

## Situation Report for COVID-19: Afghanistan, 2021-01-18

[Download the report for Afghanistan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
78	78	4	4	0.97 (95% CI: 0.8-1.15)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Afghanistan is not shown in the following plot as only 4 deaths have been reported to date**

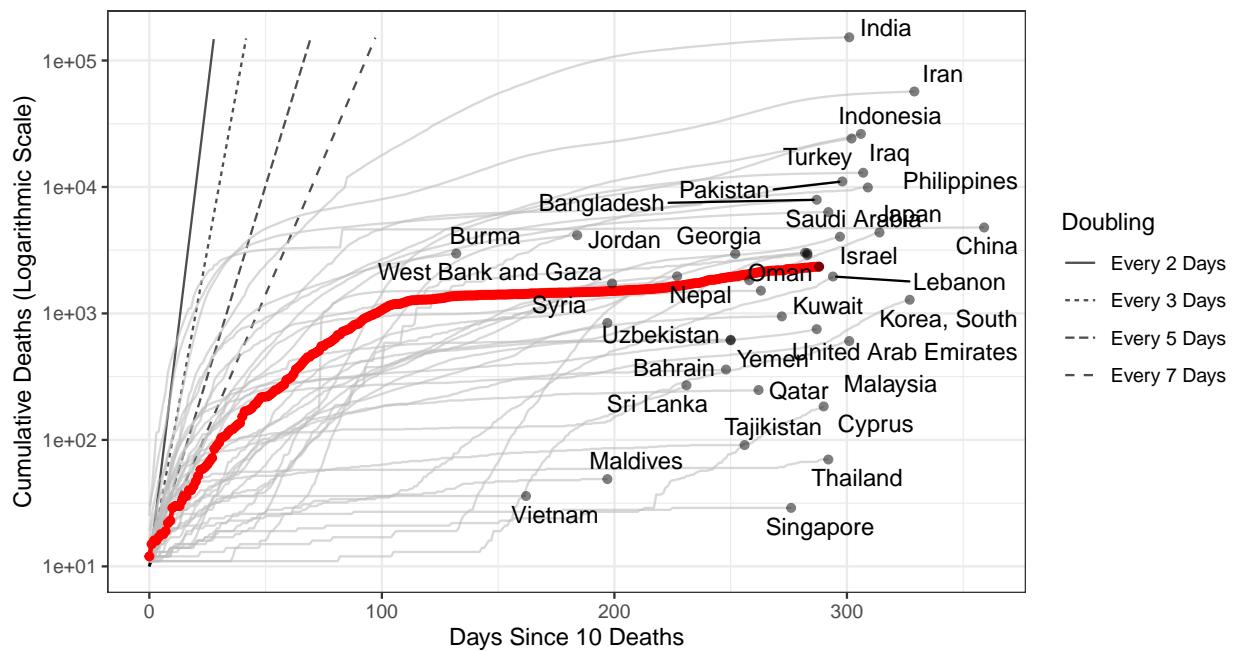


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 127,956 (95% CI: 122,965-132,946) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

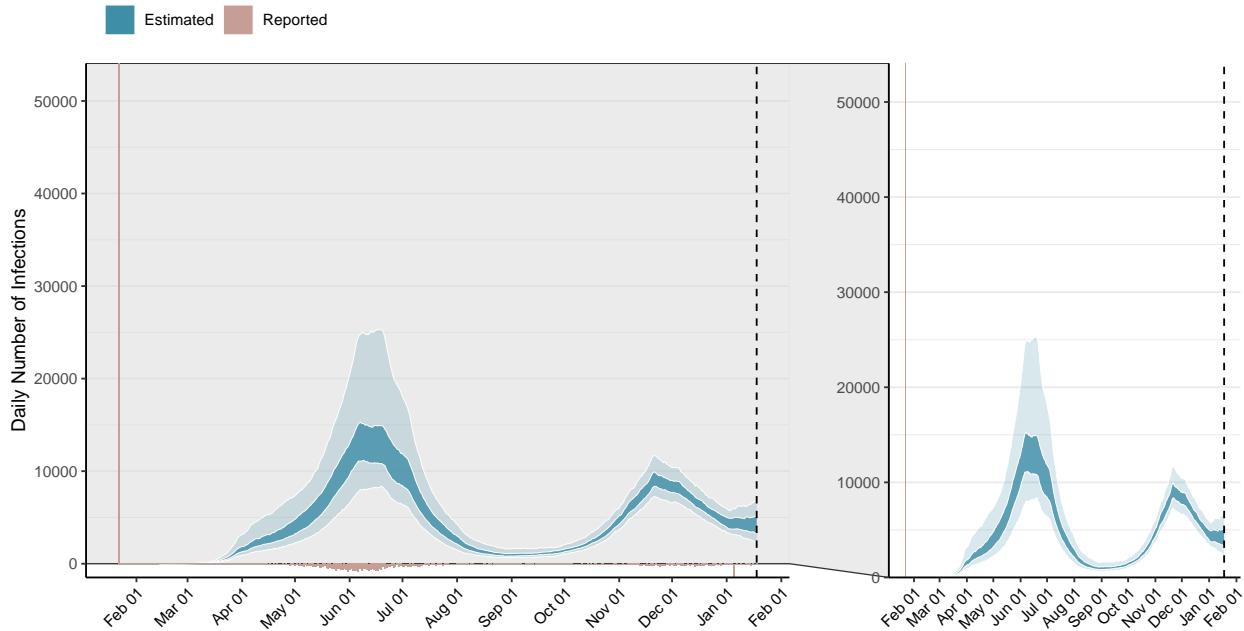
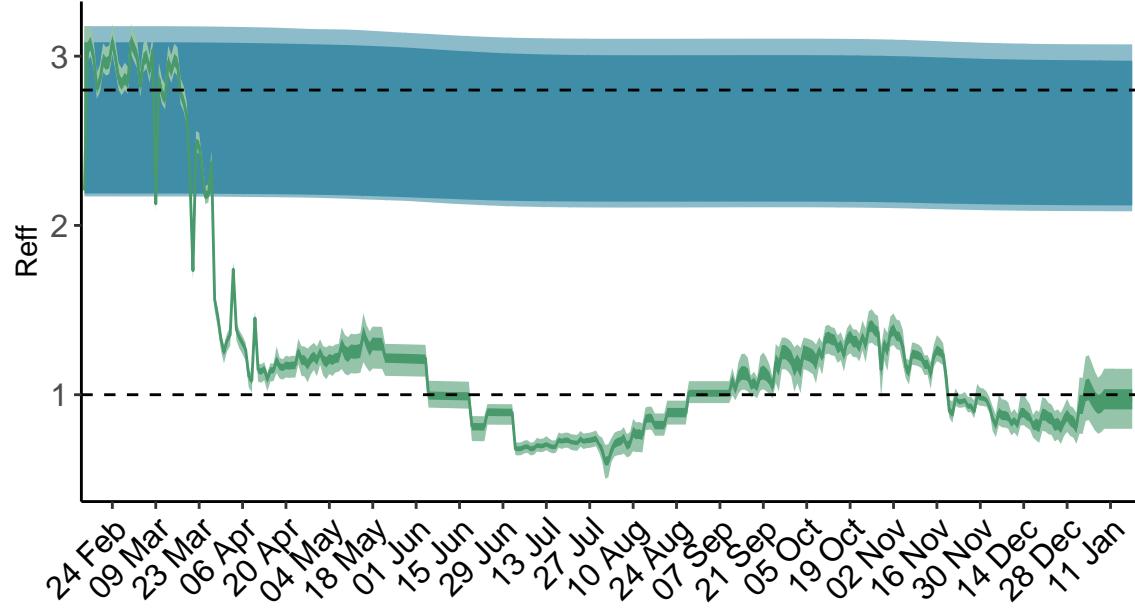


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Afghanistan is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

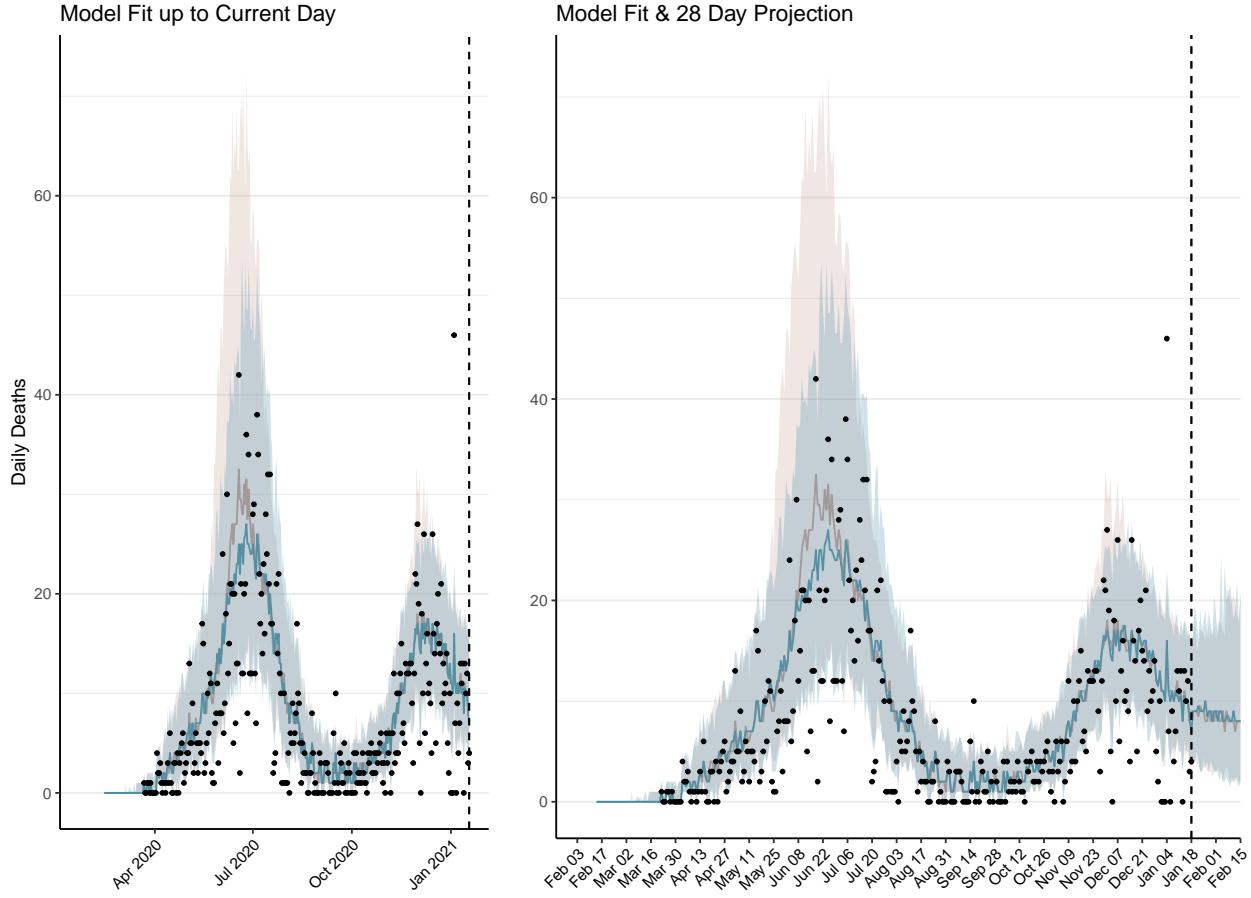


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 372 (95% CI: 356-387) patients requiring treatment with high-pressure oxygen at the current date to 359 (95% CI: 324-394) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 152 (95% CI: 146-158) patients requiring treatment with mechanical ventilation at the current date to 141 (95% CI: 128-153) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

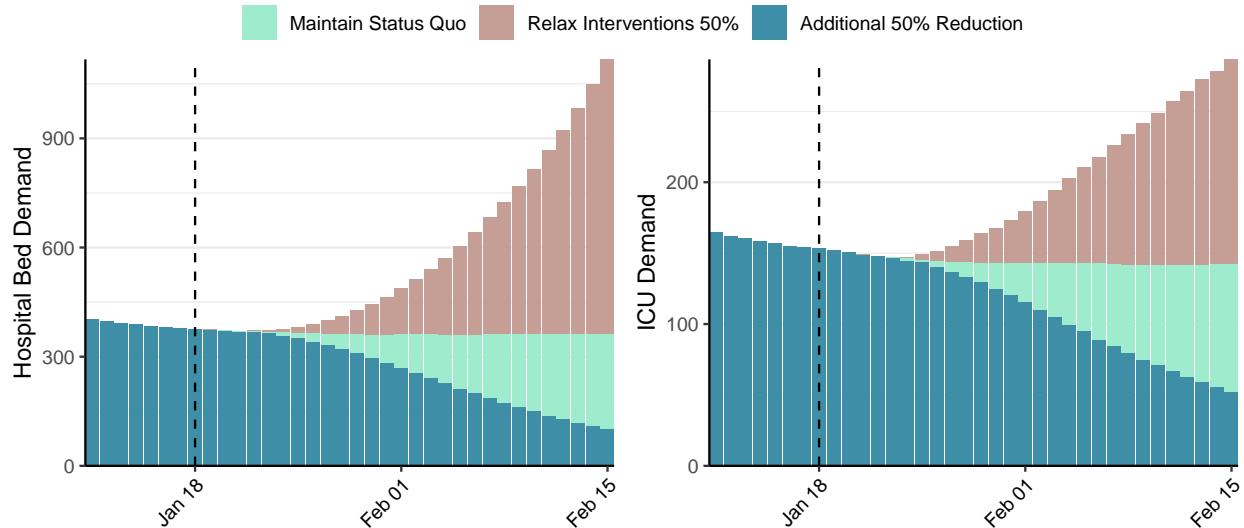


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,234 (95% CI: 3,974-4,494) at the current date to 362 (95% CI: 321-403) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,234 (95% CI: 3,974-4,494) at the current date to 25,509 (95% CI: 22,090-28,928) by 2021-02-15.

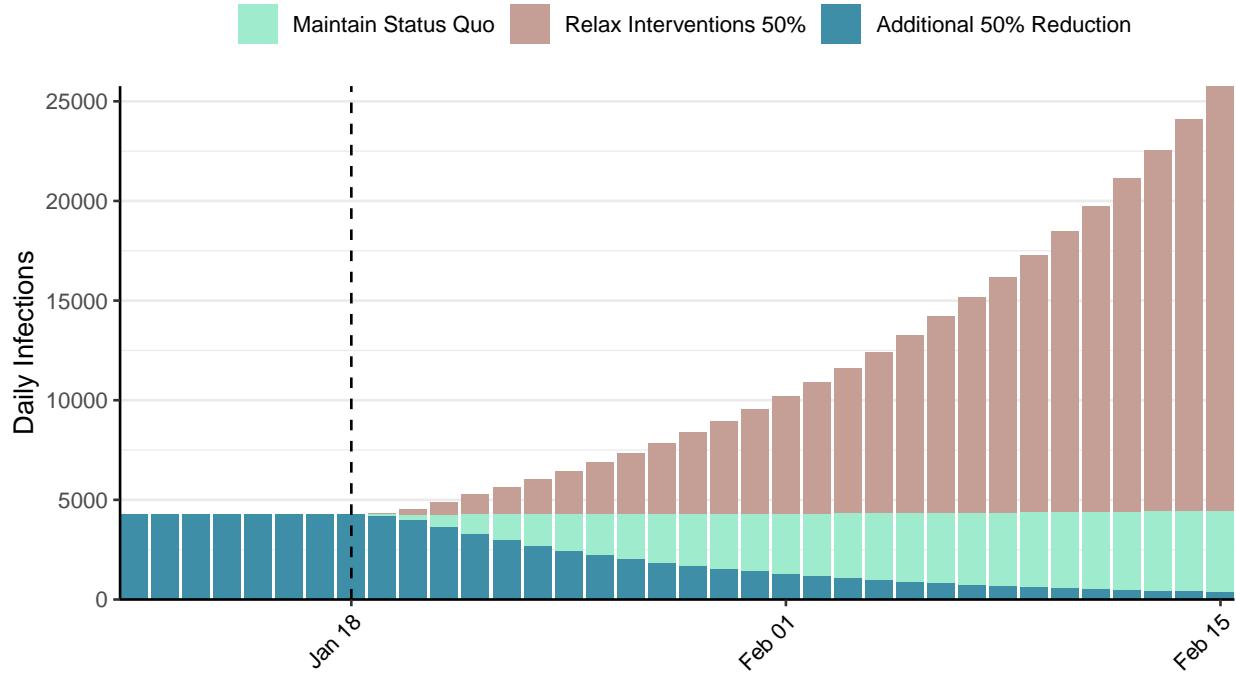


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Angola, 2021-01-18

[Download the report for Angola, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.36 (95% CI: 1.12-1.59)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Angola is not shown in the following plot as only 0 deaths have been reported to date**

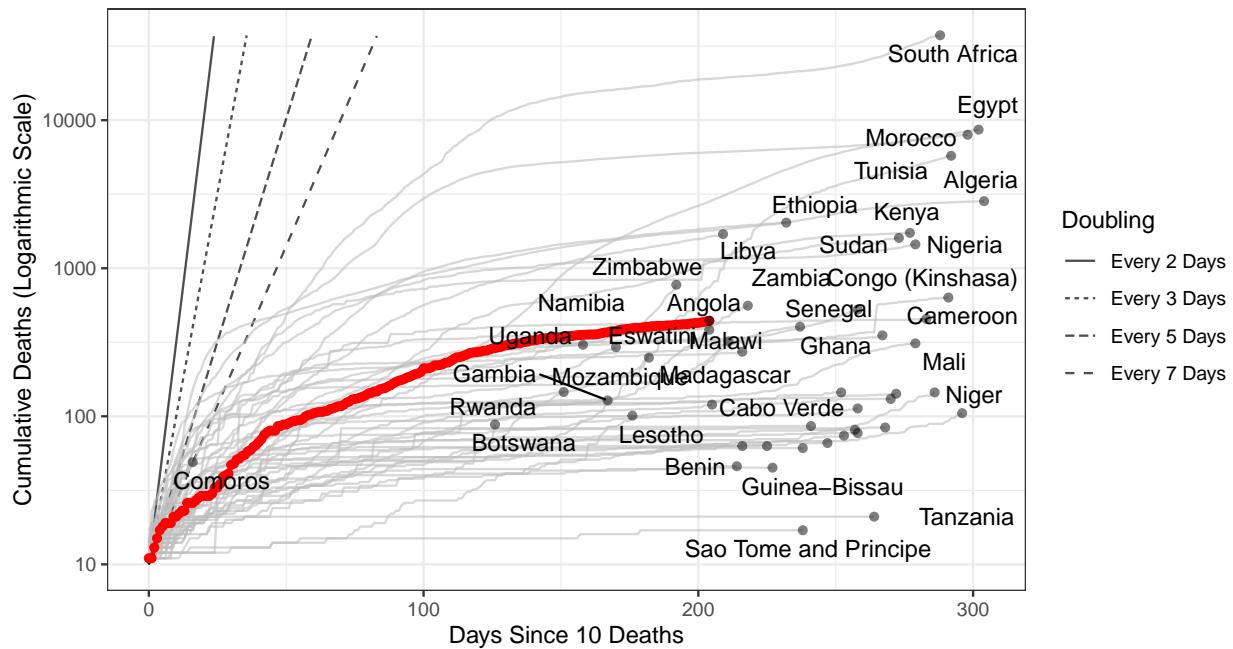


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 61,024 (95% CI: 55,405-66,643) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

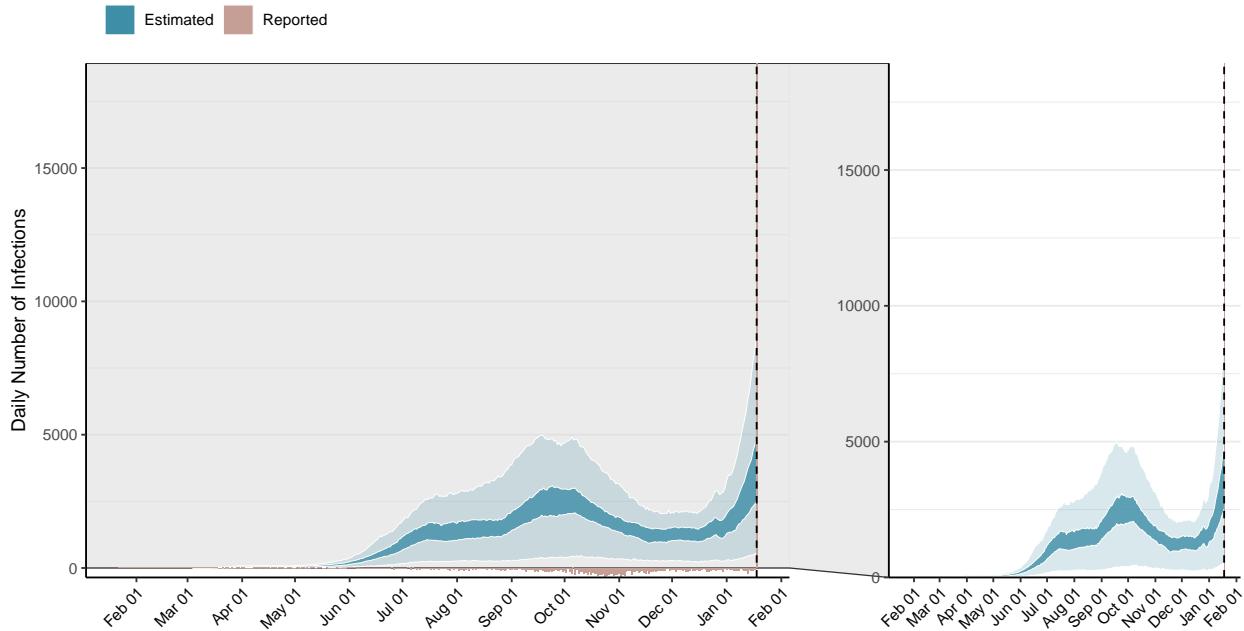
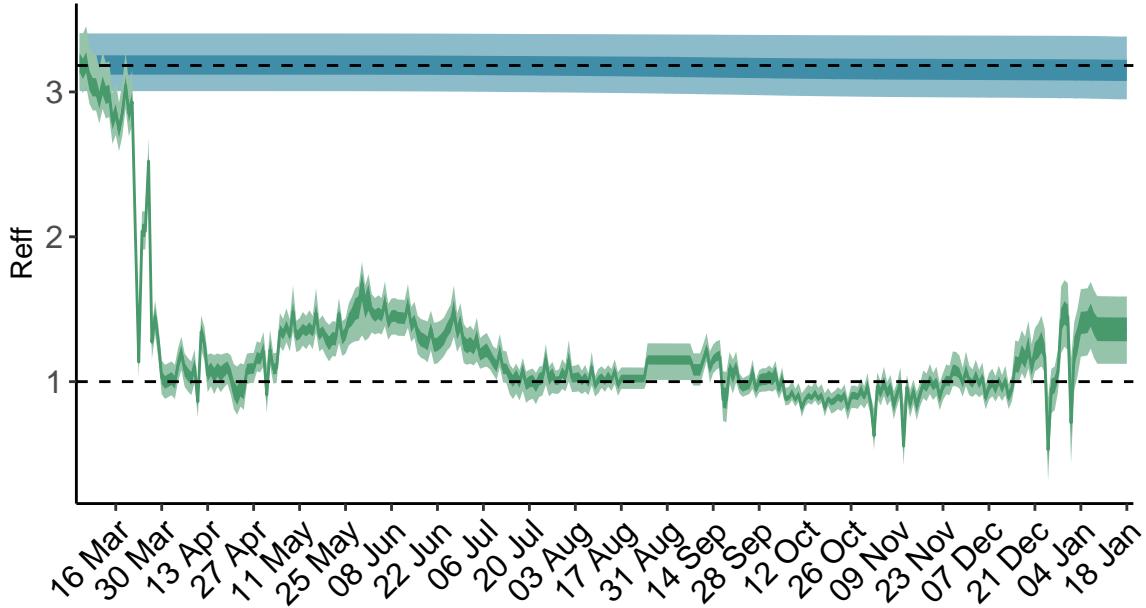


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Angola is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

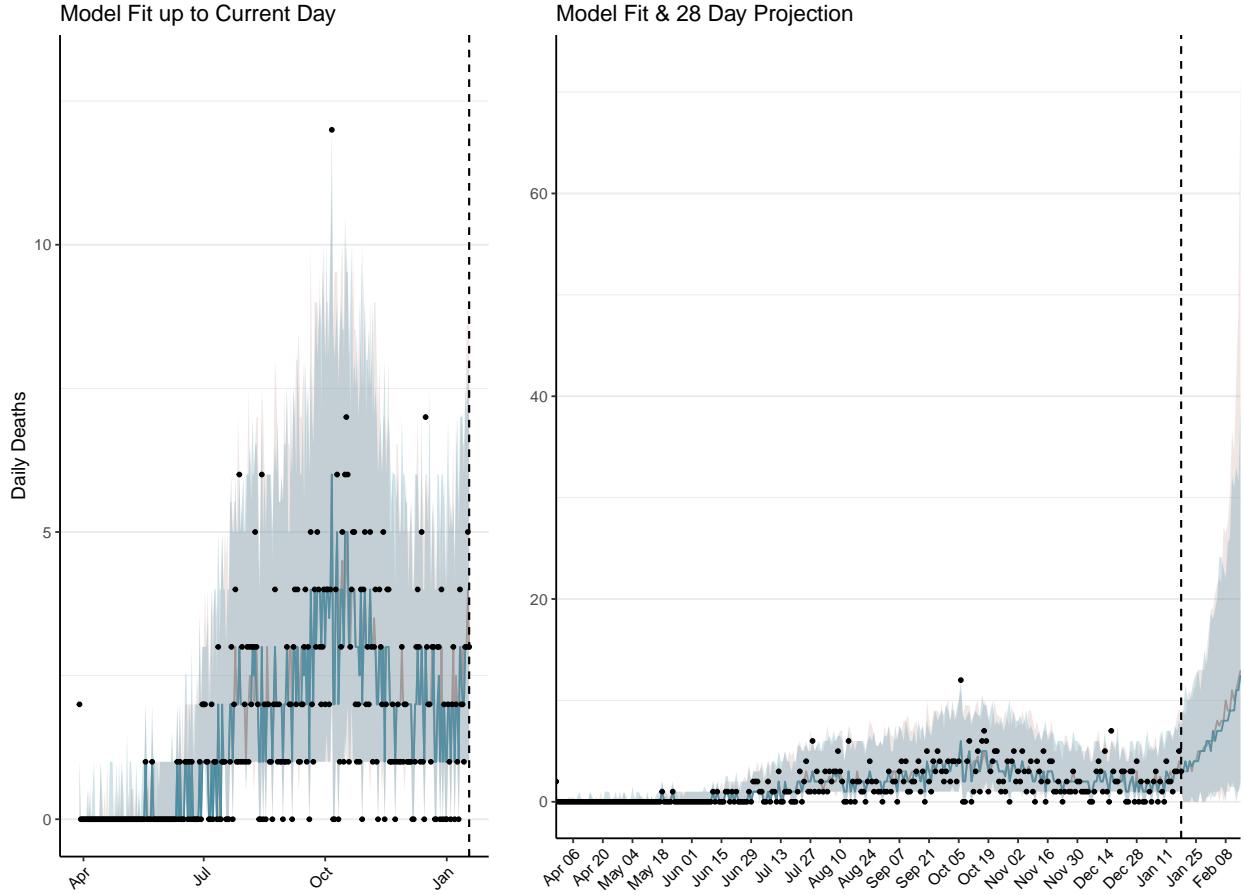


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 170 (95% CI: 154-185) patients requiring treatment with high-pressure oxygen at the current date to 744 (95% CI: 634-854) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 62 (95% CI: 56-67) patients requiring treatment with mechanical ventilation at the current date to 261 (95% CI: 225-296) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

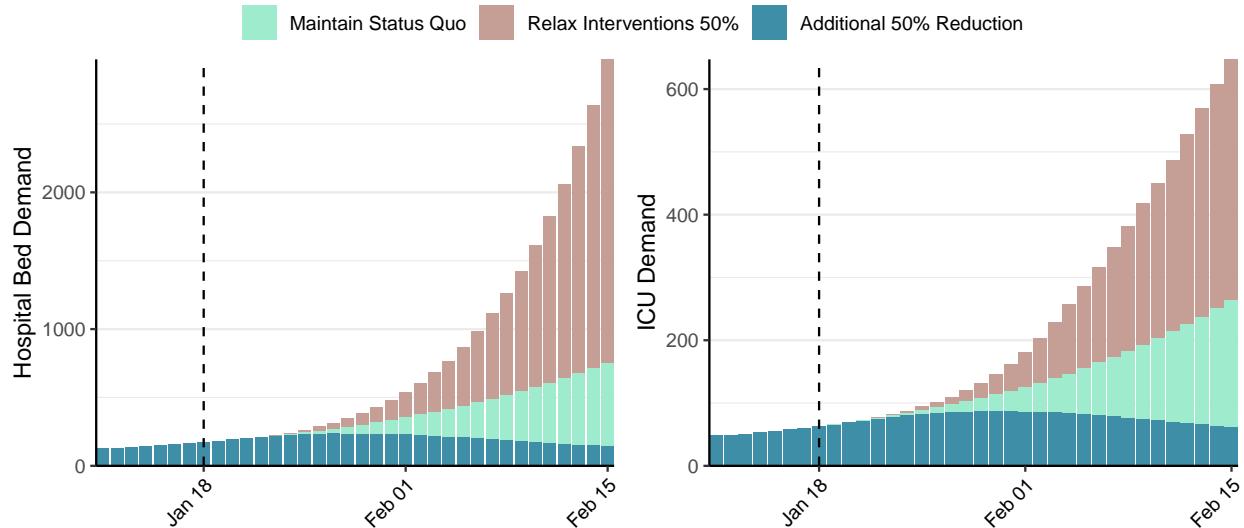


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,876 (95% CI: 3,456-4,296) at the current date to 1,094 (95% CI: 923-1,266) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,876 (95% CI: 3,456-4,296) at the current date to 119,346 (95% CI: 99,595-139,098) by 2021-02-15.

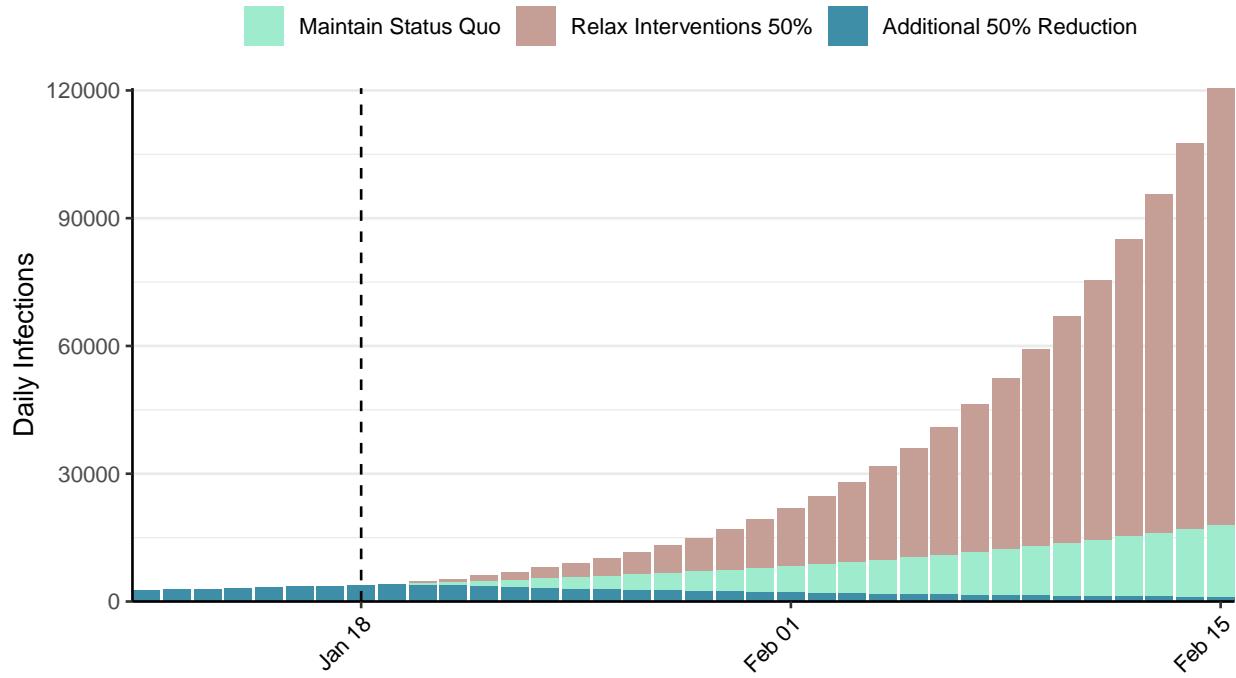


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Albania, 2021-01-18

[Download the report for Albania, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
292	292	4	4	0.97 (95% CI: 0.83-1.12)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Albania is not shown in the following plot as only 4 deaths have been reported to date**

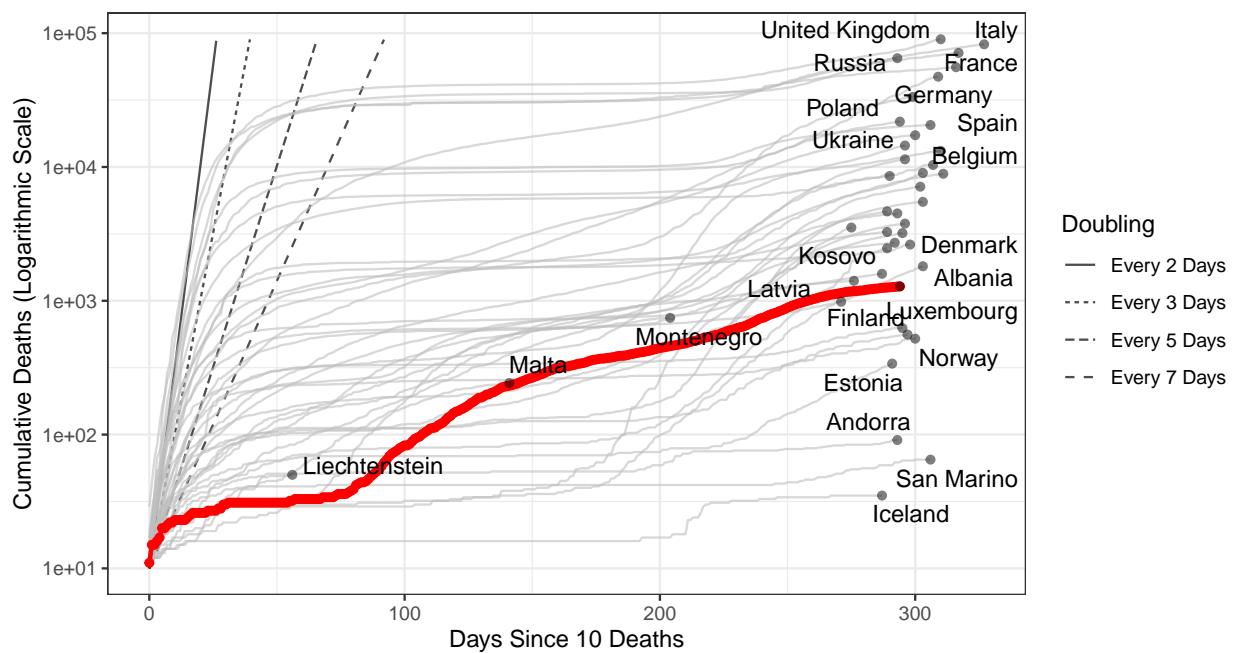


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 33,444 (95% CI: 32,118-34,771) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

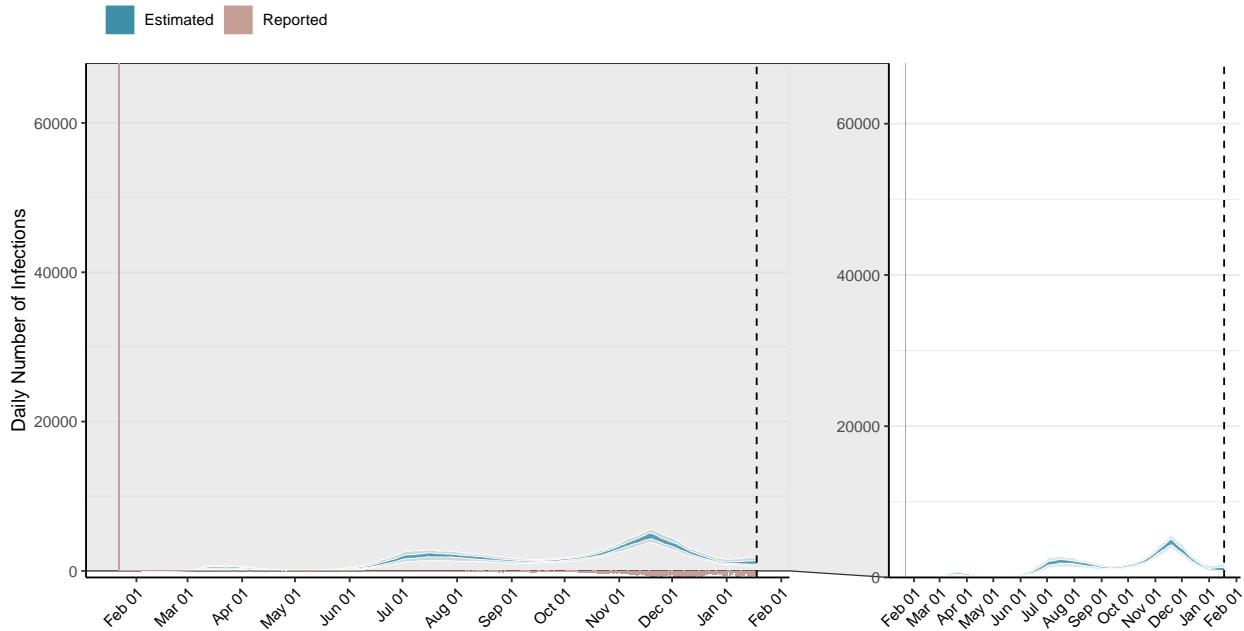
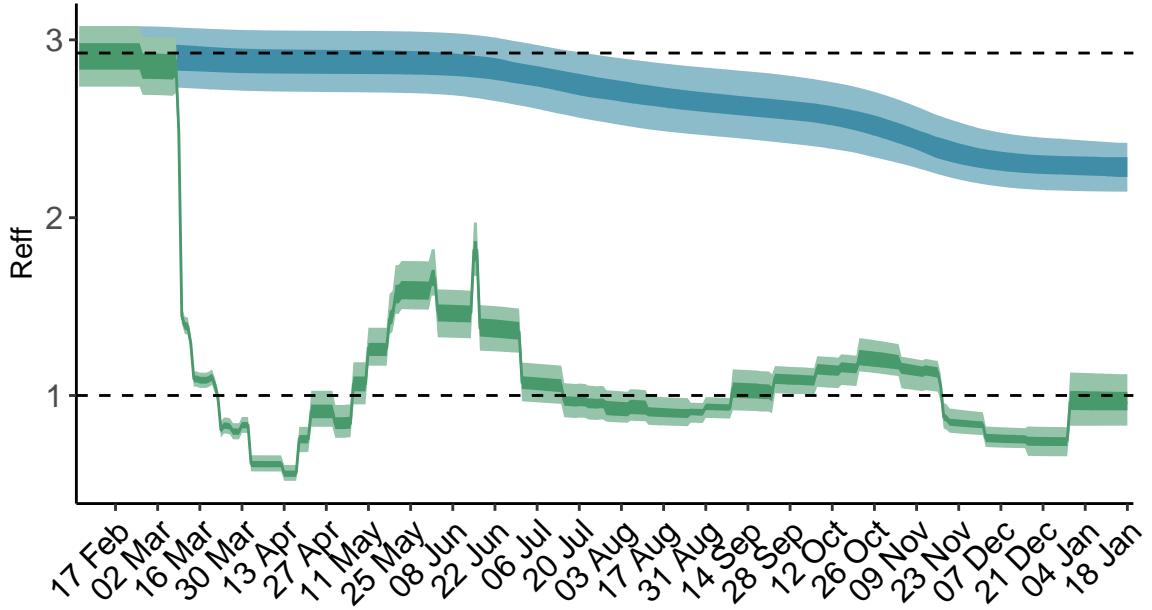


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

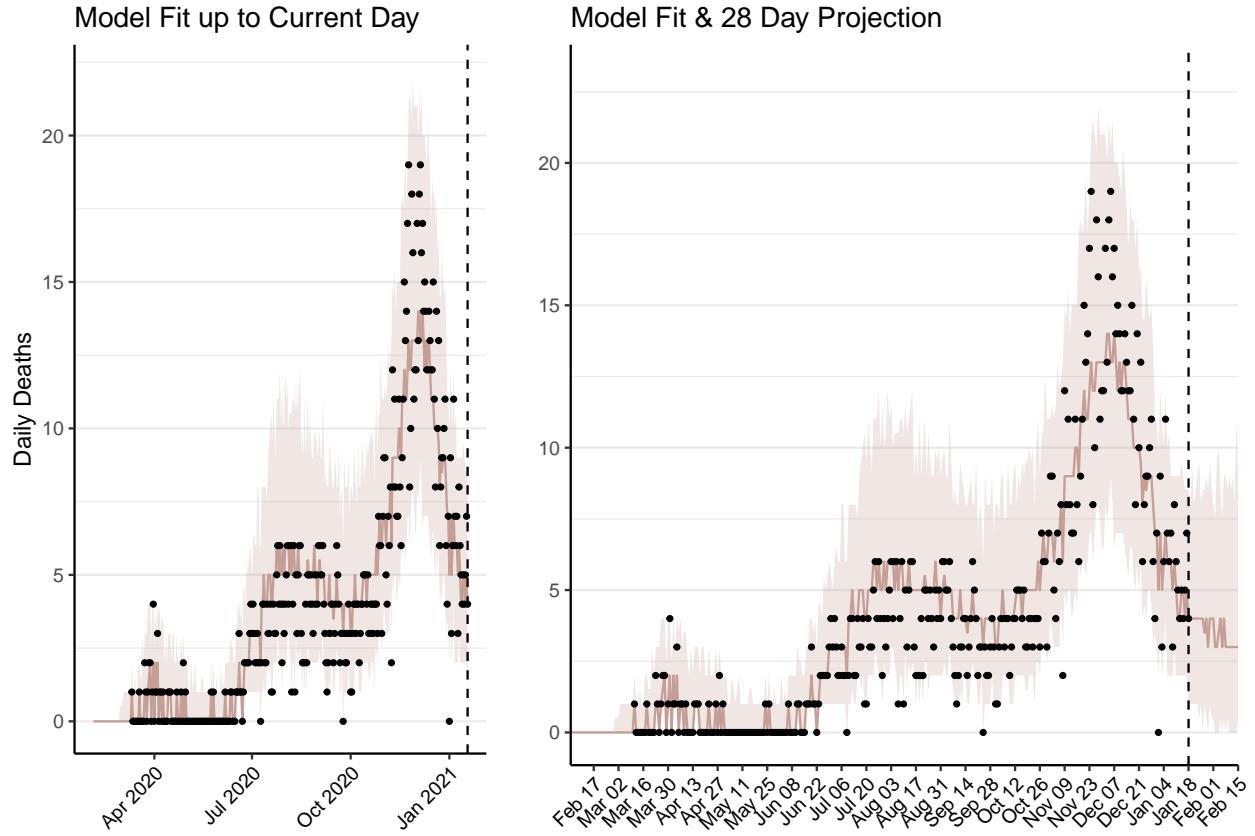


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 149 (95% CI: 142-156) patients requiring treatment with high-pressure oxygen at the current date to 141 (95% CI: 126-156) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 62 (95% CI: 59-65) patients requiring treatment with mechanical ventilation at the current date to 53 (95% CI: 48-58) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

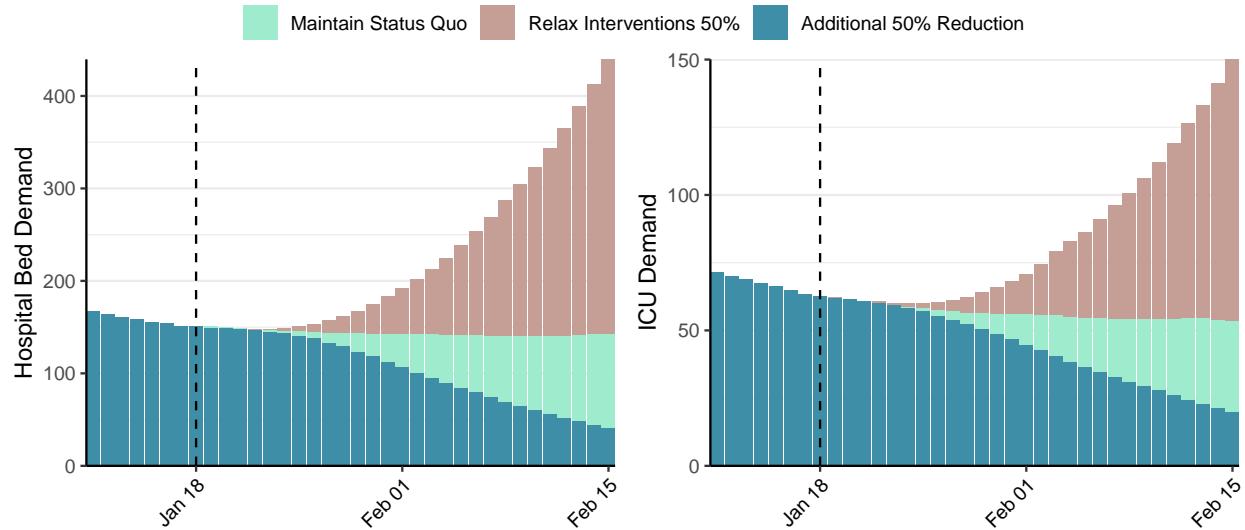


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,096 (95% CI: 1,025-1,168) at the current date to 91 (95% CI: 80-103) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,096 (95% CI: 1,025-1,168) at the current date to 5,997 (95% CI: 5,204-6,791) by 2021-02-15.

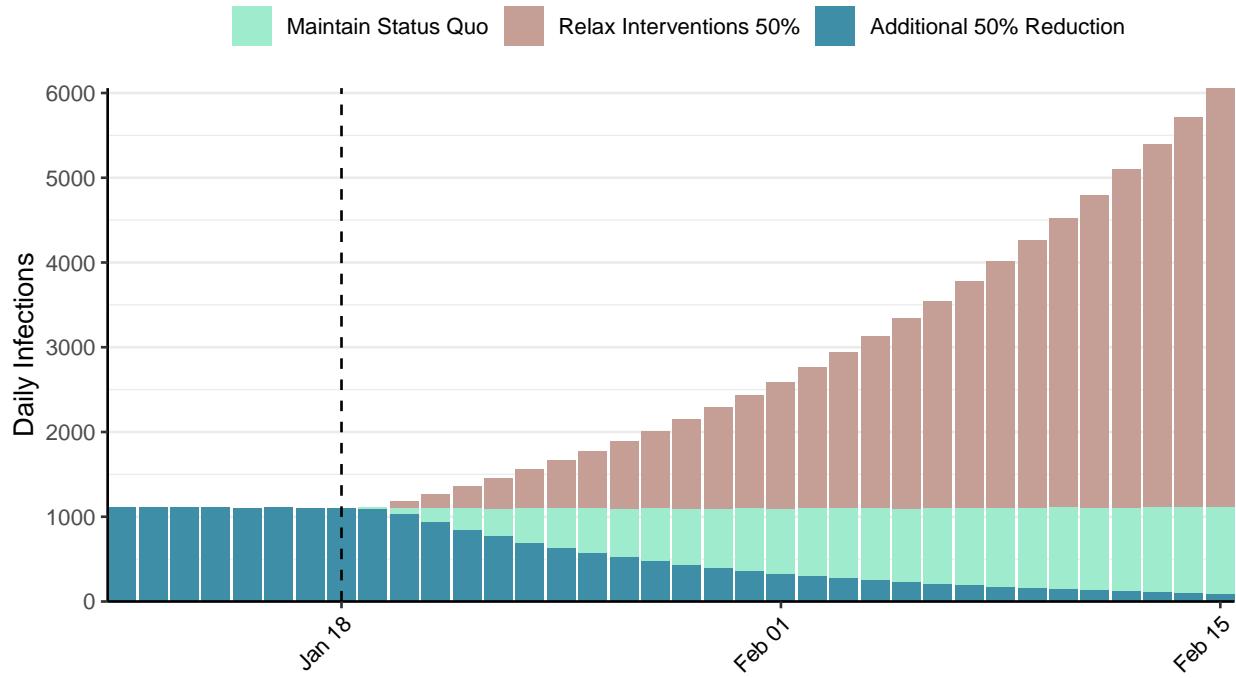


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Argentina, 2021-01-18

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### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.85 (95% CI: 0.67-1.11)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Argentina is not shown in the following plot as only 0 deaths have been reported to date**

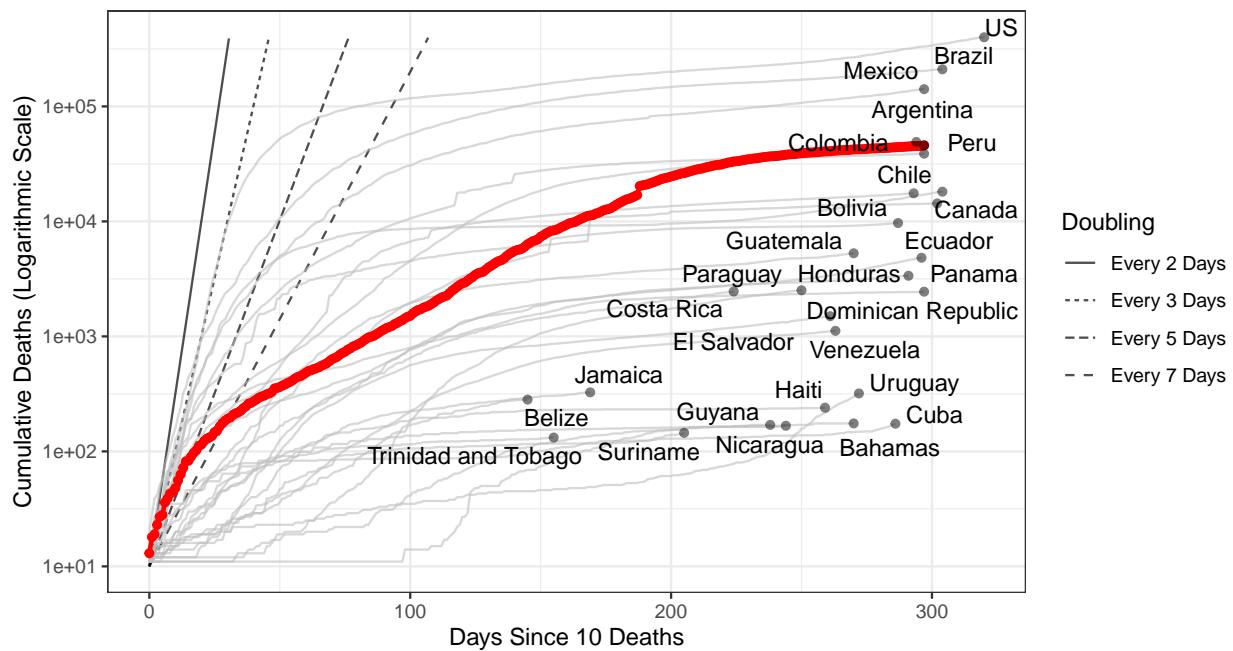


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 994,870 (95% CI: 942,180-1,047,561) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

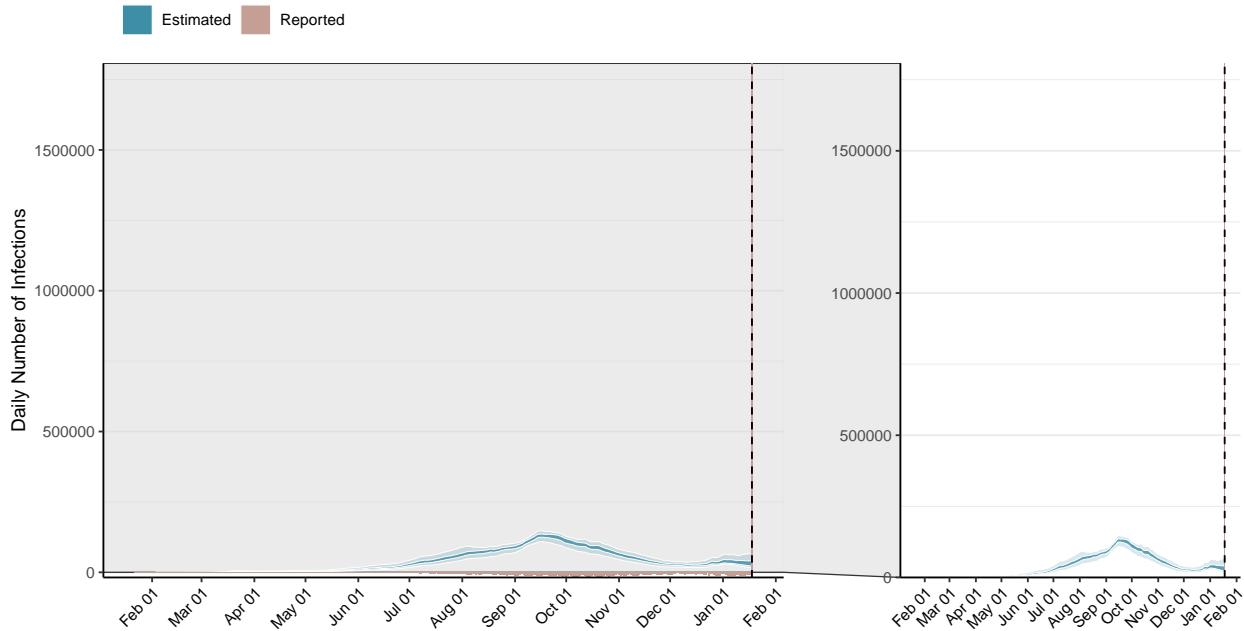
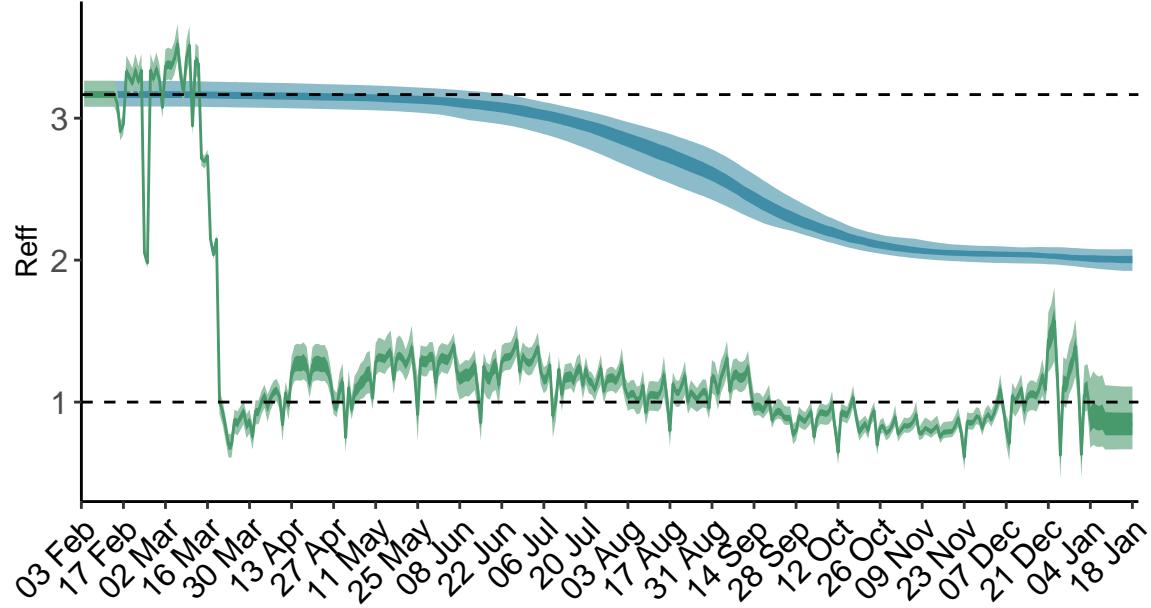


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Argentina is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

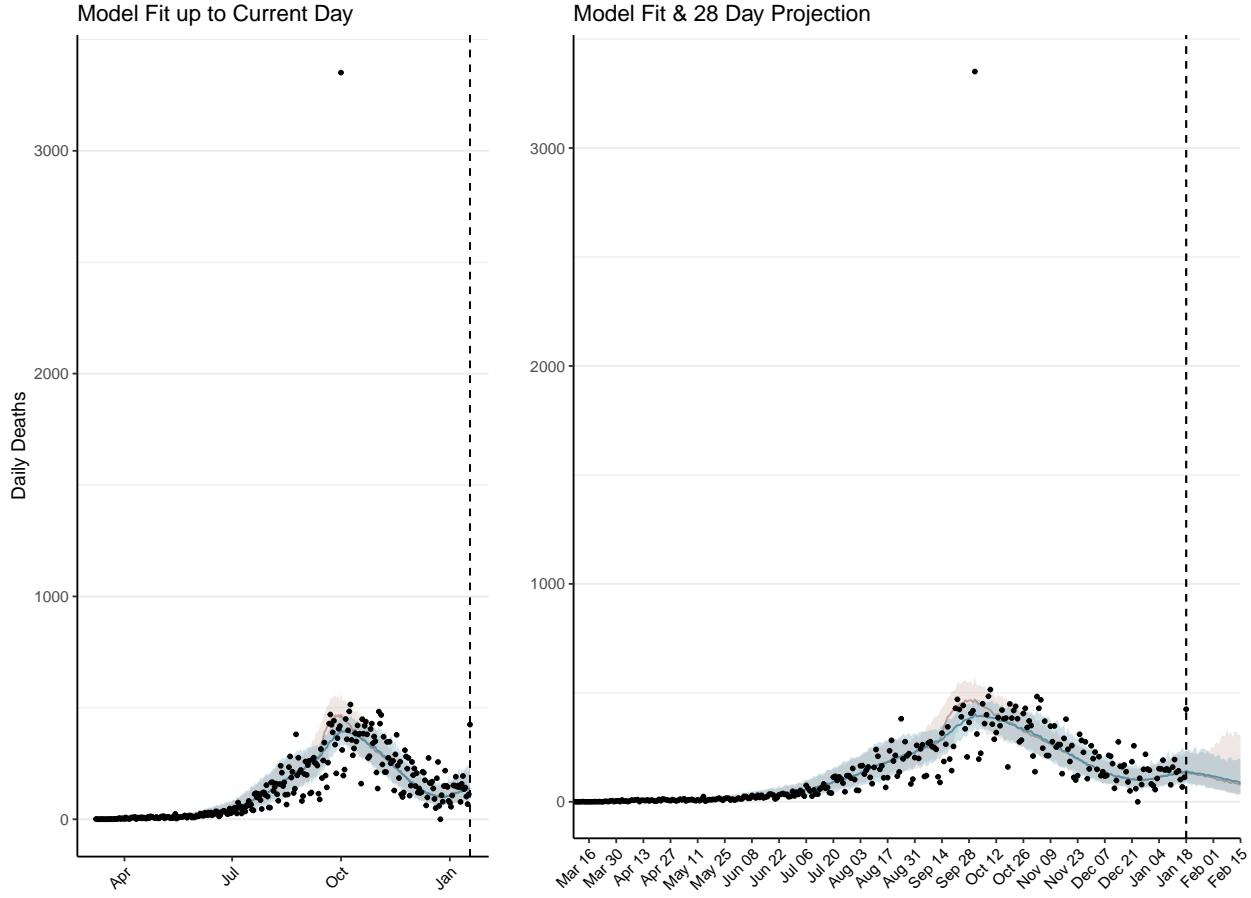


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 4,692 (95% CI: 4,426-4,959) patients requiring treatment with high-pressure oxygen at the current date to 3,233 (95% CI: 2,755-3,710) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1,626 (95% CI: 1,539-1,713) patients requiring treatment with mechanical ventilation at the current date to 1,161 (95% CI: 1,015-1,306) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

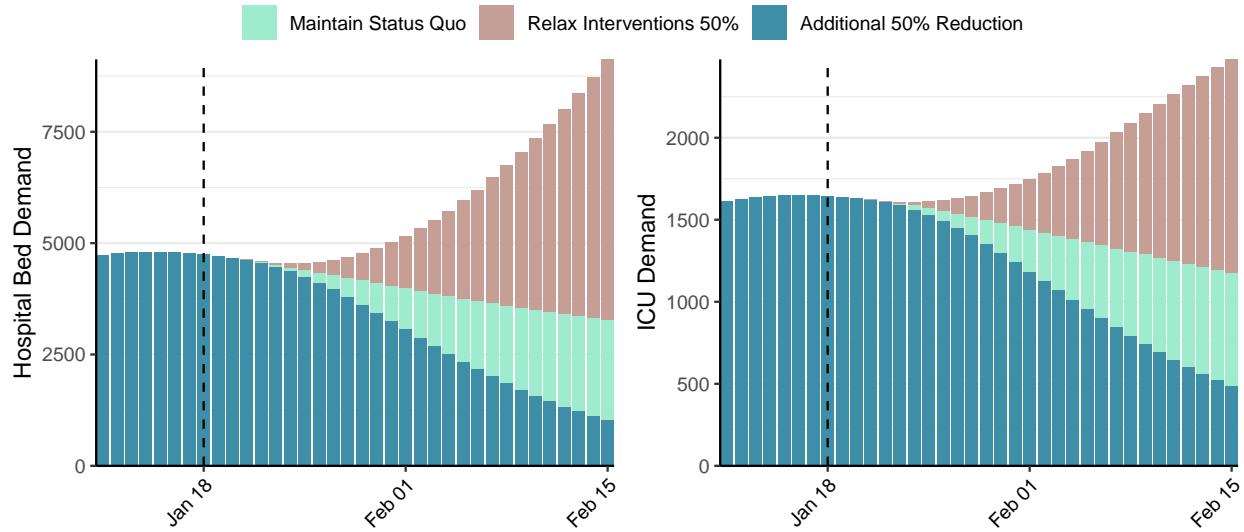
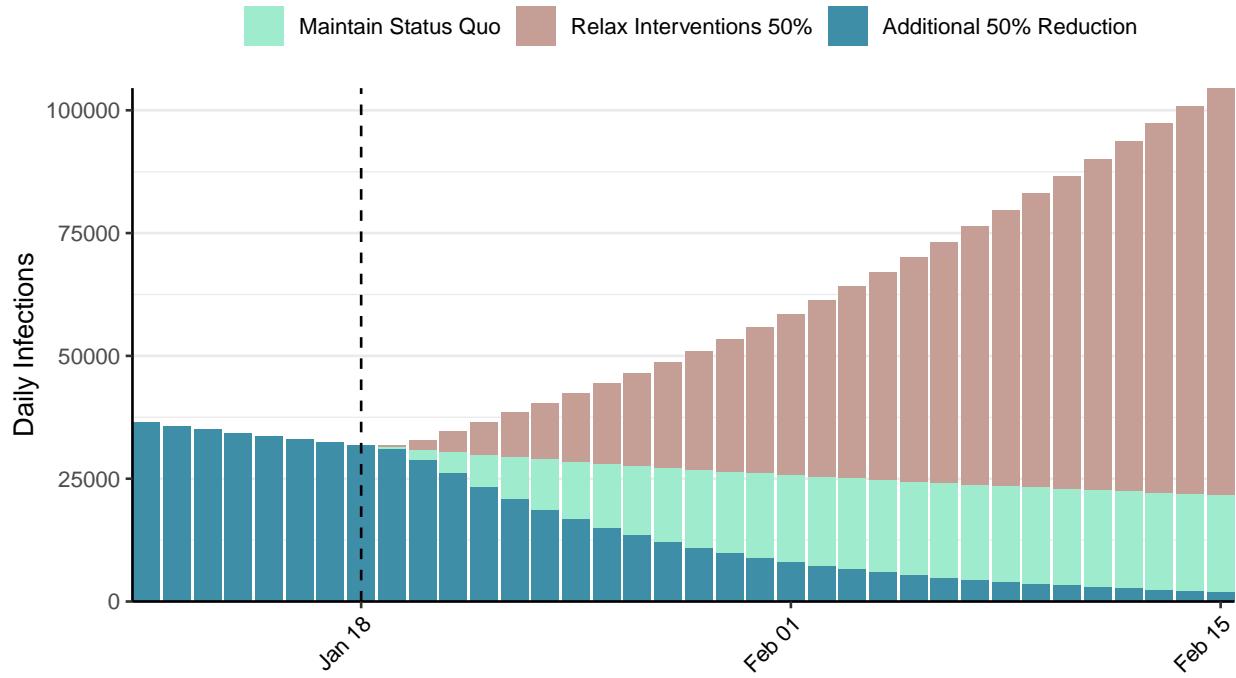


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 31,605 (95% CI: 28,952-34,258) at the current date to 1,978 (95% CI: 1,627-2,330) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 31,605 (95% CI: 28,952-34,258) at the current date to 103,479 (95% CI: 84,803-122,154) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Armenia, 2021-01-18

[Download the report for Armenia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
90	90	6	6	0.85 (95% CI: 0.59-1.17)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Armenia is not shown in the following plot as only 6 deaths have been reported to date**

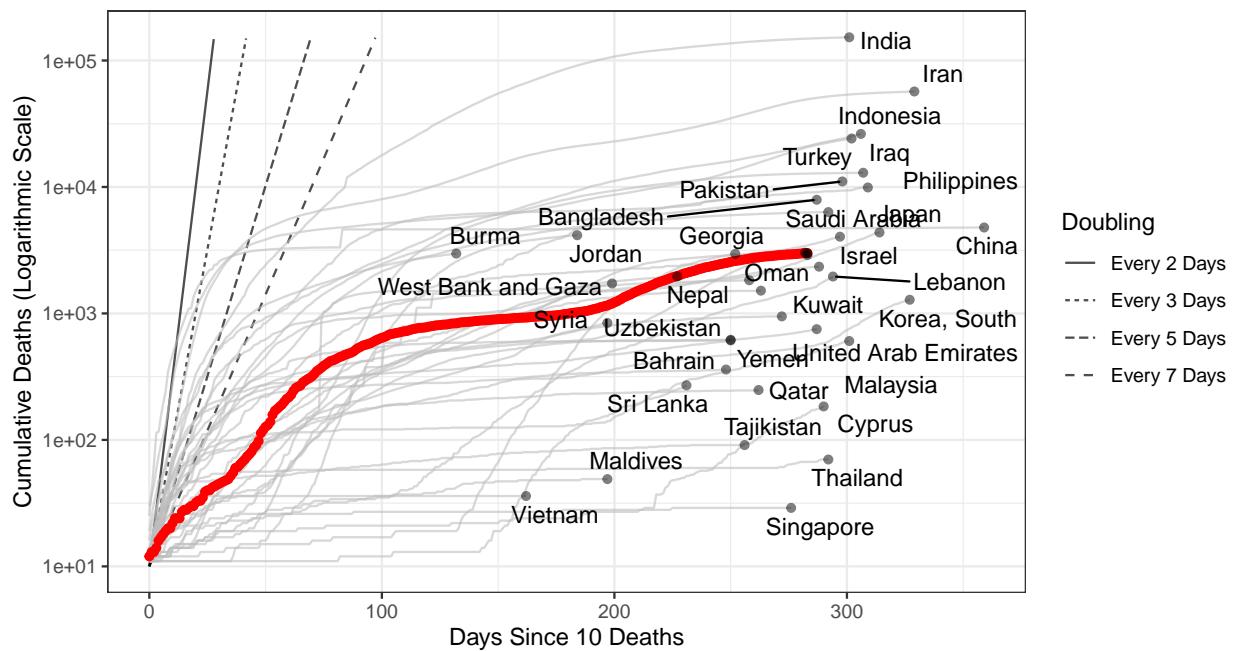


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 46,501 (95% CI: 44,284-48,718) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

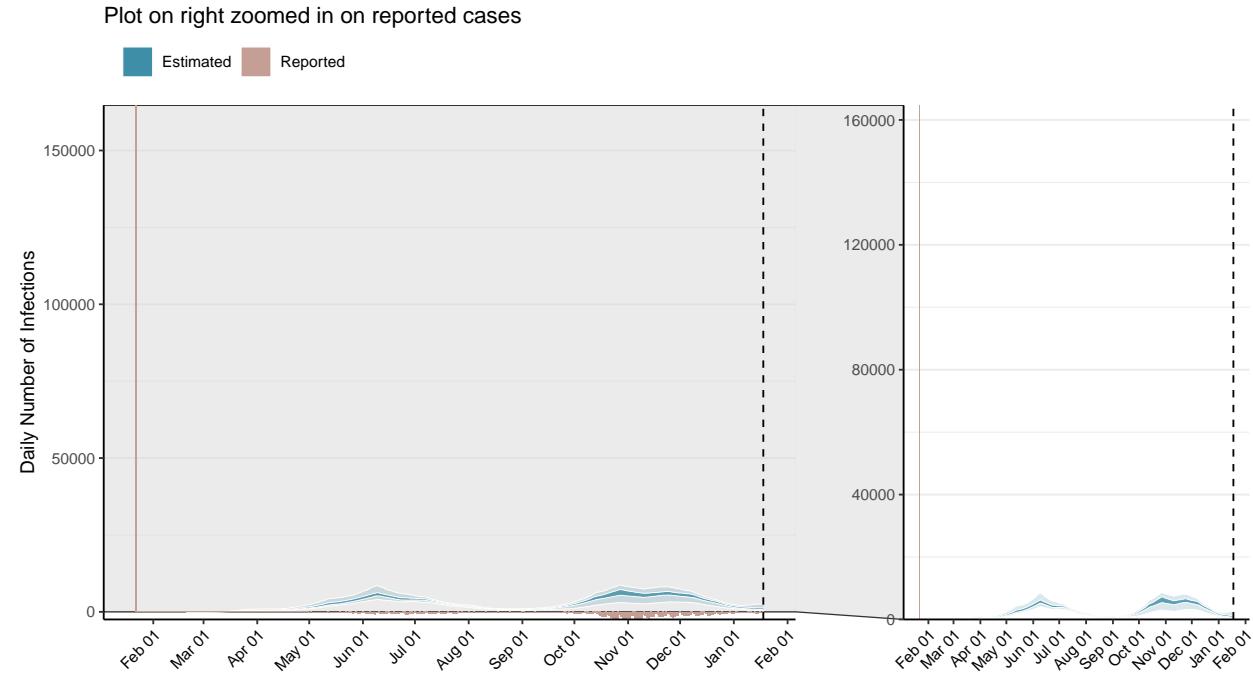
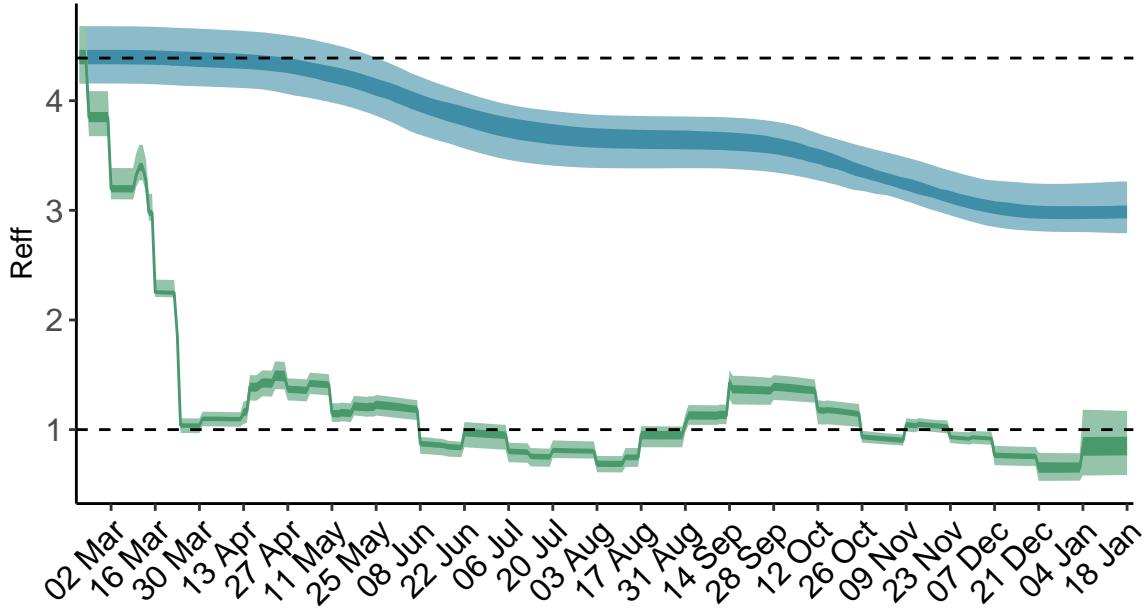


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Armenia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

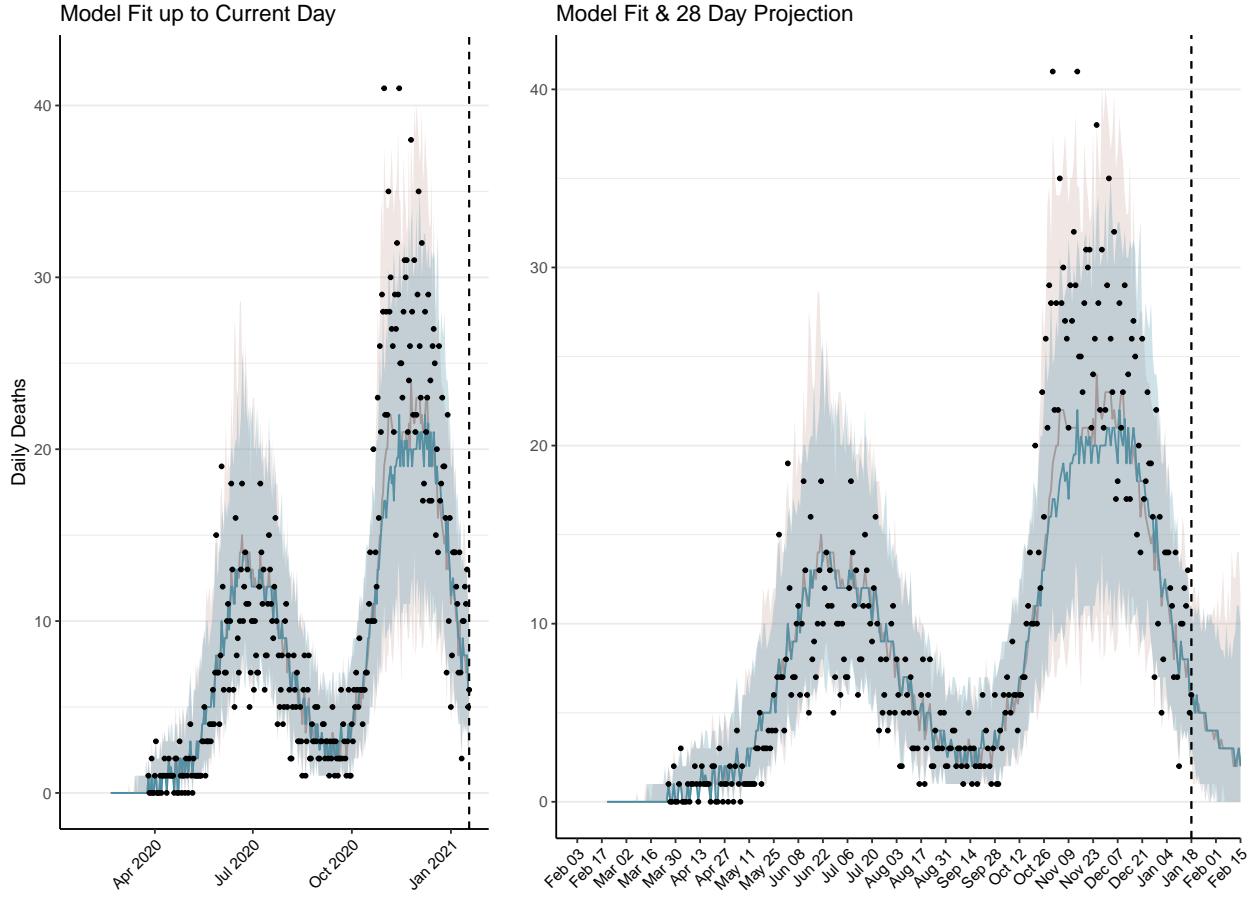


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 196 (95% CI: 184-207) patients requiring treatment with high-pressure oxygen at the current date to 125 (95% CI: 101-148) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 84 (95% CI: 80-89) patients requiring treatment with mechanical ventilation at the current date to 48 (95% CI: 40-56) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

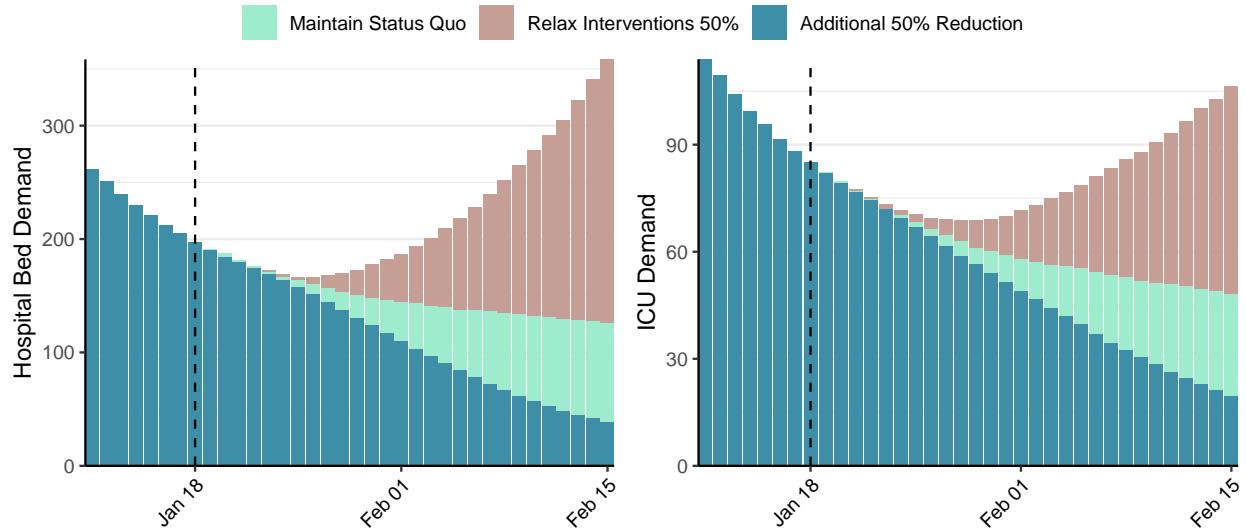


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,073 (95% CI: 967-1,180) at the current date to 76 (95% CI: 59-94) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,073 (95% CI: 967-1,180) at the current date to 4,540 (95% CI: 3,373-5,708) by 2021-02-15.

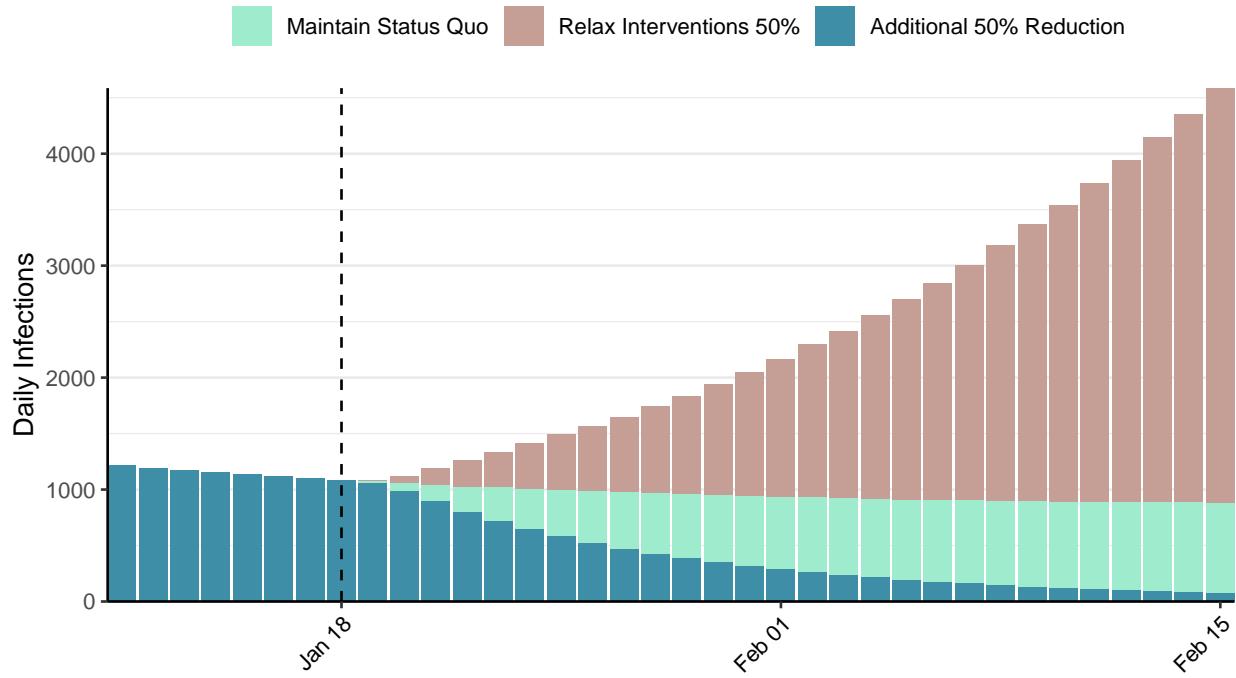


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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Situation Report for COVID-19: Azerbaijan, 2021-01-18

**[Download the report for Azerbaijan, 2021-01-18 here.](#)** This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

## Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.59 (95% CI: 0.51-0.67)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Azerbaijan is not shown in the following plot as only 0 deaths have been reported to date

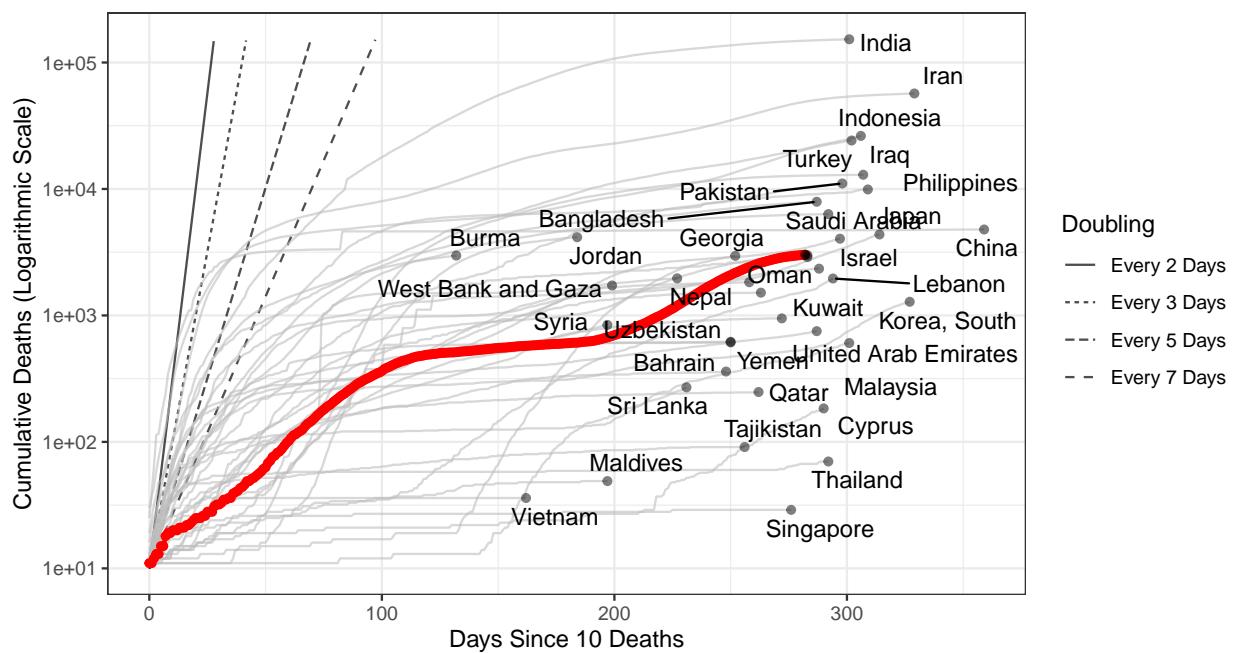


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 127,057 (95% CI: 122,294-131,821) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

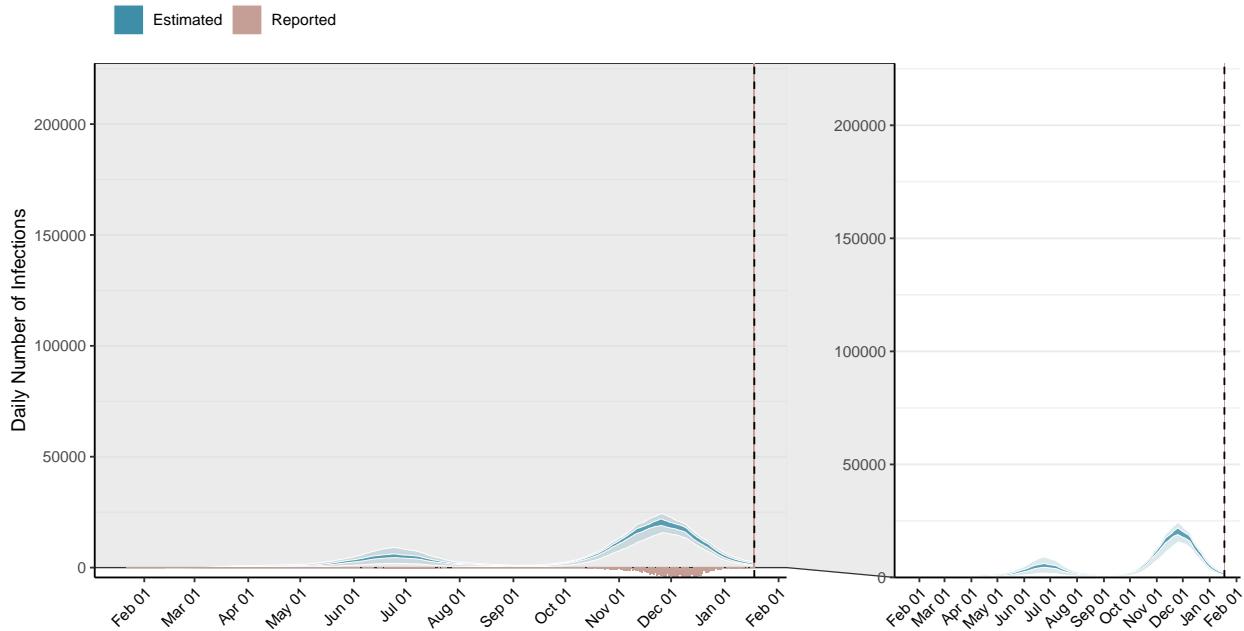
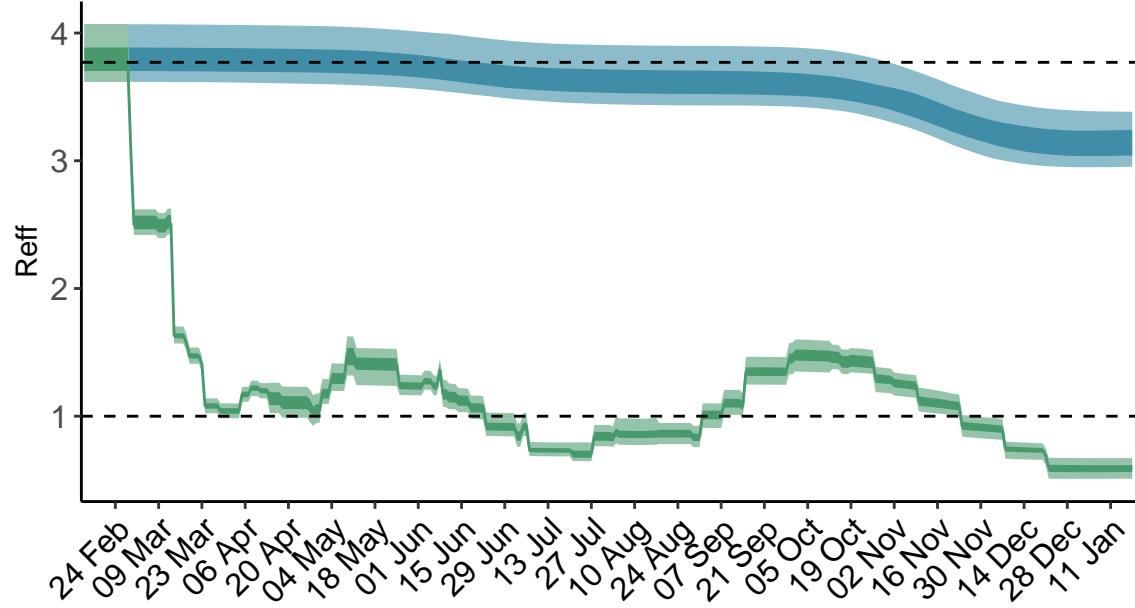


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

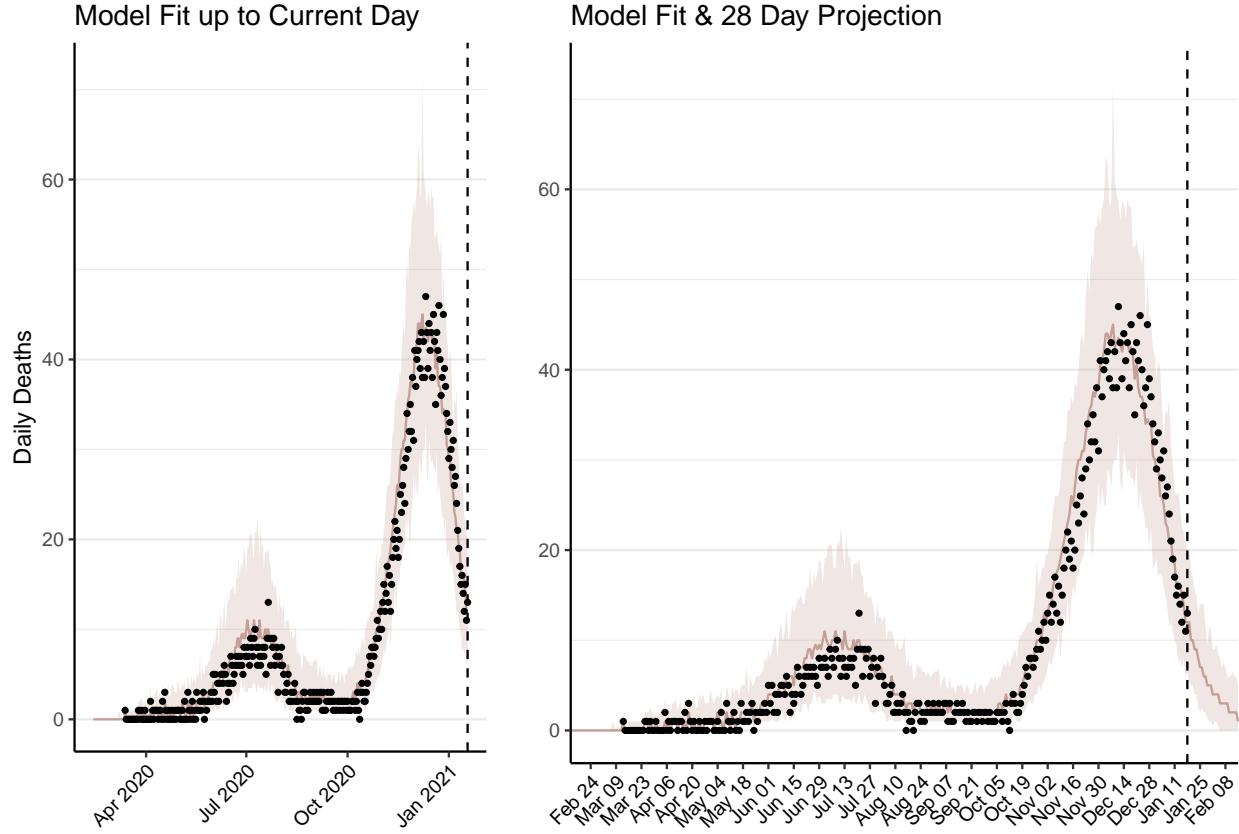


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 382 (95% CI: 367-398) patients requiring treatment with high-pressure oxygen at the current date to 59 (95% CI: 54-64) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 186 (95% CI: 179-193) patients requiring treatment with mechanical ventilation at the current date to 32 (95% CI: 29-34) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

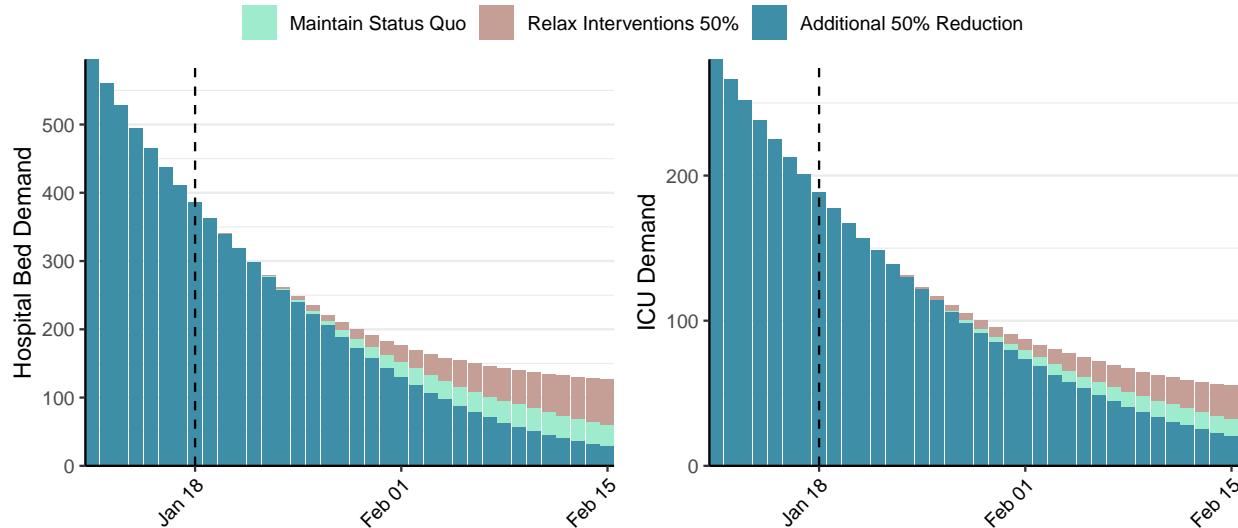


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,524 (95% CI: 1,433-1,614) at the current date to 28 (95% CI: 25-31) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,524 (95% CI: 1,433-1,614) at the current date to 1,047 (95% CI: 931-1,164) by 2021-02-15.

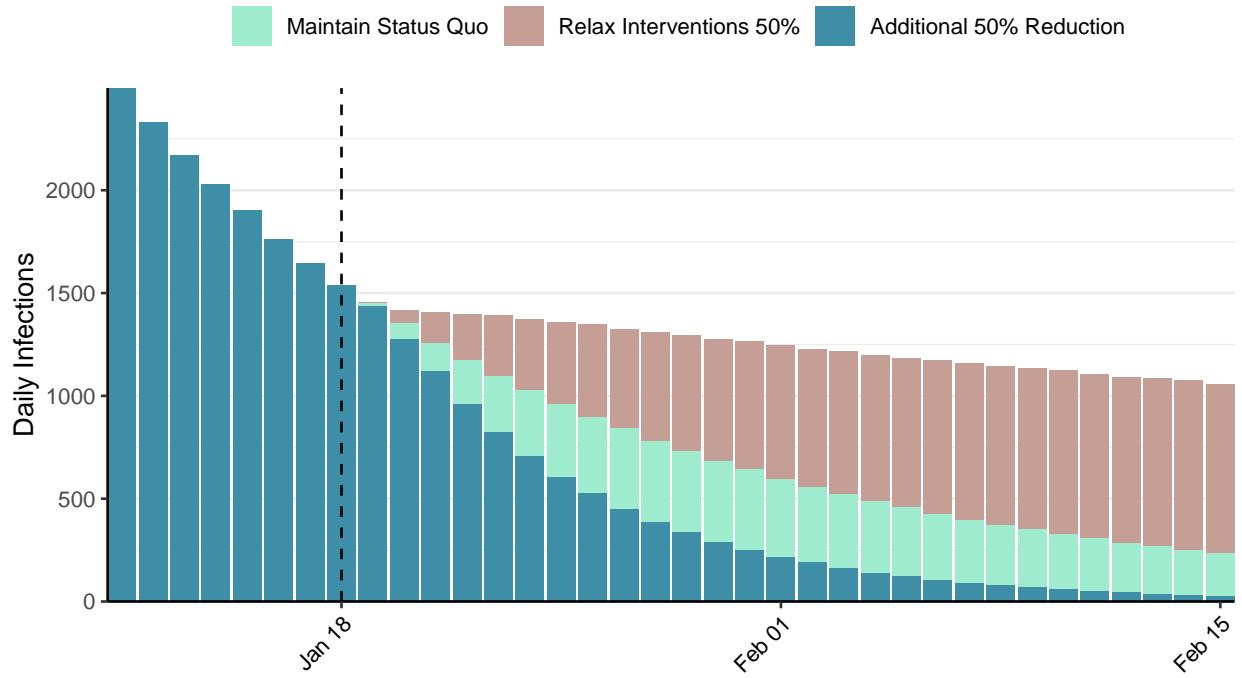


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Burundi, 2021-01-18

[Download the report for Burundi, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9	9	0	0	0.83 (95% CI: 0.5-1.28)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Burundi is not shown in the following plot as only 0 deaths have been reported to date**

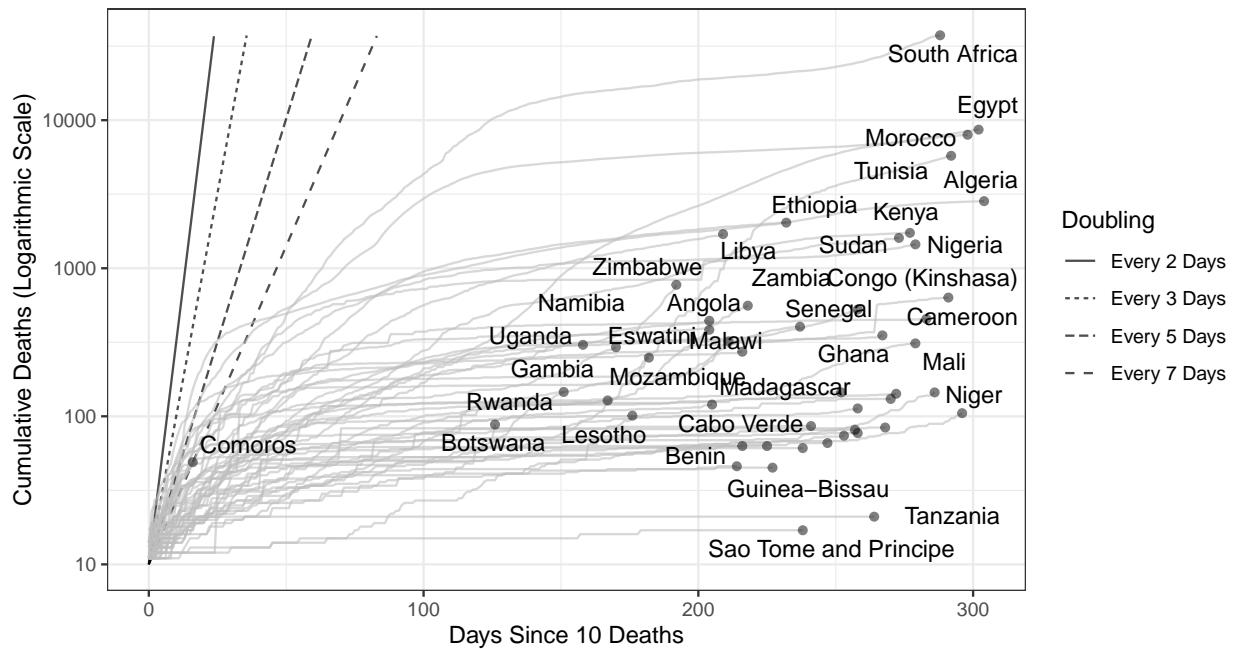


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3 (95% CI: -1-6) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

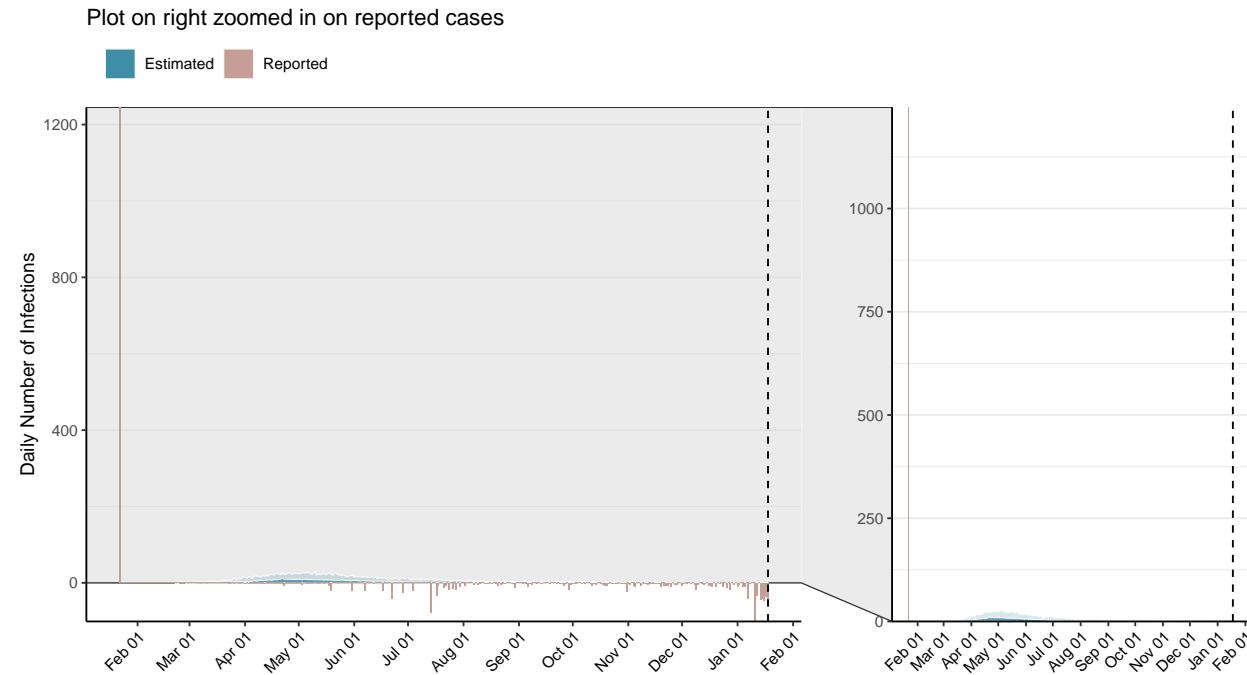
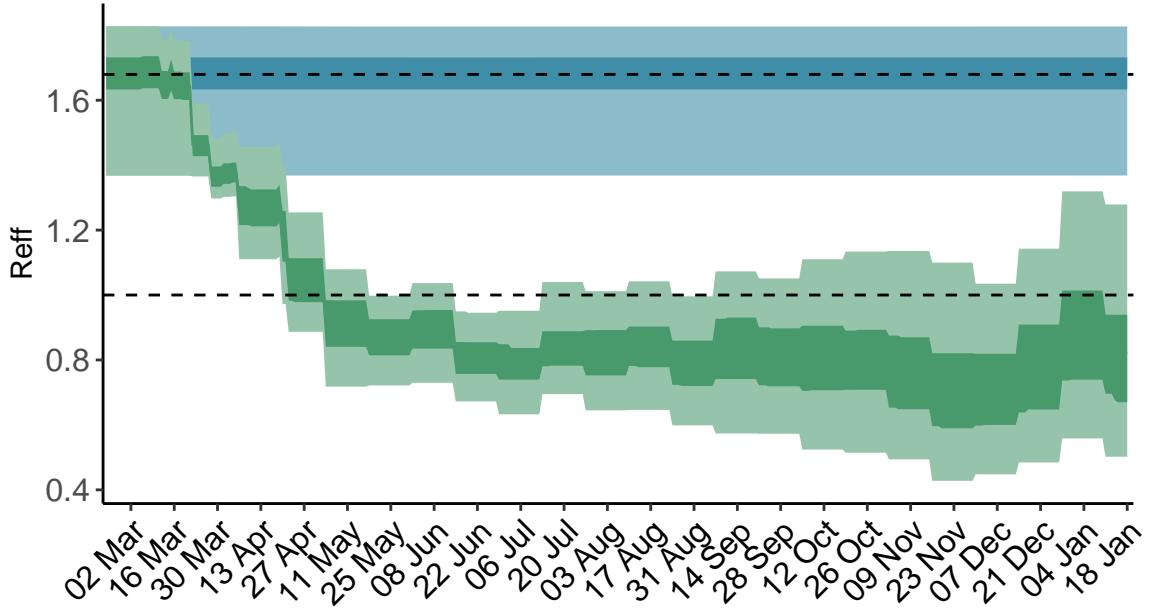


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

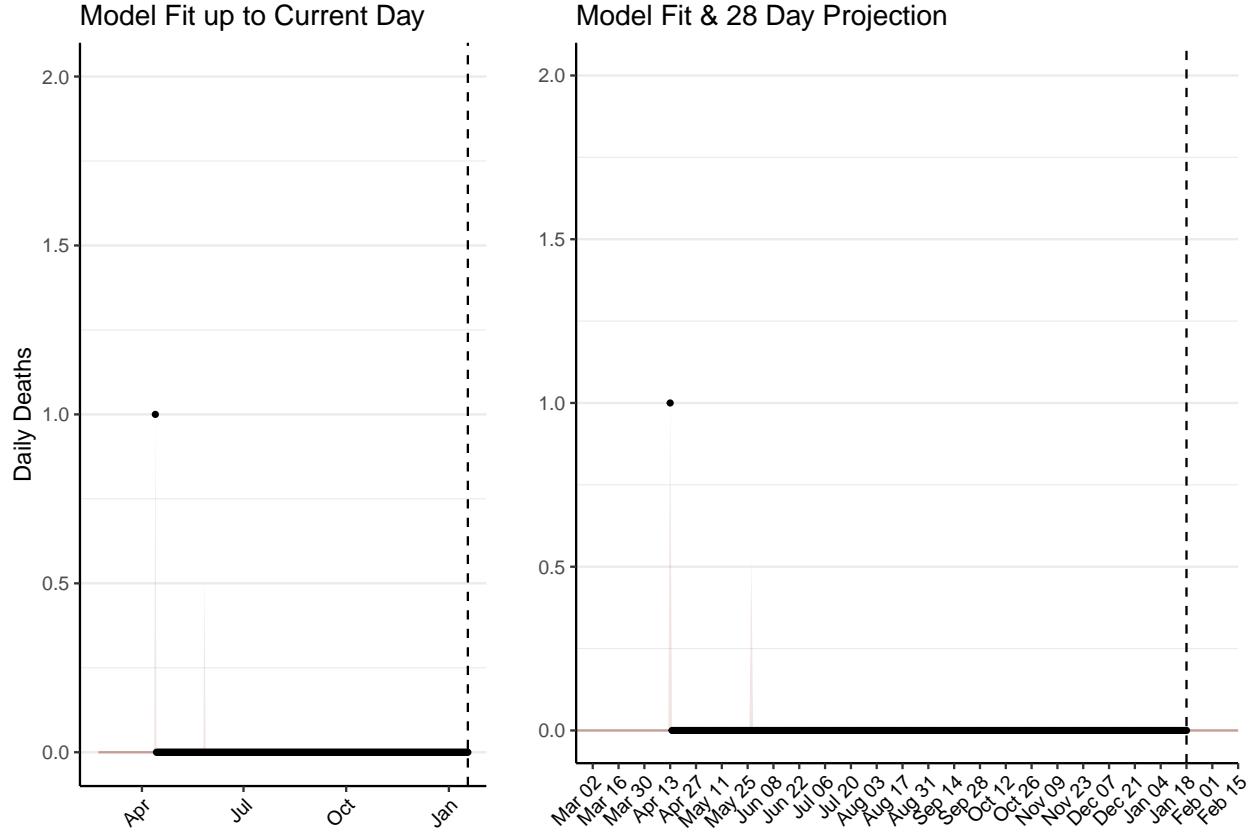


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

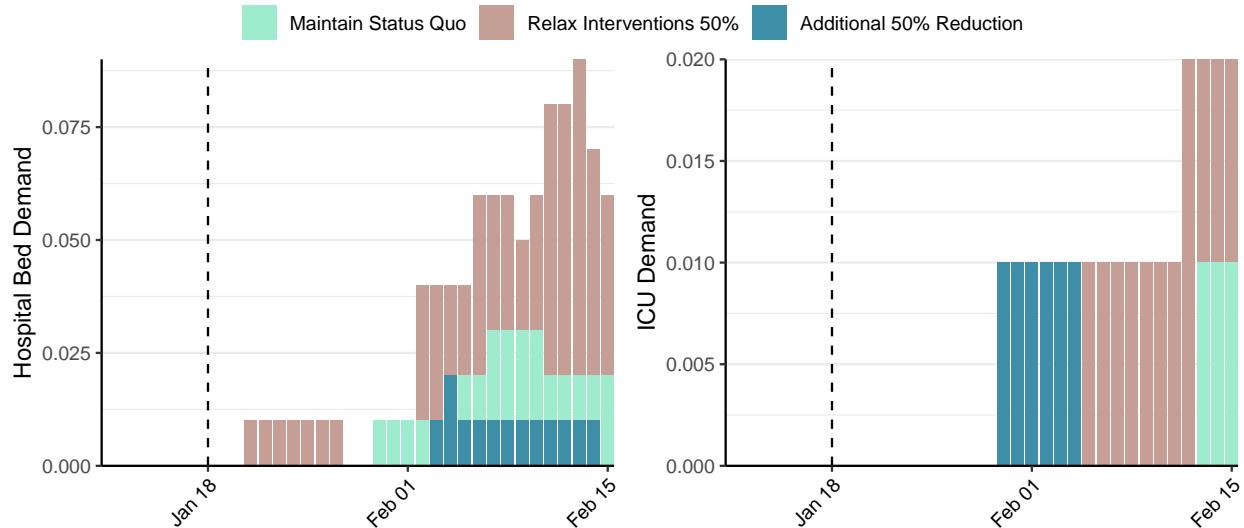


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 2 (95% CI: -1-4) by 2021-02-15.

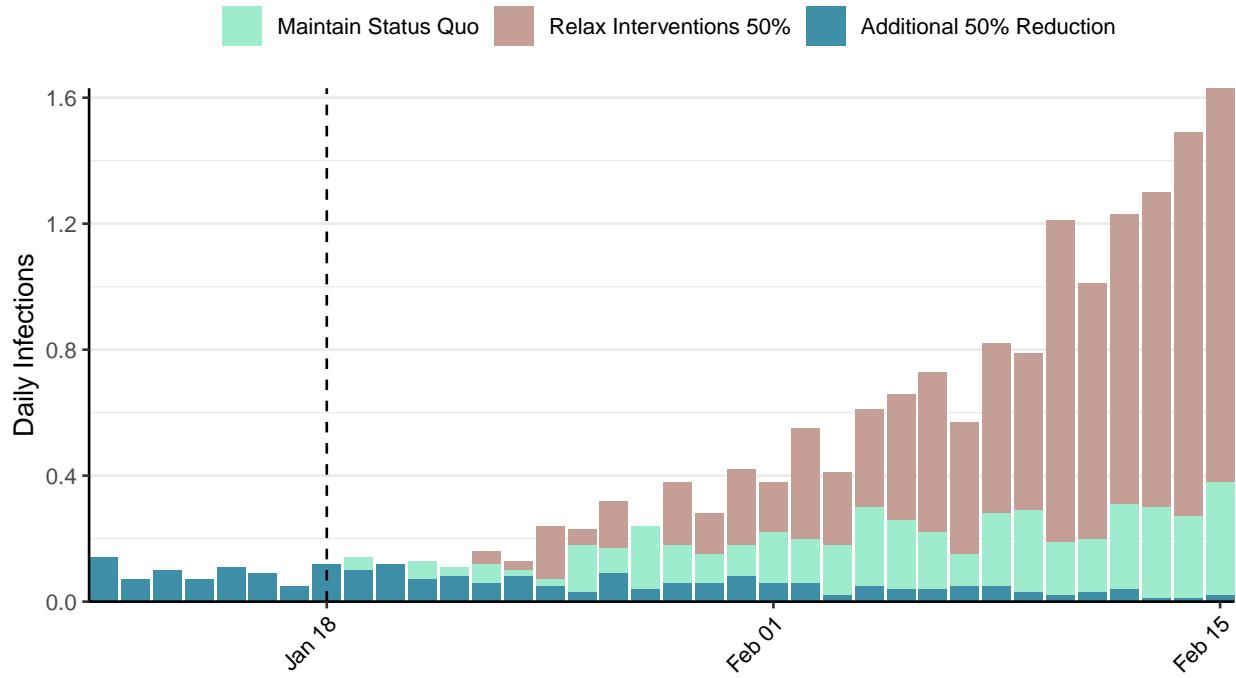


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Benin, 2021-01-18

[Download the report for Benin, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.82 (95% CI: 0.57-1.1)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Benin is not shown in the following plot as only 0 deaths have been reported to date**

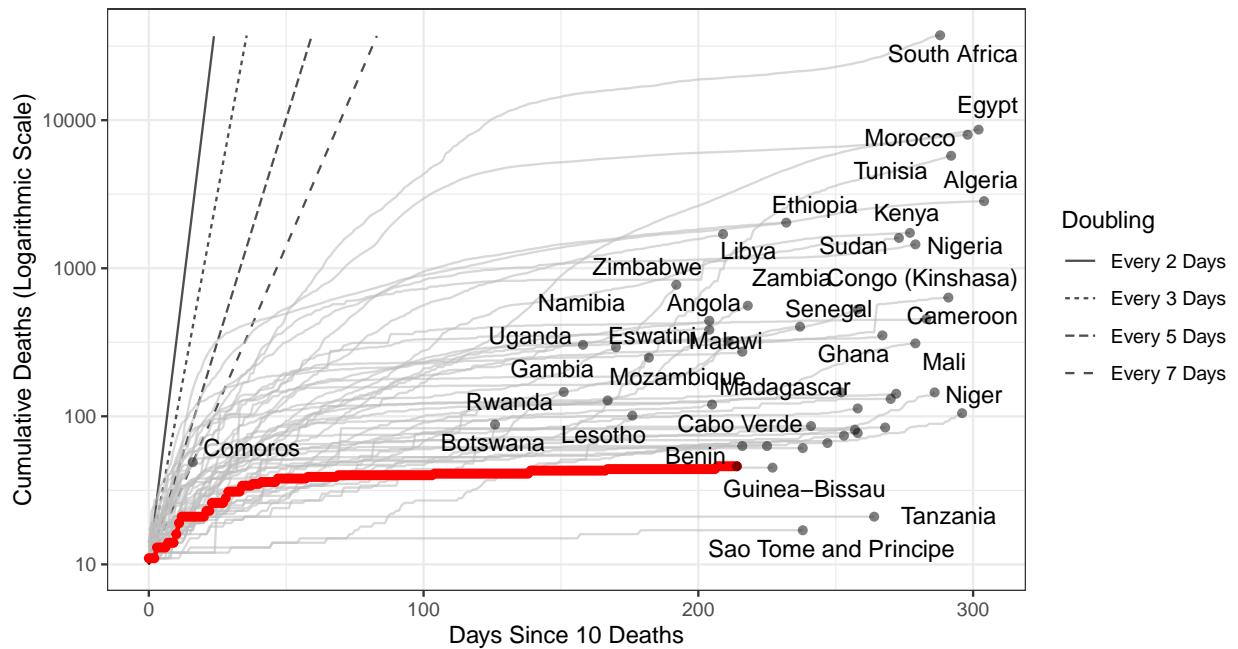


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 259 (95% CI: 189-330) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Benin has revised their historic reported cases and thus have reported negative cases.**

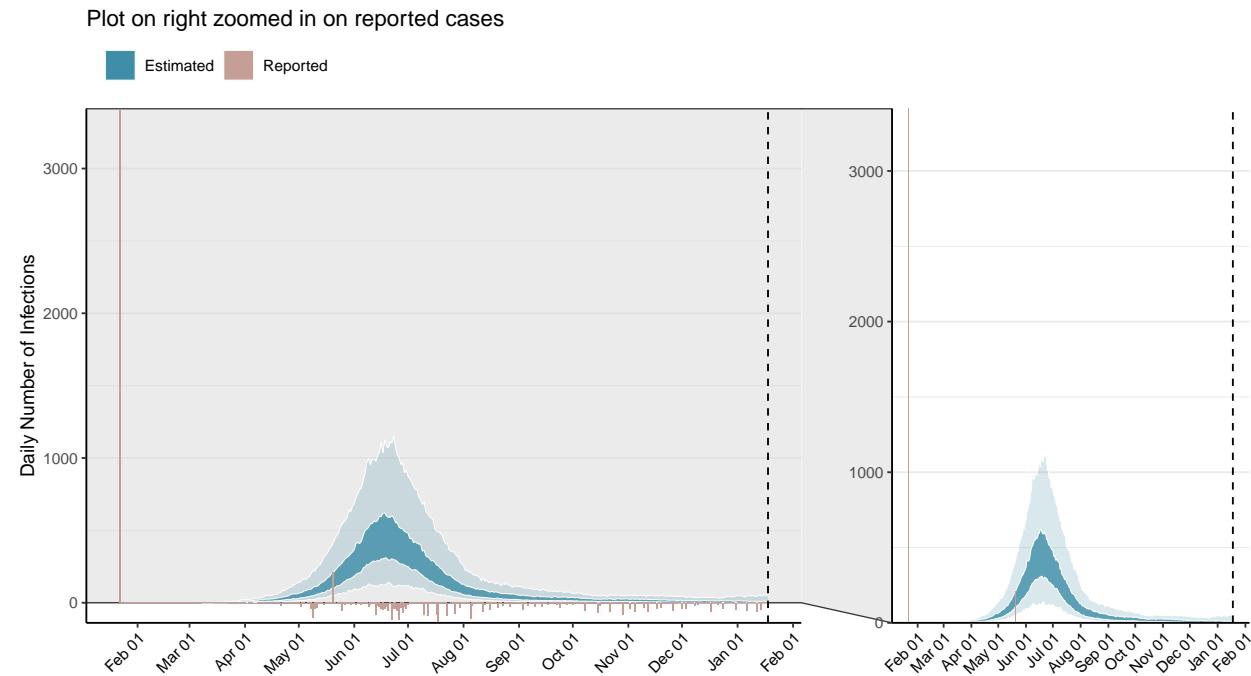
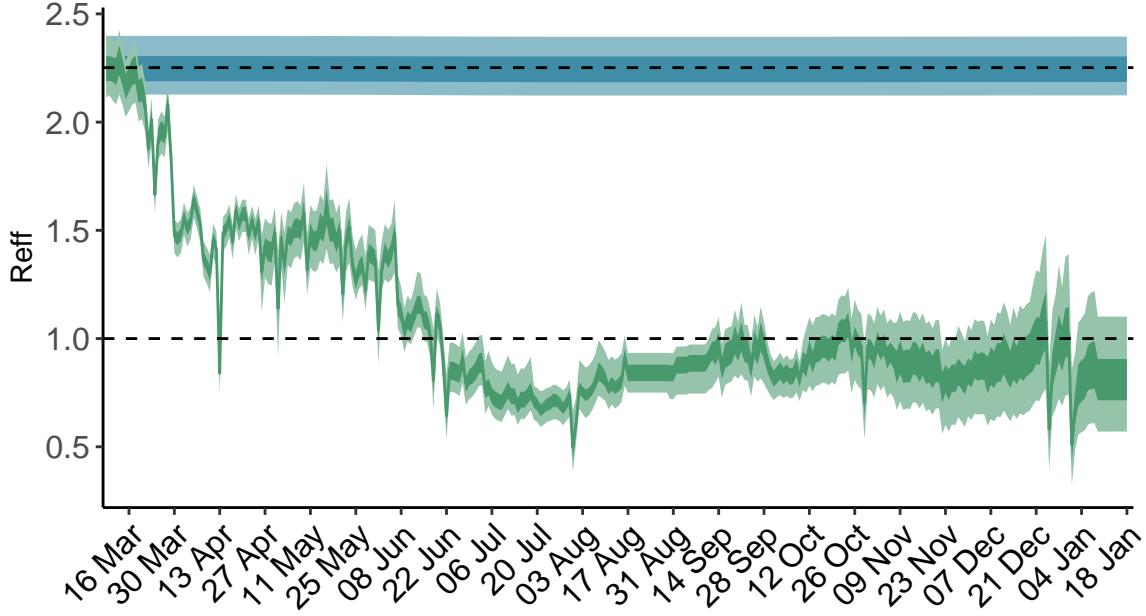


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

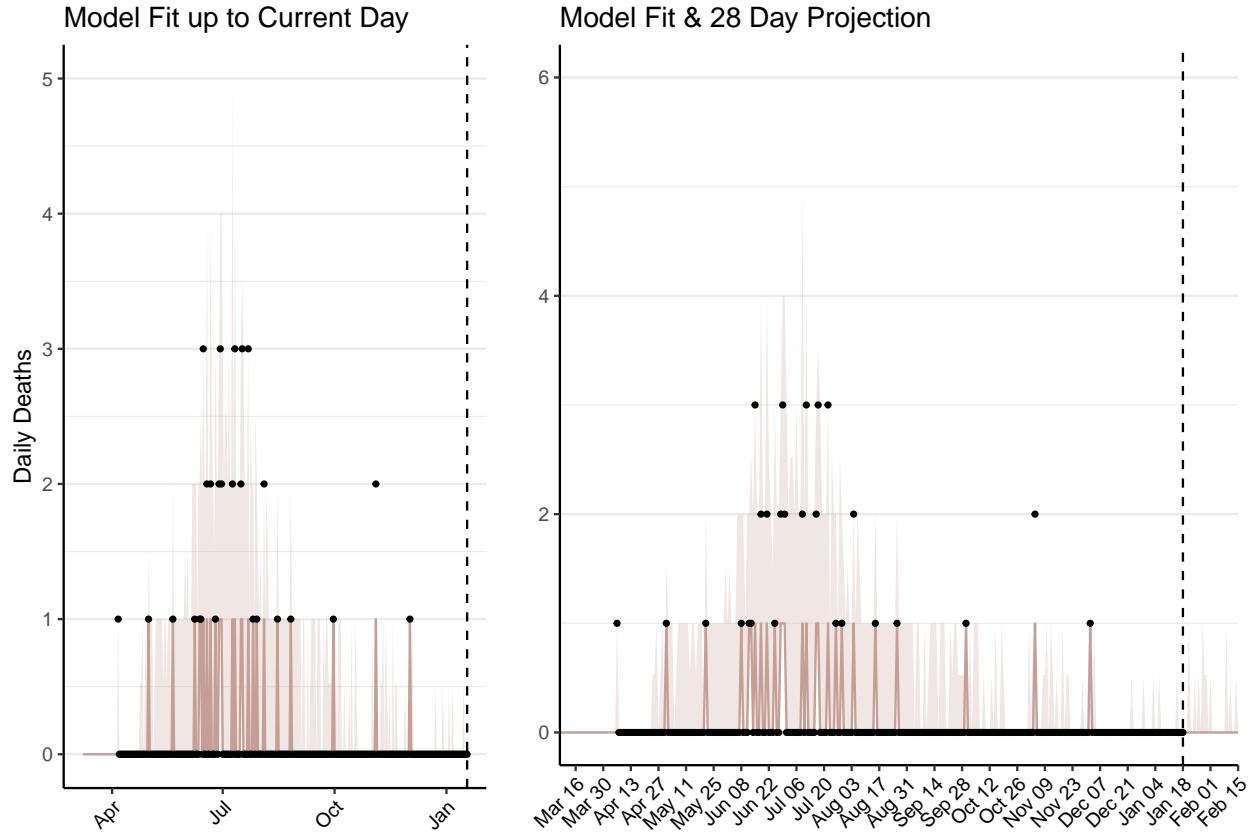


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1 (95% CI: 0-1) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 0-1) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

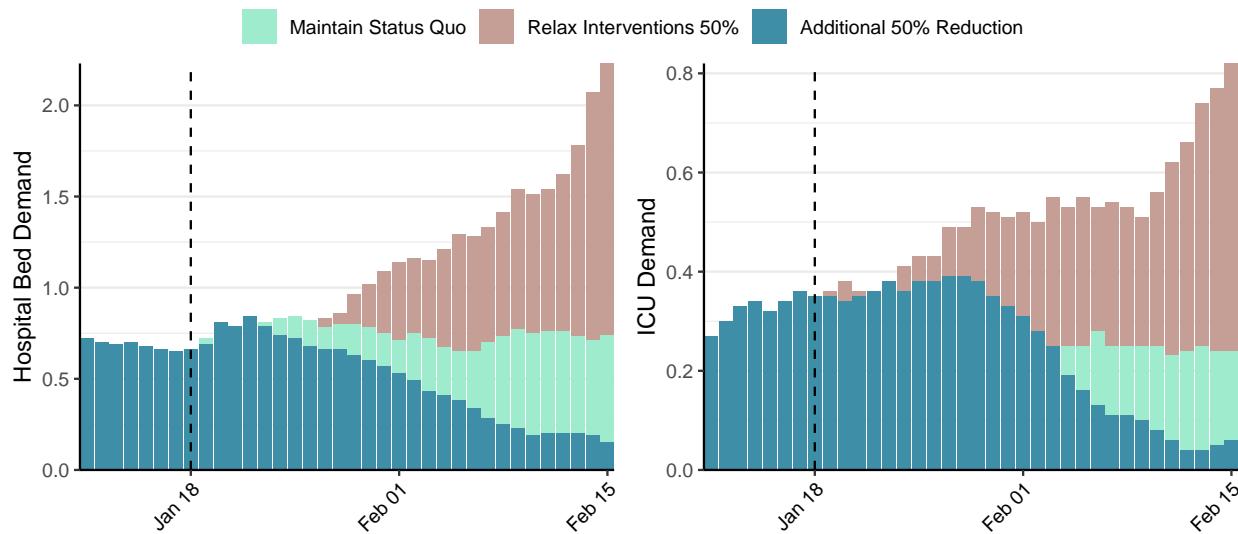


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 9 (95% CI: 6-11) at the current date to 1 (95% CI: 0-1) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 9 (95% CI: 6-11) at the current date to 51 (95% CI: 17-86) by 2021-02-15.

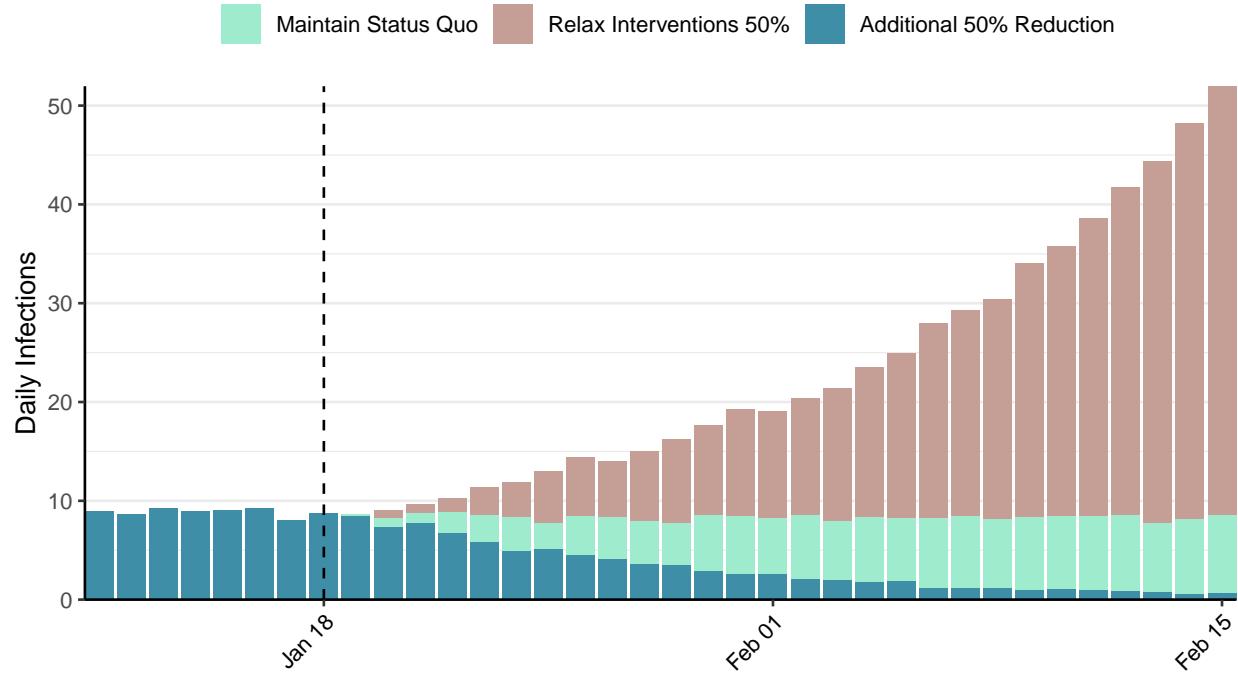


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Burkina Faso, 2021-01-18

[Download the report for Burkina Faso, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
164	164	3	3	1.17 (95% CI: 1-1.38)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Burkina Faso is not shown in the following plot as only 3 deaths have been reported to date**

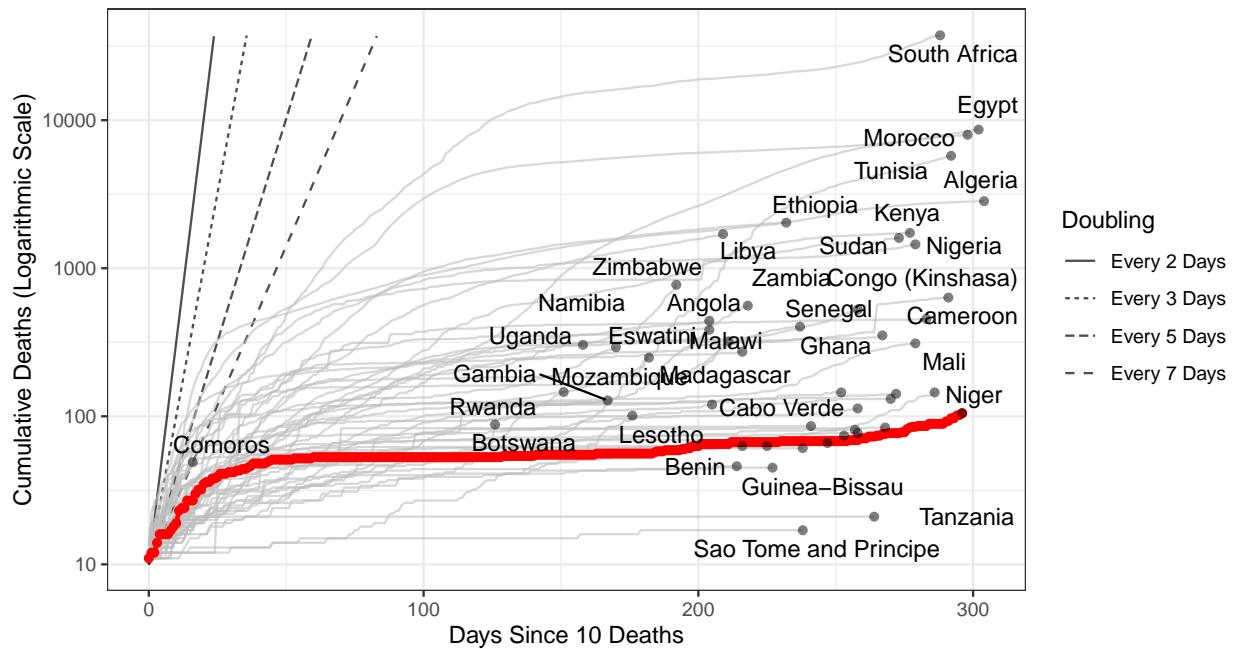


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 54,423 (95% CI: 49,545-59,301) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

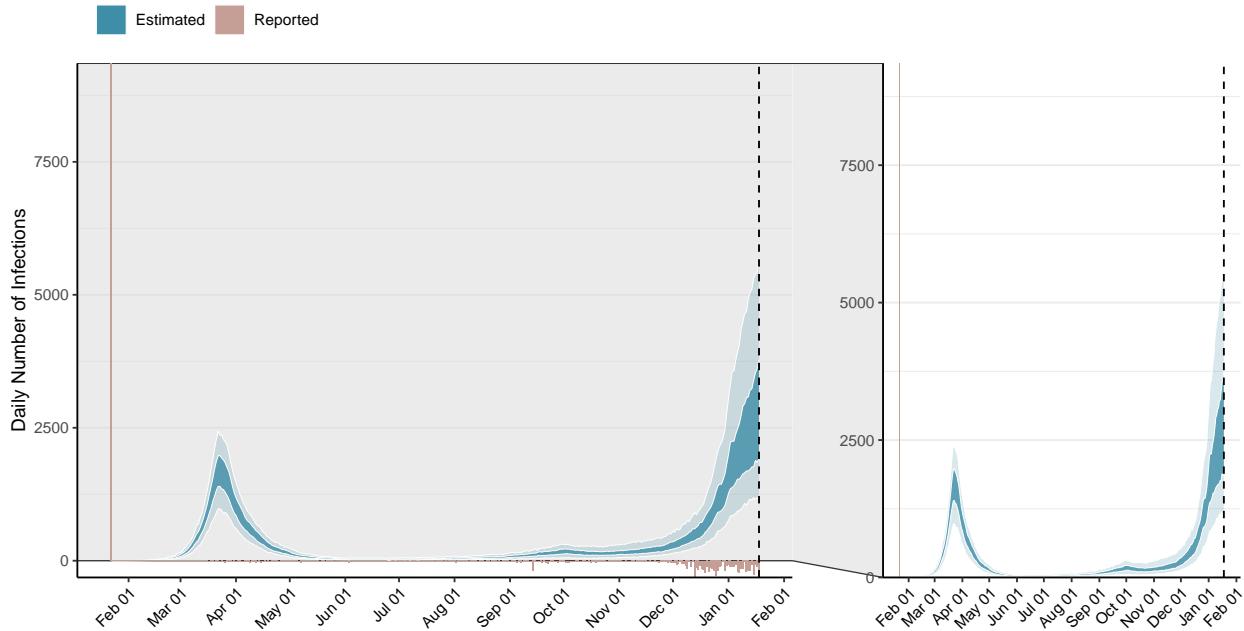
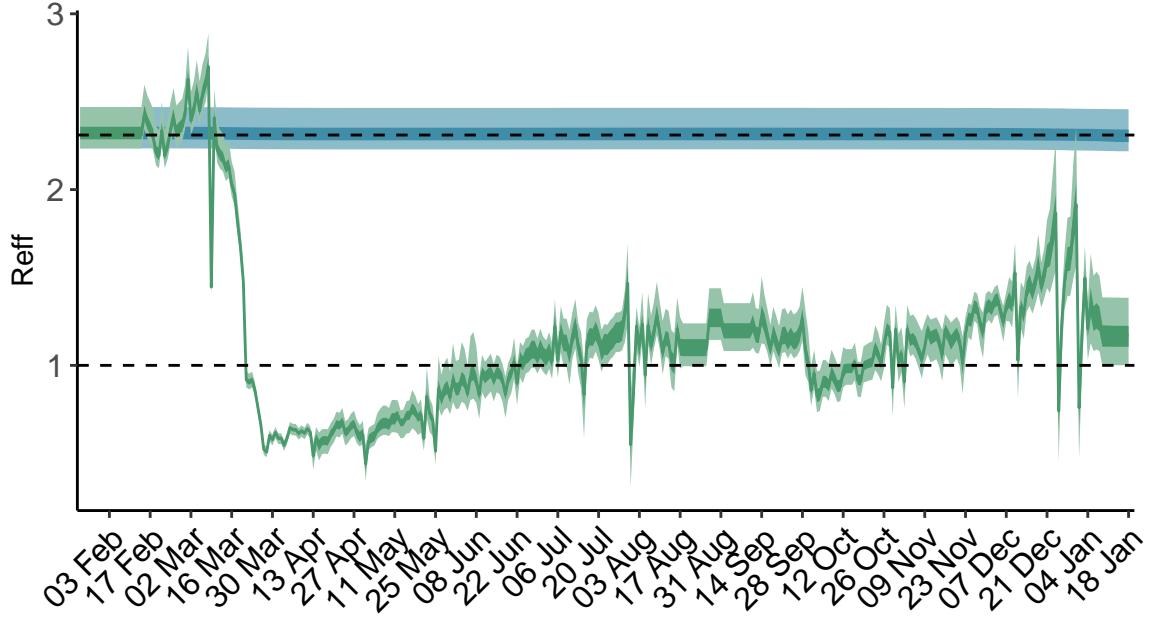


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Burkina Faso is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

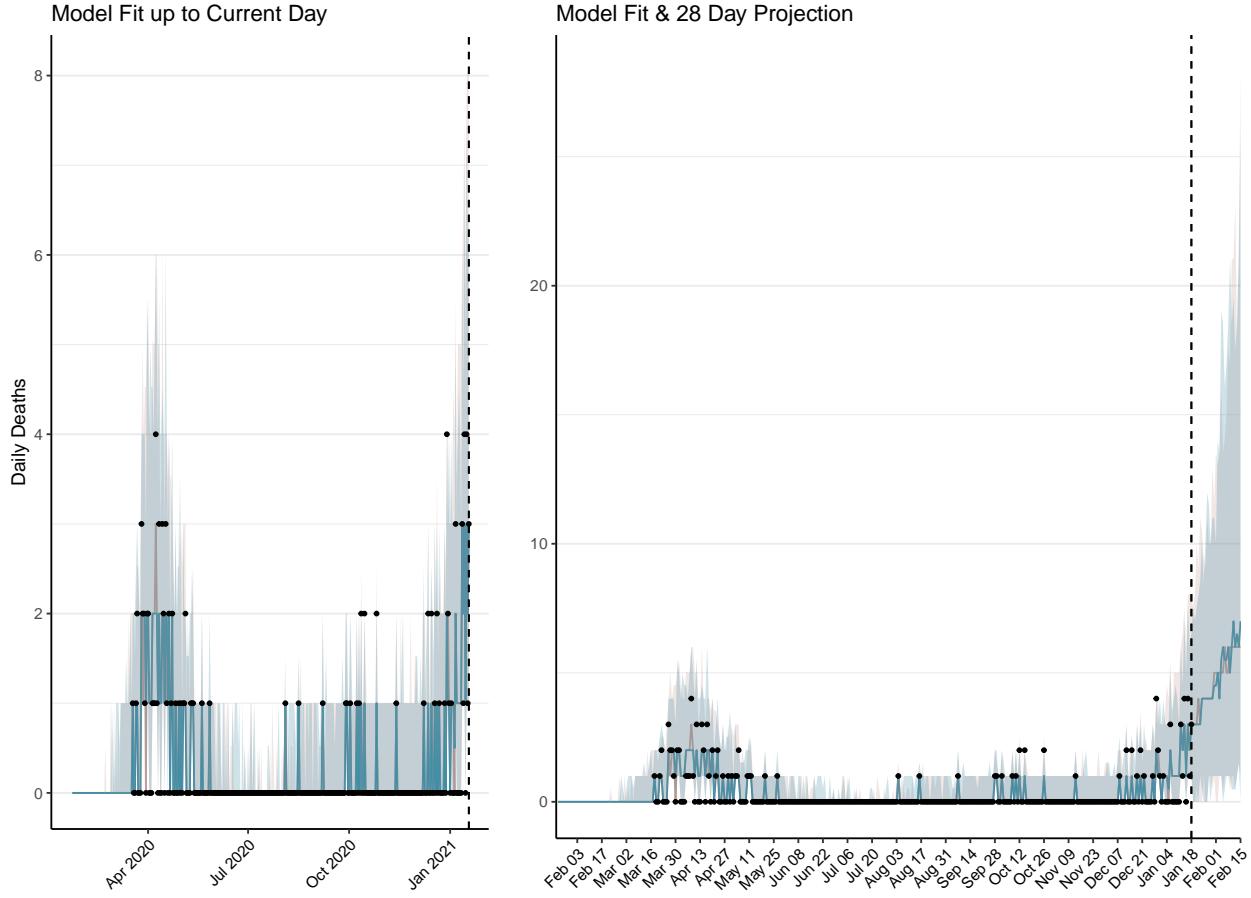


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 157 (95% CI: 143-172) patients requiring treatment with high-pressure oxygen at the current date to 377 (95% CI: 325-428) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 57 (95% CI: 52-62) patients requiring treatment with mechanical ventilation at the current date to 139 (95% CI: 122-156) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

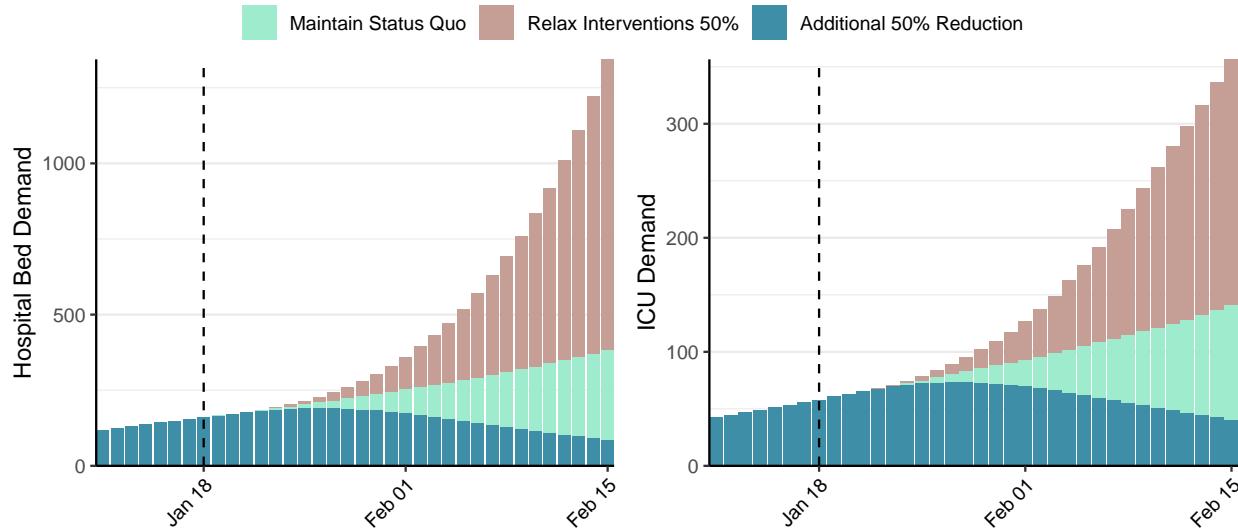


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,041 (95% CI: 2,732-3,350) at the current date to 491 (95% CI: 417-564) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,041 (95% CI: 2,732-3,350) at the current date to 44,223 (95% CI: 36,982-51,463) by 2021-02-15.

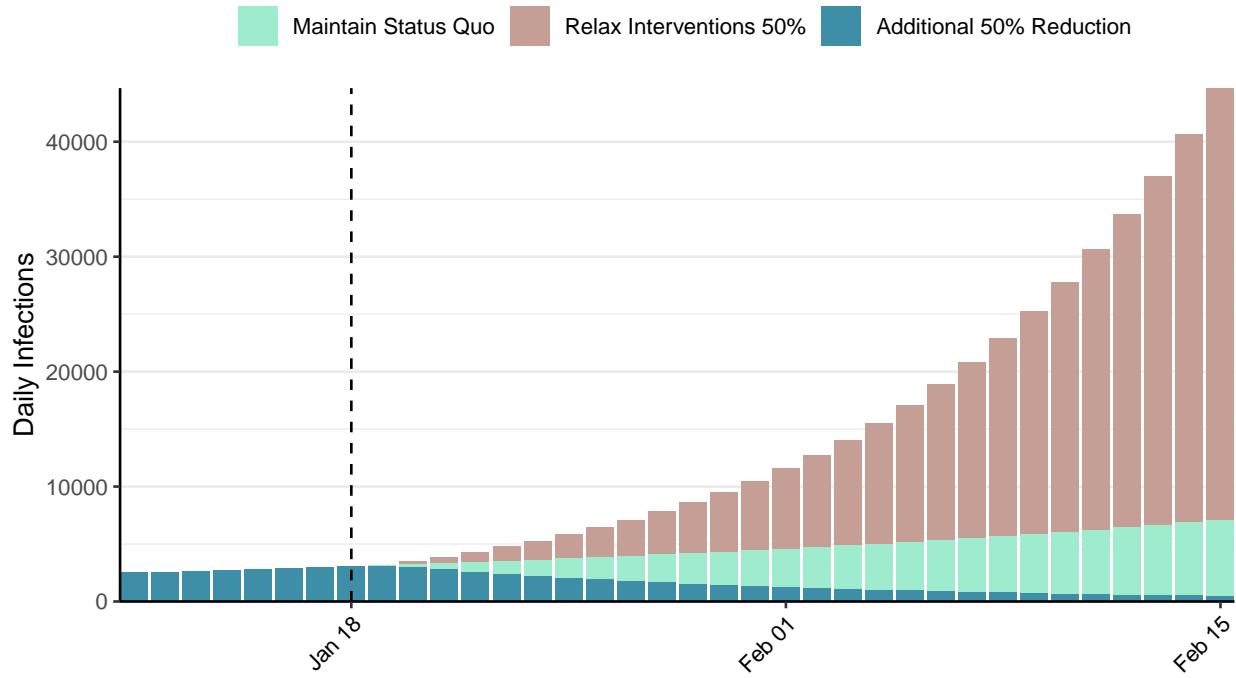


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Bangladesh, 2021-01-18

[Download the report for Bangladesh, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.78 (95% CI: 0.67-0.9)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Bangladesh is not shown in the following plot as only 0 deaths have been reported to date**

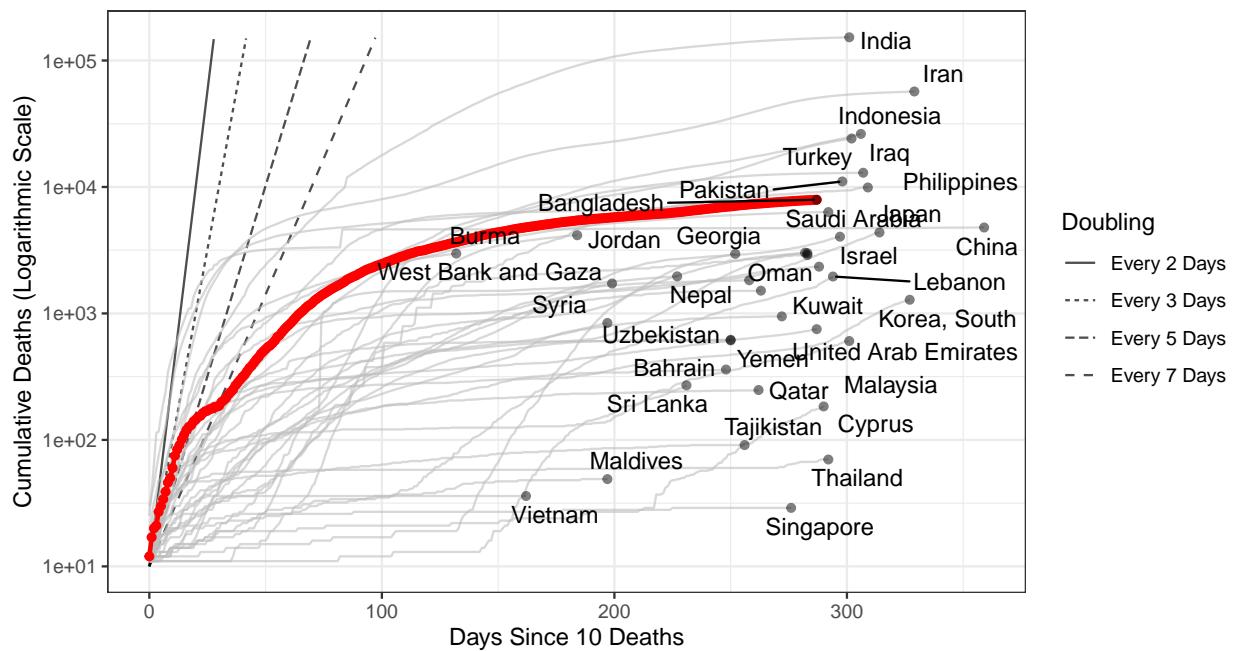


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 205,928 (95% CI: 195,017-216,838) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

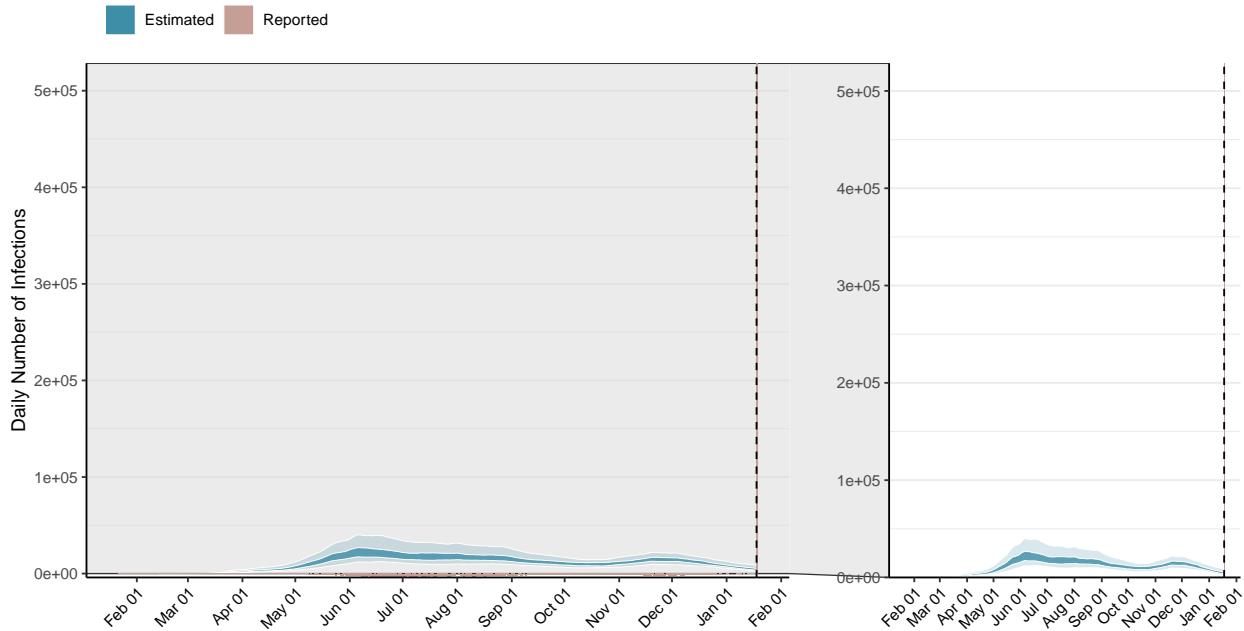
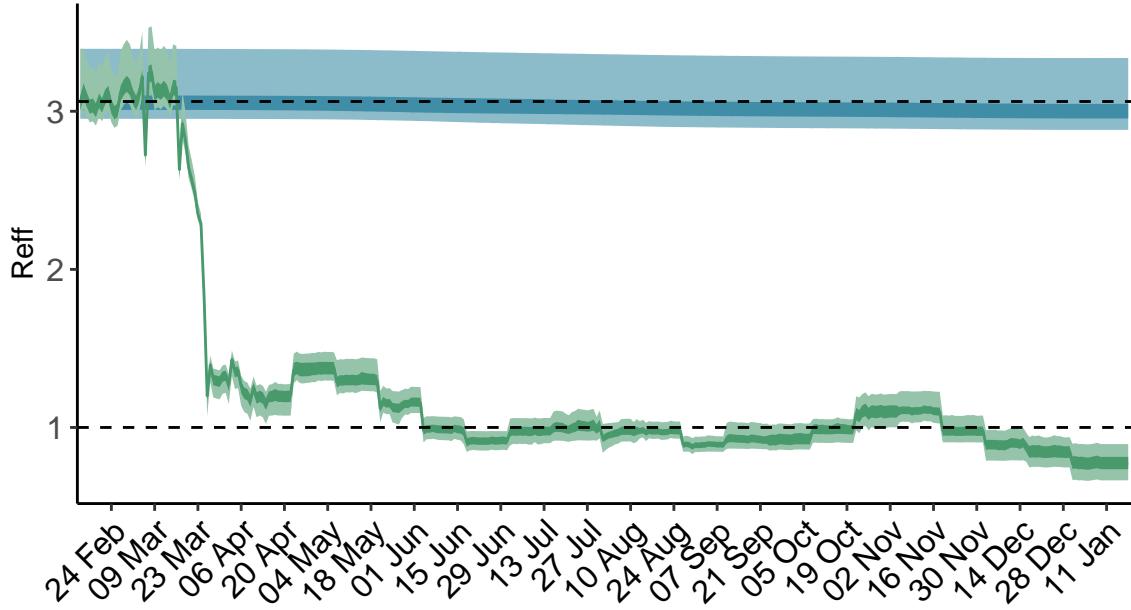


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

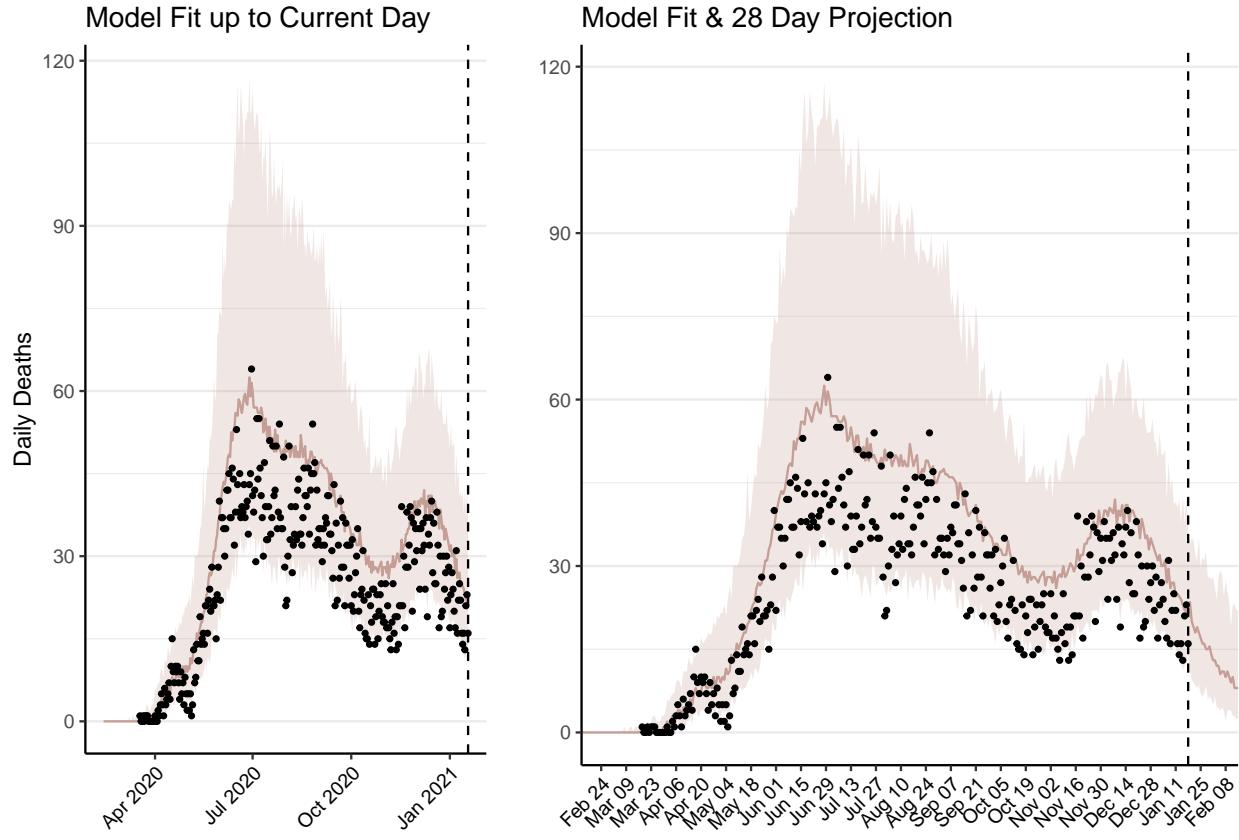


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 744 (95% CI: 701-786) patients requiring treatment with high-pressure oxygen at the current date to 309 (95% CI: 275-343) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 306 (95% CI: 290-323) patients requiring treatment with mechanical ventilation at the current date to 131 (95% CI: 117-144) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

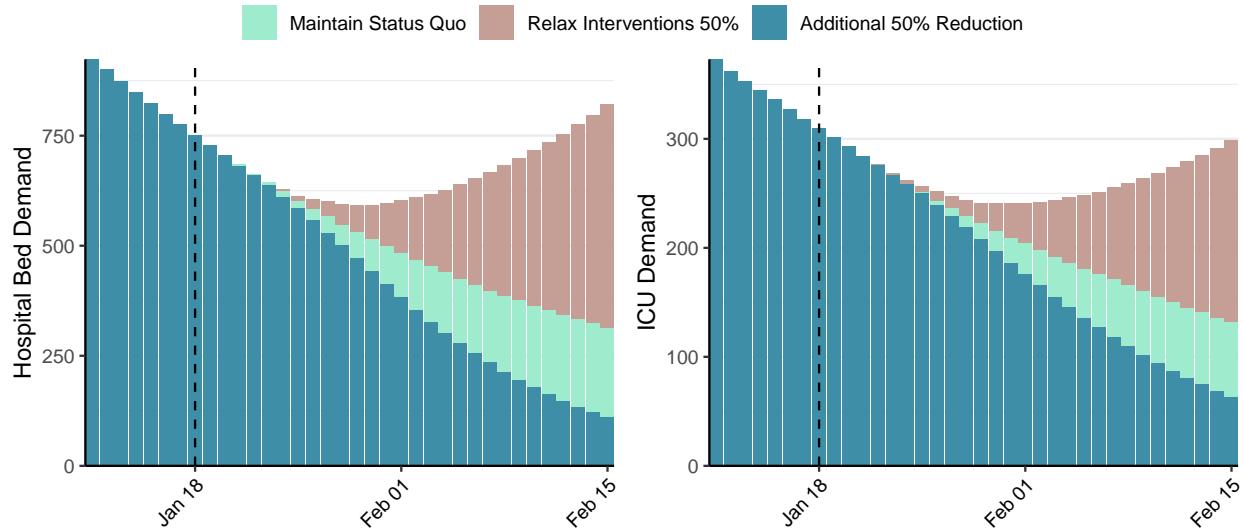
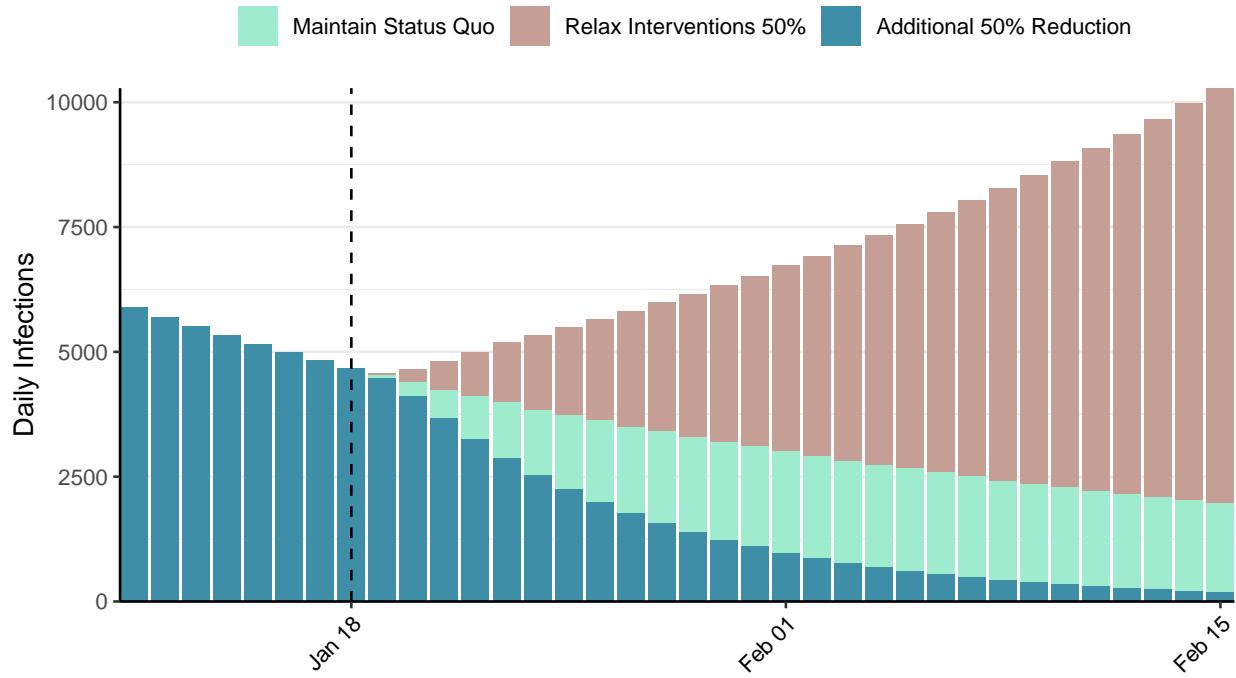


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,633 (95% CI: 4,283-4,984) at the current date to 191 (95% CI: 167-216) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,633 (95% CI: 4,283-4,984) at the current date to 10,181 (95% CI: 8,569-11,794) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Bulgaria, 2021-01-18

[Download the report for Bulgaria, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
570	570	82	82	0.78 (95% CI: 0.54-1.04)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

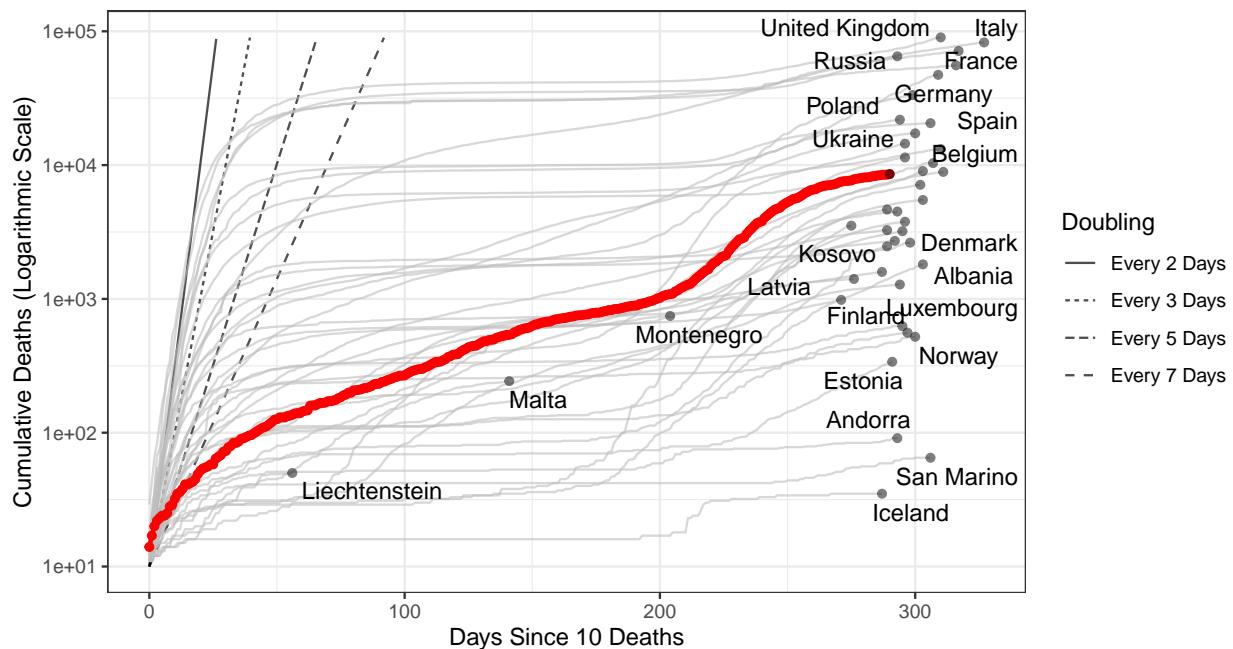


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 197,984 (95% CI: 191,319-204,649) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

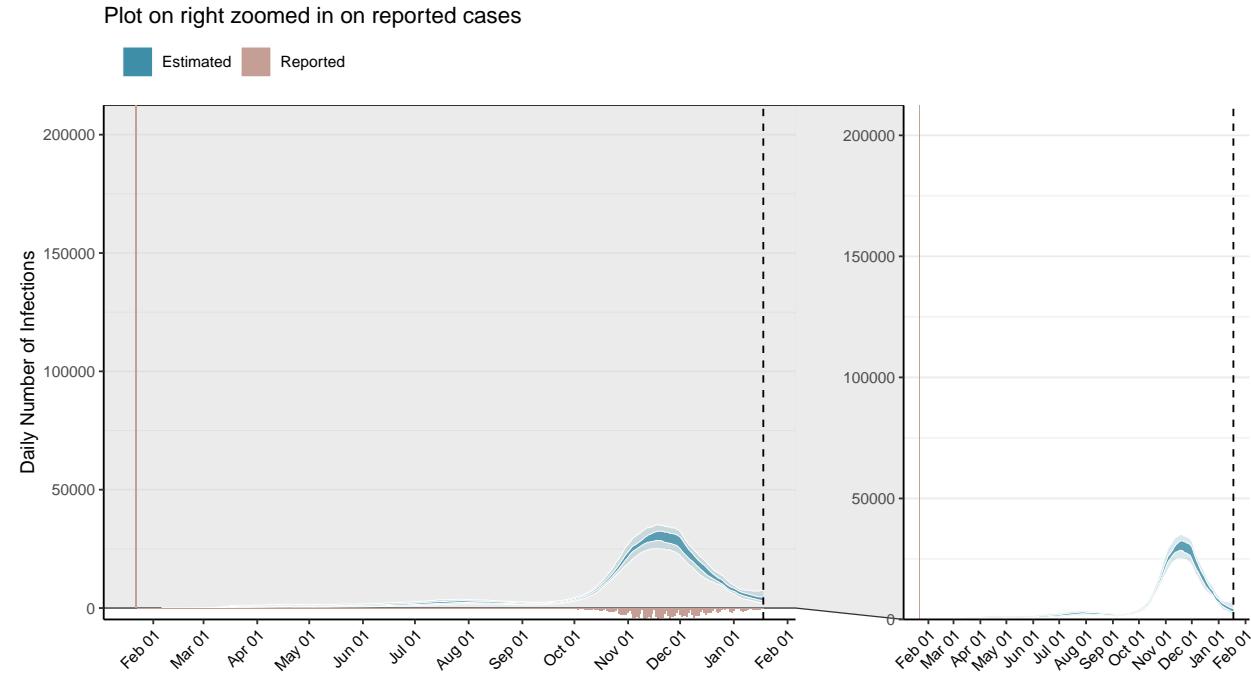
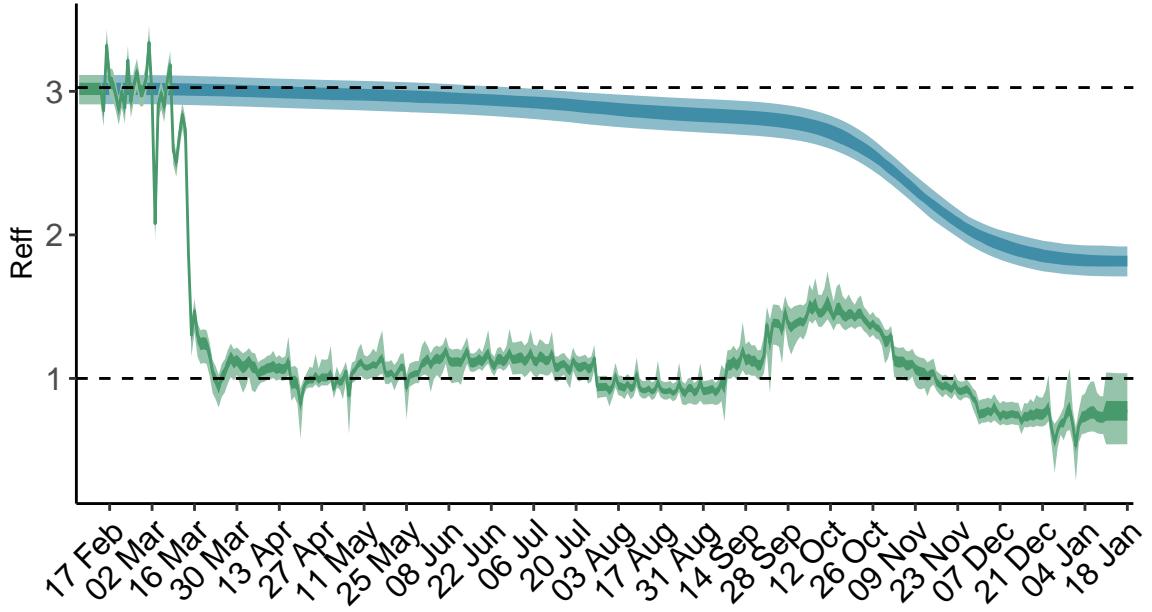


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Bulgaria is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

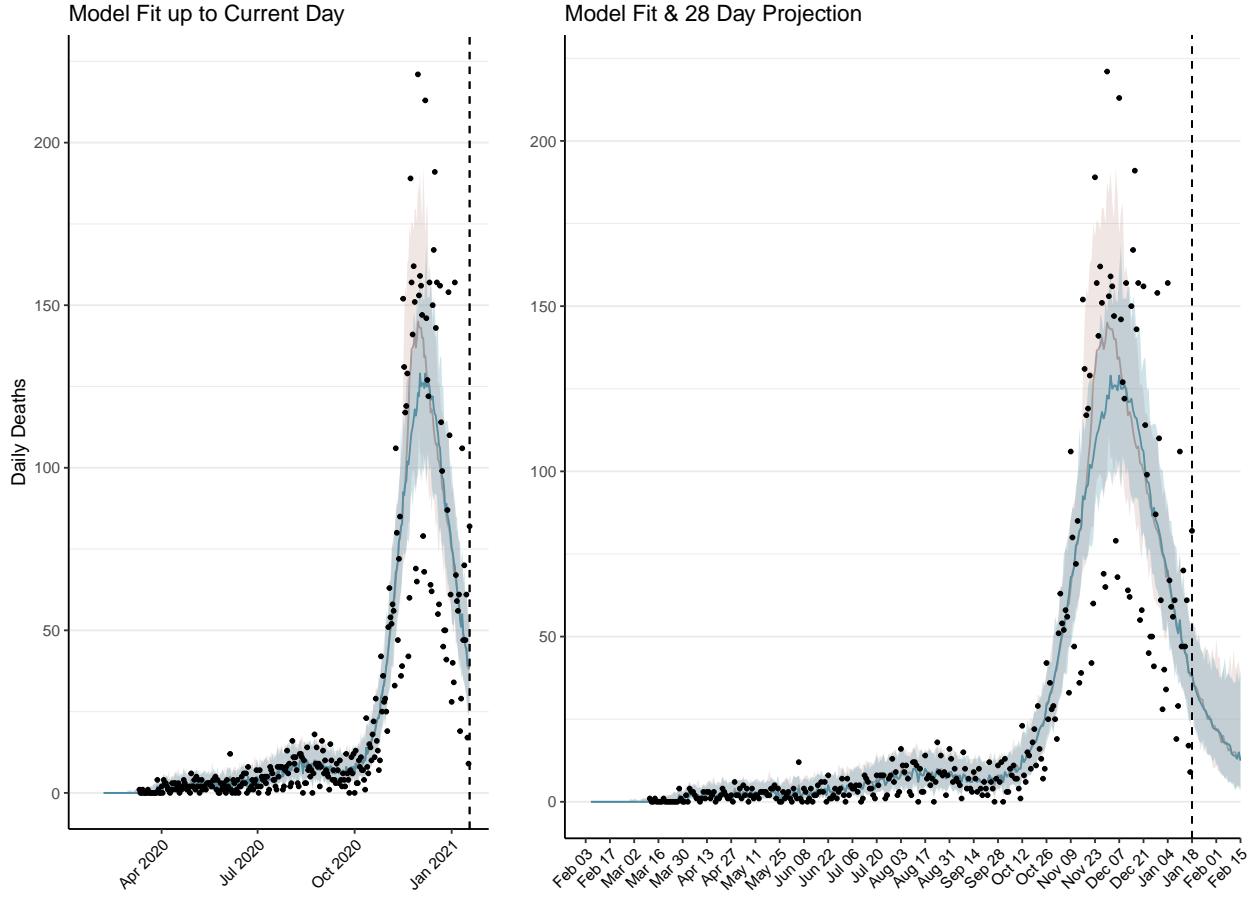


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,134 (95% CI: 1,093-1,176) patients requiring treatment with high-pressure oxygen at the current date to 474 (95% CI: 410-539) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 480 (95% CI: 463-496) patients requiring treatment with mechanical ventilation at the current date to 194 (95% CI: 171-216) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

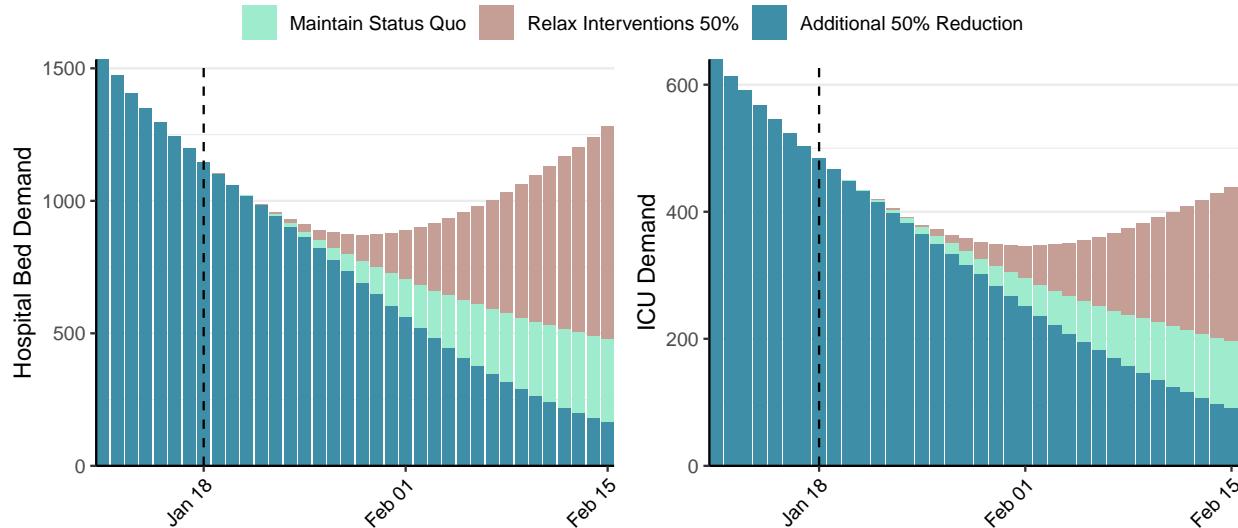


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,910 (95% CI: 3,641-4,180) at the current date to 187 (95% CI: 155-219) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,910 (95% CI: 3,641-4,180) at the current date to 9,467 (95% CI: 7,618-11,316) by 2021-02-15.

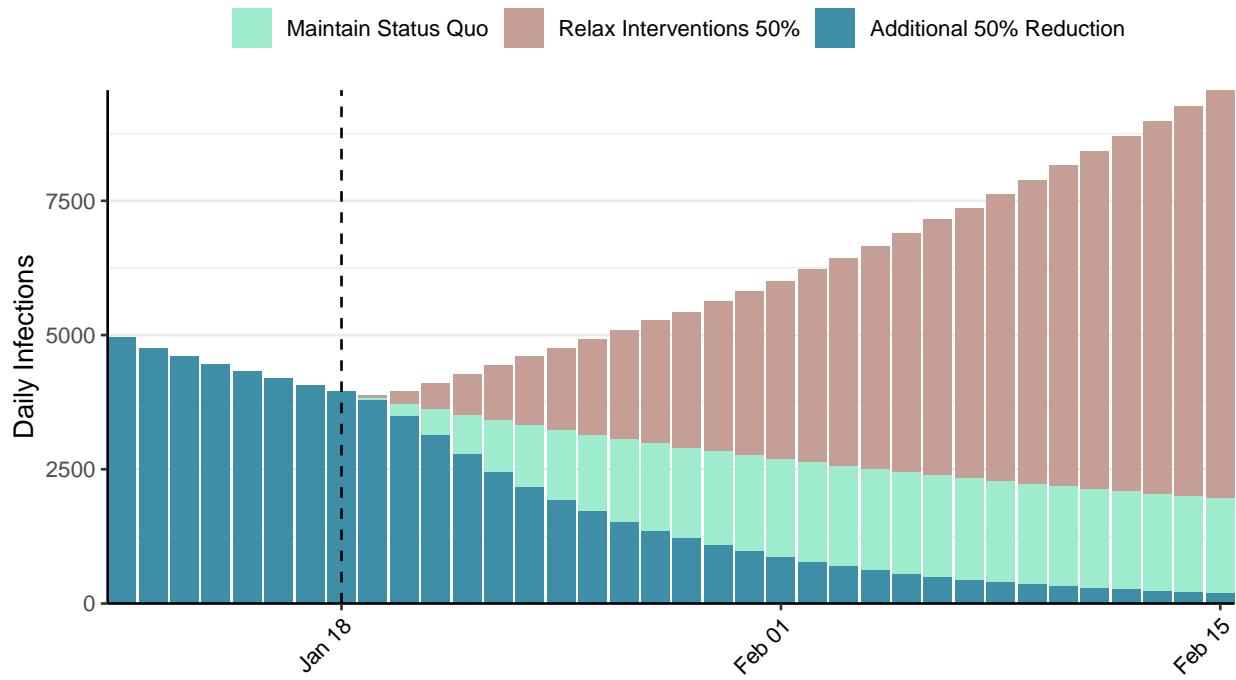


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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Situation Report for COVID-19: Bosnia and Herzegovina, 2021-01-18

**[Download the report for Bosnia and Herzegovina, 2021-01-18 here.](#)** This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

## Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,072	1,072	75	75	0.89 (95% CI: 0.81-1)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

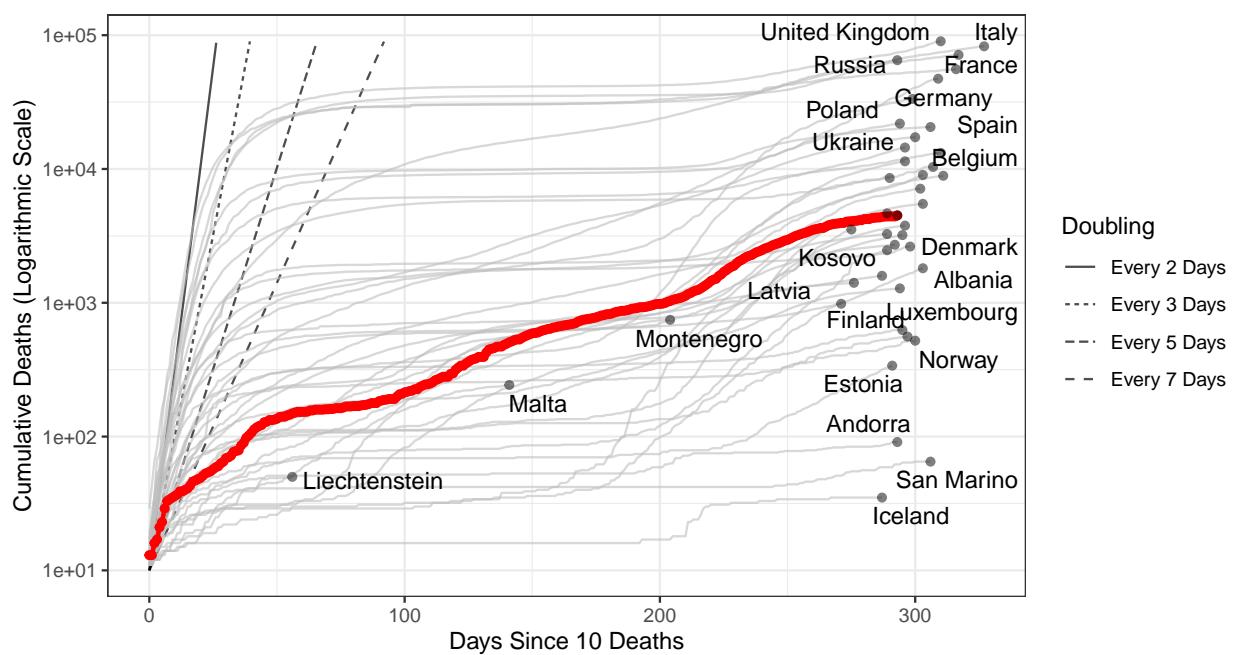


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 114,108 (95% CI: 111,251–116,966) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

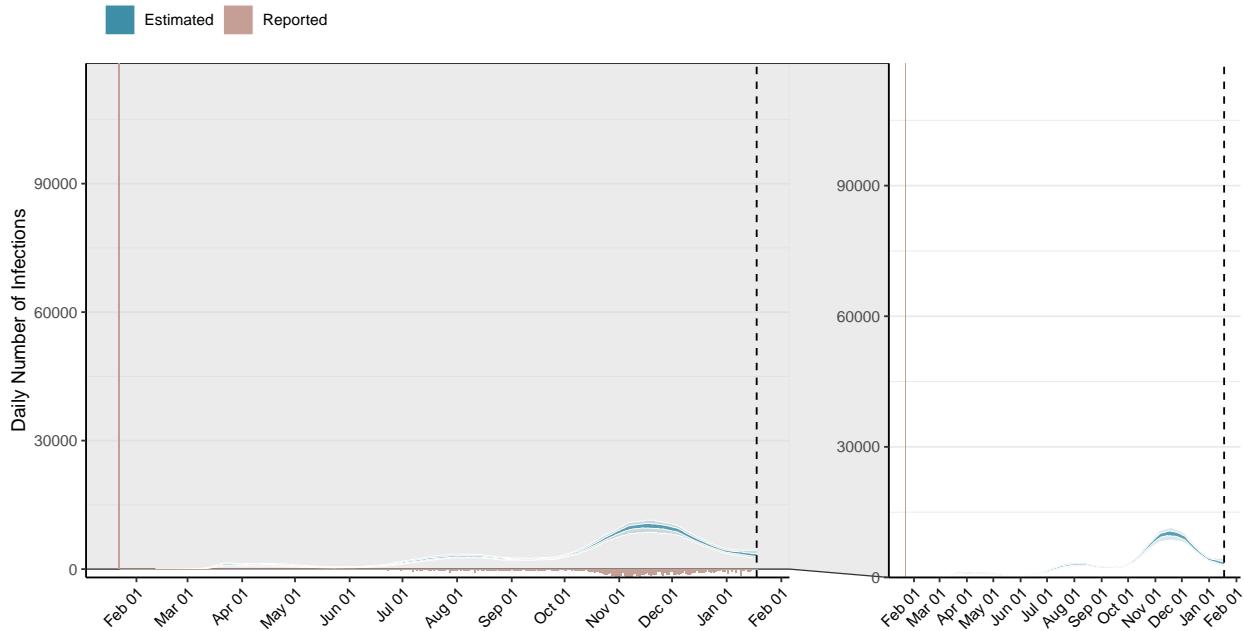
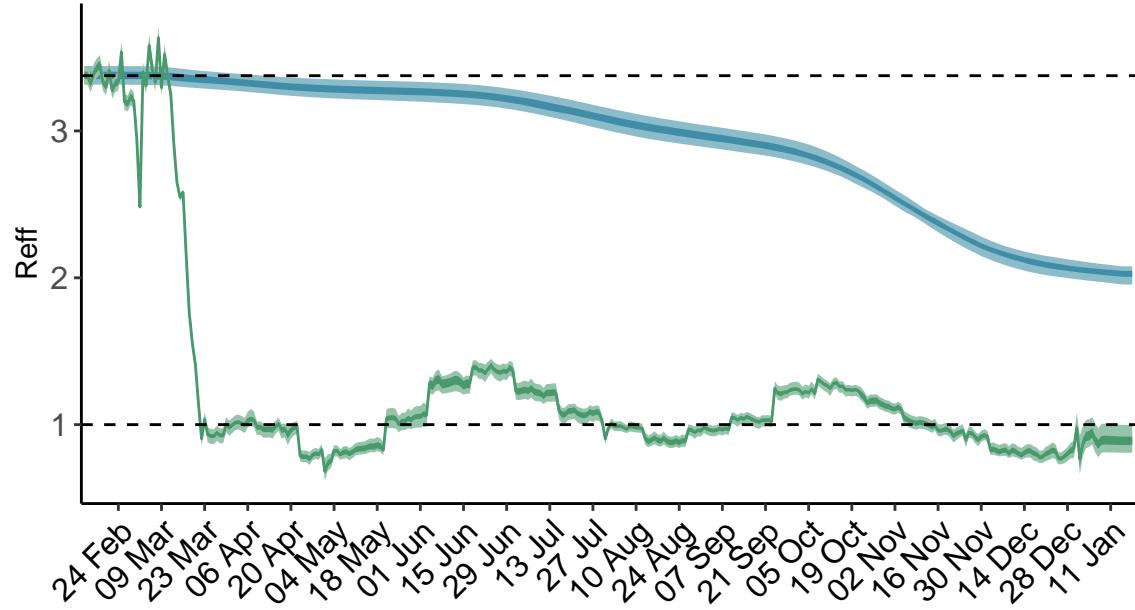


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Bosnia and Herzegovina is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

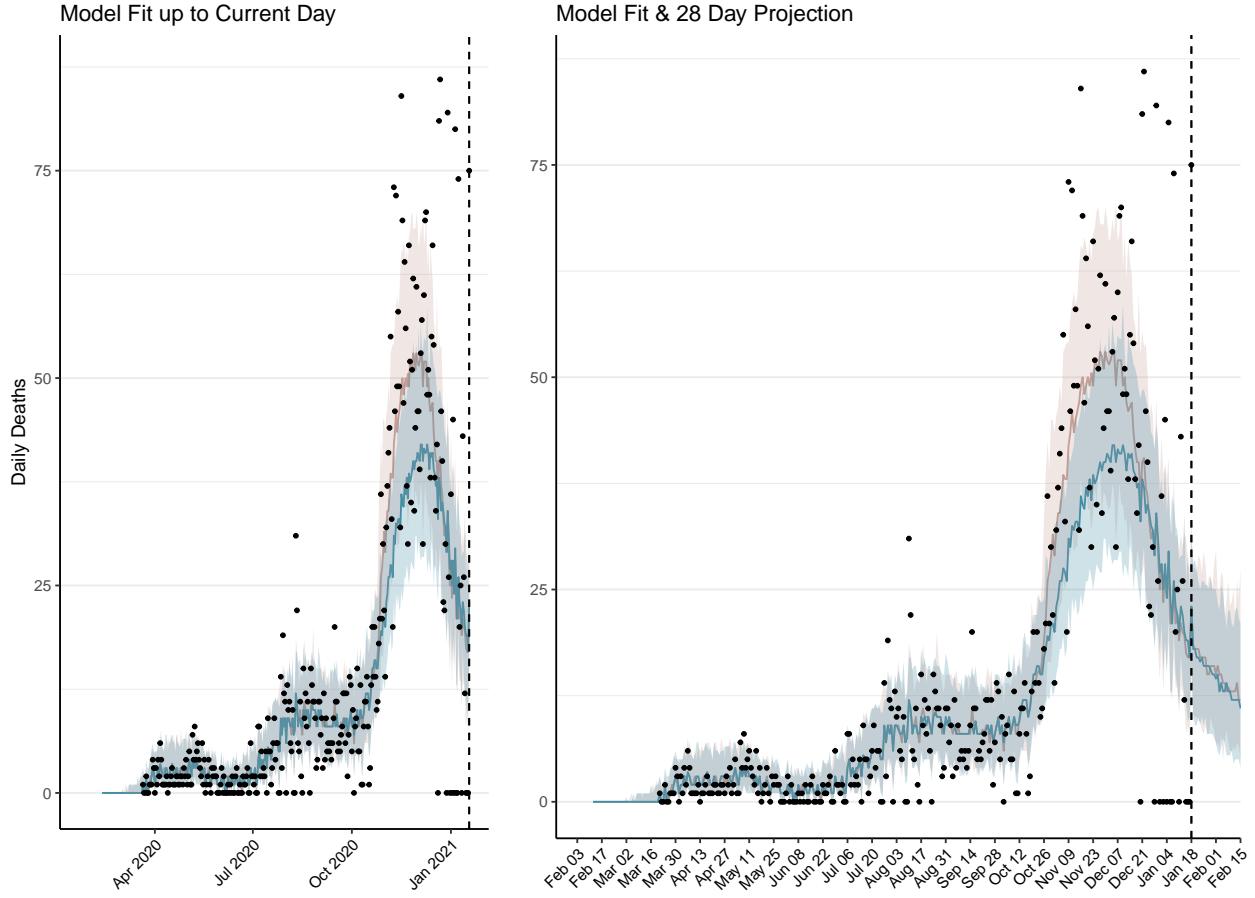


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 646 (95% CI: 628-663) patients requiring treatment with high-pressure oxygen at the current date to 431 (95% CI: 407-455) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 232 (95% CI: 227-237) patients requiring treatment with mechanical ventilation at the current date to 169 (95% CI: 161-177) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

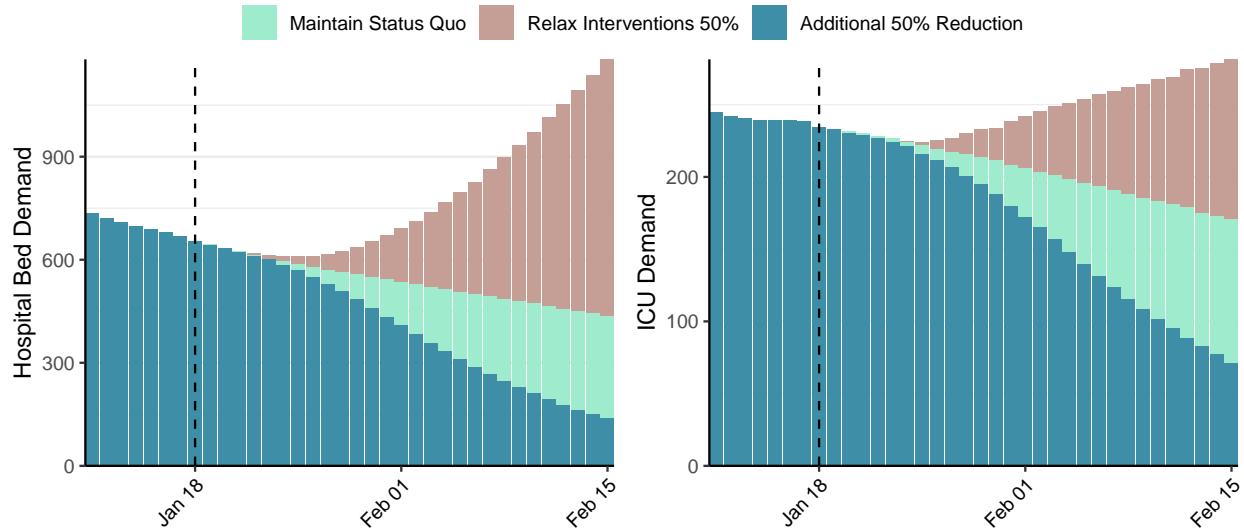


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,219 (95% CI: 3,103-3,336) at the current date to 199 (95% CI: 186-213) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,219 (95% CI: 3,103-3,336) at the current date to 10,038 (95% CI: 9,365-10,711) by 2021-02-15.

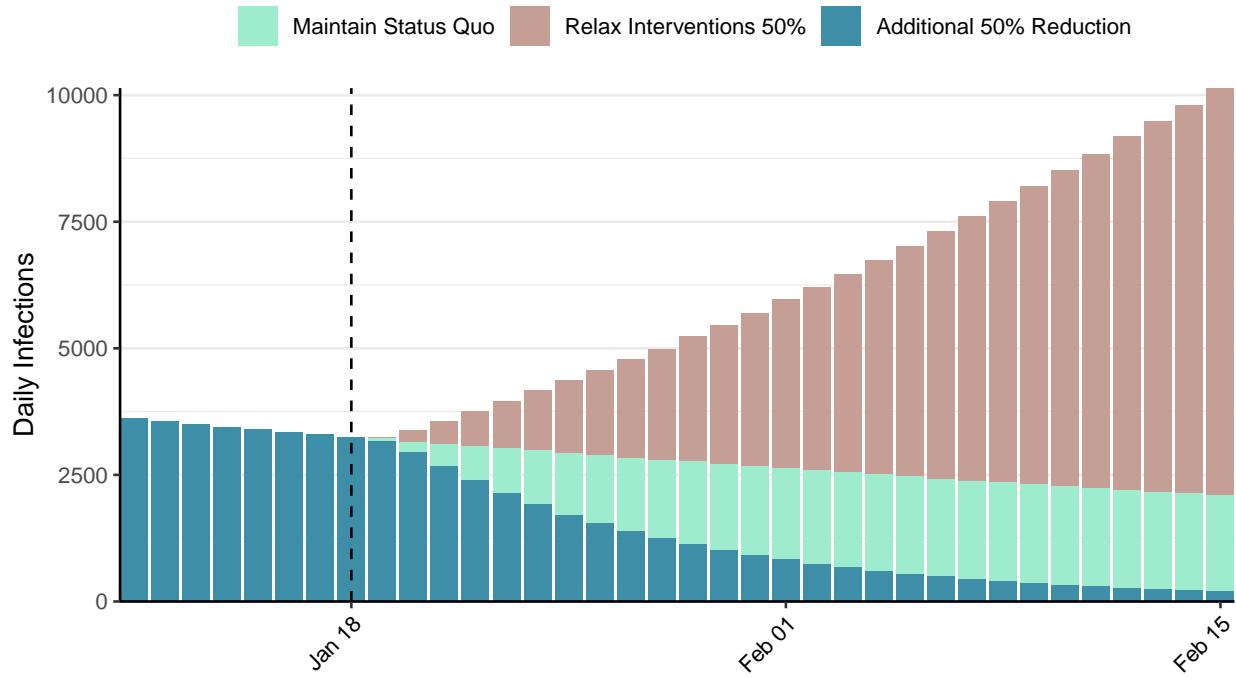


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Belarus, 2021-01-18

[Download the report for Belarus, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,899	1,899	9	9	0.82 (95% CI: 0.67-1.01)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Belarus is not shown in the following plot as only 9 deaths have been reported to date**

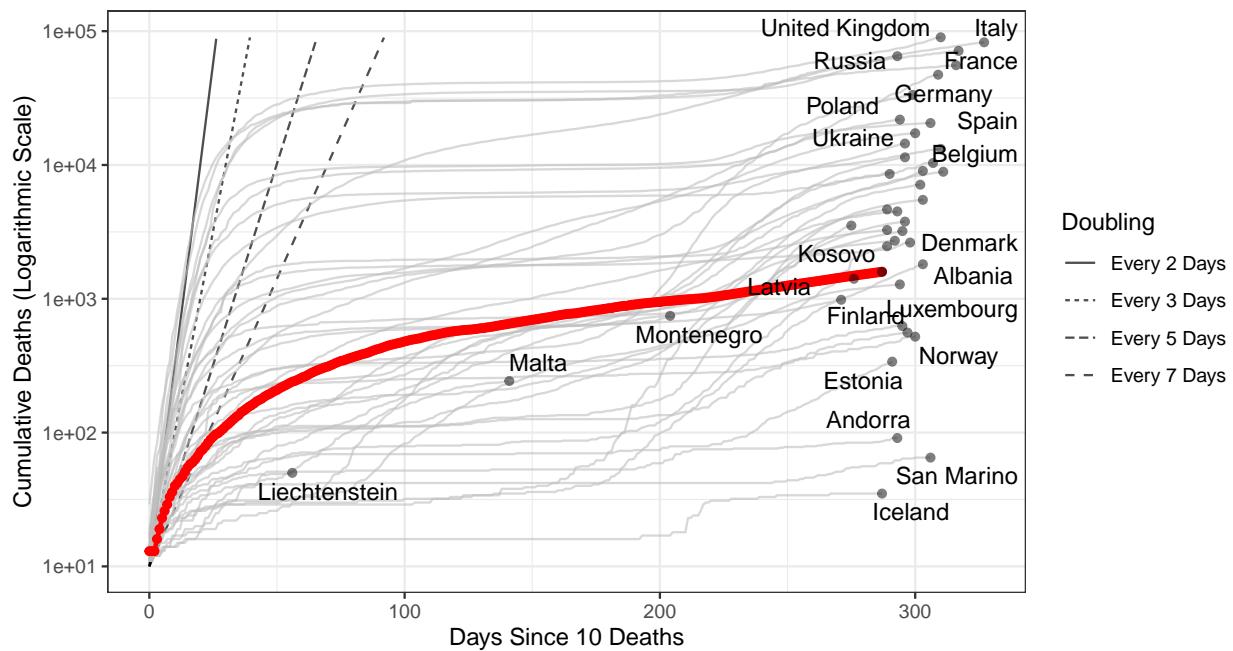


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 96,214 (95% CI: 92,702-99,725) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

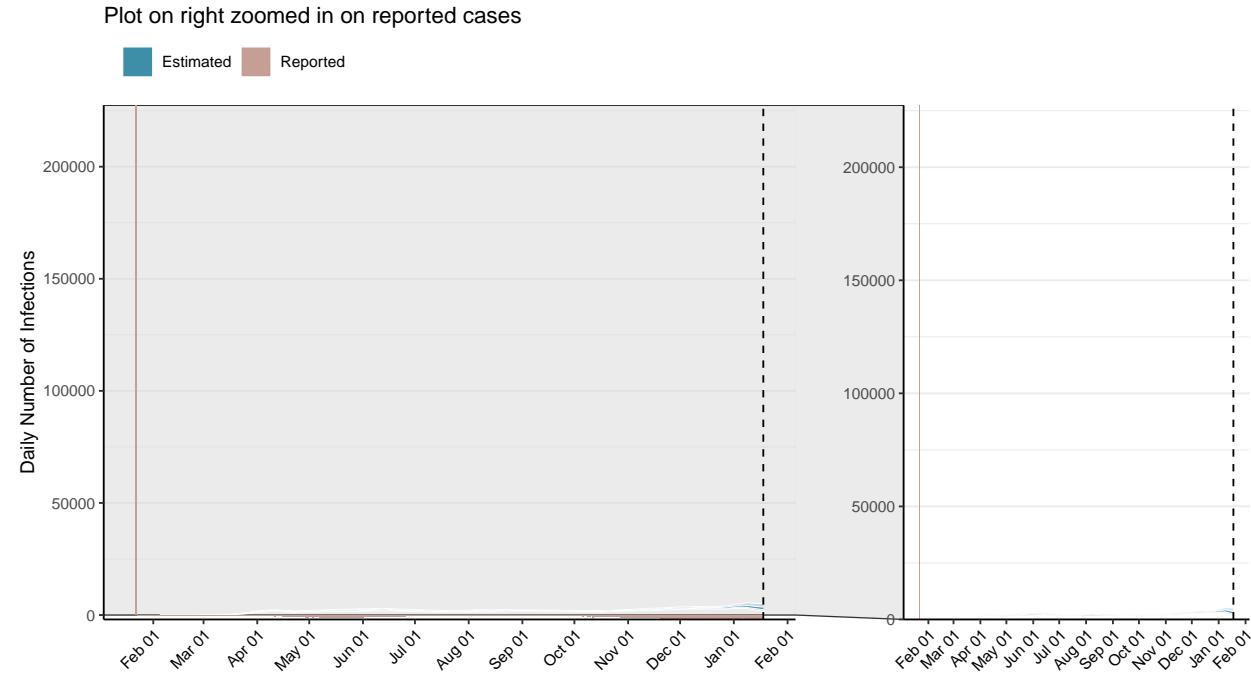
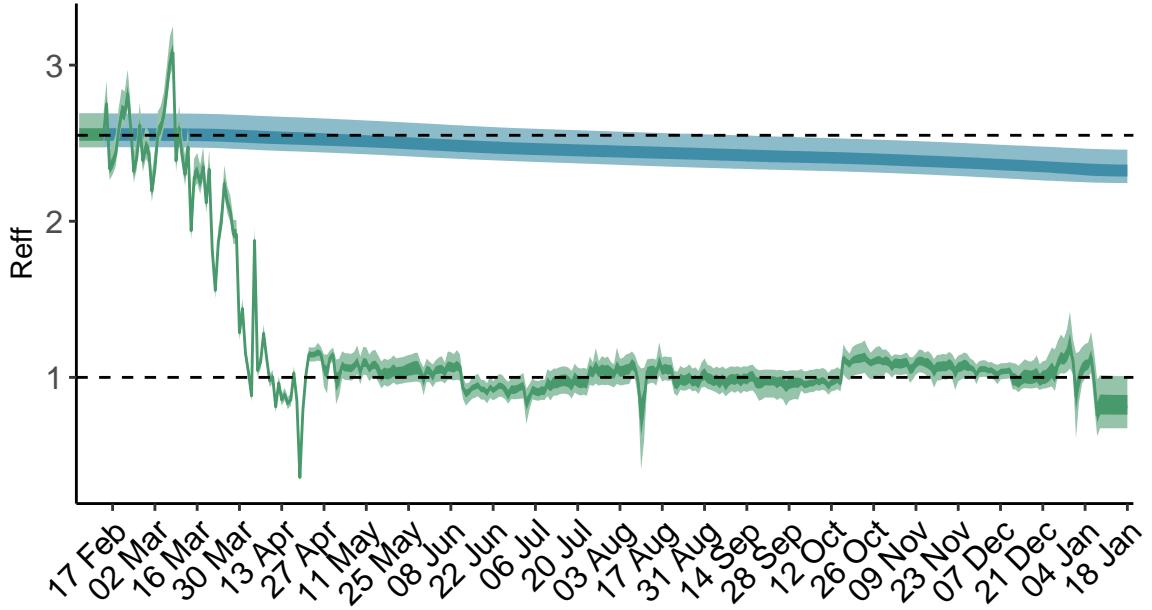


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

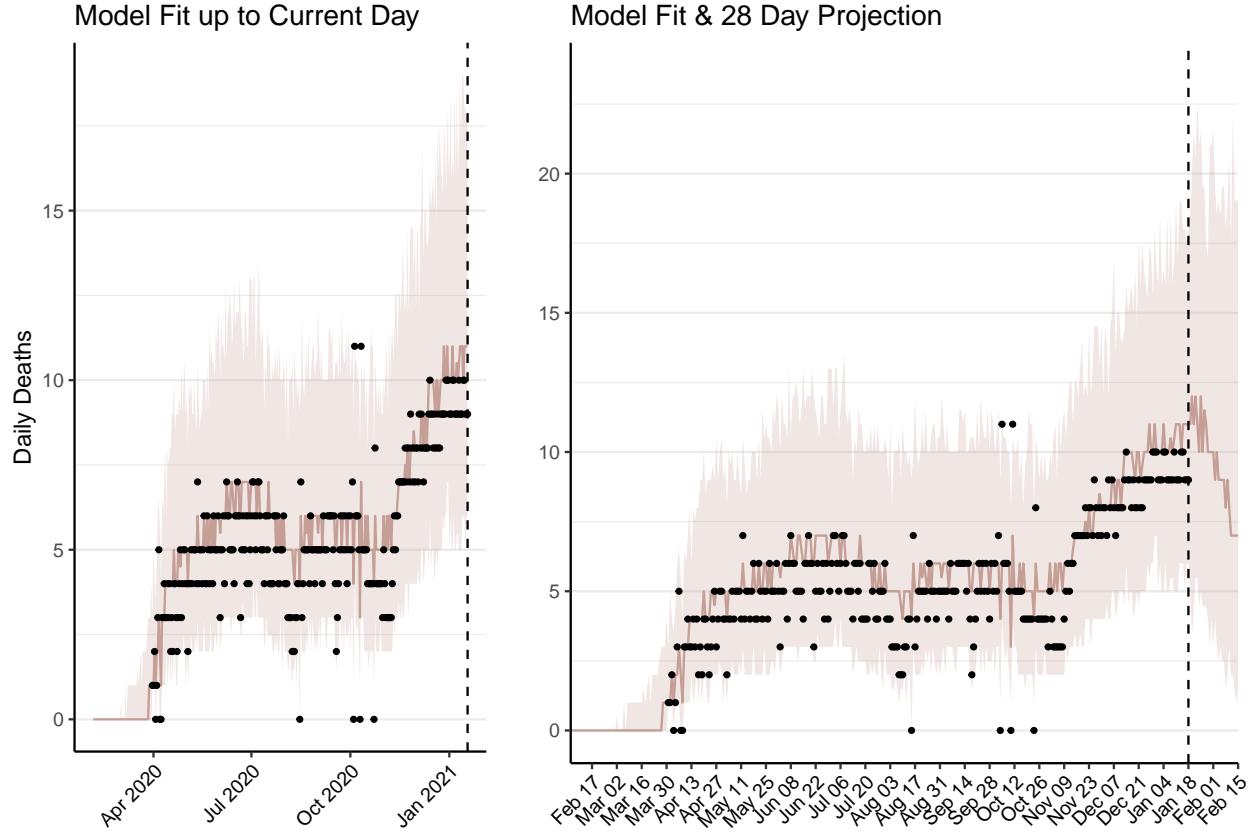


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 431 (95% CI: 413-449) patients requiring treatment with high-pressure oxygen at the current date to 259 (95% CI: 229-289) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 161 (95% CI: 155-167) patients requiring treatment with mechanical ventilation at the current date to 103 (95% CI: 93-114) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

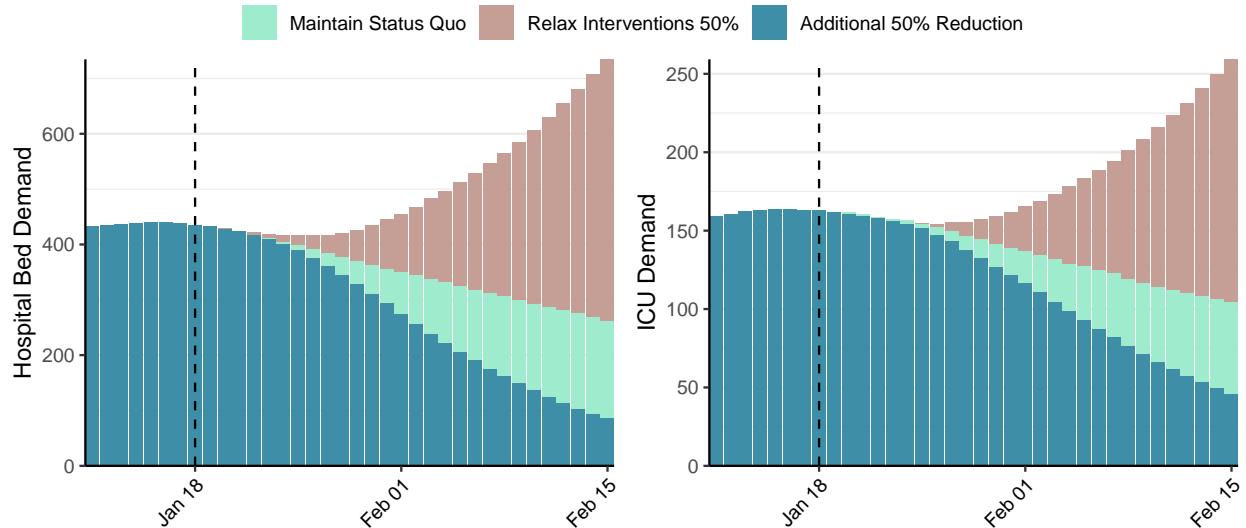


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,013 (95% CI: 2,823-3,203) at the current date to 157 (95% CI: 135-179) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,013 (95% CI: 2,823-3,203) at the current date to 8,735 (95% CI: 7,284-10,187) by 2021-02-15.

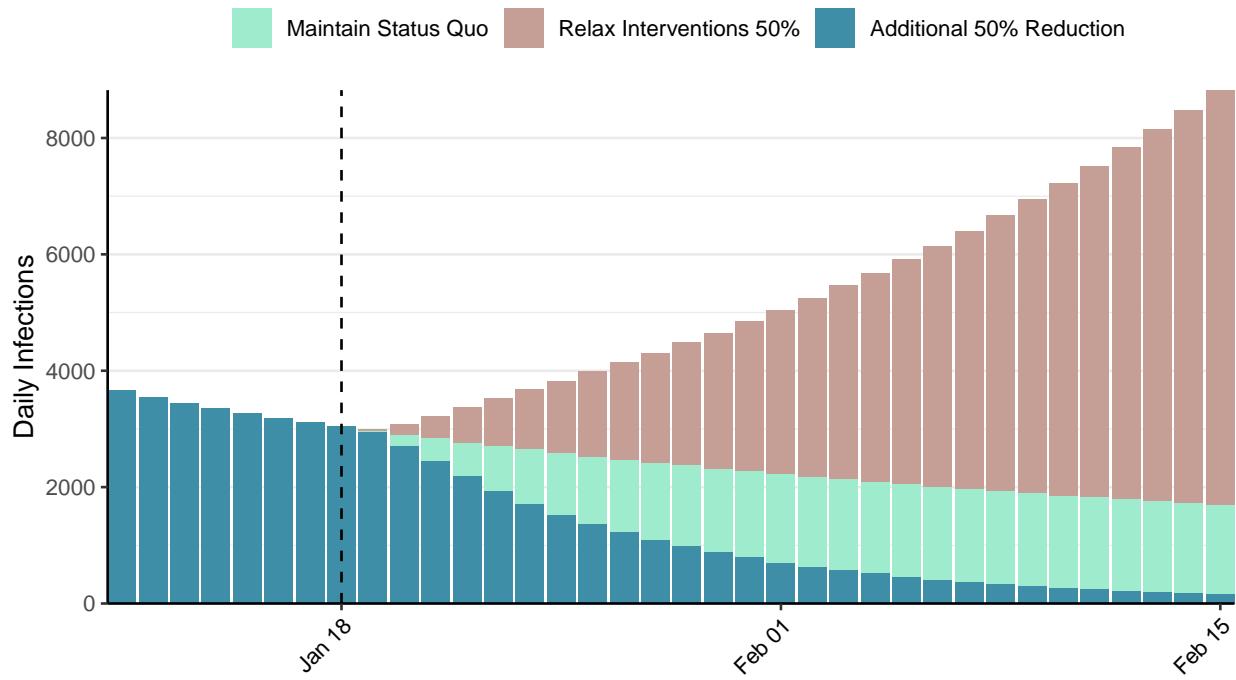


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Belize, 2021-01-18

[Download the report for Belize, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
12	12	1	1	0.58 (95% CI: 0.45-0.79)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Belize is not shown in the following plot as only 1 deaths have been reported to date**

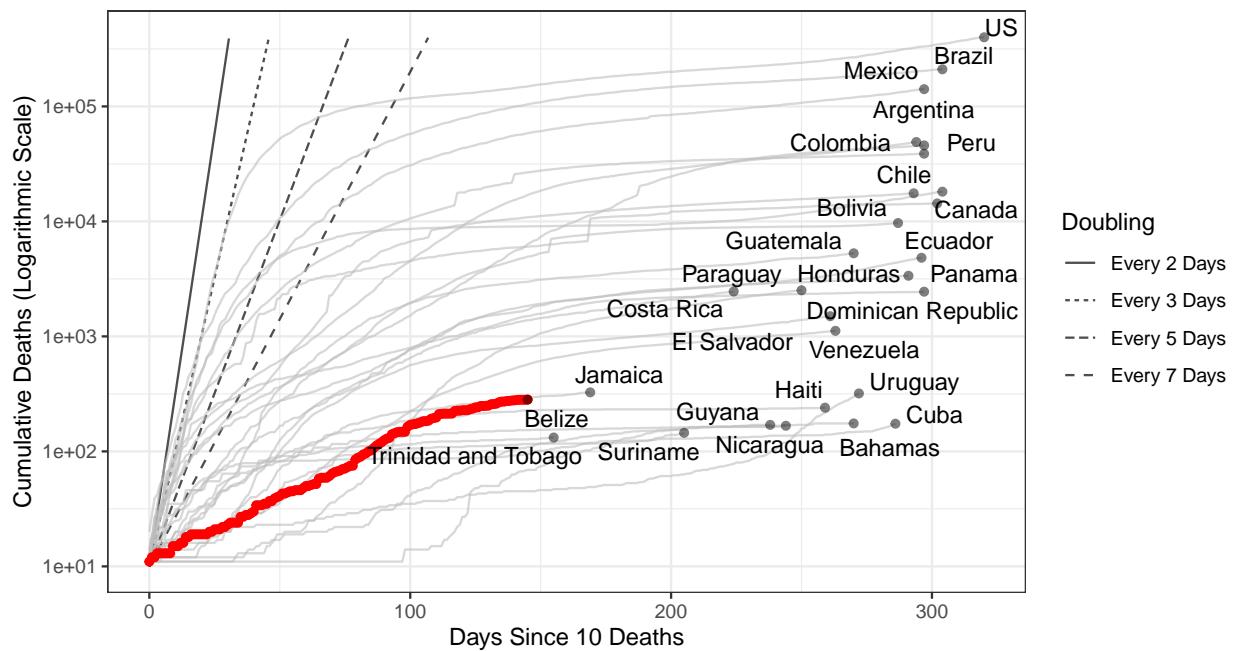


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 14,588 (95% CI: 13,855-15,321) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

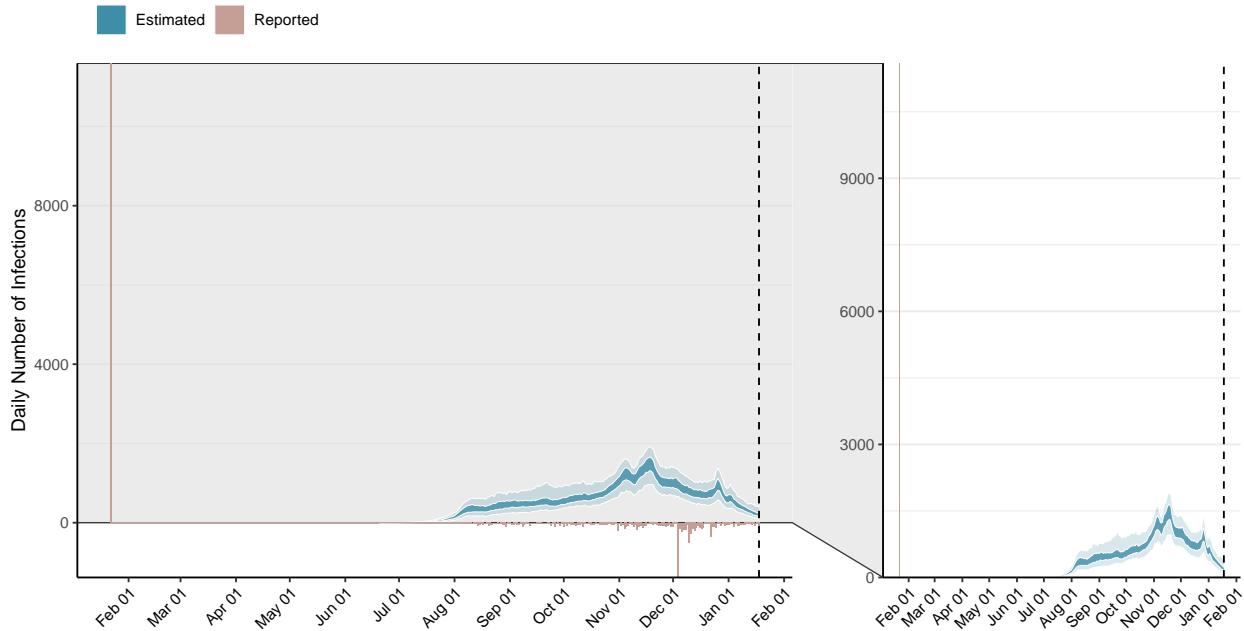
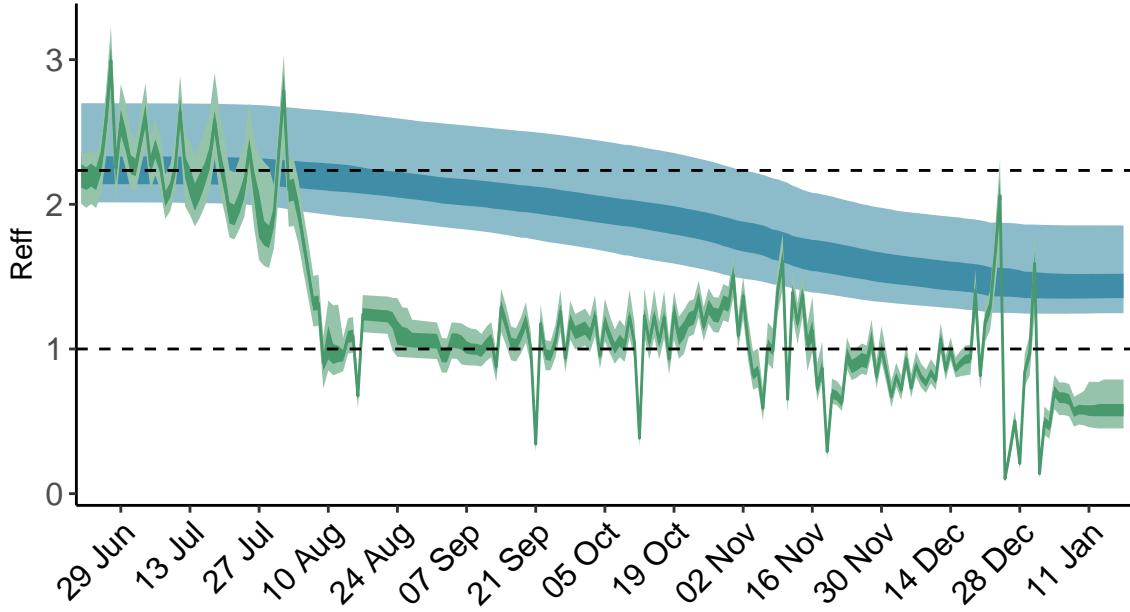


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Belize is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

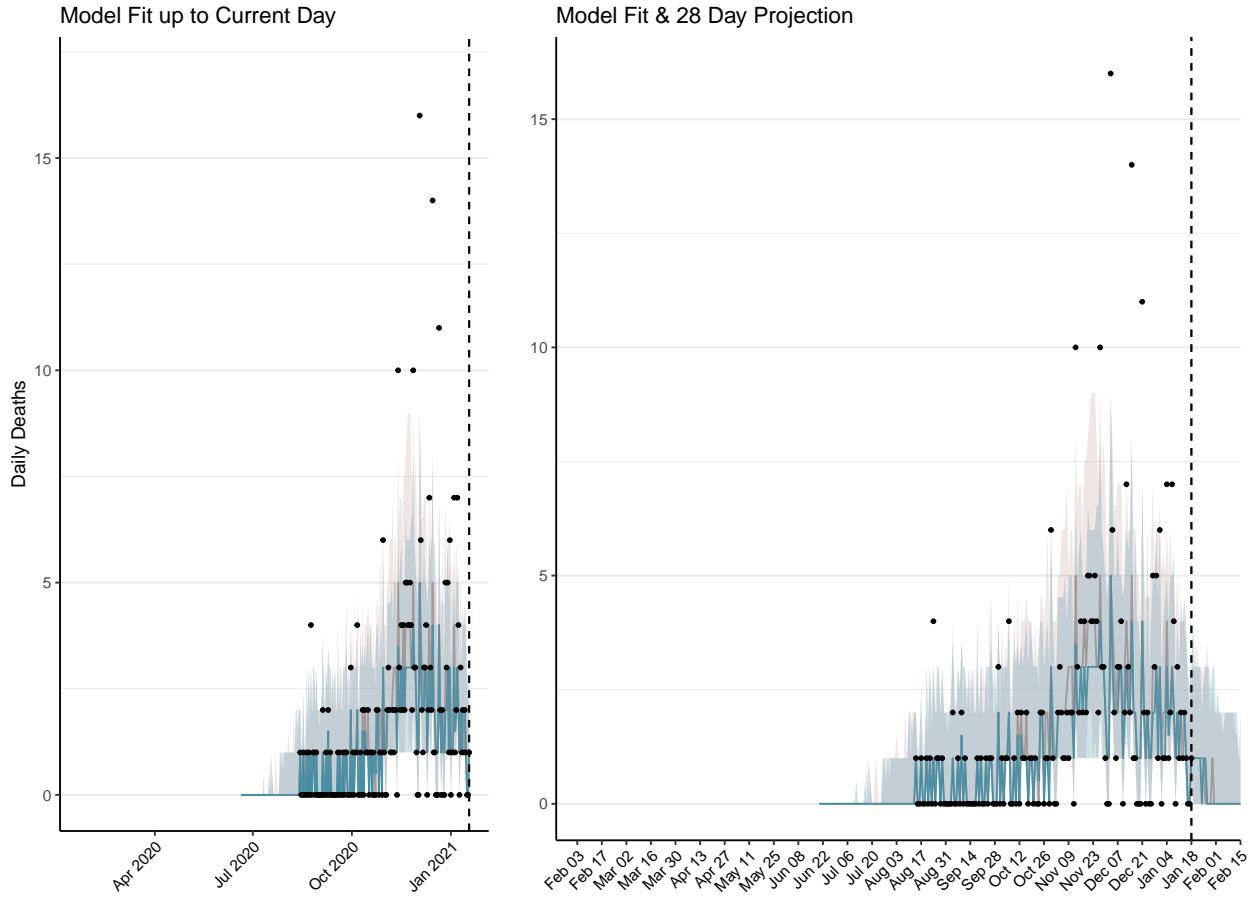


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 40 (95% CI: 38-42) patients requiring treatment with high-pressure oxygen at the current date to 7 (95% CI: 7-8) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 11 (95% CI: 11-12) patients requiring treatment with mechanical ventilation at the current date to 3 (95% CI: 3-4) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

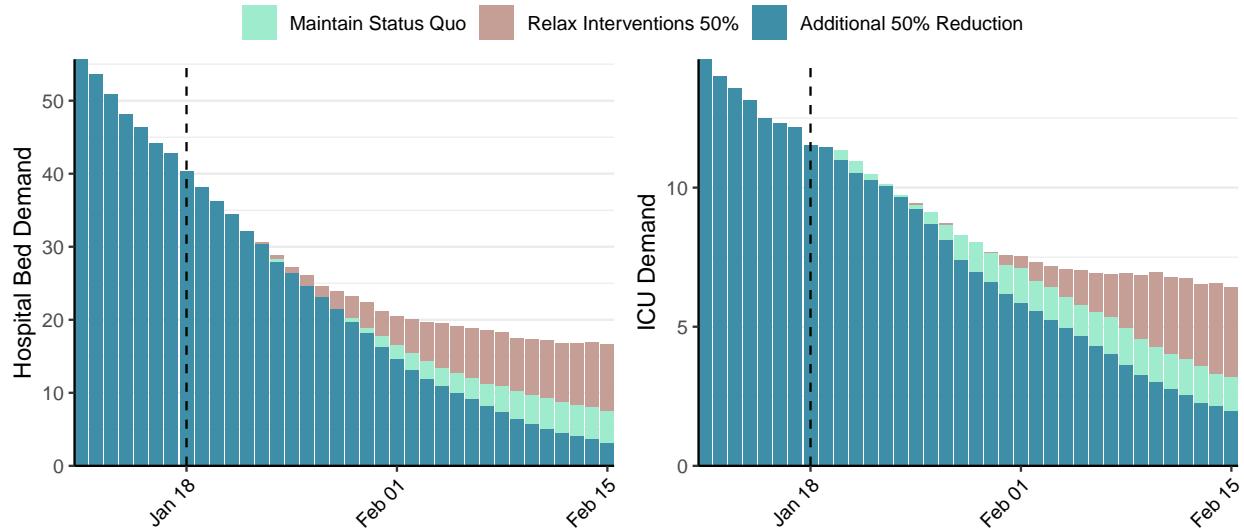


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 199 (95% CI: 185-213) at the current date to 4 (95% CI: 3-5) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 199 (95% CI: 185-213) at the current date to 180 (95% CI: 147-212) by 2021-02-15.

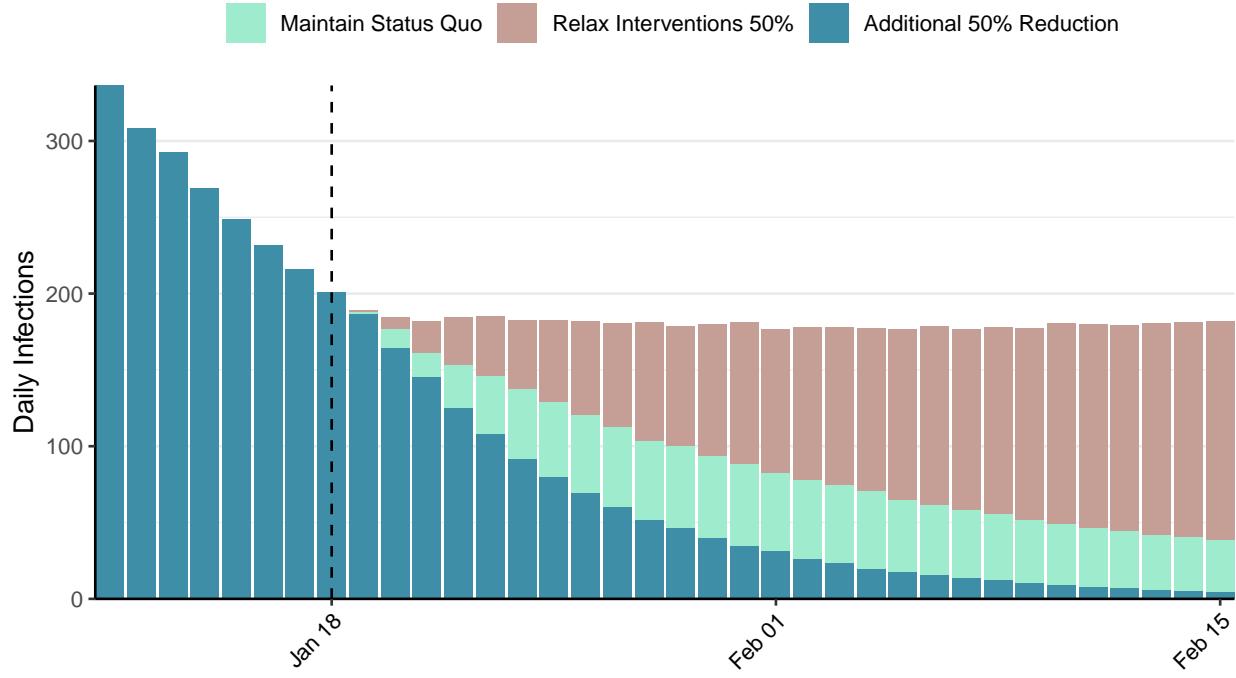


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Bolivia, 2021-01-18

[Download the report for Bolivia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.08 (95% CI: 0.89-1.25)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Bolivia is not shown in the following plot as only 0 deaths have been reported to date**

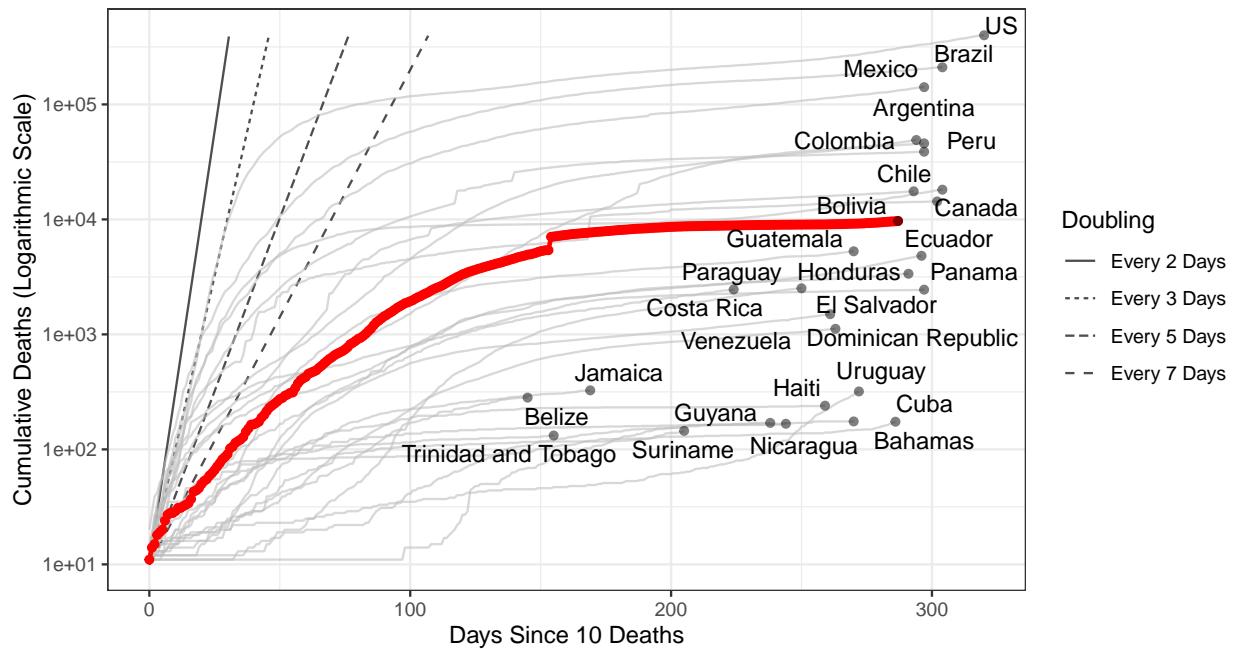


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 309,535 (95% CI: 298,203-320,867) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

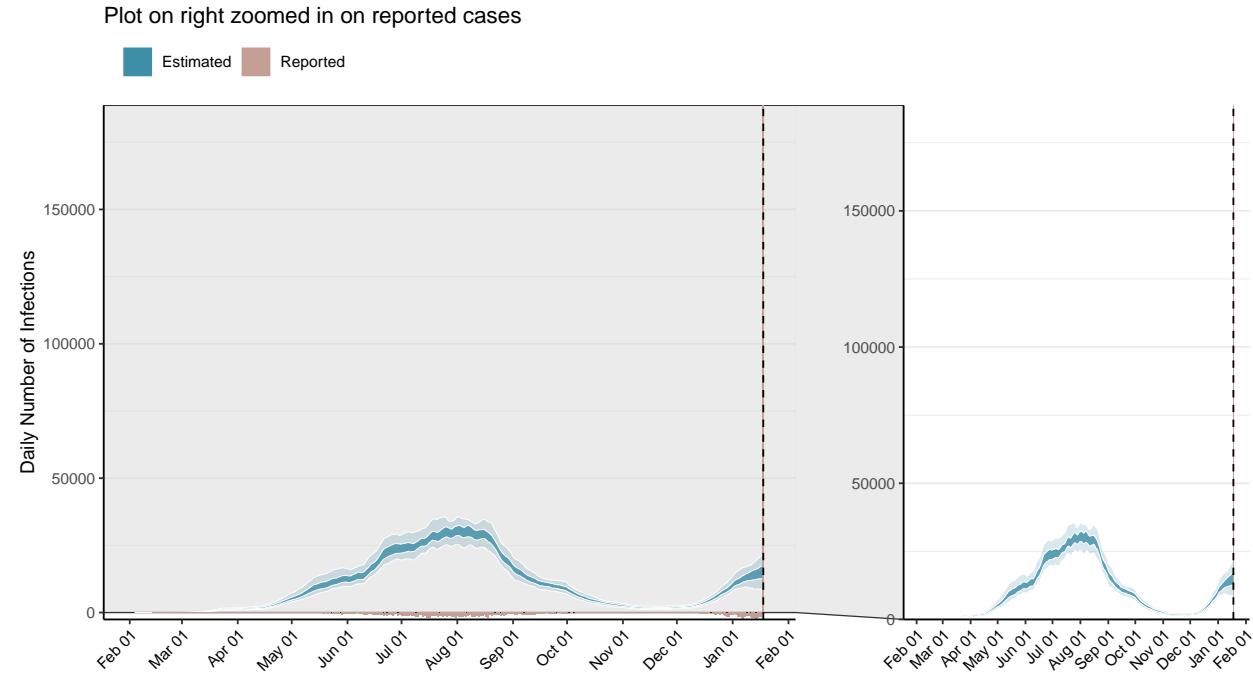
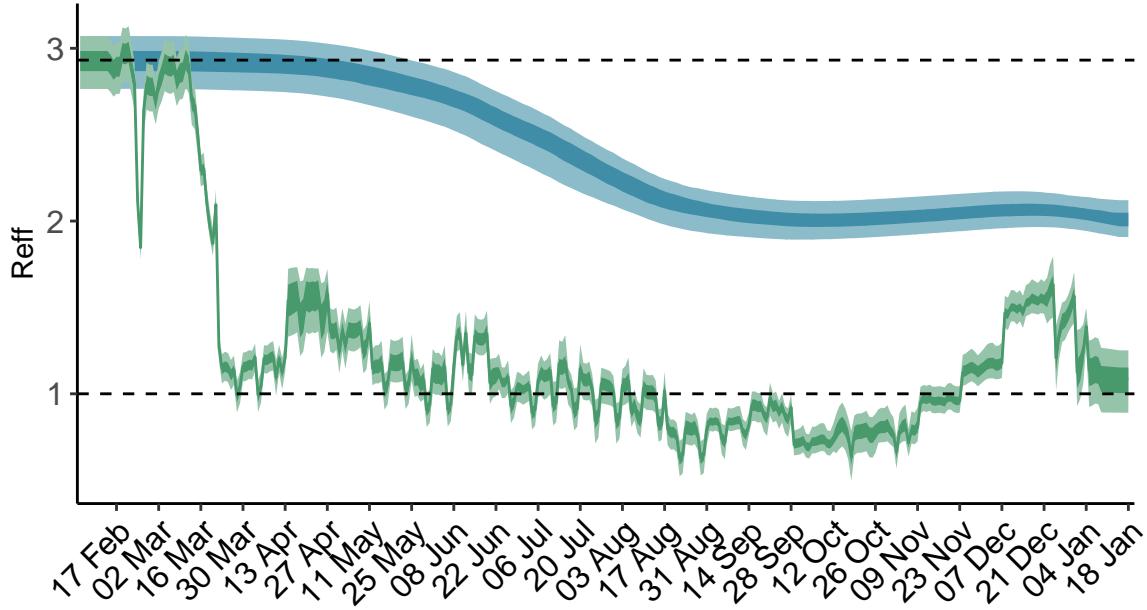


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Bolivia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

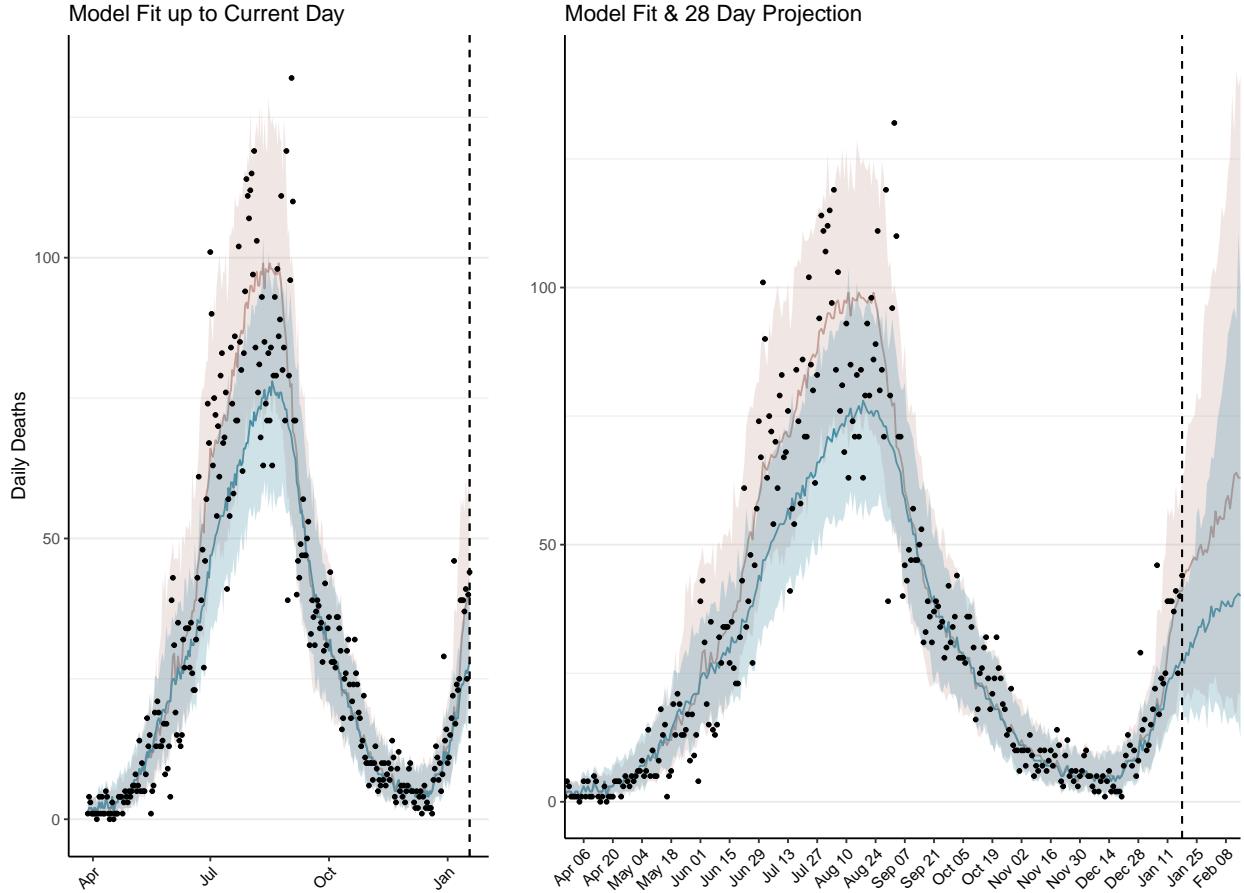


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,178 (95% CI: 1,133-1,222) patients requiring treatment with high-pressure oxygen at the current date to 1,859 (95% CI: 1,698-2,020) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 301 (95% CI: 294-308) patients requiring treatment with mechanical ventilation at the current date to 331 (95% CI: 320-342) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

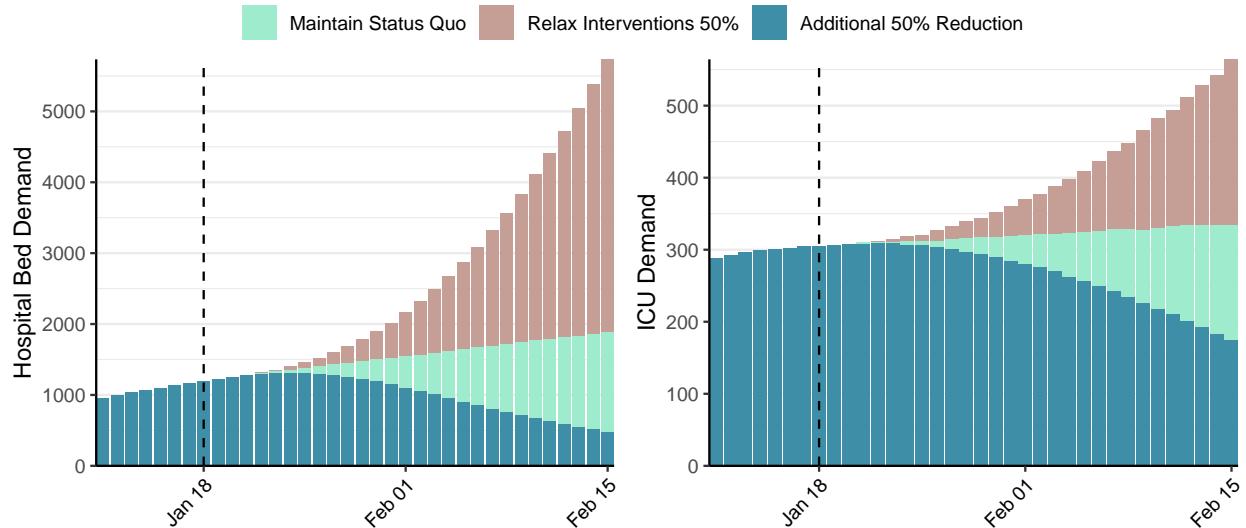
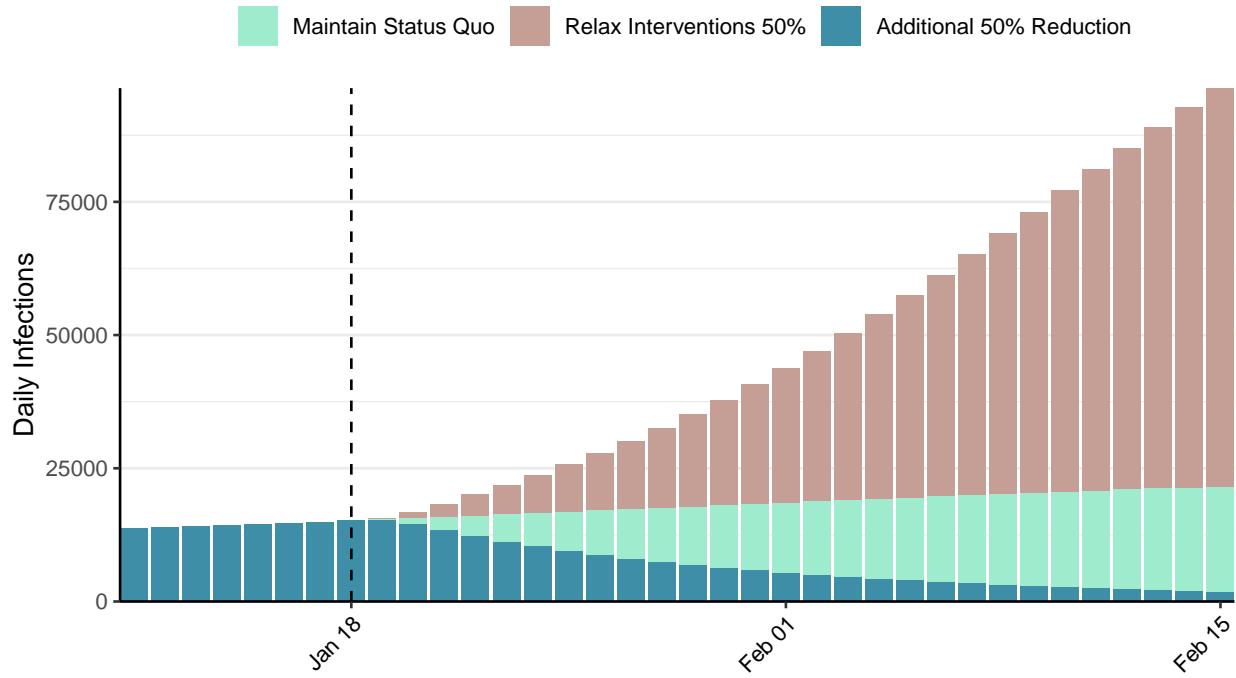


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 15,076 (95% CI: 14,286-15,867) at the current date to 1,811 (95% CI: 1,629-1,992) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 15,076 (95% CI: 14,286-15,867) at the current date to 95,389 (95% CI: 86,941-103,837) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Brazil, 2021-01-18

[Download the report for Brazil, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.93 (95% CI: 0.76-1.13)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Brazil is not shown in the following plot as only 0 deaths have been reported to date**

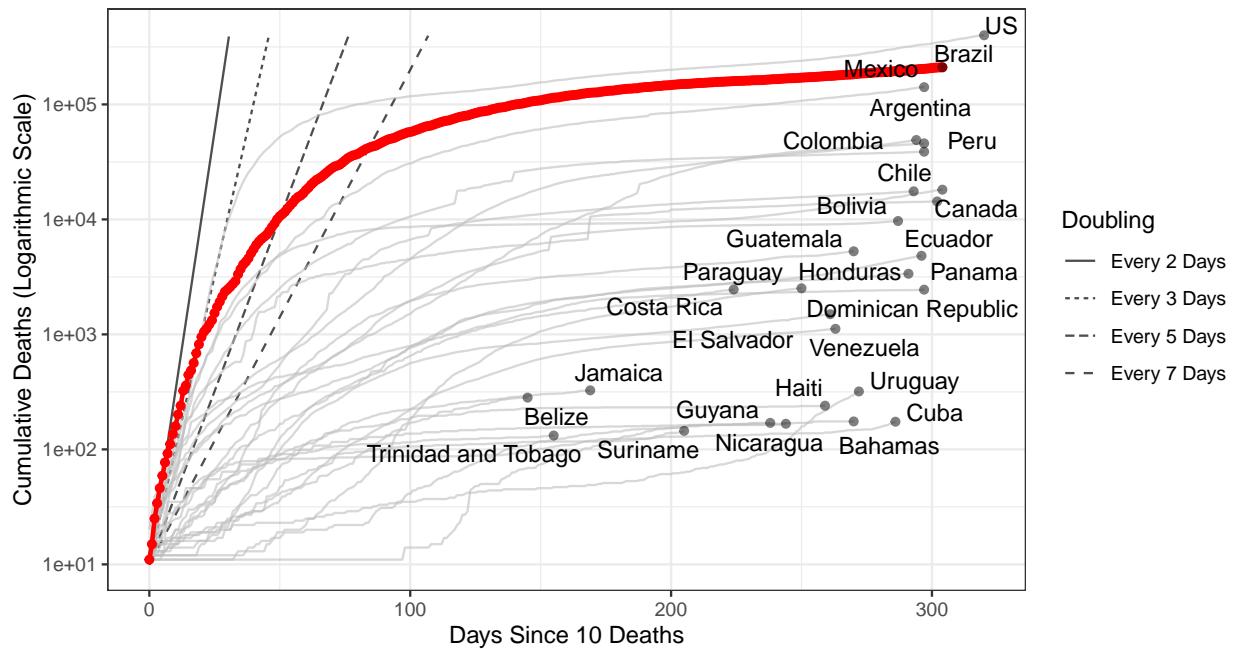


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 6,996,136 (95% CI: 6,698,157-7,294,114) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

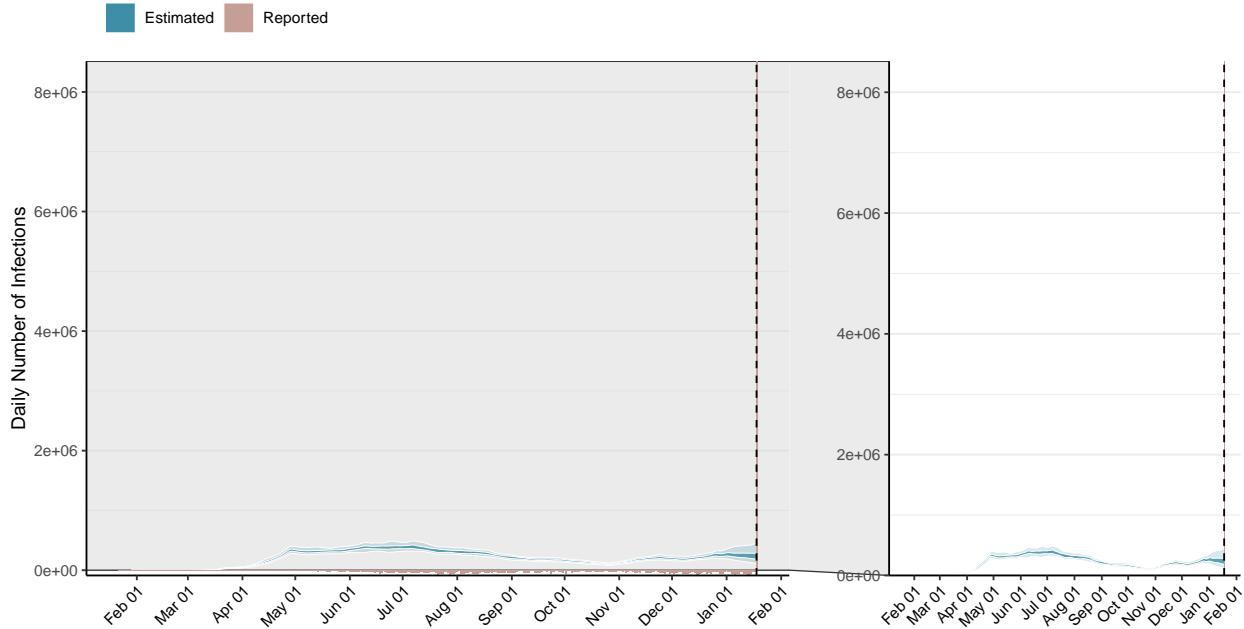


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.

For sub-national estimates of  $R_t$ , and further analysis of Brazil, please see [Report 21](#)

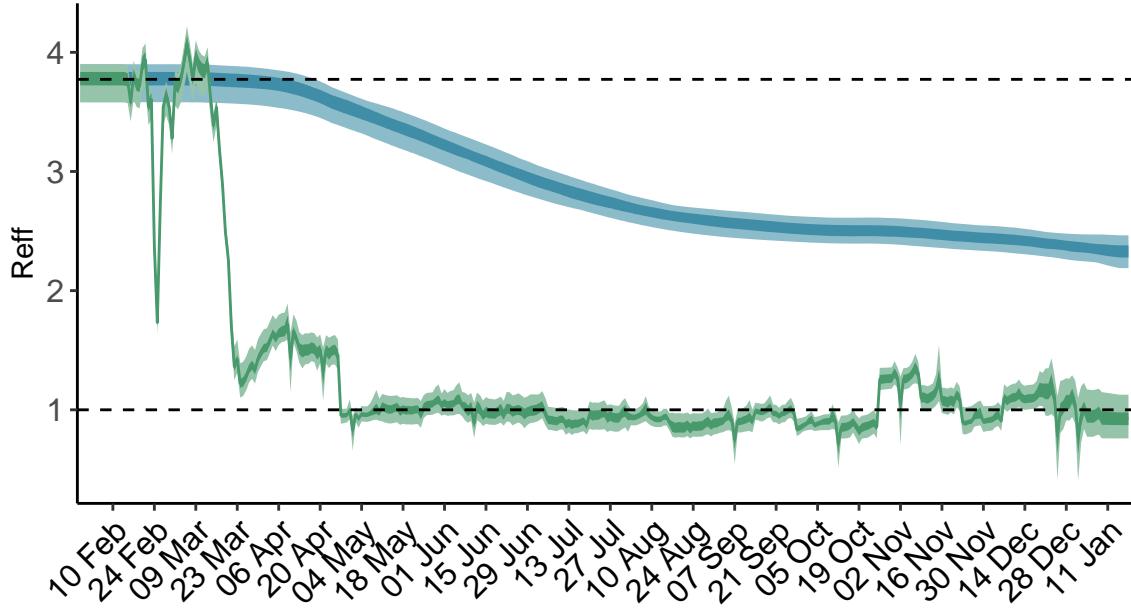


Figure 3: **Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Brazil is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

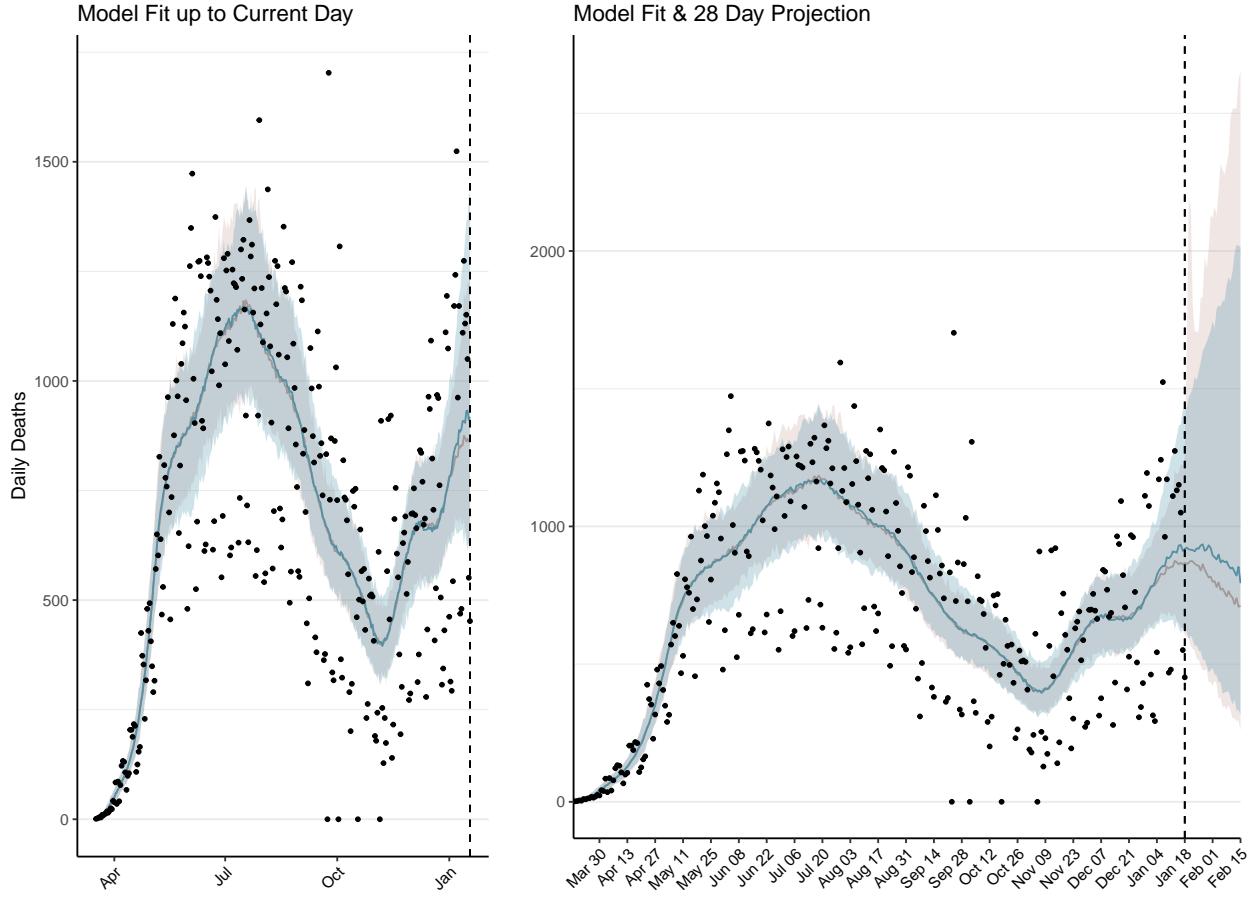


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 31,146 (95% CI: 29,643-32,649) patients requiring treatment with high-pressure oxygen at the current date to 27,111 (95% CI: 23,921-30,302) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 11,421 (95% CI: 10,924-11,919) patients requiring treatment with mechanical ventilation at the current date to 9,478 (95% CI: 8,715-10,241) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

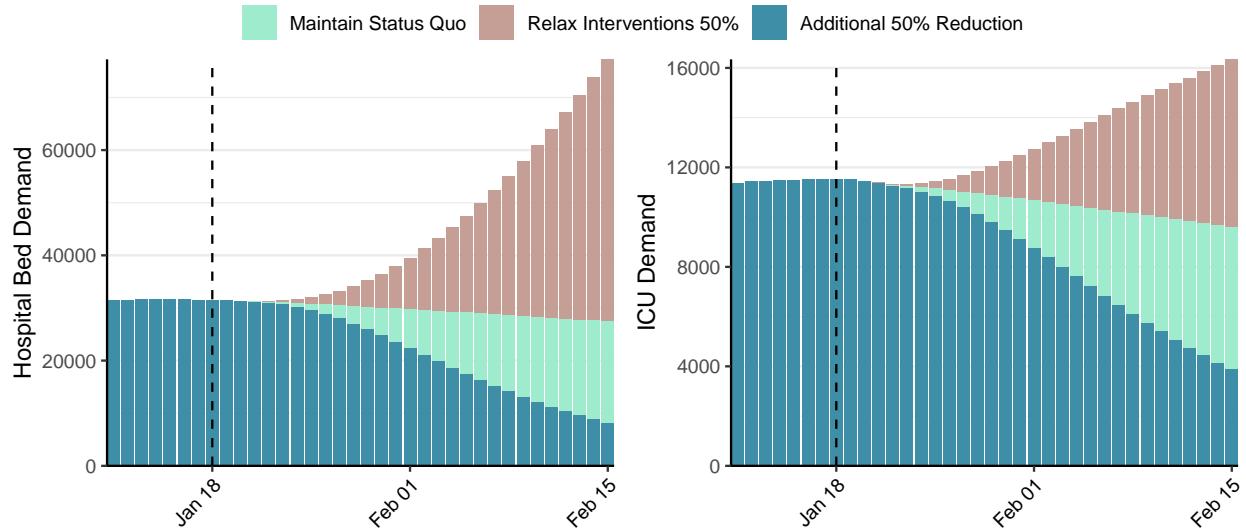
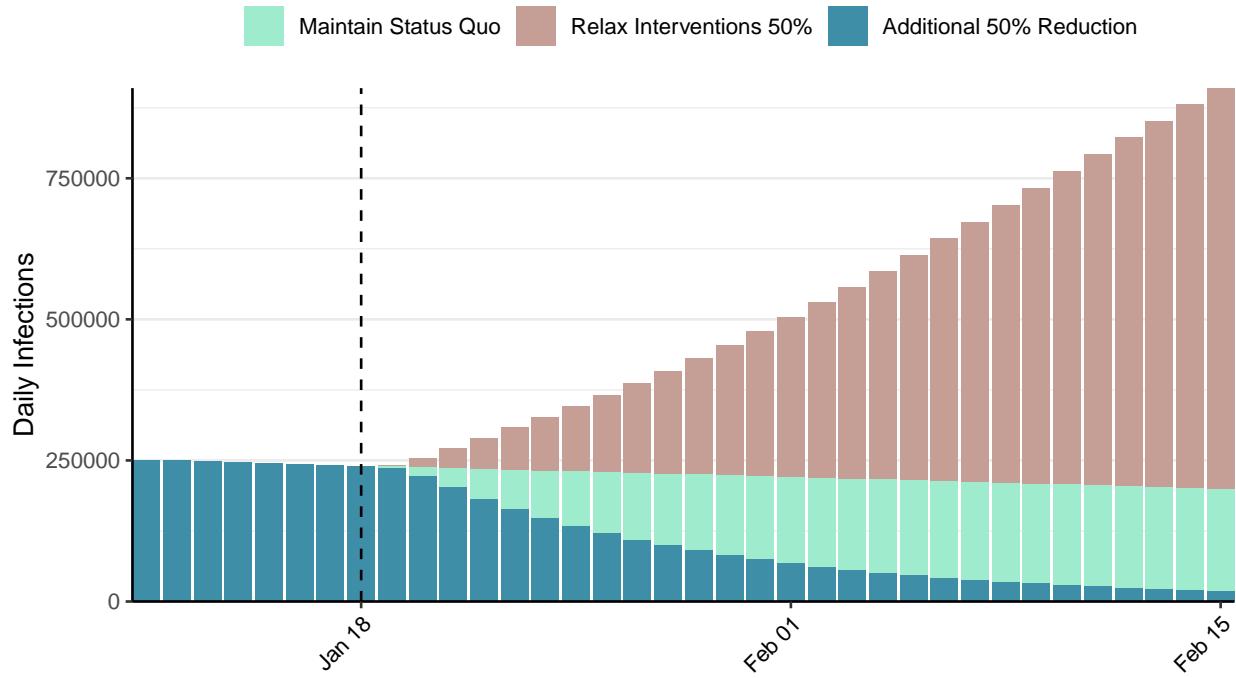


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 238,299 (95% CI: 220,436-256,161) at the current date to 18,270 (95% CI: 15,741-20,799) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 238,299 (95% CI: 220,436-256,161) at the current date to 900,769 (95% CI: 794,698-1,006,839) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Bhutan, 2021-01-18

[Download the report for Bhutan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1	1	0	0	2.09 (95% CI: 1.37-3.04)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Bhutan is not shown in the following plot as only 0 deaths have been reported to date**

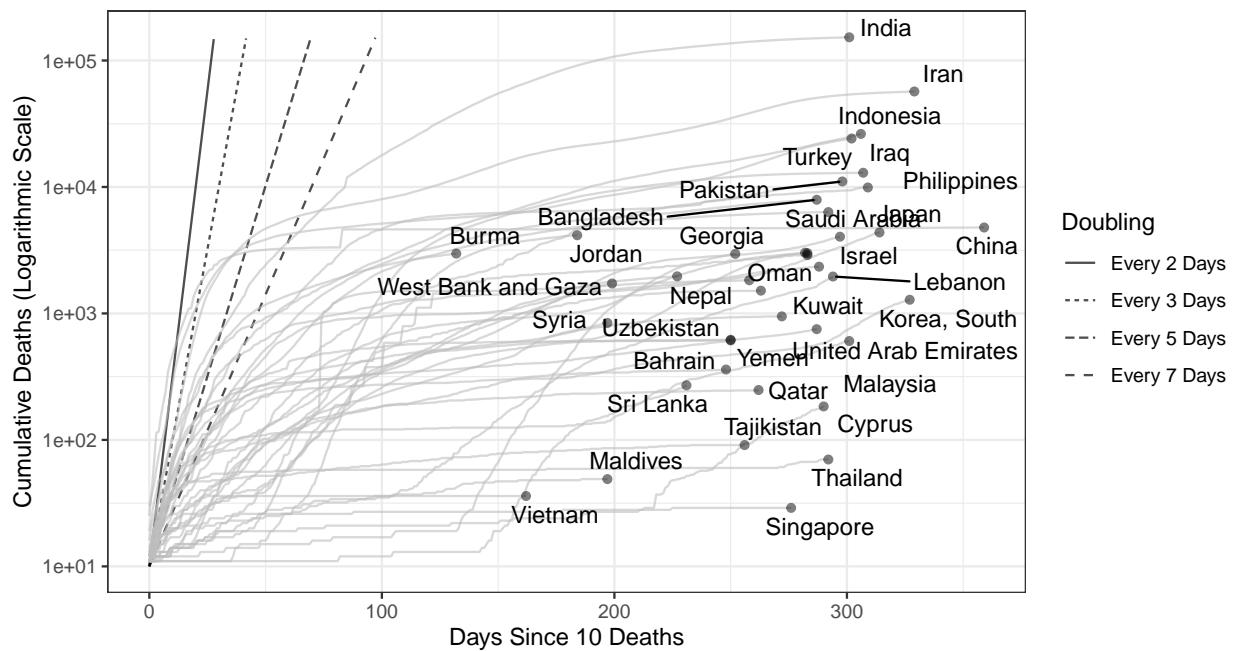


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,953 (95% CI: 2,287-3,619) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

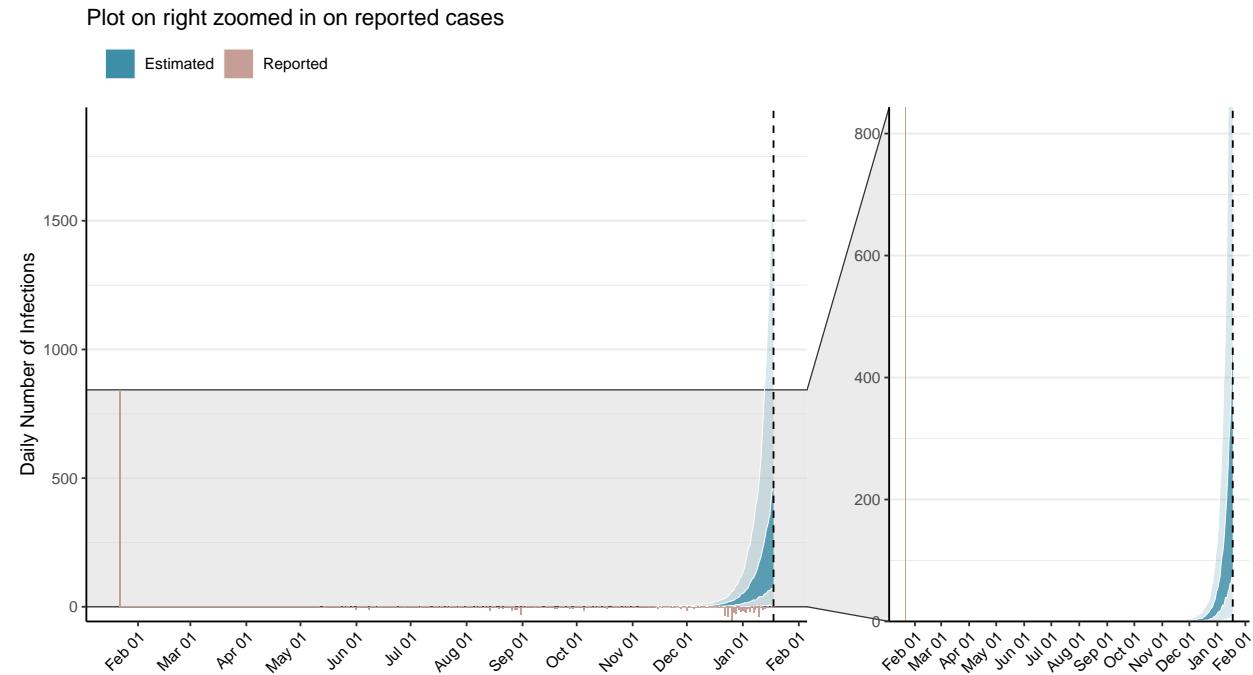
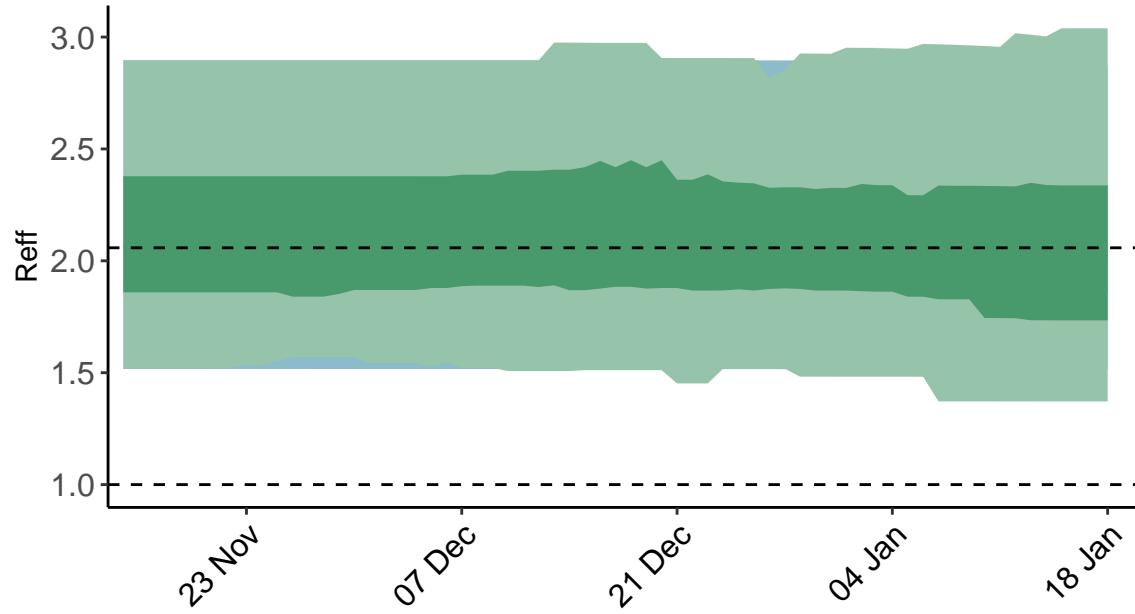


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Bhutan is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

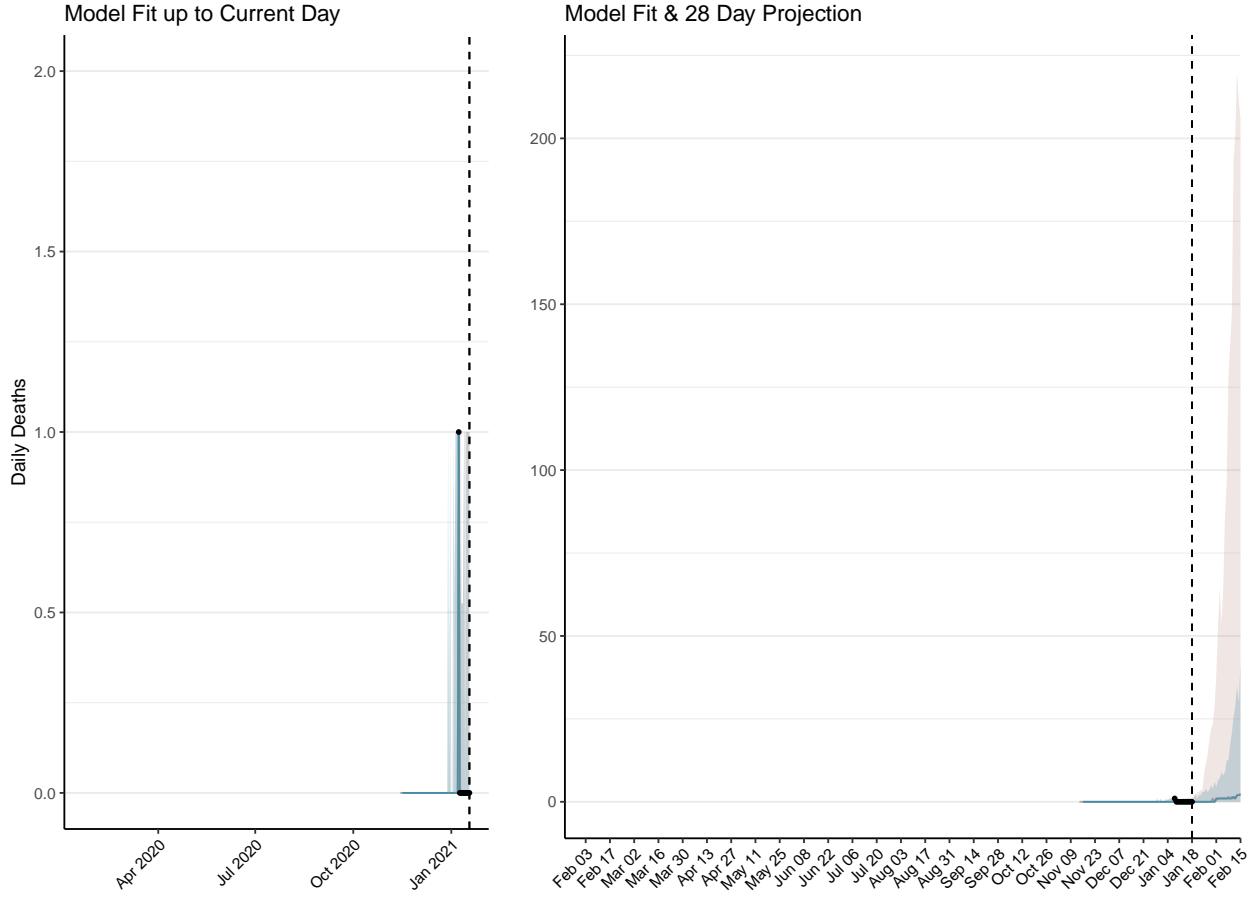


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 13 (95% CI: 10-17) patients requiring treatment with high-pressure oxygen at the current date to 338 (95% CI: 213-463) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 4 (95% CI: 3-5) patients requiring treatment with mechanical ventilation at the current date to 39 (95% CI: 30-48) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

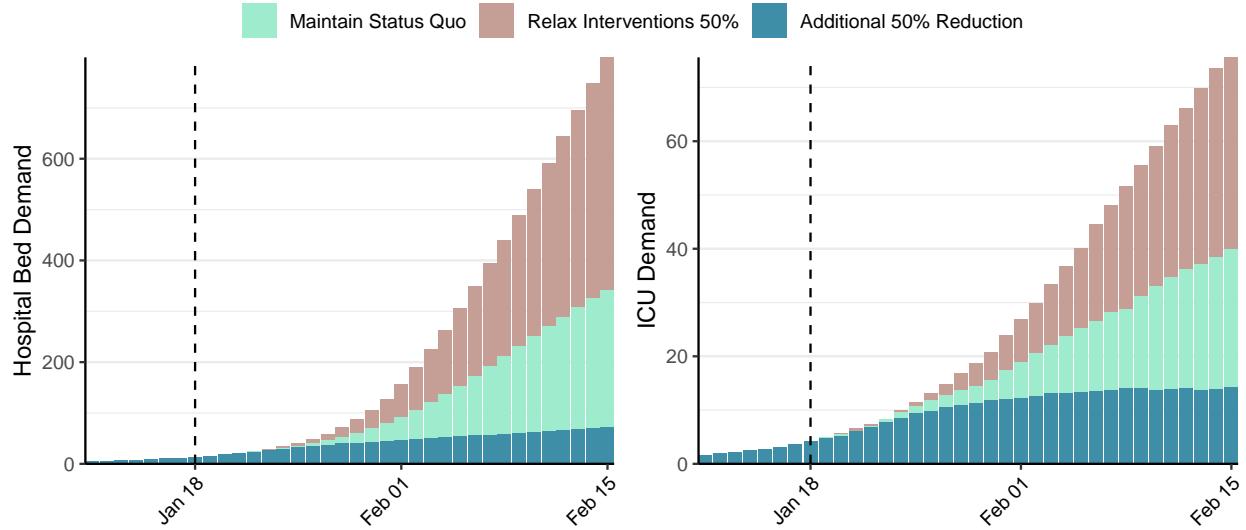


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 400 (95% CI: 294-505) at the current date to 845 (95% CI: 301-1,389) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 400 (95% CI: 294-505) at the current date to 12,722 (95% CI: 10,178-15,266) by 2021-02-15.

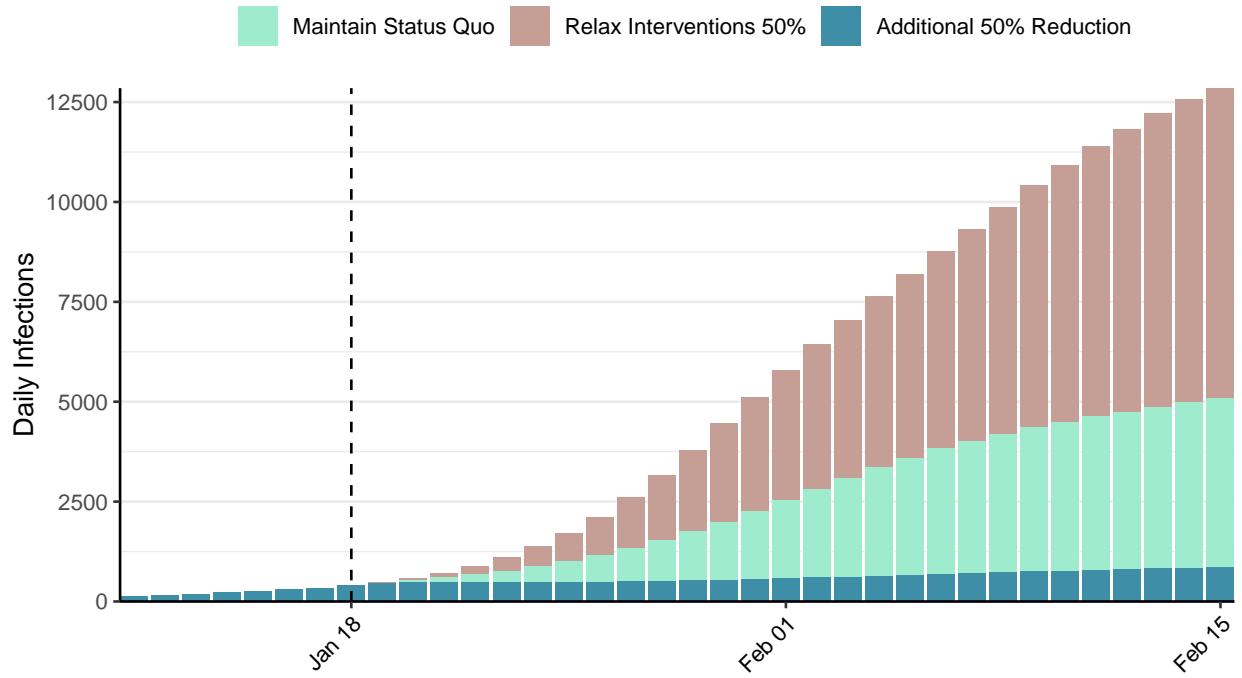


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Botswana, 2021-01-18

[Download the report for Botswana, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,265	1,265	17	17	1.36 (95% CI: 1.13-1.59)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

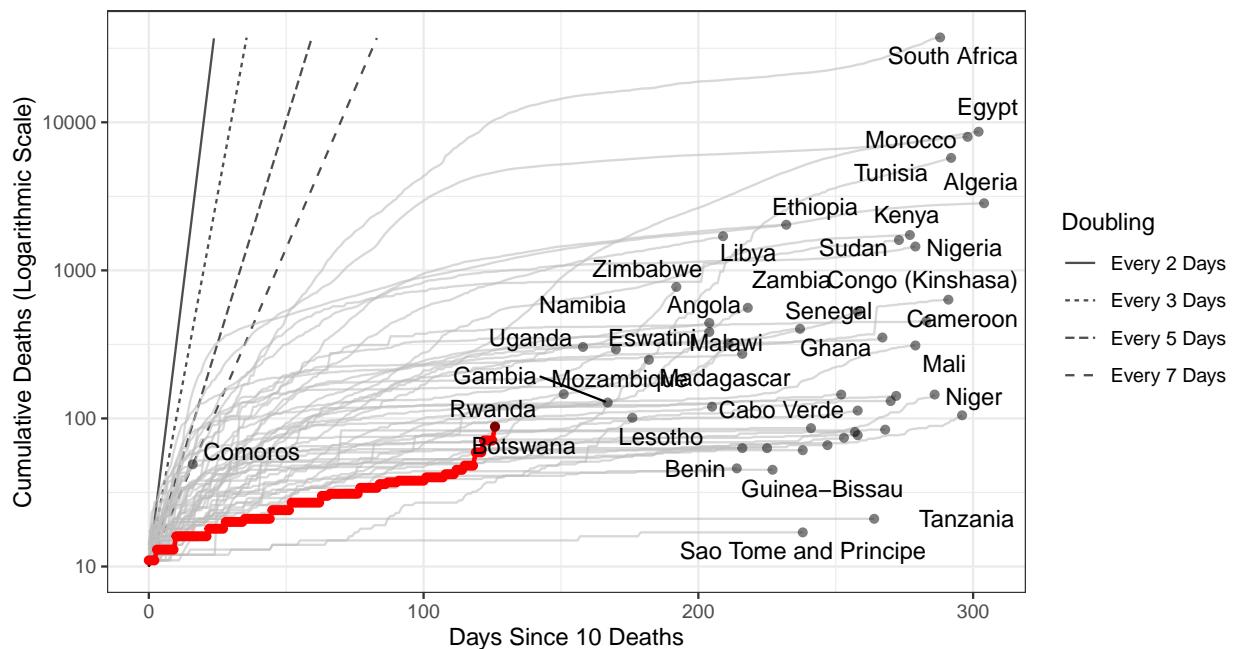


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 53,079 (95% CI: 47,265–58,893) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

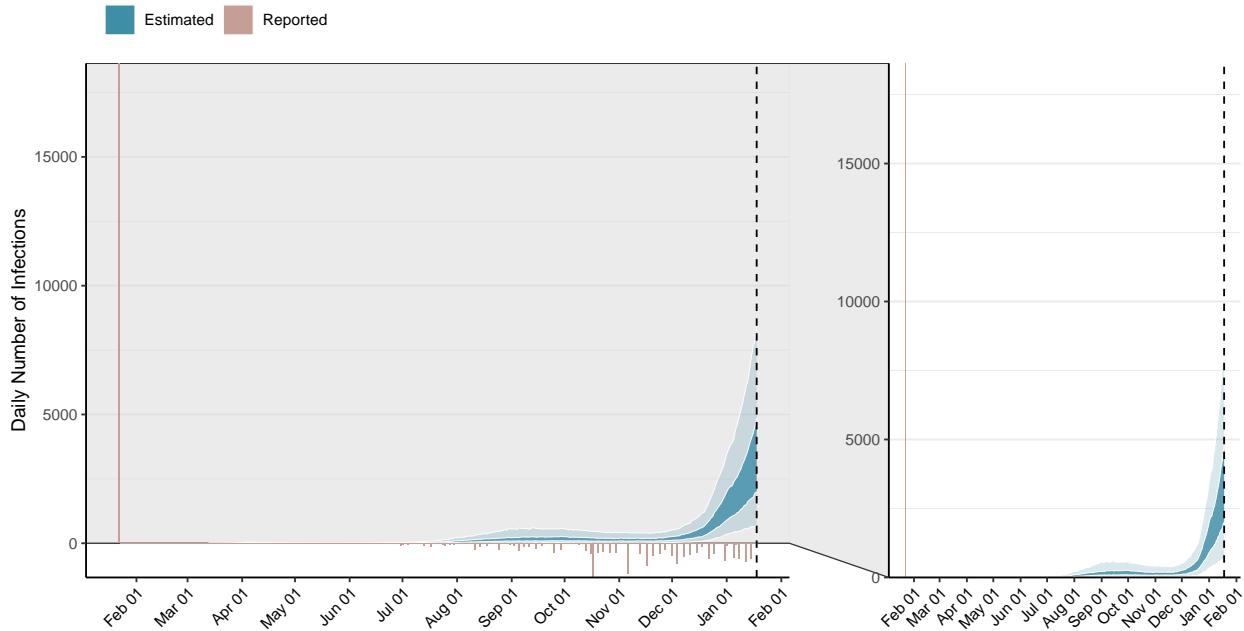
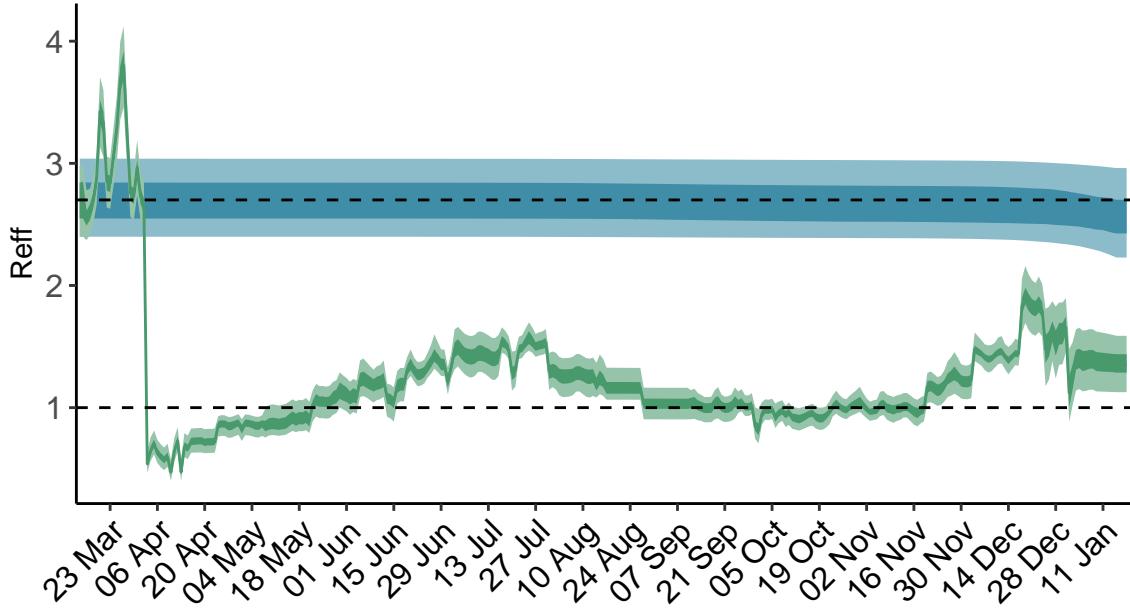


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Botswana is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

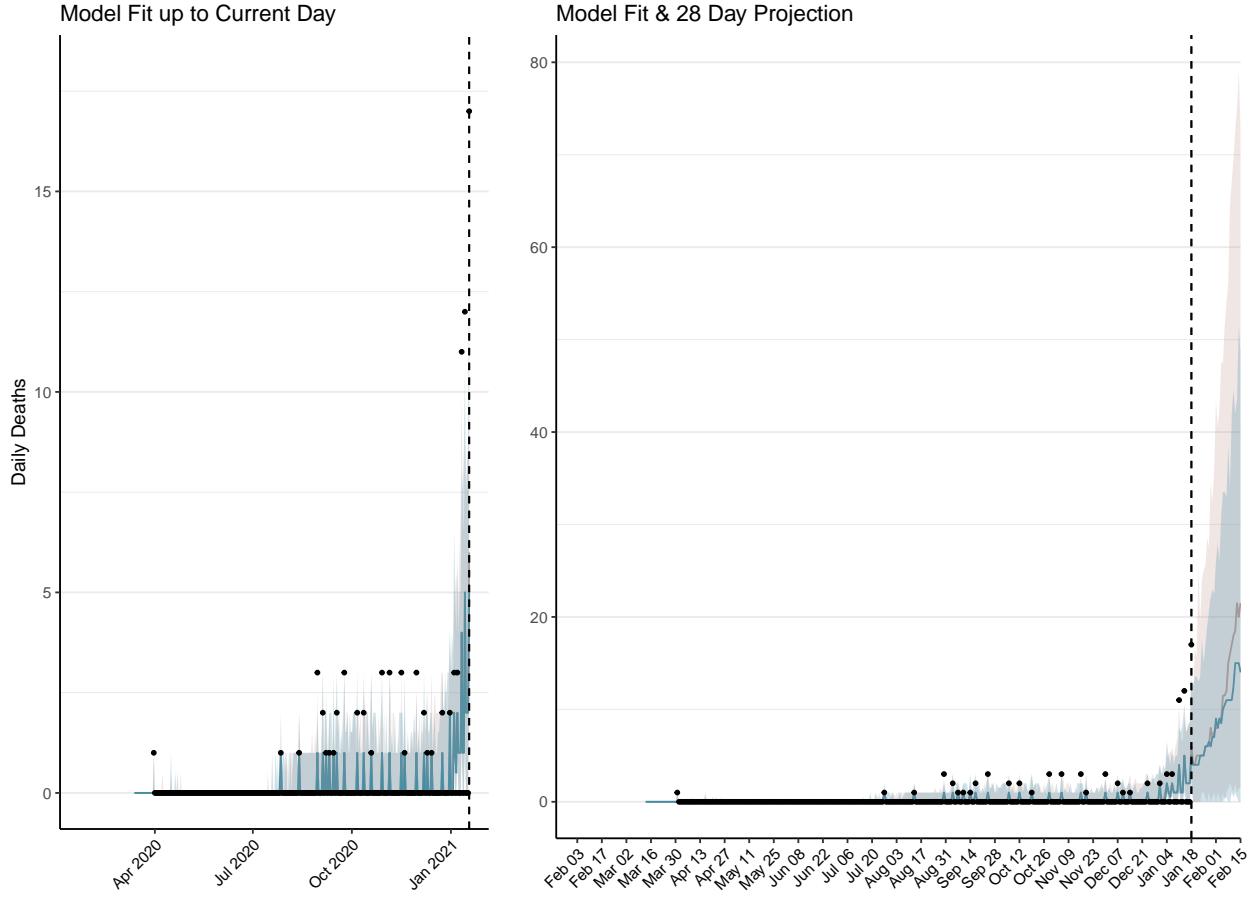


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 194 (95% CI: 173-215) patients requiring treatment with high-pressure oxygen at the current date to 730 (95% CI: 636-825) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 67 (95% CI: 59-74) patients requiring treatment with mechanical ventilation at the current date to 162 (95% CI: 150-173) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

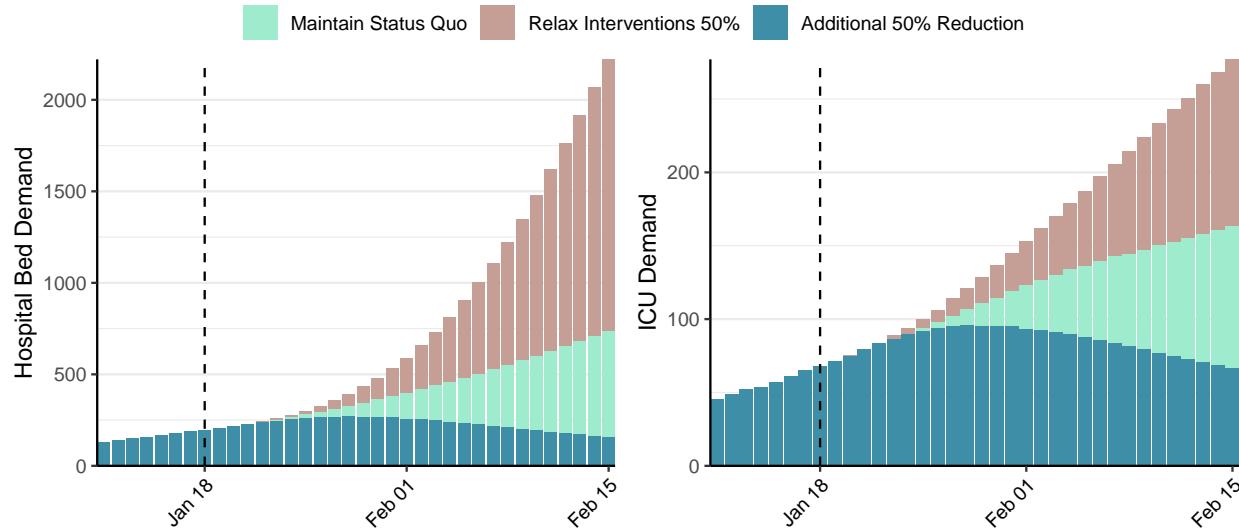


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,583 (95% CI: 3,165-4,001) at the current date to 925 (95% CI: 788-1,062) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,583 (95% CI: 3,165-4,001) at the current date to 44,272 (95% CI: 40,605-47,940) by 2021-02-15.

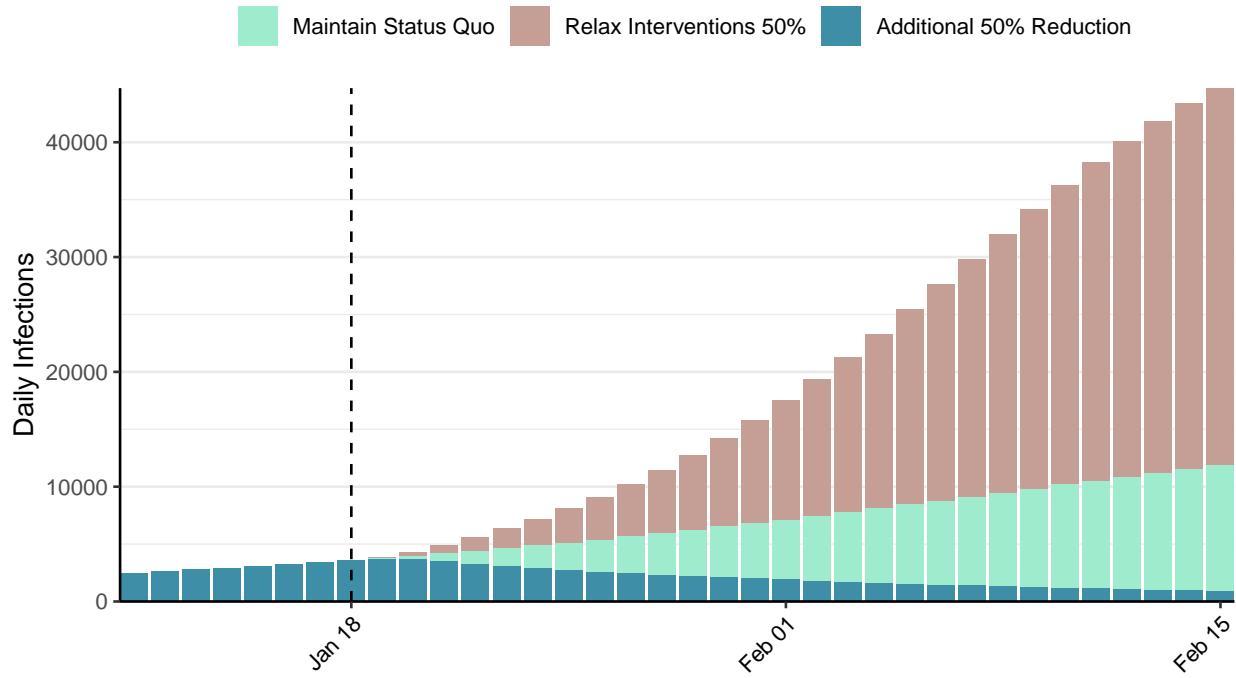


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Central African Republic, 2021-01-18

[Download the report for Central African Republic, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.7 (95% CI: 0.38-1.12)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Central African Republic is not shown in the following plot as only 0 deaths have been reported to date**

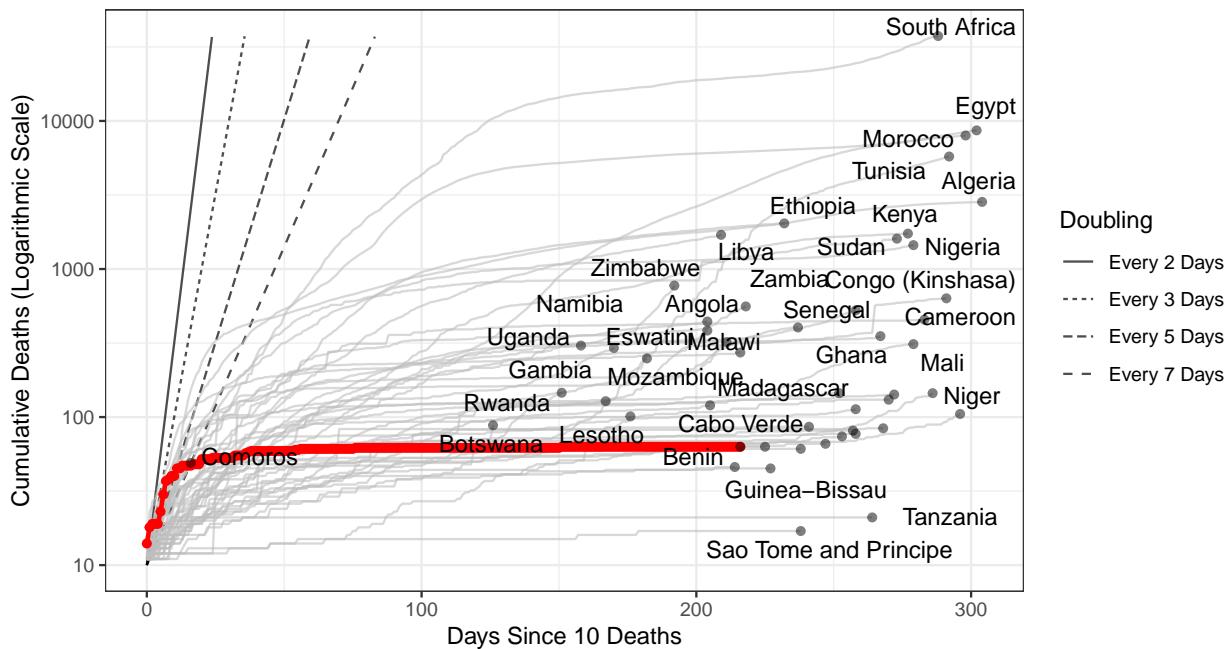


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 0 (95% CI: 0-1) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

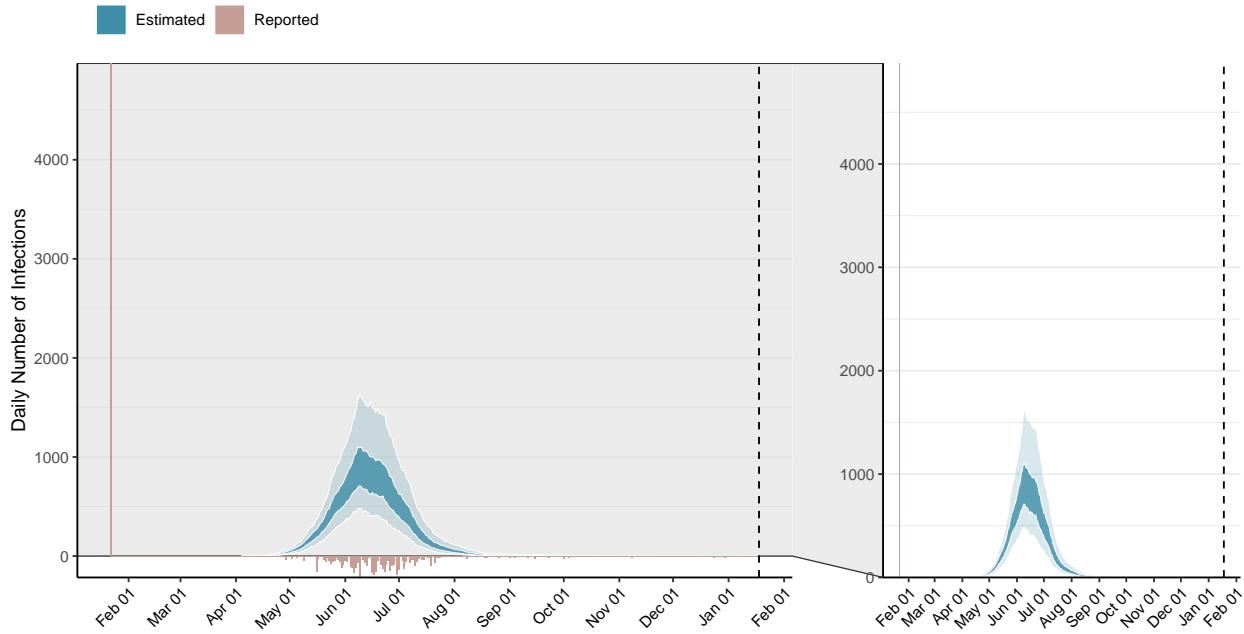
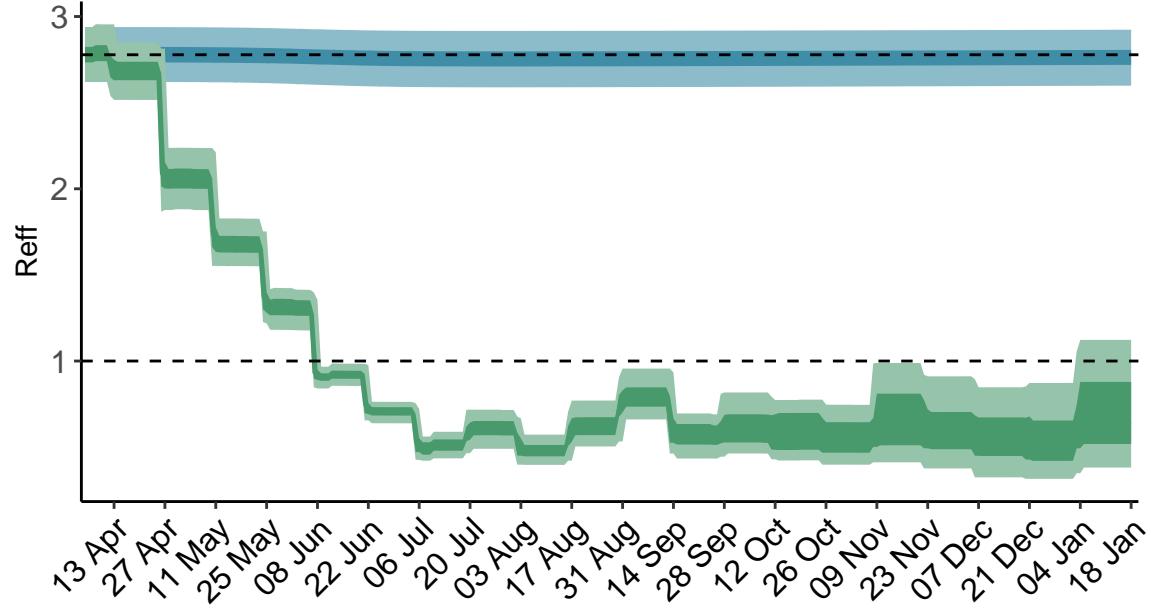


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

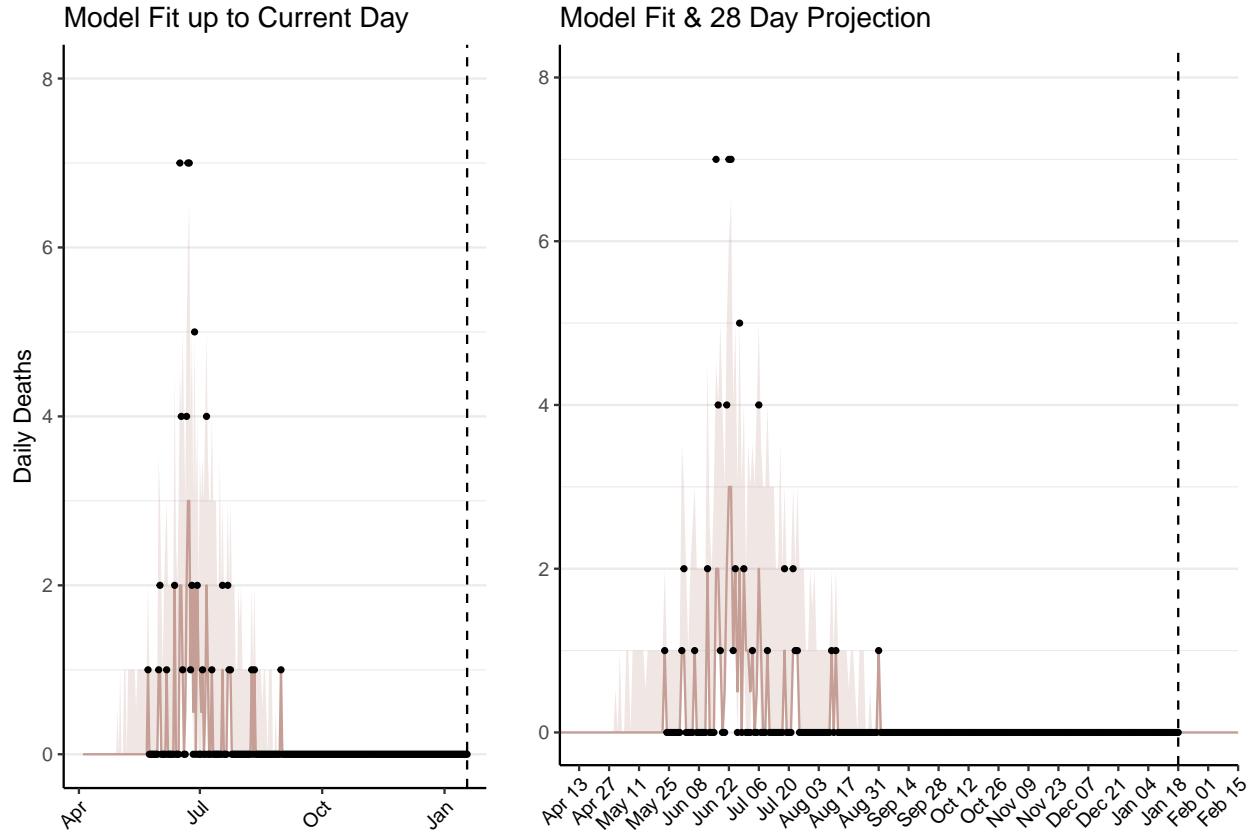


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: NaN-NaN) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

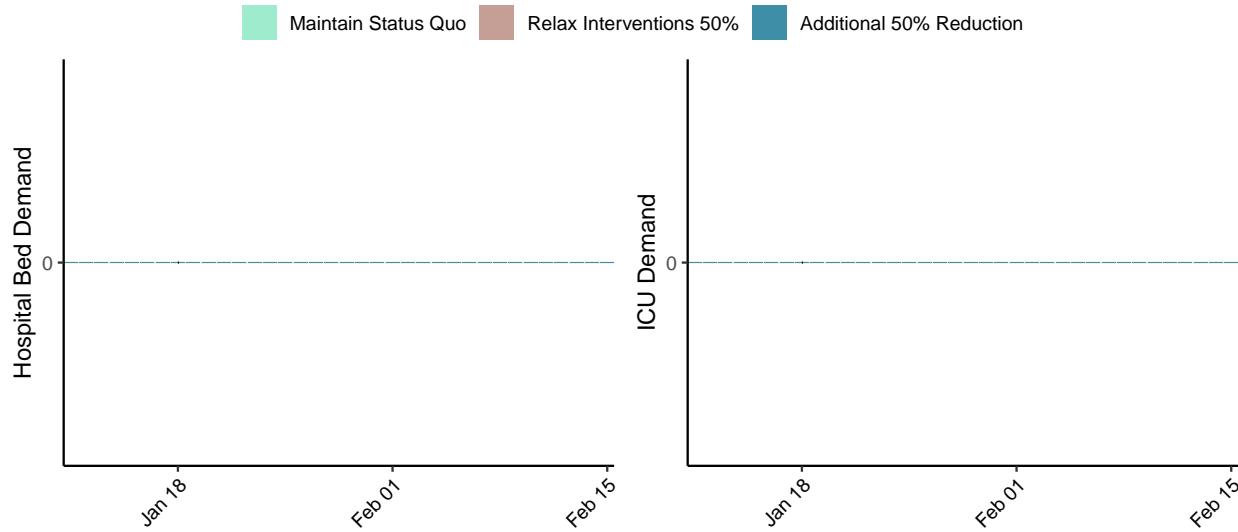
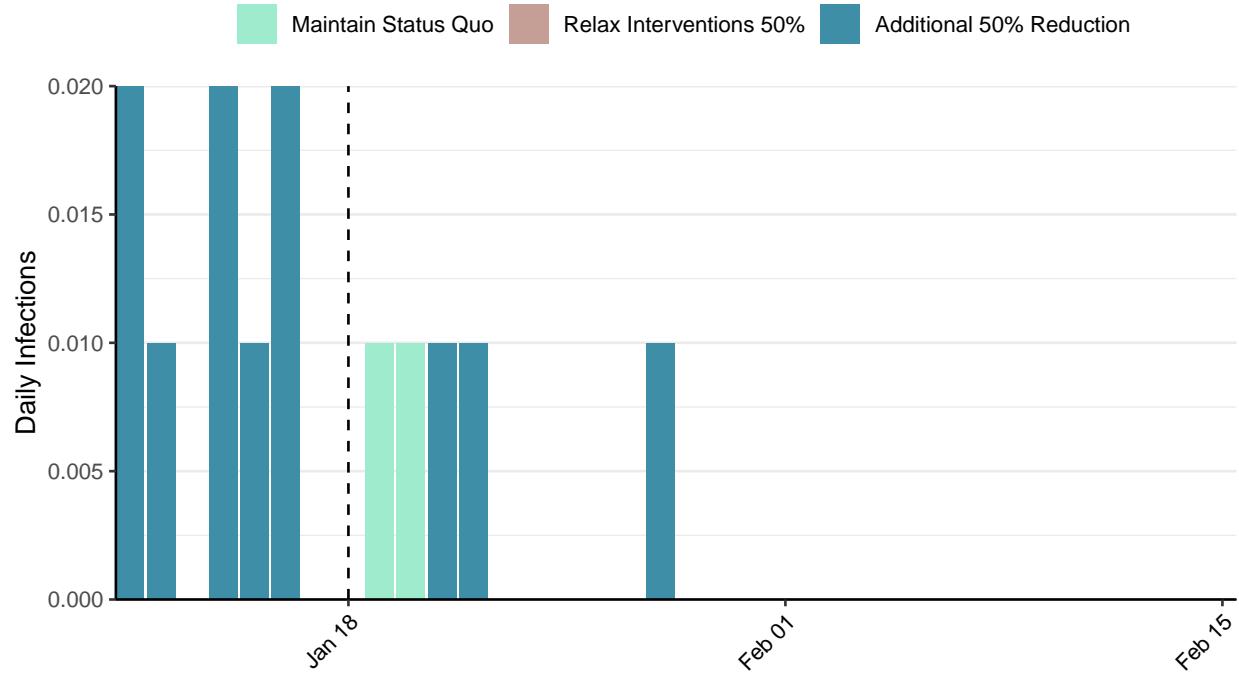


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: NaN-NaN) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: NaN-NaN) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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## Situation Report for COVID-19: Chile, 2021-01-18

[Download the report for Chile, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.95 (95% CI: 0.75-1.35)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Chile is not shown in the following plot as only 0 deaths have been reported to date**

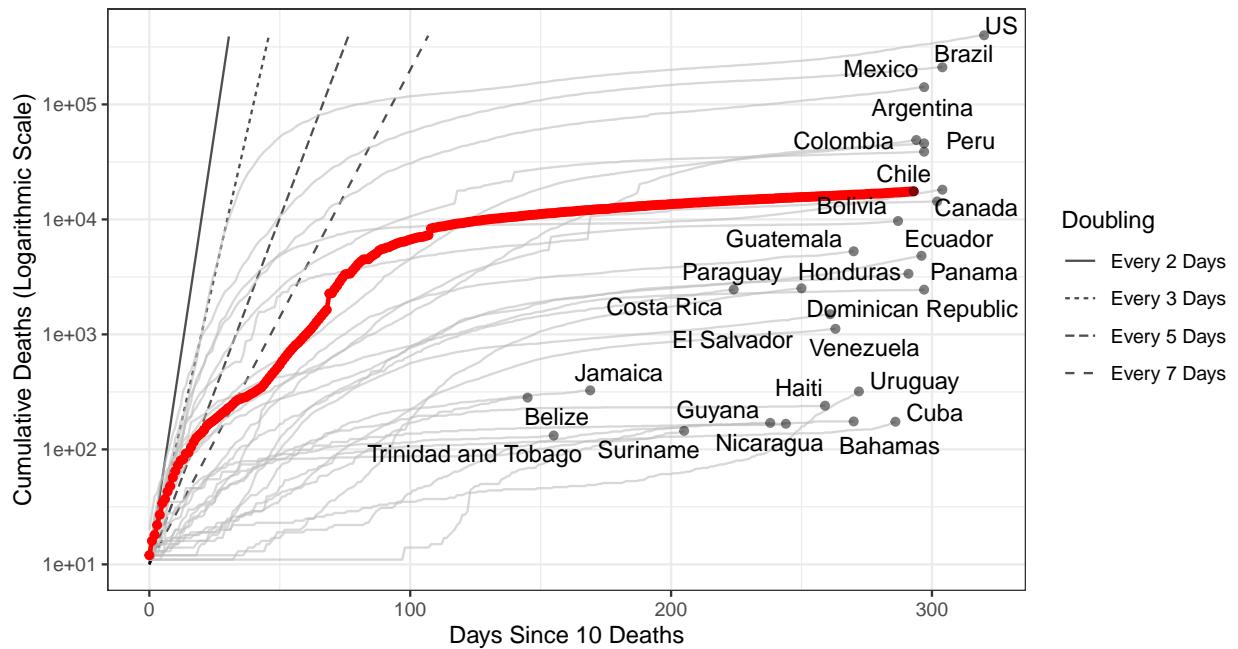


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 349,796 (95% CI: 329,328-370,265) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

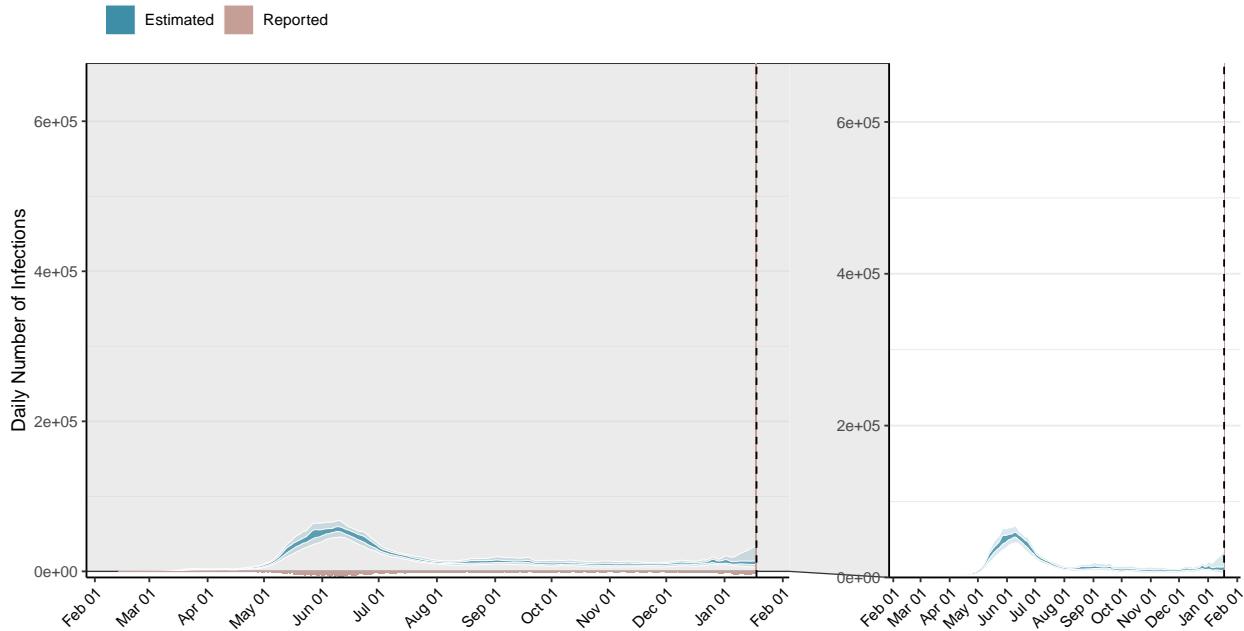
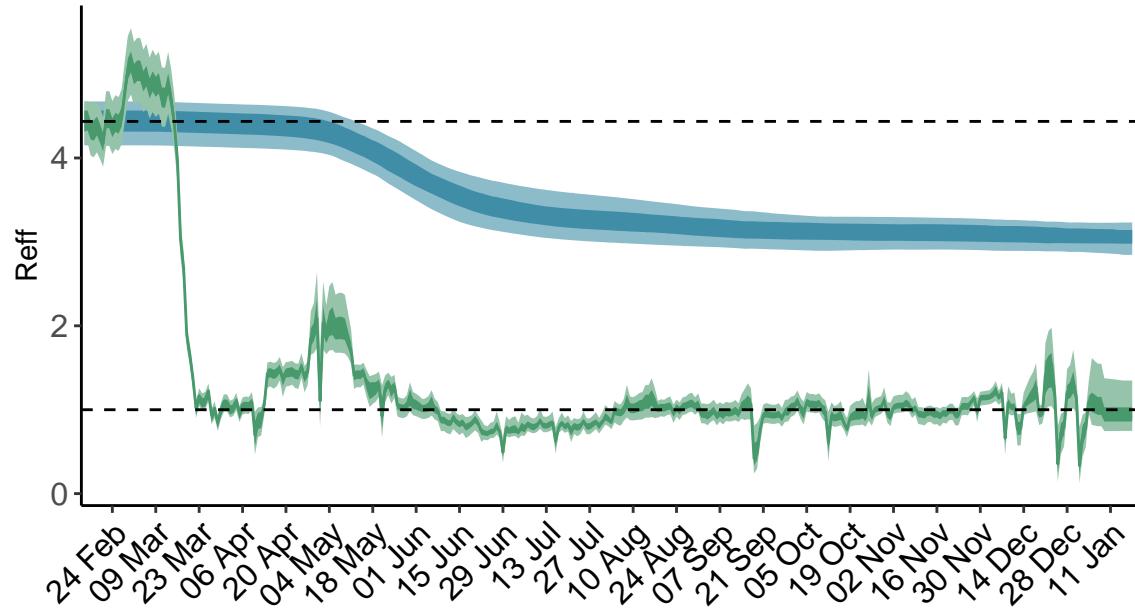


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

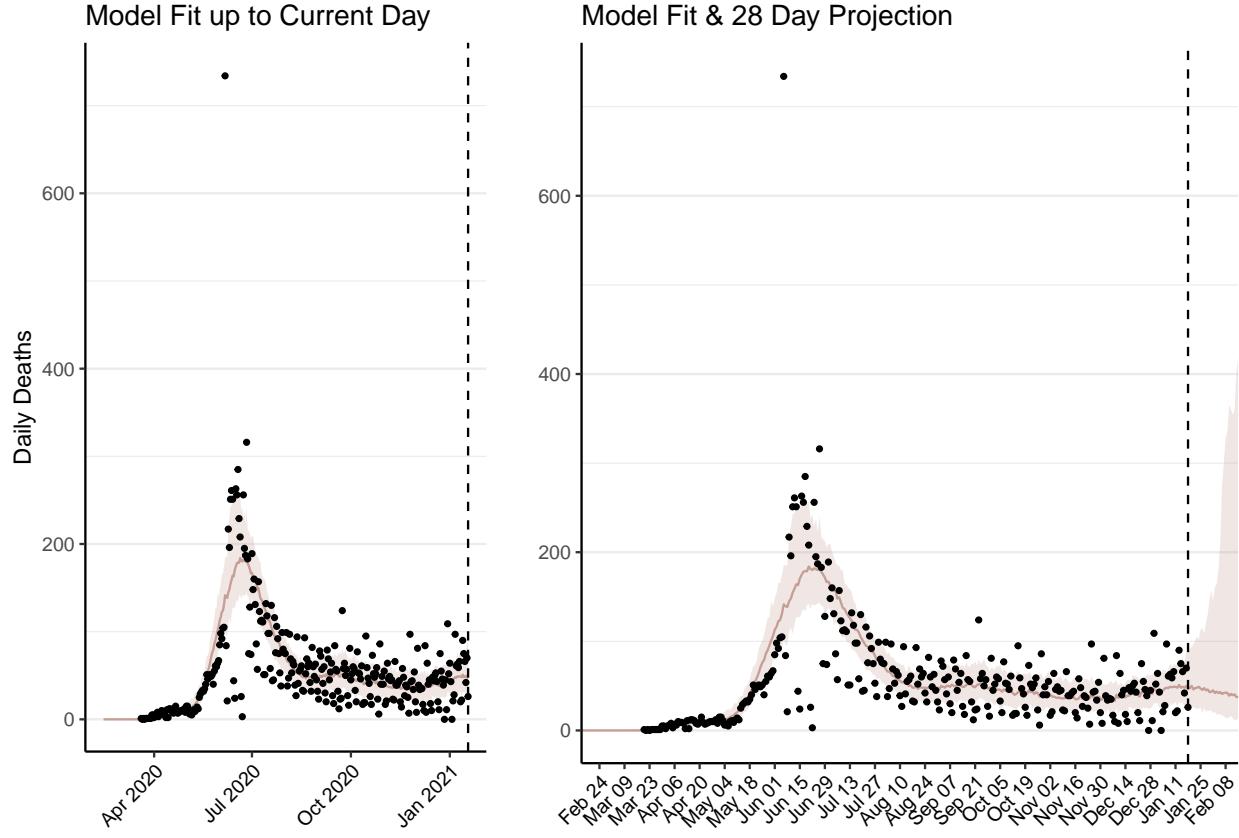


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,676 (95% CI: 1,566-1,786) patients requiring treatment with high-pressure oxygen at the current date to 1,984 (95% CI: 1,479-2,488) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 602 (95% CI: 566-638) patients requiring treatment with mechanical ventilation at the current date to 634 (95% CI: 523-745) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

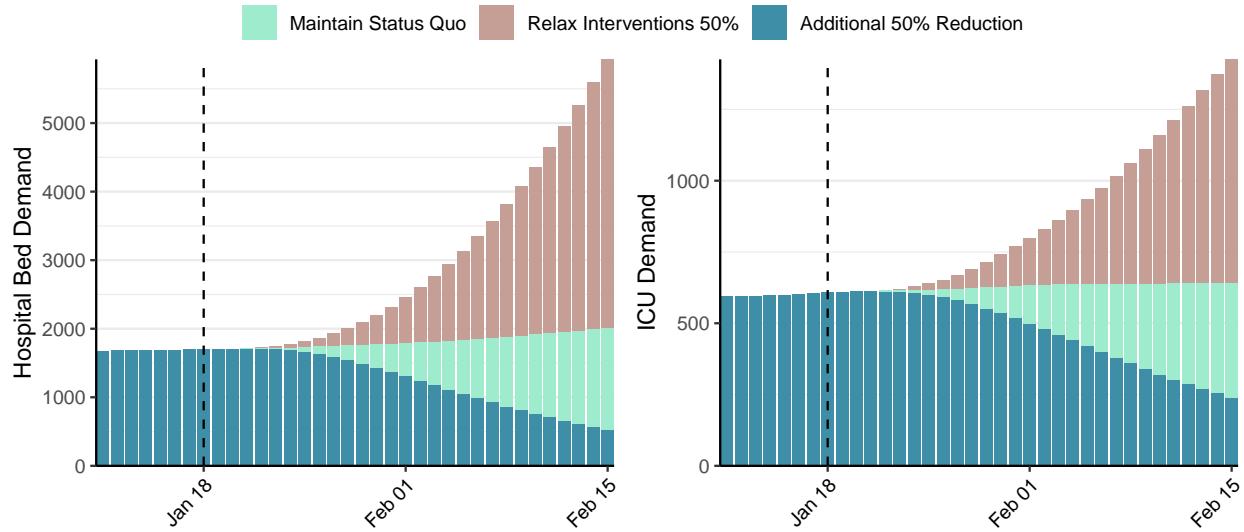


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 12,705 (95% CI: 11,189-14,221) at the current date to 1,339 (95% CI: 922-1,755) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 12,705 (95% CI: 11,189-14,221) at the current date to 67,287 (95% CI: 52,371-82,202) by 2021-02-15.

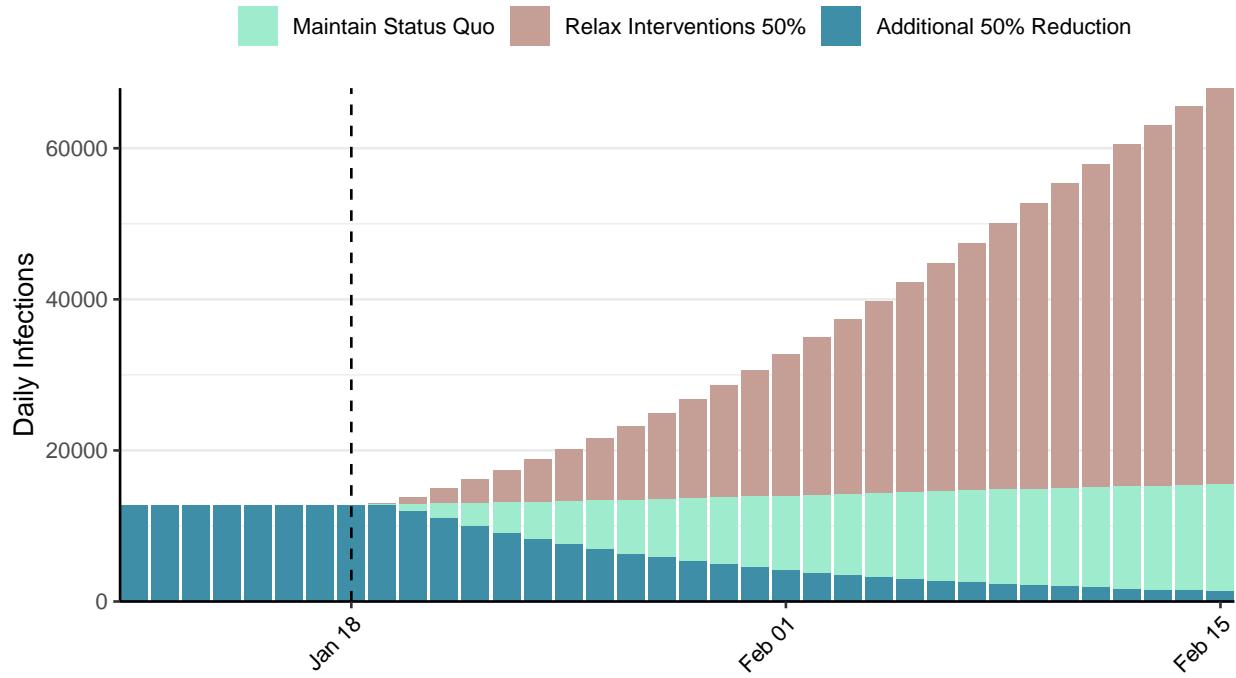


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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Situation Report for COVID-19: China, 2021-01-18

**Download the report for China, 2021-01-18 here.** This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

## Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
225	225	1	1	1.27 (95% CI: 1.1-1.51)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** China is not shown in the following plot as only 1 deaths have been reported to date

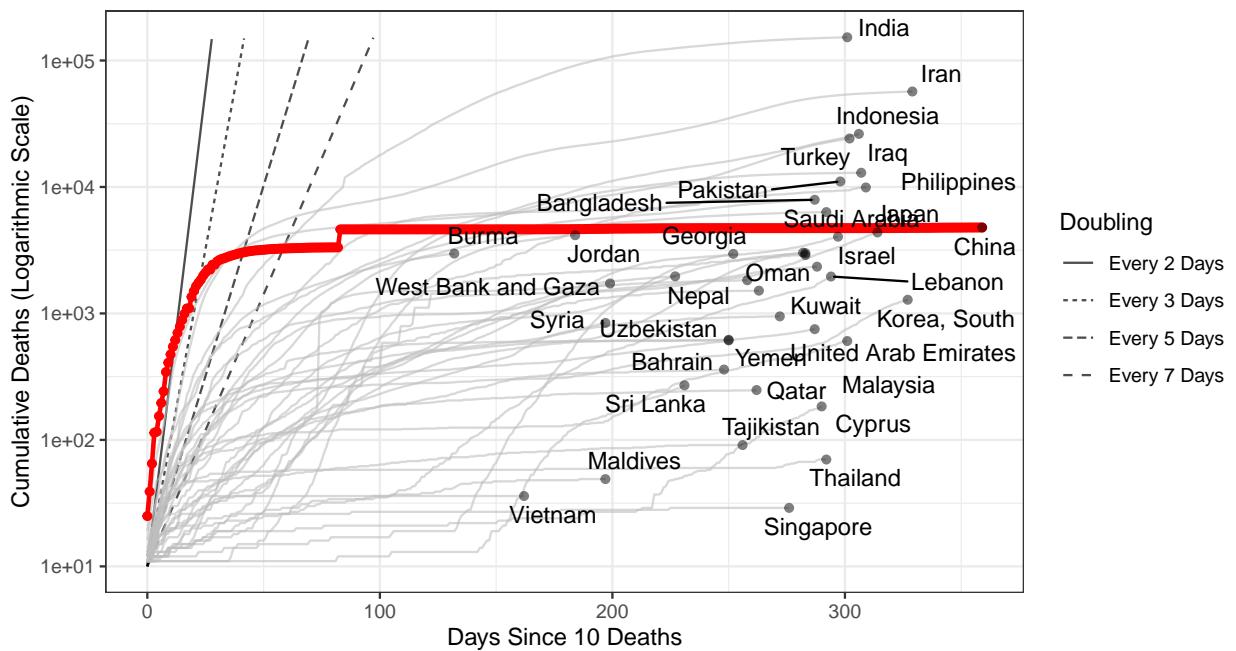


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 15,190 (95% CI: 13,783-16,597) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. China has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

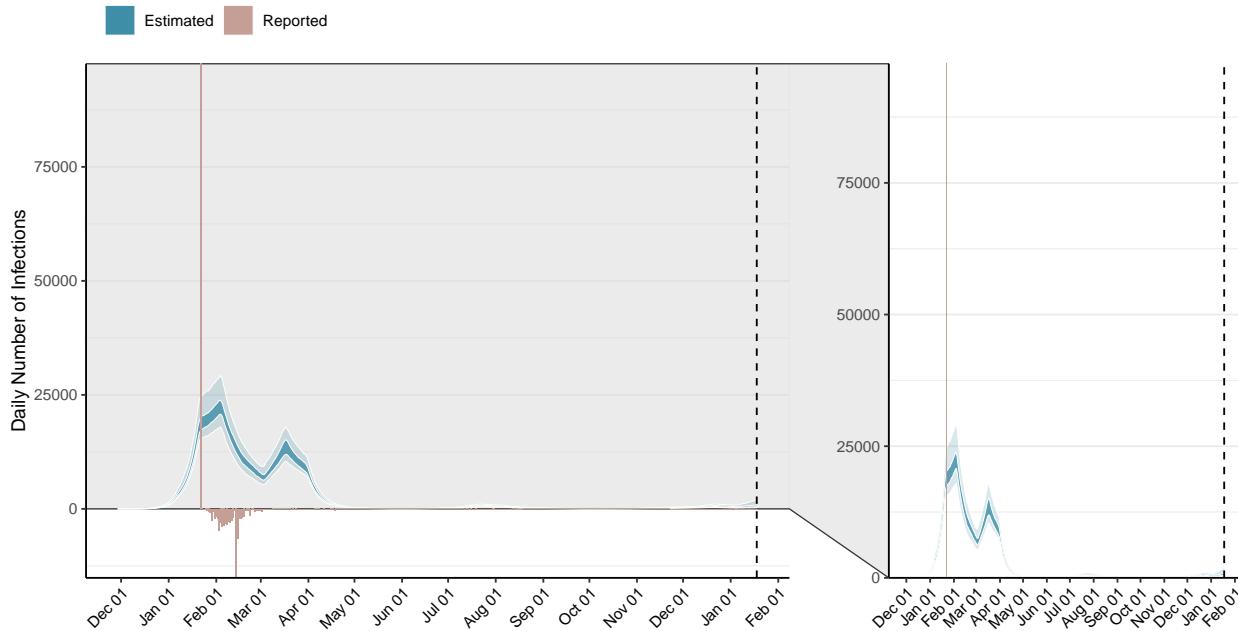
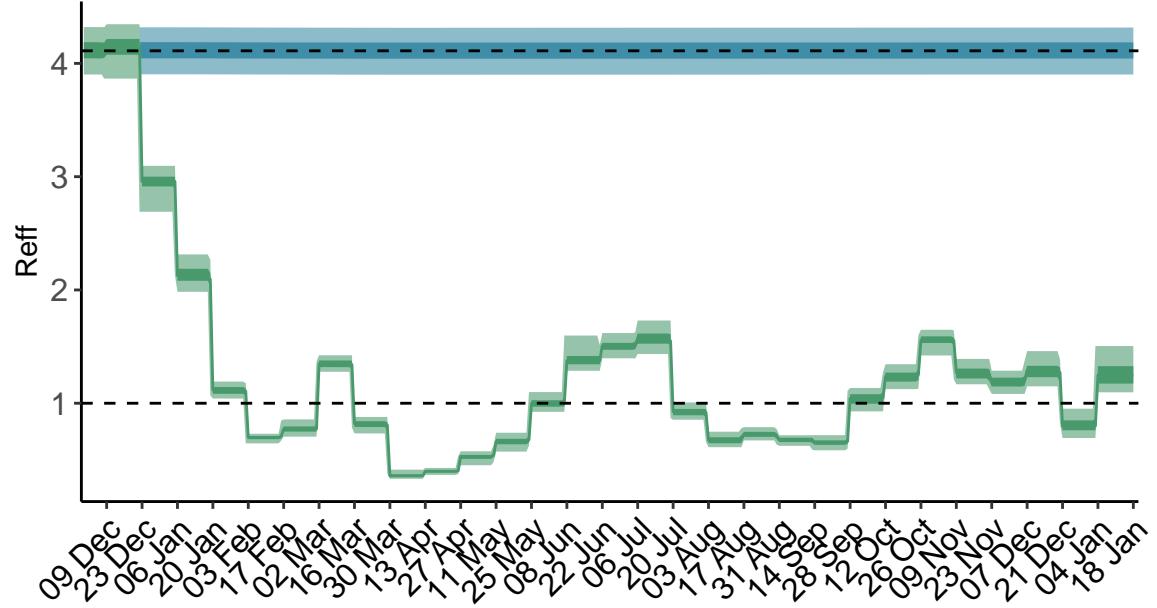


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

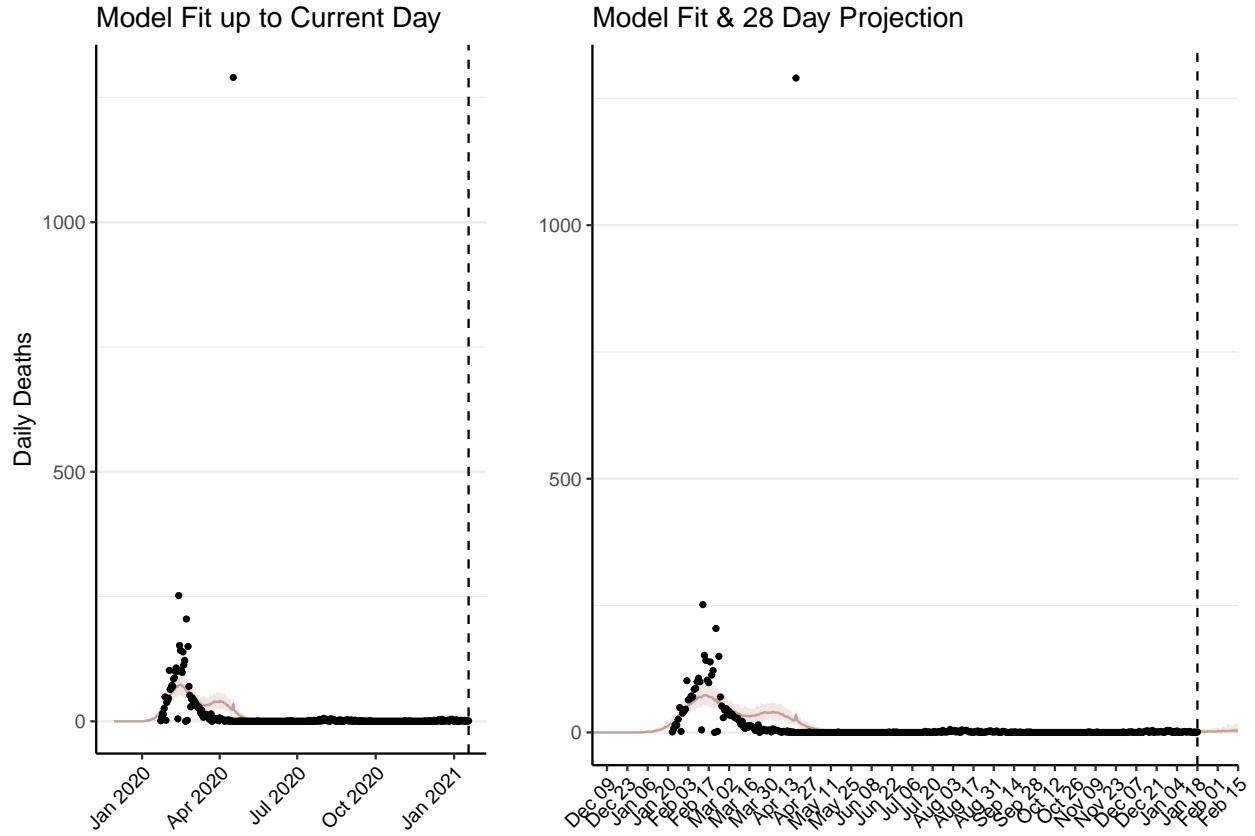


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 75 (95% CI: 67-83) patients requiring treatment with high-pressure oxygen at the current date to 253 (95% CI: 163-342) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 29 (95% CI: 26-32) patients requiring treatment with mechanical ventilation at the current date to 93 (95% CI: 62-125) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

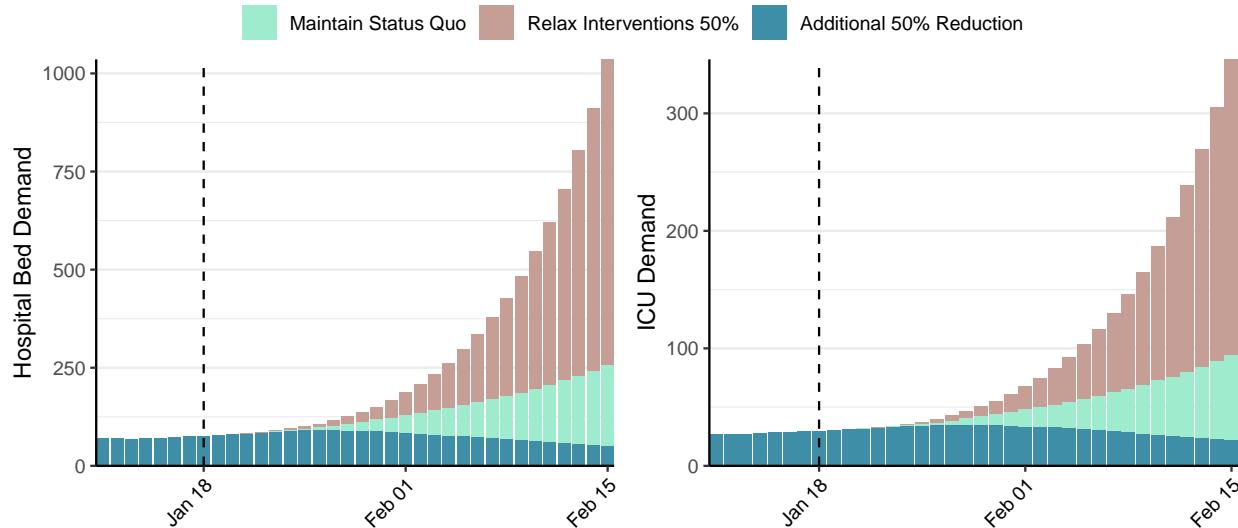


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 746 (95% CI: 630-862) at the current date to 188 (95% CI: 110-267) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 746 (95% CI: 630-862) at the current date to 23,075 (95% CI: 9,890-36,260) by 2021-02-15.

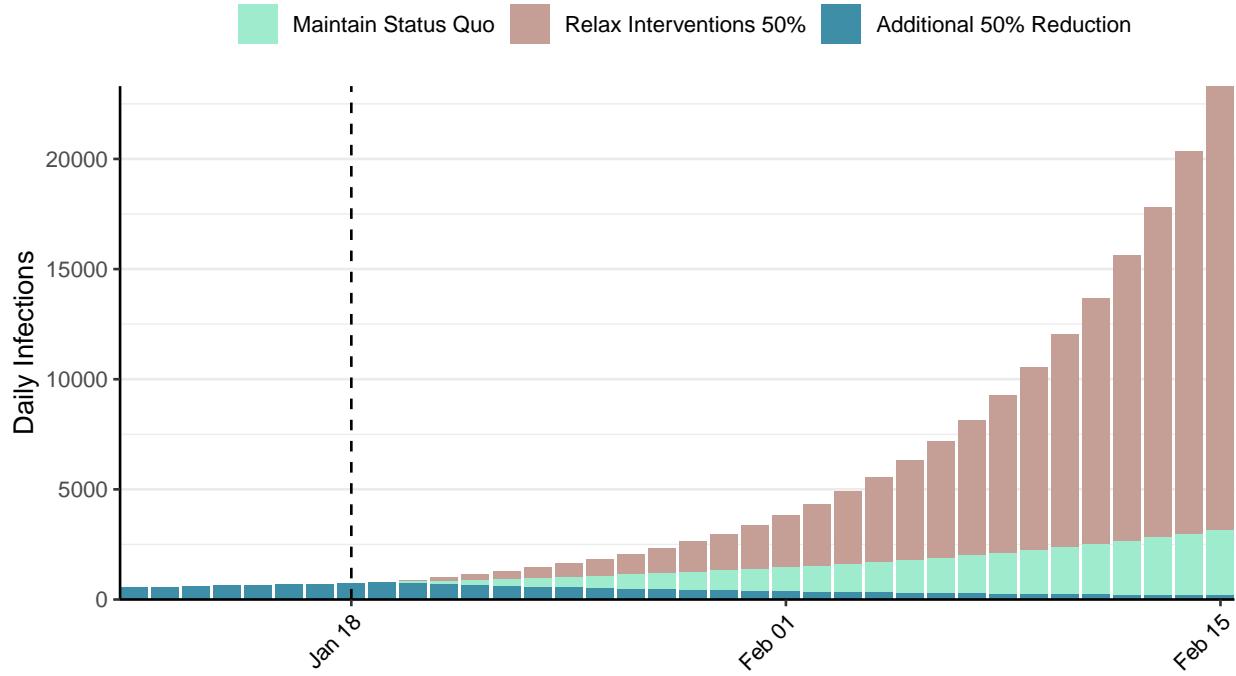


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Cote d'Ivoire, 2021-01-18

[Download the report for Cote d'Ivoire, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
63	63	1	1	1.34 (95% CI: 1.07-1.7)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Cote d'Ivoire is not shown in the following plot as only 1 deaths have been reported to date**

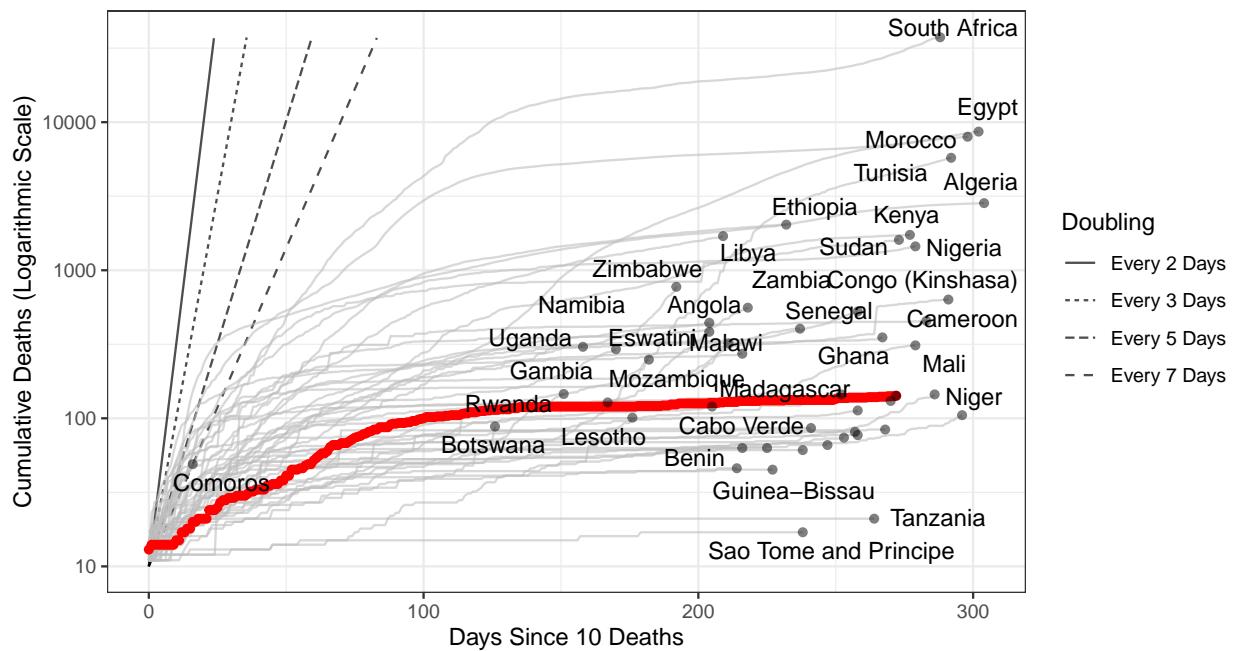


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 11,256 (95% CI: 10,312-12,200) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Cote d'Ivoire has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

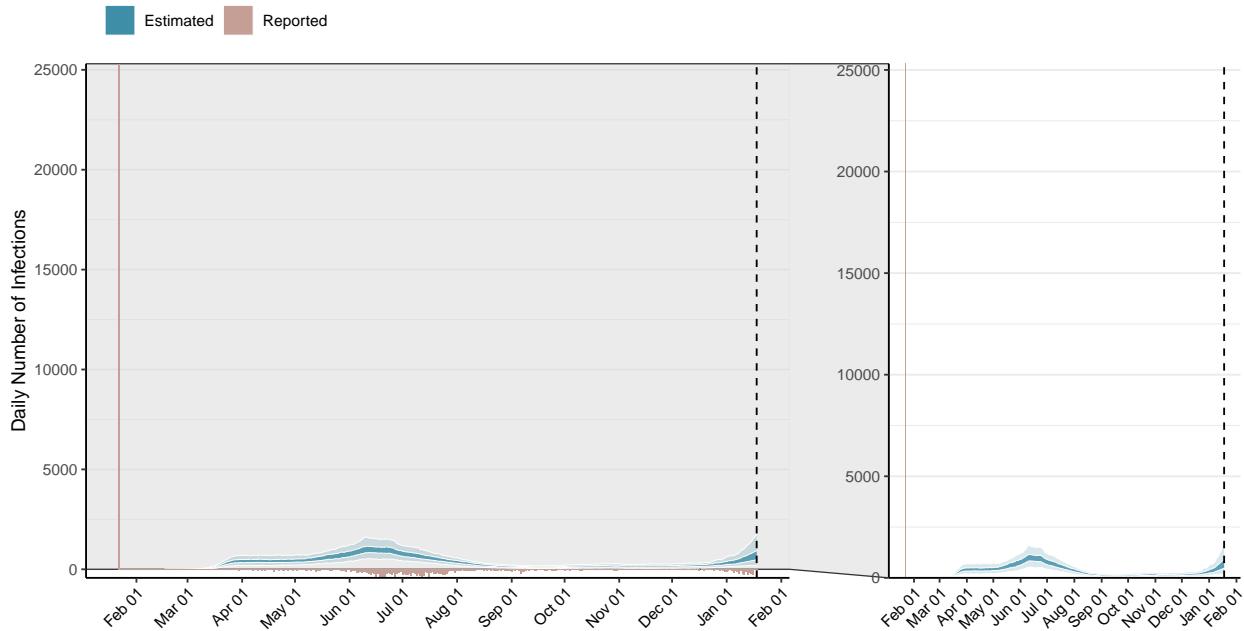
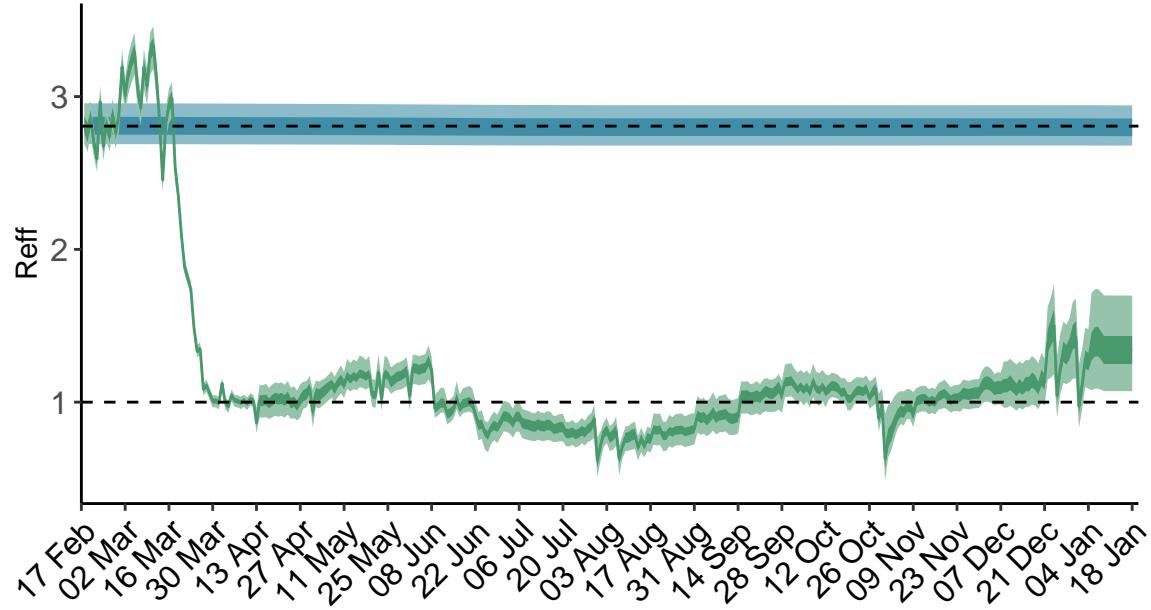


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Cote d'Ivoire is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

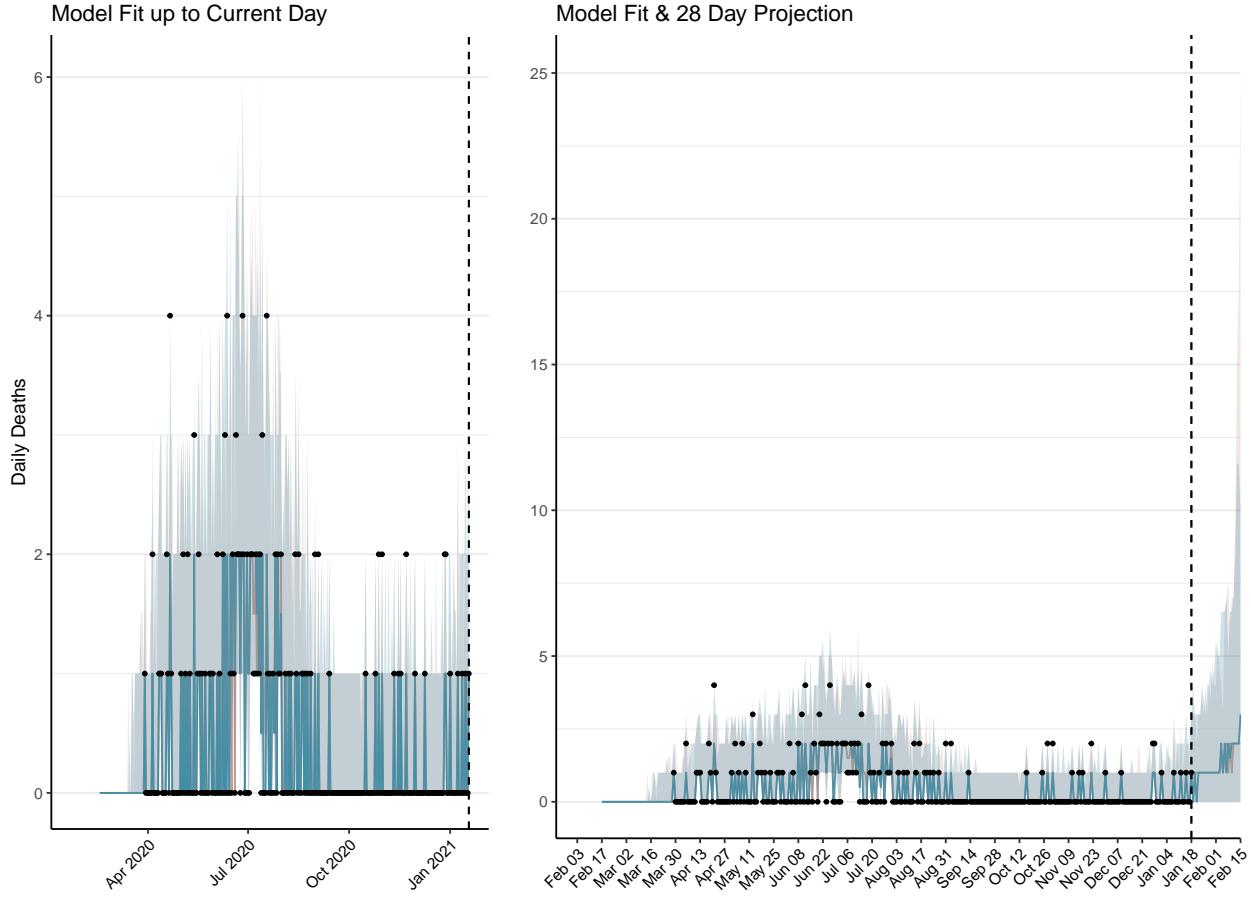


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 33 (95% CI: 30-36) patients requiring treatment with high-pressure oxygen at the current date to 150 (95% CI: 125-176) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 13 (95% CI: 11-14) patients requiring treatment with mechanical ventilation at the current date to 54 (95% CI: 46-62) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

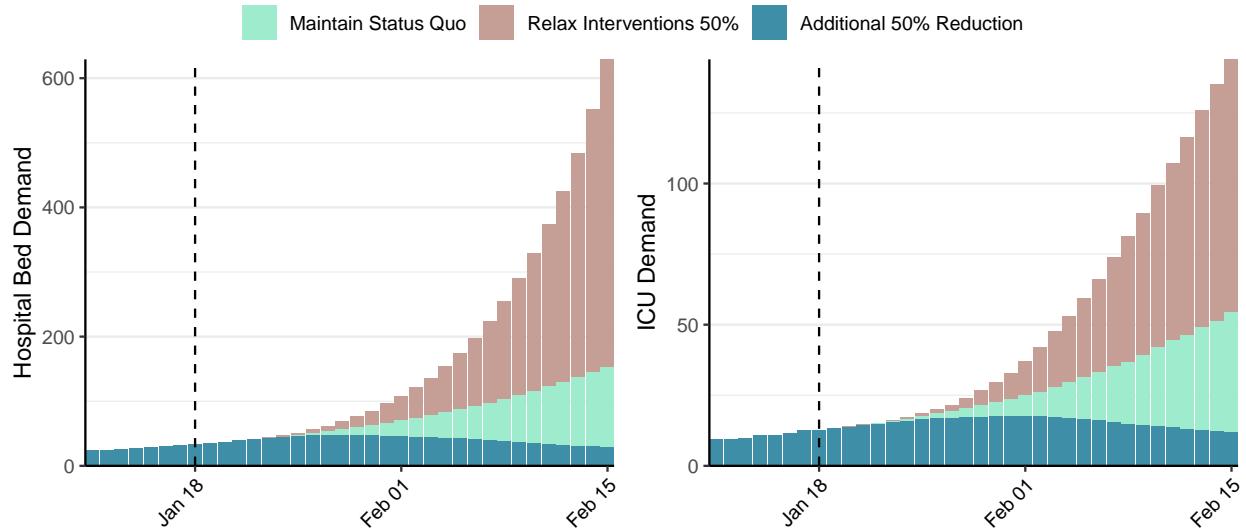


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 718 (95% CI: 642-794) at the current date to 209 (95% CI: 171-247) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 718 (95% CI: 642-794) at the current date to 25,533 (95% CI: 20,016-31,051) by 2021-02-15.

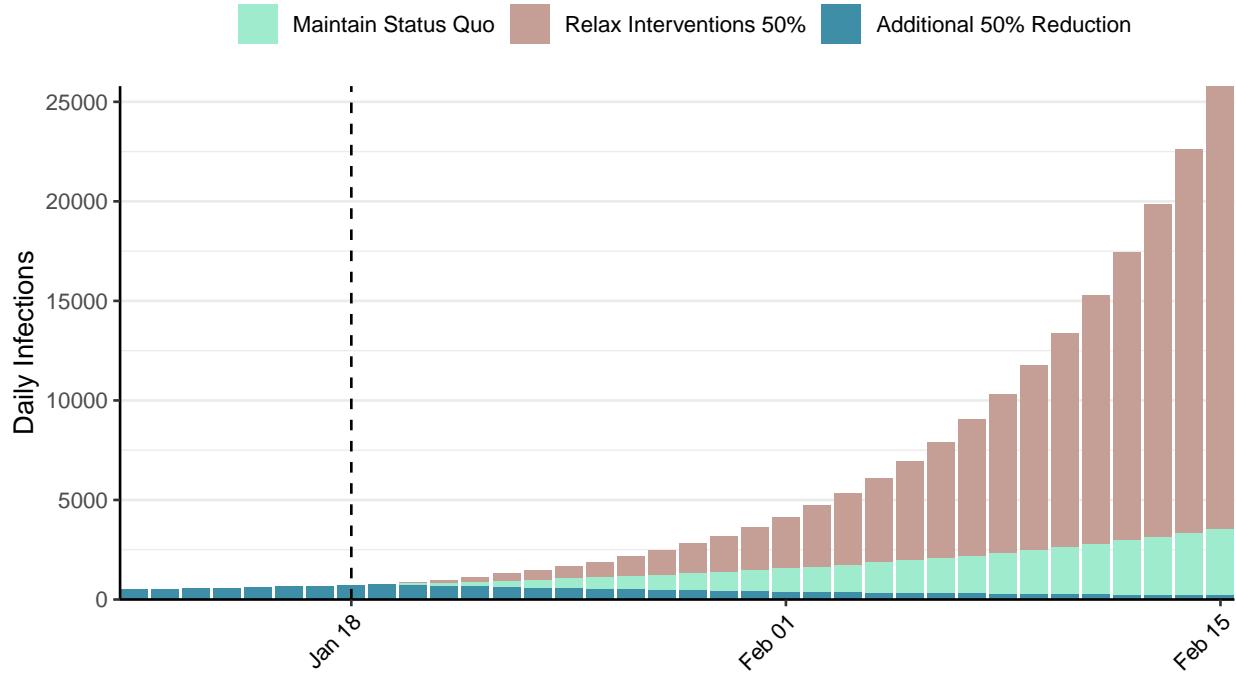


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Cameroon, 2021-01-18

[Download the report for Cameroon, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.98 (95% CI: 0.78-1.27)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Cameroon is not shown in the following plot as only 0 deaths have been reported to date**

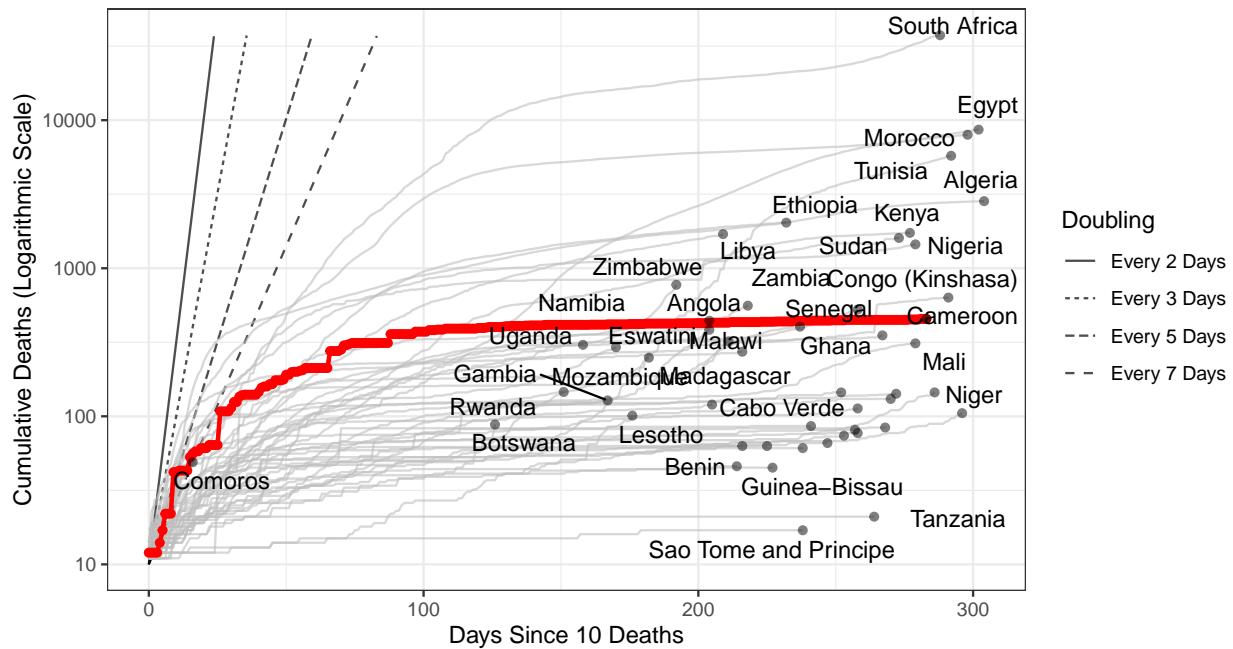


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 6,778 (95% CI: 6,313-7,243) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

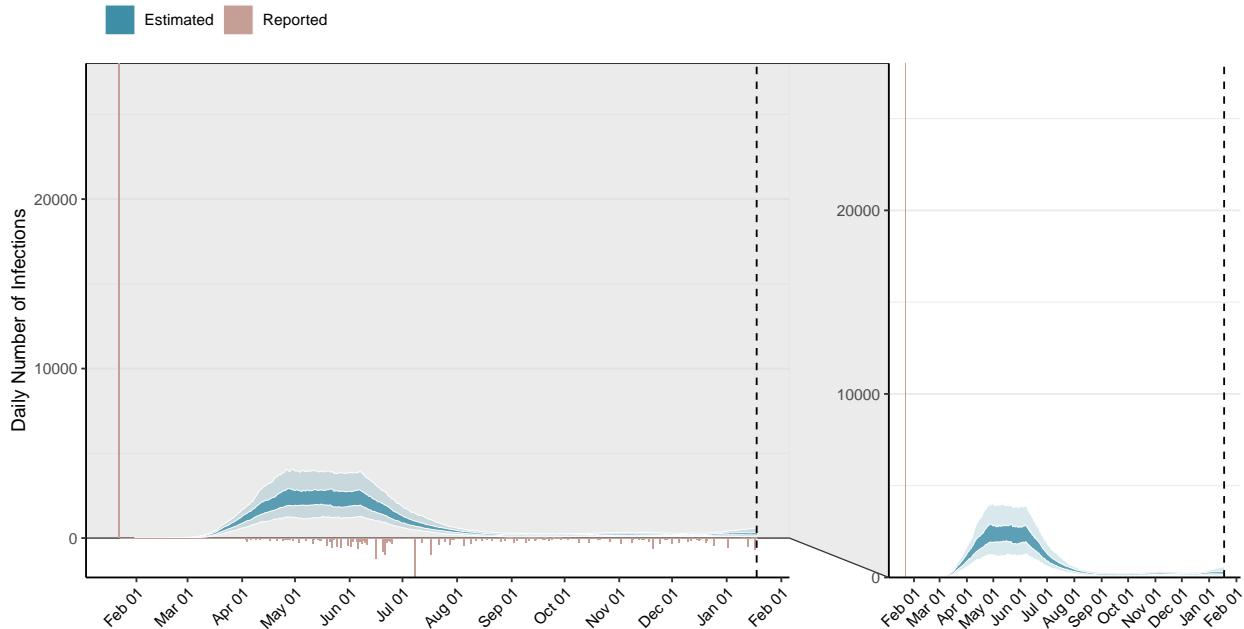
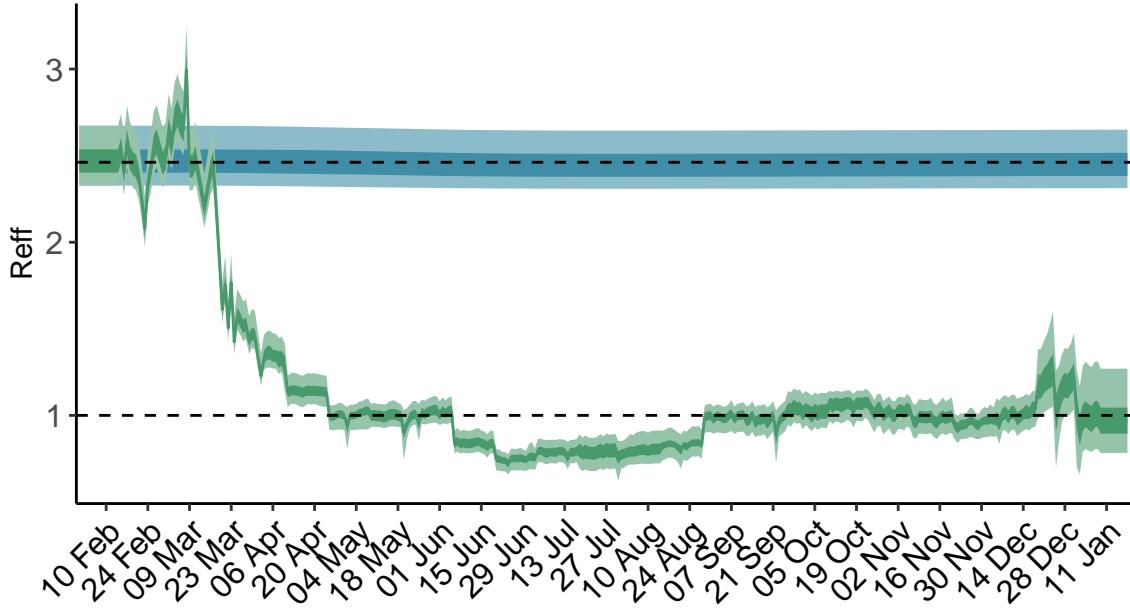


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

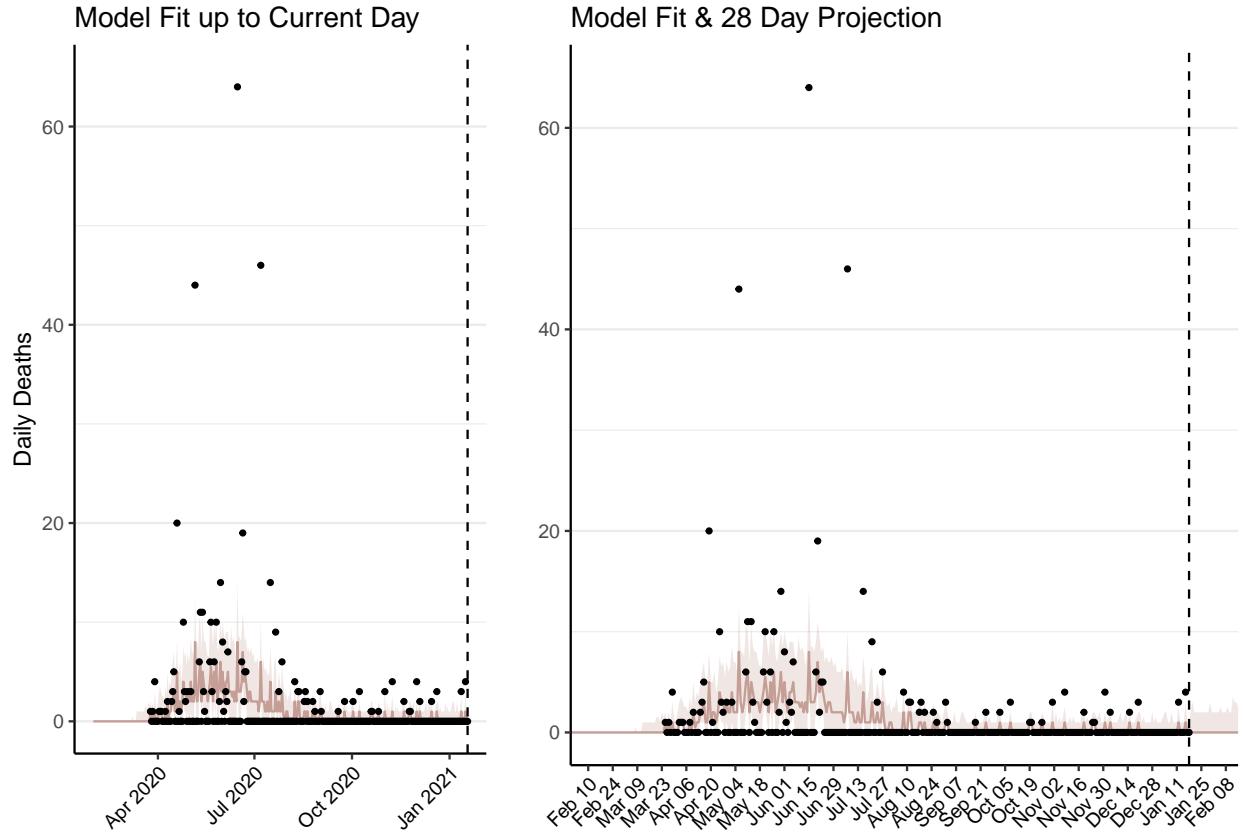


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 19 (95% CI: 17-20) patients requiring treatment with high-pressure oxygen at the current date to 23 (95% CI: 19-27) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 7 (95% CI: 7-8) patients requiring treatment with mechanical ventilation at the current date to 9 (95% CI: 7-10) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

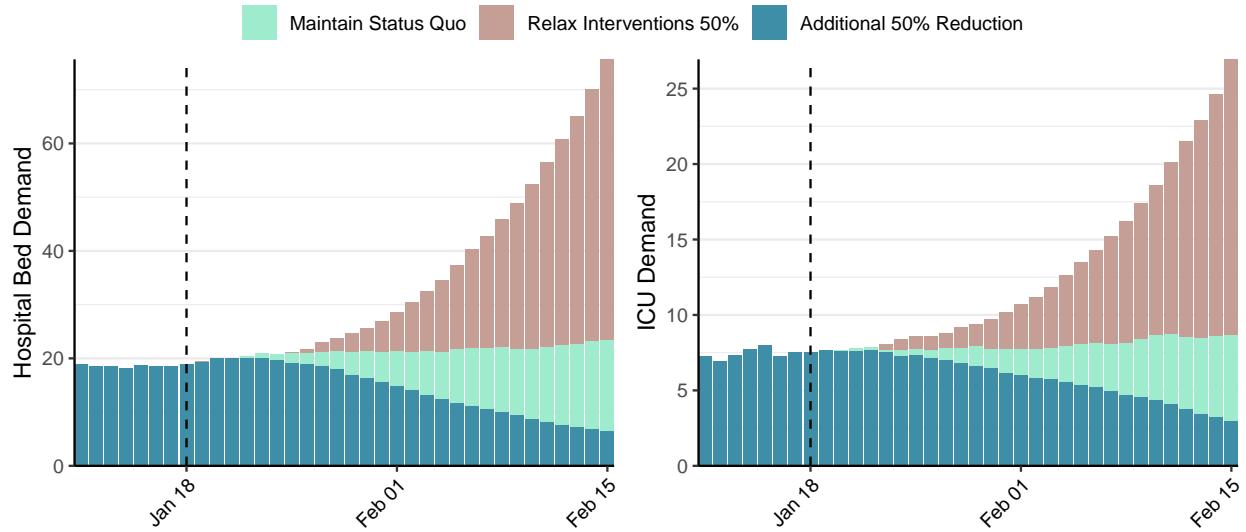
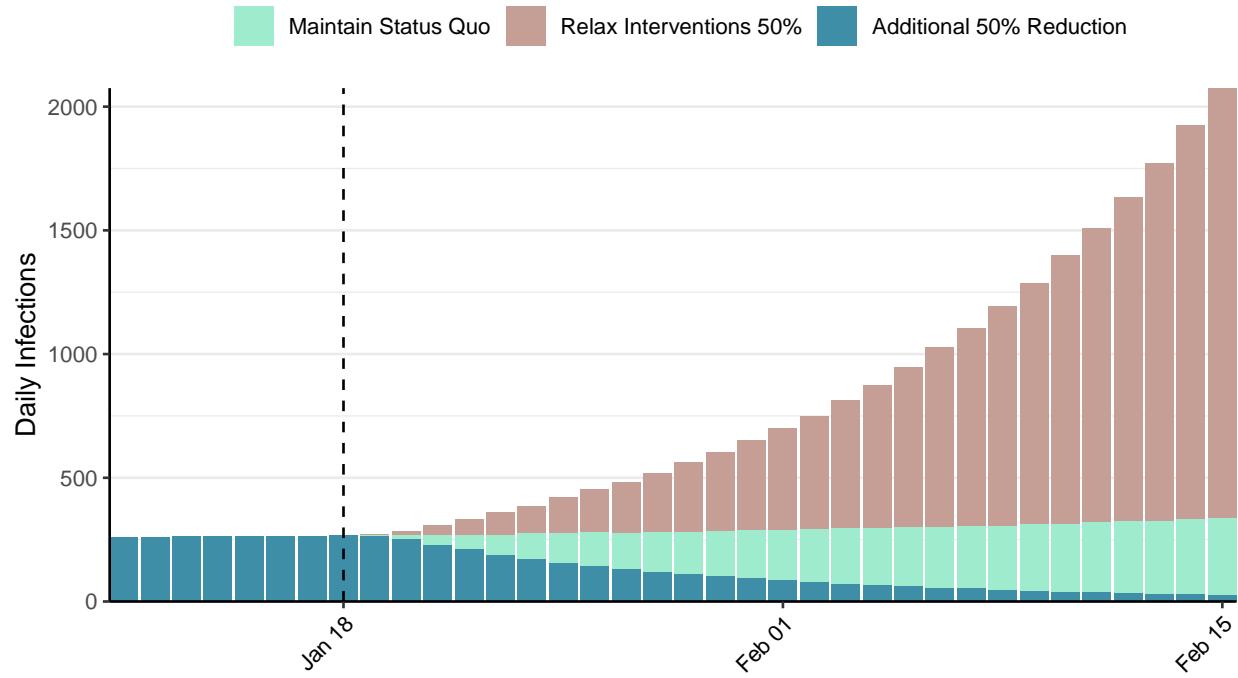


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 265 (95% CI: 238-292) at the current date to 26 (95% CI: 20-31) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 265 (95% CI: 238-292) at the current date to 2,054 (95% CI: 1,506-2,603) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Democratic Republic of Congo, 2021-01-18

[Download the report for Democratic Republic of Congo, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
80	80	6	6	0.97 (95% CI: 0.77-1.2)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Democratic Republic of Congo is not shown in the following plot as only 6 deaths have been reported to date

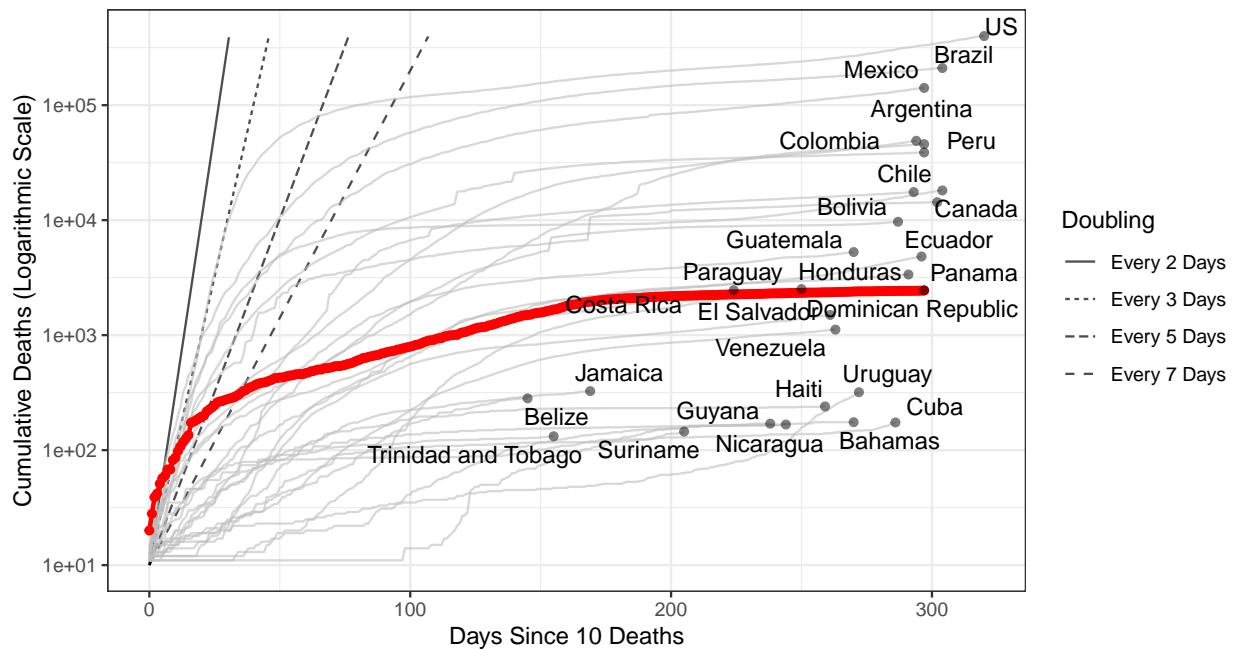


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 159,356 (95% CI: 142,347-176,365) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

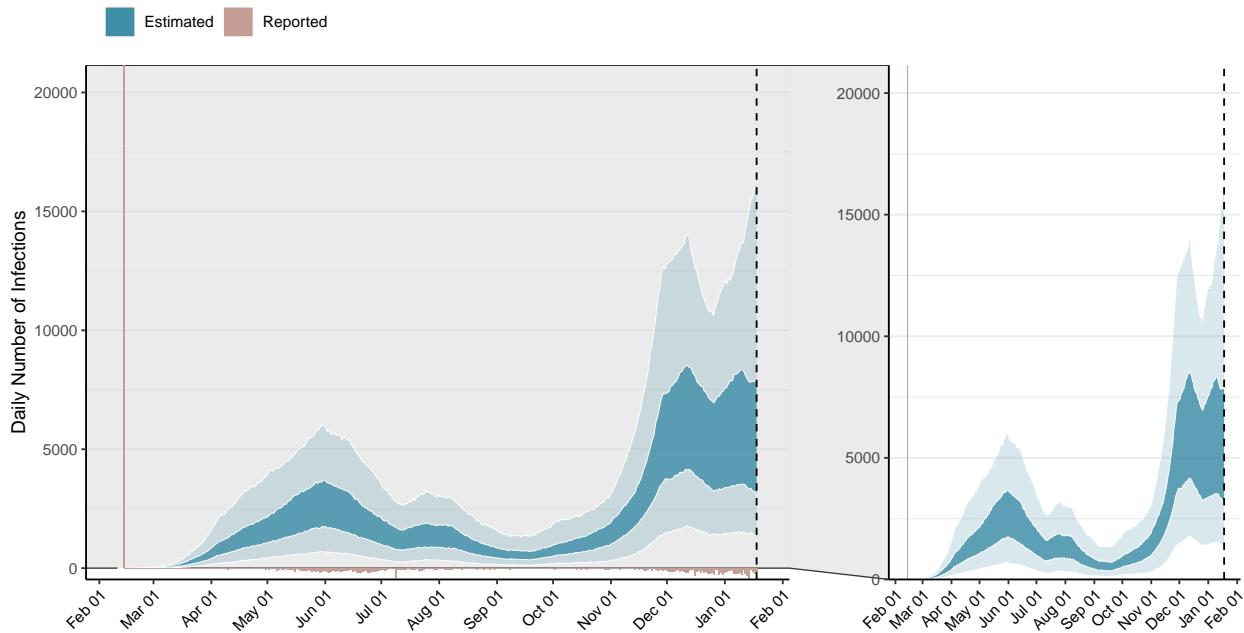
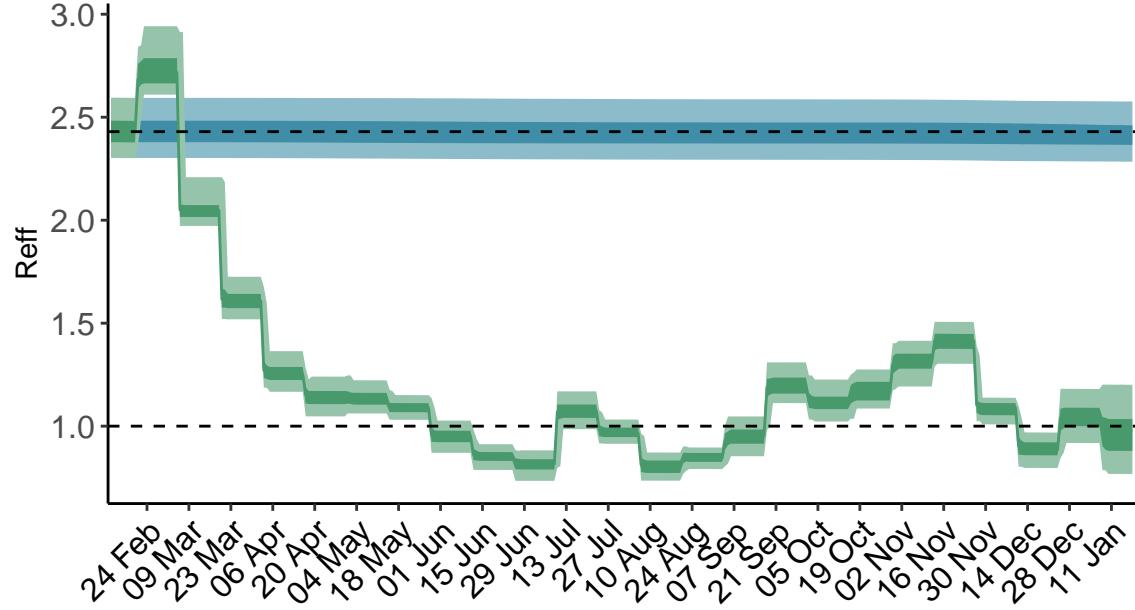


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

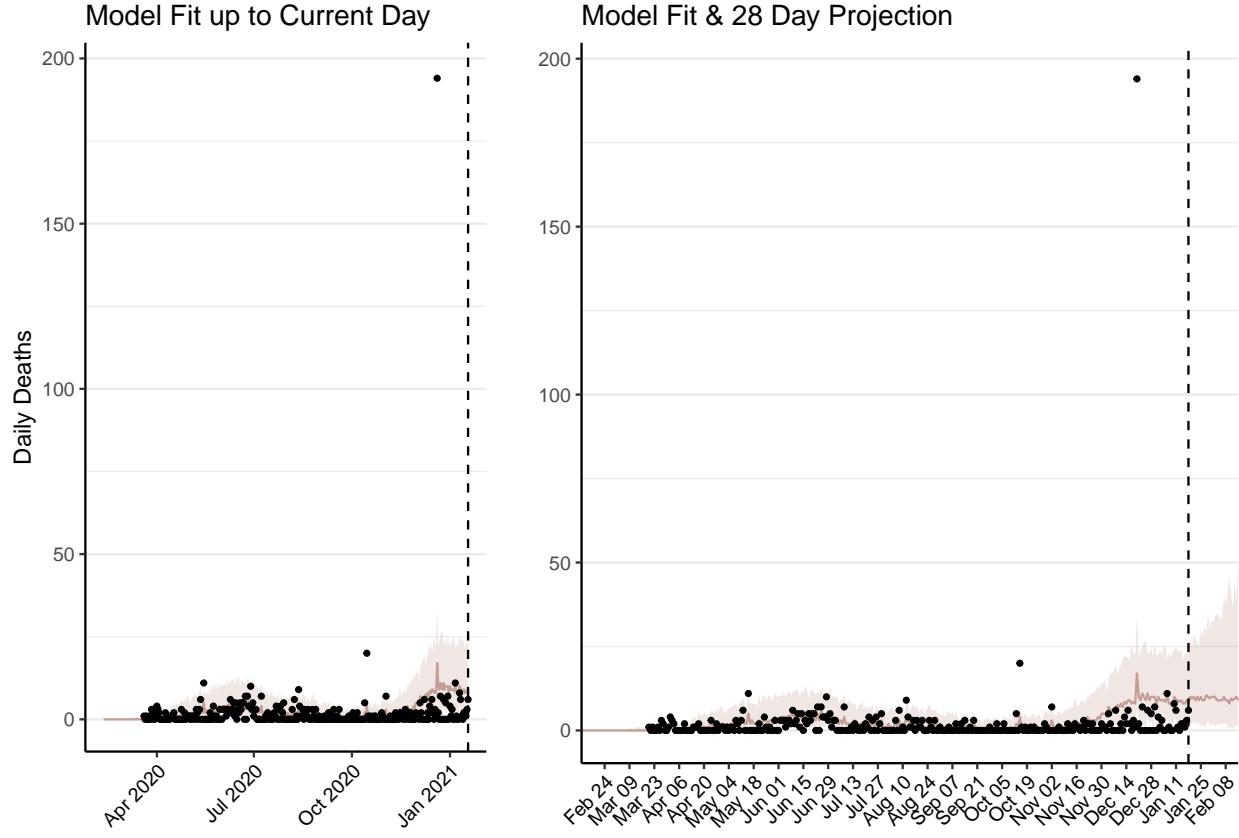


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 458 (95% CI: 408-509) patients requiring treatment with high-pressure oxygen at the current date to 513 (95% CI: 402-623) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 177 (95% CI: 159-196) patients requiring treatment with mechanical ventilation at the current date to 197 (95% CI: 160-234) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

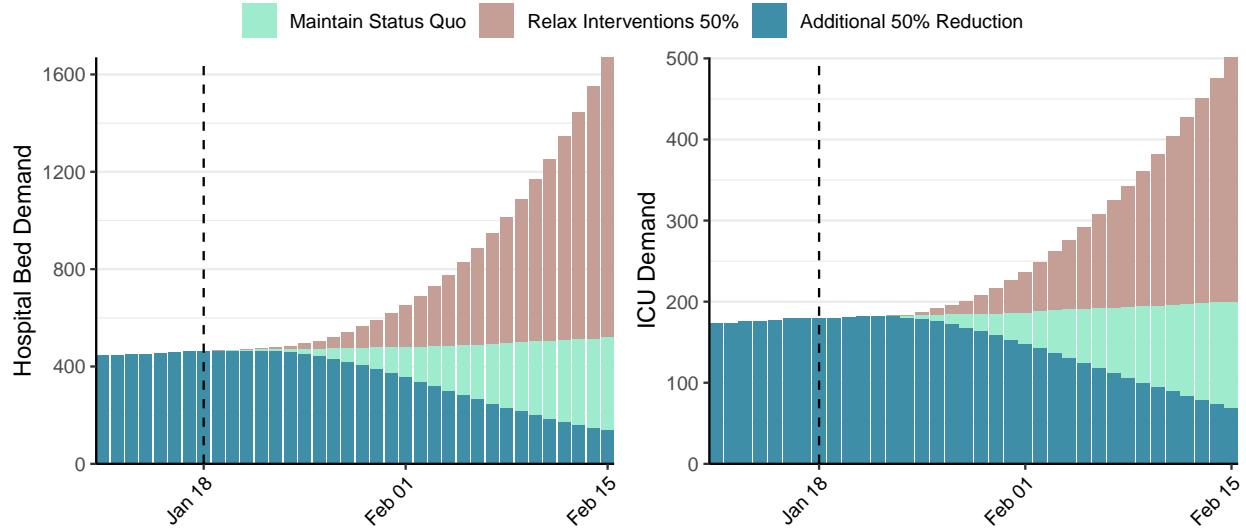
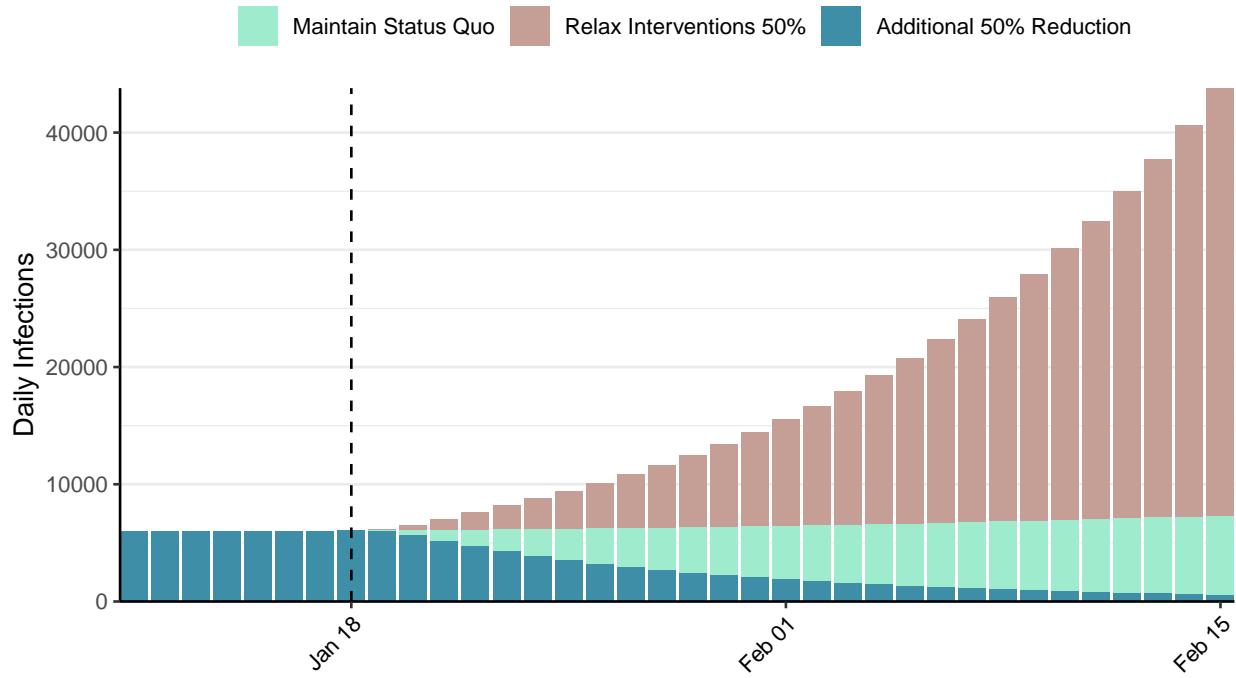


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 6,003 (95% CI: 5,194-6,812) at the current date to 574 (95% CI: 430-717) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 6,003 (95% CI: 5,194-6,812) at the current date to 43,360 (95% CI: 30,388-56,333) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Republic of the Congo, 2021-01-18

[Download the report for Republic of the Congo, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.96 (95% CI: 0.78-1.11)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Republic of the Congo is not shown in the following plot as only 0 deaths have been reported to date

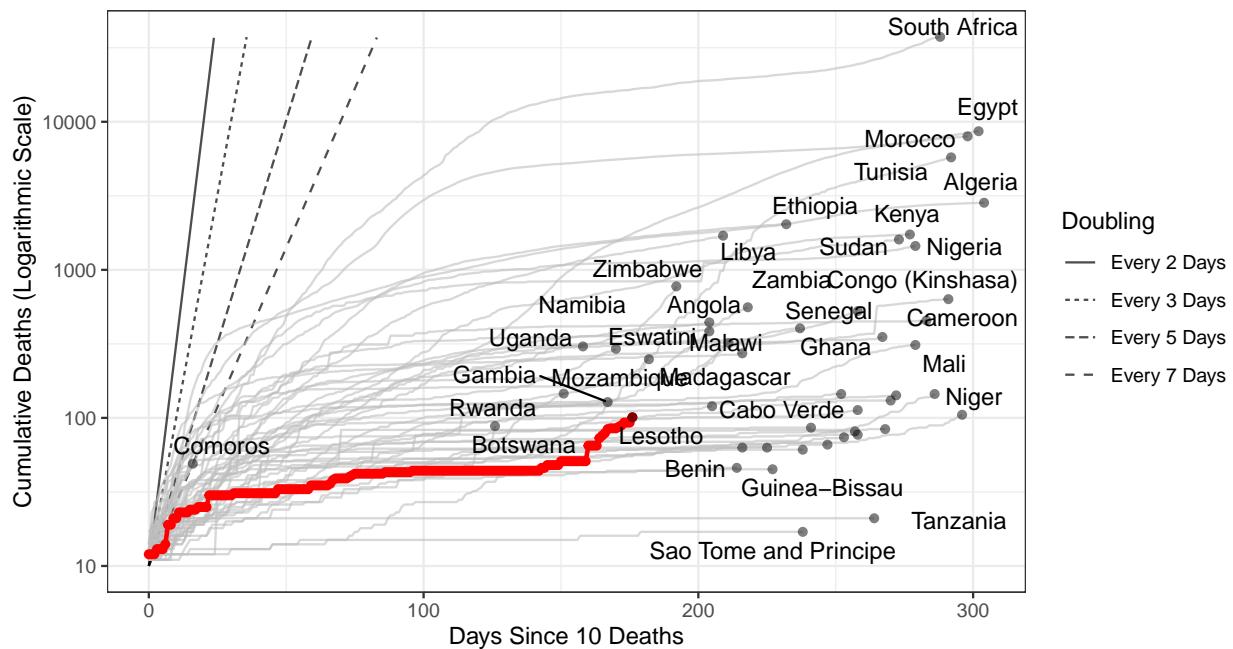


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 8,136 (95% CI: 7,525–8,746) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

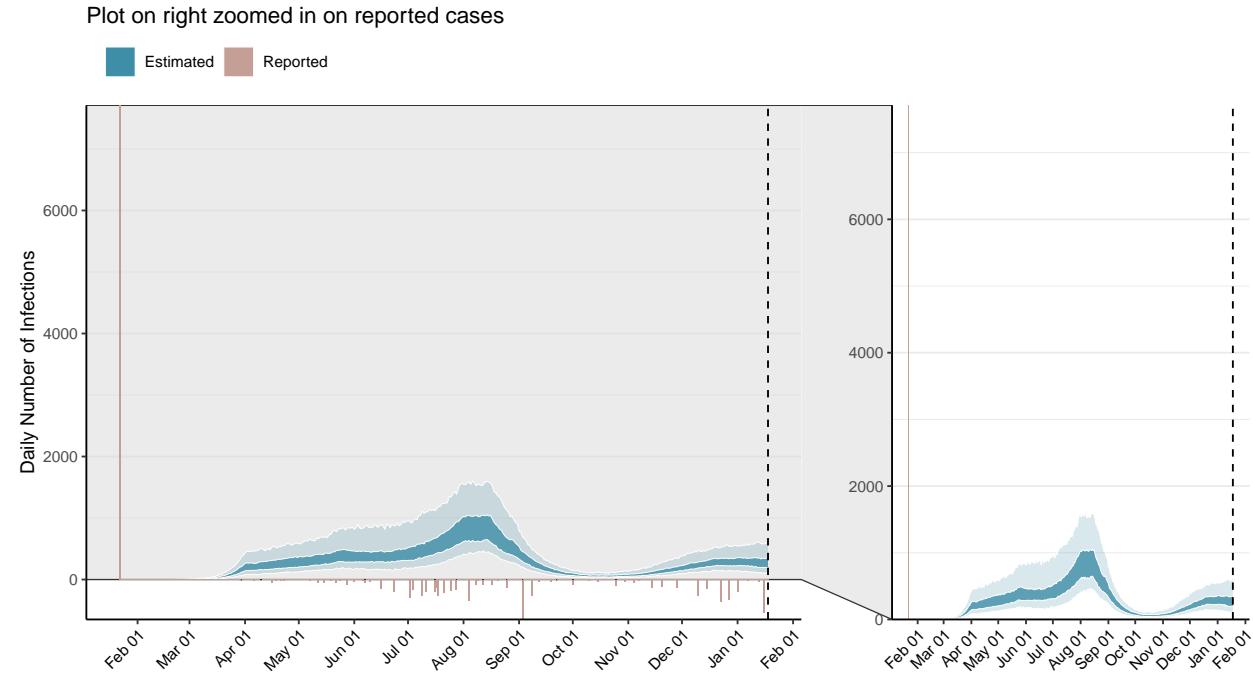
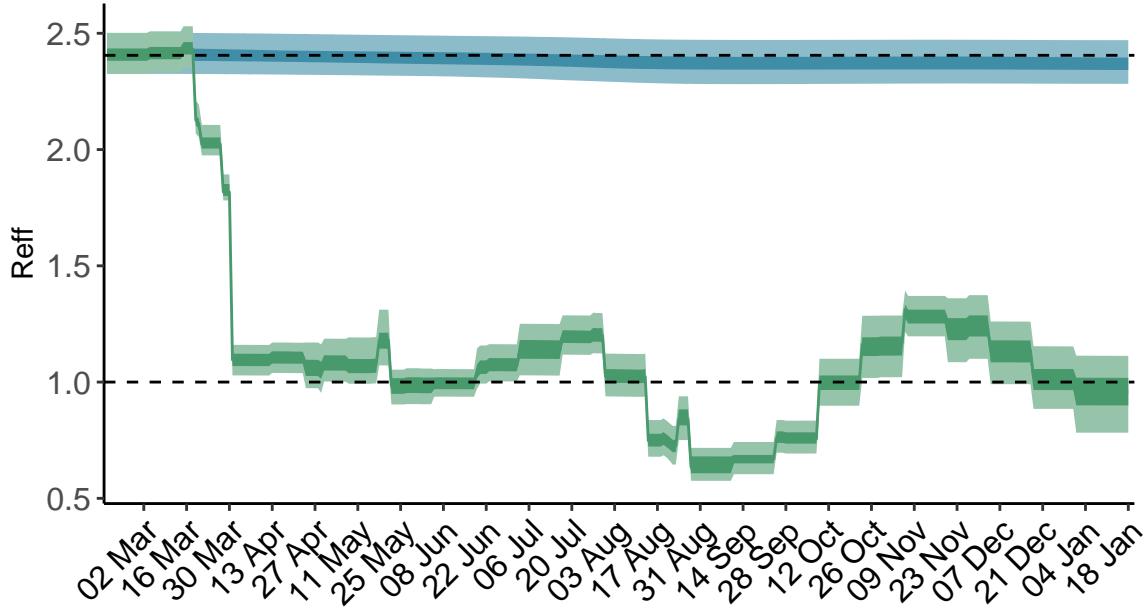


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

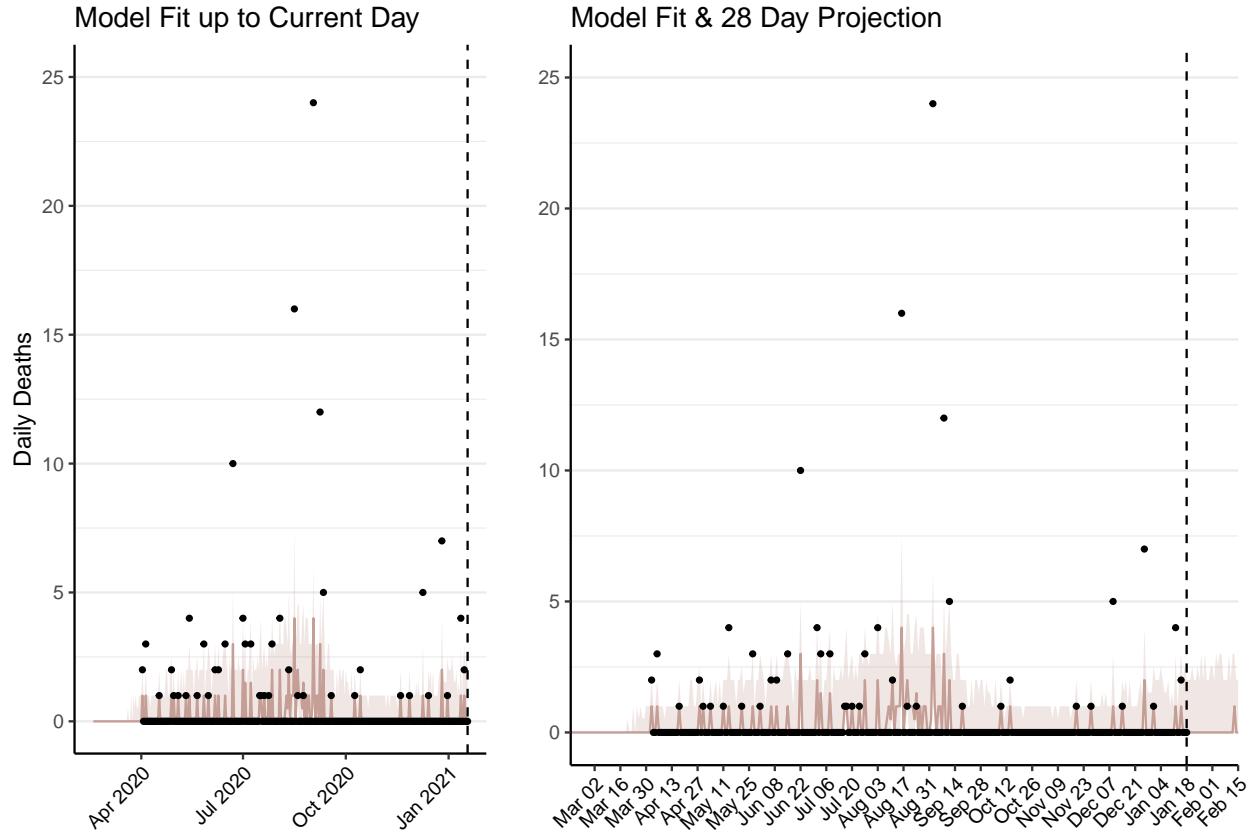


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 23 (95% CI: 21-25) patients requiring treatment with high-pressure oxygen at the current date to 22 (95% CI: 19-25) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 9 (95% CI: 8-10) patients requiring treatment with mechanical ventilation at the current date to 9 (95% CI: 8-10) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

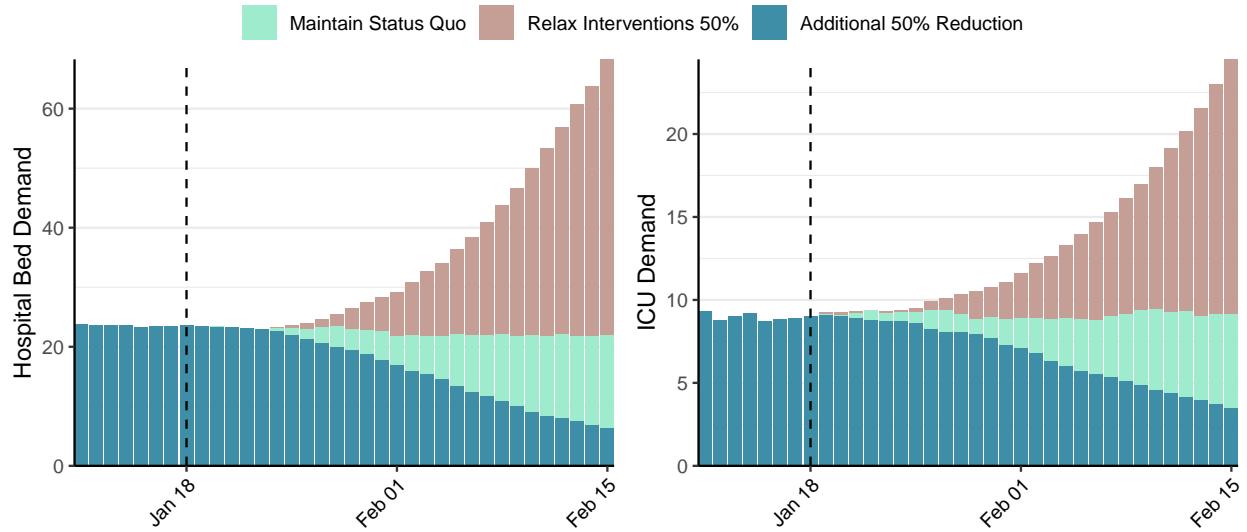


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 282 (95% CI: 255-310) at the current date to 24 (95% CI: 20-28) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 282 (95% CI: 255-310) at the current date to 1,633 (95% CI: 1,373-1,894) by 2021-02-15.

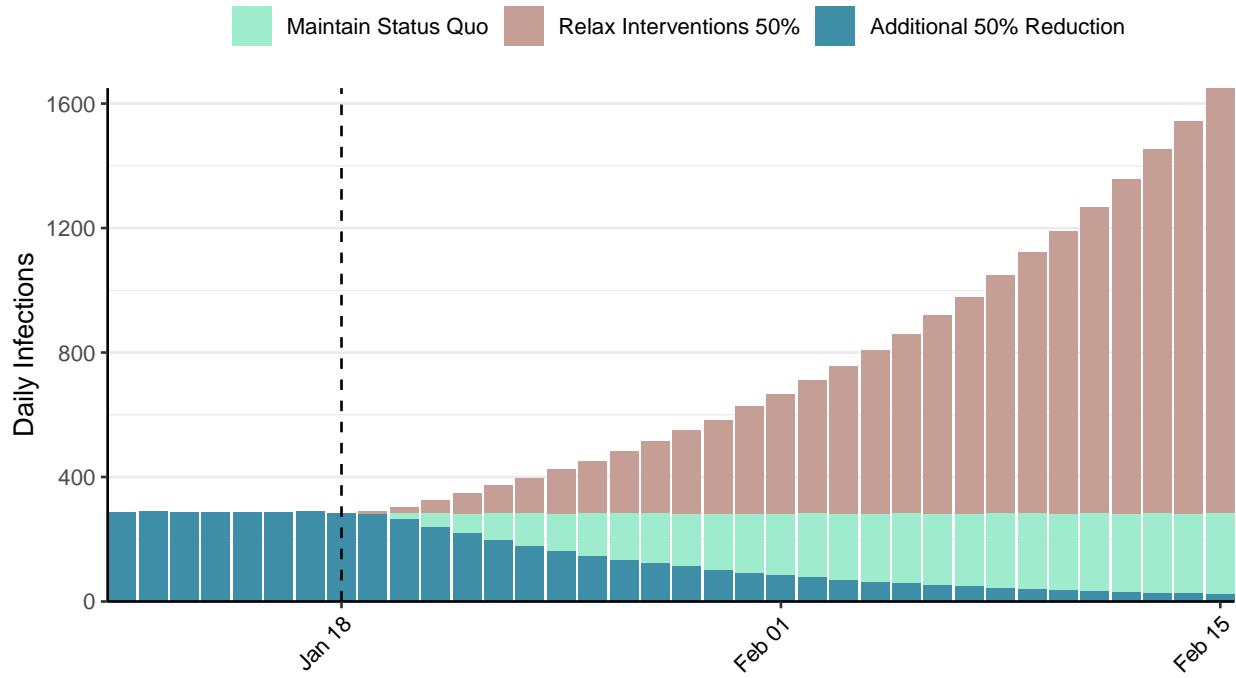


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Colombia, 2021-01-18

[Download the report for Colombia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.97 (95% CI: 0.8-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Colombia is not shown in the following plot as only 0 deaths have been reported to date**

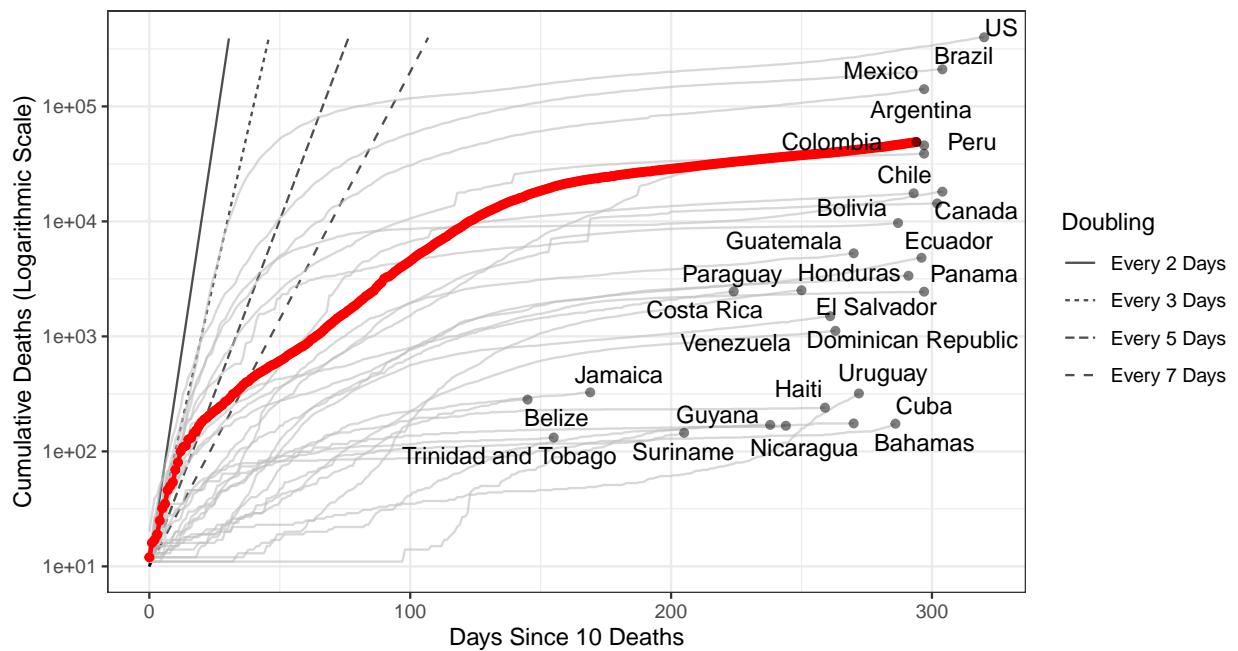


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,435,225 (95% CI: 2,360,182-2,510,268) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

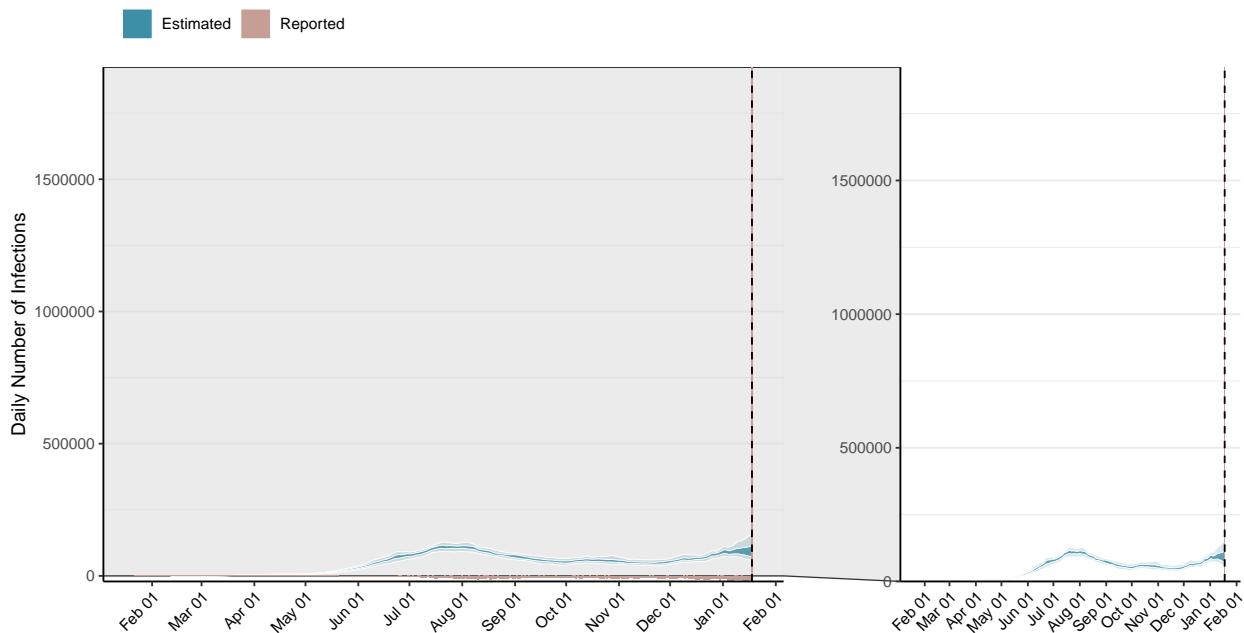
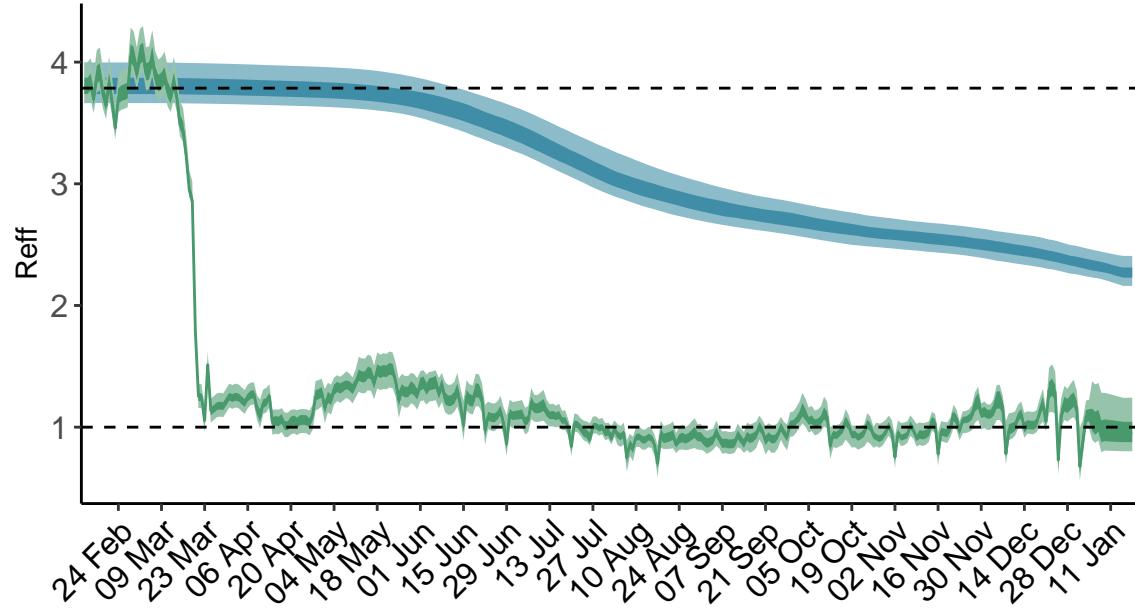


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Colombia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

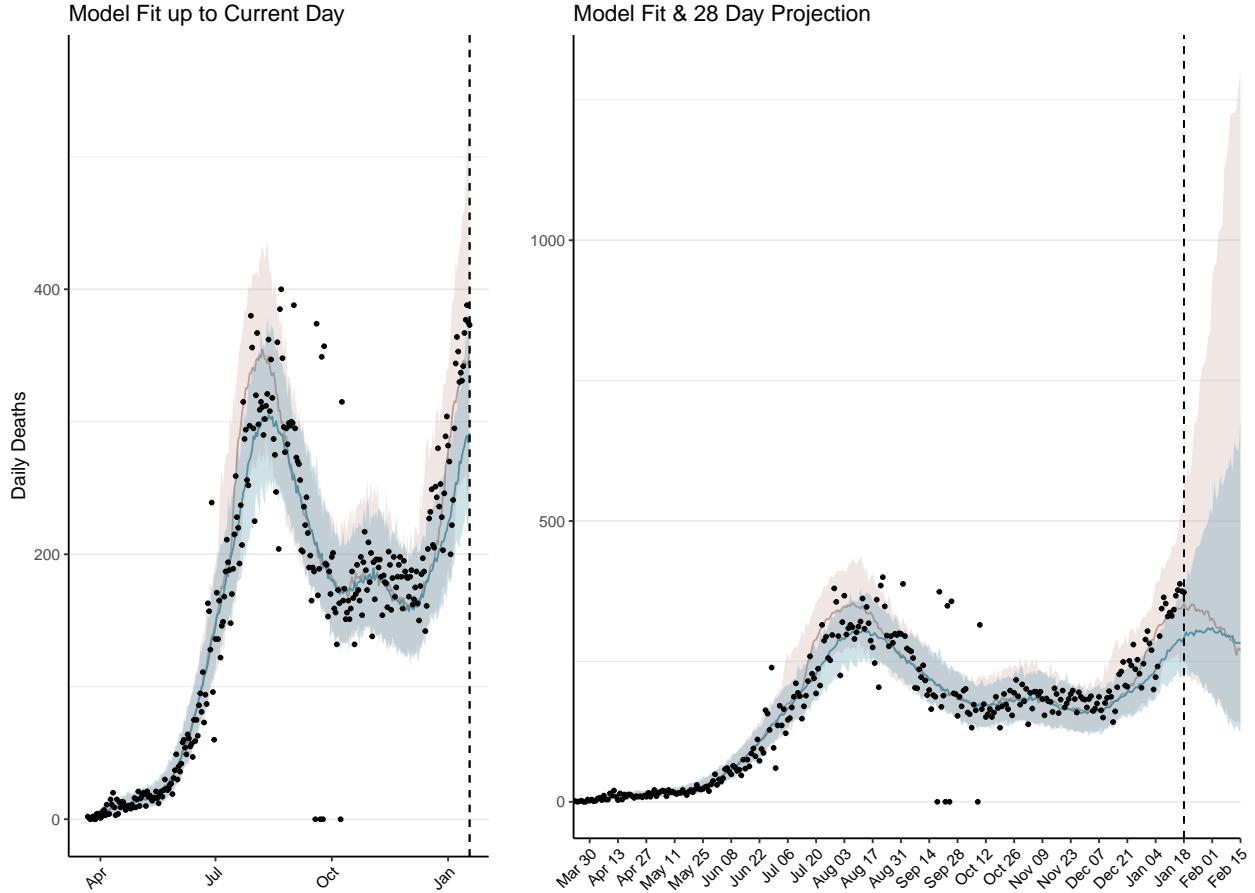


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 10,678 (95% CI: 10,320-11,036) patients requiring treatment with high-pressure oxygen at the current date to 11,346 (95% CI: 9,926-12,766) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2,823 (95% CI: 2,764-2,882) patients requiring treatment with mechanical ventilation at the current date to 2,703 (95% CI: 2,583-2,823) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

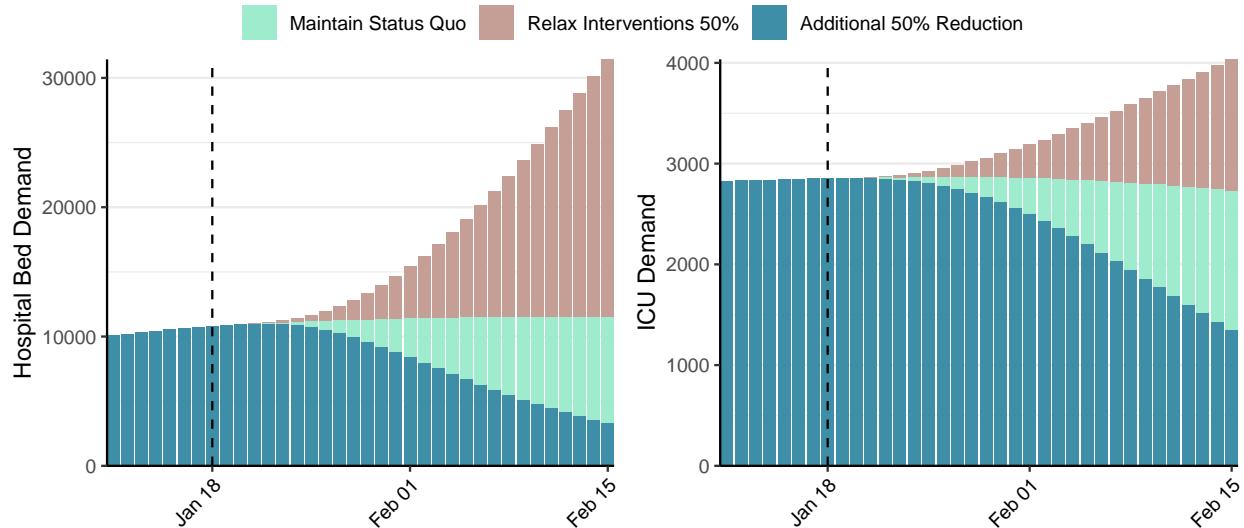


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 93,657 (95% CI: 87,728-99,587) at the current date to 8,467 (95% CI: 7,150-9,784) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 93,657 (95% CI: 87,728-99,587) at the current date to 340,650 (95% CI: 303,104-378,195) by 2021-02-15.

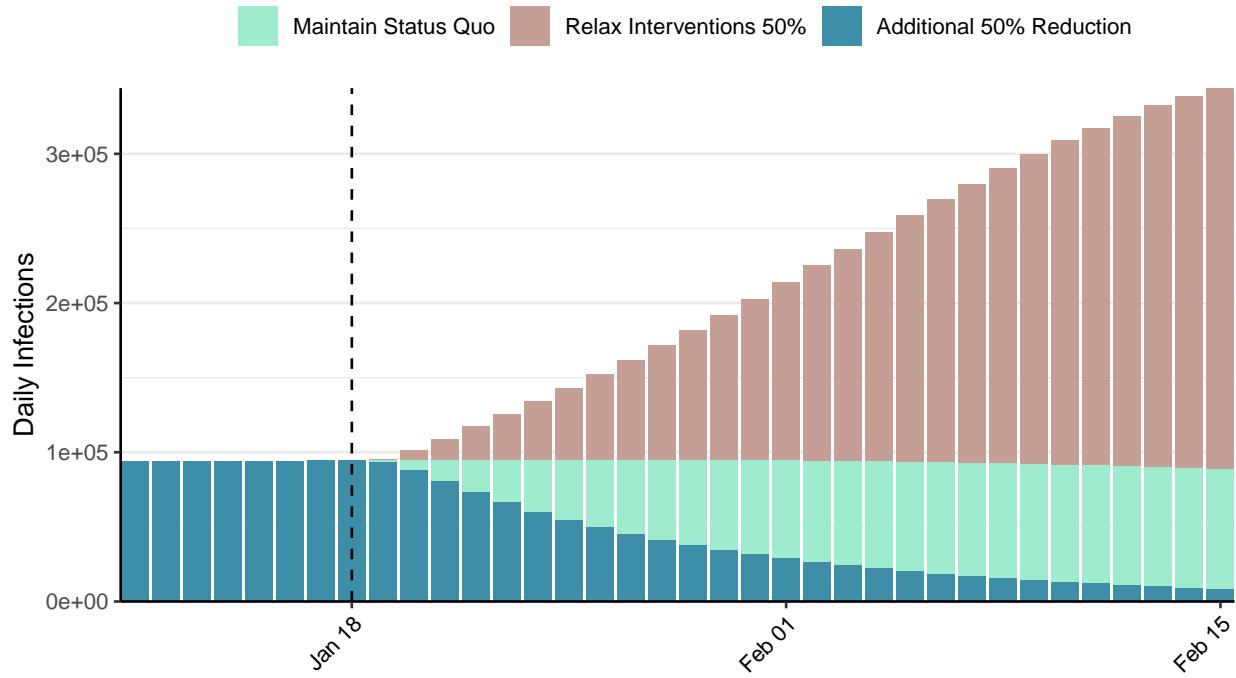


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Comoros, 2021-01-18

[Download the report for Comoros, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.42 (95% CI: 1.24-1.61)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Comoros is not shown in the following plot as only 0 deaths have been reported to date**

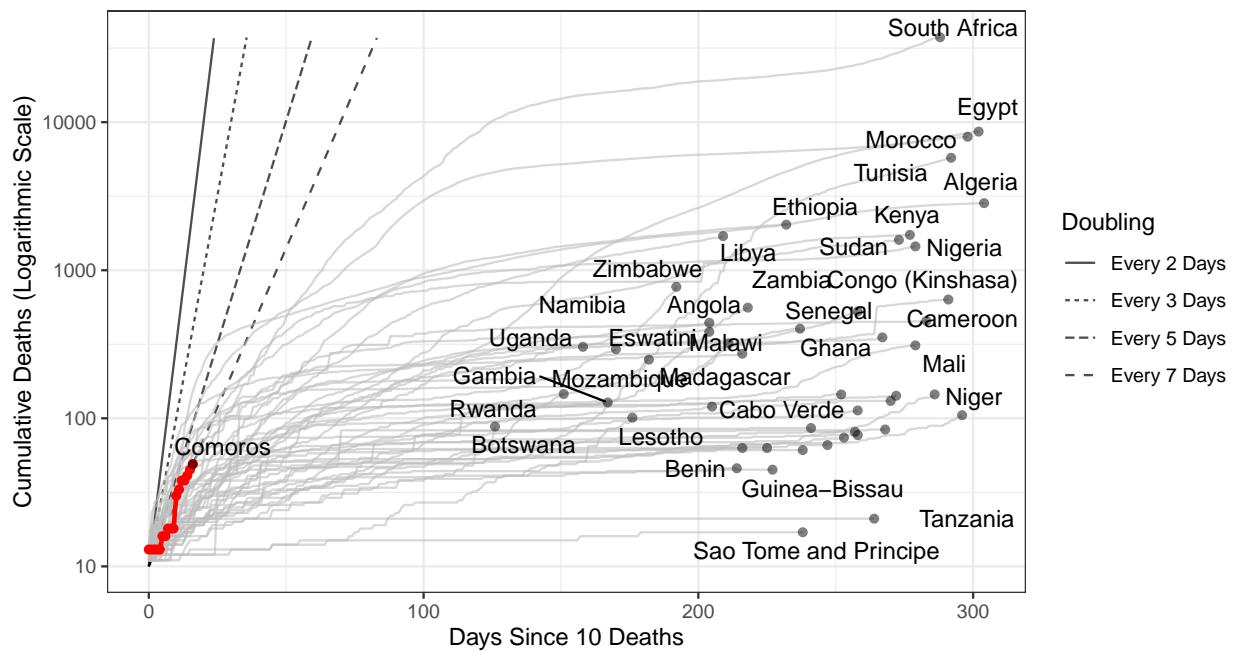


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 21,934 (95% CI: 18,886-24,982) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

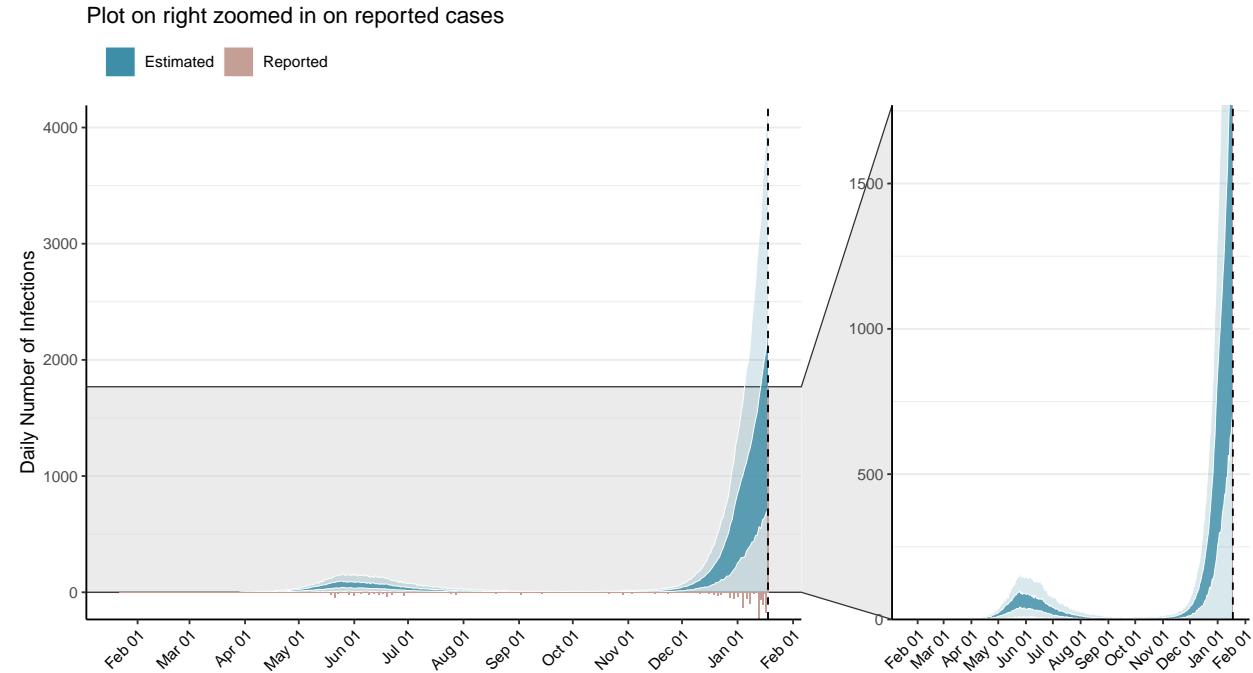
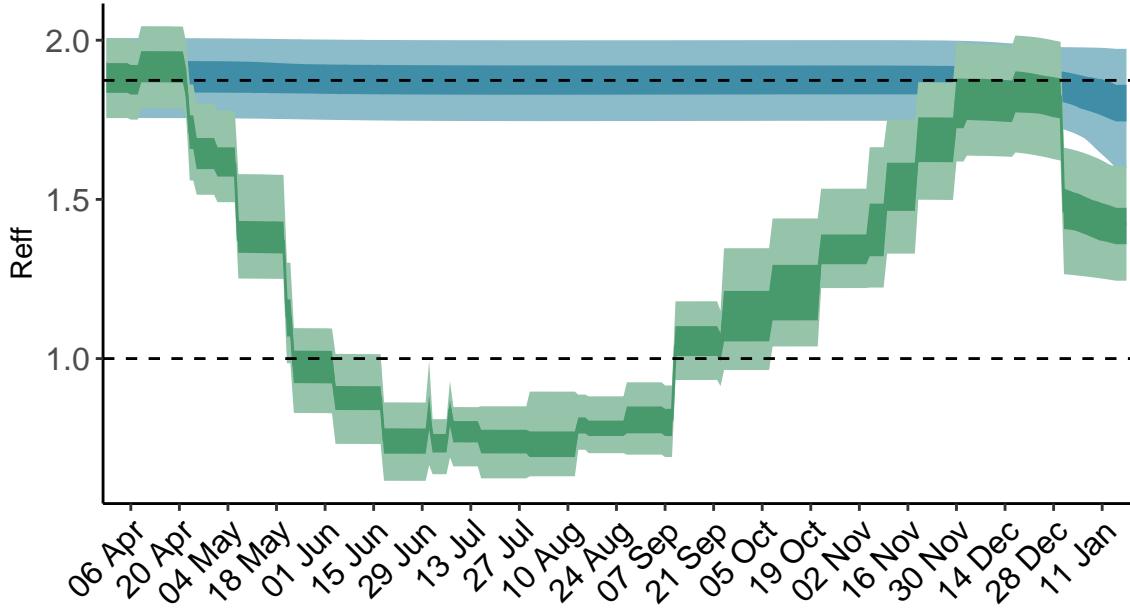


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Comoros is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

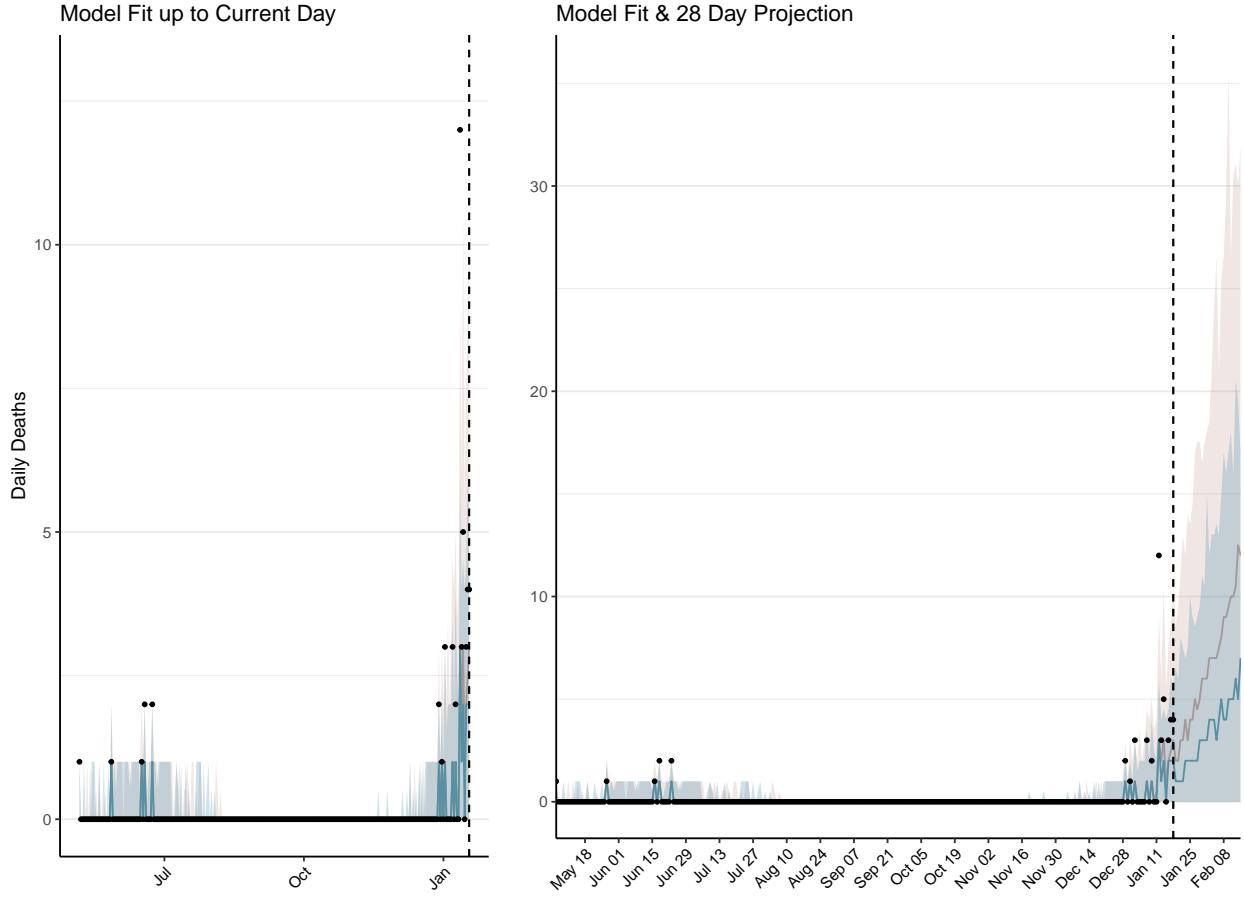


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 71 (95% CI: 60-81) patients requiring treatment with high-pressure oxygen at the current date to 287 (95% CI: 248-326) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 14 (95% CI: 12-15) patients requiring treatment with mechanical ventilation at the current date to 28 (95% CI: 25-31) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

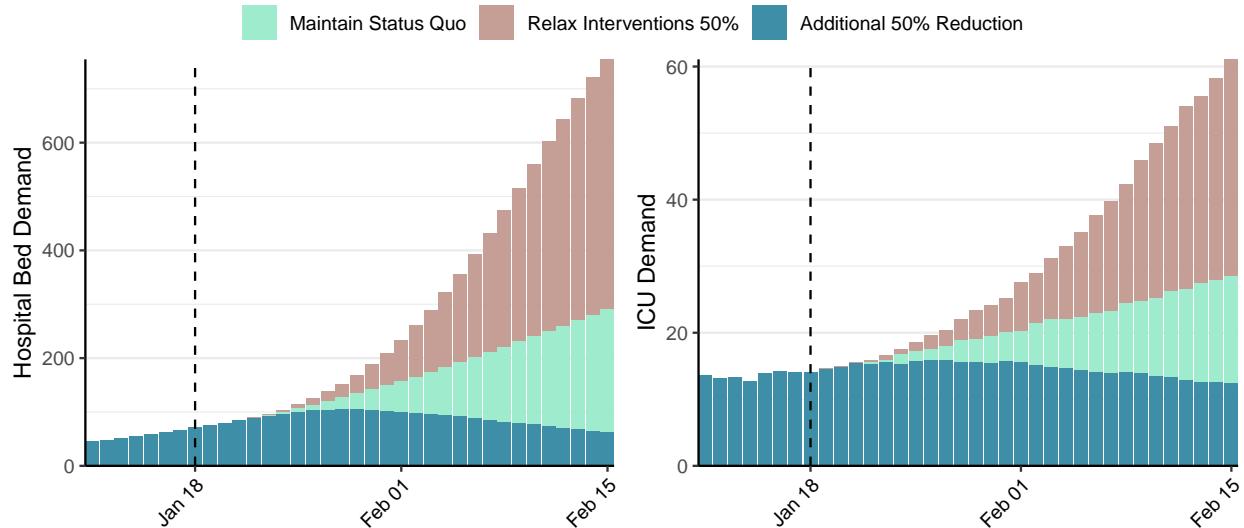


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,608 (95% CI: 1,377-1,838) at the current date to 432 (95% CI: 368-496) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,608 (95% CI: 1,377-1,838) at the current date to 17,131 (95% CI: 15,505-18,757) by 2021-02-15.

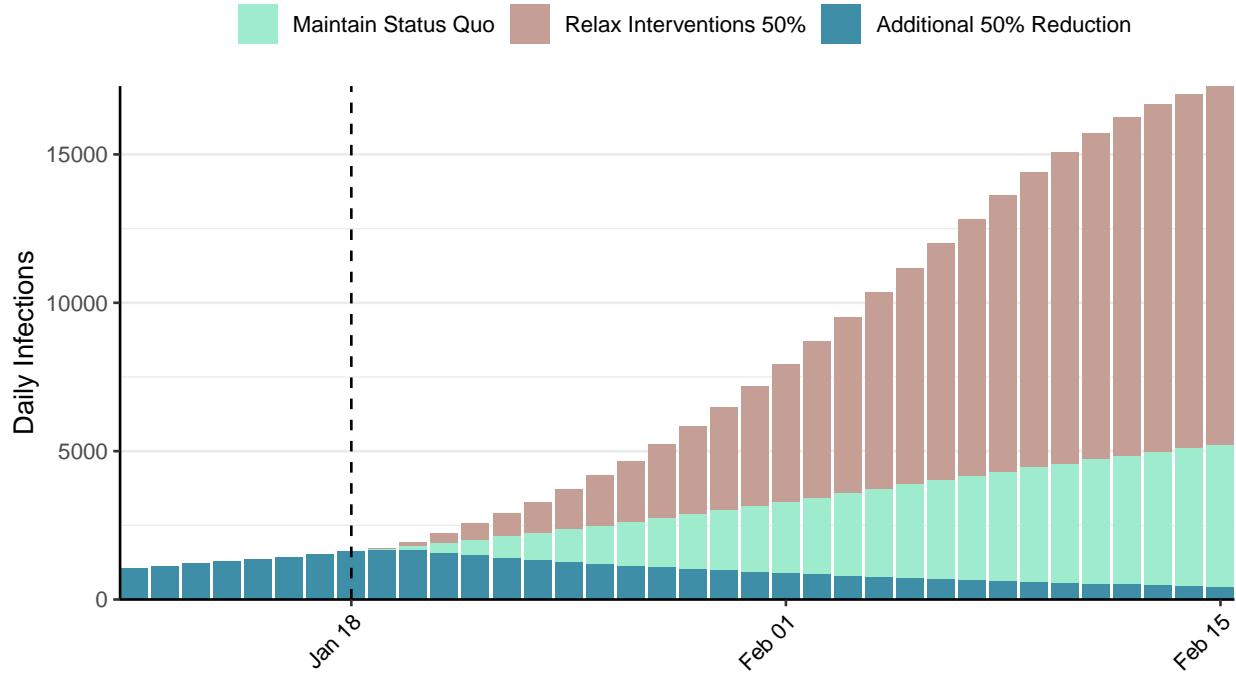


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Cabo Verde, 2021-01-18

[Download the report for Cabo Verde, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
53	53	1	1	1.38 (95% CI: 1.11-1.7)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Cabo Verde is not shown in the following plot as only 1 deaths have been reported to date**

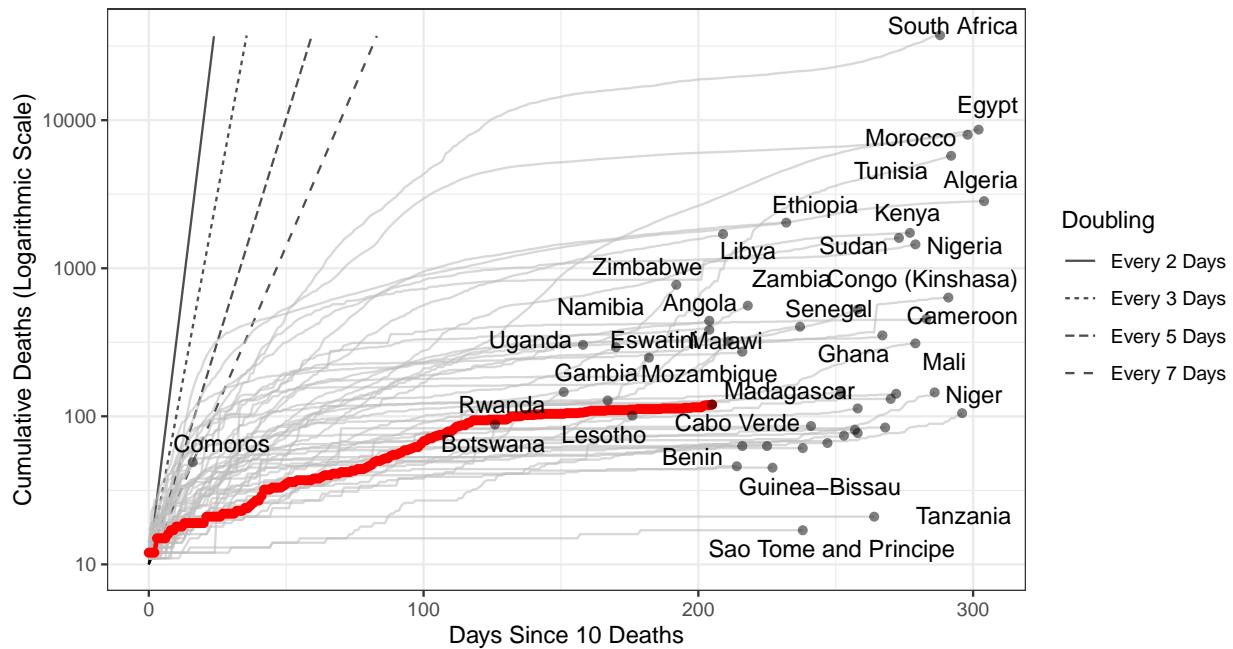


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 5,123 (95% CI: 4,632-5,613) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

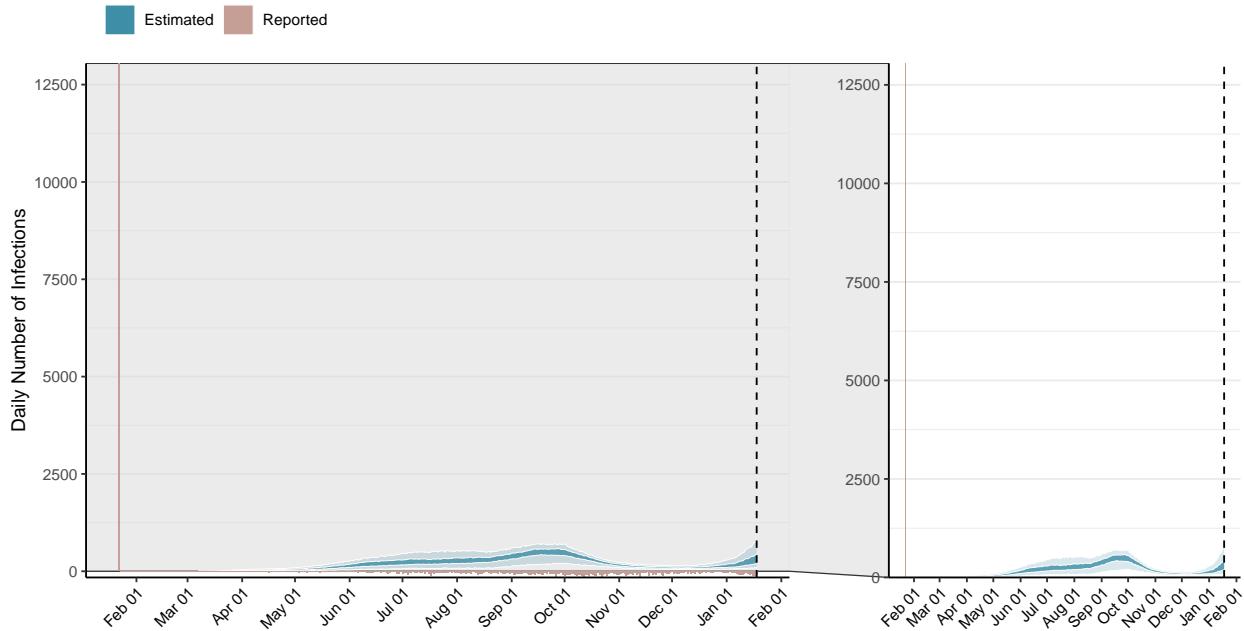
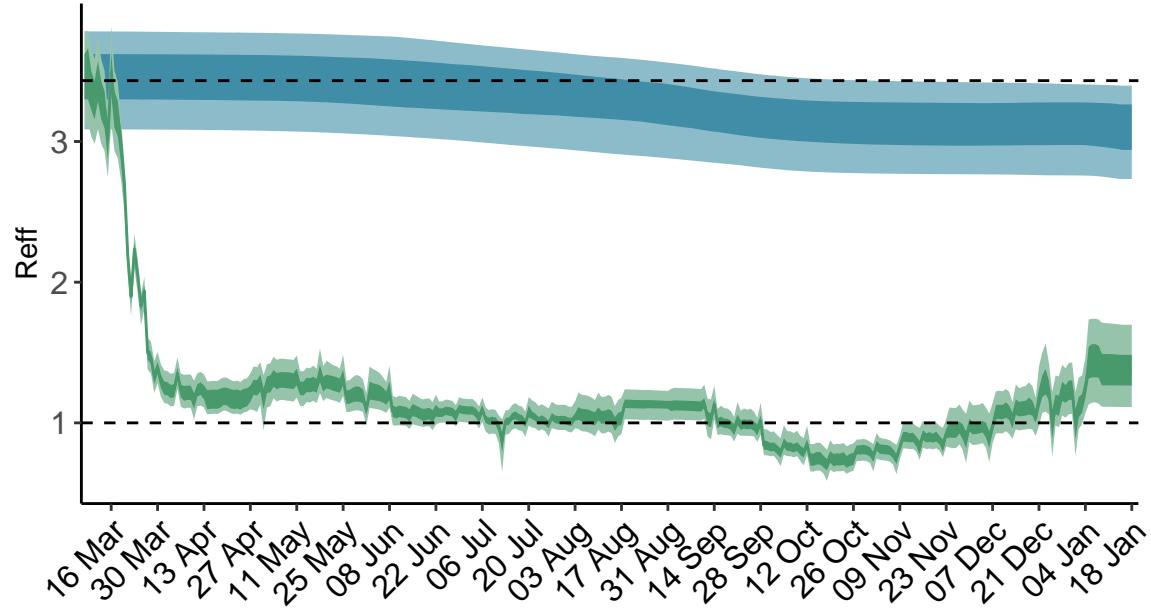


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Cabo Verde is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

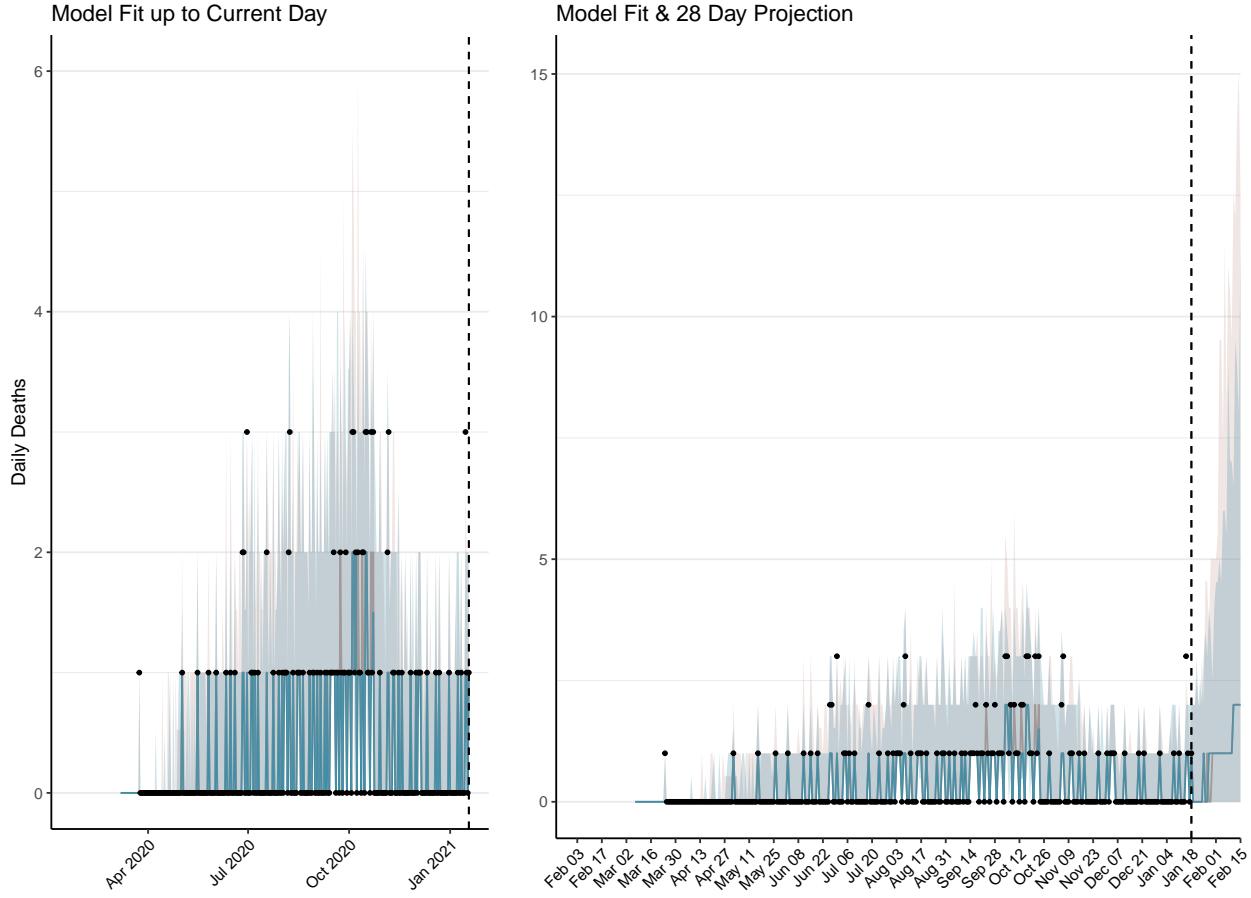


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 20 (95% CI: 18-22) patients requiring treatment with high-pressure oxygen at the current date to 99 (95% CI: 80-117) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 7 (95% CI: 6-7) patients requiring treatment with mechanical ventilation at the current date to 21 (95% CI: 19-23) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

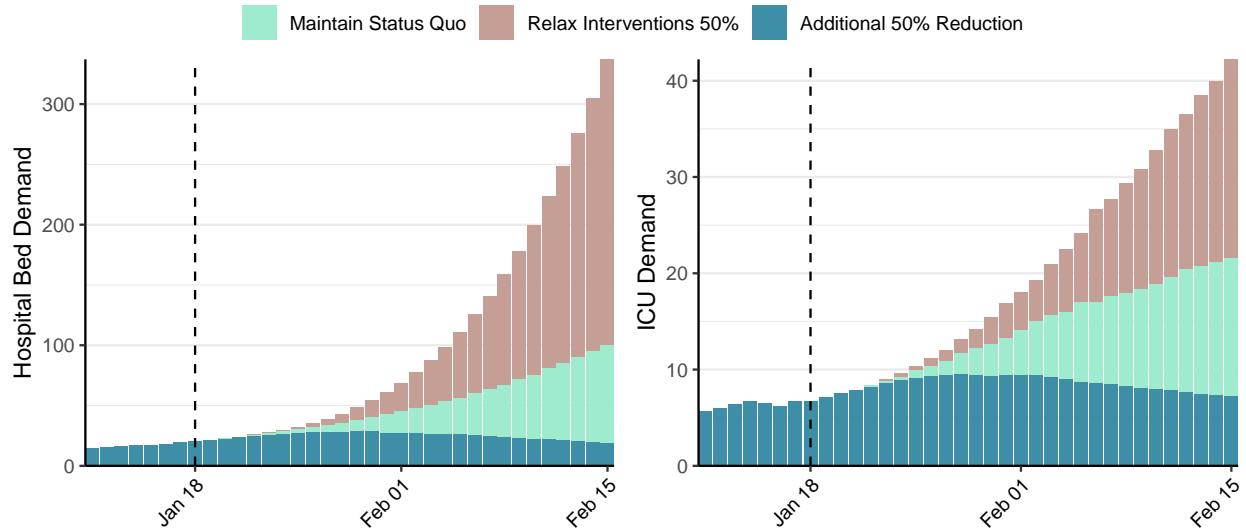


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 340 (95% CI: 296-384) at the current date to 113 (95% CI: 88-138) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 340 (95% CI: 296-384) at the current date to 7,306 (95% CI: 6,331-8,280) by 2021-02-15.

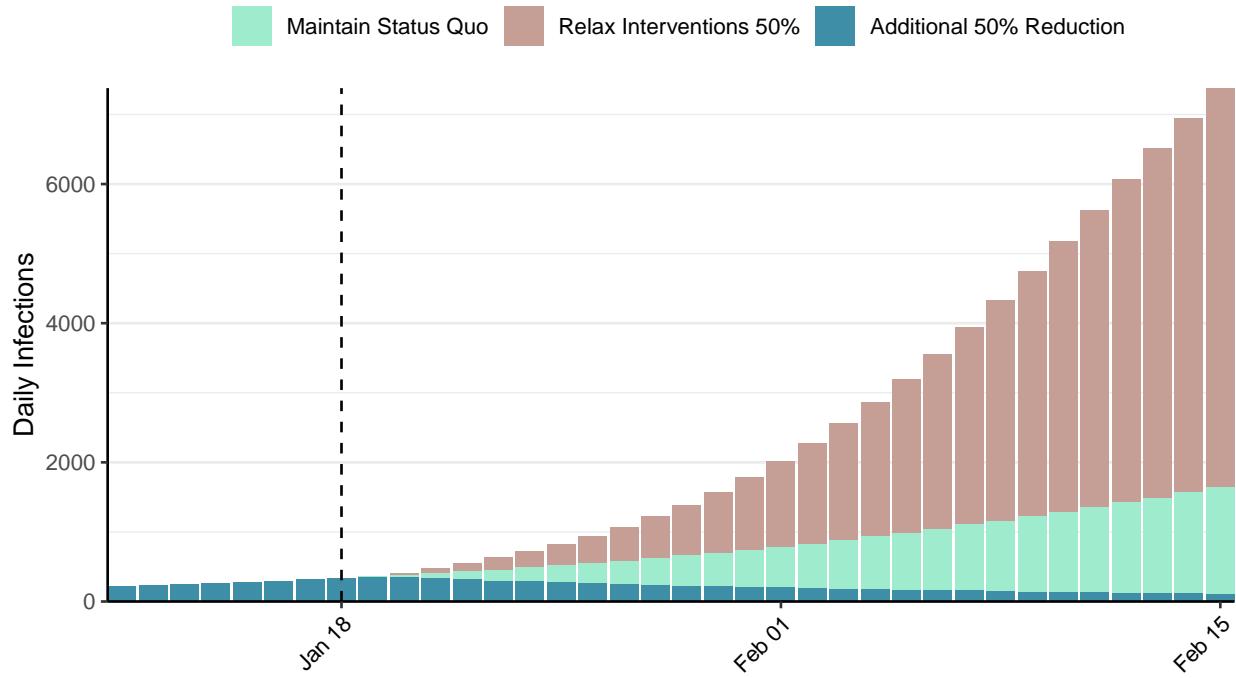


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Costa Rica, 2021-01-18

[Download the report for Costa Rica, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.96 (95% CI: 0.83-1.09)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Costa Rica is not shown in the following plot as only 0 deaths have been reported to date**

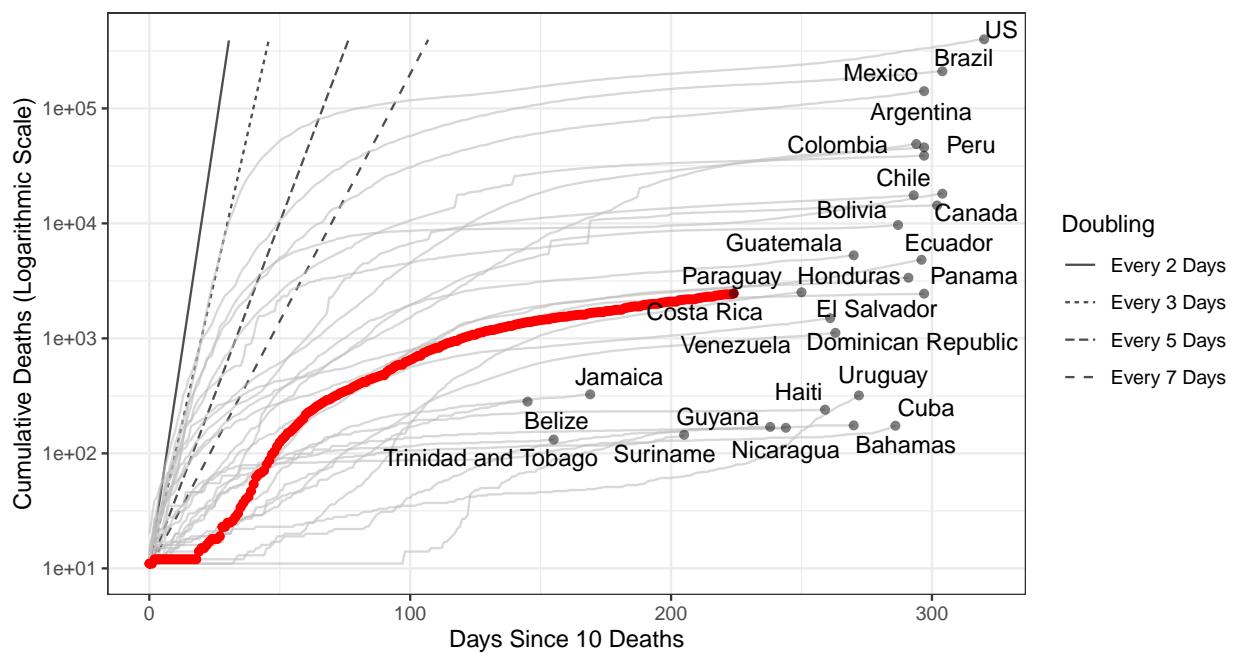


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 111,020 (95% CI: 100,993-121,046) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

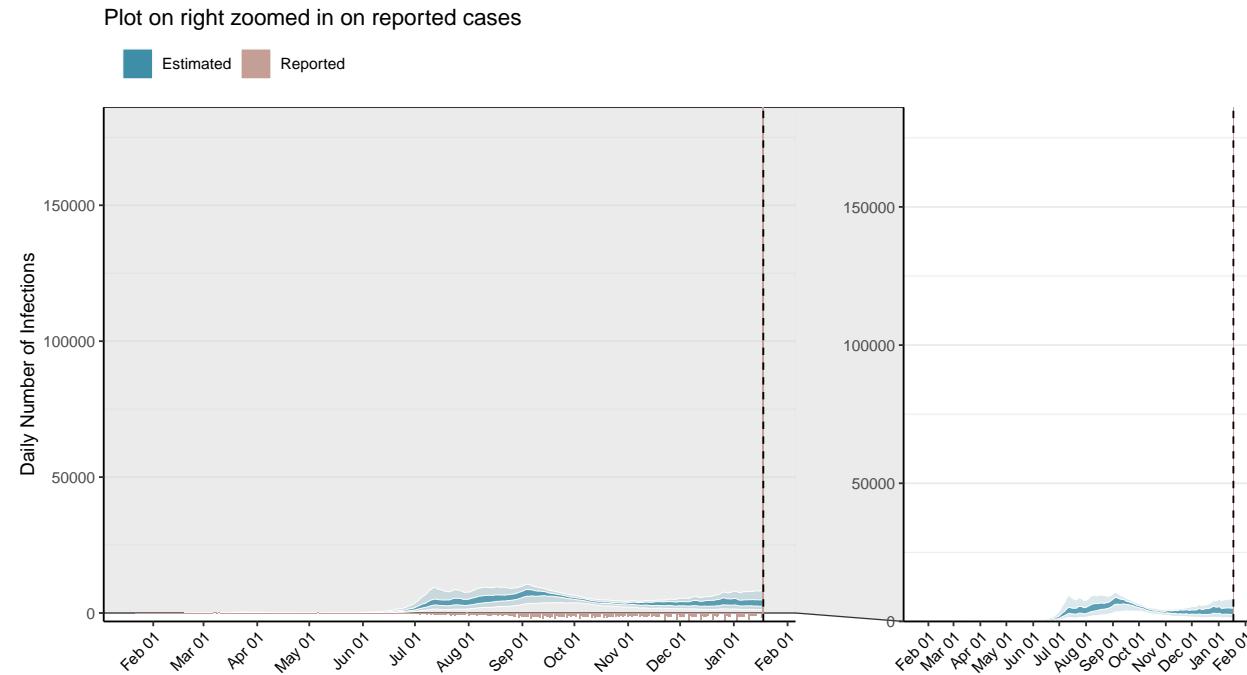
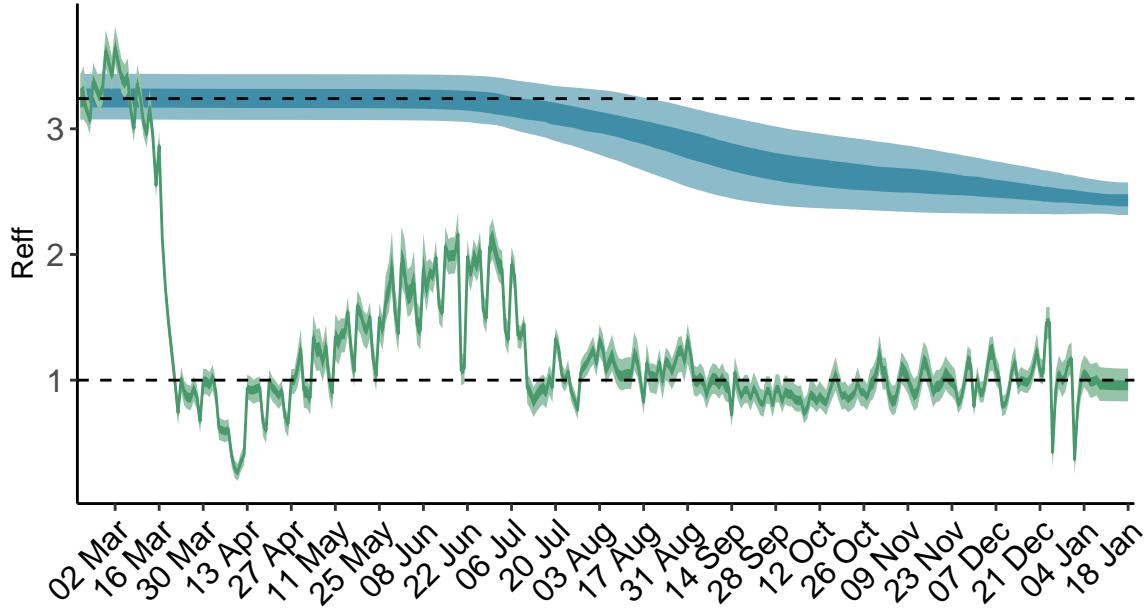


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

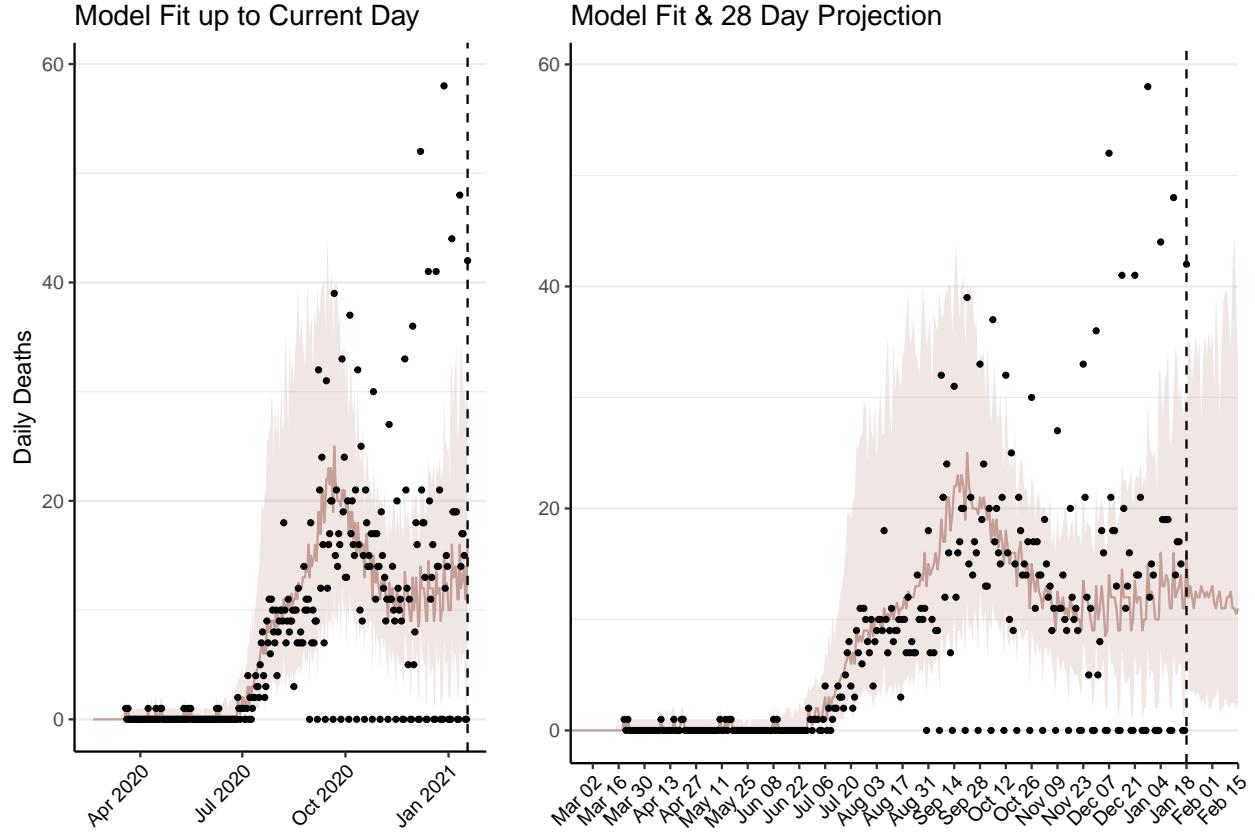


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 462 (95% CI: 420-504) patients requiring treatment with high-pressure oxygen at the current date to 430 (95% CI: 373-487) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 159 (95% CI: 148-171) patients requiring treatment with mechanical ventilation at the current date to 143 (95% CI: 131-156) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

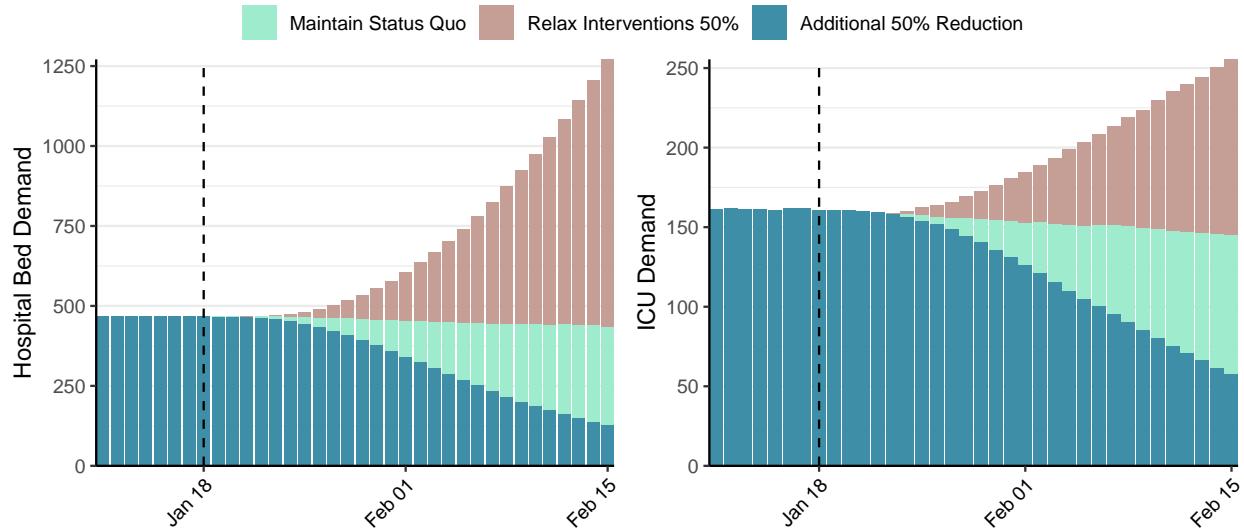
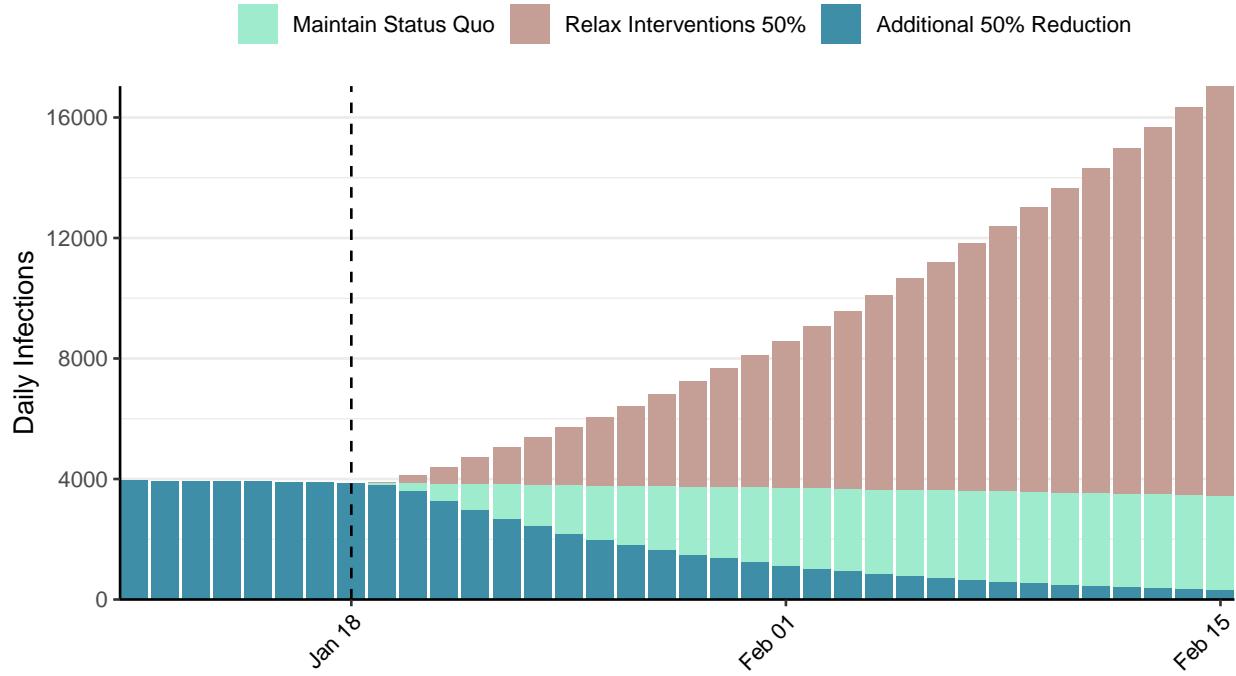


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,845 (95% CI: 3,426-4,264) at the current date to 302 (95% CI: 258-346) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,845 (95% CI: 3,426-4,264) at the current date to 16,873 (95% CI: 14,824-18,921) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Cuba, 2021-01-18

[Download the report for Cuba, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.55 (95% CI: 1.39-1.75)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Cuba is not shown in the following plot as only 0 deaths have been reported to date**

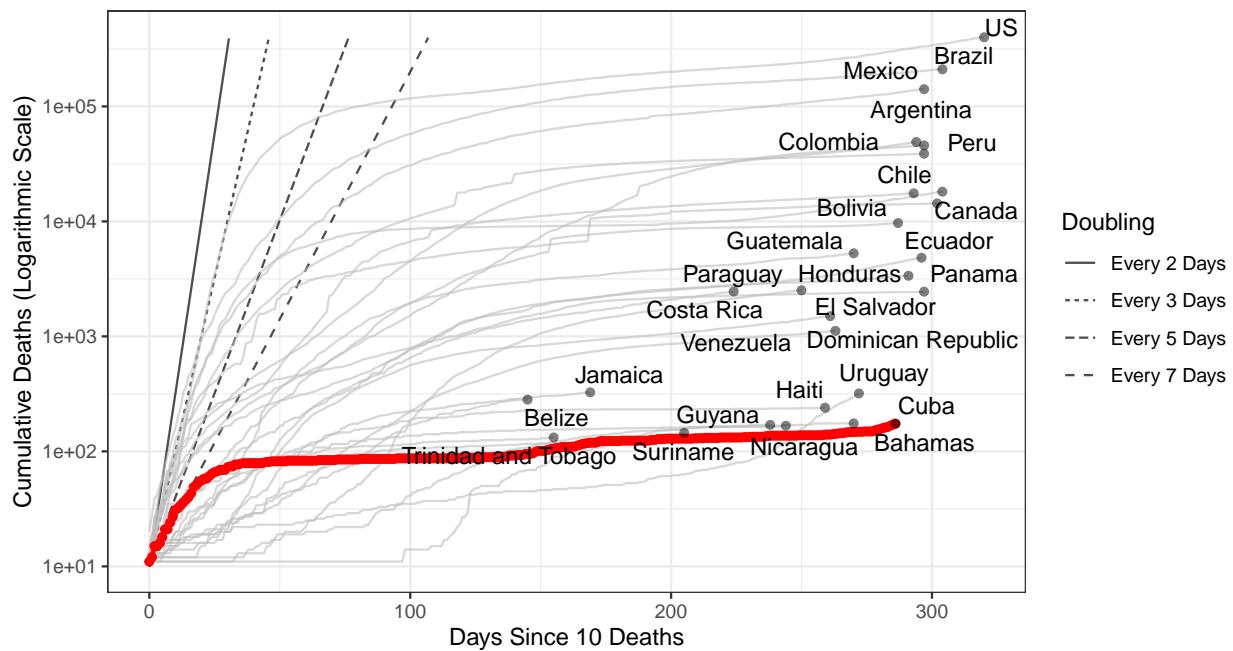


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 20,697 (95% CI: 19,011-22,384) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

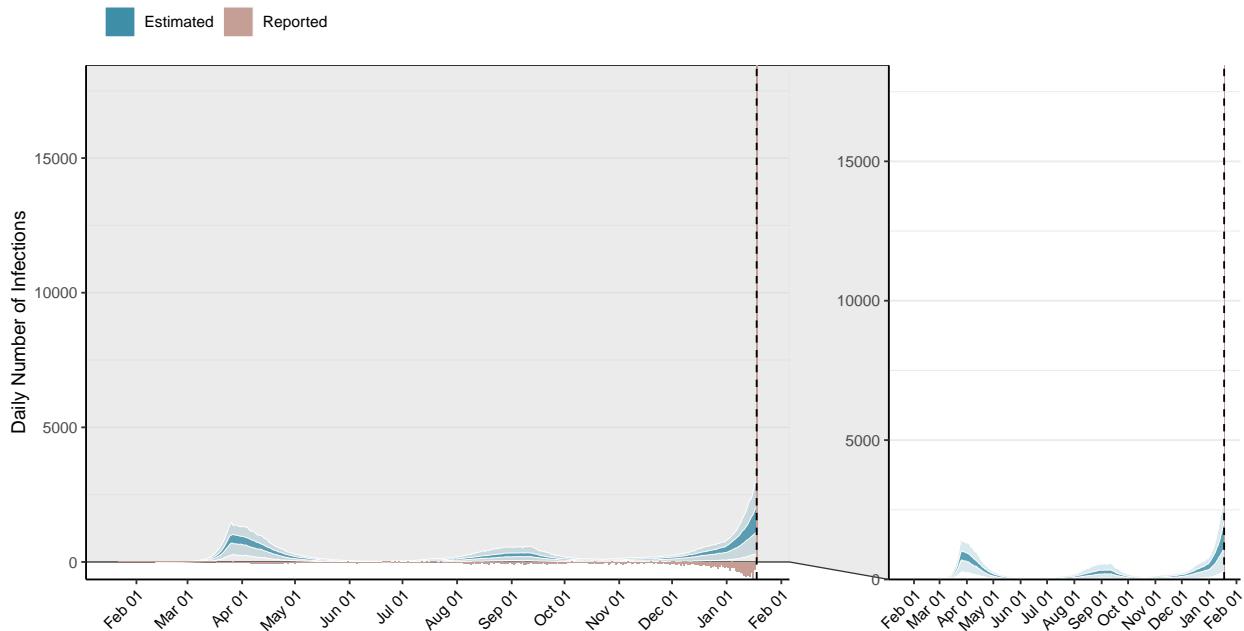
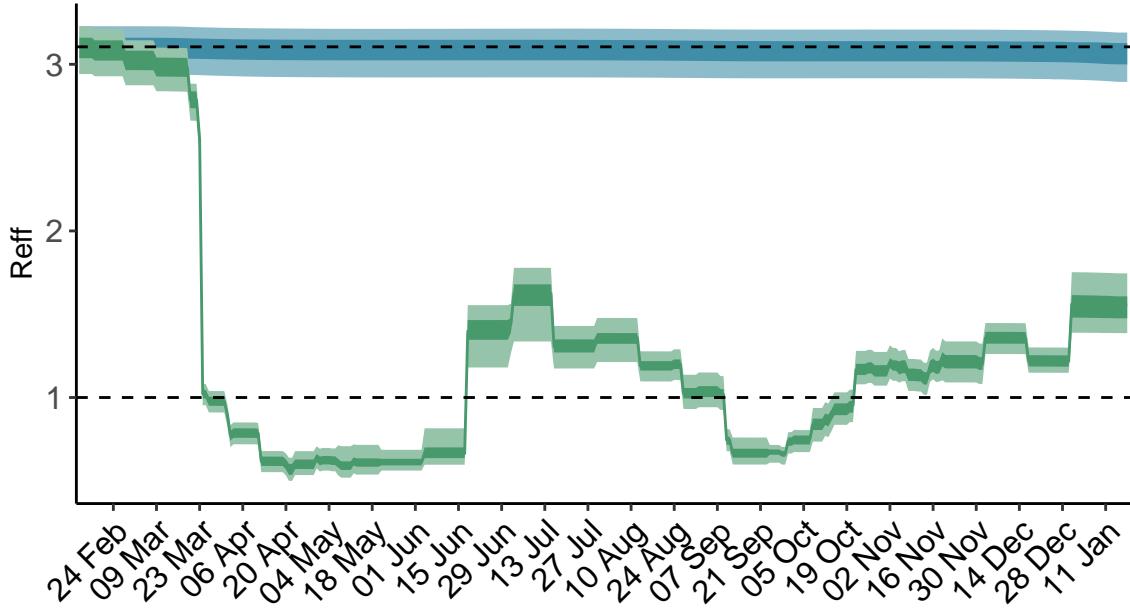


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Cuba is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

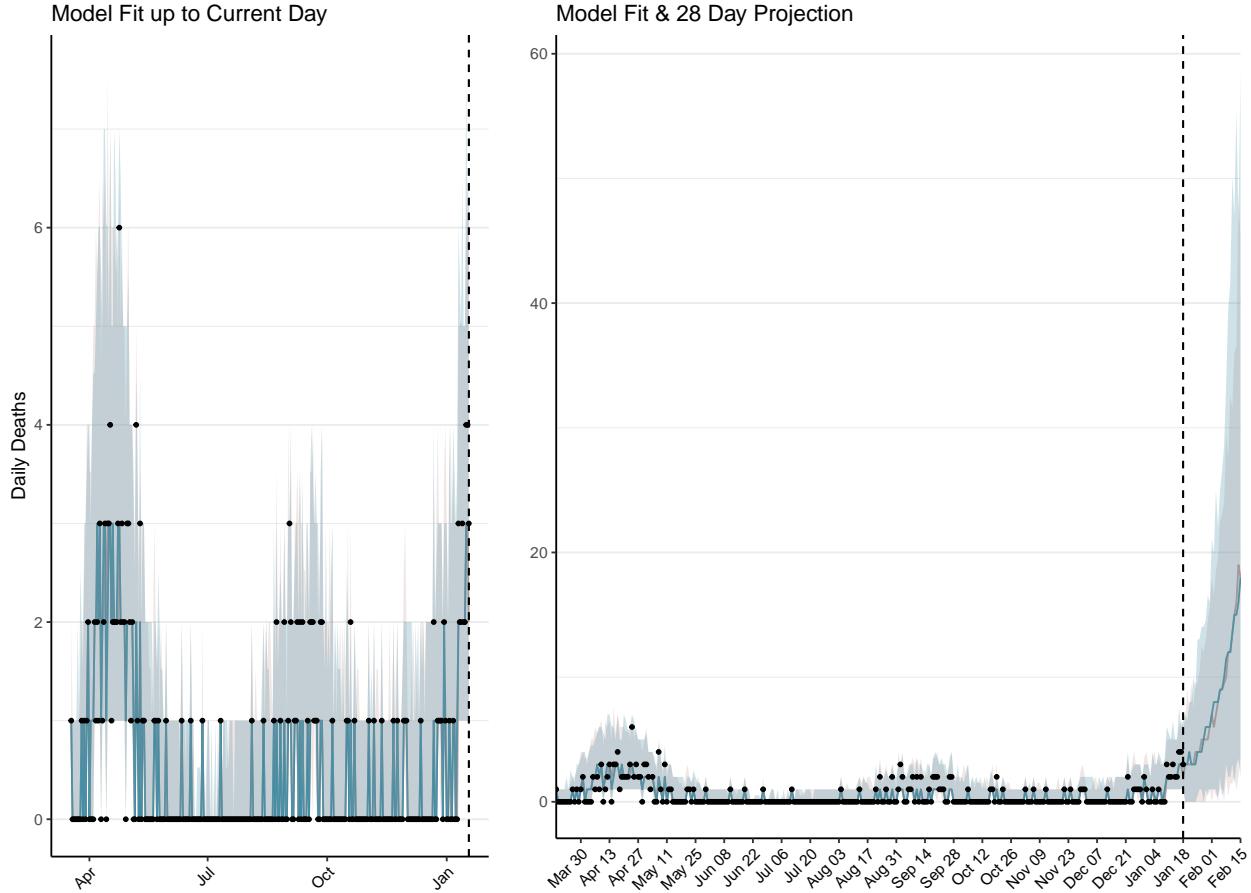


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 109 (95% CI: 100-118) patients requiring treatment with high-pressure oxygen at the current date to 817 (95% CI: 725-909) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 33 (95% CI: 30-36) patients requiring treatment with mechanical ventilation at the current date to 249 (95% CI: 222-277) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

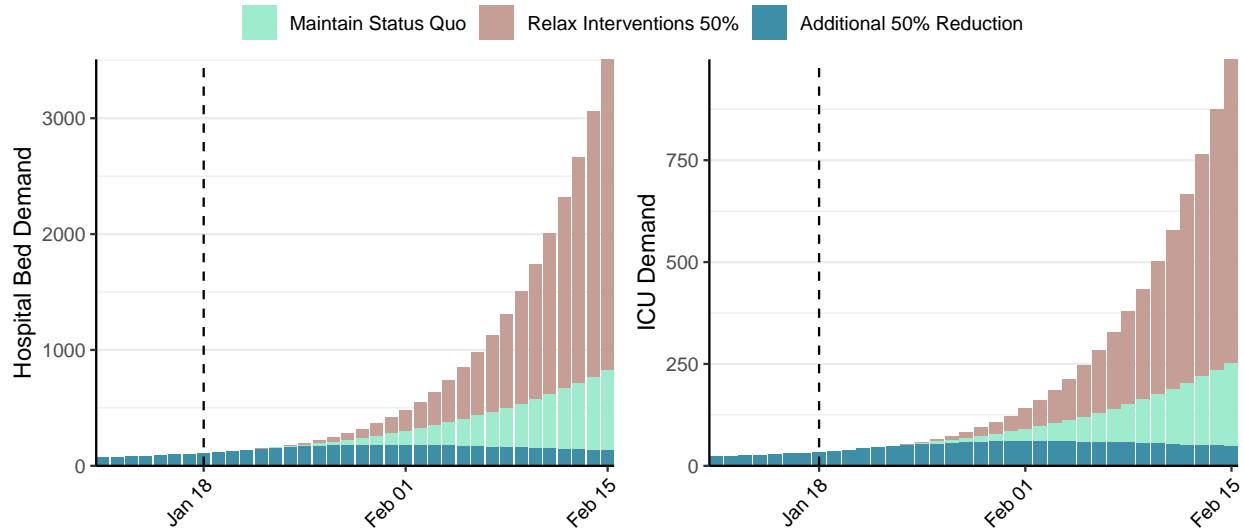


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,607 (95% CI: 1,464-1,750) at the current date to 679 (95% CI: 599-759) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,607 (95% CI: 1,464-1,750) at the current date to 76,920 (95% CI: 68,444-85,396) by 2021-02-15.

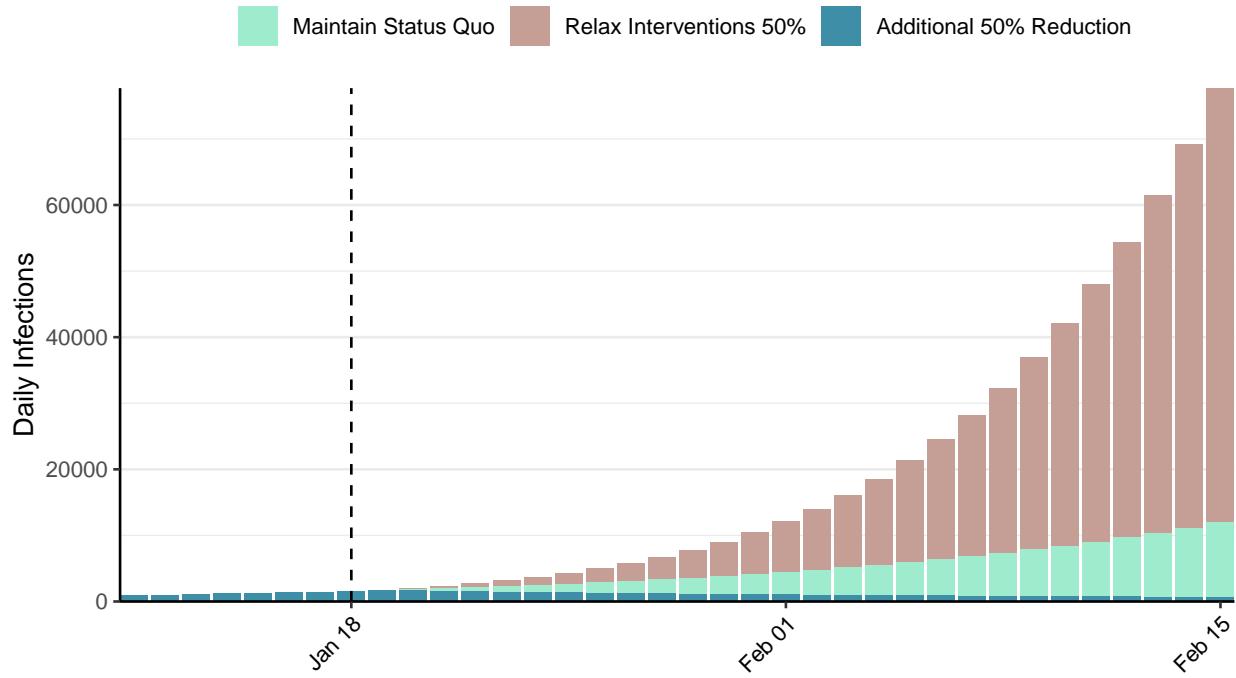


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Djibouti, 2021-01-18

[Download the report for Djibouti, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.65 (95% CI: 0.39-1.15)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Djibouti is not shown in the following plot as only 0 deaths have been reported to date**

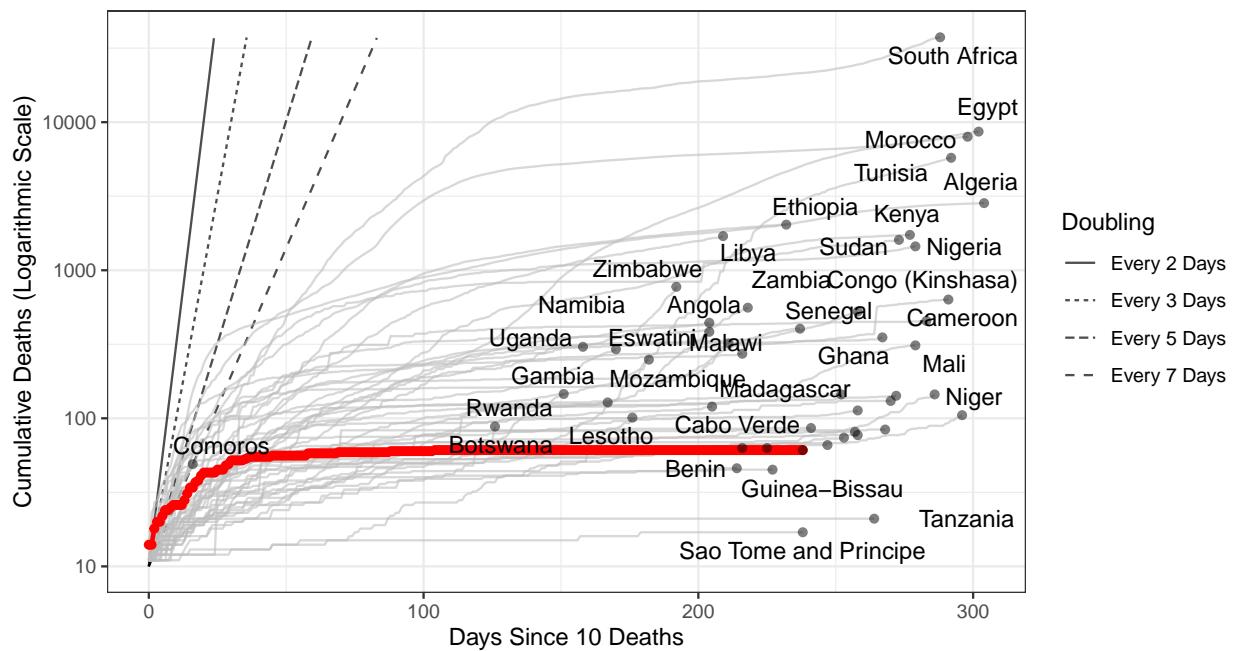


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1 (95% CI: 0-2) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

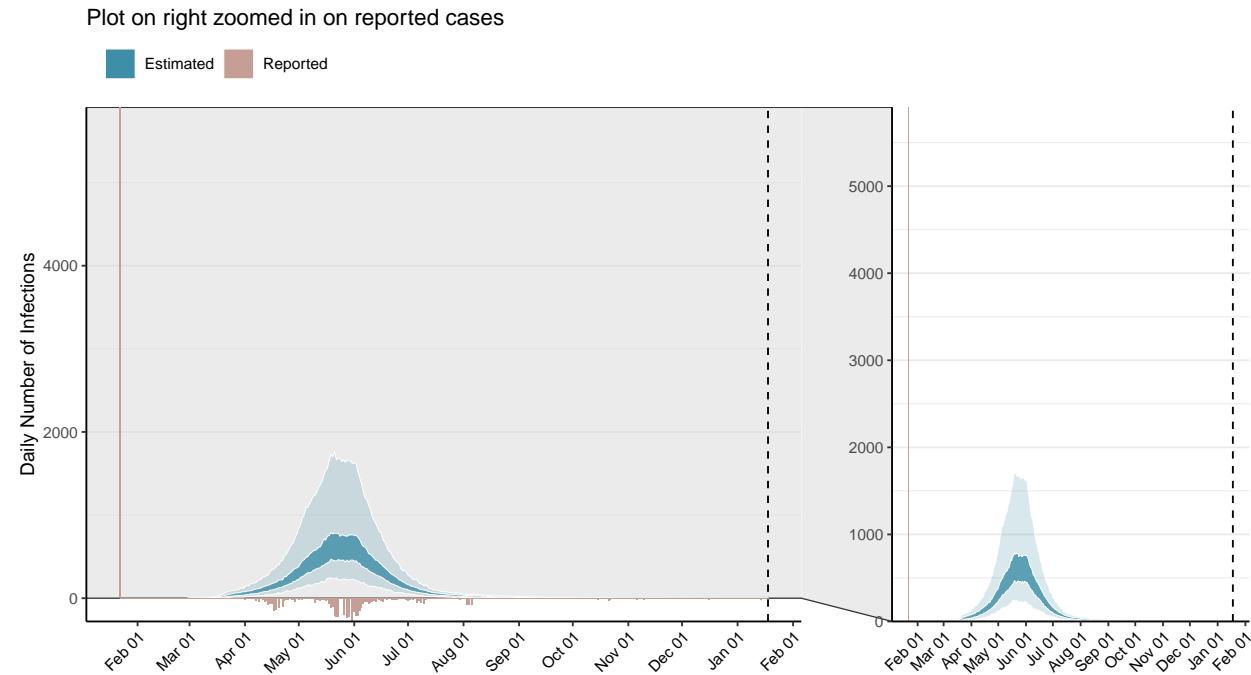
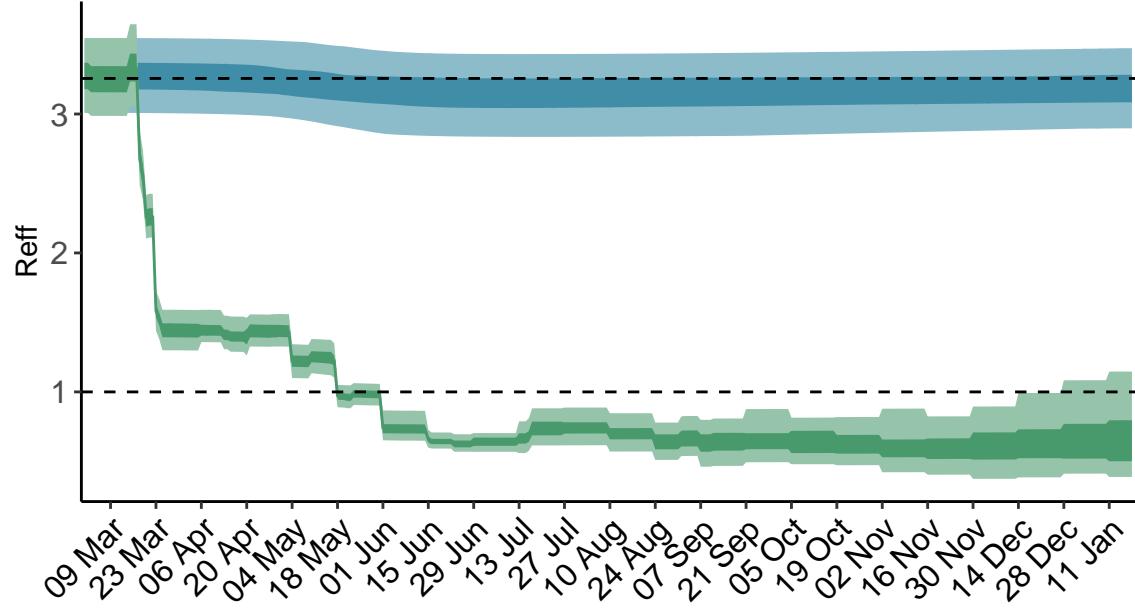


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

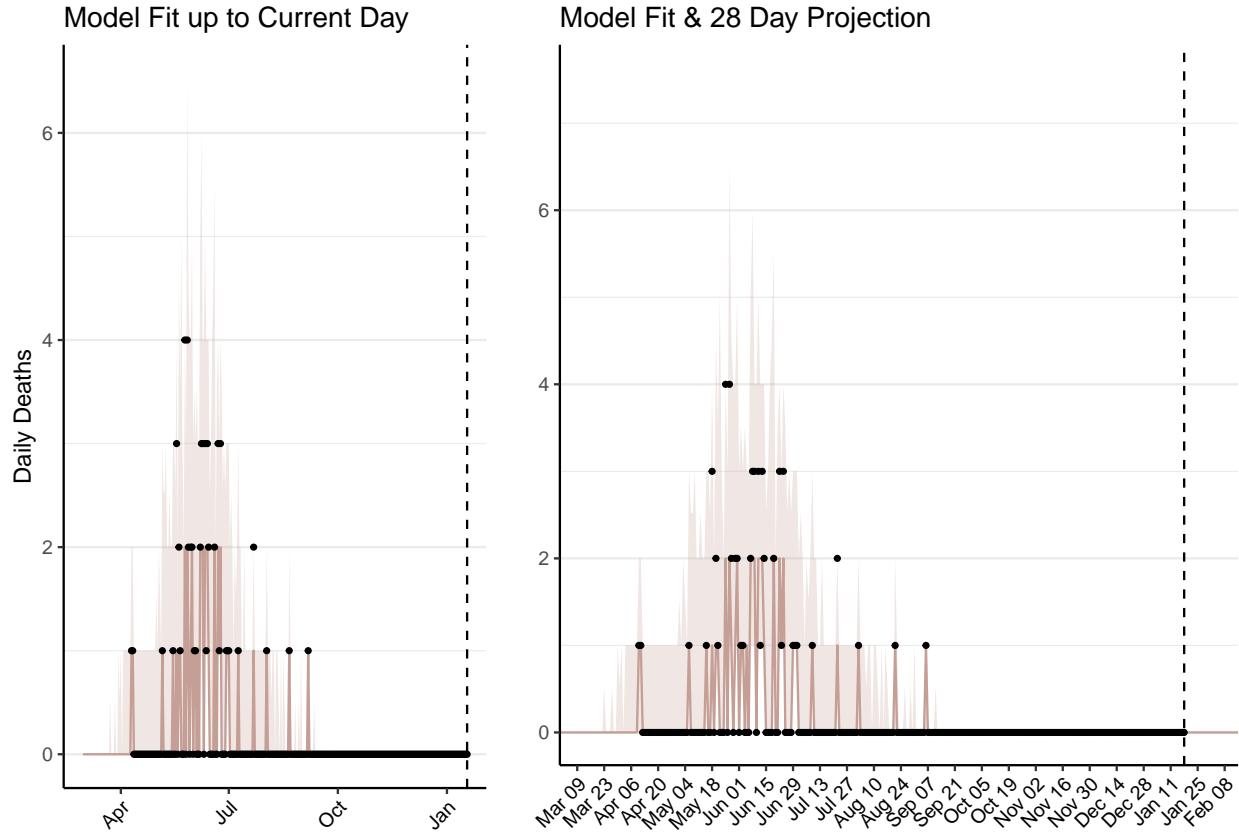


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: NaN-NaN) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

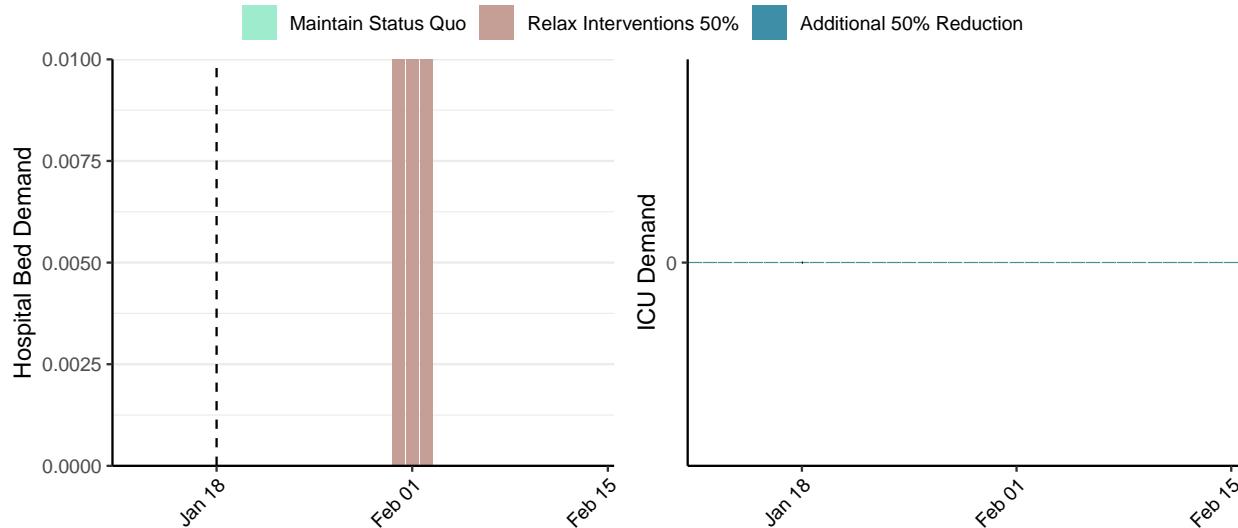


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15.

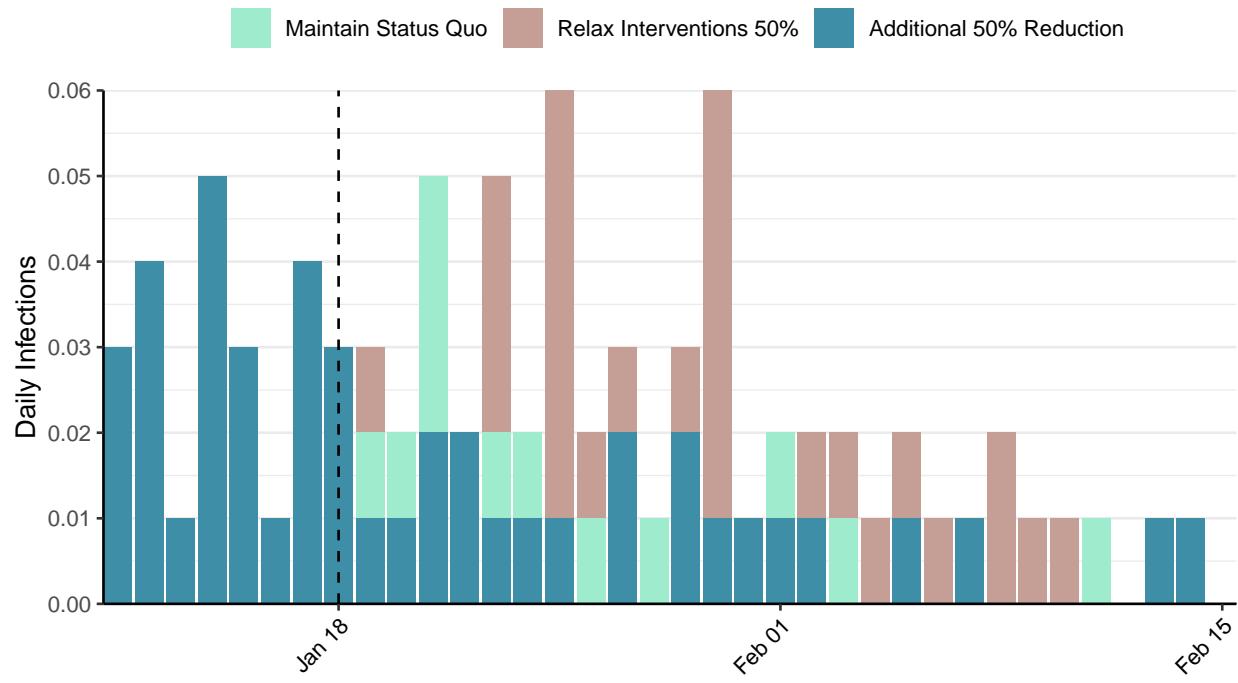


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Dominican Republic, 2021-01-18

[Download the report for Dominican Republic, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,848	1,848	11	11	1.03 (95% CI: 0.79-1.34)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

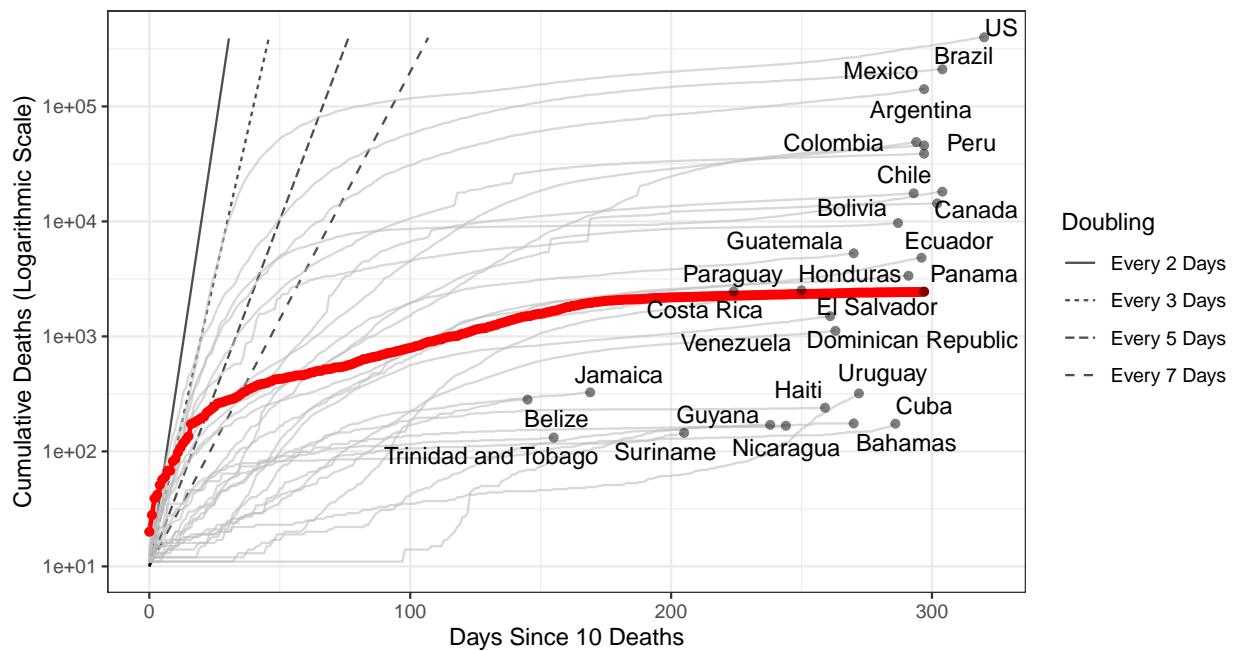


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 30,545 (95% CI: 28,890-32,199) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

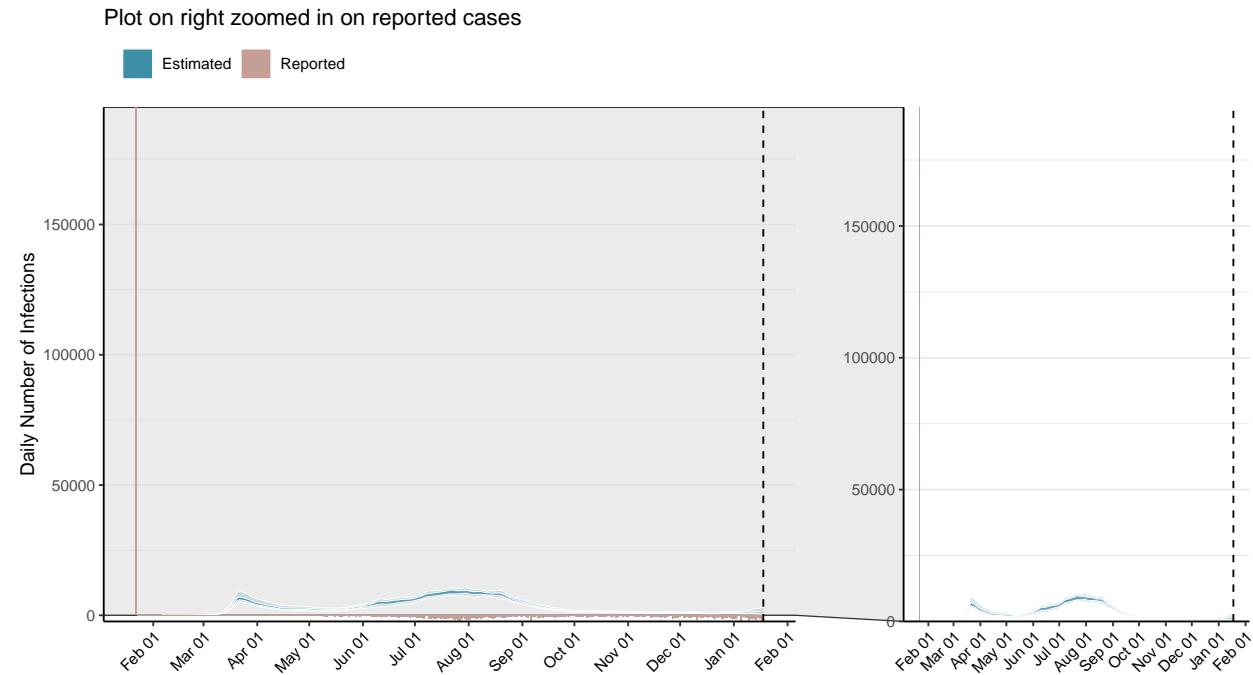
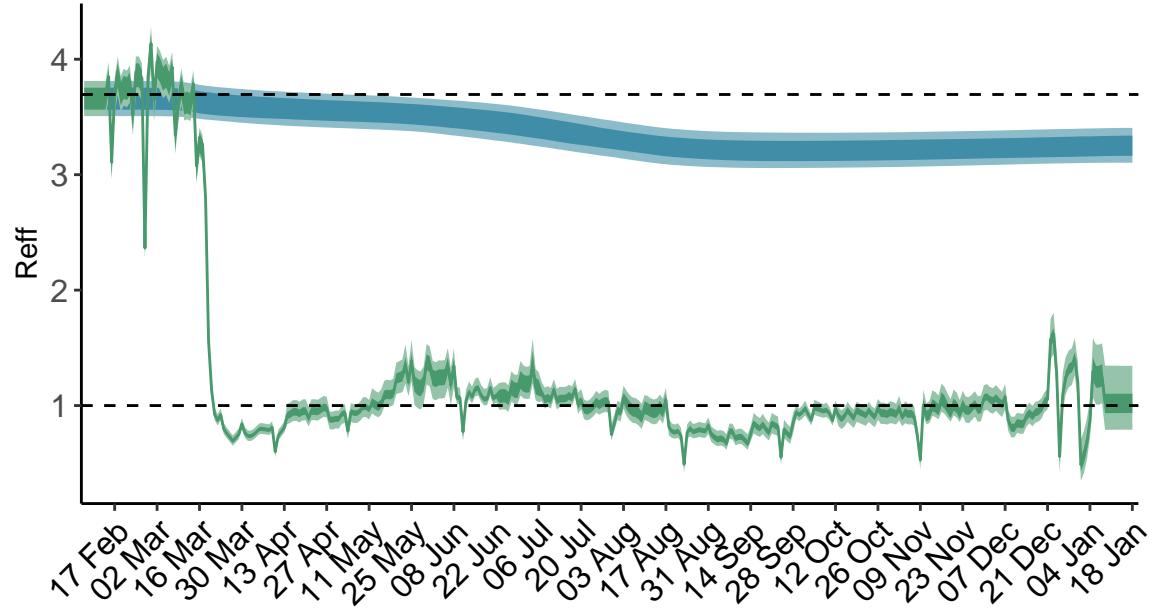


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

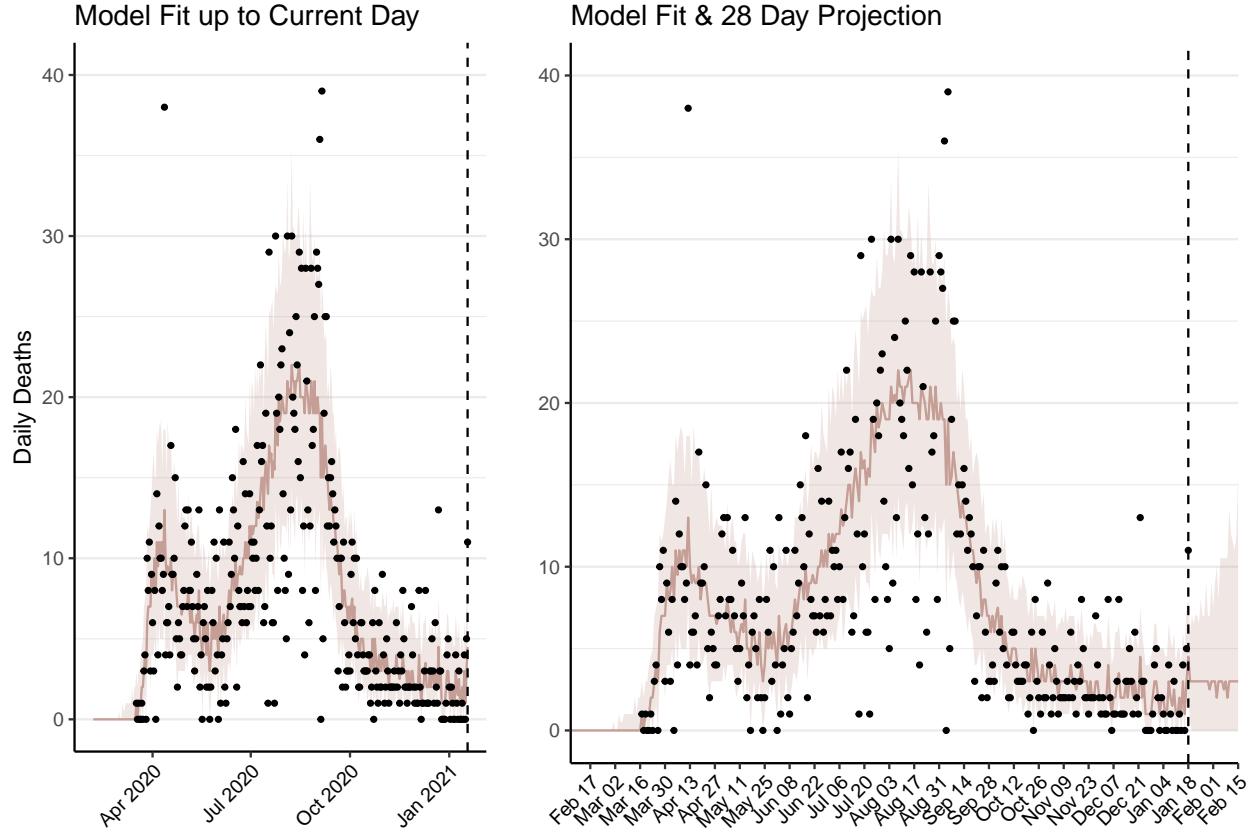


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 103 (95% CI: 97-109) patients requiring treatment with high-pressure oxygen at the current date to 154 (95% CI: 124-183) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 36 (95% CI: 33-38) patients requiring treatment with mechanical ventilation at the current date to 52 (95% CI: 42-61) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

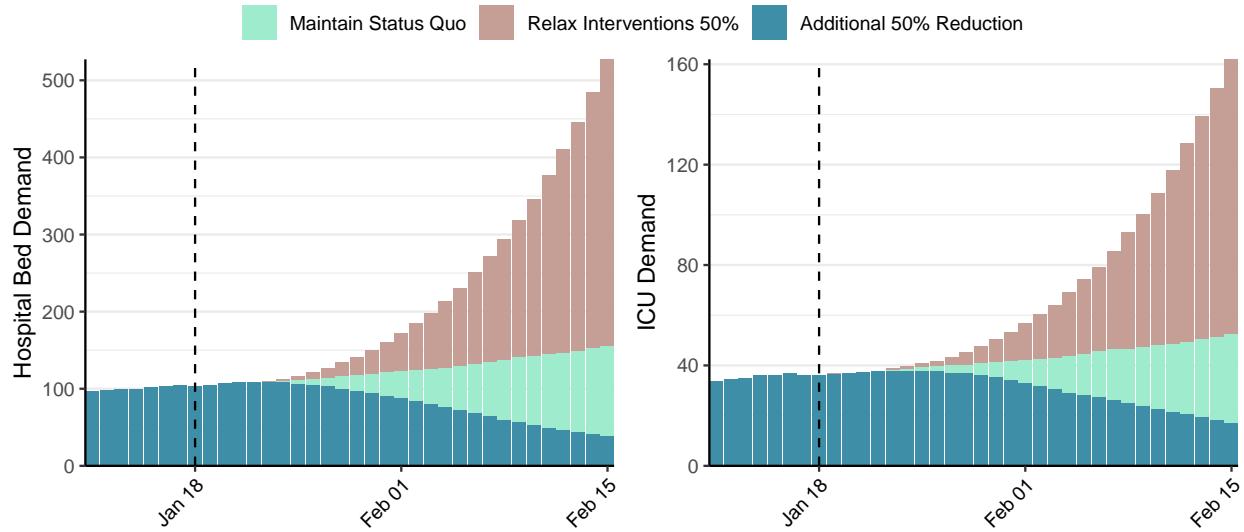


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,268 (95% CI: 1,147-1,388) at the current date to 156 (95% CI: 123-188) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,268 (95% CI: 1,147-1,388) at the current date to 12,836 (95% CI: 9,563-16,109) by 2021-02-15.

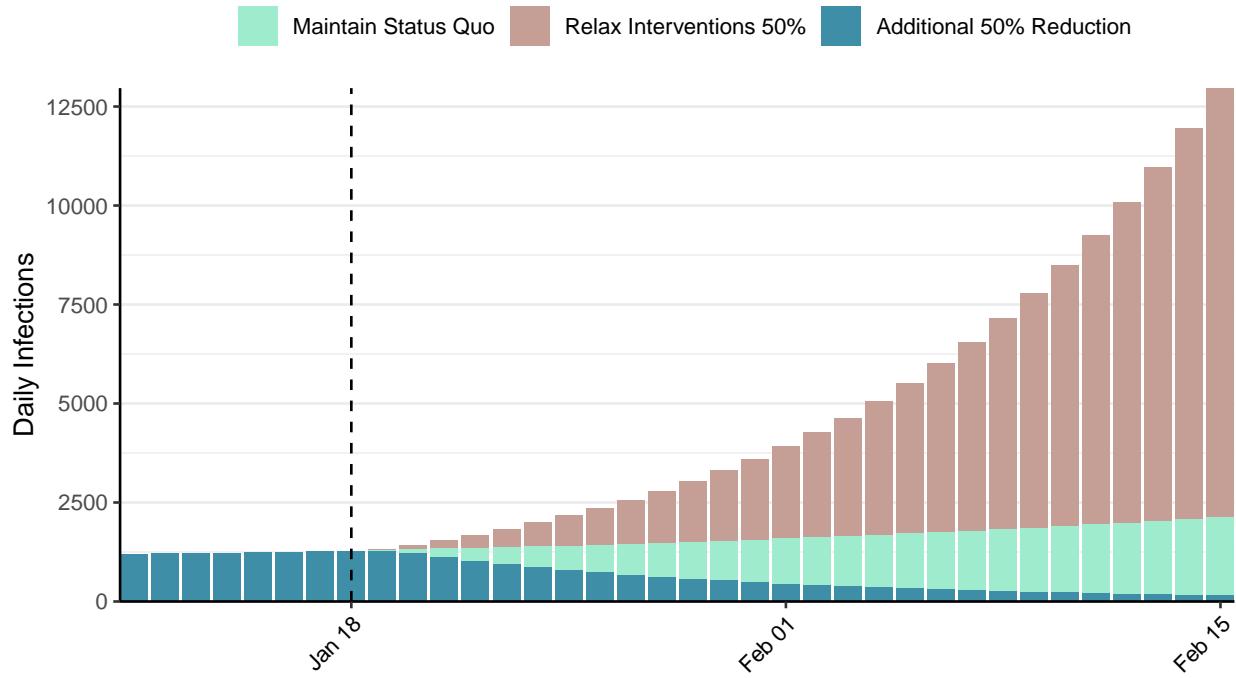


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Algeria, 2021-01-18

[Download the report for Algeria, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
259	259	4	4	0.89 (95% CI: 0.76-1.1)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Algeria is not shown in the following plot as only 4 deaths have been reported to date**

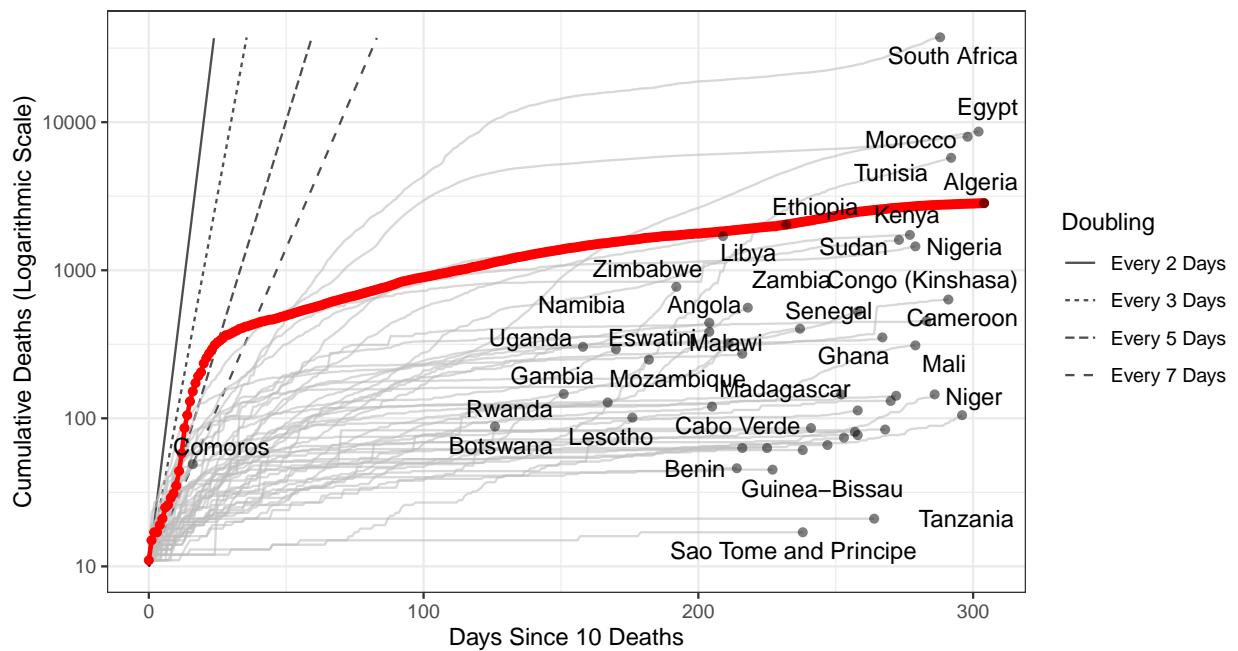


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 39,307 (95% CI: 37,800-40,814) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

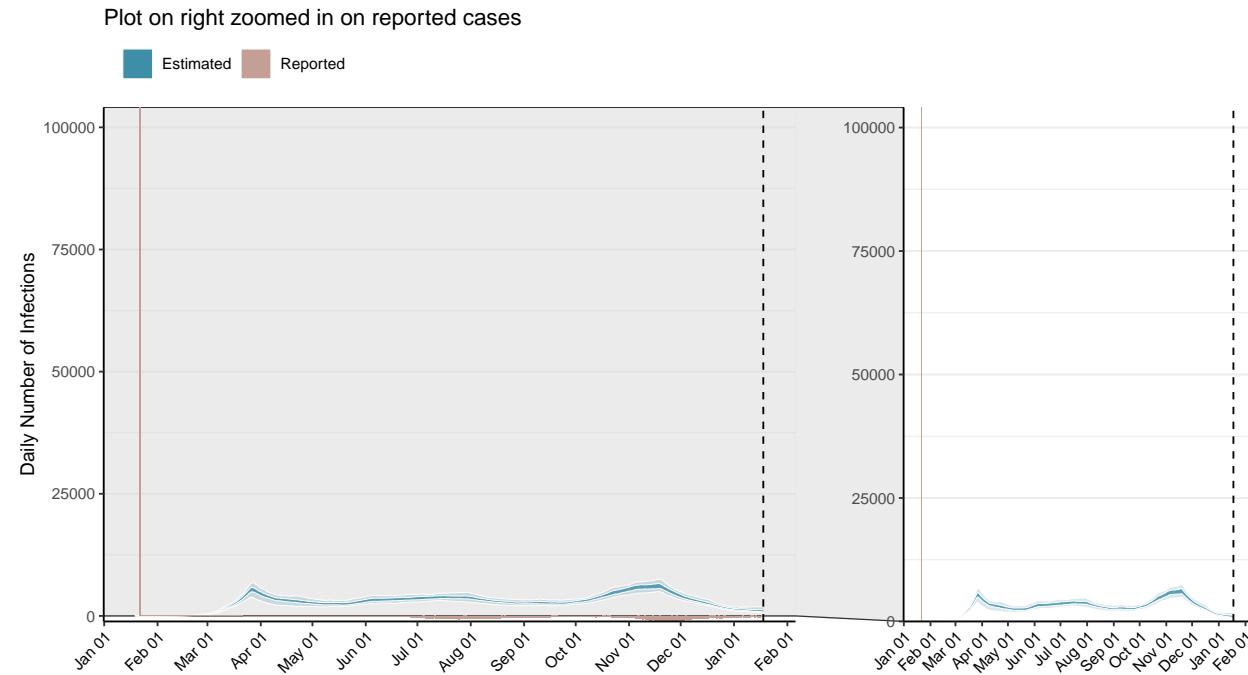
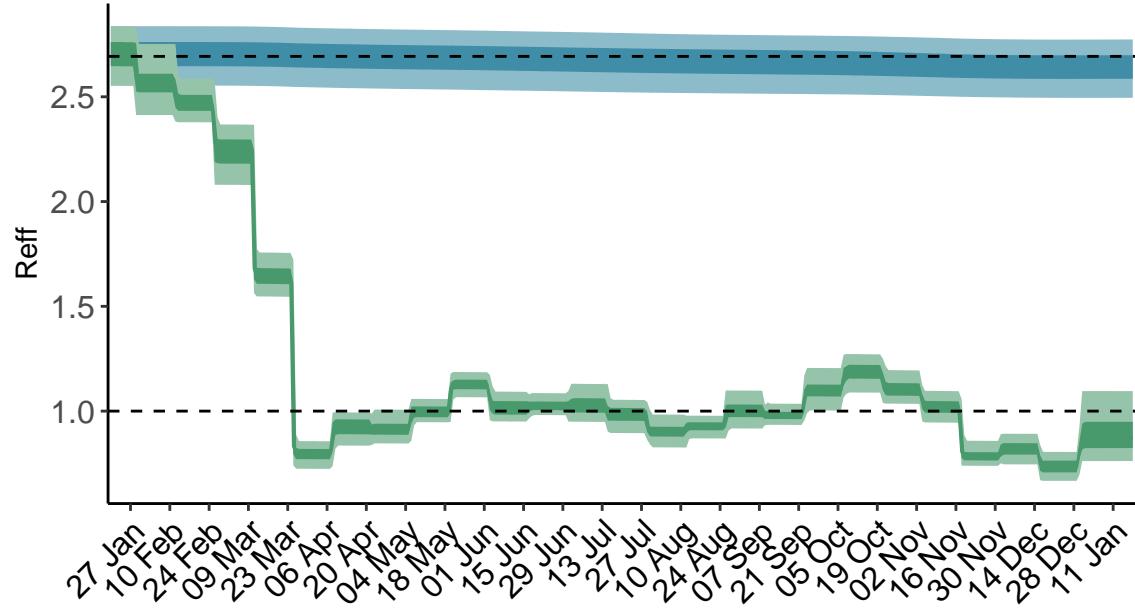


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

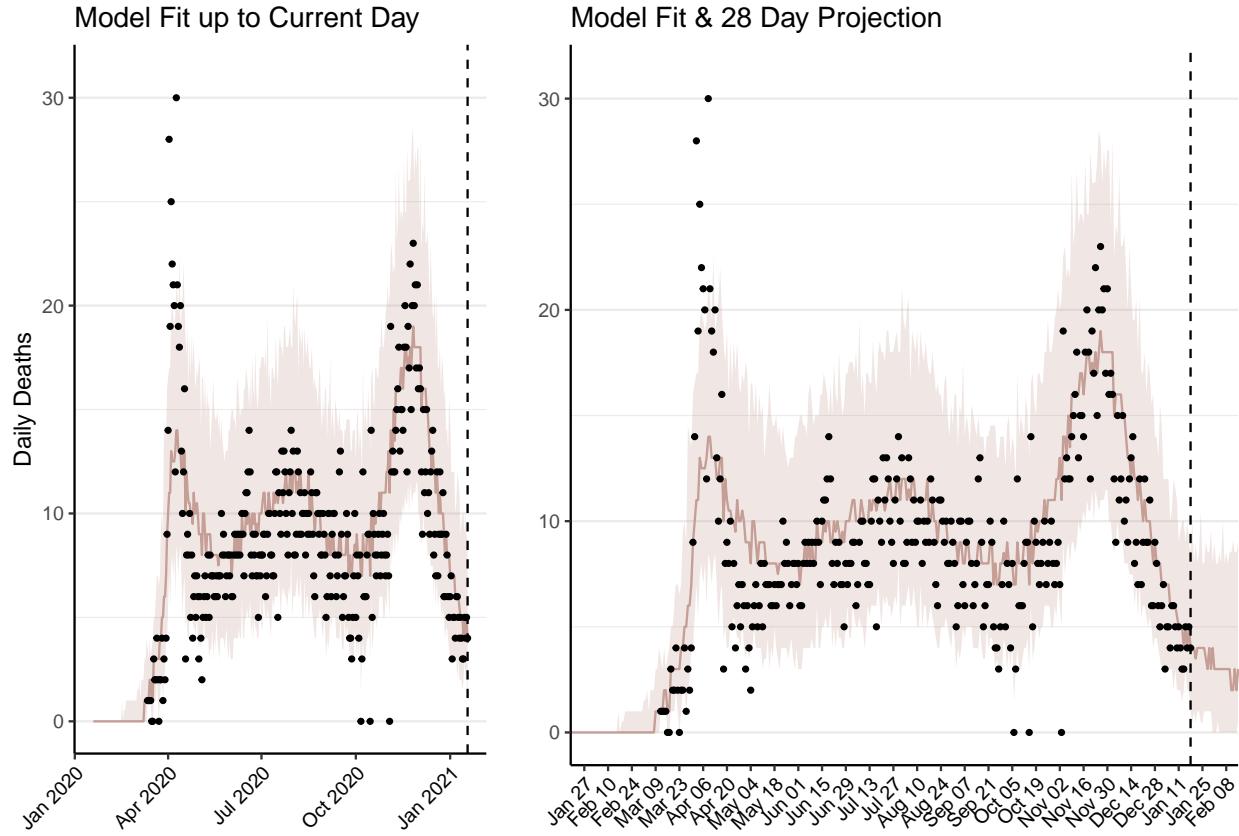


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 162 (95% CI: 155-169) patients requiring treatment with high-pressure oxygen at the current date to 113 (95% CI: 99-127) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 68 (95% CI: 65-71) patients requiring treatment with mechanical ventilation at the current date to 45 (95% CI: 40-50) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

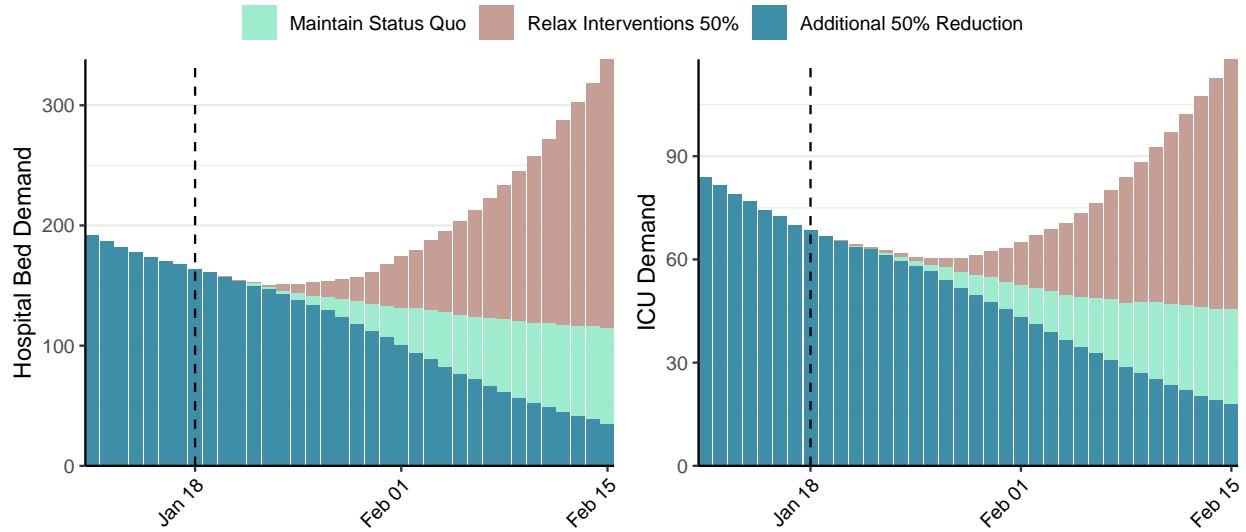


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,097 (95% CI: 1,019-1,175) at the current date to 75 (95% CI: 63-87) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,097 (95% CI: 1,019-1,175) at the current date to 4,884 (95% CI: 3,979-5,789) by 2021-02-15.

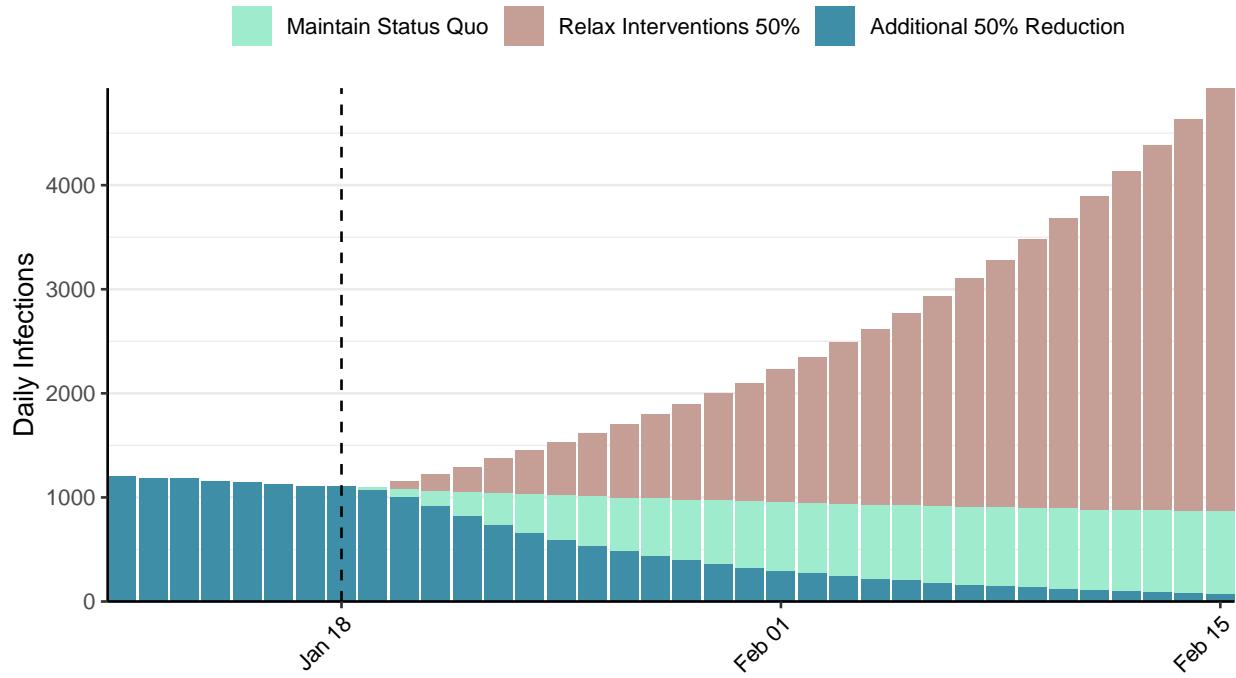


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Ecuador, 2021-01-18

[Download the report for Ecuador, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.05 (95% CI: 0.84-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Ecuador is not shown in the following plot as only 0 deaths have been reported to date**

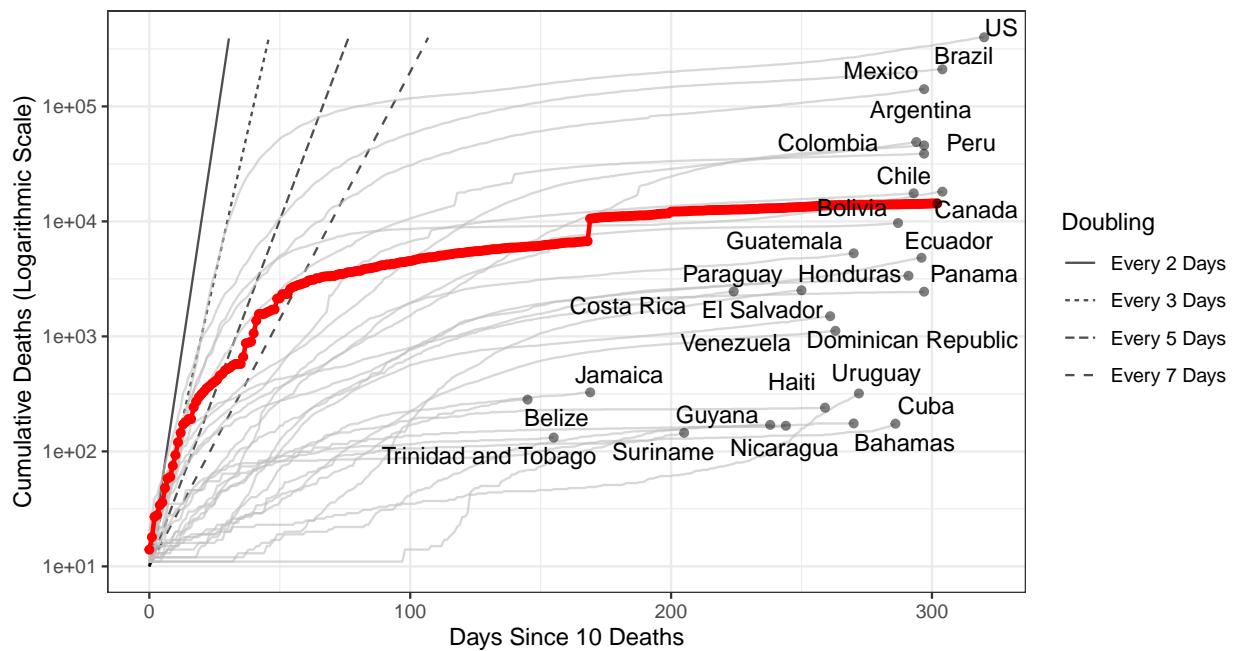


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 218,121 (95% CI: 208,939–227,304) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

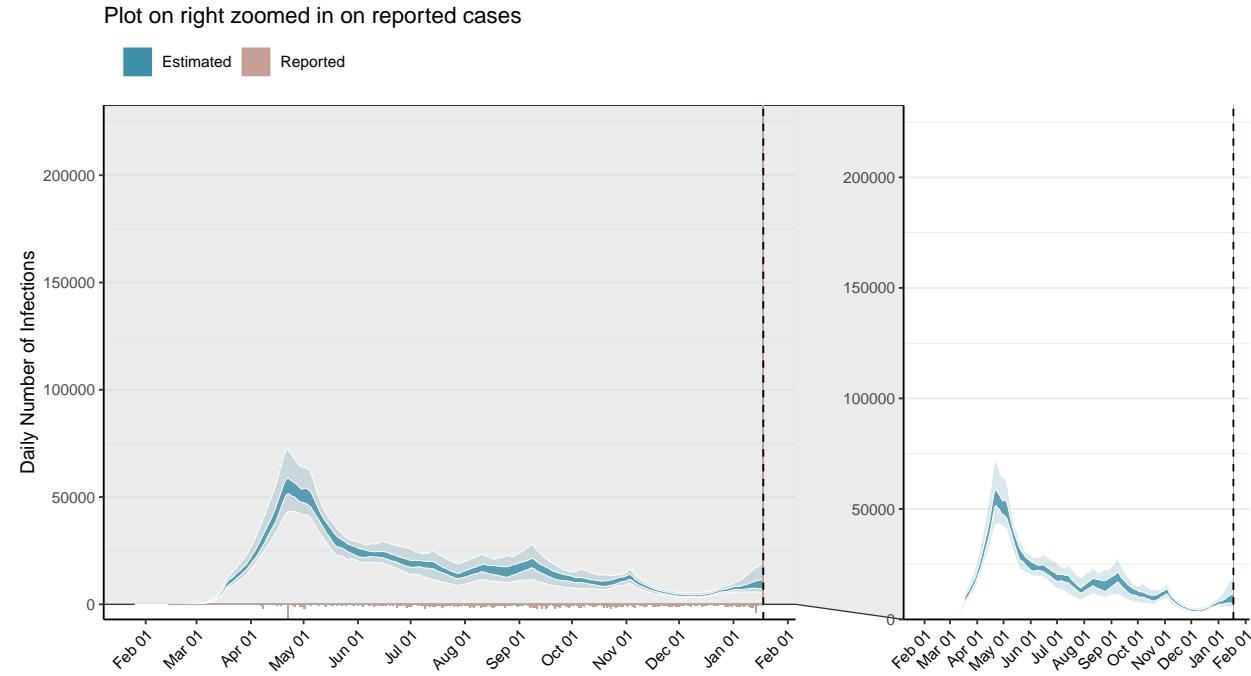
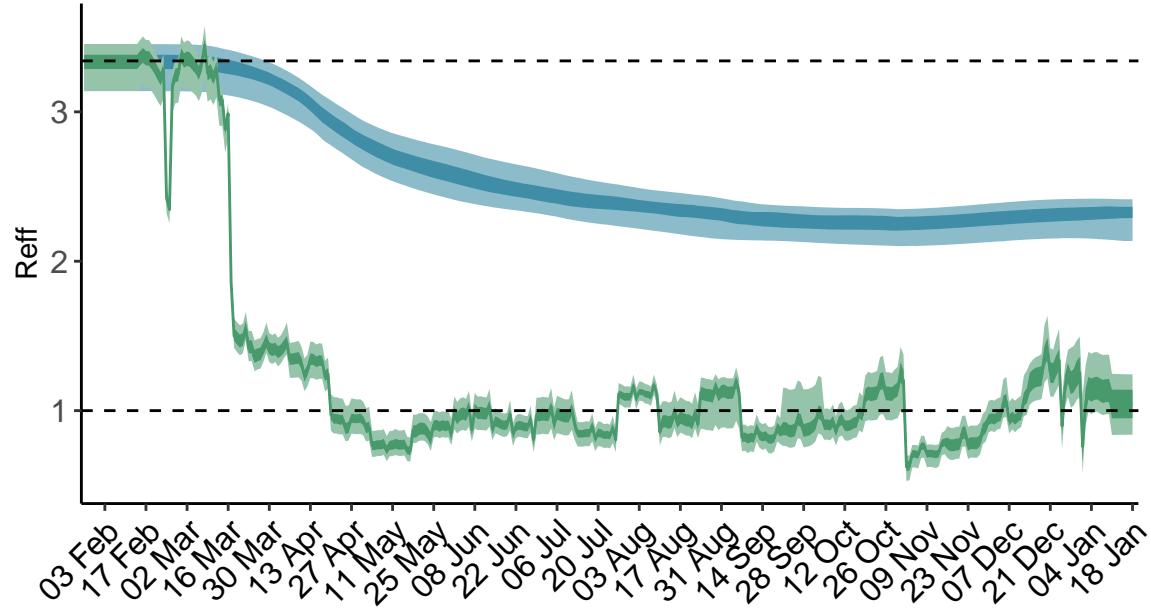


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Ecuador is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

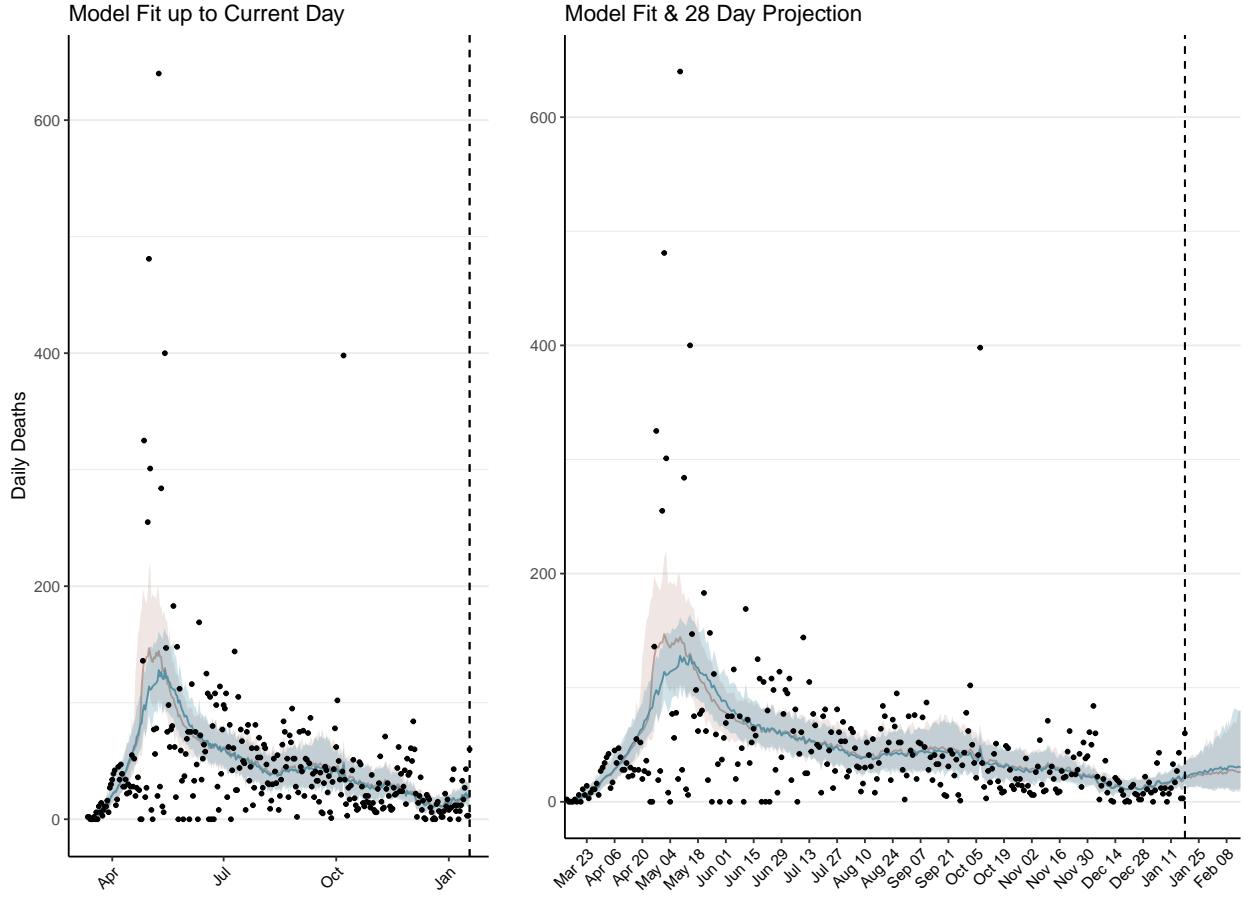


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 829 (95% CI: 791-867) patients requiring treatment with high-pressure oxygen at the current date to 1,234 (95% CI: 1,088-1,381) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 289 (95% CI: 276-302) patients requiring treatment with mechanical ventilation at the current date to 429 (95% CI: 381-478) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

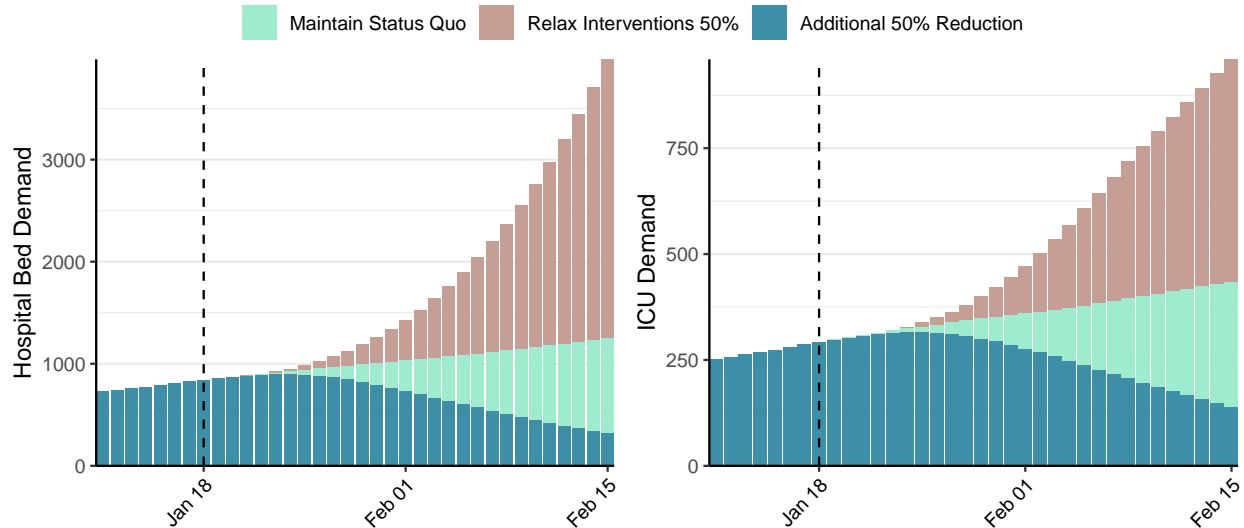


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 9,670 (95% CI: 8,984-10,355) at the current date to 1,125 (95% CI: 976-1,274) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 9,670 (95% CI: 8,984-10,355) at the current date to 74,362 (95% CI: 64,354-84,371) by 2021-02-15.

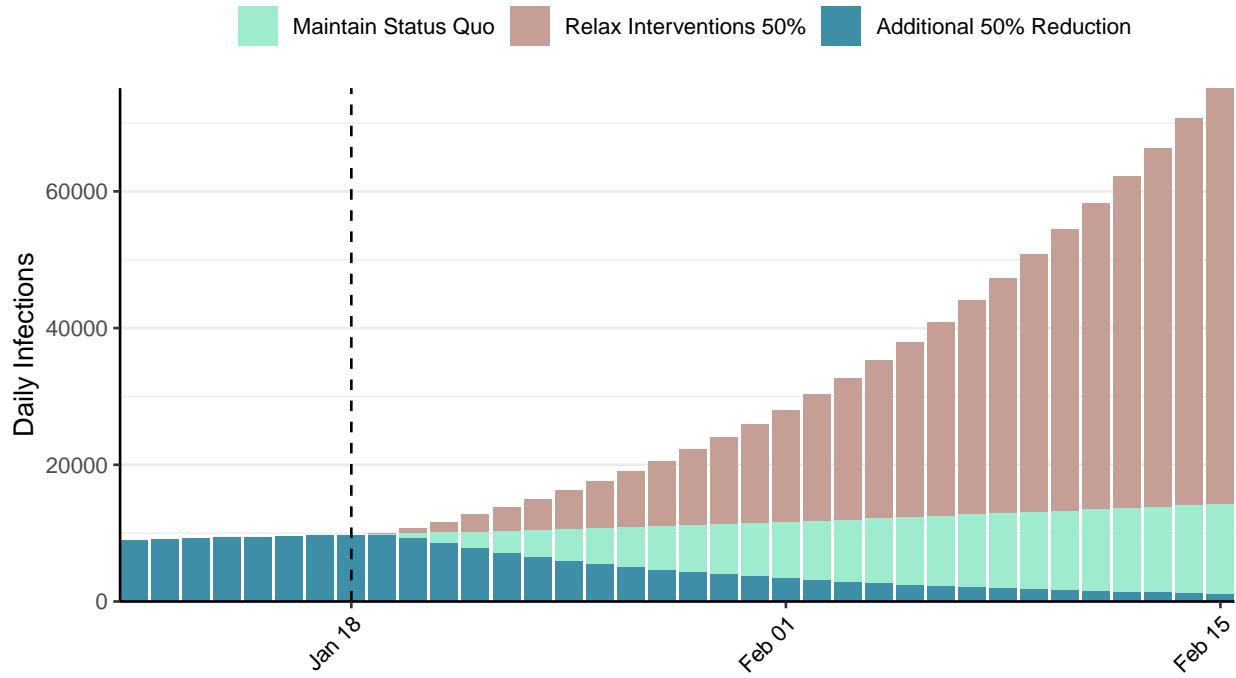


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Egypt, 2021-01-18

[Download the report for Egypt, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
878	878	55	55	0.82 (95% CI: 0.65-1.03)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

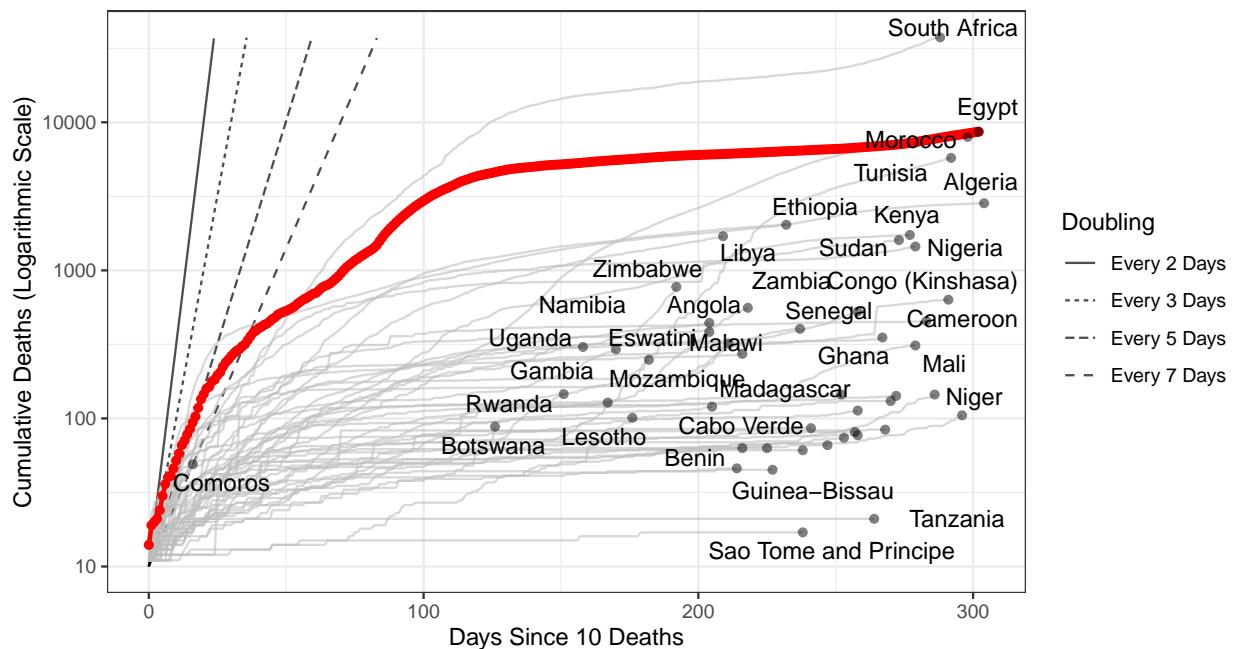


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 803,335 (95% CI: 774,245-832,425) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

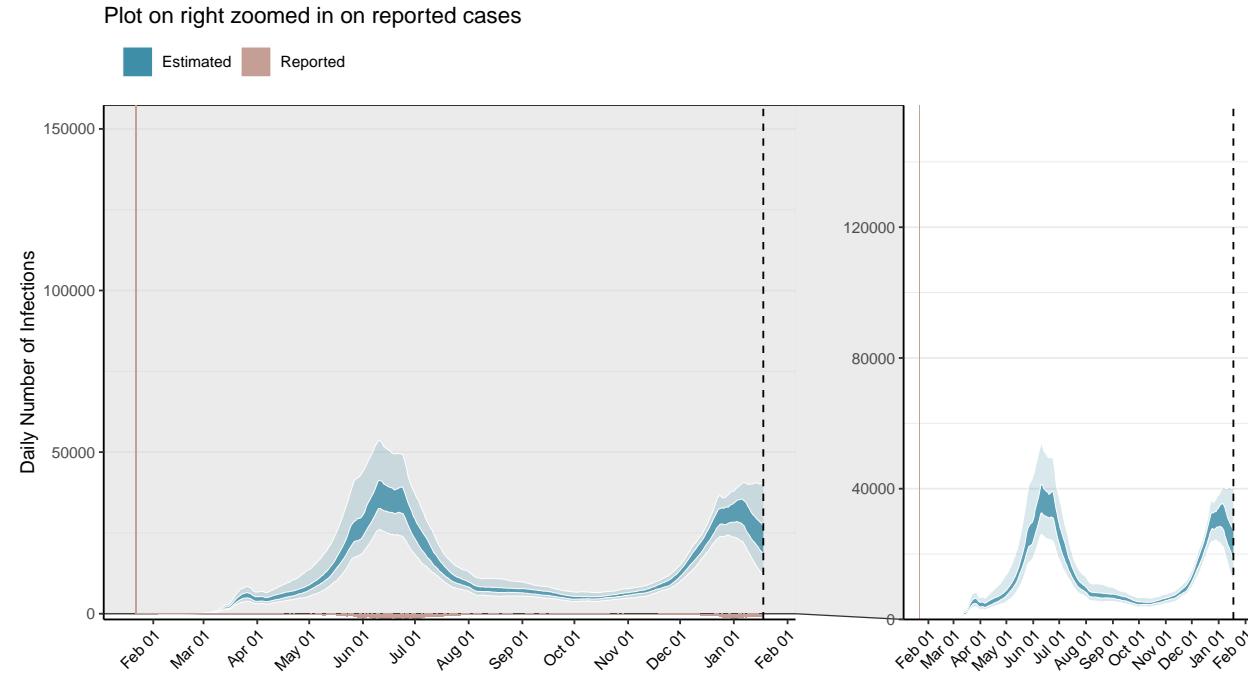
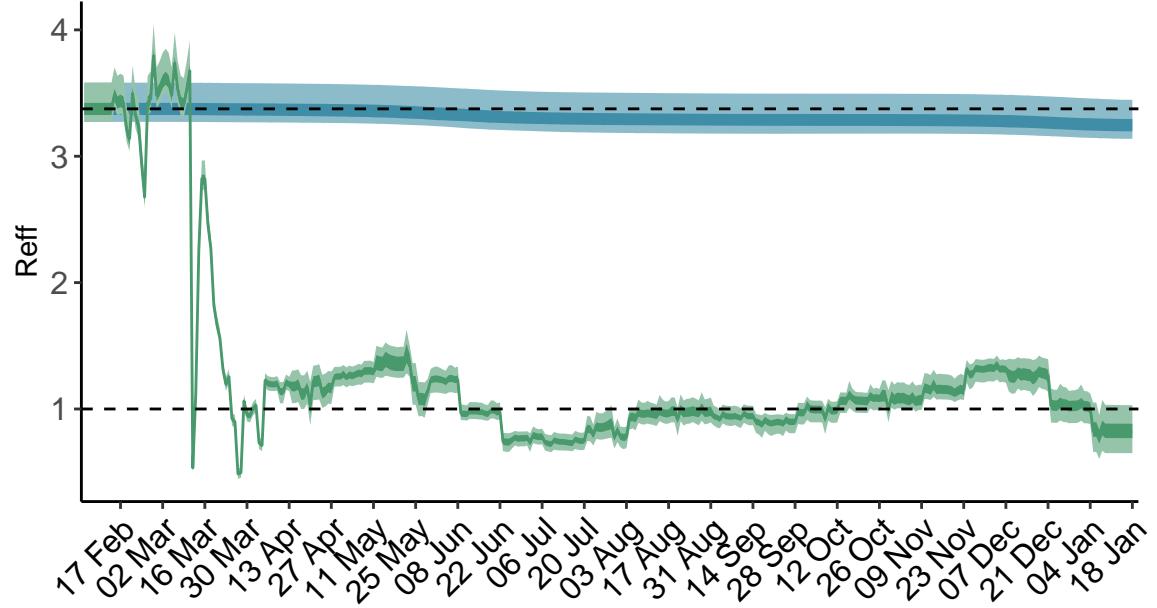


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

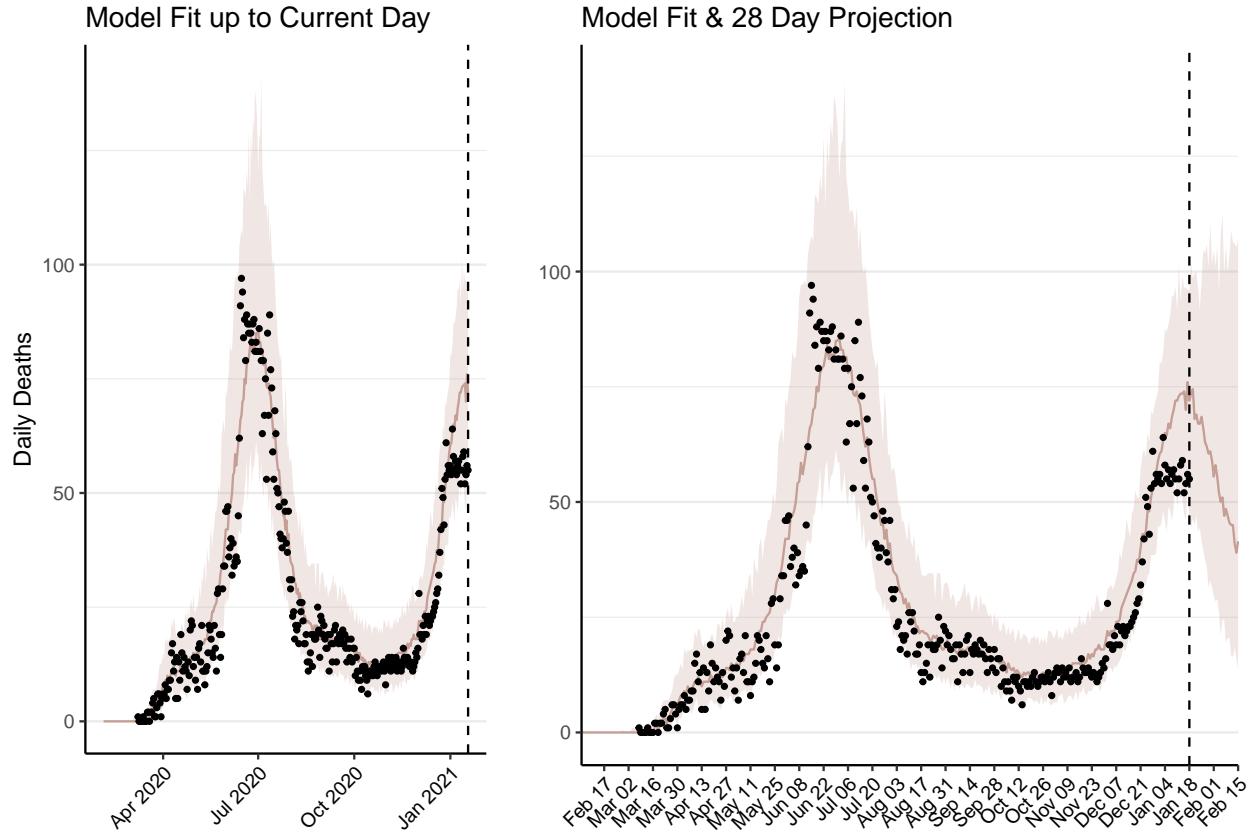


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 2,761 (95% CI: 2,651-2,872) patients requiring treatment with high-pressure oxygen at the current date to 1,603 (95% CI: 1,411-1,796) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1,077 (95% CI: 1,036-1,118) patients requiring treatment with mechanical ventilation at the current date to 672 (95% CI: 599-745) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

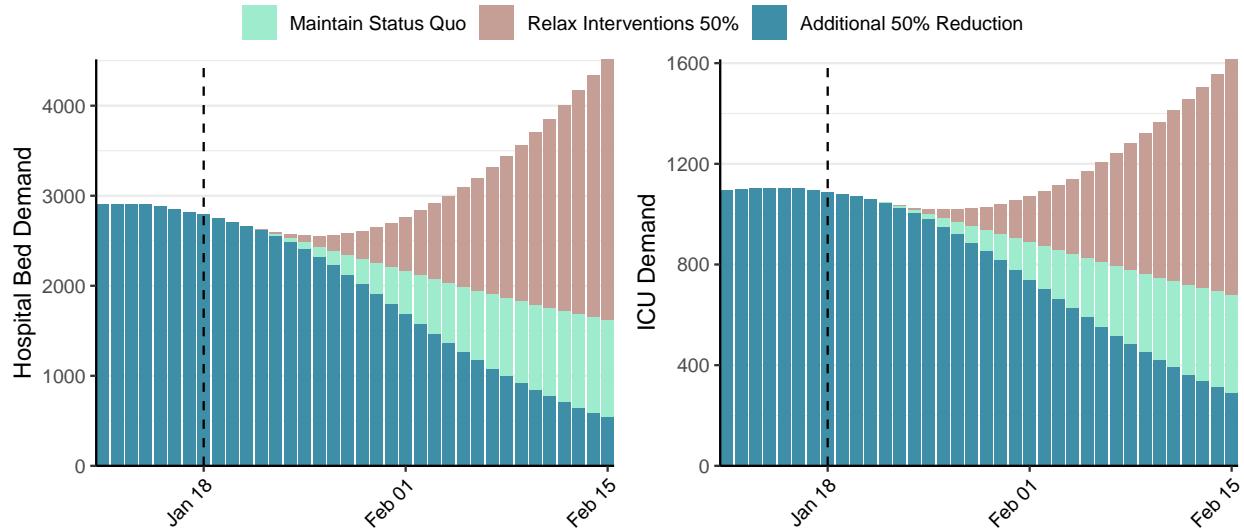


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 23,101 (95% CI: 21,595-24,607) at the current date to 1,223 (95% CI: 1,042-1,404) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 23,101 (95% CI: 21,595-24,607) at the current date to 71,089 (95% CI: 57,904-84,273) by 2021-02-15.

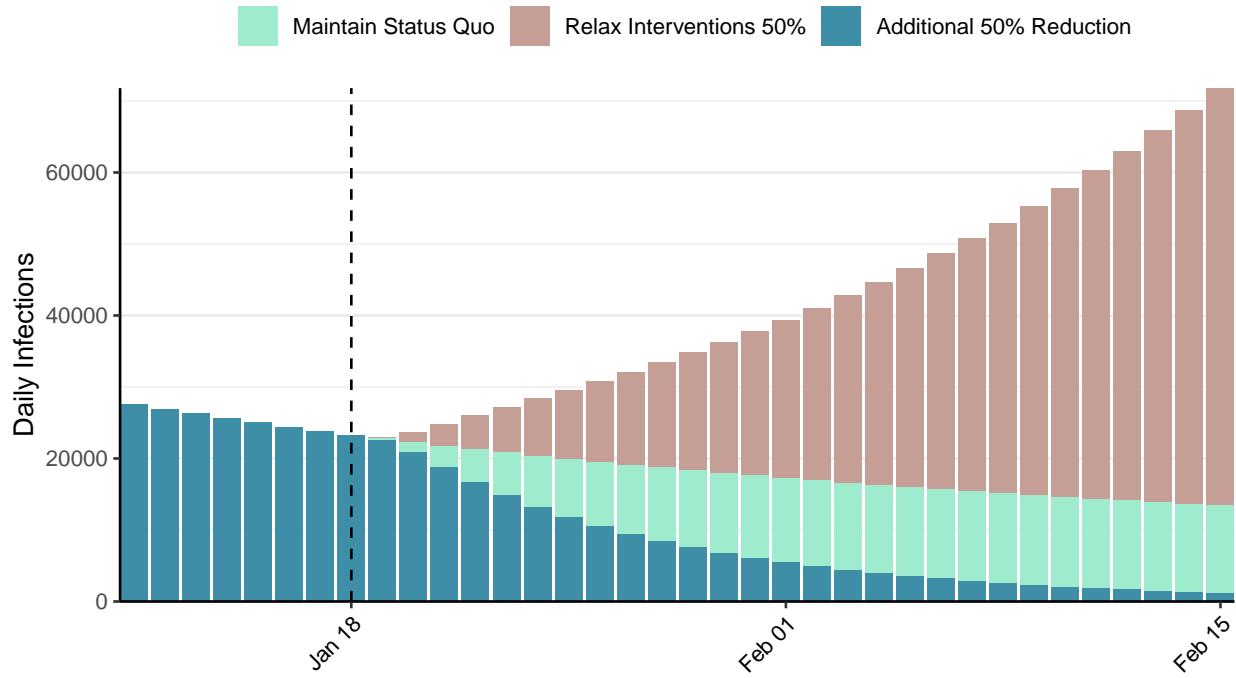


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Eritrea, 2021-01-18

[Download the report for Eritrea, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.67 (95% CI: 1.35-1.95)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Eritrea is not shown in the following plot as only 0 deaths have been reported to date**

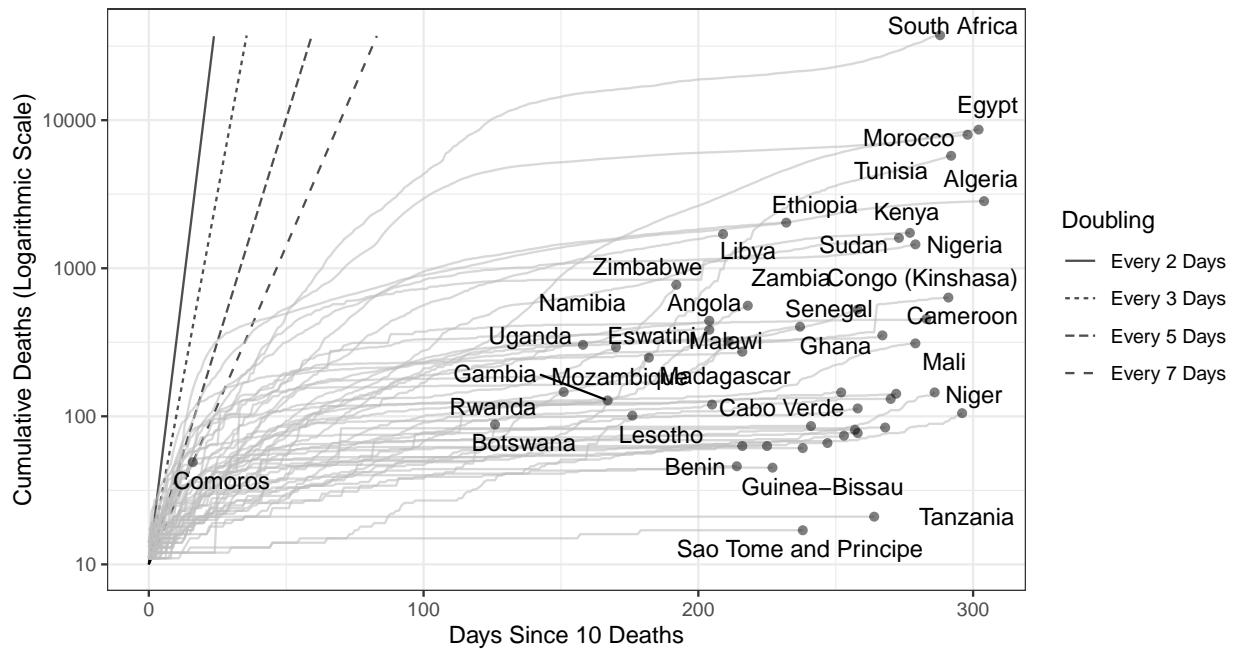


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 10,002 (95% CI: 8,688-11,316) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

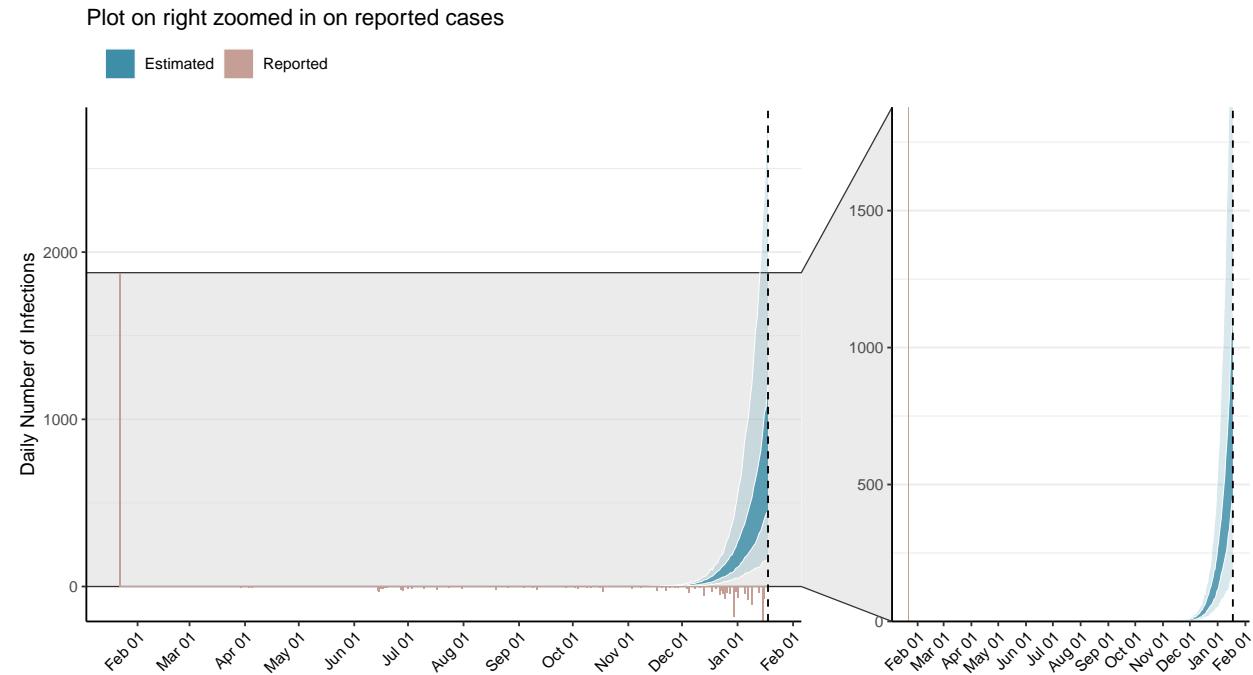
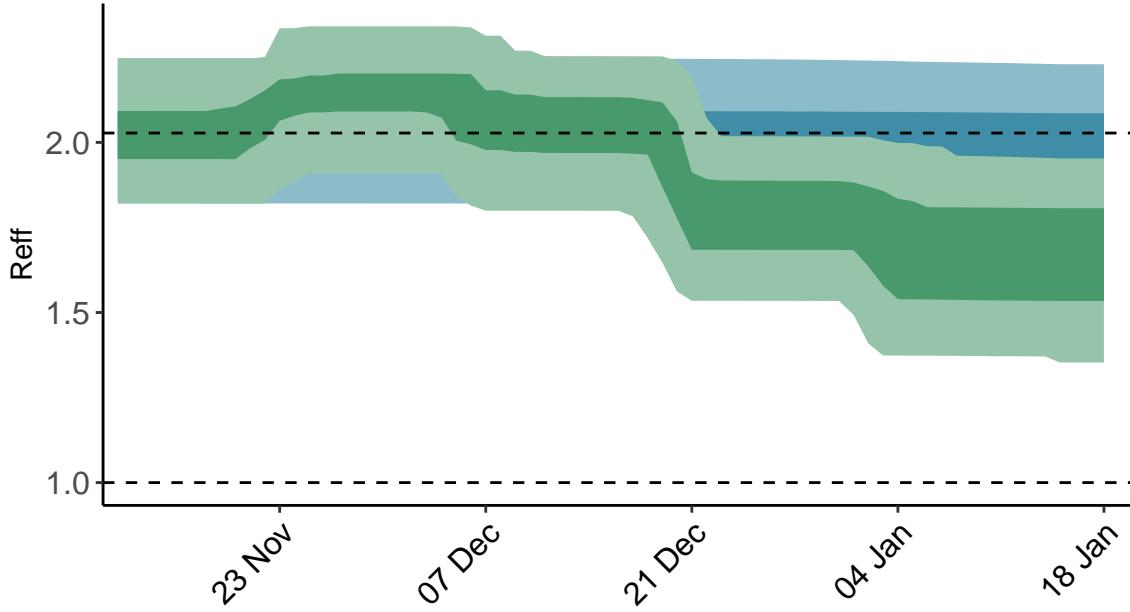


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Eritrea is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

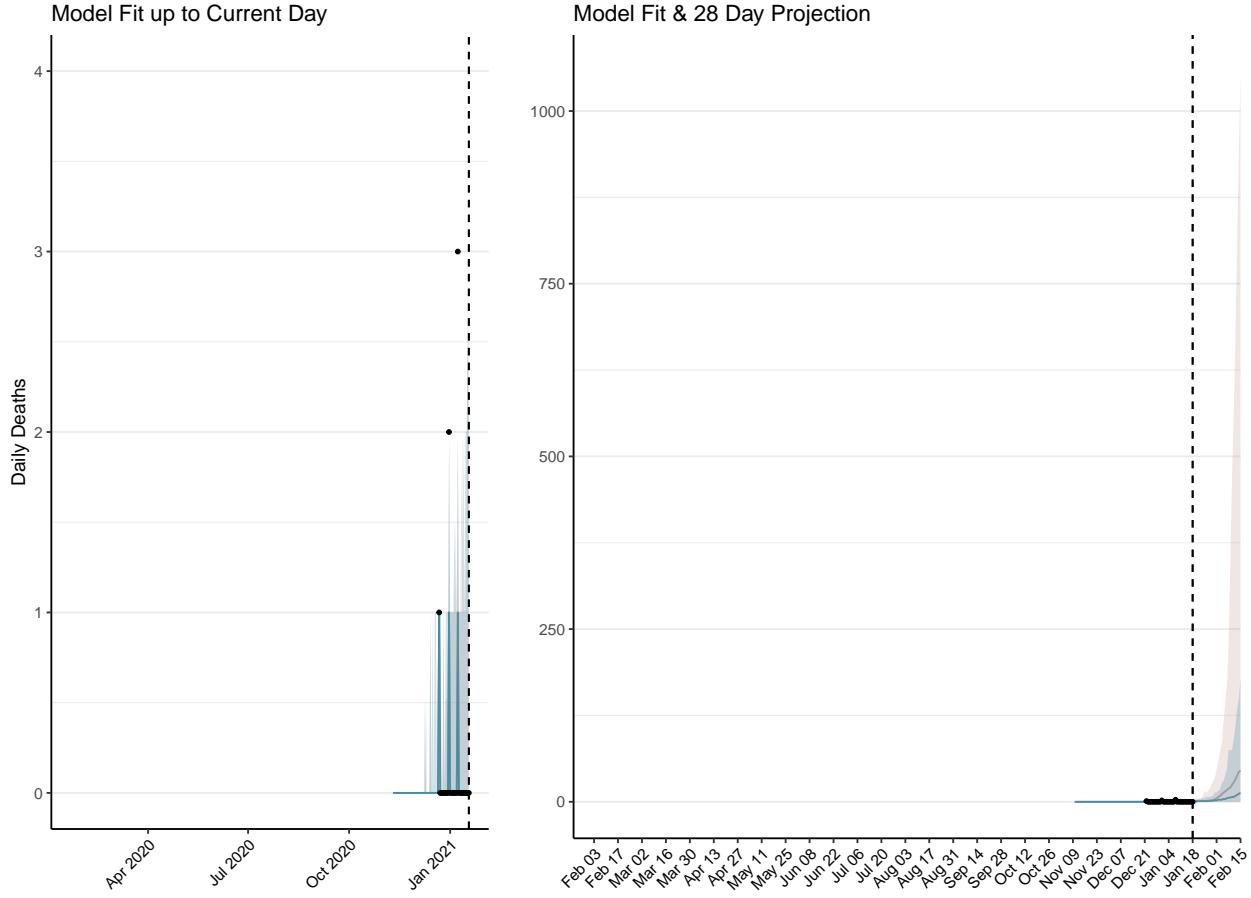


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 35 (95% CI: 31-40) patients requiring treatment with high-pressure oxygen at the current date to 1,776 (95% CI: 1,364-2,187) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 11 (95% CI: 10-13) patients requiring treatment with mechanical ventilation at the current date to 164 (95% CI: 130-197) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

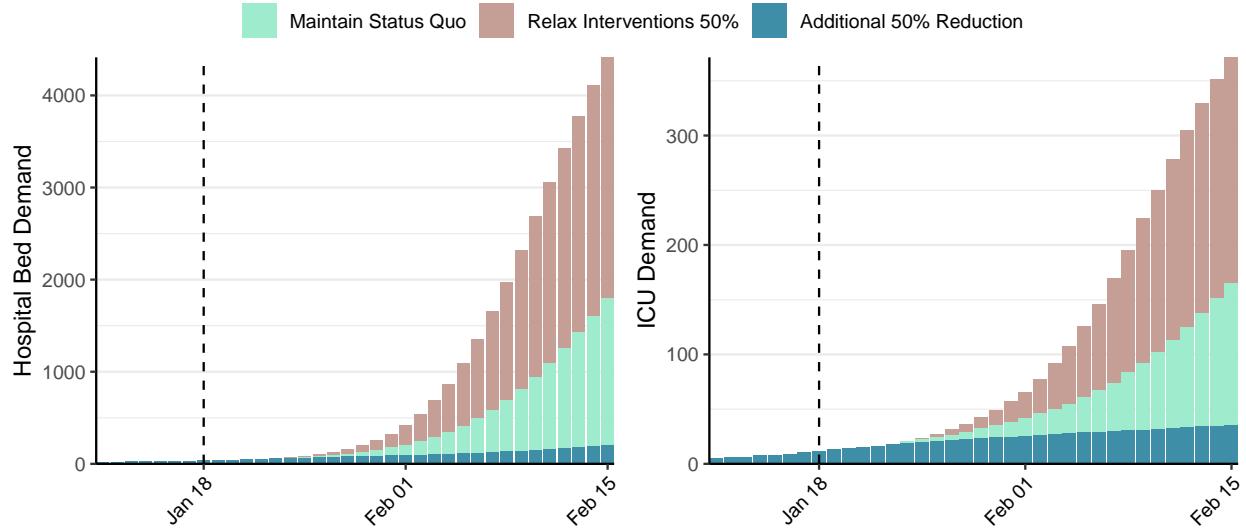


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 932 (95% CI: 789-1,075) at the current date to 4,508 (95% CI: 2,906-6,111) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 932 (95% CI: 789-1,075) at the current date to 114,435 (95% CI: 100,529-128,342) by 2021-02-15.

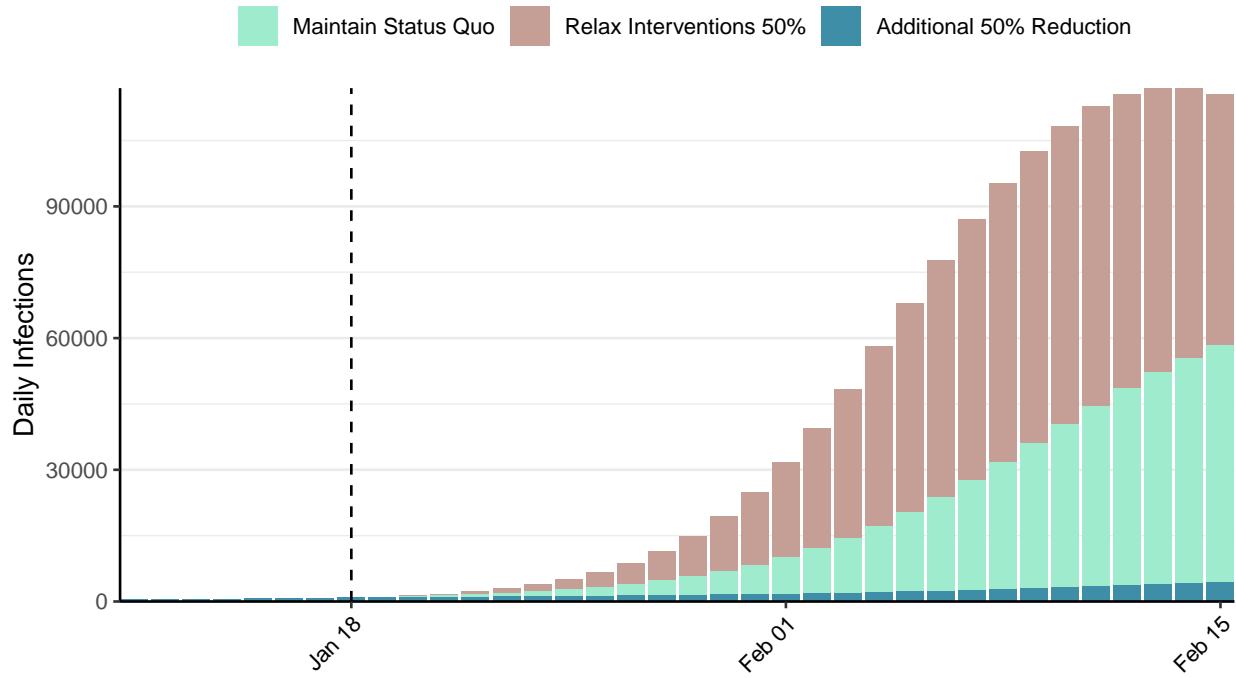


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Ethiopia, 2021-01-18

[Download the report for Ethiopia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
351	351	3	3	1.01 (95% CI: 0.75-1.26)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Ethiopia is not shown in the following plot as only 3 deaths have been reported to date**

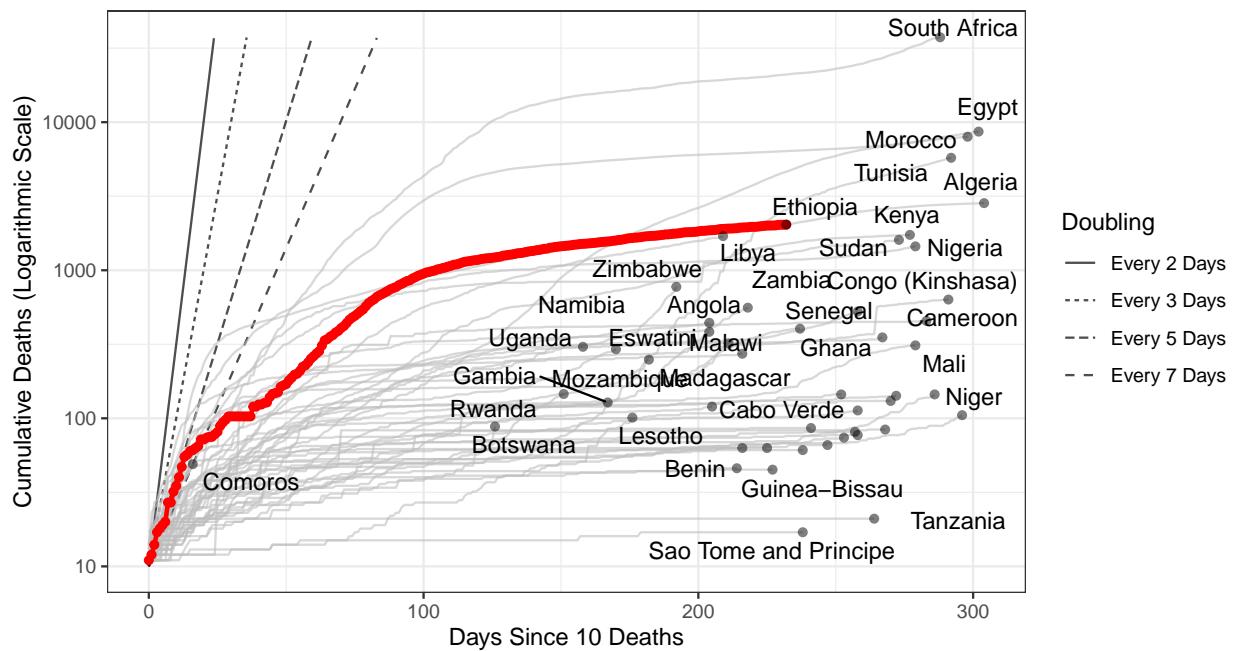


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 117,020 (95% CI: 107,428-126,612) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

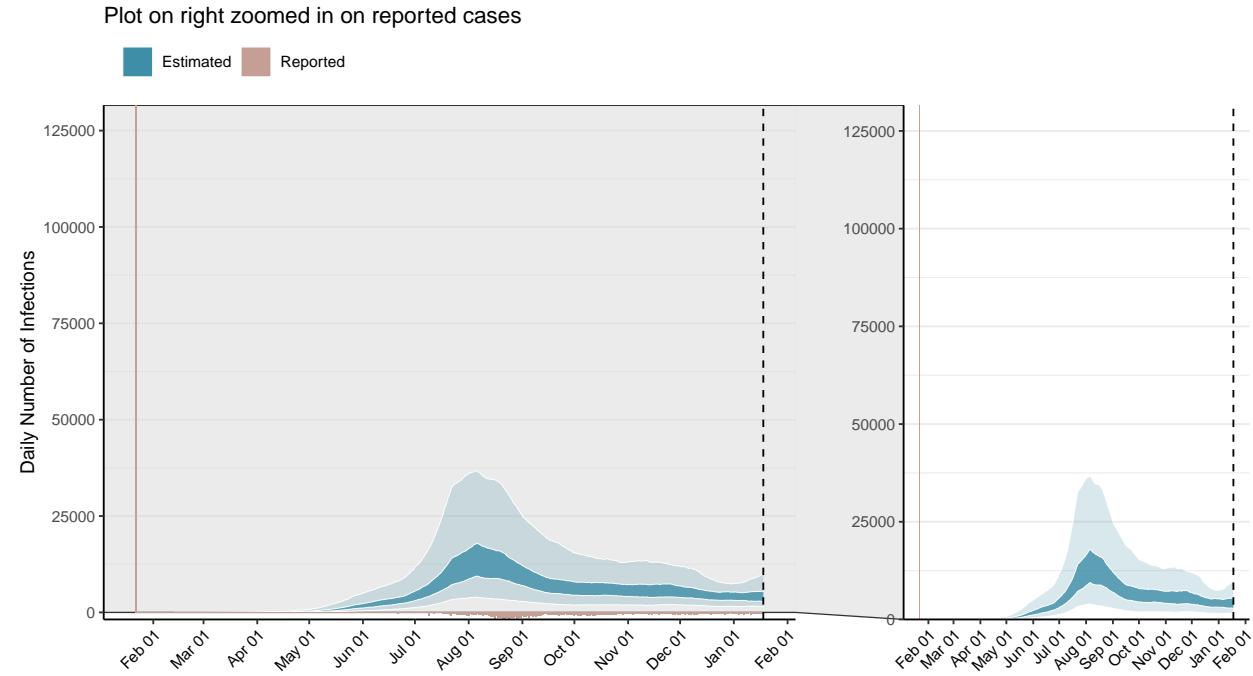
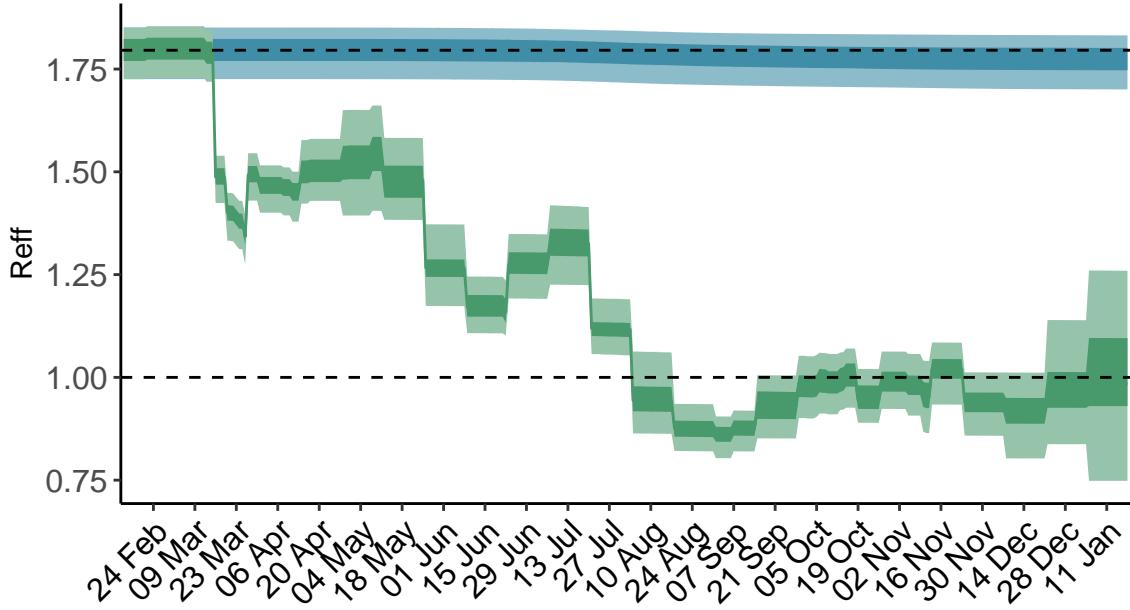


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

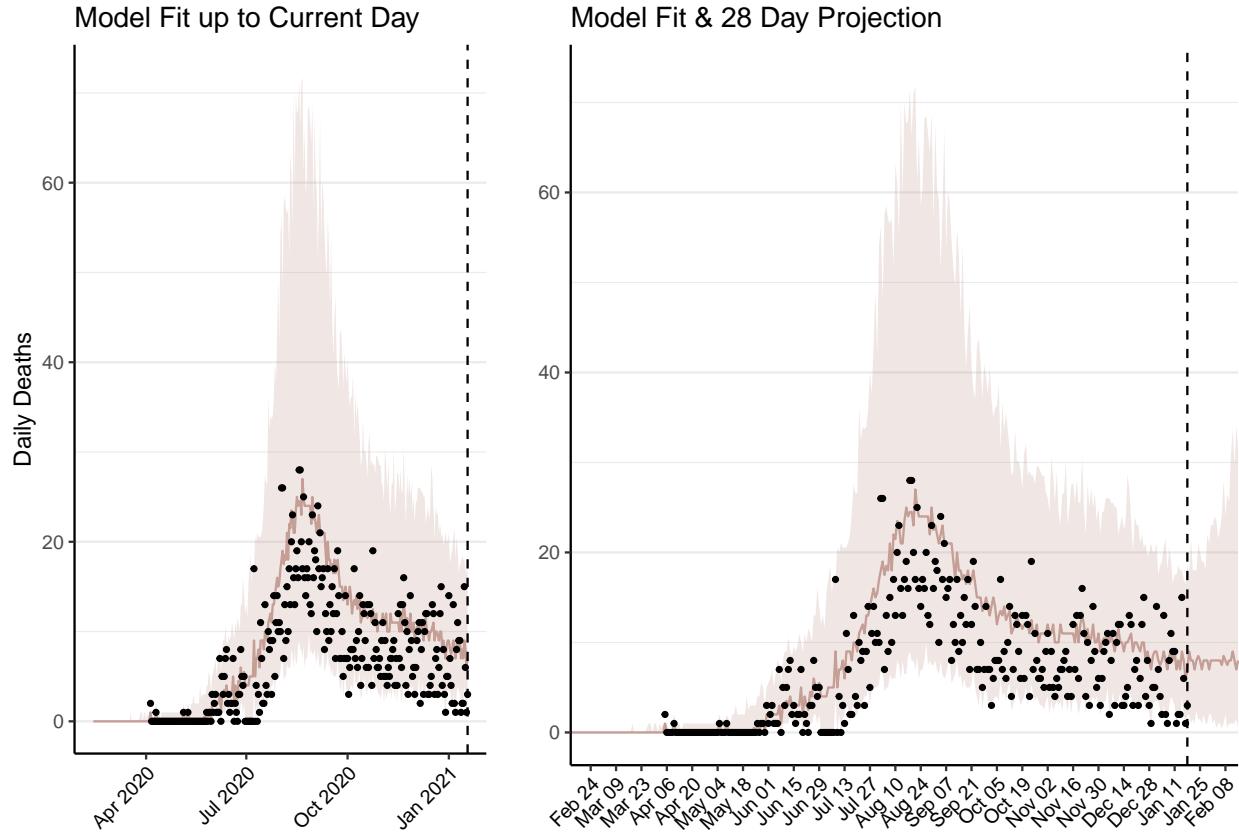


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 344 (95% CI: 315-373) patients requiring treatment with high-pressure oxygen at the current date to 437 (95% CI: 359-514) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 136 (95% CI: 124-147) patients requiring treatment with mechanical ventilation at the current date to 163 (95% CI: 136-191) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

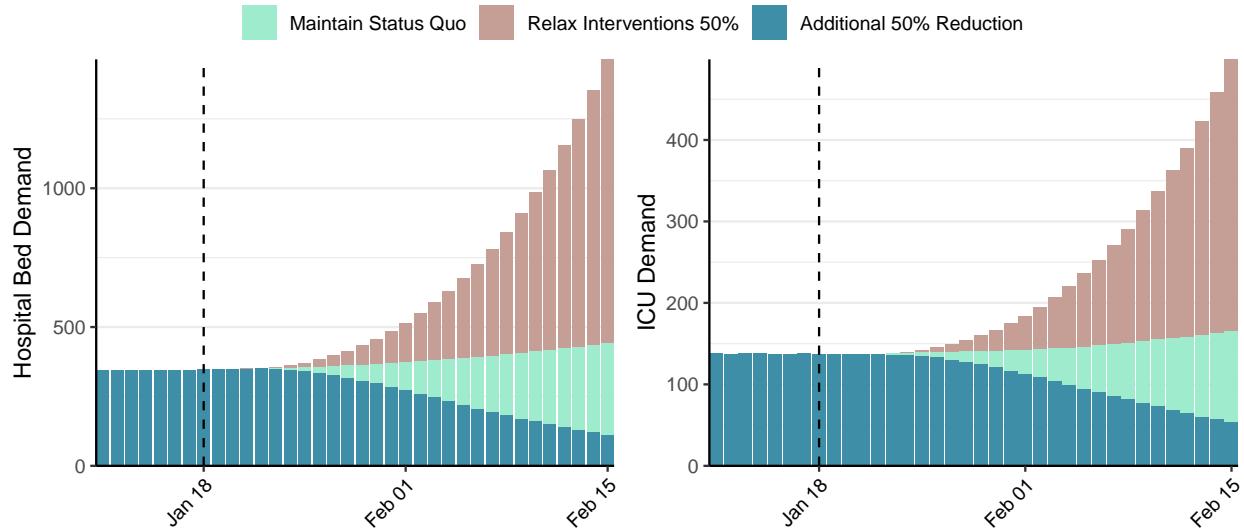
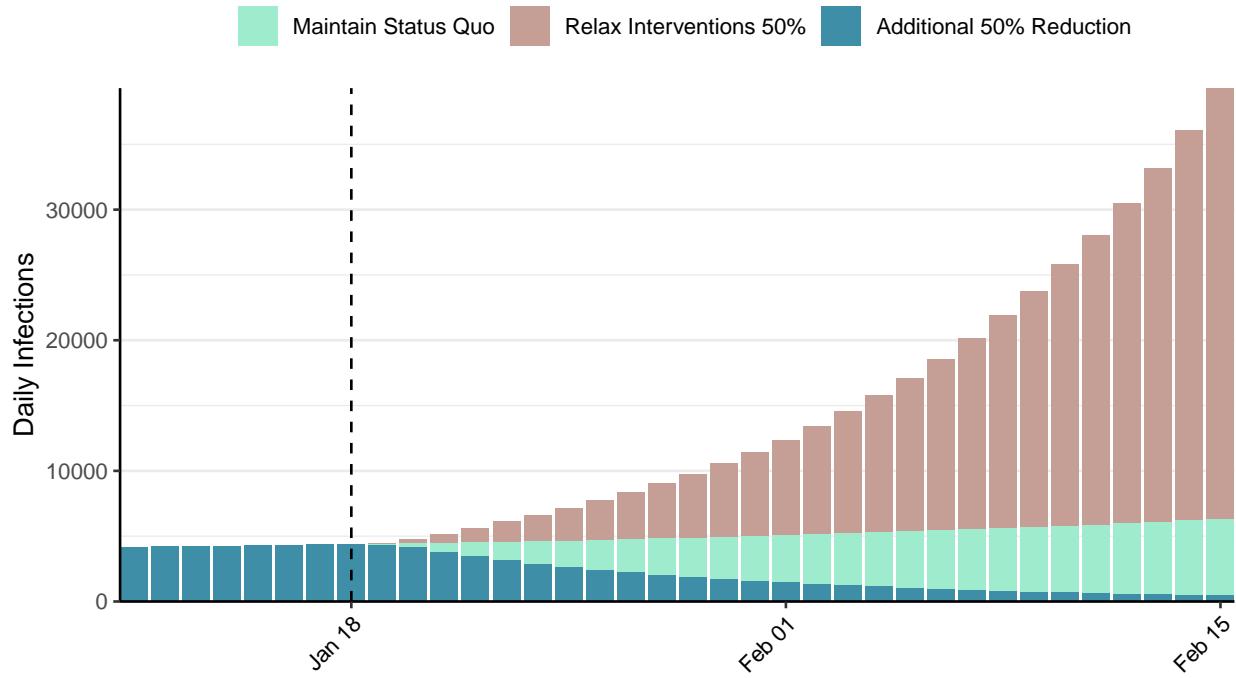


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,332 (95% CI: 3,867-4,797) at the current date to 471 (95% CI: 375-567) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,332 (95% CI: 3,867-4,797) at the current date to 38,914 (95% CI: 29,286-48,542) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Fiji, 2021-01-18

[Download the report for Fiji, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.74 (95% CI: 0.49-1.11)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Fiji is not shown in the following plot as only 0 deaths have been reported to date**

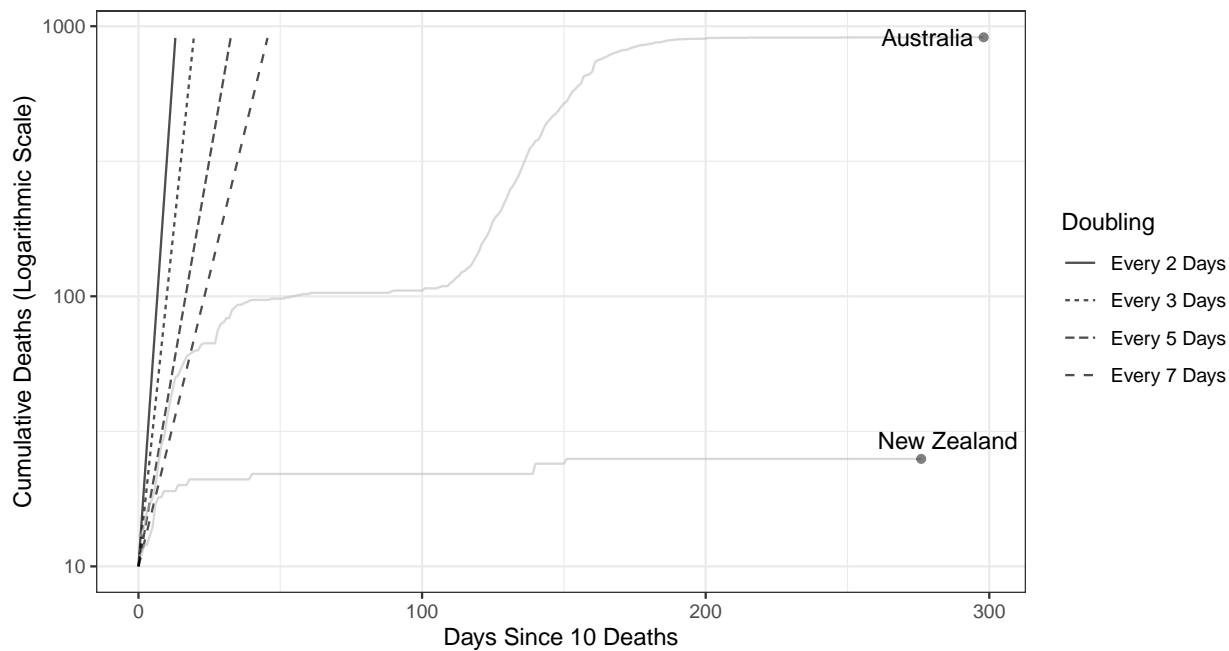


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 8 (95% CI: 1-15) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

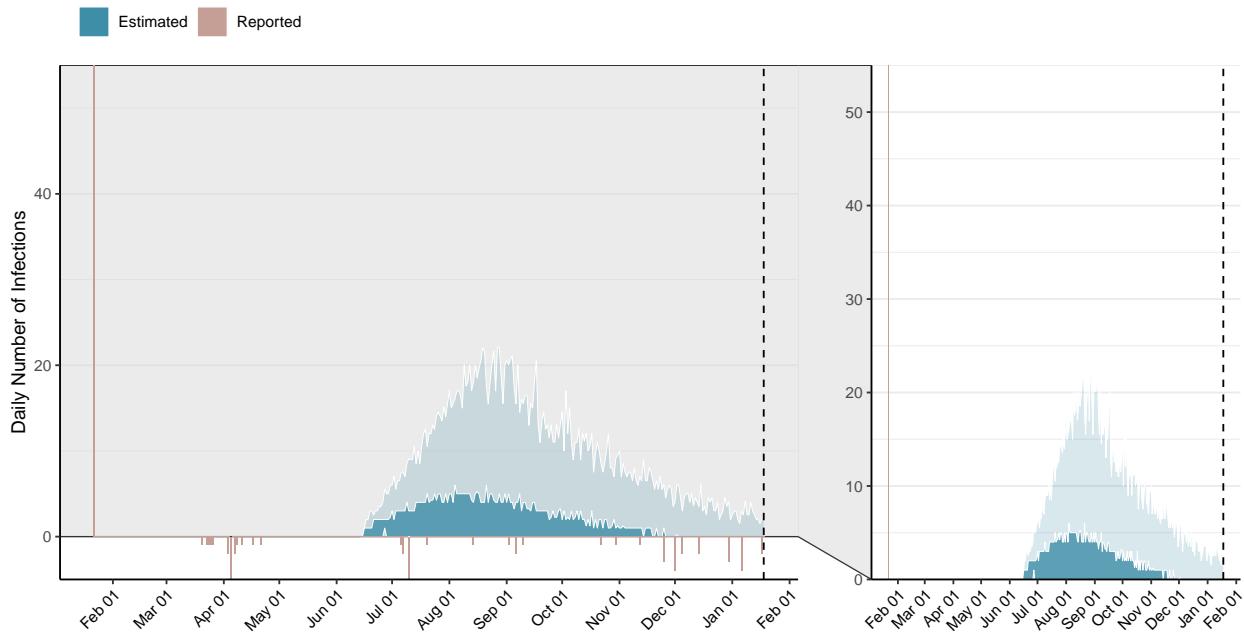
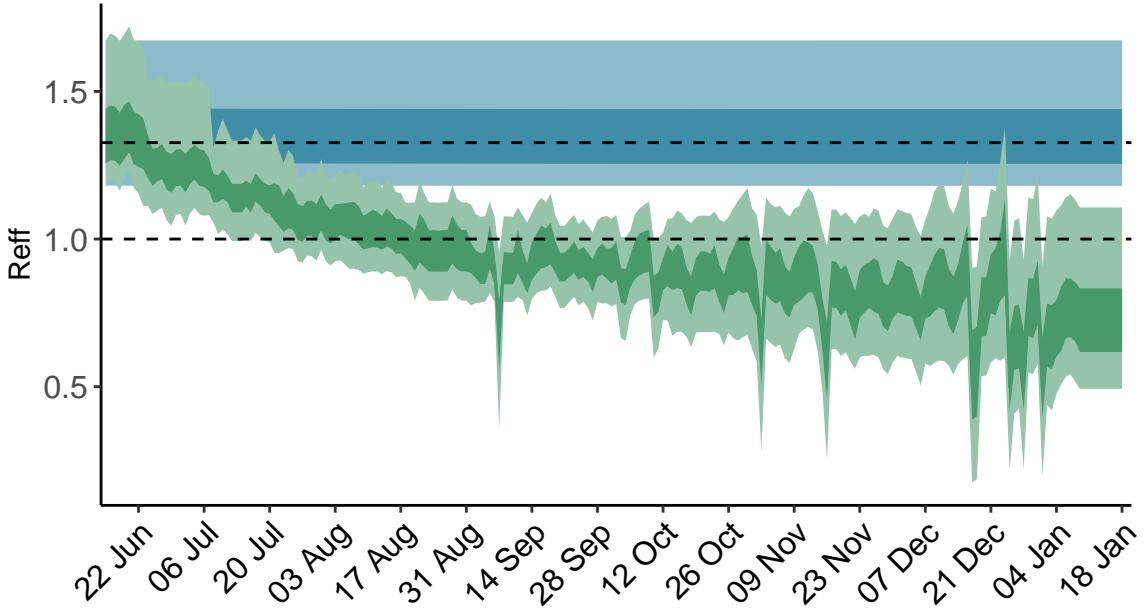


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

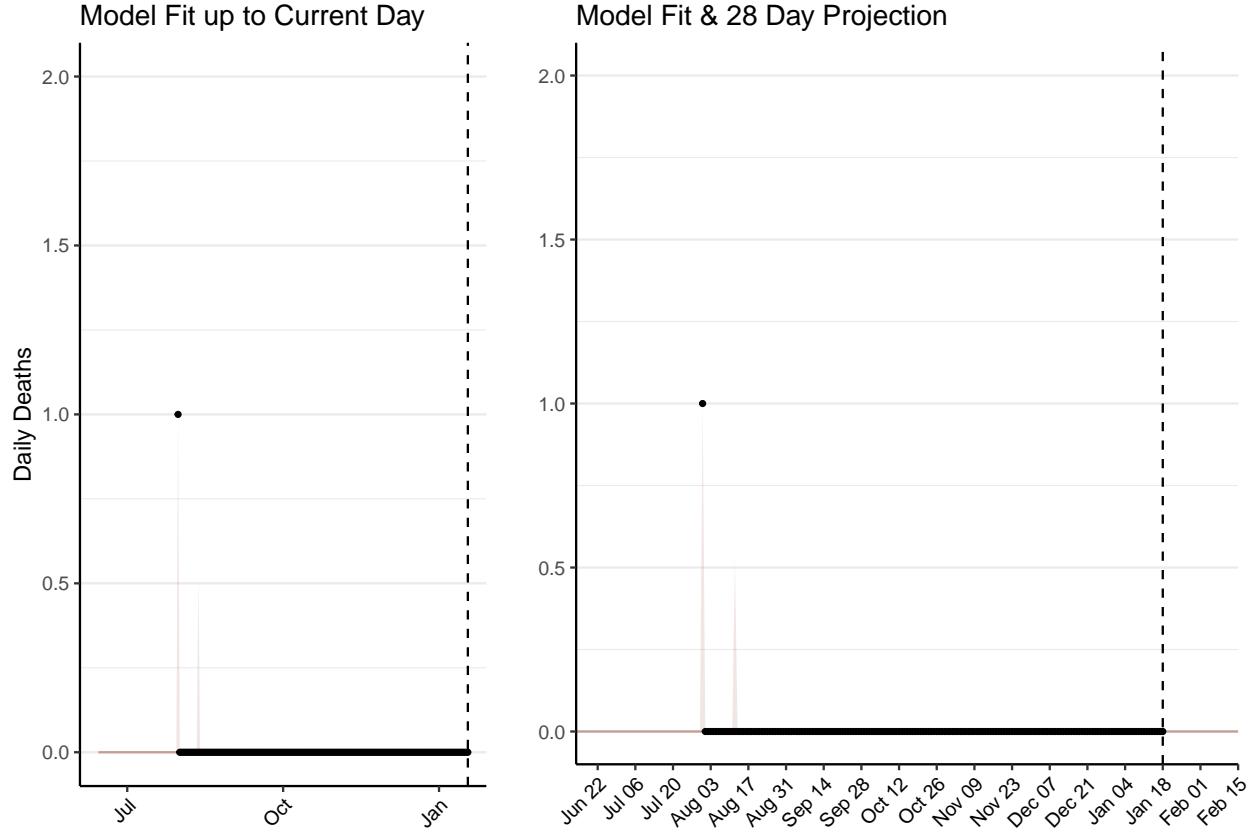


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

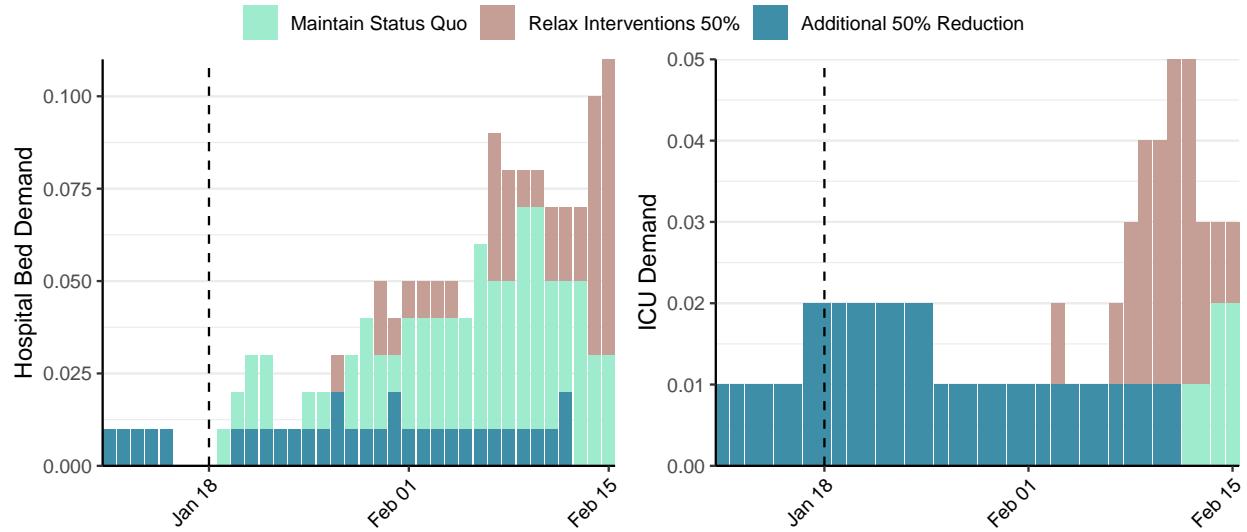


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: 0-1) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: 0-1) at the current date to 1 (95% CI: -1-4) by 2021-02-15.

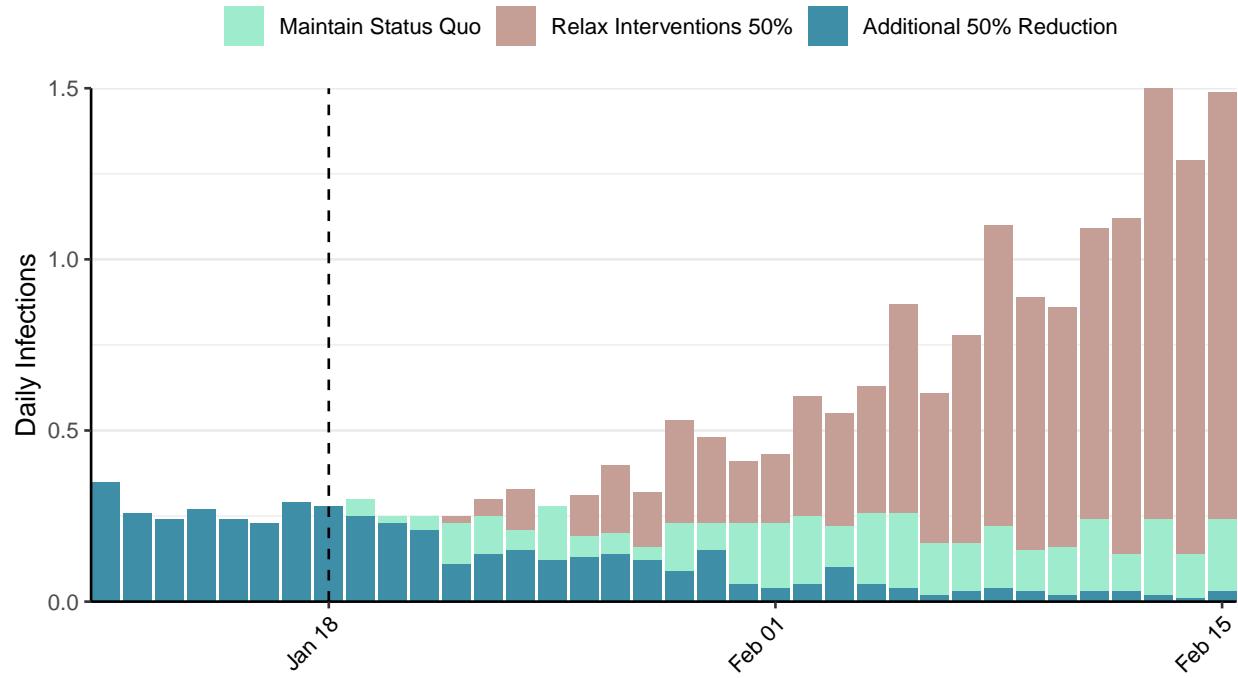


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Gabon, 2021-01-18

[Download the report for Gabon, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
120	120	0	0	1.2 (95% CI: 0.85-1.52)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Gabon is not shown in the following plot as only 0 deaths have been reported to date**

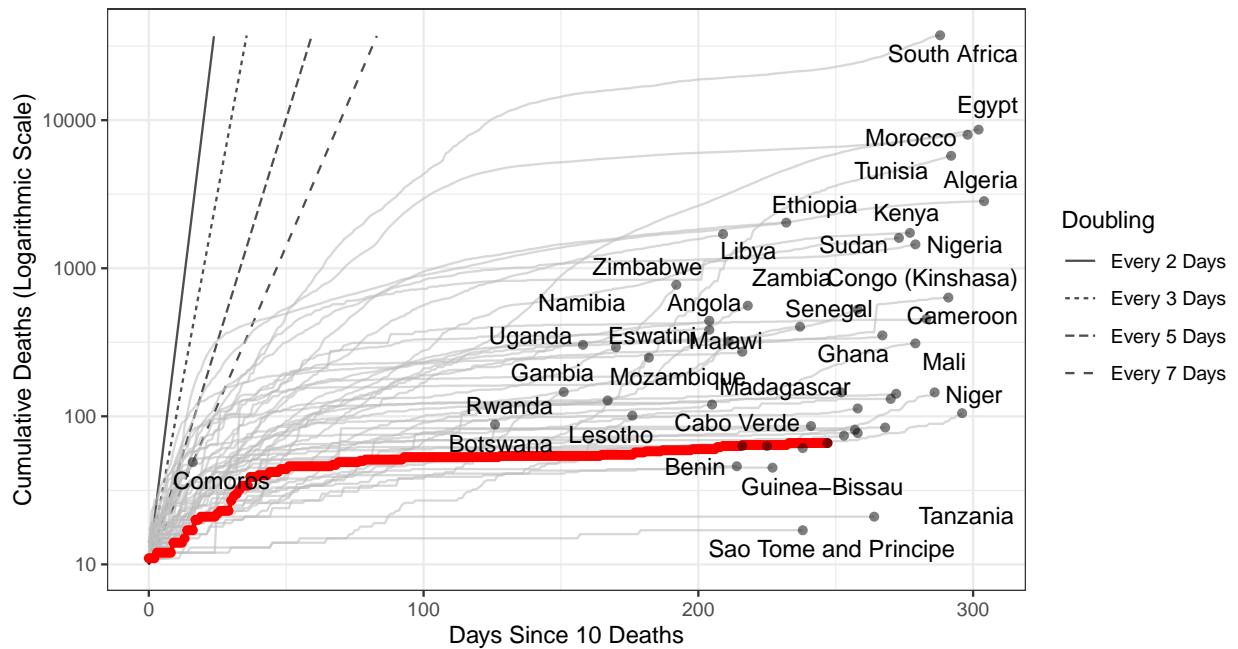


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,302 (95% CI: 2,035-2,570) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

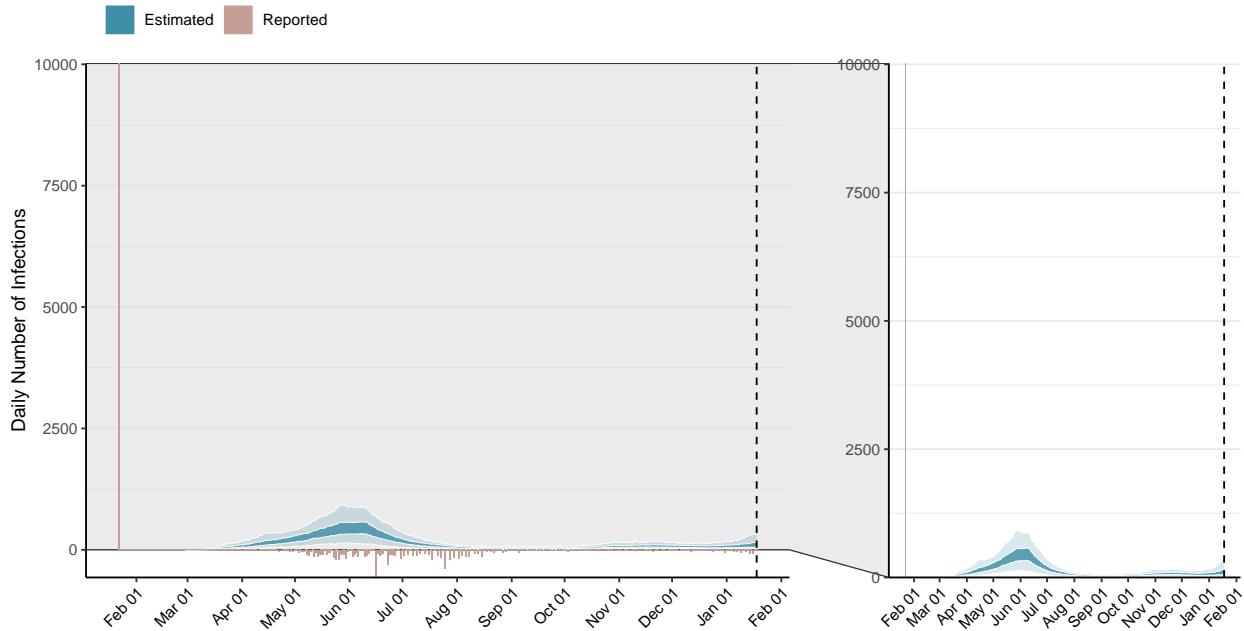
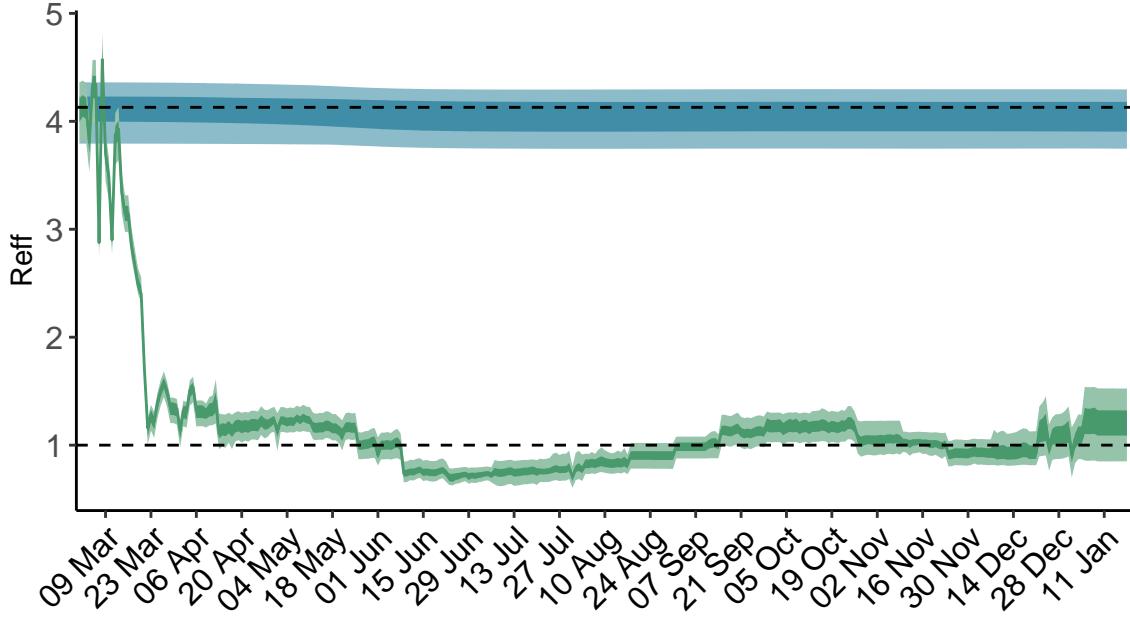


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

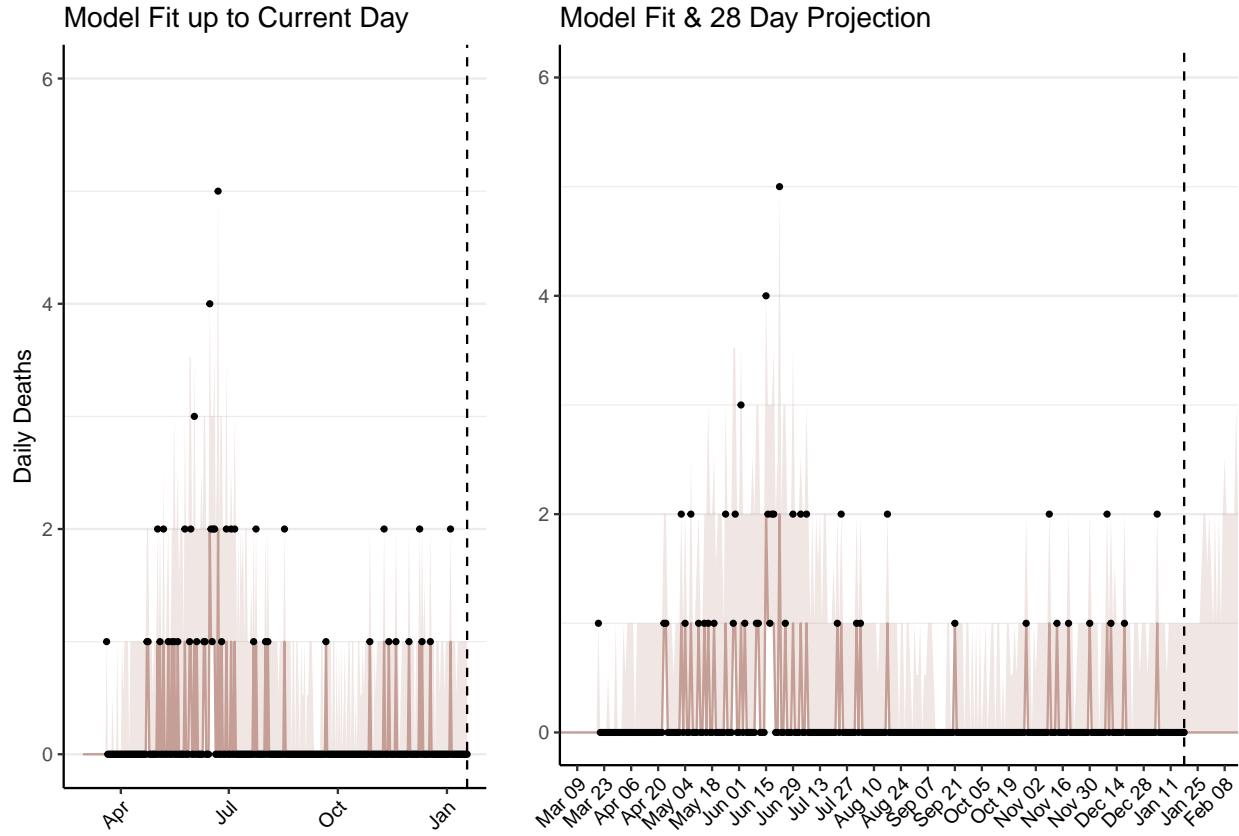


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 7 (95% CI: 6-8) patients requiring treatment with high-pressure oxygen at the current date to 21 (95% CI: 16-25) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 3 (95% CI: 2-3) patients requiring treatment with mechanical ventilation at the current date to 7 (95% CI: 6-9) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

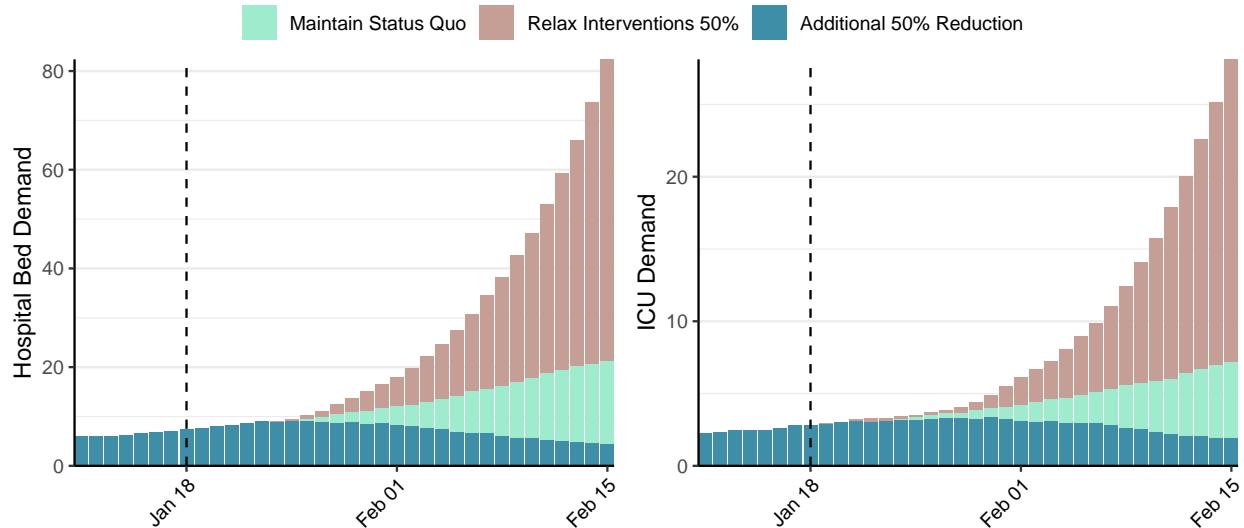


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 120 (95% CI: 103-137) at the current date to 24 (95% CI: 19-30) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 120 (95% CI: 103-137) at the current date to 2,655 (95% CI: 1,984-3,326) by 2021-02-15.

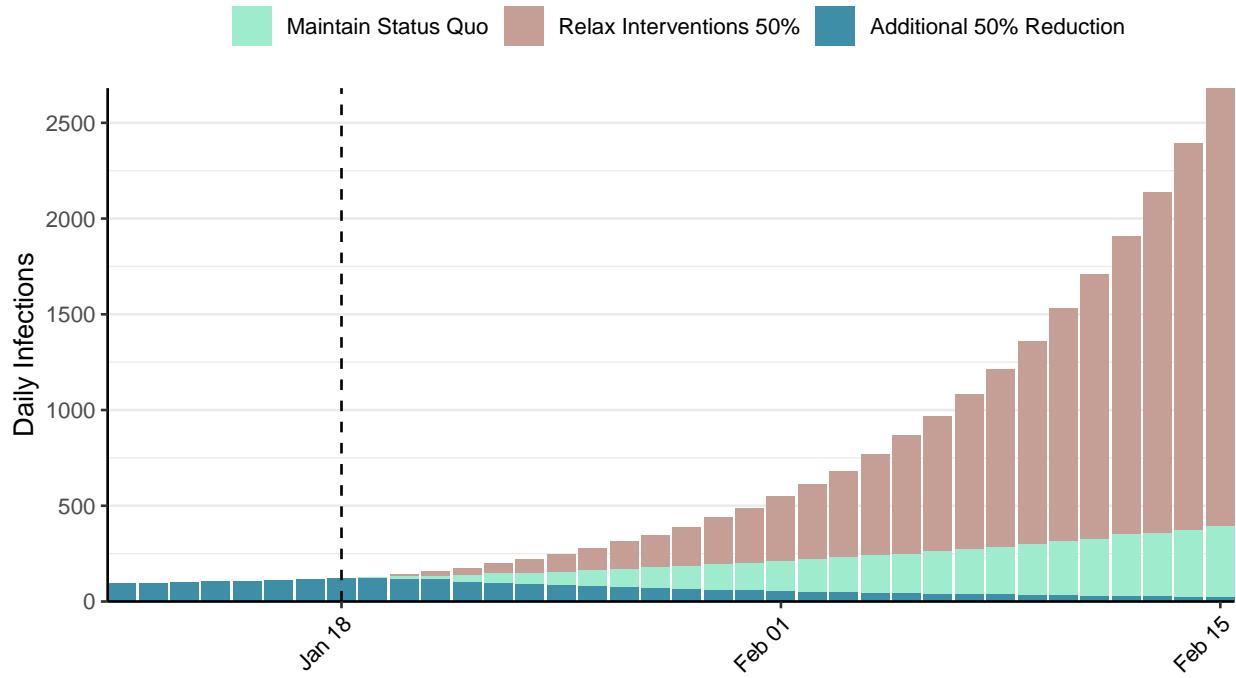


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Georgia, 2021-01-18

[Download the report for Georgia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.81 (95% CI: 0.65-1.05)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Georgia is not shown in the following plot as only 0 deaths have been reported to date**

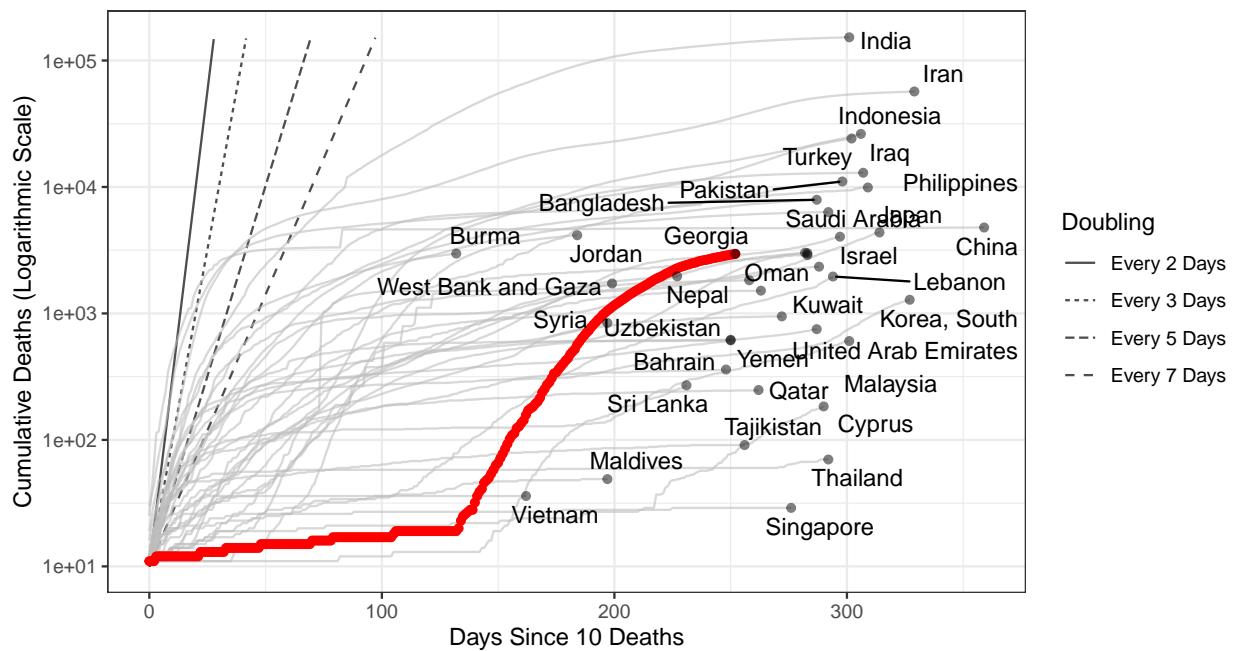


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 124,580 (95% CI: 116,196-132,965) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

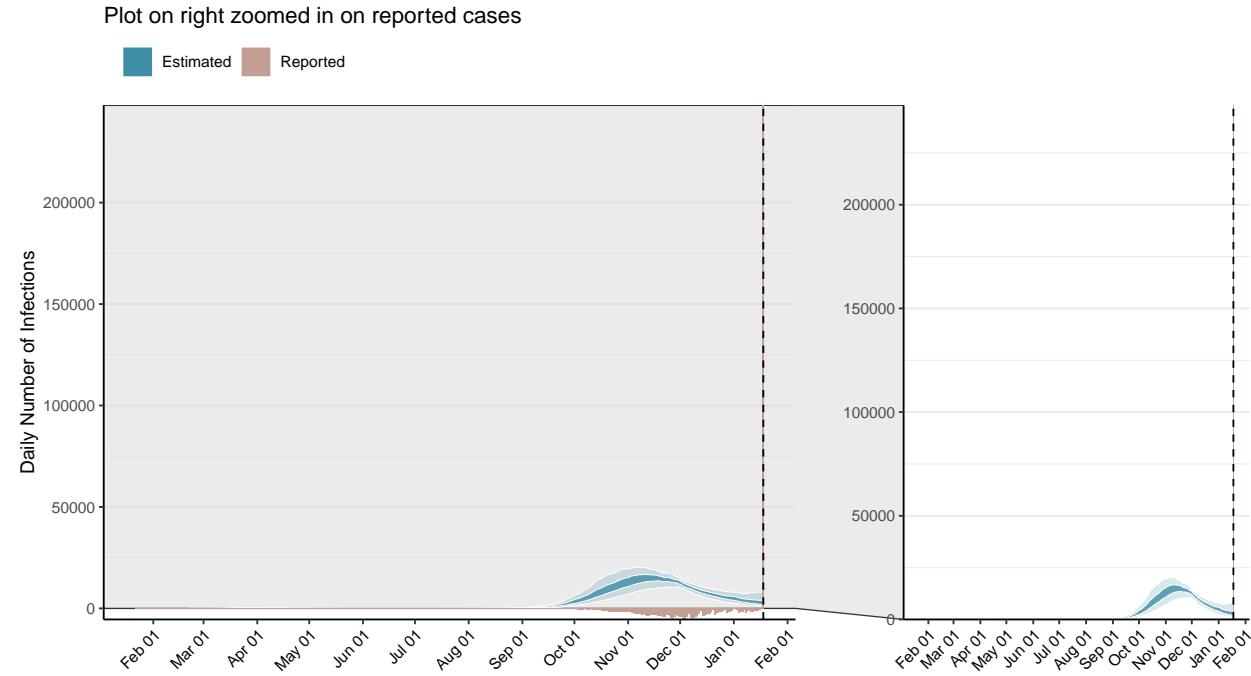
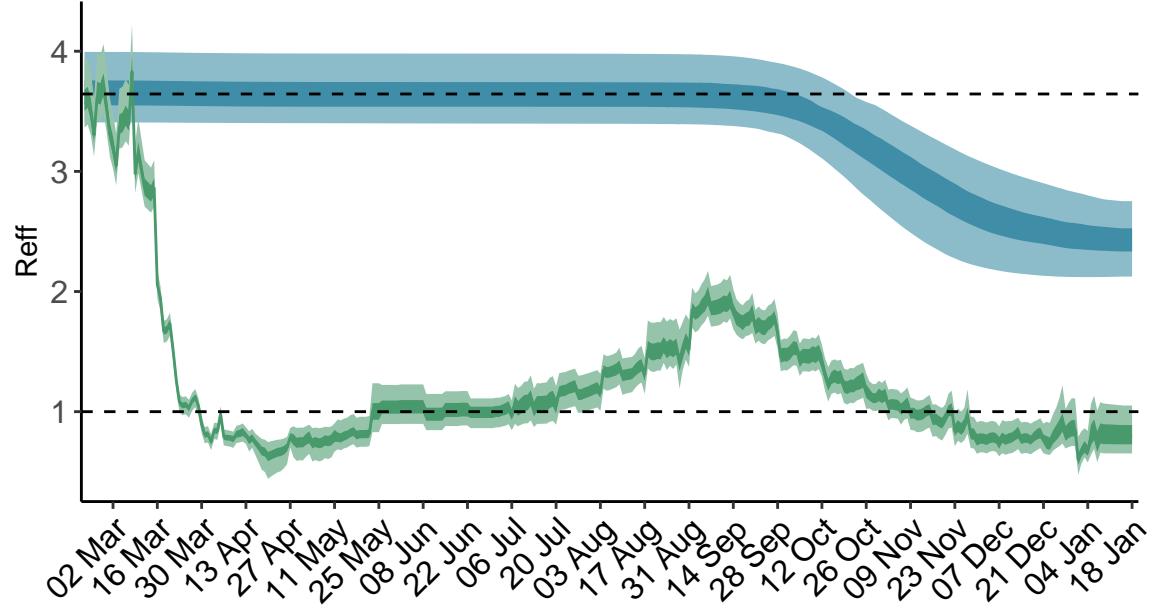


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

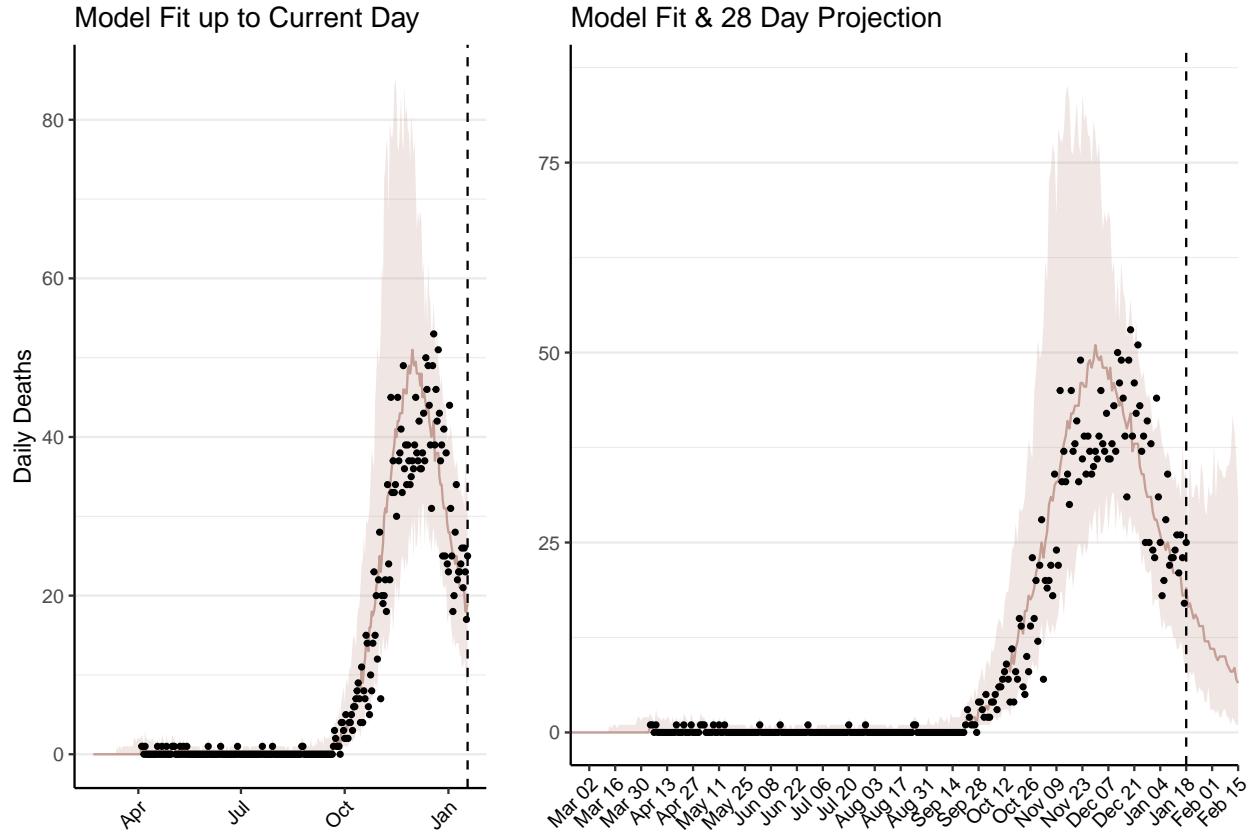


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 592 (95% CI: 551-633) patients requiring treatment with high-pressure oxygen at the current date to 339 (95% CI: 275-403) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 246 (95% CI: 231-260) patients requiring treatment with mechanical ventilation at the current date to 134 (95% CI: 111-157) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

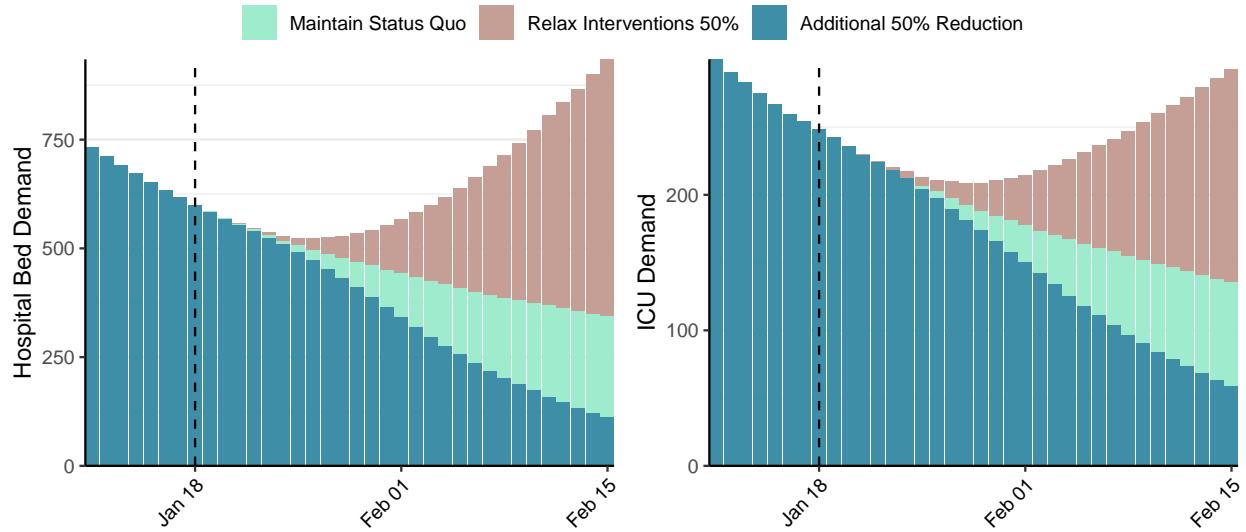


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,088 (95% CI: 2,716-3,461) at the current date to 182 (95% CI: 141-223) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,088 (95% CI: 2,716-3,461) at the current date to 8,833 (95% CI: 6,882-10,784) by 2021-02-15.

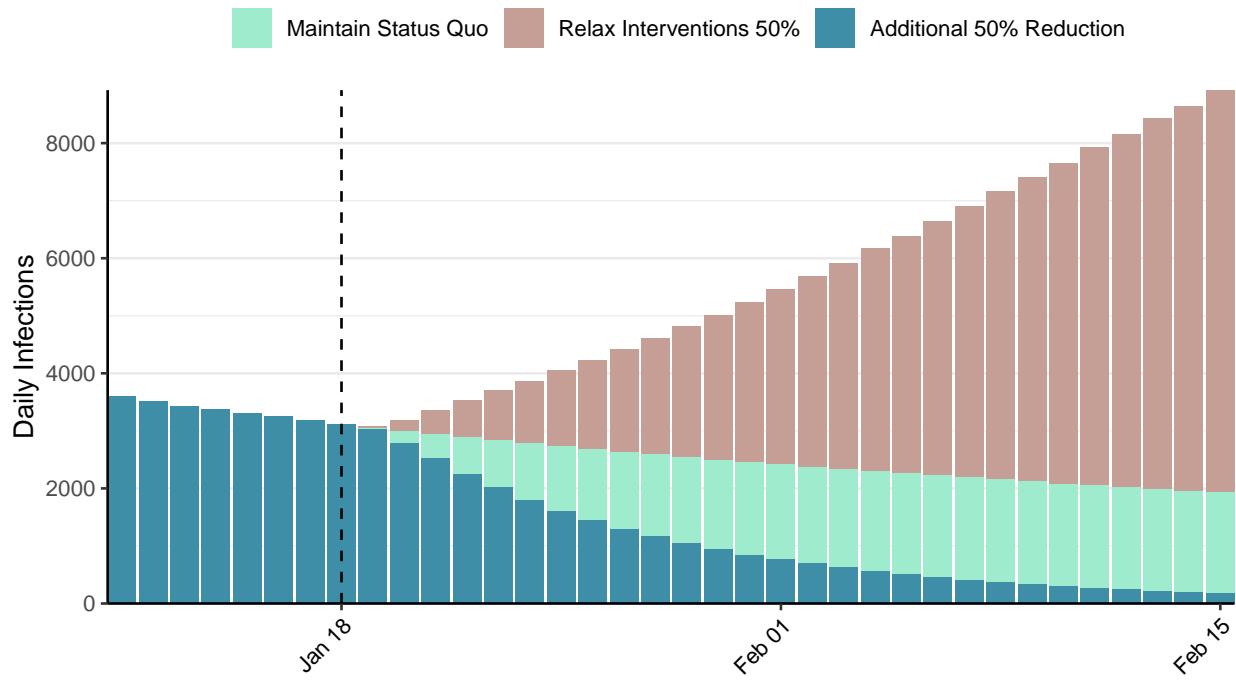


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Ghana, 2021-01-18

[Download the report for Ghana, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
351	351	6	6	1.63 (95% CI: 1.35-1.95)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Ghana is not shown in the following plot as only 6 deaths have been reported to date**

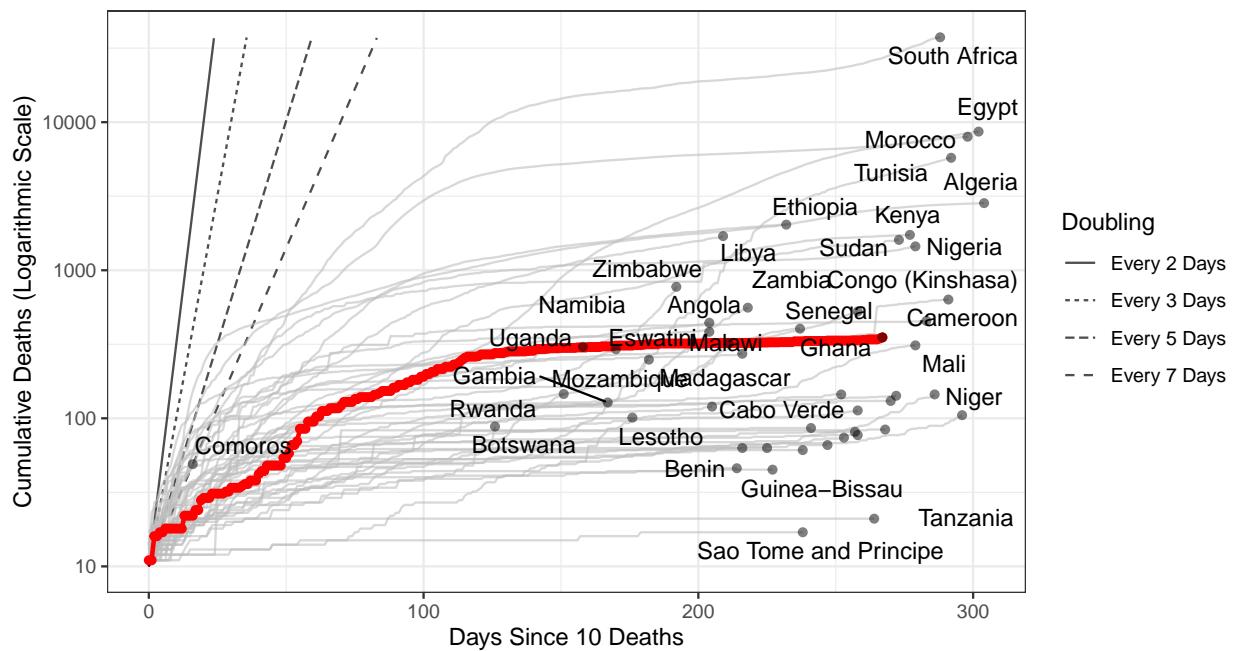


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 35,575 (95% CI: 32,685–38,465) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

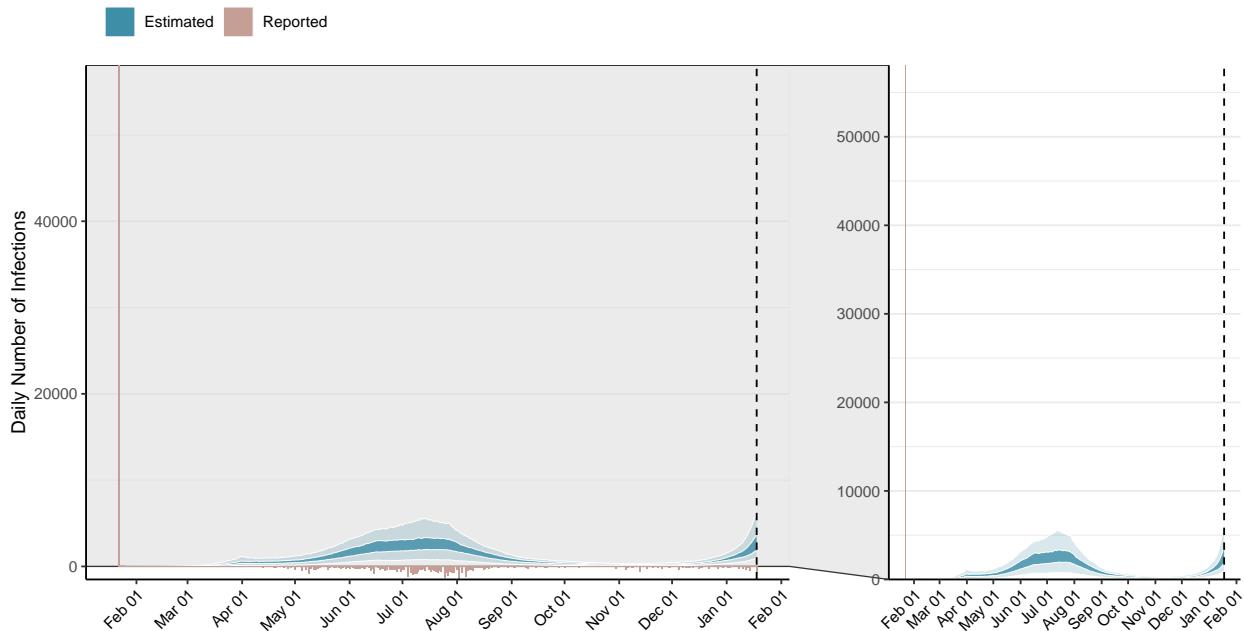
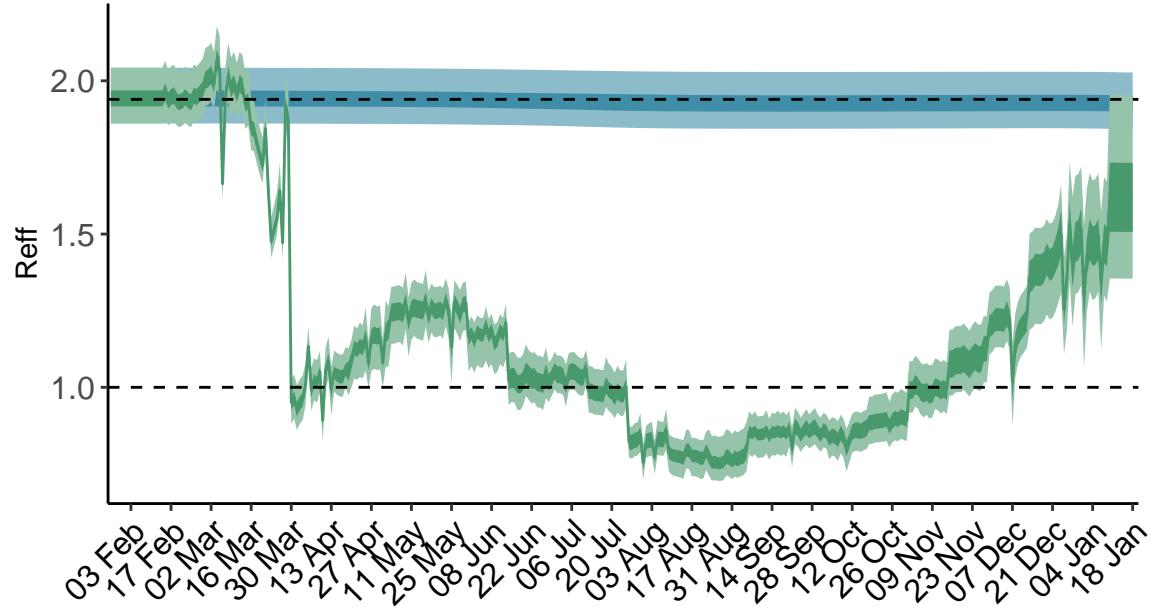


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Ghana is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

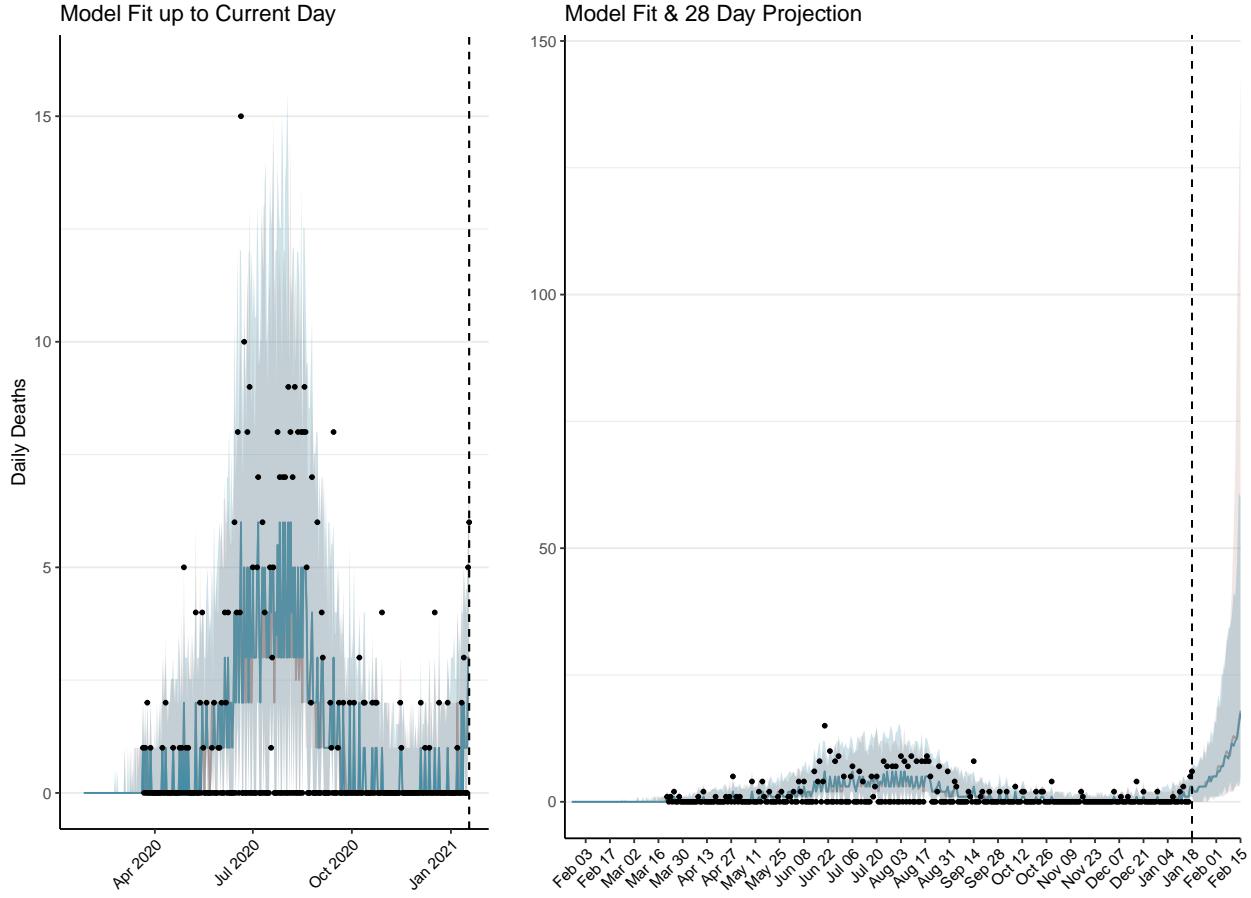


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 112 (95% CI: 103-122) patients requiring treatment with high-pressure oxygen at the current date to 1,174 (95% CI: 987-1,361) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 41 (95% CI: 37-45) patients requiring treatment with mechanical ventilation at the current date to 395 (95% CI: 340-449) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

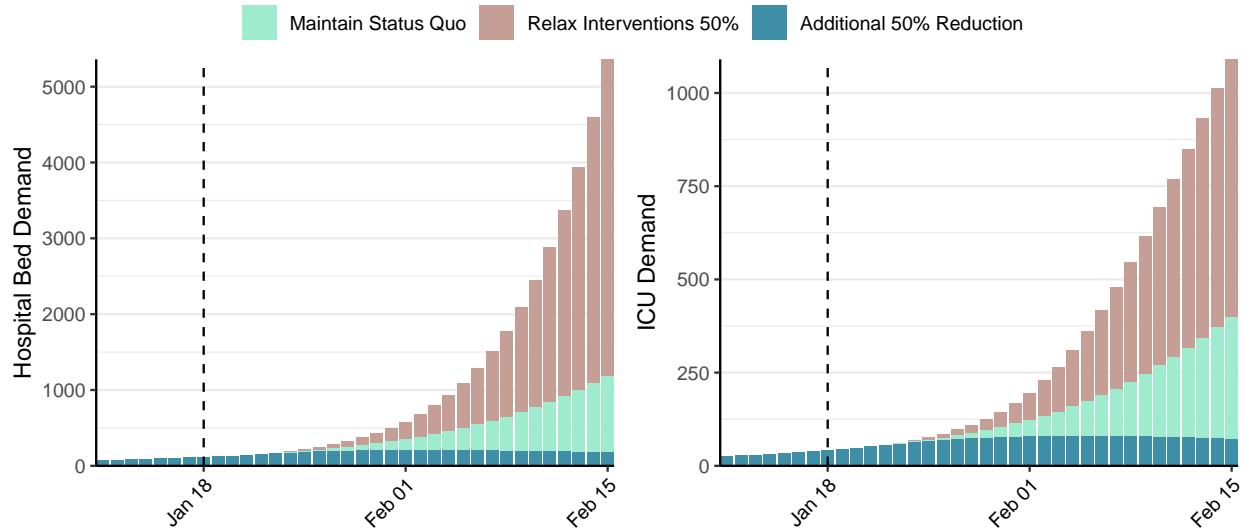


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 2,882 (95% CI: 2,602-3,162) at the current date to 1,684 (95% CI: 1,395-1,974) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,882 (95% CI: 2,602-3,162) at the current date to 232,682 (95% CI: 192,185-273,180) by 2021-02-15.

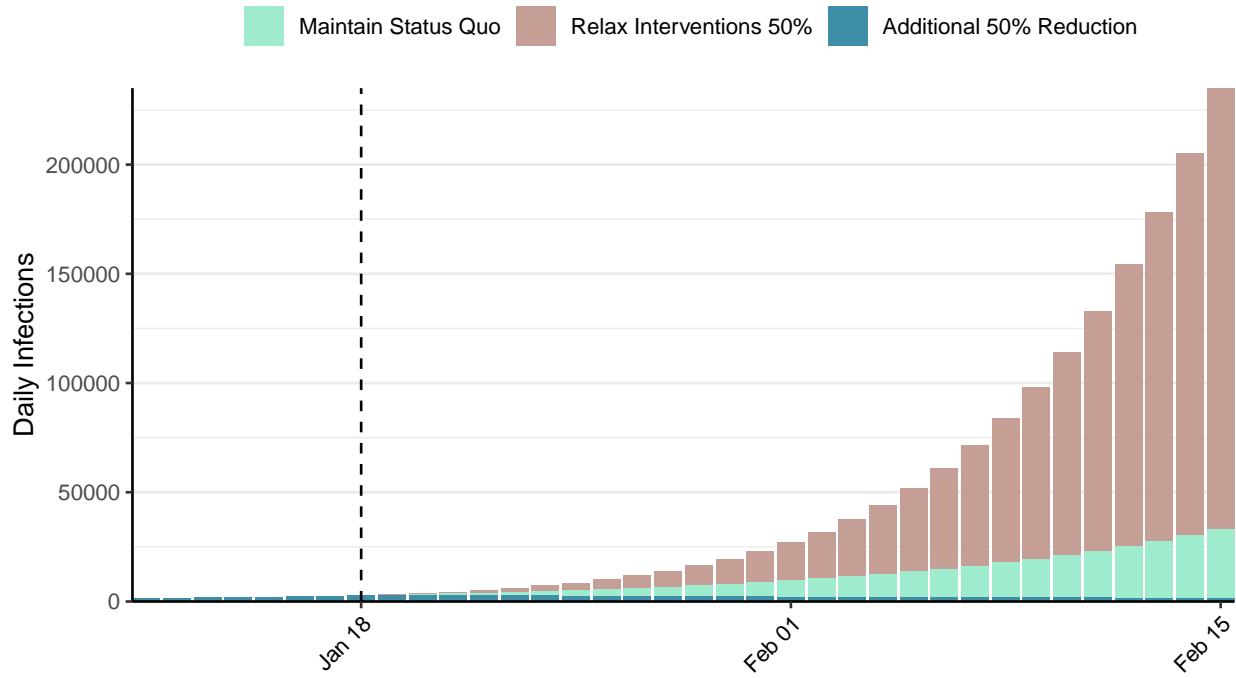


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Guinea, 2021-01-18

[Download the report for Guinea, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.69 (95% CI: 0.5-0.94)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Guinea is not shown in the following plot as only 0 deaths have been reported to date**

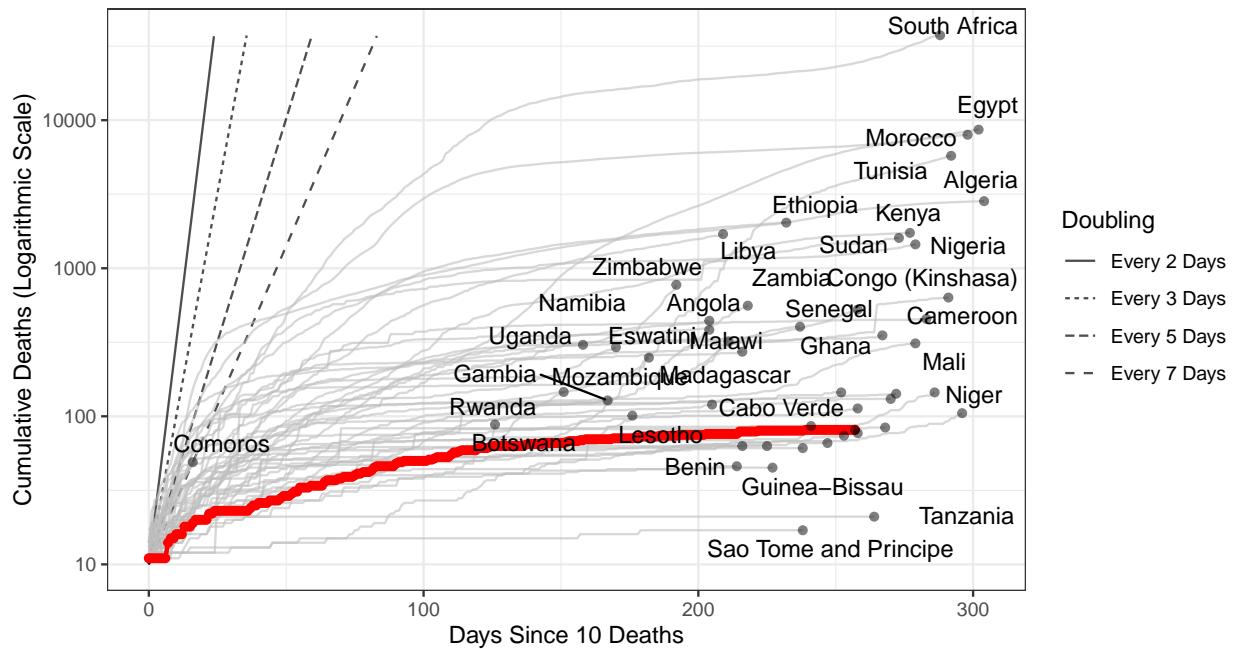


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 238 (95% CI: 206-269) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

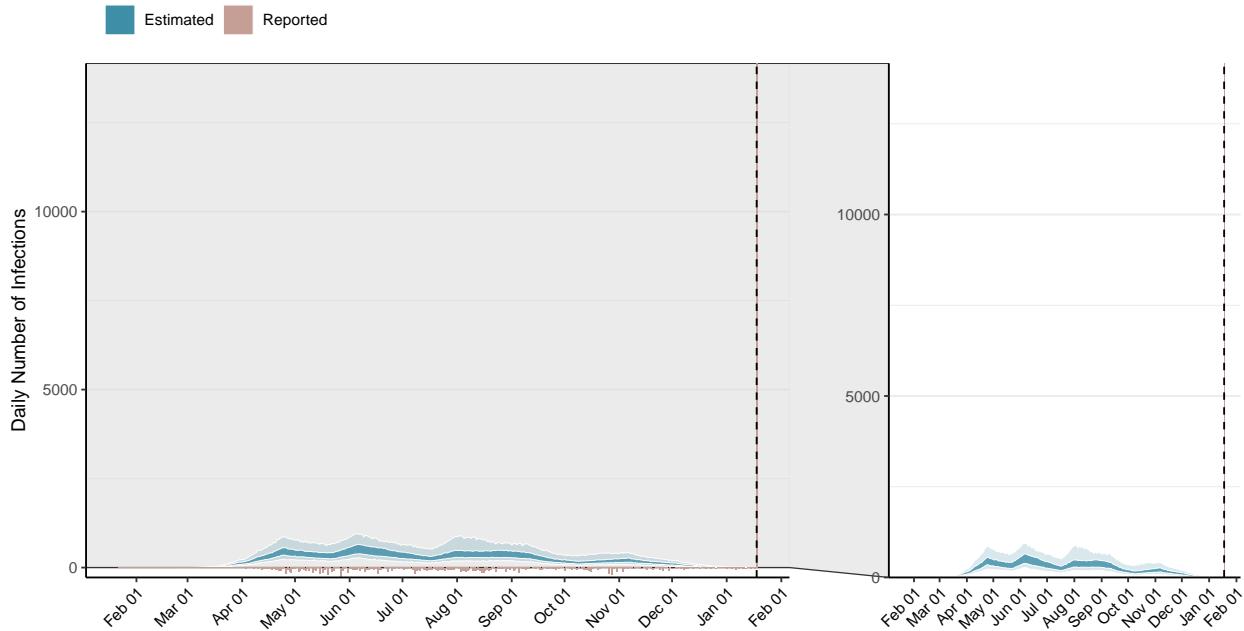
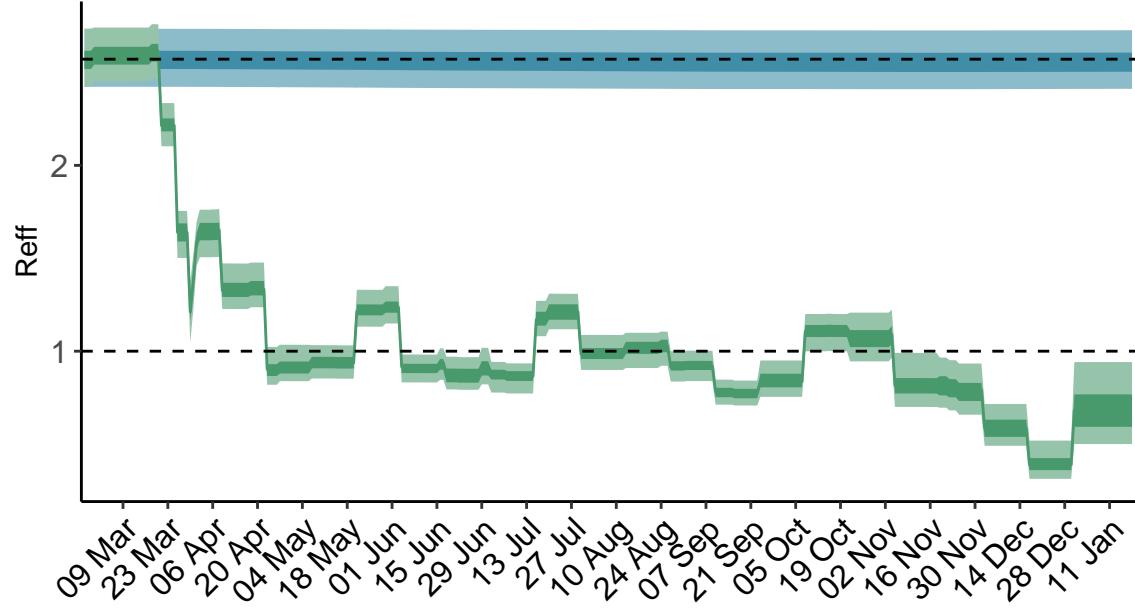


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

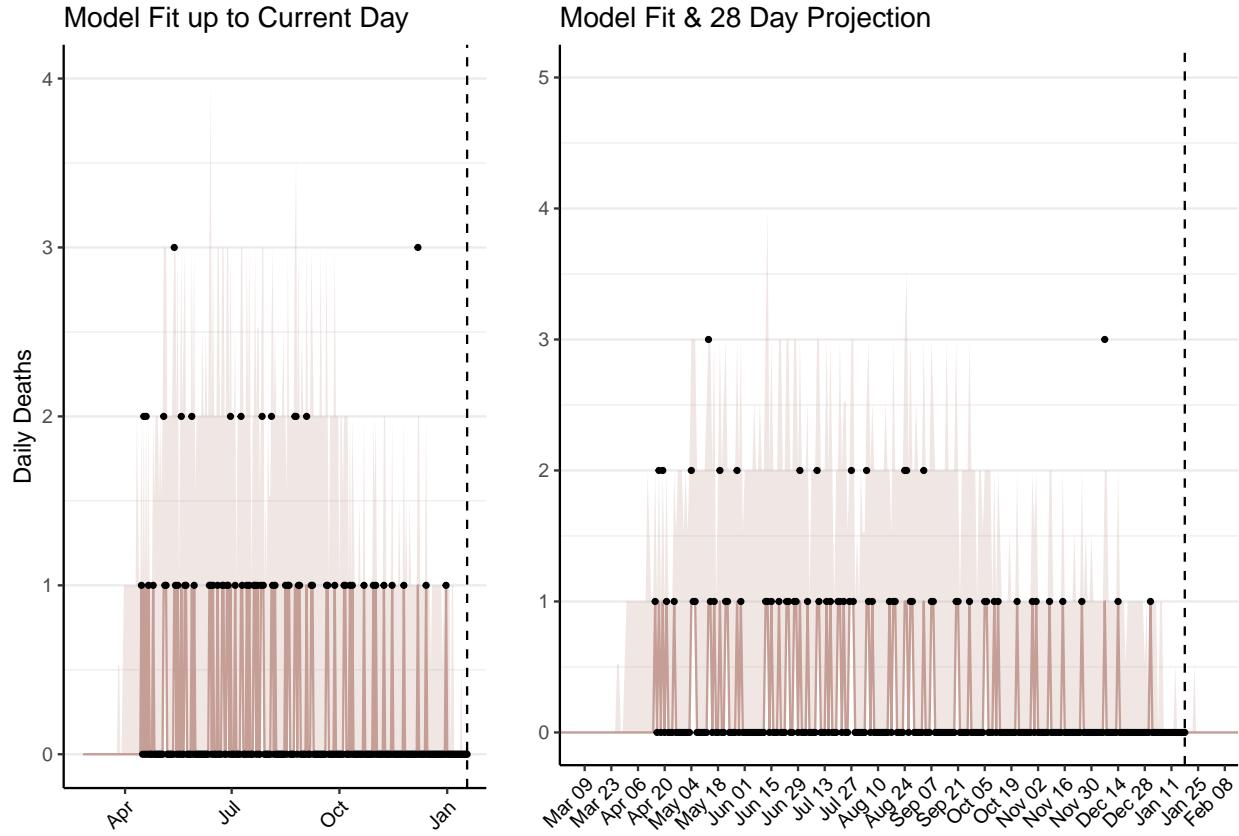


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1 (95% CI: 0-1) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

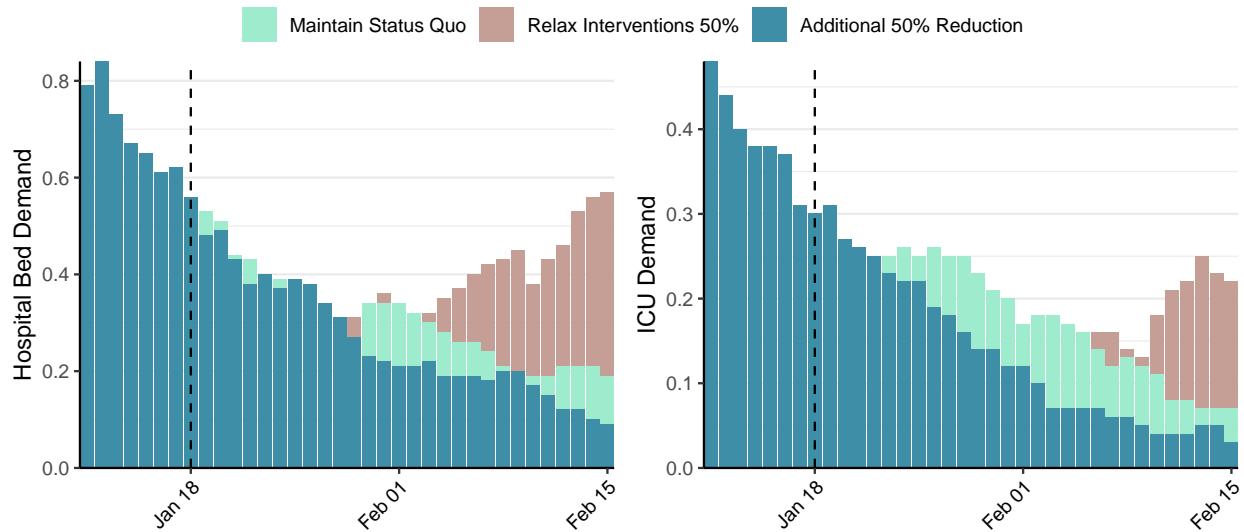


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4 (95% CI: 3-5) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4 (95% CI: 3-5) at the current date to 9 (95% CI: 5-13) by 2021-02-15.

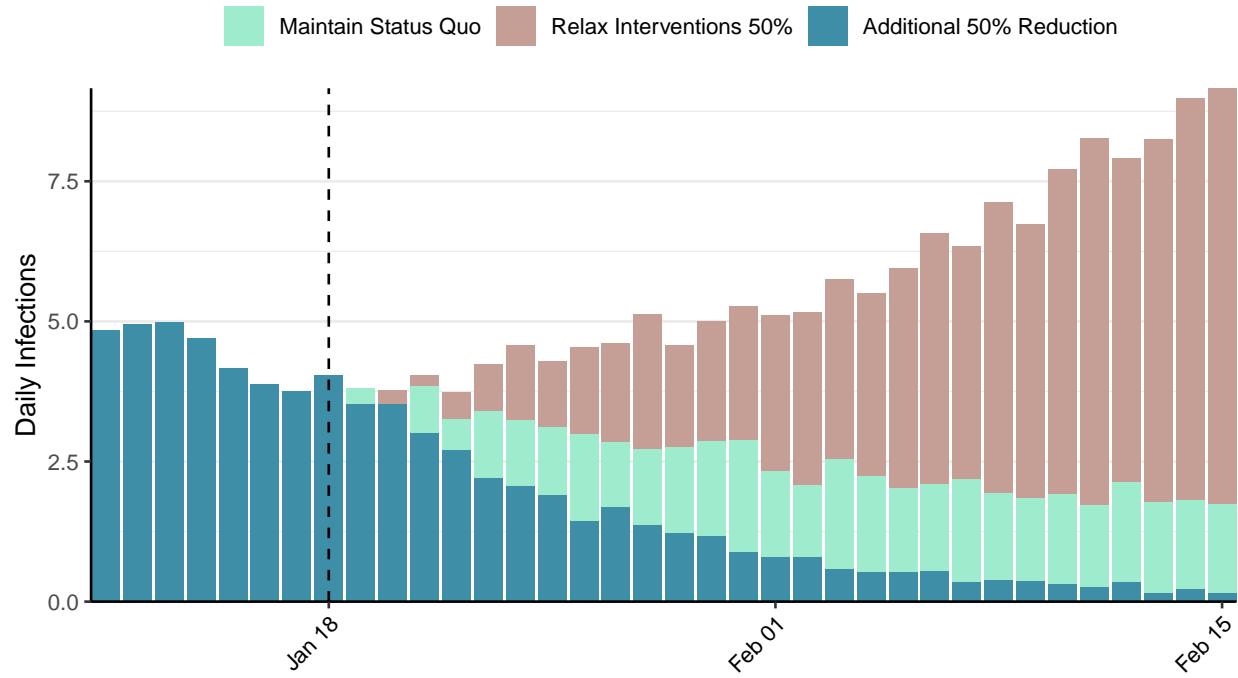


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Gambia, 2021-01-18

[Download the report for Gambia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
23	23	1	1	1.4 (95% CI: 1.12-1.63)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Gambia is not shown in the following plot as only 1 deaths have been reported to date**

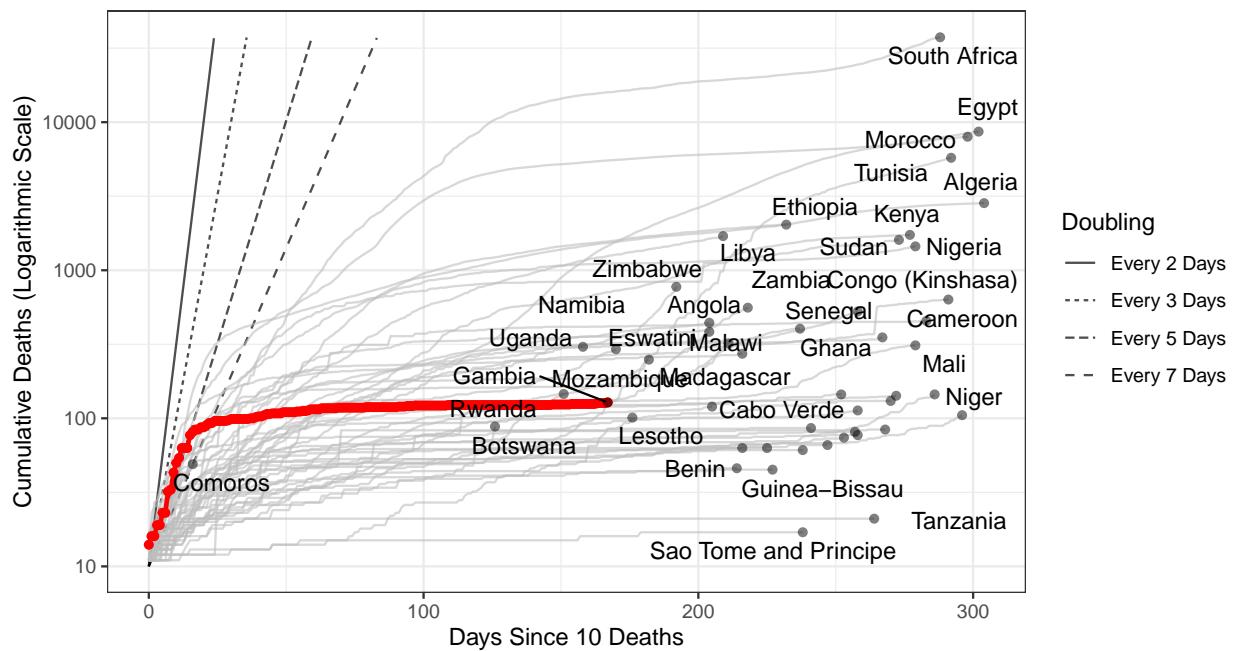


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 5,577 (95% CI: 4,959–6,194) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Gambia has revised their historic reported cases and thus have reported negative cases.**

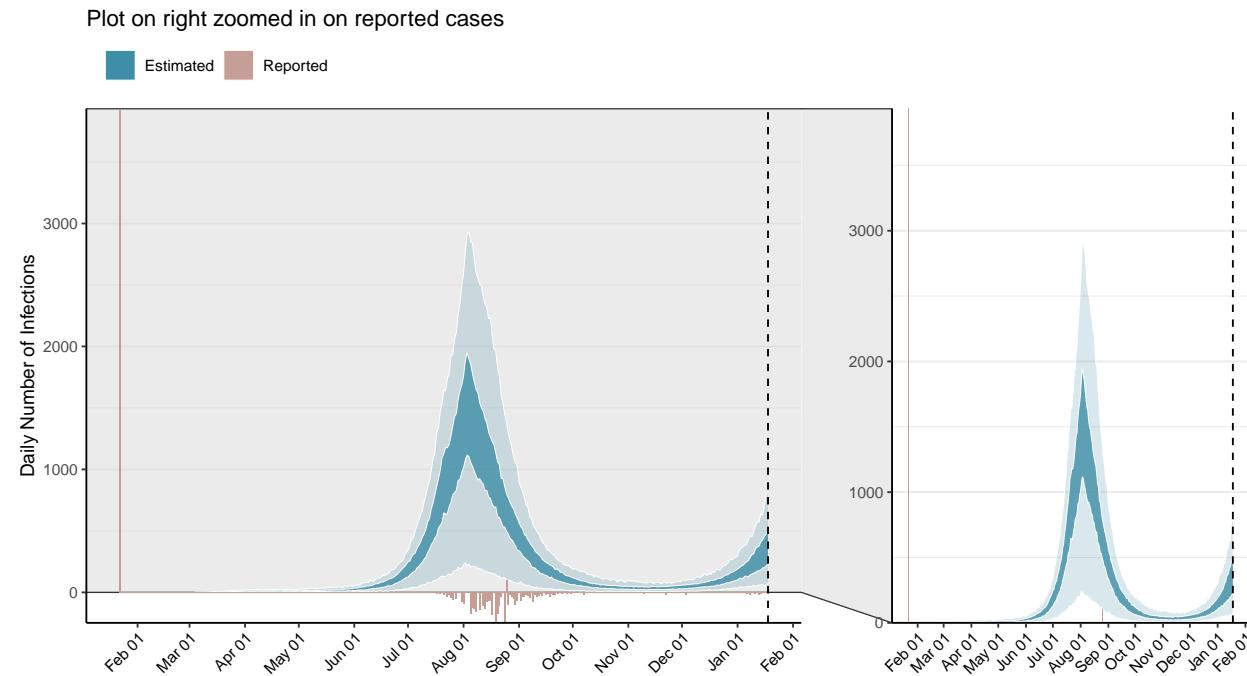
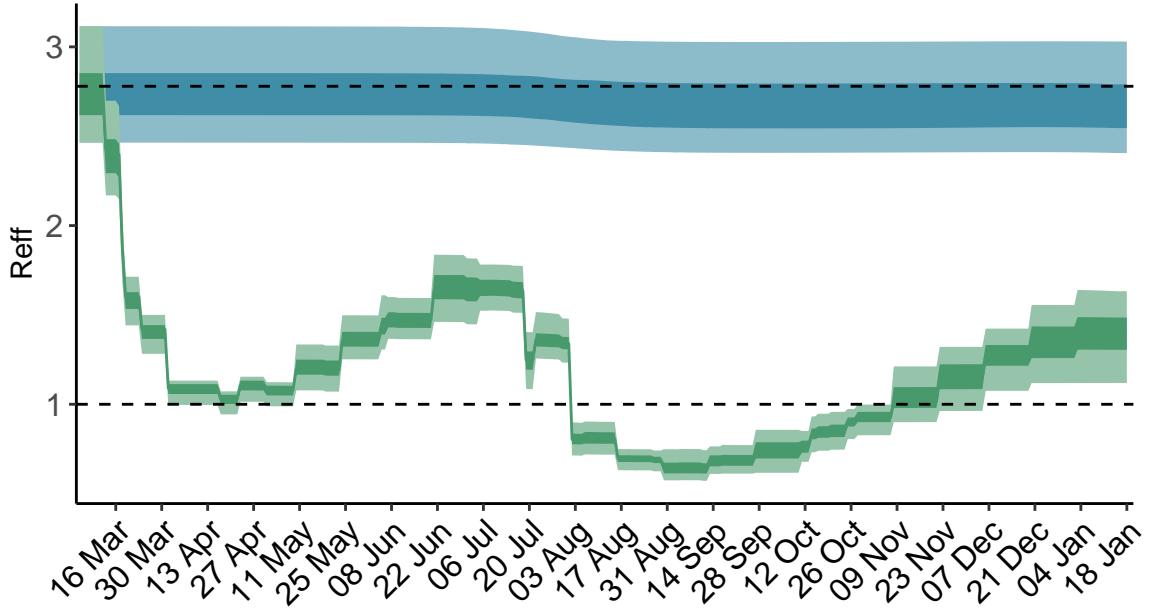


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Gambia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

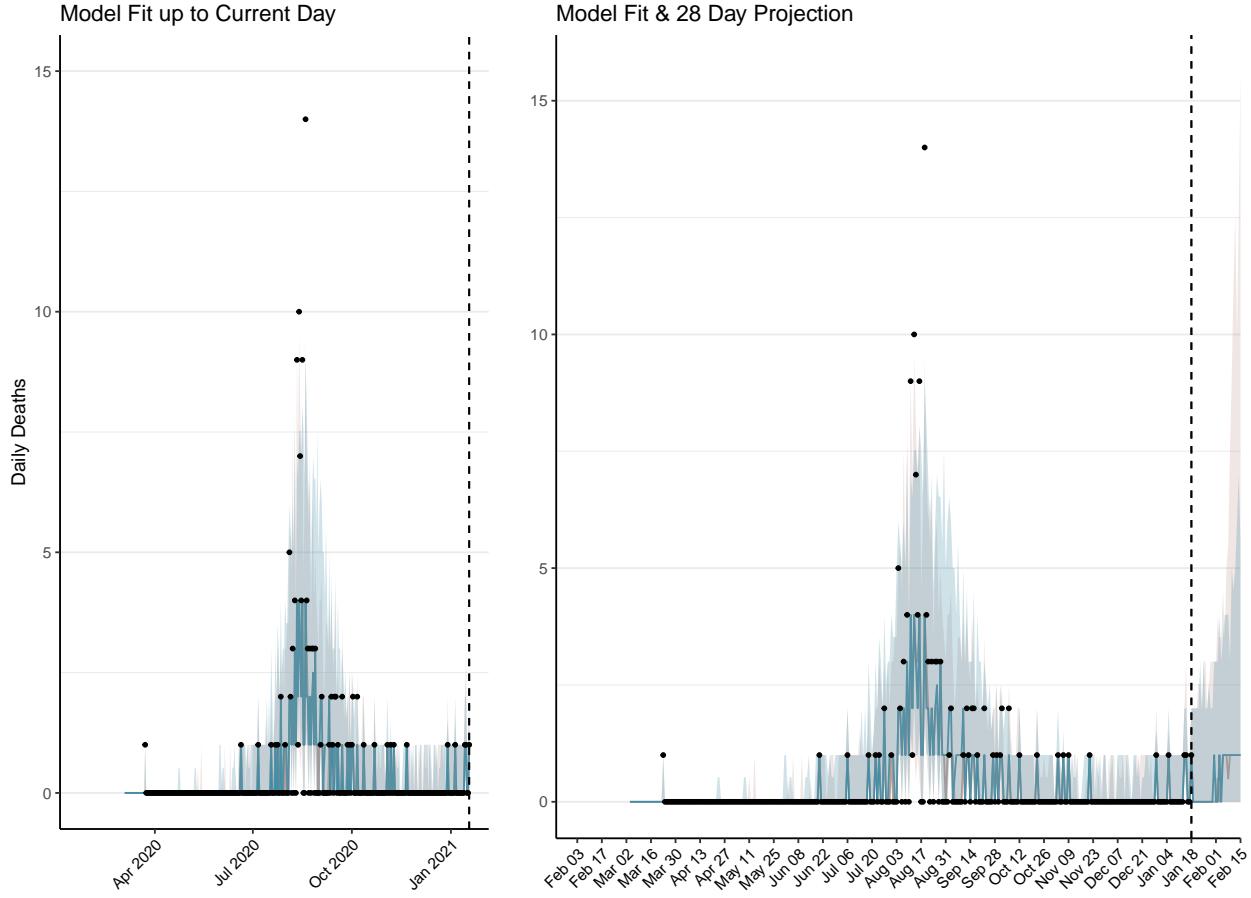


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 16 (95% CI: 14-18) patients requiring treatment with high-pressure oxygen at the current date to 85 (95% CI: 69-100) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 6 (95% CI: 5-7) patients requiring treatment with mechanical ventilation at the current date to 26 (95% CI: 22-29) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

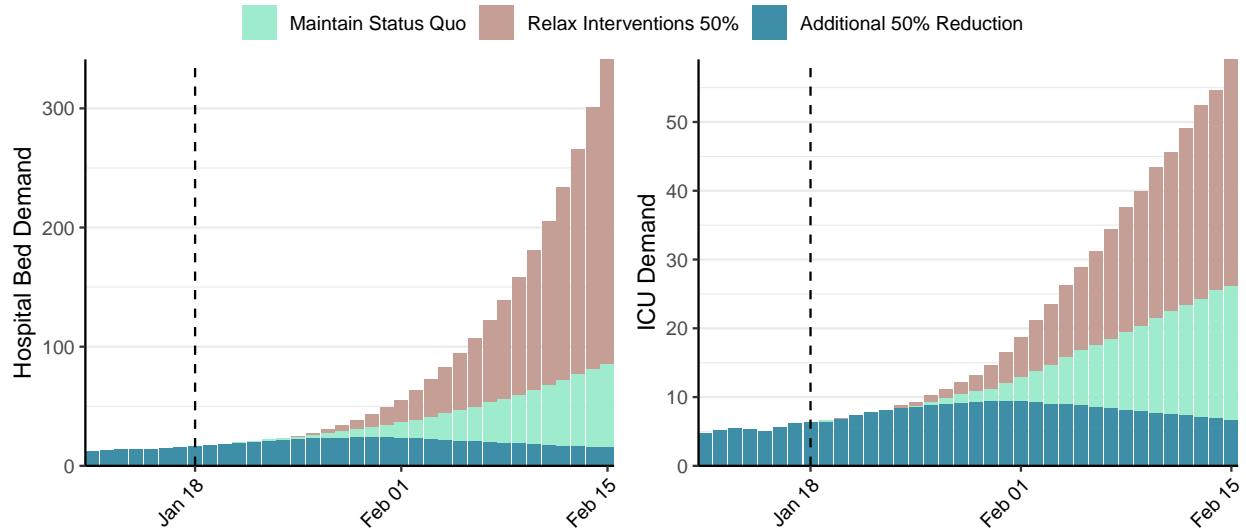


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 382 (95% CI: 331-433) at the current date to 128 (95% CI: 102-154) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 382 (95% CI: 331-433) at the current date to 13,435 (95% CI: 10,900-15,969) by 2021-02-15.

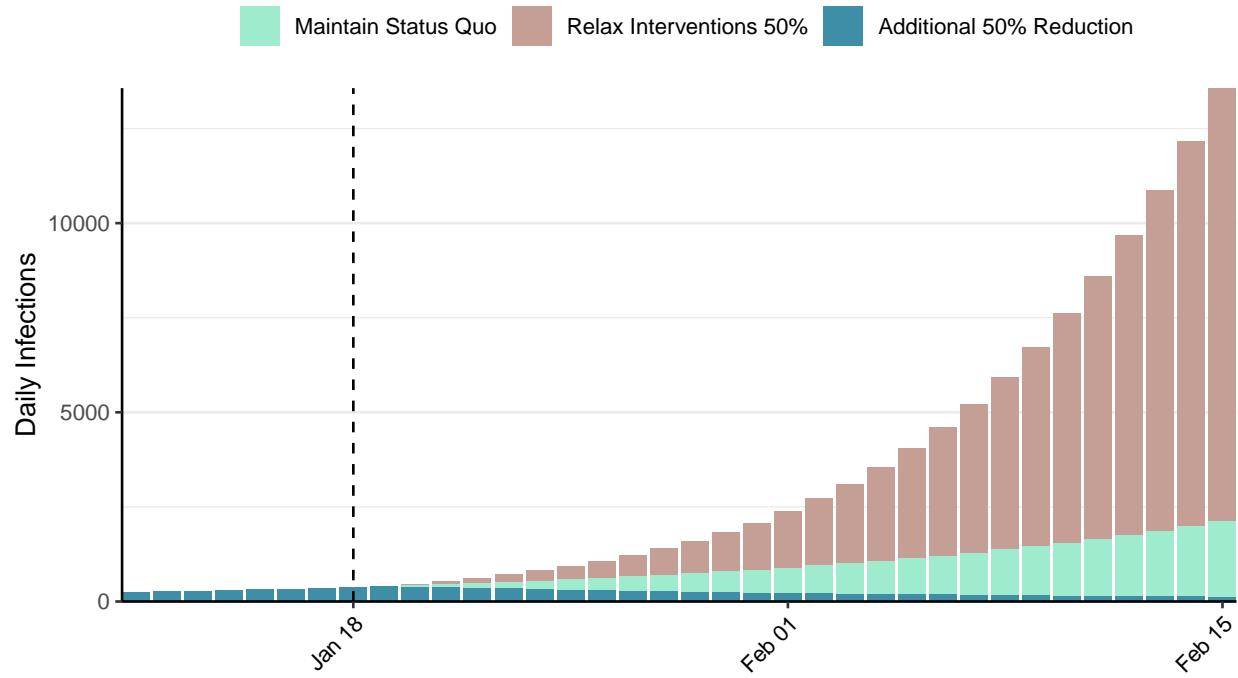


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Guinea-Bissau, 2021-01-18

[Download the report for Guinea-Bissau, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.71 (95% CI: 0.45-0.96)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Guinea-Bissau is not shown in the following plot as only 0 deaths have been reported to date**

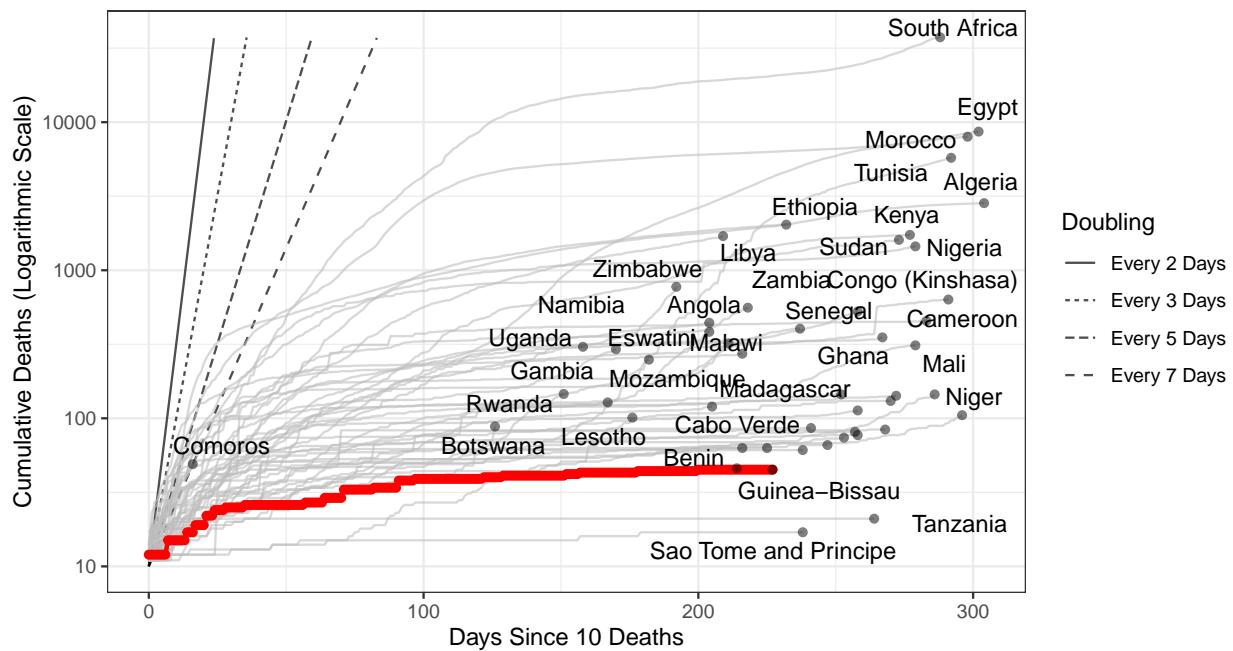


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 59 (95% CI: 44-74) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

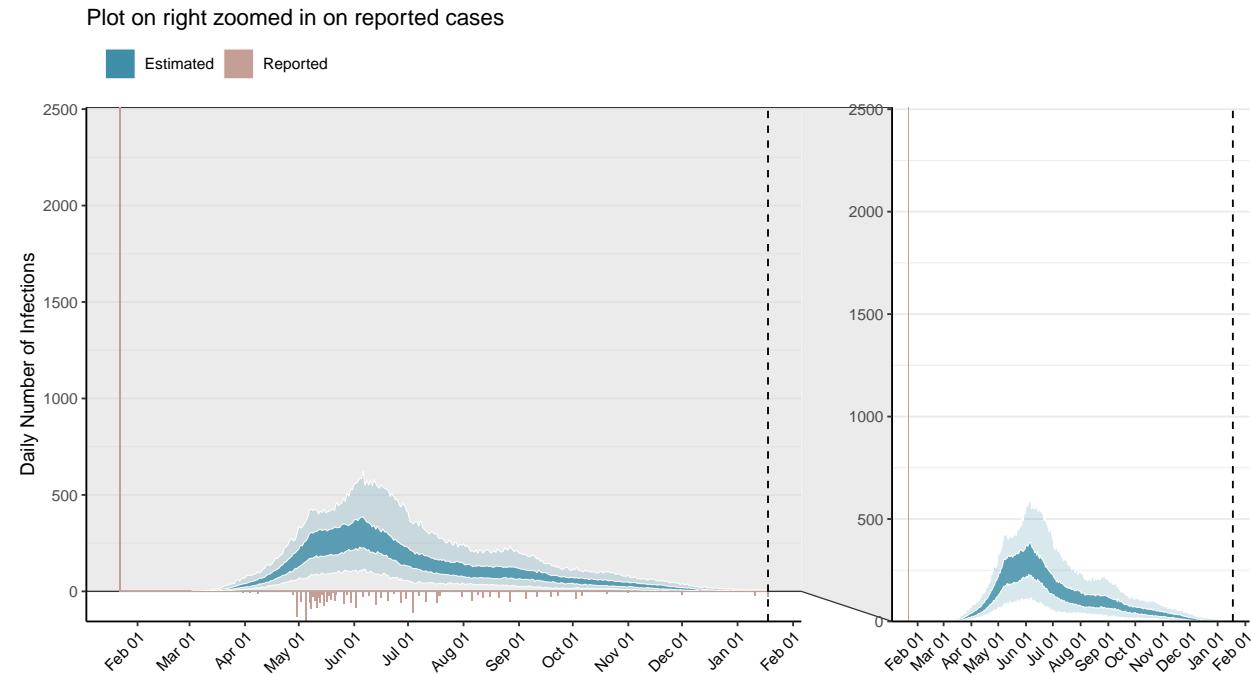
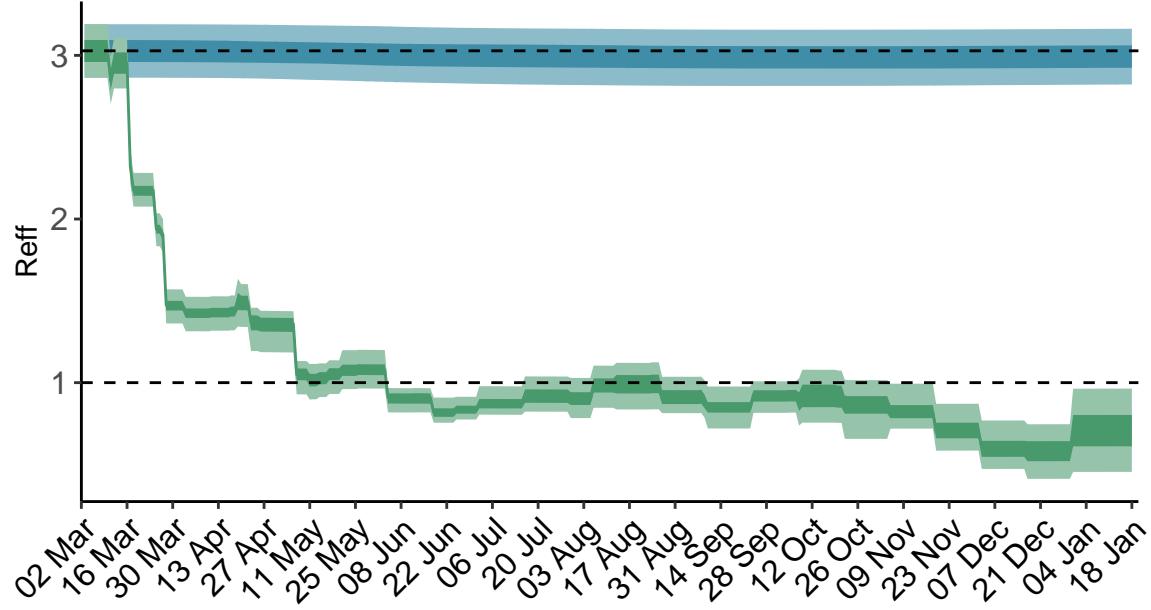


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

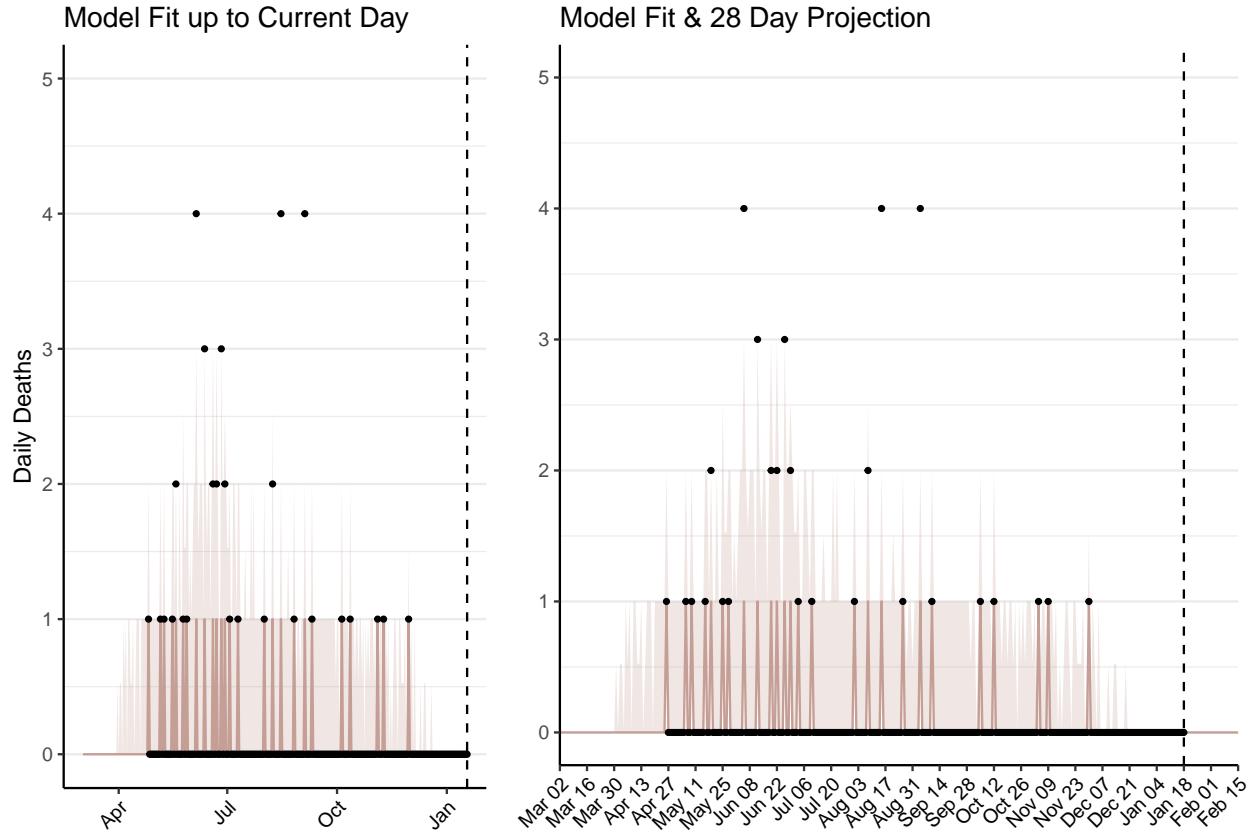


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

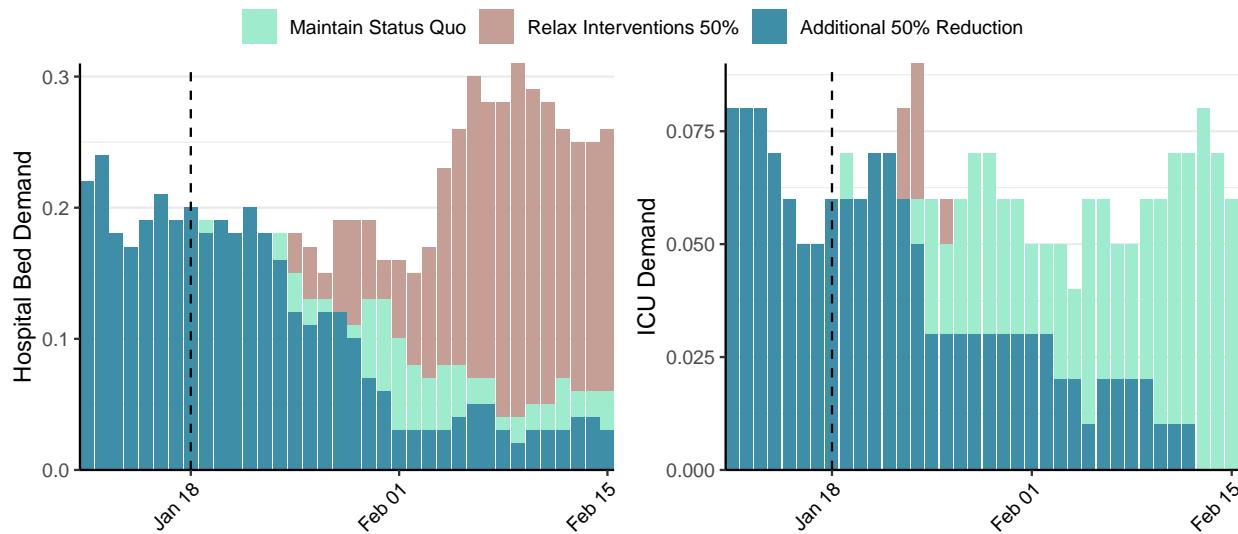


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 4 (95% CI: 2-5) by 2021-02-15.

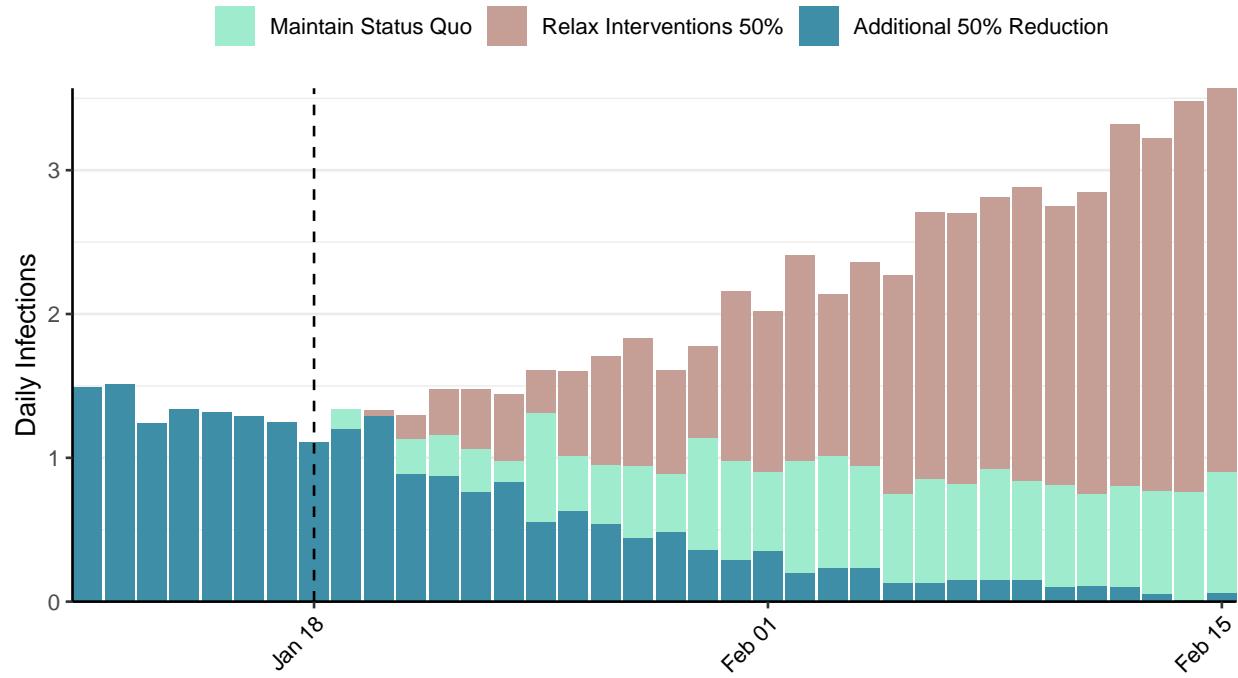


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Equatorial Guinea, 2021-01-18

[Download the report for Equatorial Guinea, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9	9	0	0	0.71 (95% CI: 0.52-0.95)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Equatorial Guinea is not shown in the following plot as only 0 deaths have been reported to date

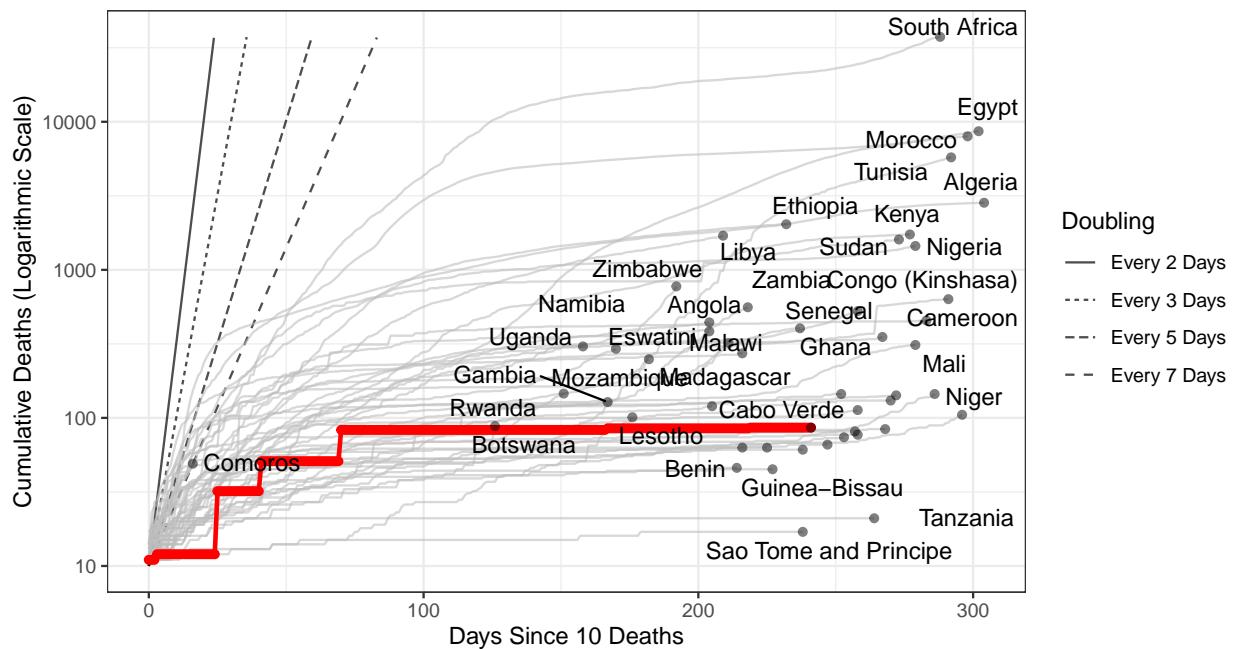


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 39 (95% CI: 27-50) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

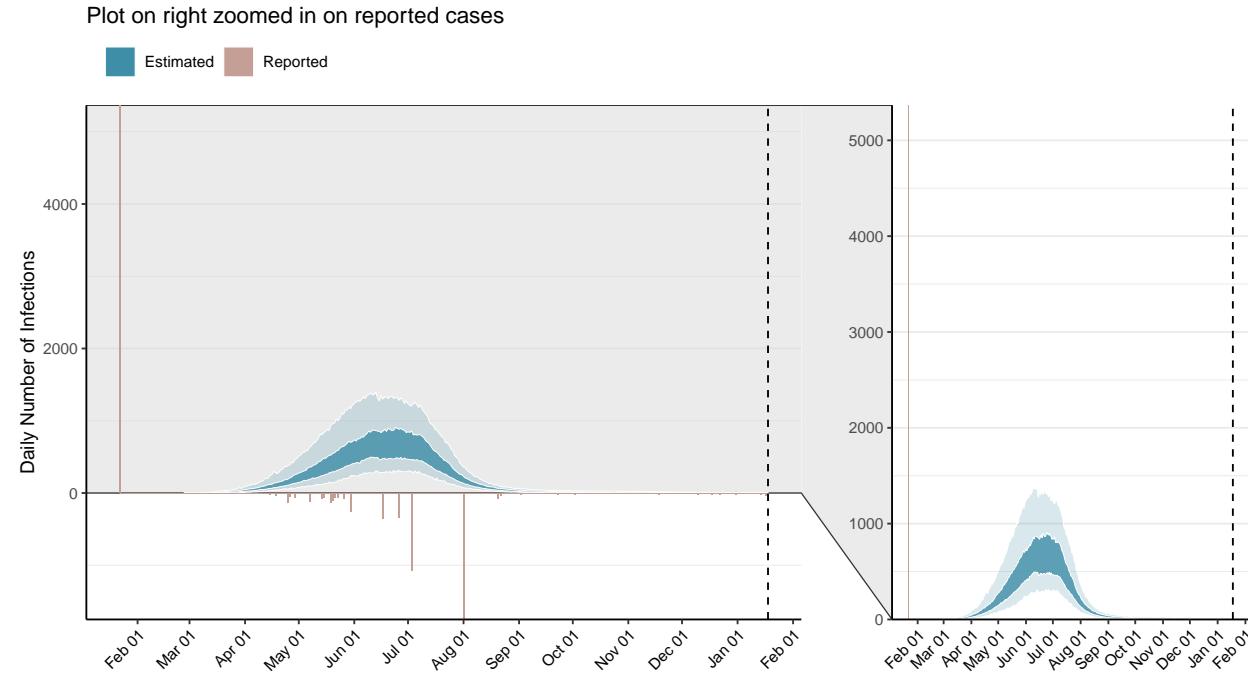
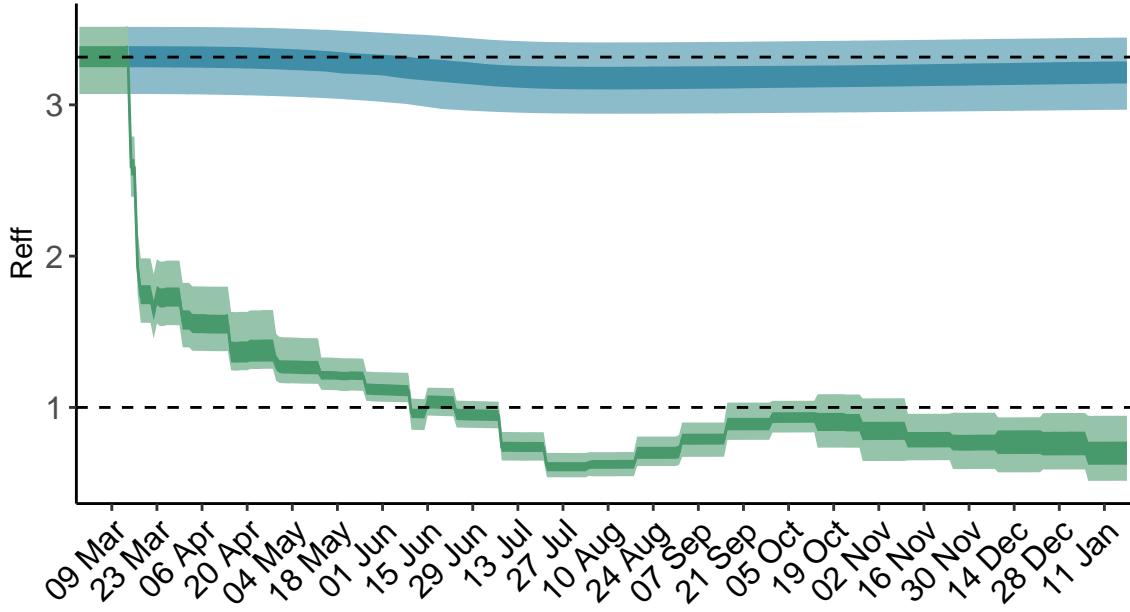


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

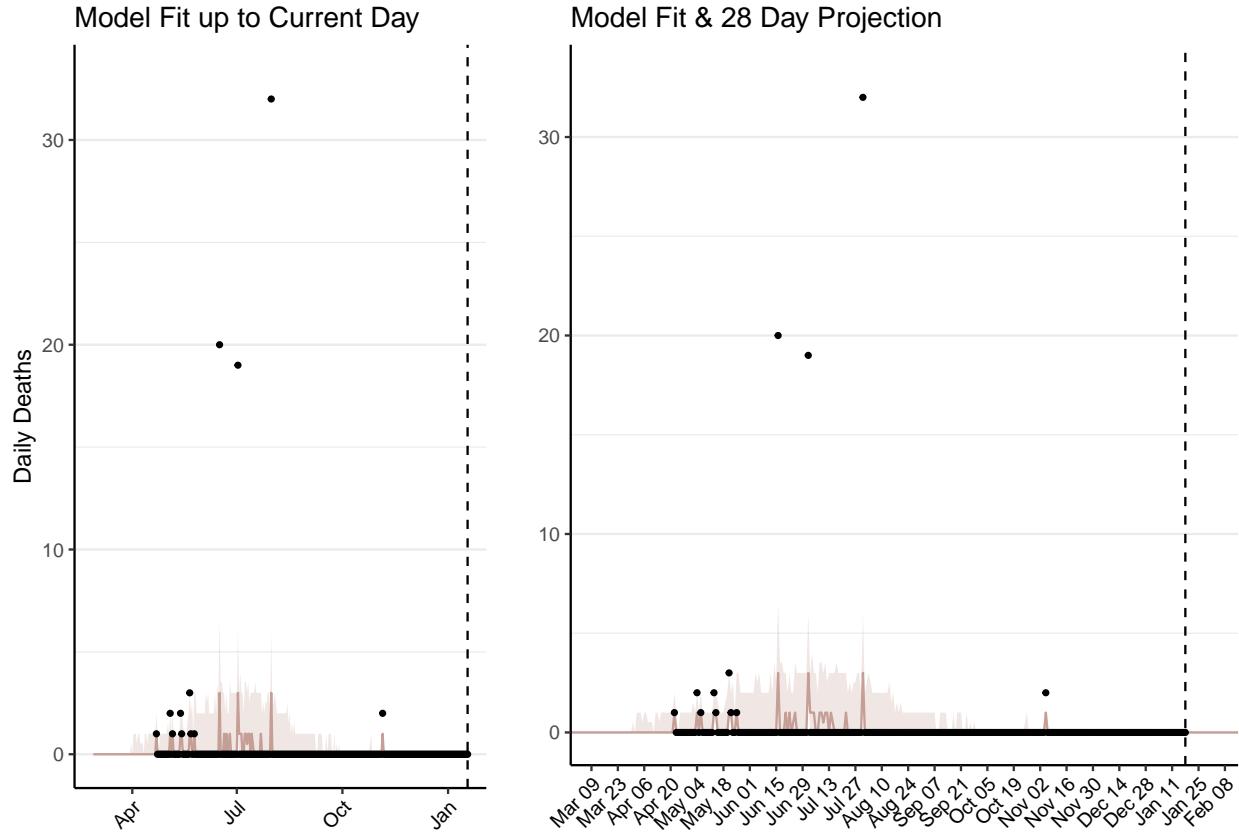


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

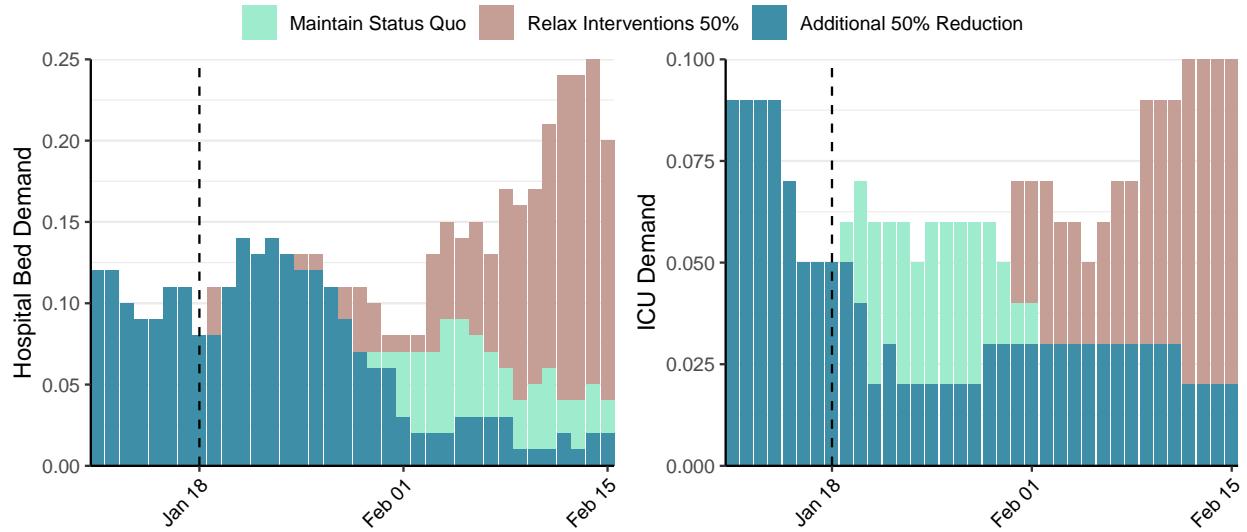


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 5 (95% CI: -1-12) by 2021-02-15.

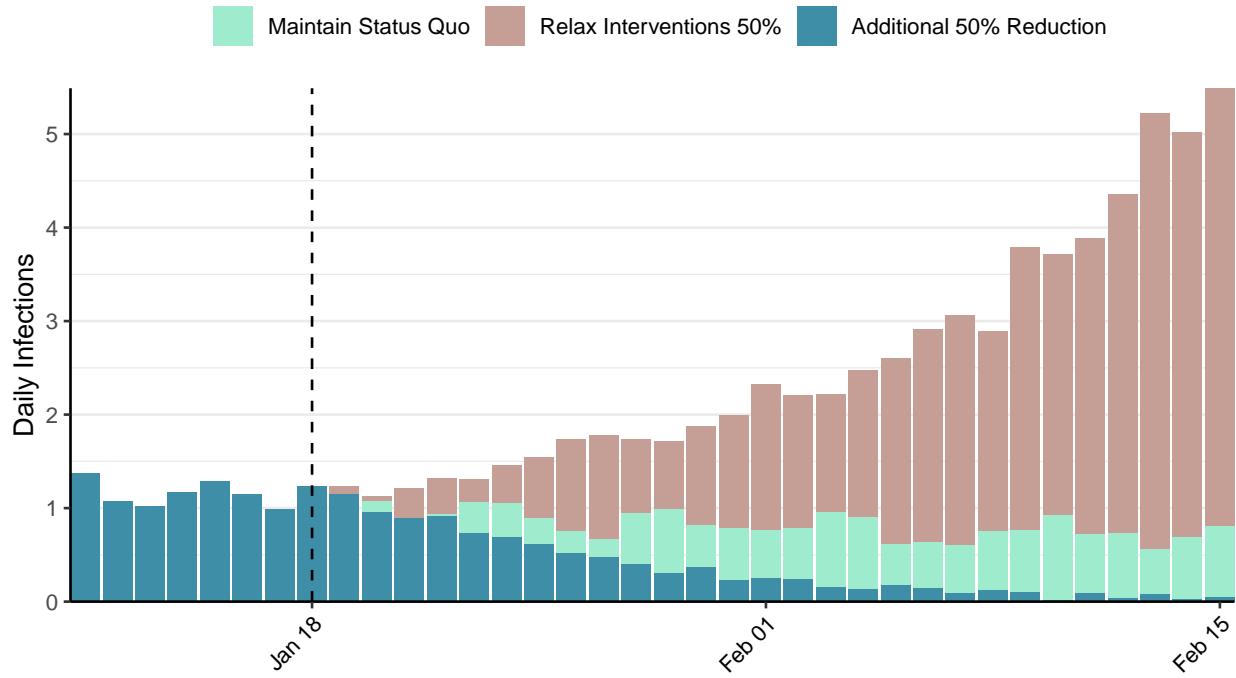


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Grenada, 2021-01-18

[Download the report for Grenada, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.87 (95% CI: 1.27-2.51)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Grenada is not shown in the following plot as only 0 deaths have been reported to date**

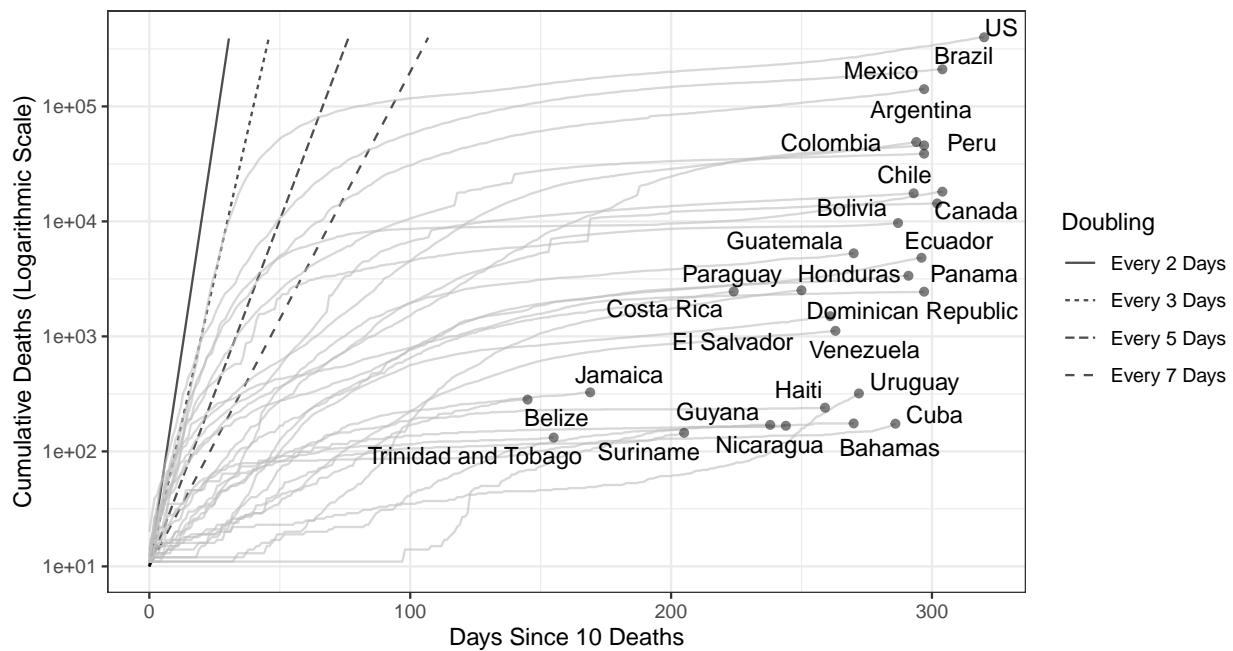


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,976 (95% CI: 1,503-2,450) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

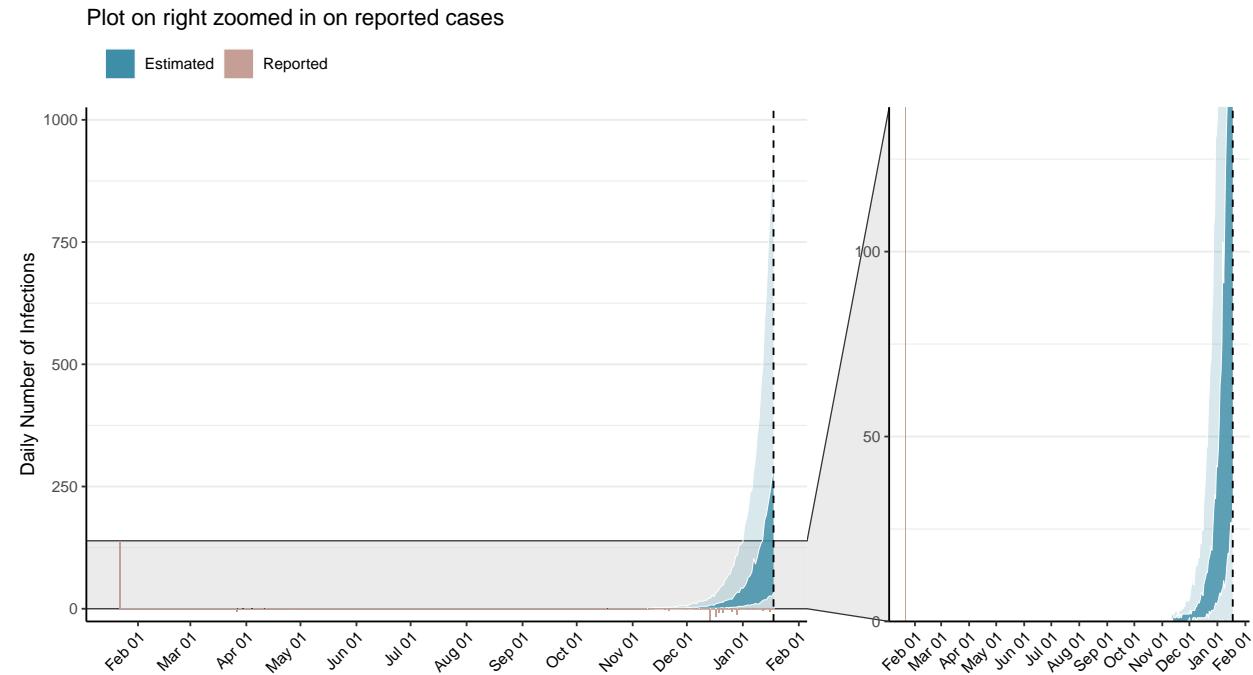
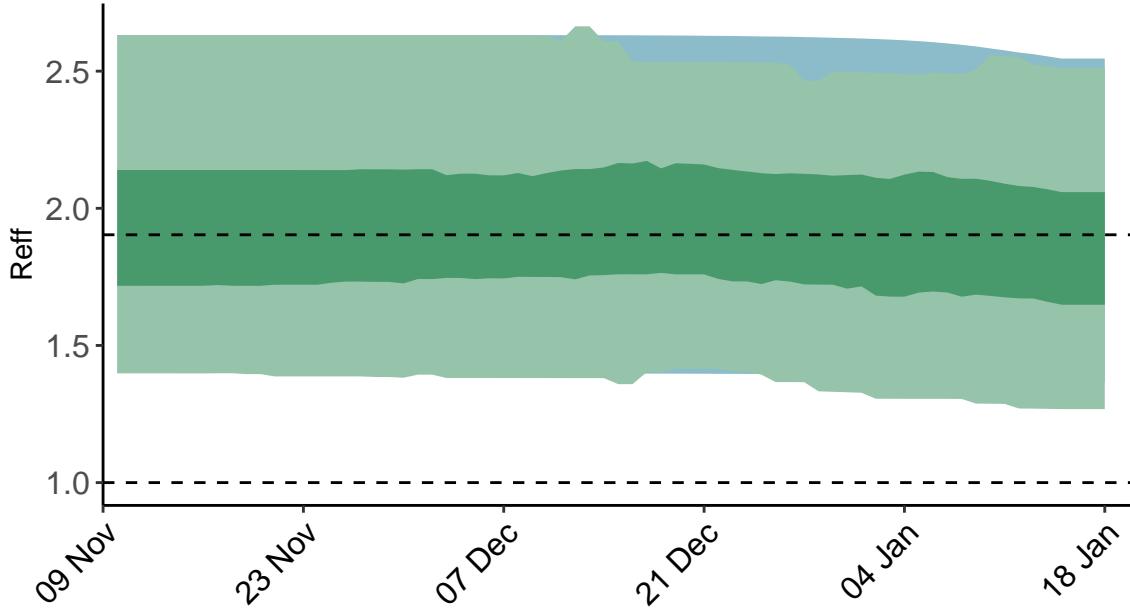


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

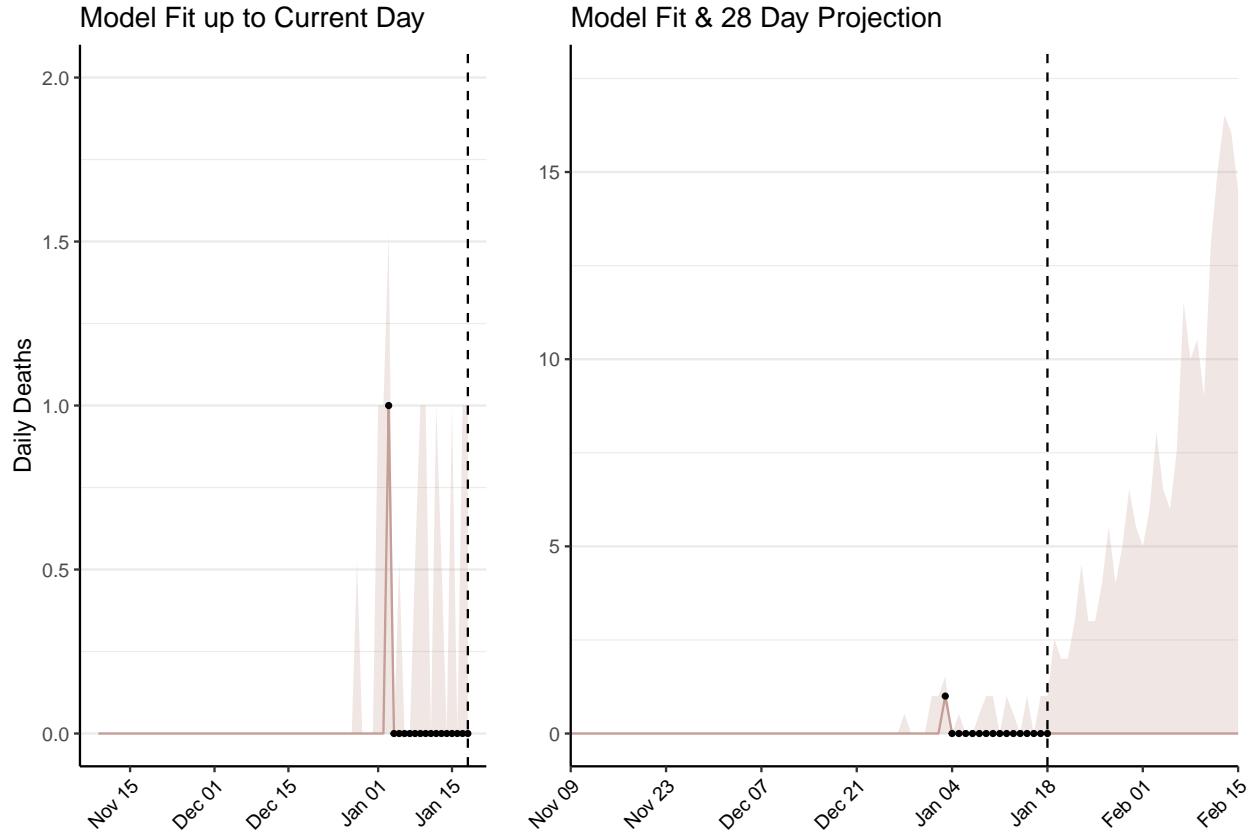


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 8 (95% CI: 6-10) patients requiring treatment with high-pressure oxygen at the current date to 51 (95% CI: 34-68) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2 (95% CI: 2-3) patients requiring treatment with mechanical ventilation at the current date to 7 (95% CI: 6-9) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

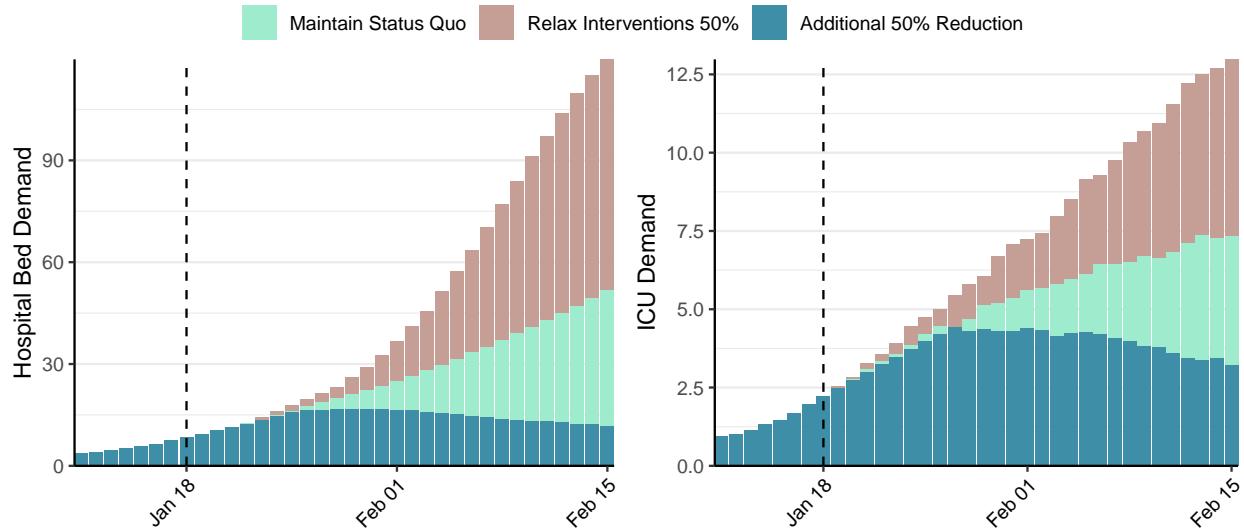


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 214 (95% CI: 161-268) at the current date to 74 (95% CI: 44-105) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 214 (95% CI: 161-268) at the current date to 1,165 (95% CI: 908-1,422) by 2021-02-15.

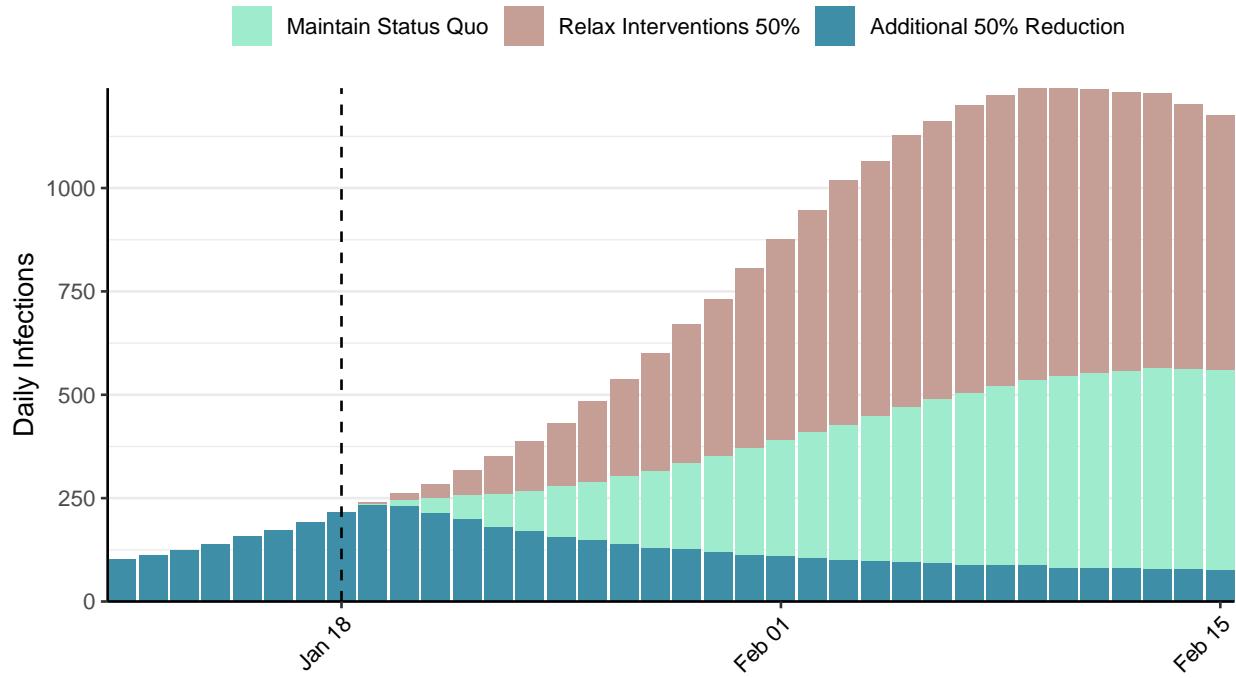


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Guatemala, 2021-01-18

[Download the report for Guatemala, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.9 (95% CI: 0.73-1.09)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Guatemala is not shown in the following plot as only 0 deaths have been reported to date**

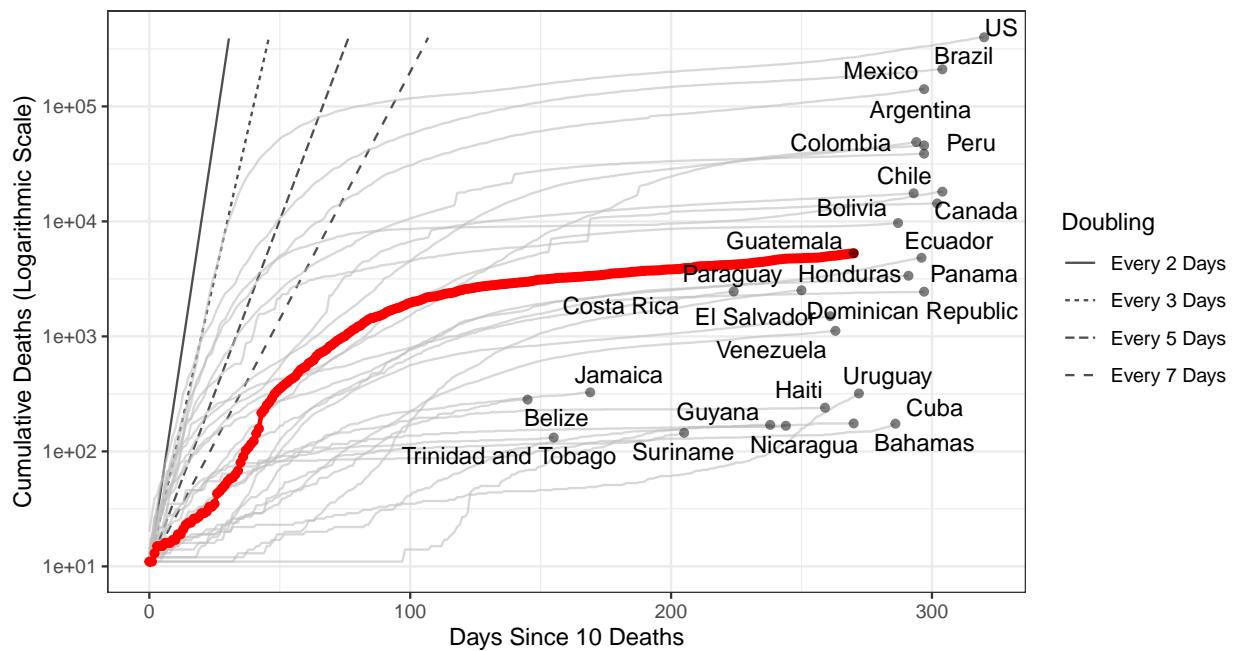


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 365,139 (95% CI: 330,096-400,183) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

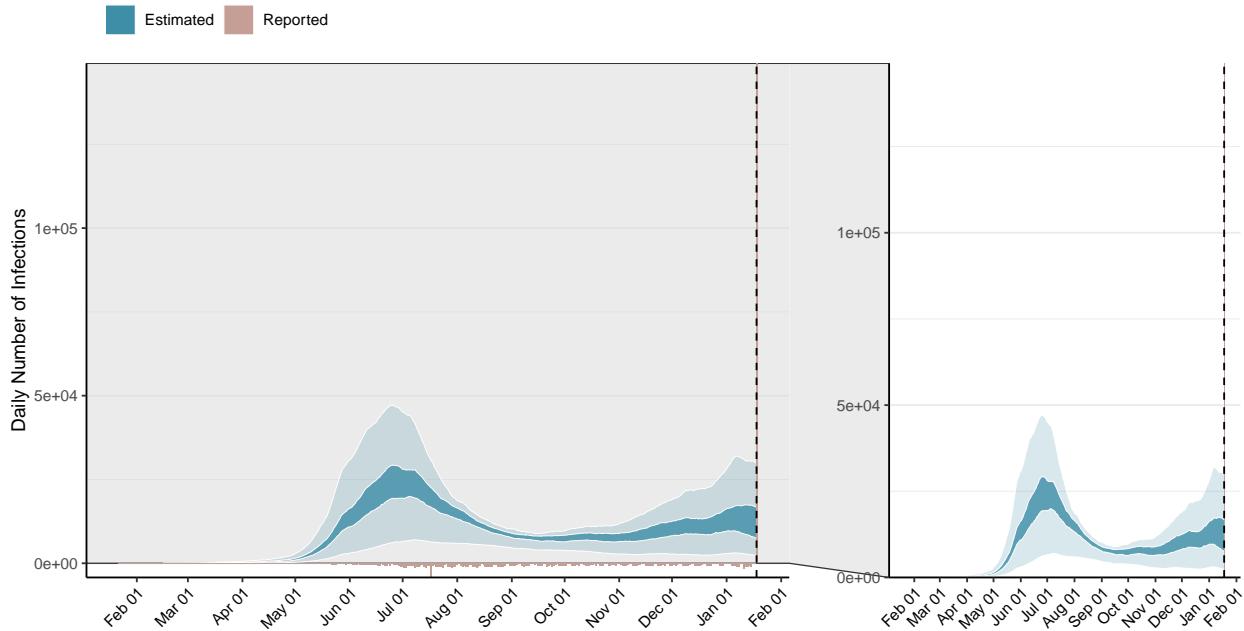
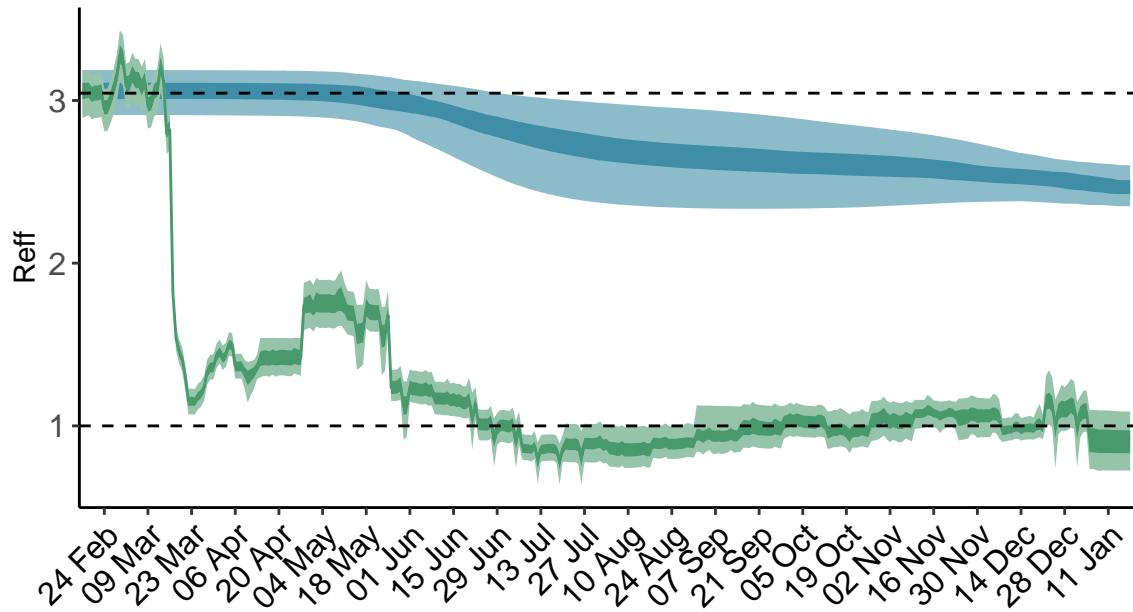


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

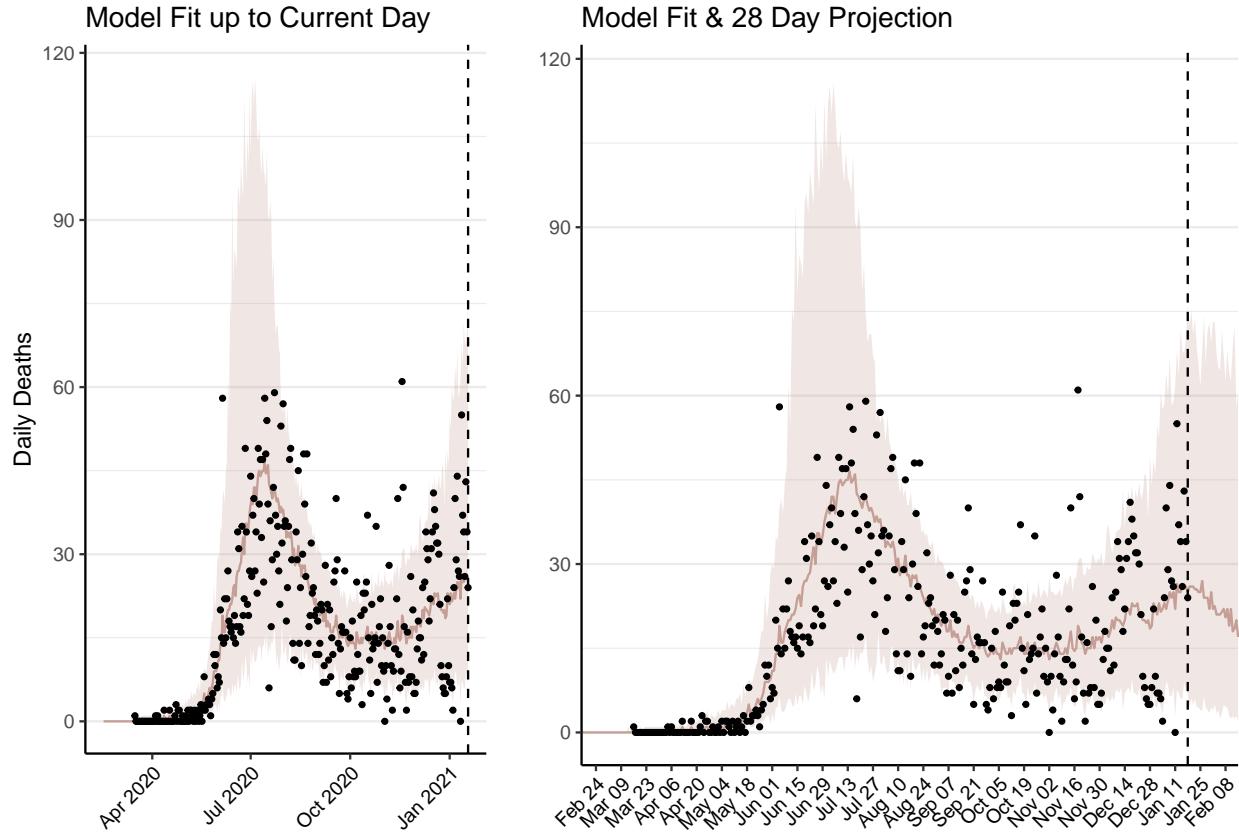


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,046 (95% CI: 945-1,146) patients requiring treatment with high-pressure oxygen at the current date to 830 (95% CI: 718-942) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 350 (95% CI: 321-380) patients requiring treatment with mechanical ventilation at the current date to 289 (95% CI: 255-323) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

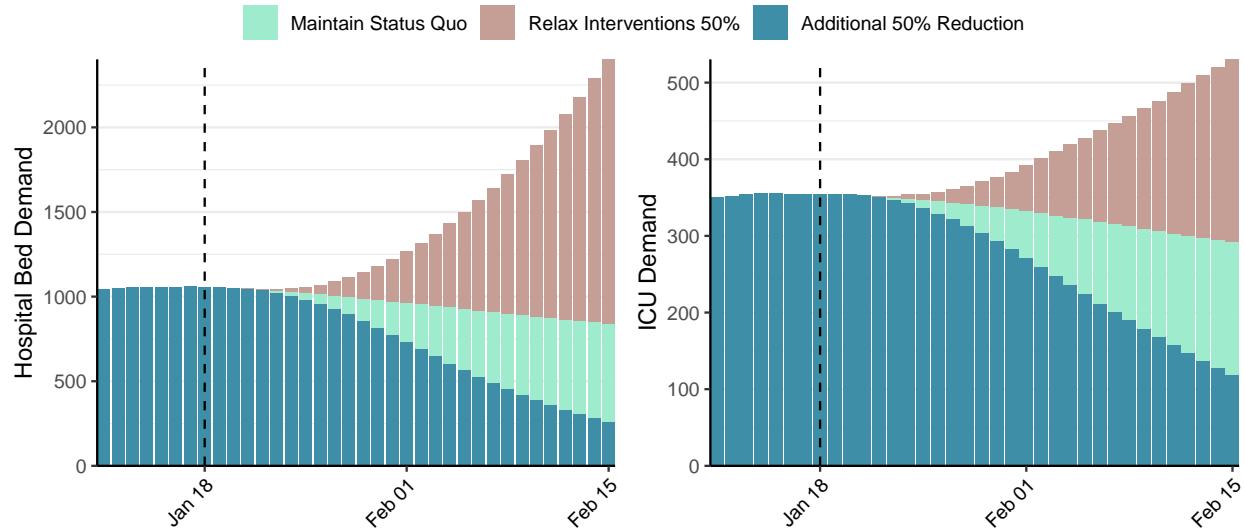
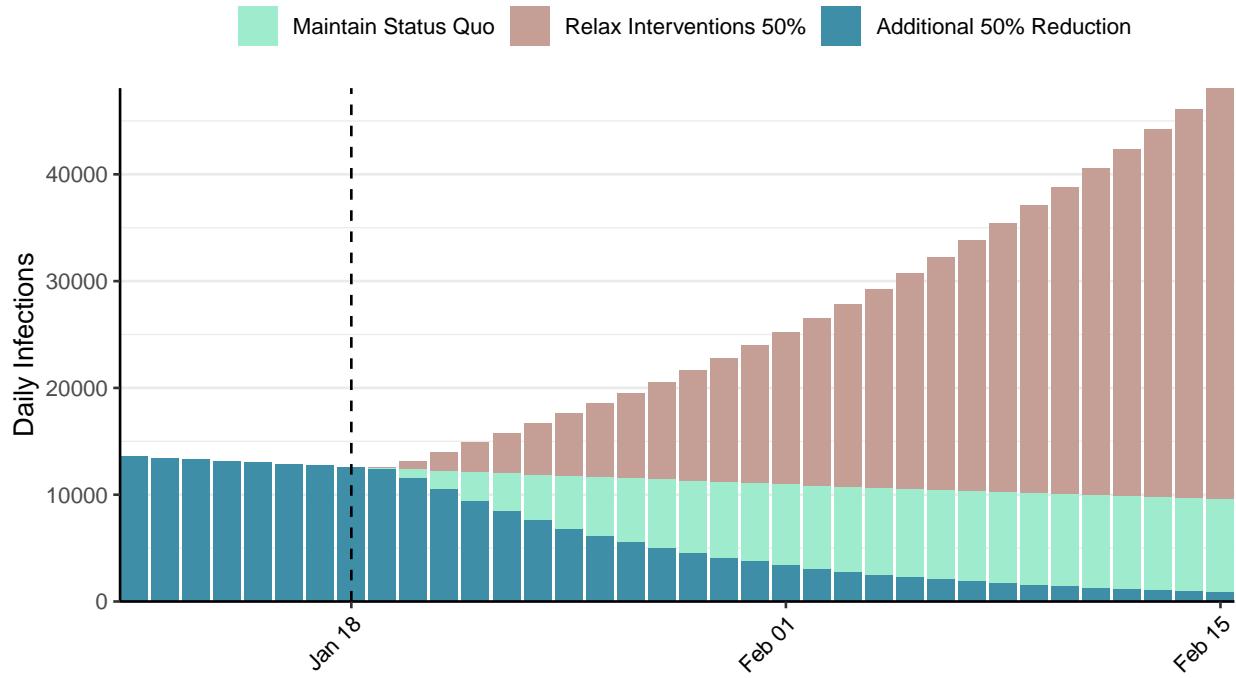


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 12,491 (95% CI: 11,097-13,885) at the current date to 852 (95% CI: 726-978) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 12,491 (95% CI: 11,097-13,885) at the current date to 47,597 (95% CI: 40,584-54,609) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: French Guiana, 2021-01-18

[Download the report for French Guiana, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
132	132	0	0	1.05 (95% CI: 0.73-1.32)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. French Guiana is not shown in the following plot as only 0 deaths have been reported to date**

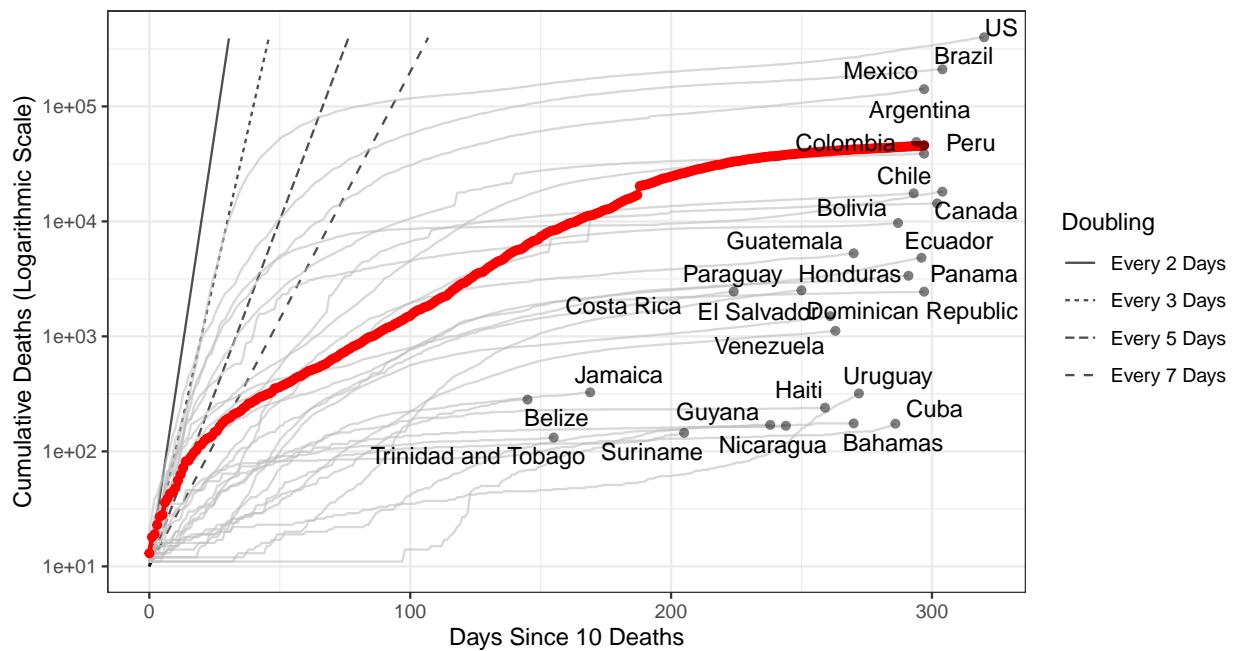


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,002 (95% CI: 1,618-2,386) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

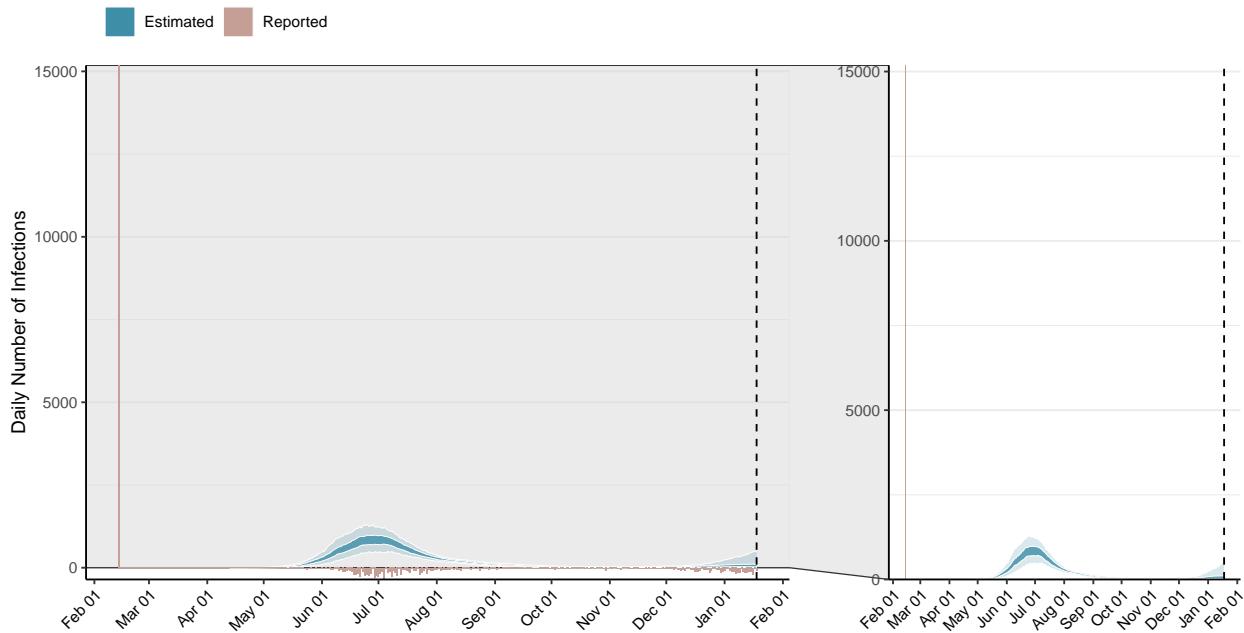
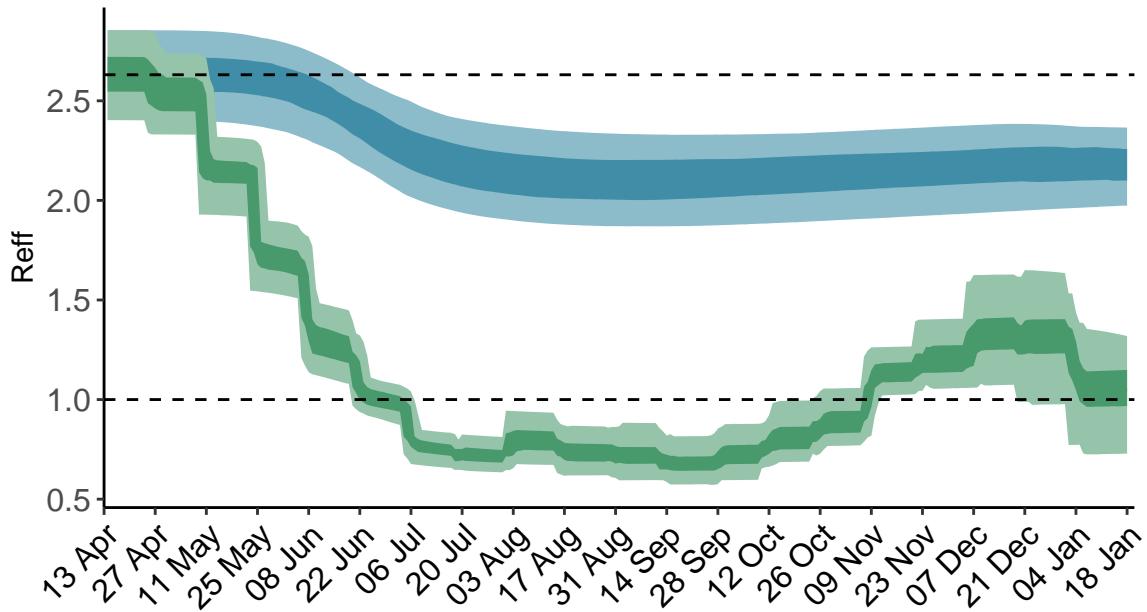


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

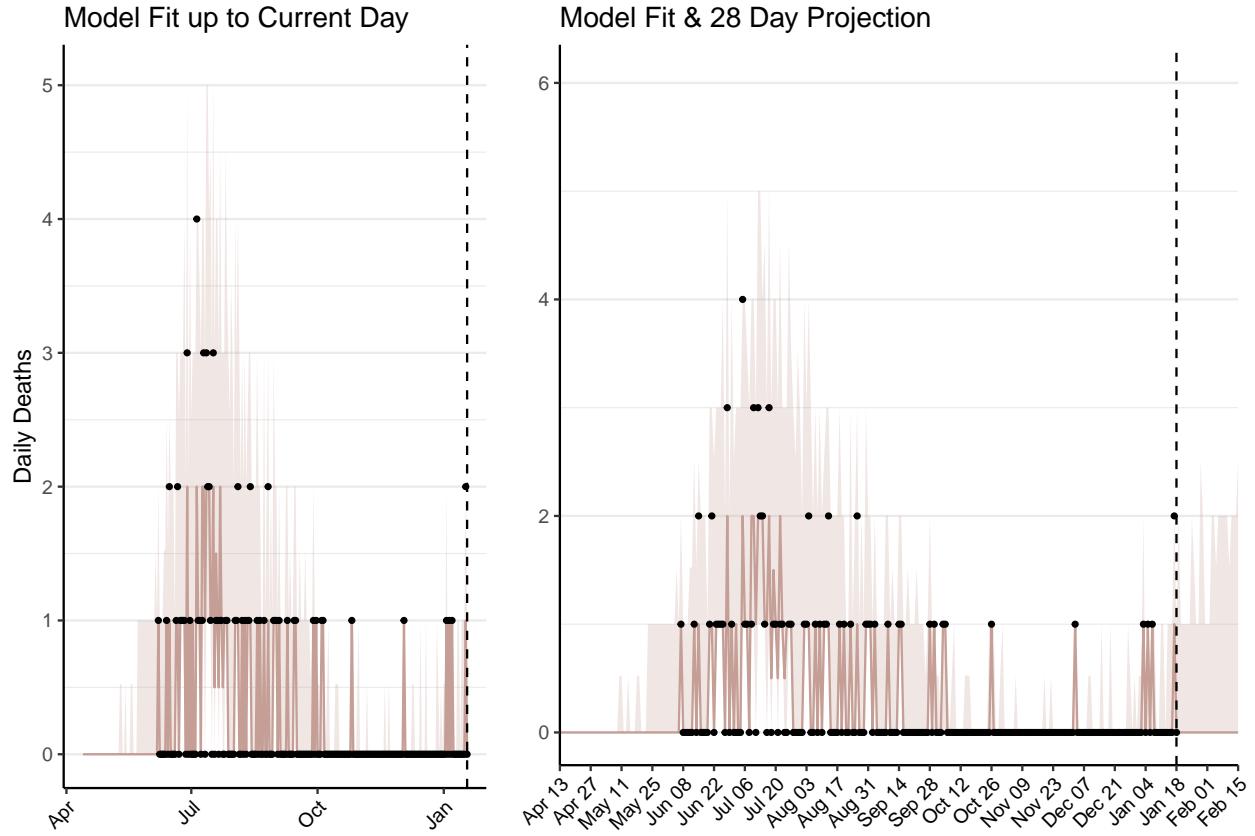


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 6 (95% CI: 5-8) patients requiring treatment with high-pressure oxygen at the current date to 12 (95% CI: 8-16) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2 (95% CI: 1-3) patients requiring treatment with mechanical ventilation at the current date to 4 (95% CI: 3-5) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

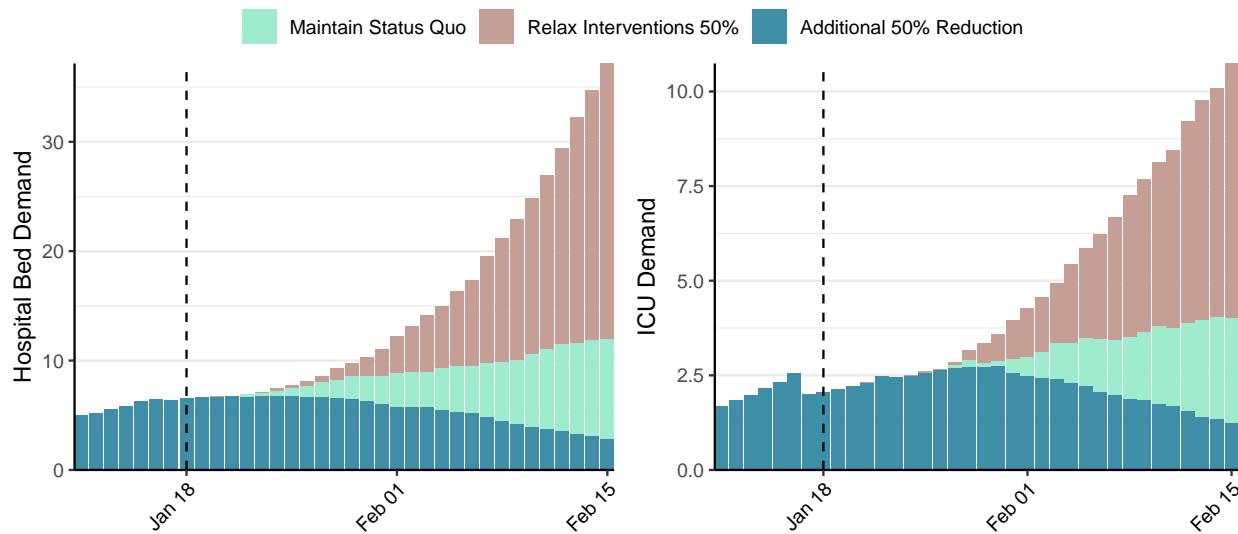


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 99 (95% CI: 75-122) at the current date to 14 (95% CI: 9-19) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 99 (95% CI: 75-122) at the current date to 852 (95% CI: 611-1,092) by 2021-02-15.

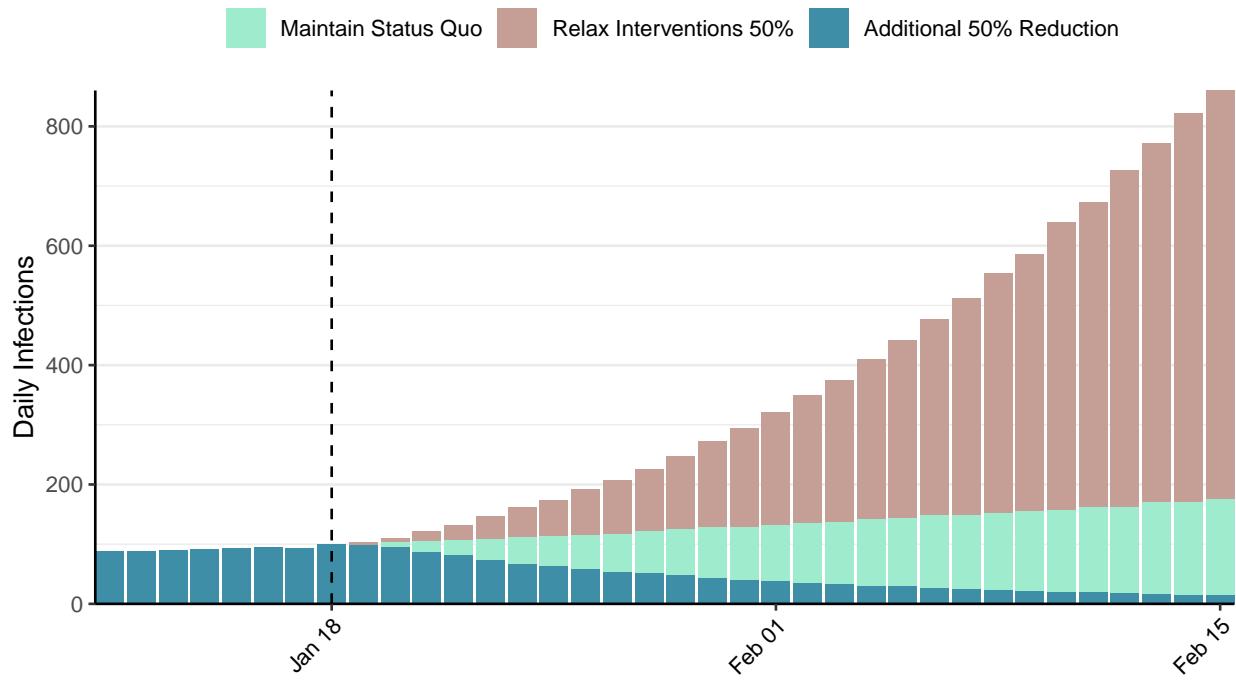


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Guyana, 2021-01-18

[Download the report for Guyana, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
23	23	0	0	1.11 (95% CI: 0.98-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Guyana is not shown in the following plot as only 0 deaths have been reported to date**

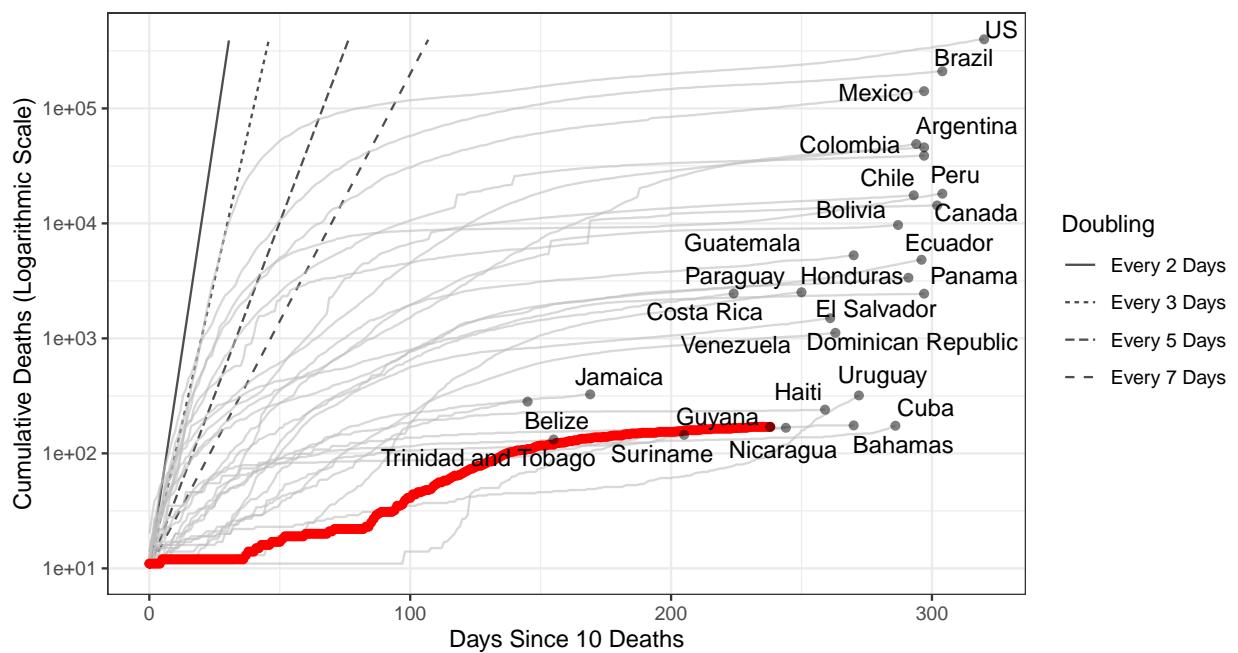


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3,495 (95% CI: 3,219-3,772) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Guyana has revised their historic reported cases and thus have reported negative cases.**

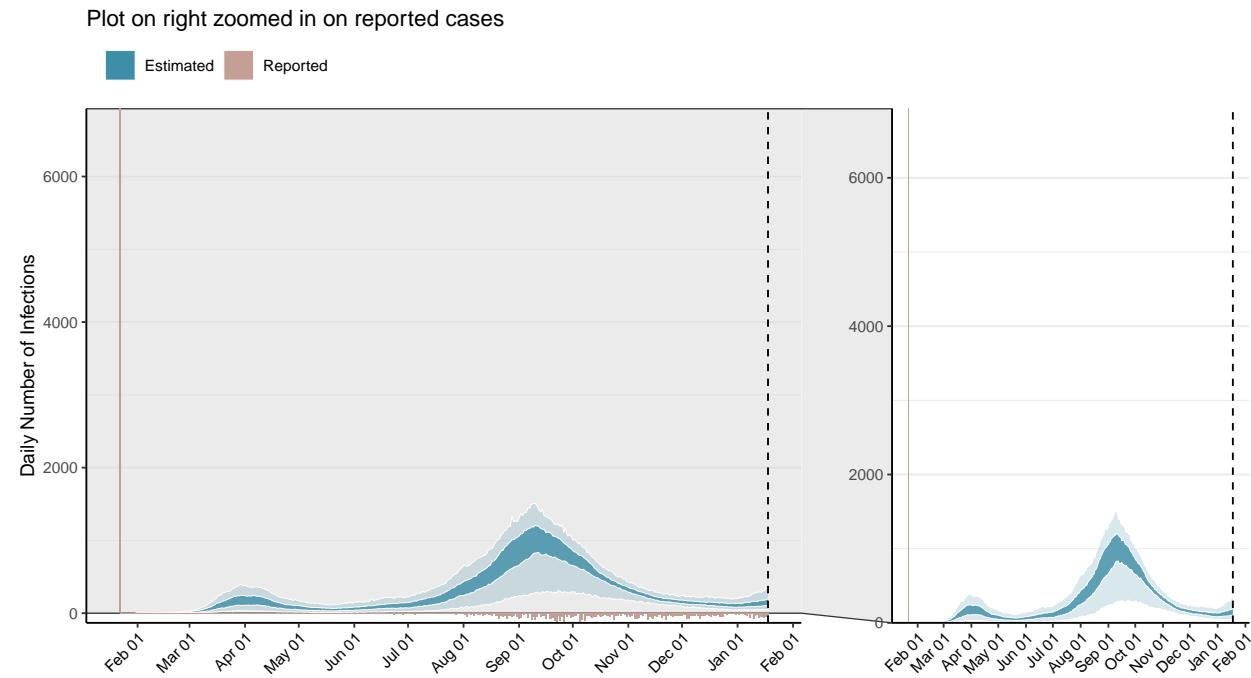
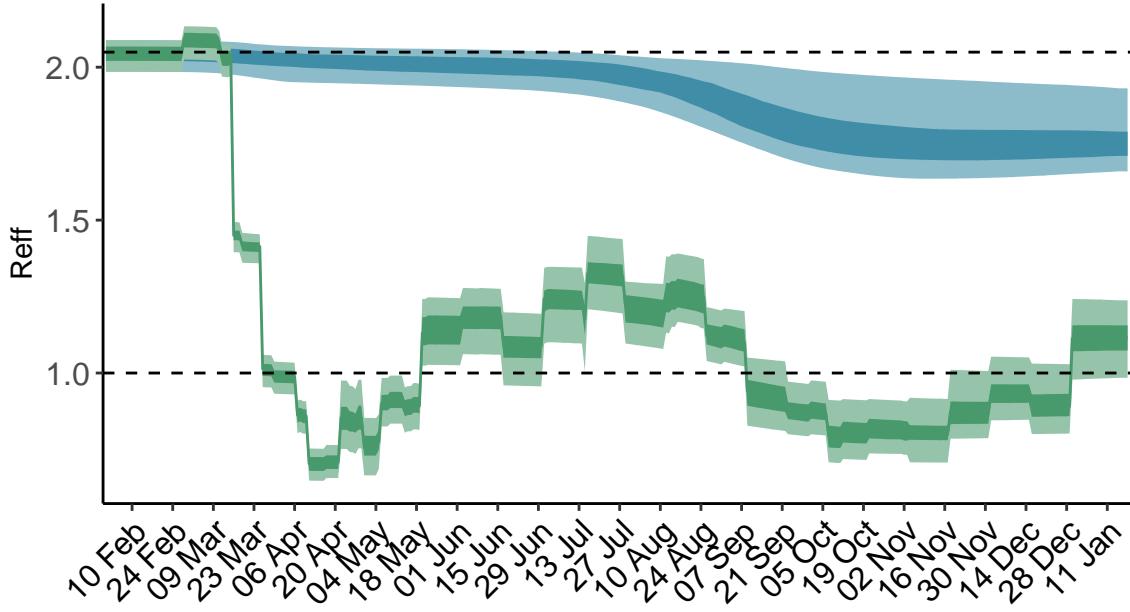


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

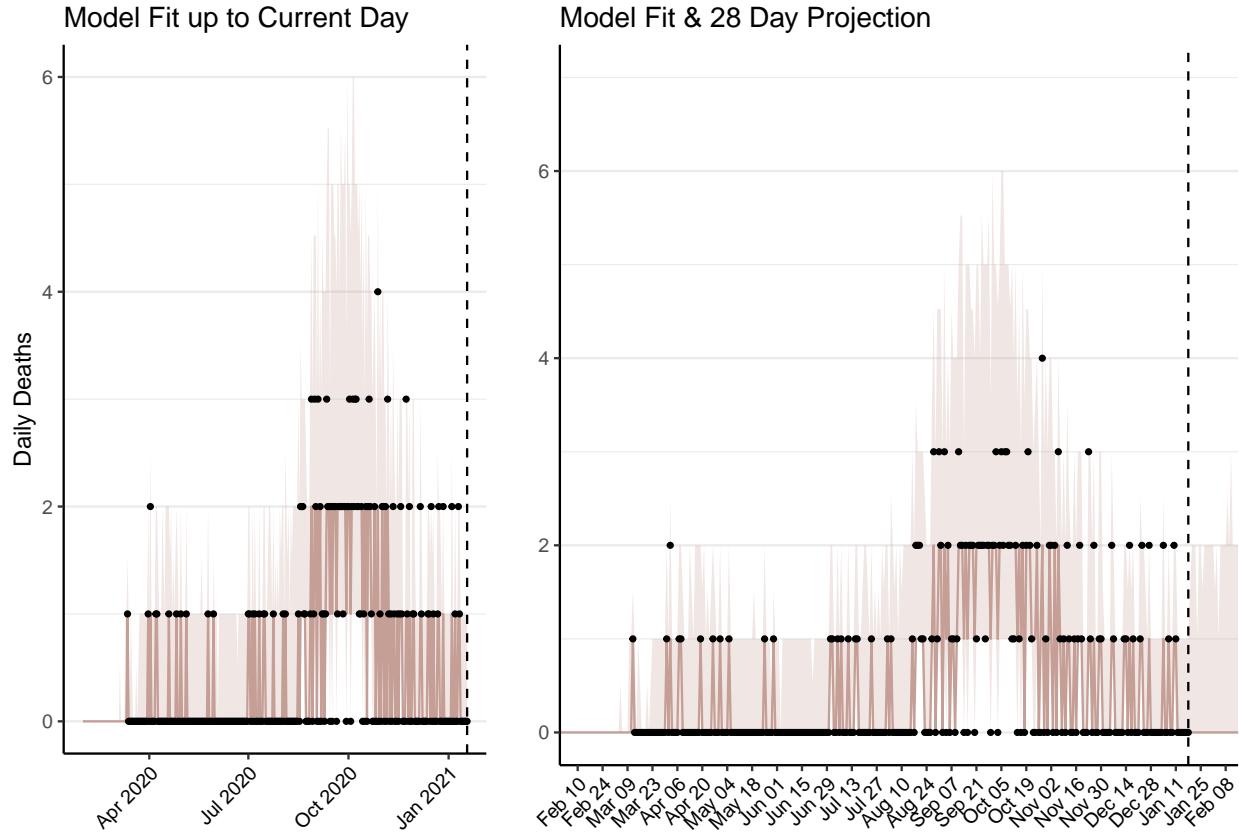


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 11 (95% CI: 10-12) patients requiring treatment with high-pressure oxygen at the current date to 19 (95% CI: 17-22) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 4 (95% CI: 4-4) patients requiring treatment with mechanical ventilation at the current date to 7 (95% CI: 6-7) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

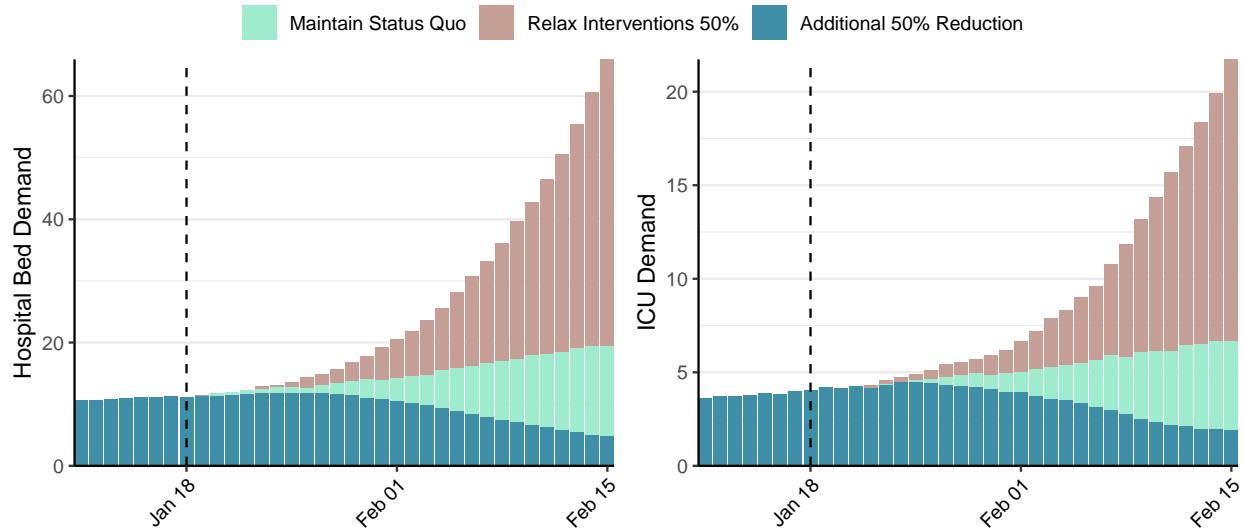


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 155 (95% CI: 140-170) at the current date to 20 (95% CI: 17-22) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 155 (95% CI: 140-170) at the current date to 1,583 (95% CI: 1,378-1,789) by 2021-02-15.

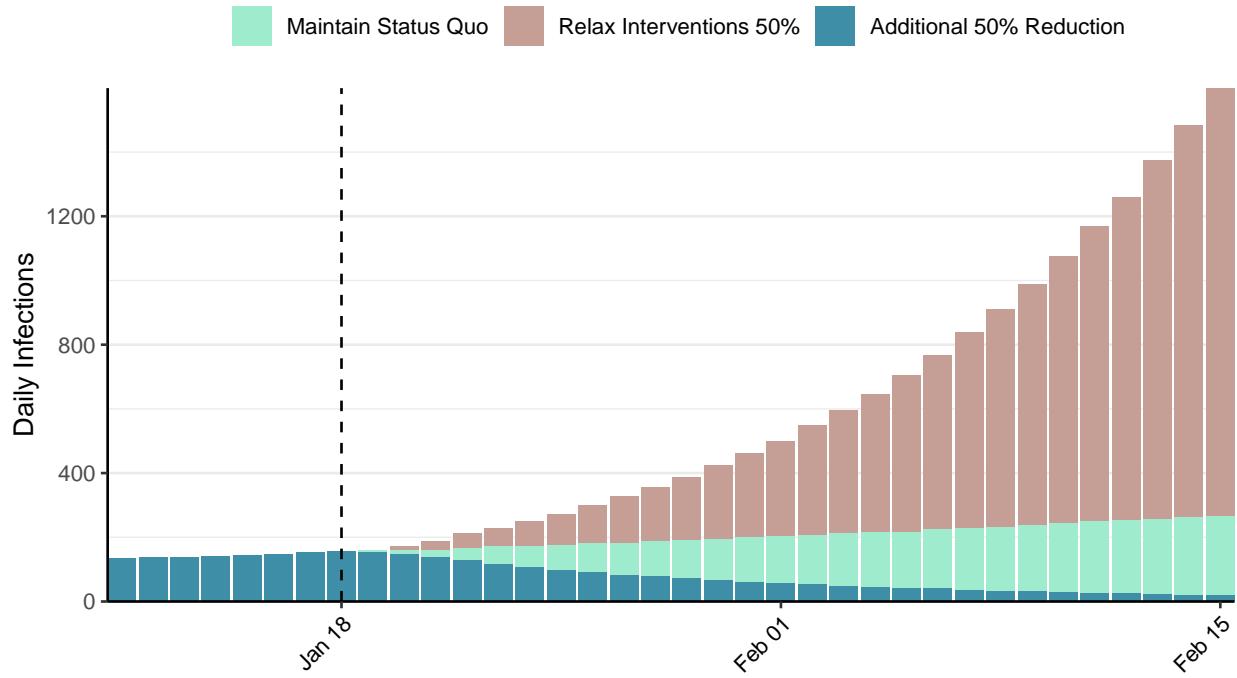


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Honduras, 2021-01-18

[Download the report for Honduras, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.13 (95% CI: 0.95-1.34)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Honduras is not shown in the following plot as only 0 deaths have been reported to date**

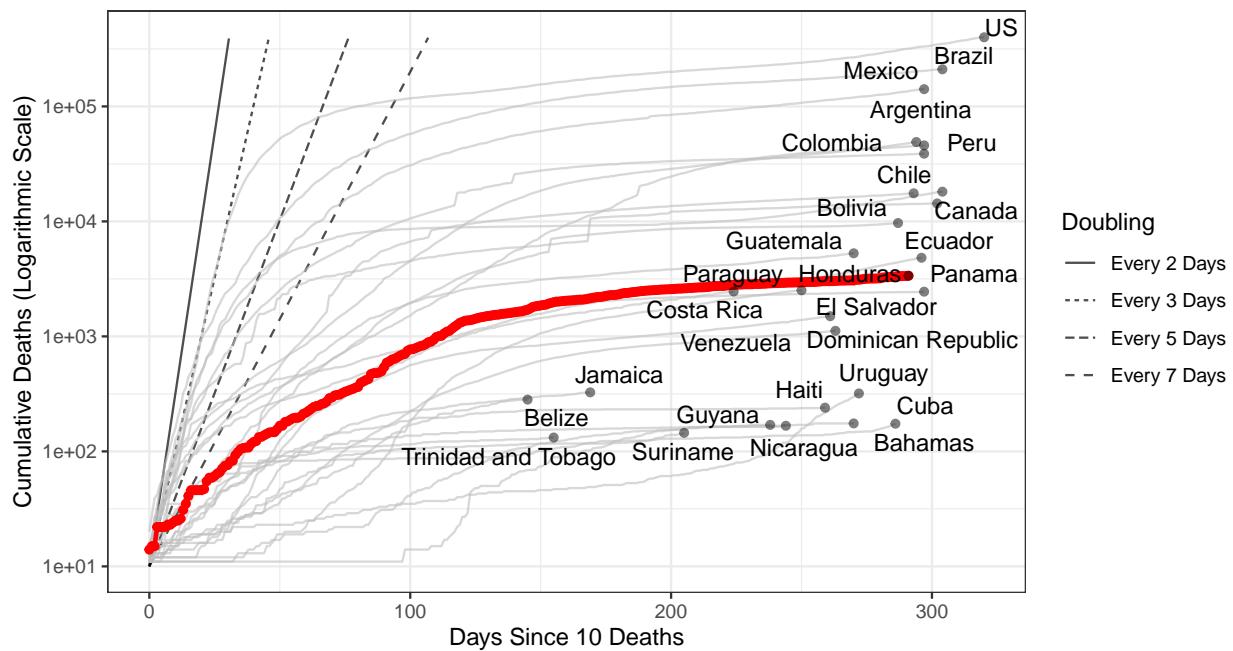


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 219,048 (95% CI: 207,530-230,566) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Honduras has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

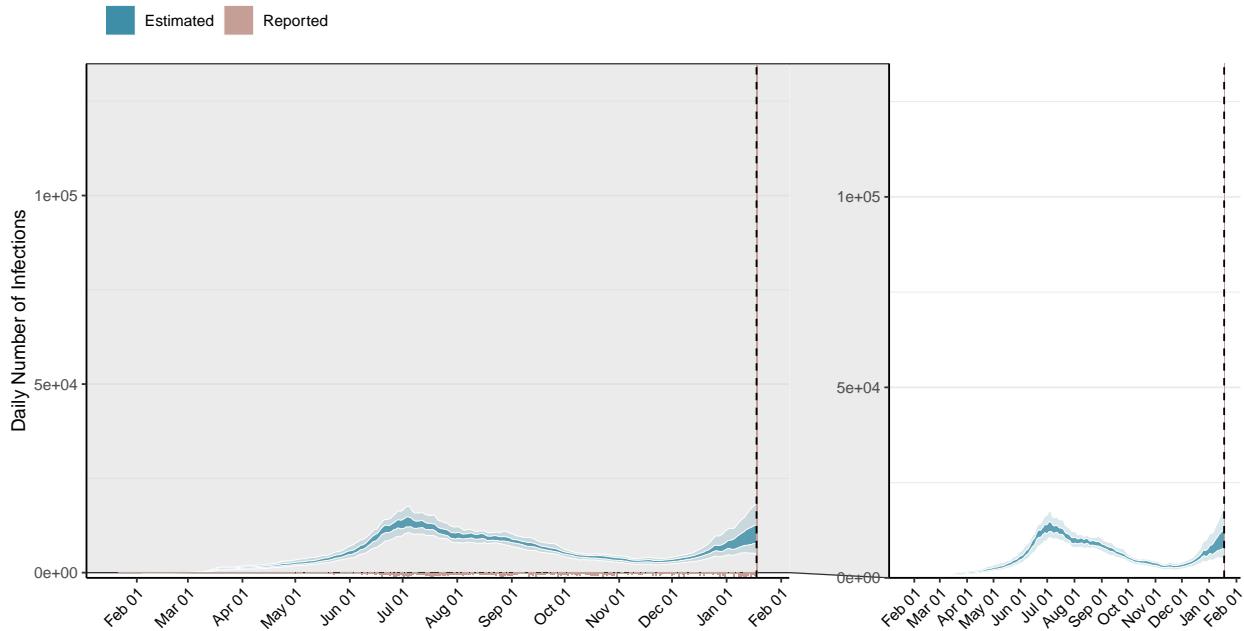
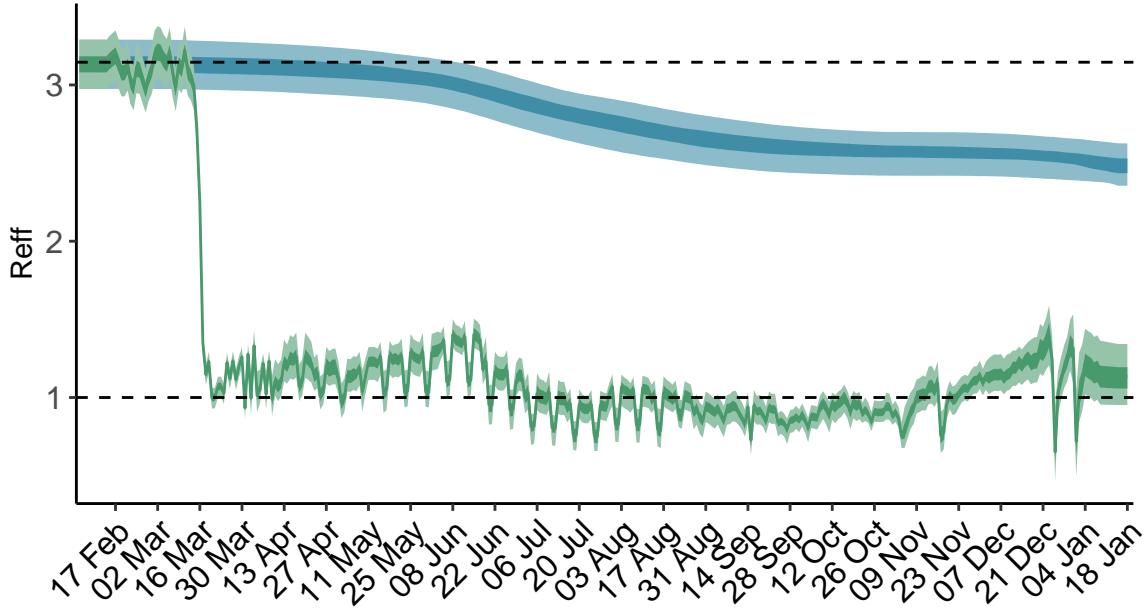


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

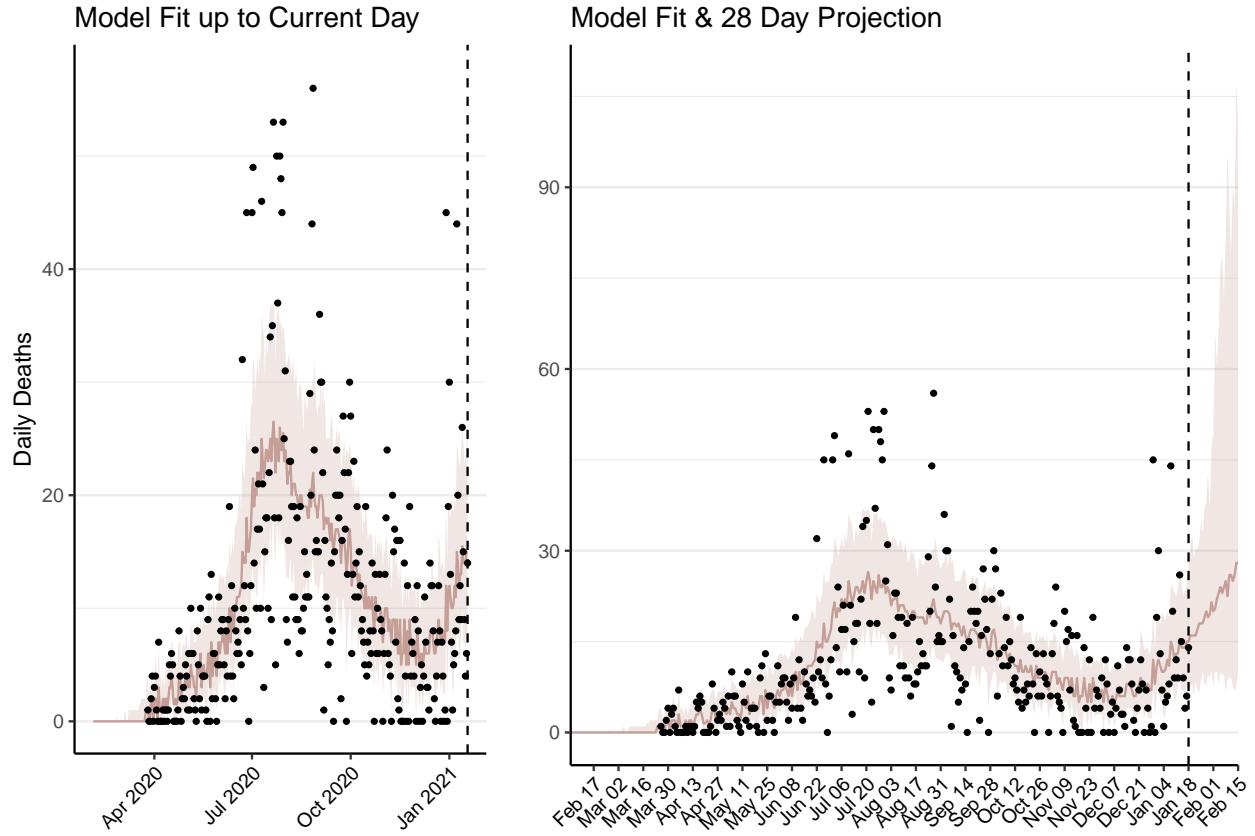


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 662 (95% CI: 624-699) patients requiring treatment with high-pressure oxygen at the current date to 1,261 (95% CI: 1,120-1,402) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 226 (95% CI: 213-238) patients requiring treatment with mechanical ventilation at the current date to 386 (95% CI: 355-417) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

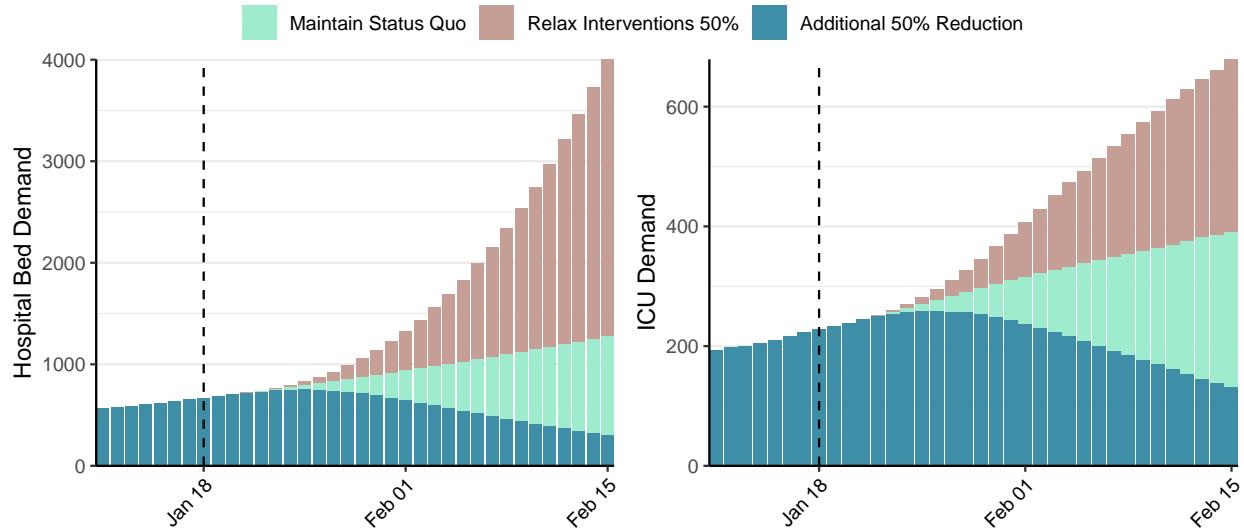


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 10,495 (95% CI: 9,709-11,281) at the current date to 1,513 (95% CI: 1,318-1,708) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10,495 (95% CI: 9,709-11,281) at the current date to 86,086 (95% CI: 77,277-94,896) by 2021-02-15.

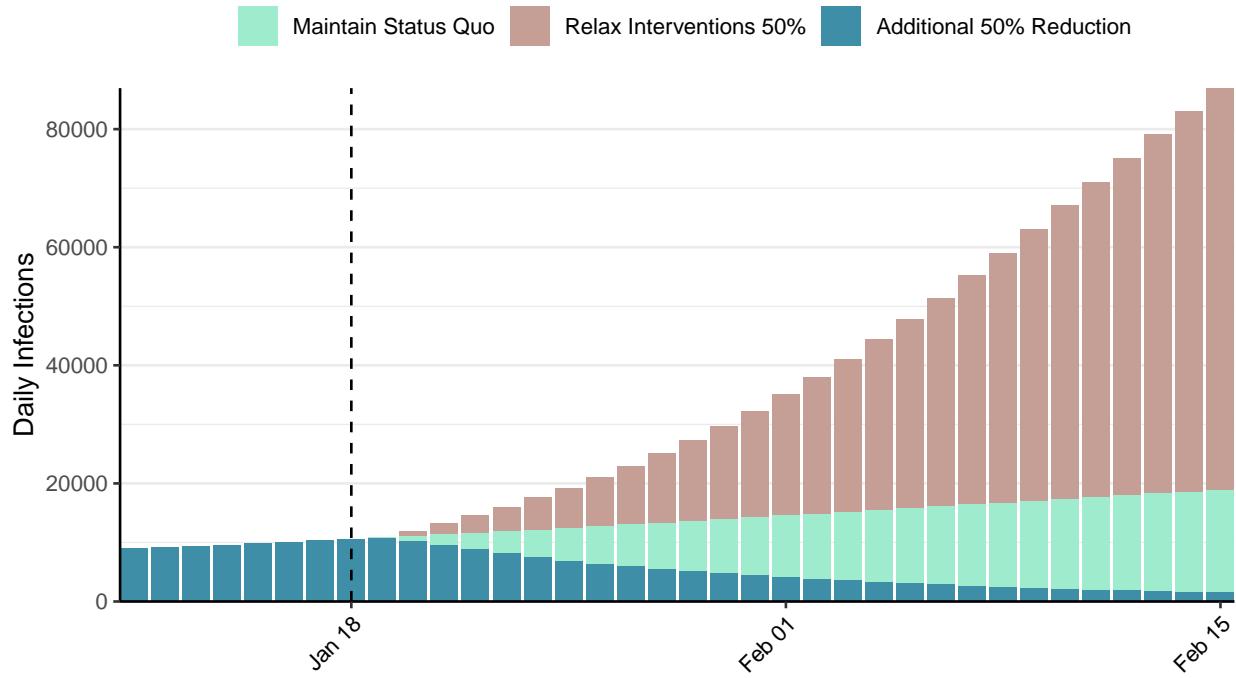


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Haiti, 2021-01-18

[Download the report for Haiti, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.12 (95% CI: 0.91-1.35)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Haiti is not shown in the following plot as only 0 deaths have been reported to date**

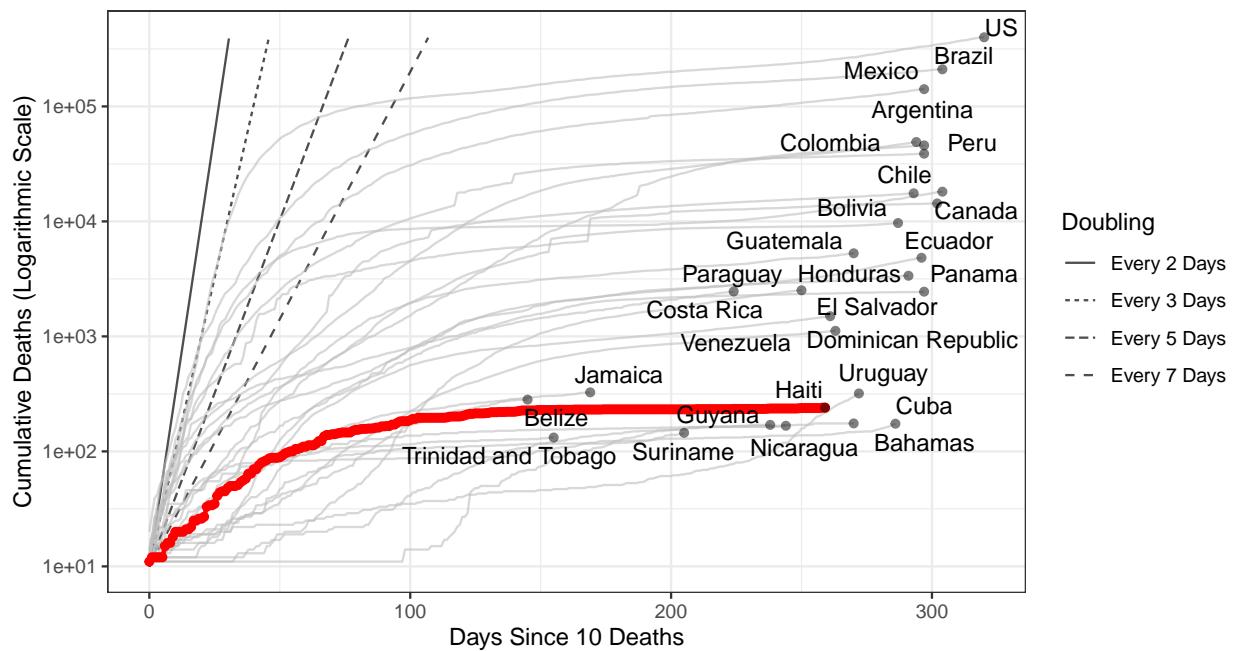


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 4,582 (95% CI: 4,107-5,058) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

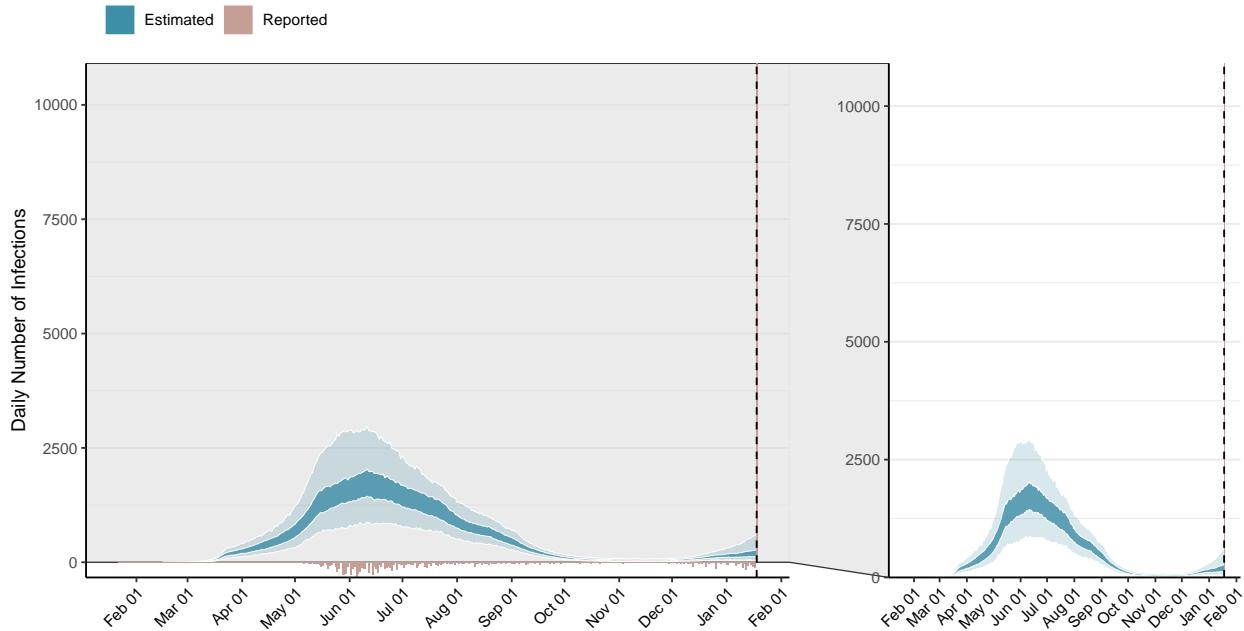
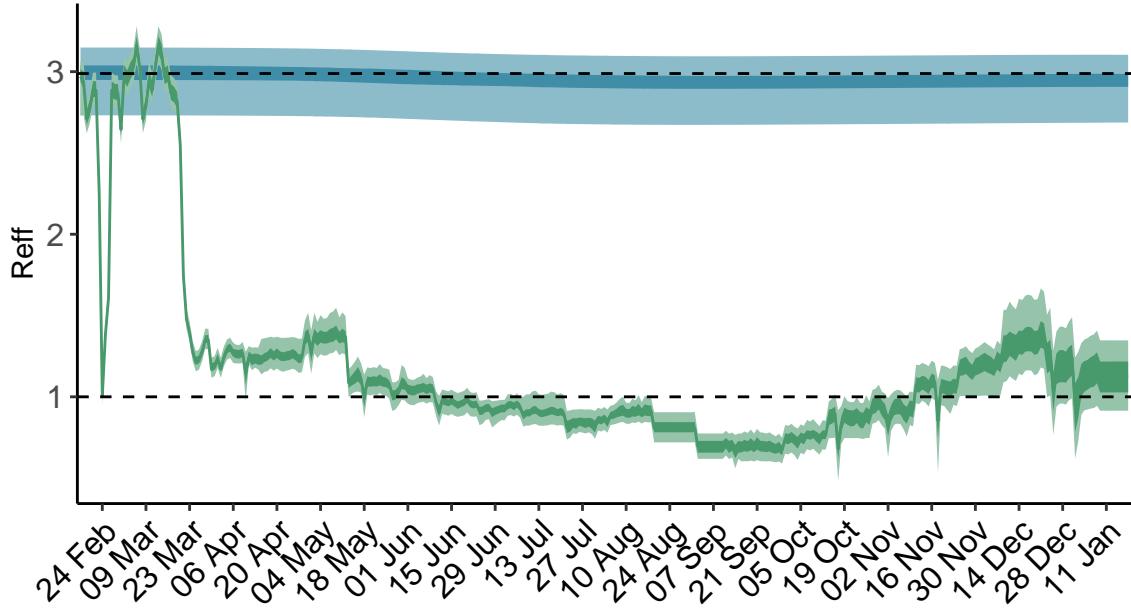


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

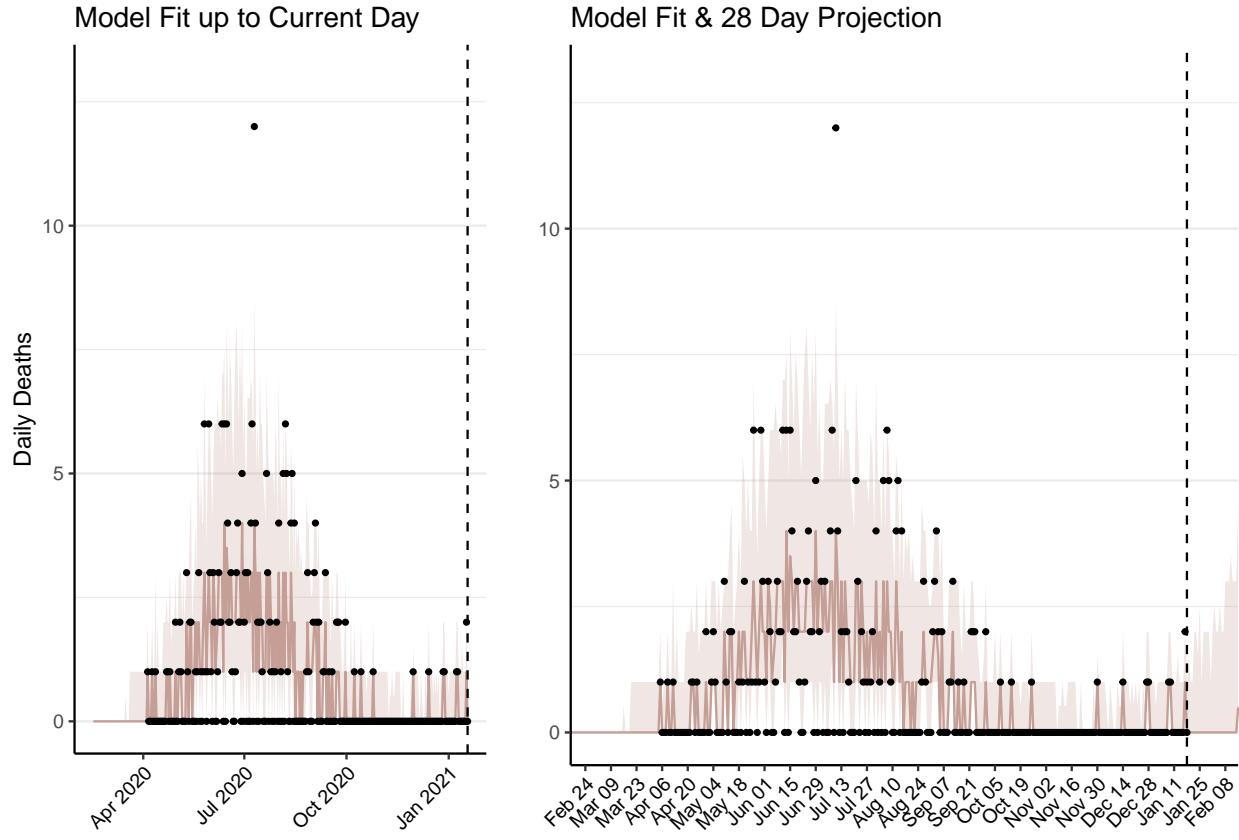


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 13 (95% CI: 11-14) patients requiring treatment with high-pressure oxygen at the current date to 26 (95% CI: 21-31) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 4 (95% CI: 4-5) patients requiring treatment with mechanical ventilation at the current date to 9 (95% CI: 7-11) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

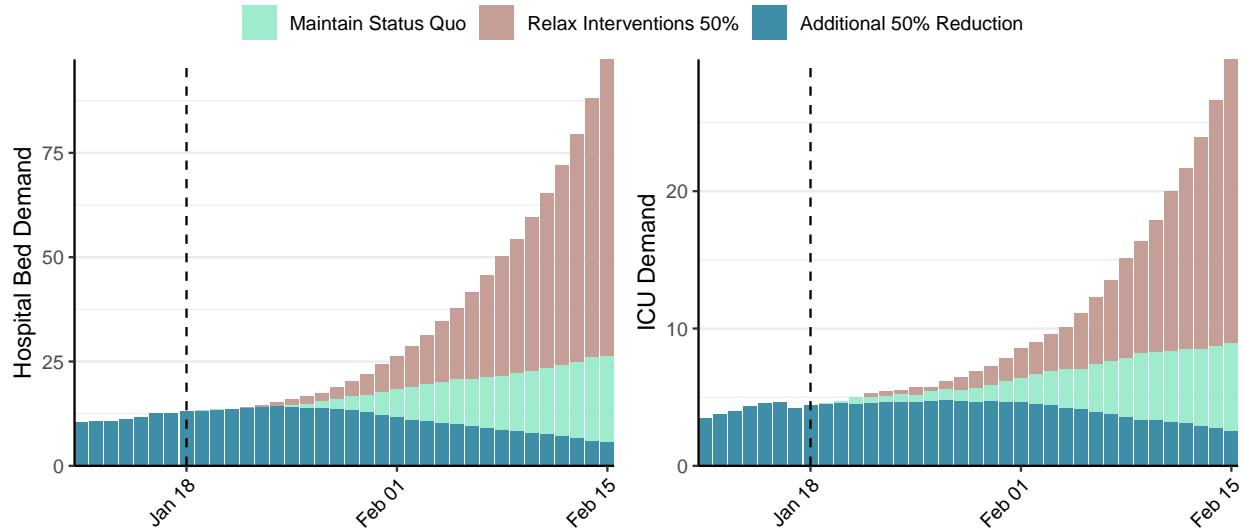


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 220 (95% CI: 189-250) at the current date to 34 (95% CI: 26-41) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 220 (95% CI: 189-250) at the current date to 3,232 (95% CI: 2,454-4,010) by 2021-02-15.

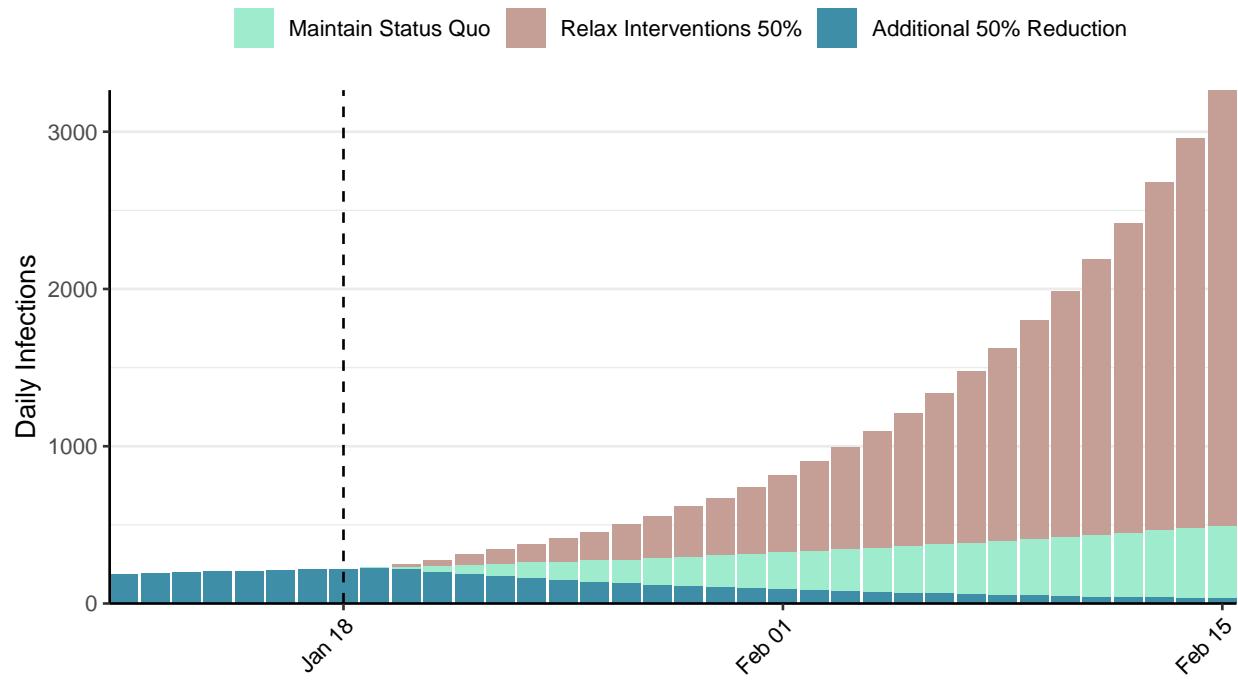


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Indonesia, 2021-01-18

[Download the report for Indonesia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9,086	9,086	295	295	1.36 (95% CI: 1.23-1.47)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

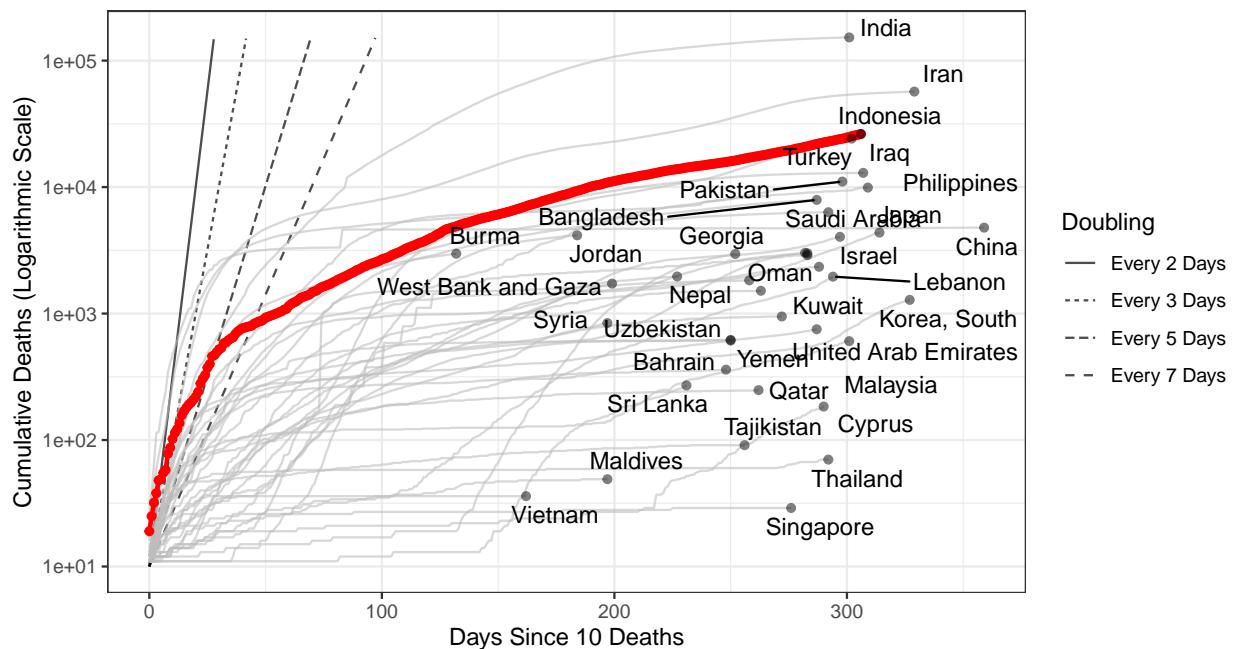


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 4,167,717 (95% CI: 4,026,681-4,308,754) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

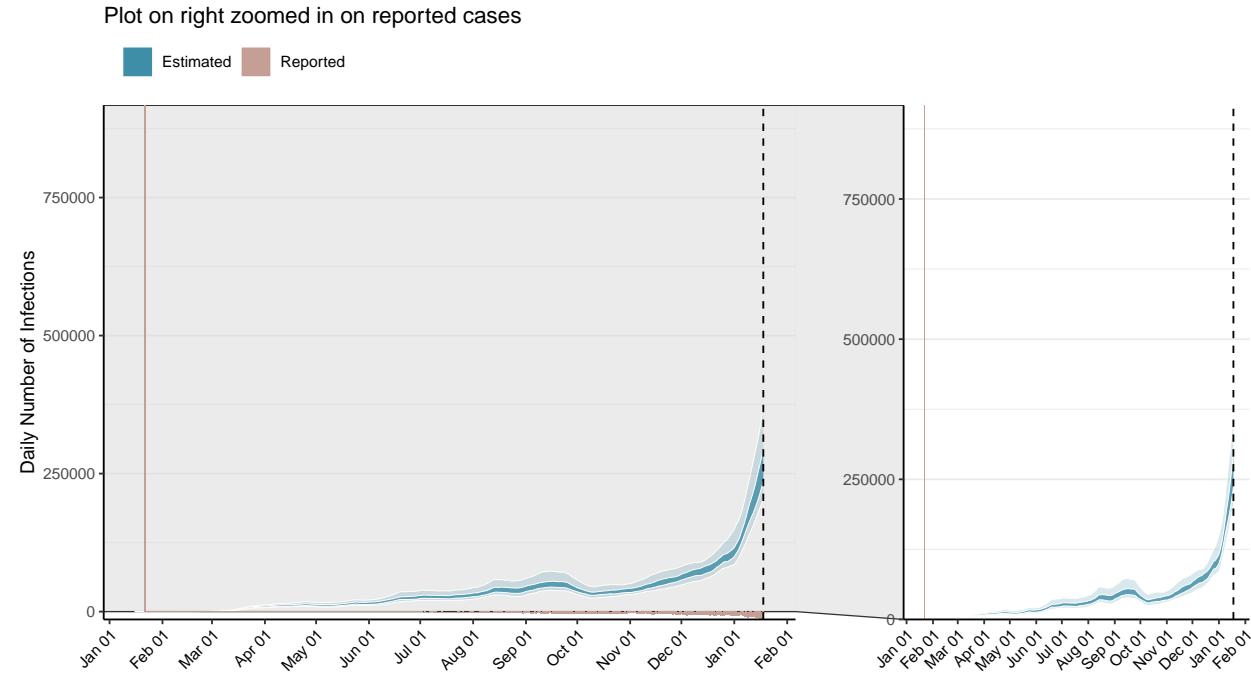
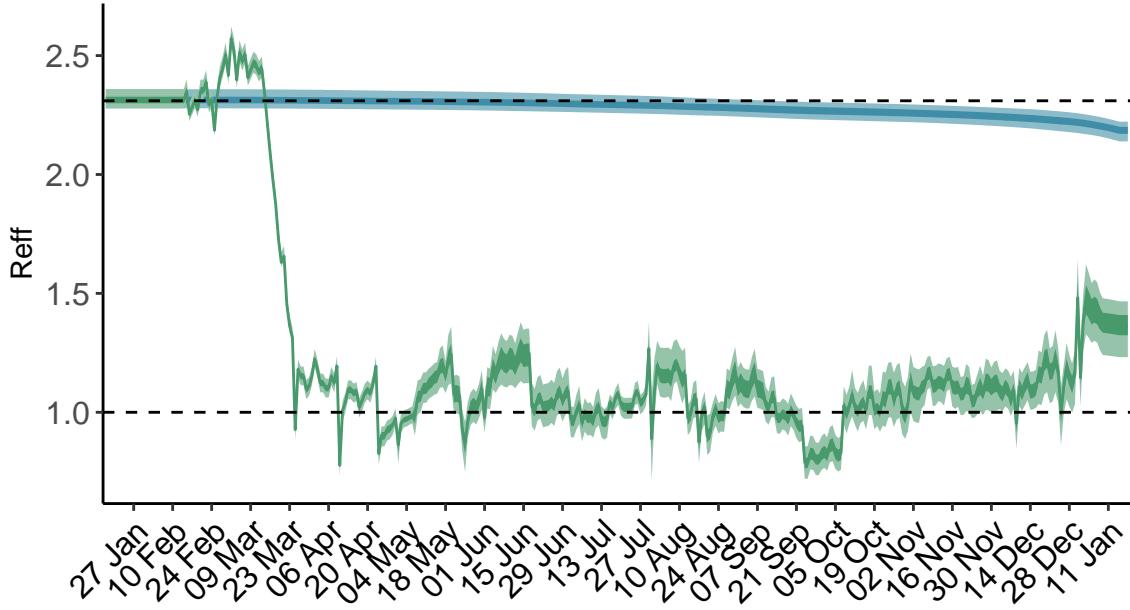


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Indonesia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

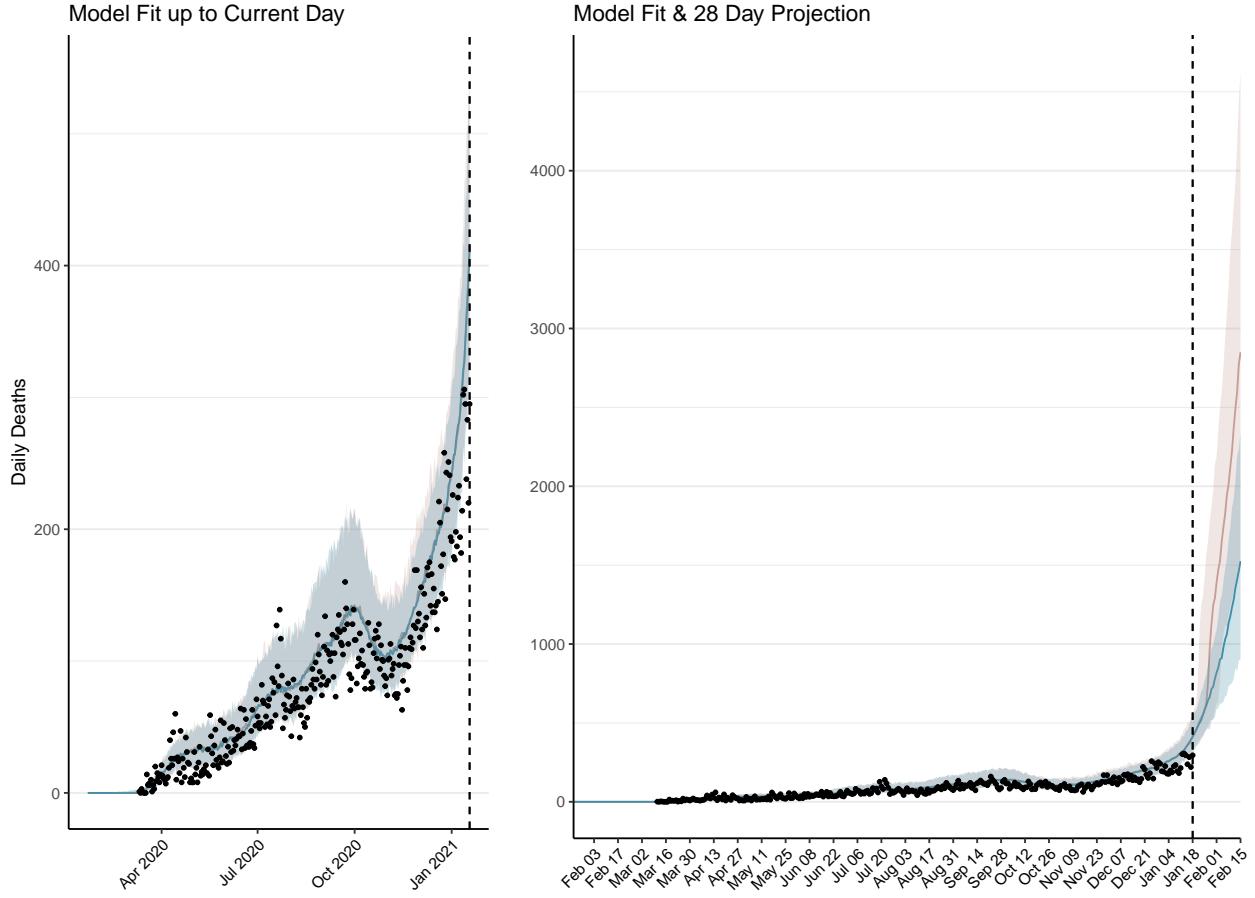


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 19,279 (95% CI: 18,611-19,946) patients requiring treatment with high-pressure oxygen at the current date to 71,561 (95% CI: 67,712-75,409) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 7,048 (95% CI: 6,807-7,289) patients requiring treatment with mechanical ventilation at the current date to 13,270 (95% CI: 12,925-13,615) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

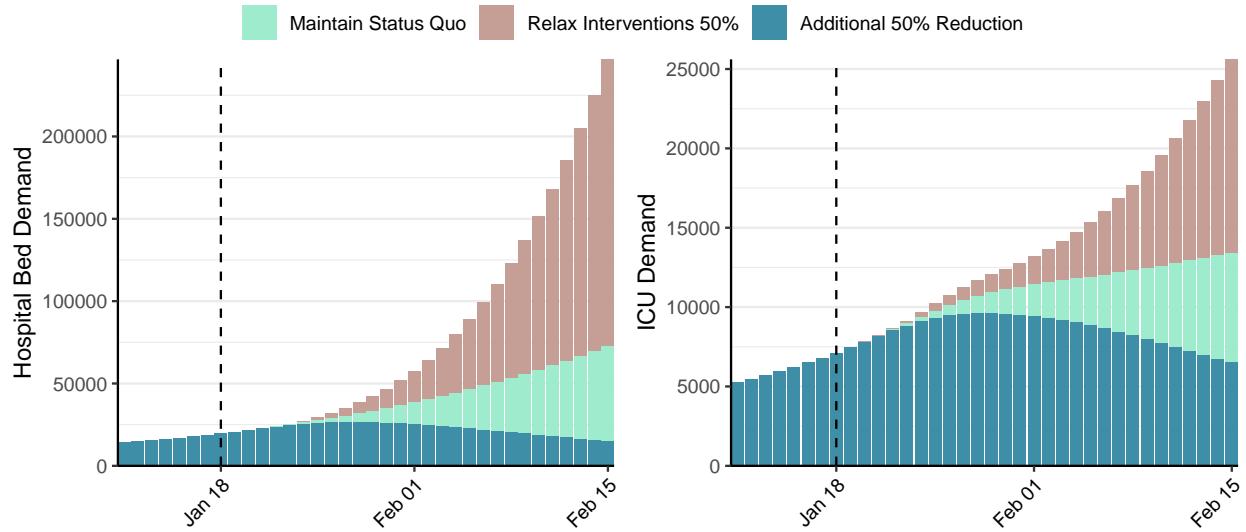
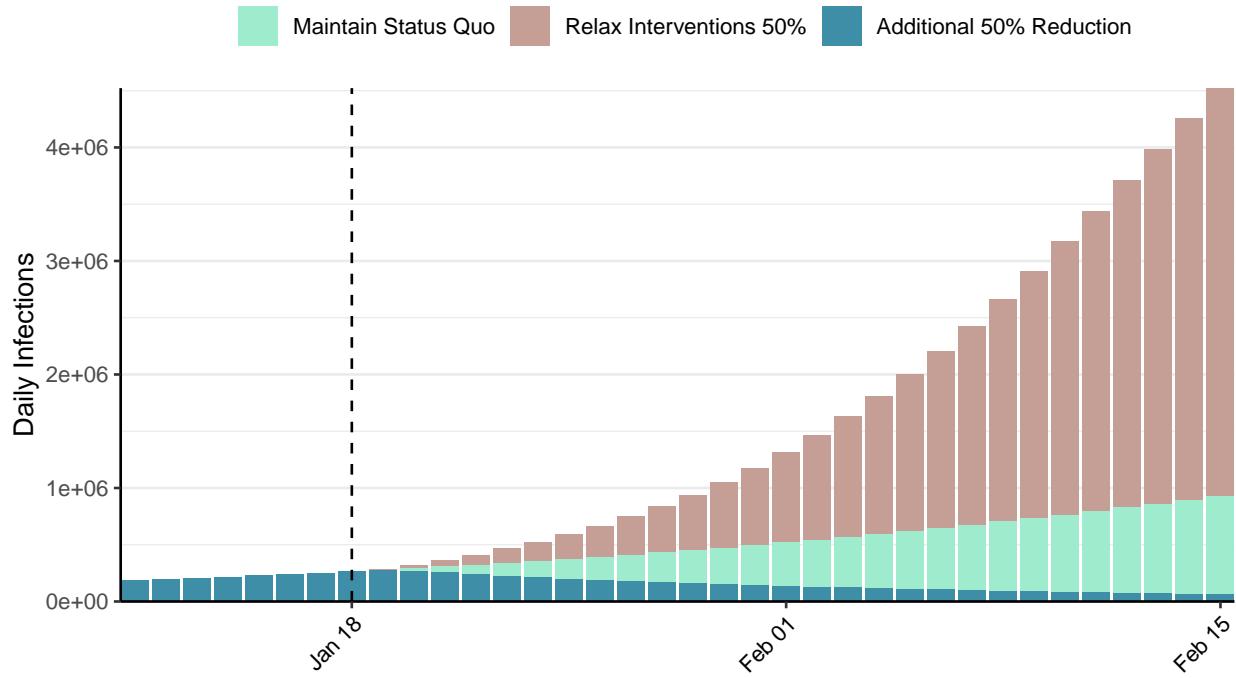


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 264,787 (95% CI: 254,631-274,944) at the current date to 65,187 (95% CI: 61,238-69,137) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 264,787 (95% CI: 254,631-274,944) at the current date to 4,477,909 (95% CI: 4,261,419-4,694,399) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: India, 2021-01-18

[Download the report for India, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
10,050	10,050	137	137	0.92 (95% CI: 0.7-1.18)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

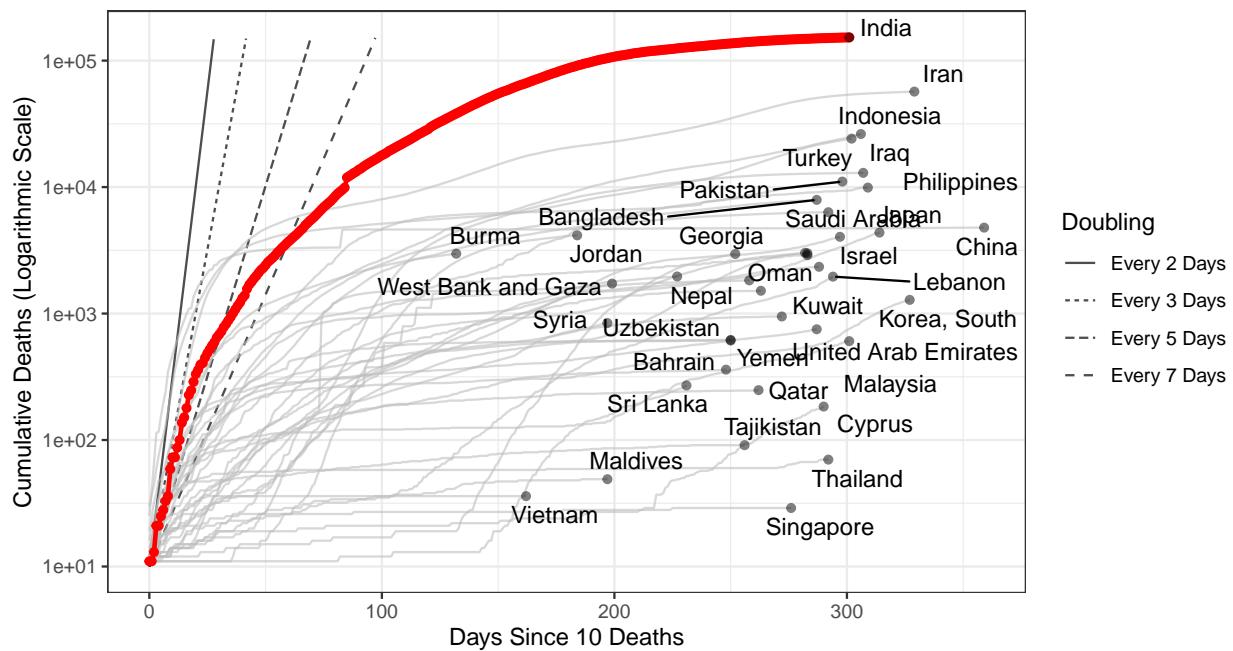


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,736,030 (95% CI: 1,660,097-1,811,963) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

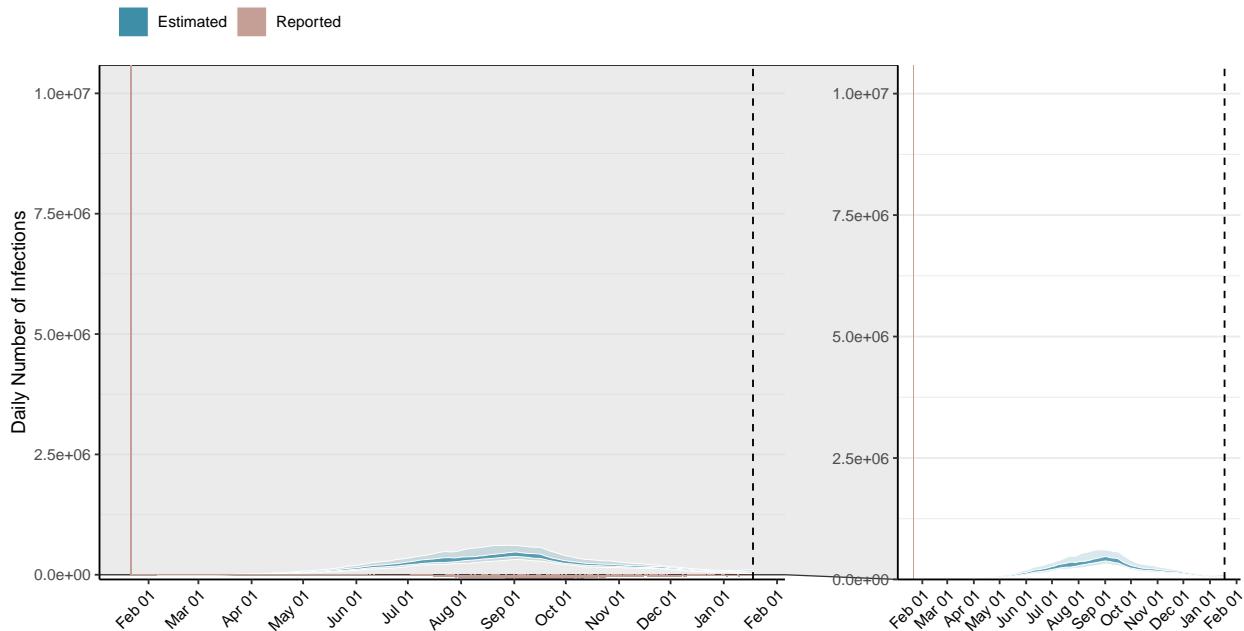
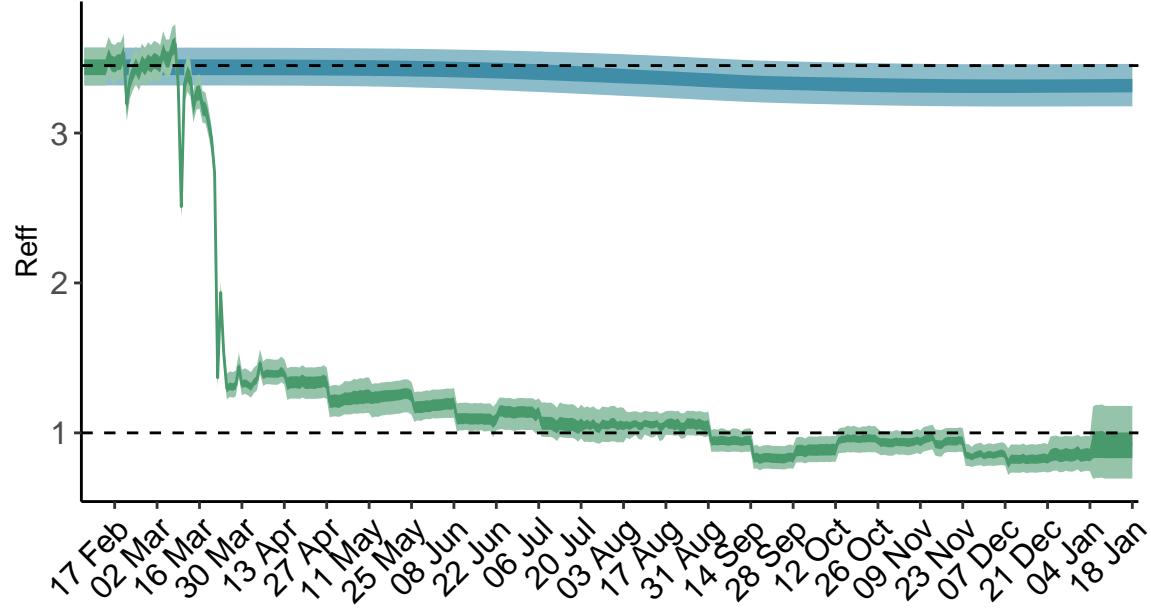


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

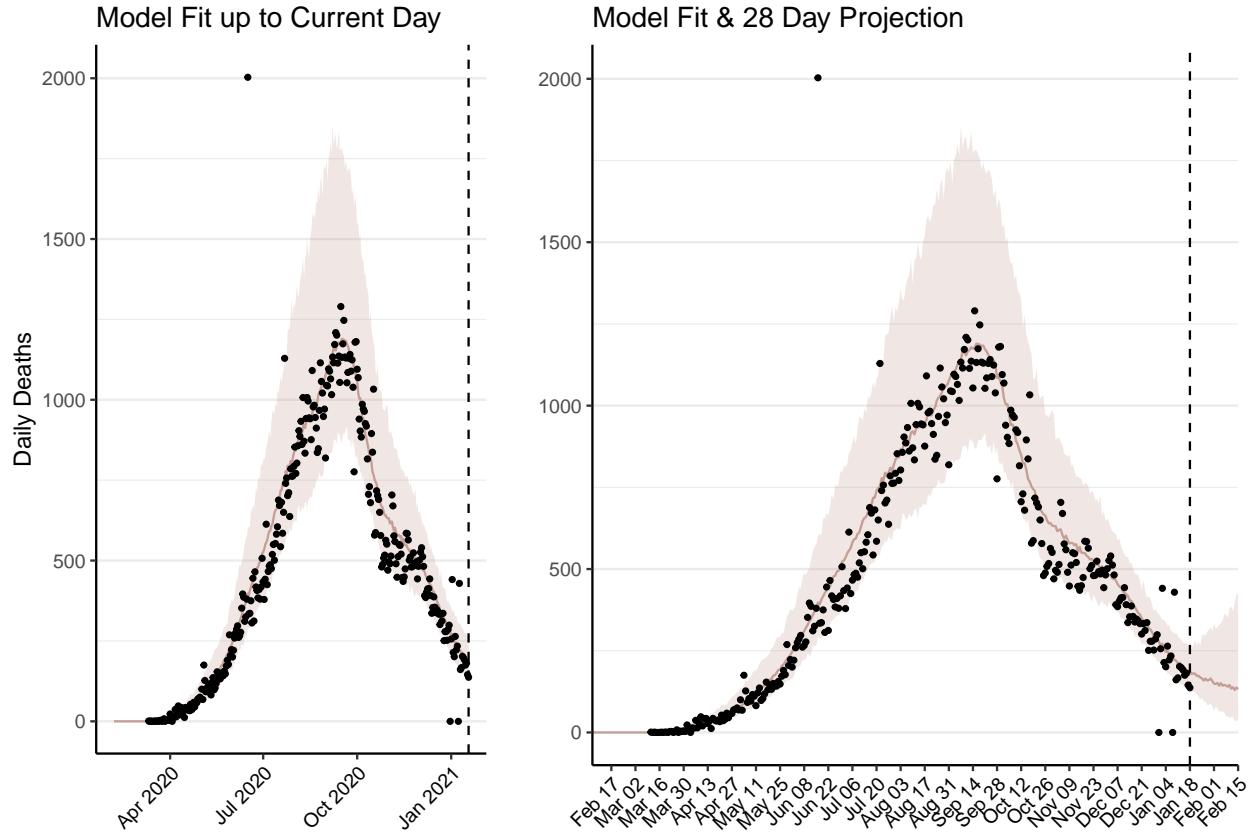


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 6,713 (95% CI: 6,394-7,031) patients requiring treatment with high-pressure oxygen at the current date to 5,778 (95% CI: 4,881-6,676) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2,790 (95% CI: 2,669-2,910) patients requiring treatment with mechanical ventilation at the current date to 2,300 (95% CI: 1,973-2,628) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

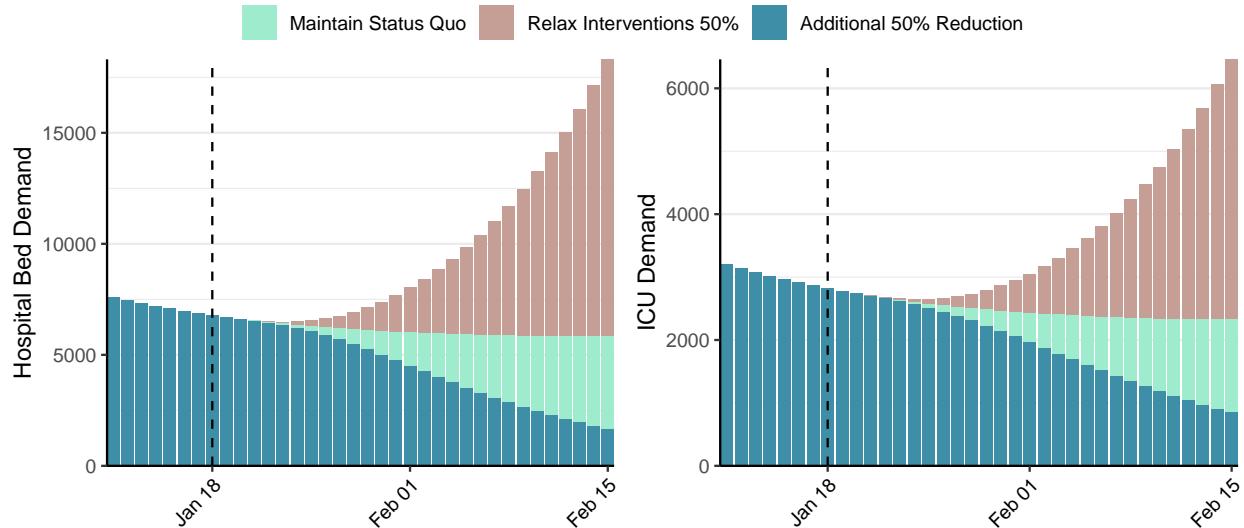
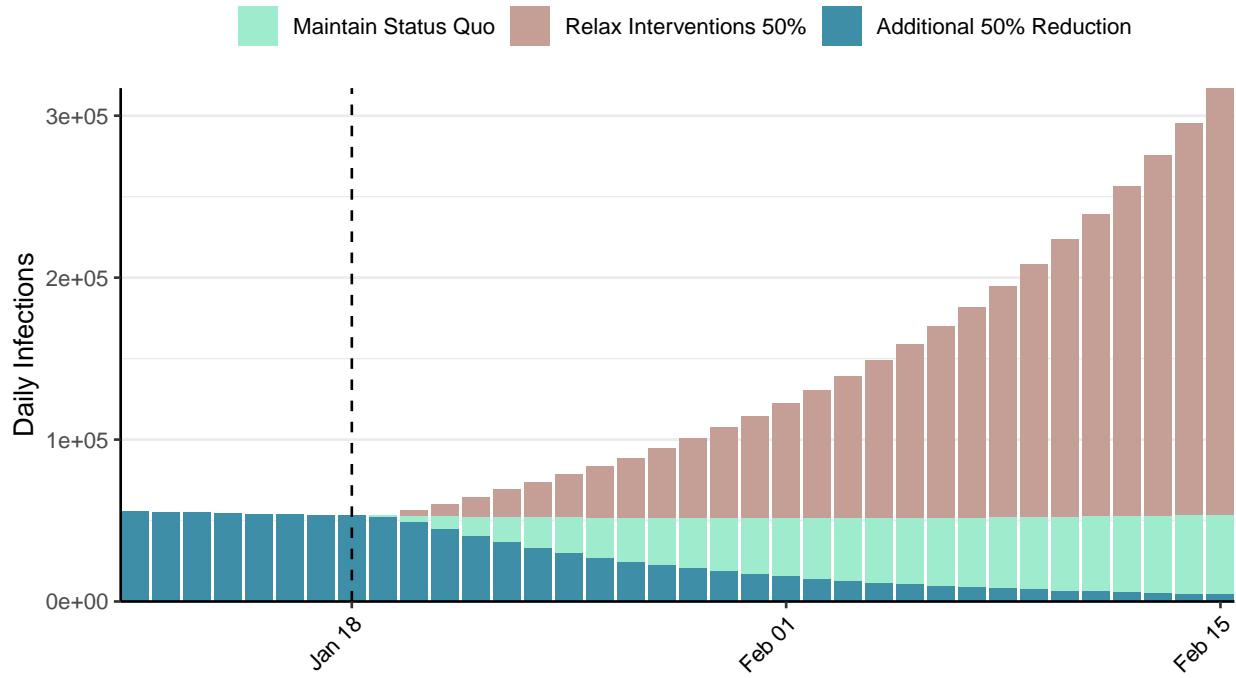


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 52,854 (95% CI: 48,599-57,109) at the current date to 4,311 (95% CI: 3,517-5,105) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 52,854 (95% CI: 48,599-57,109) at the current date to 313,898 (95% CI: 238,526-389,269) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Iraq, 2021-01-18

[Download the report for Iraq, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
797	797	9	9	0.8 (95% CI: 0.67-0.92)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Iraq is not shown in the following plot as only 9 deaths have been reported to date**

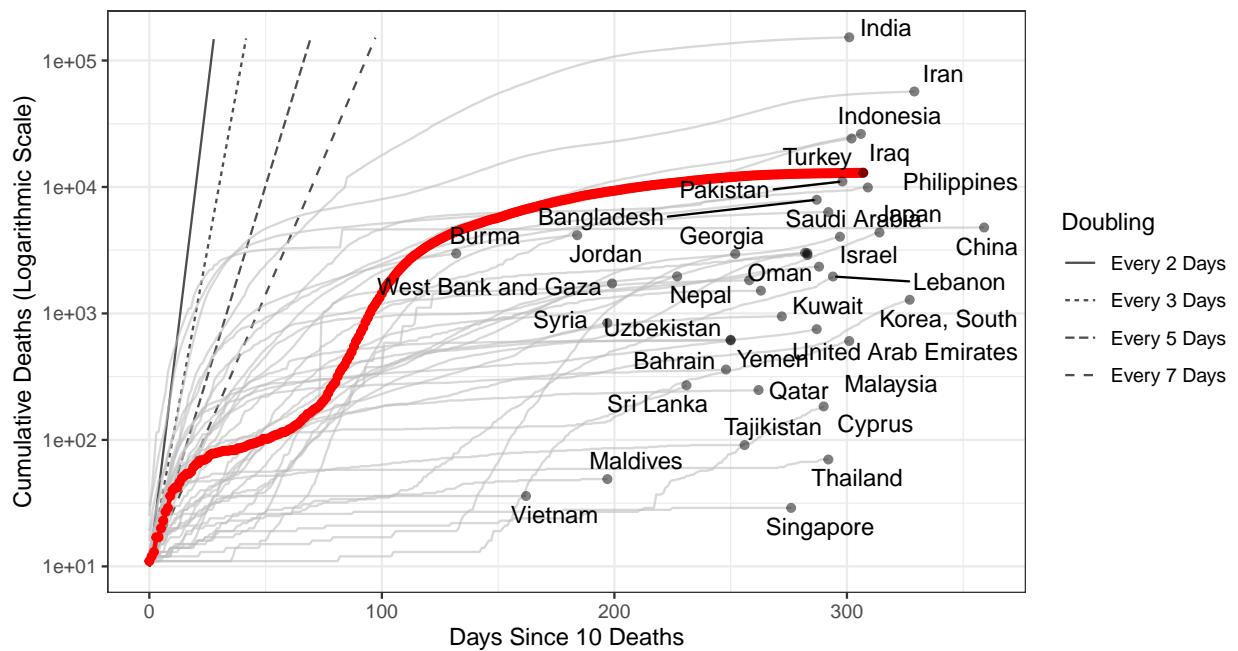


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 53,654 (95% CI: 49,981-57,327) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

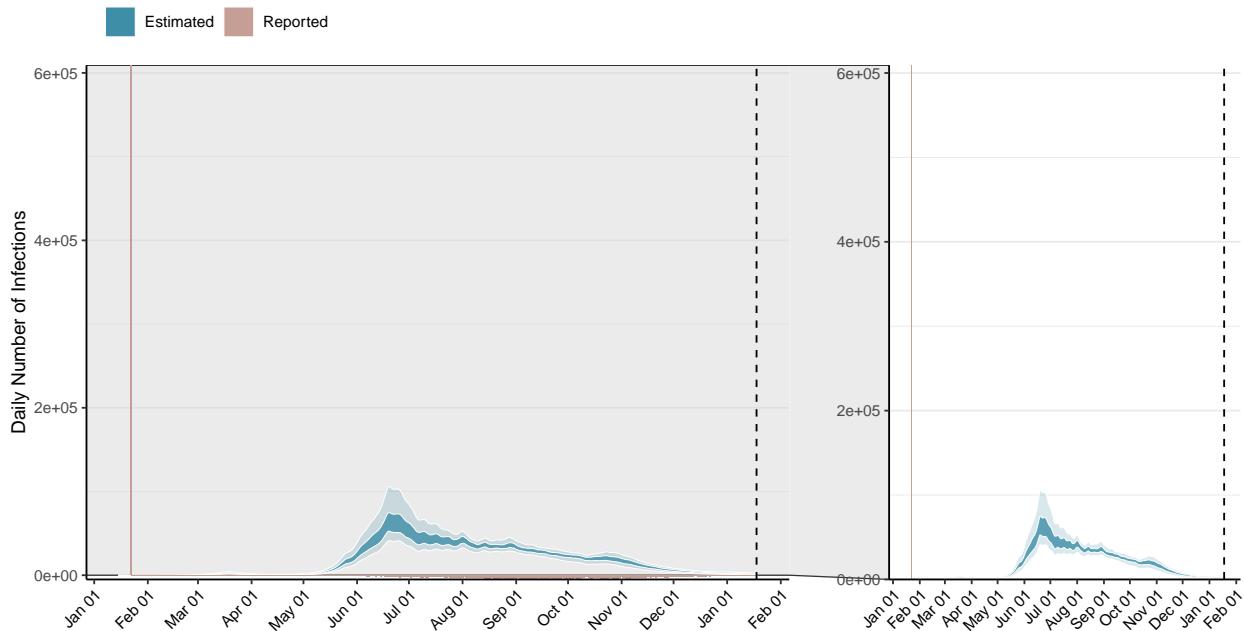
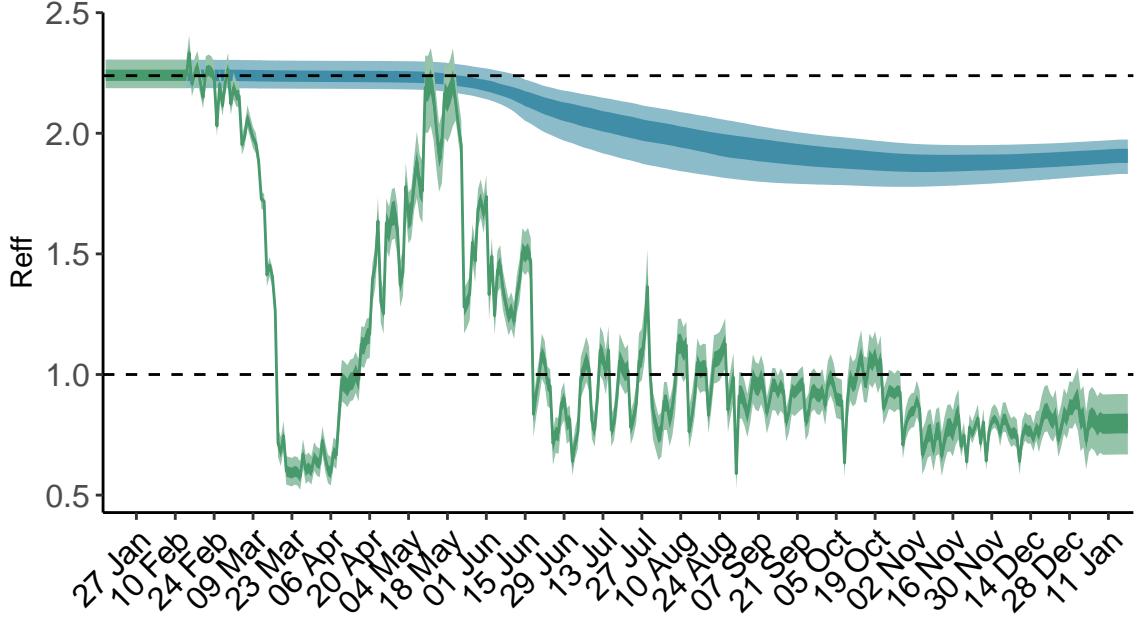


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Iraq is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

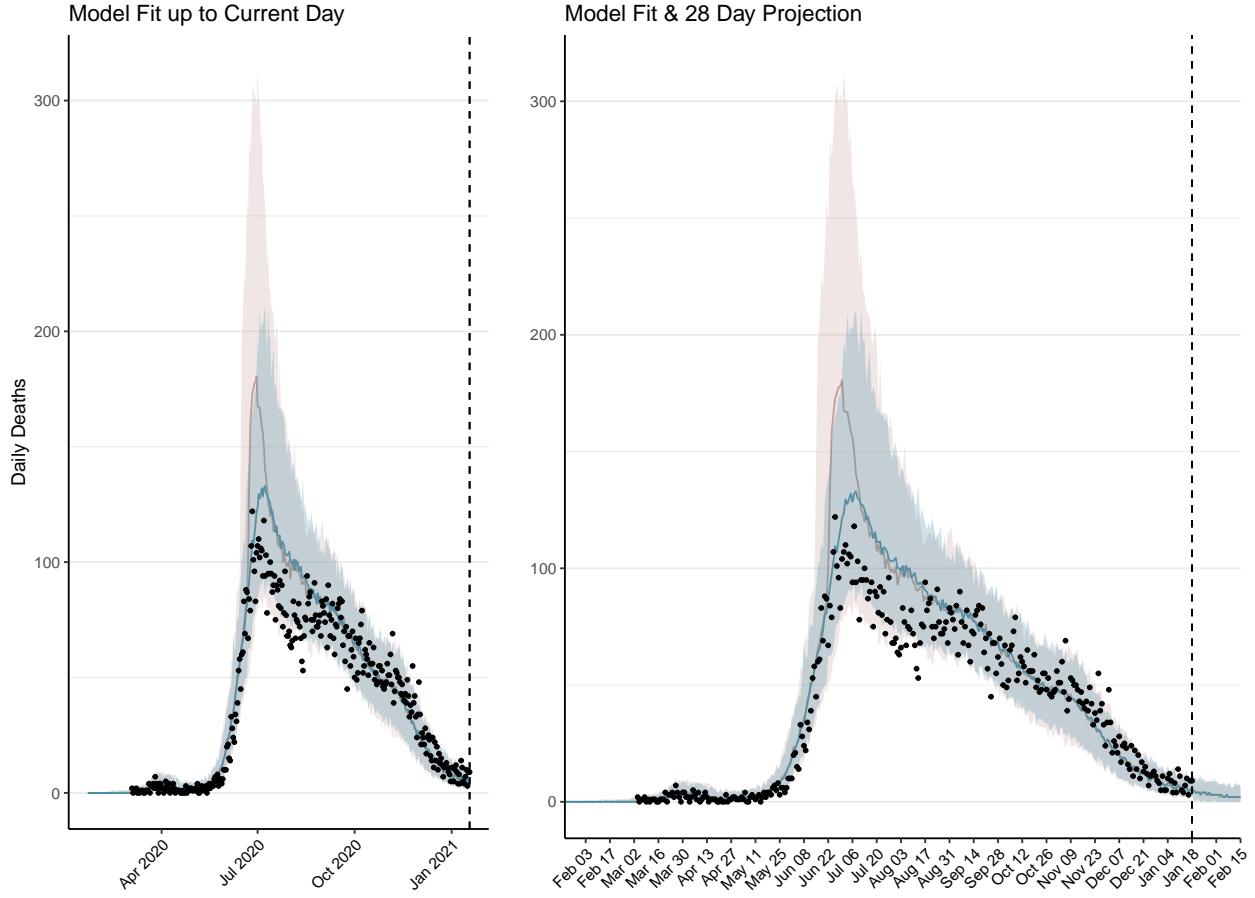


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 176 (95% CI: 163-189) patients requiring treatment with high-pressure oxygen at the current date to 78 (95% CI: 69-87) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 75 (95% CI: 70-81) patients requiring treatment with mechanical ventilation at the current date to 33 (95% CI: 29-37) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

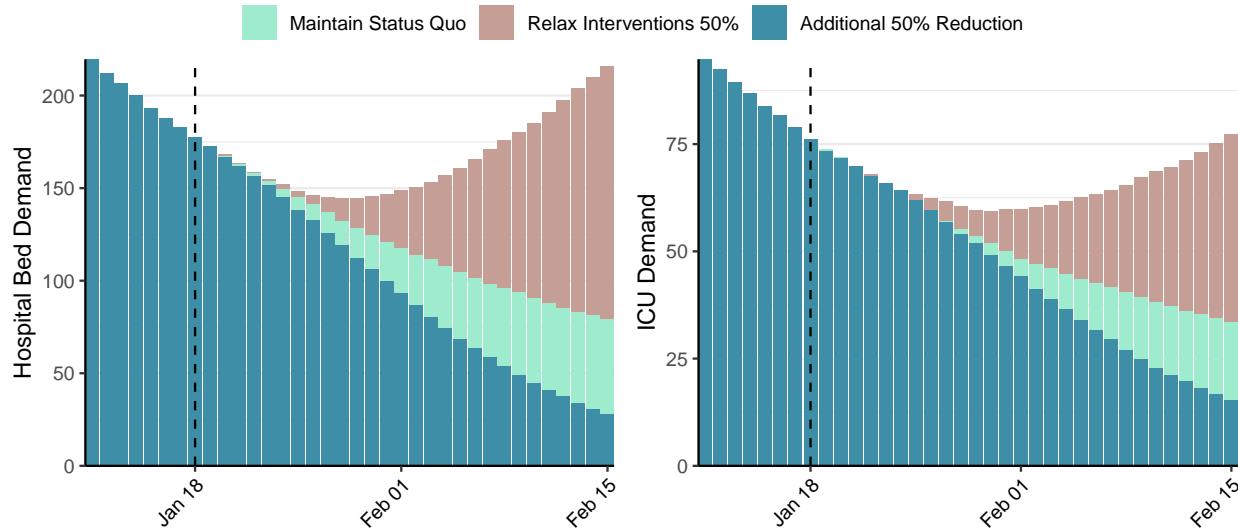


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,266 (95% CI: 1,157-1,375) at the current date to 57 (95% CI: 50-65) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,266 (95% CI: 1,157-1,375) at the current date to 3,110 (95% CI: 2,669-3,552) by 2021-02-15.

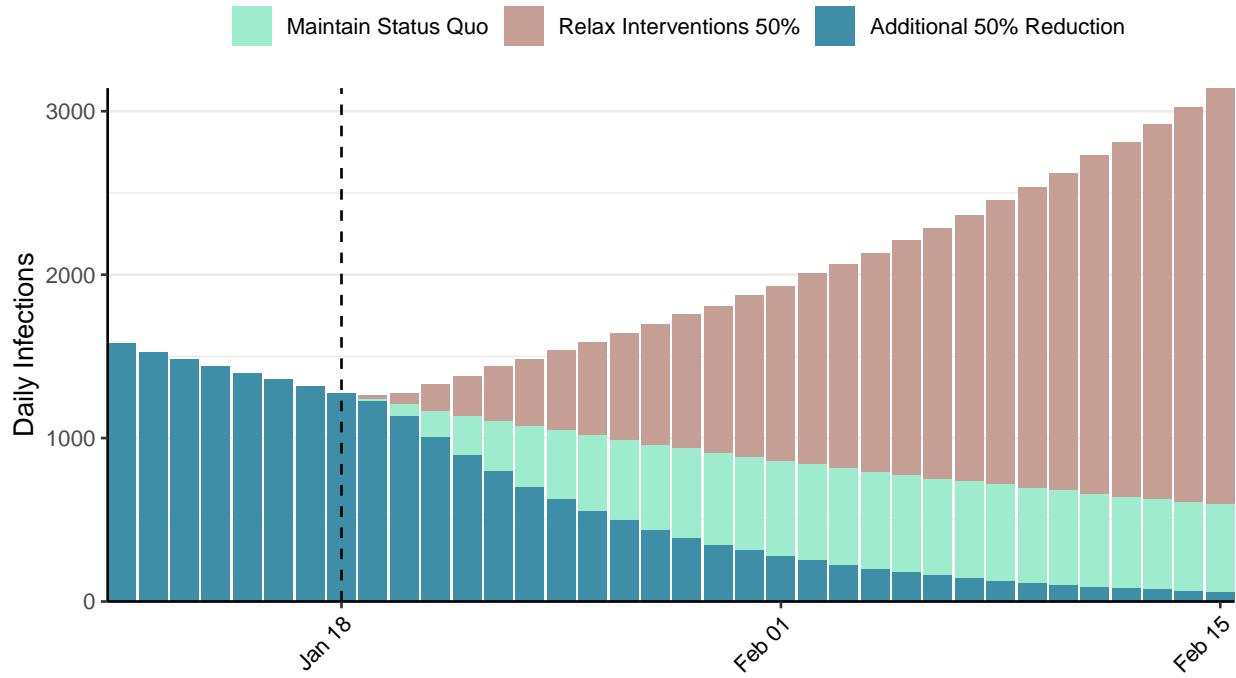


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Jamaica, 2021-01-18

[Download the report for Jamaica, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
113	113	2	2	1.06 (95% CI: 0.84-1.35)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Jamaica is not shown in the following plot as only 2 deaths have been reported to date**

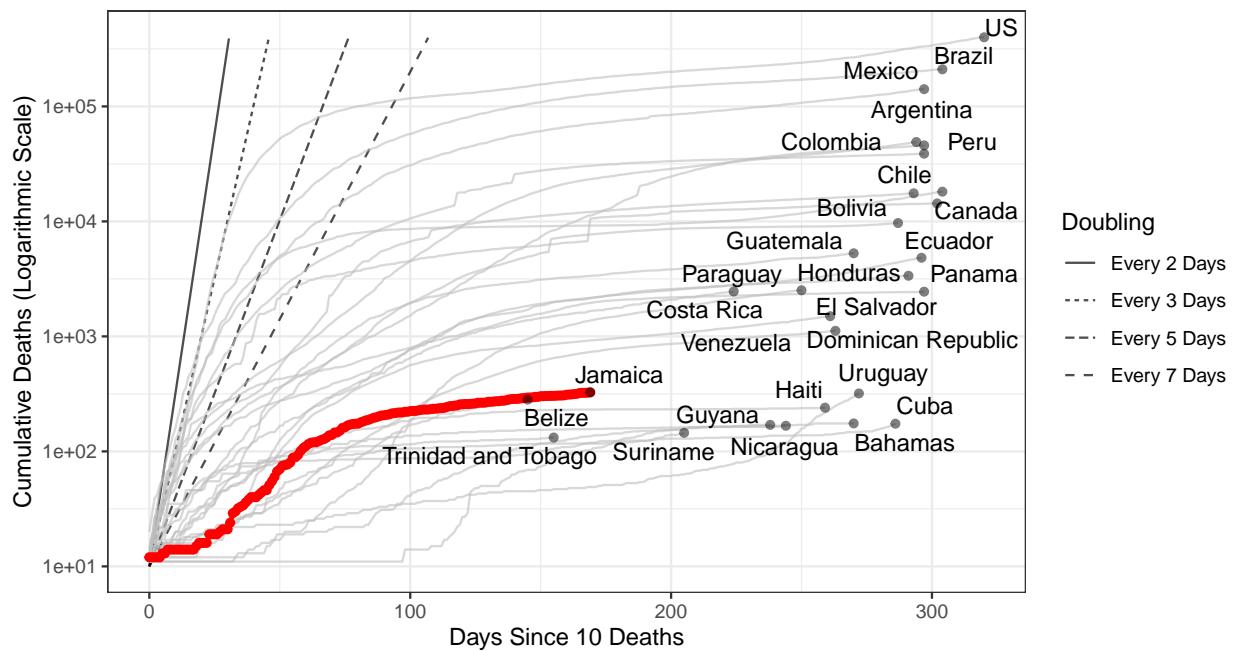


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 21,685 (95% CI: 20,412-22,958) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

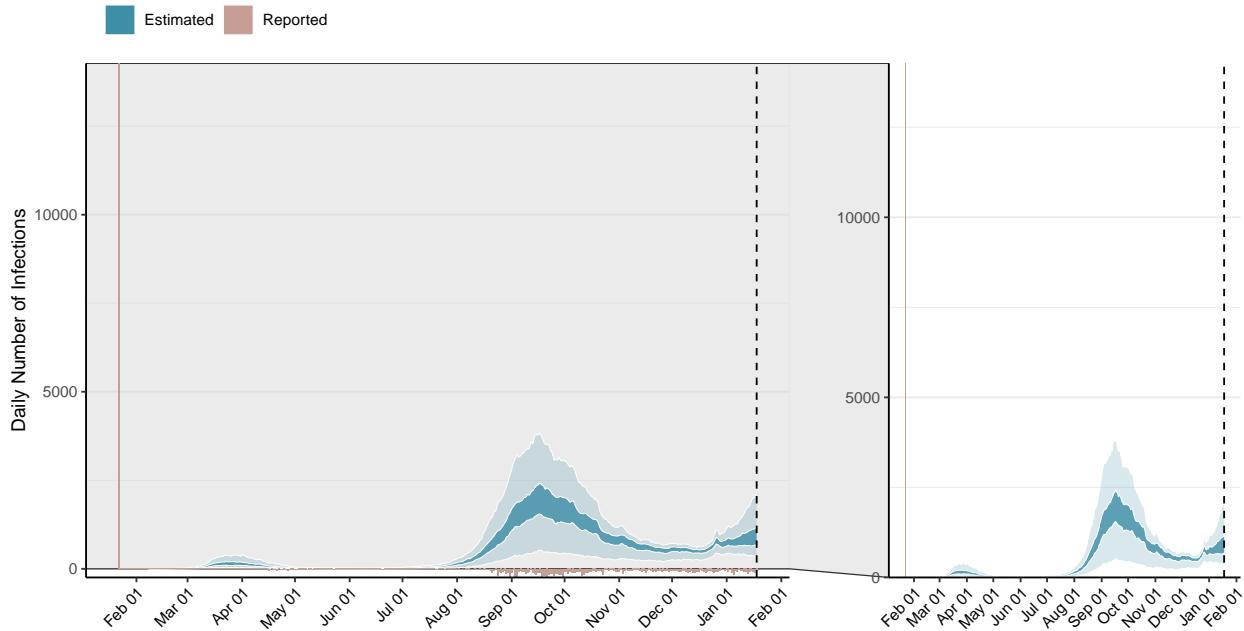
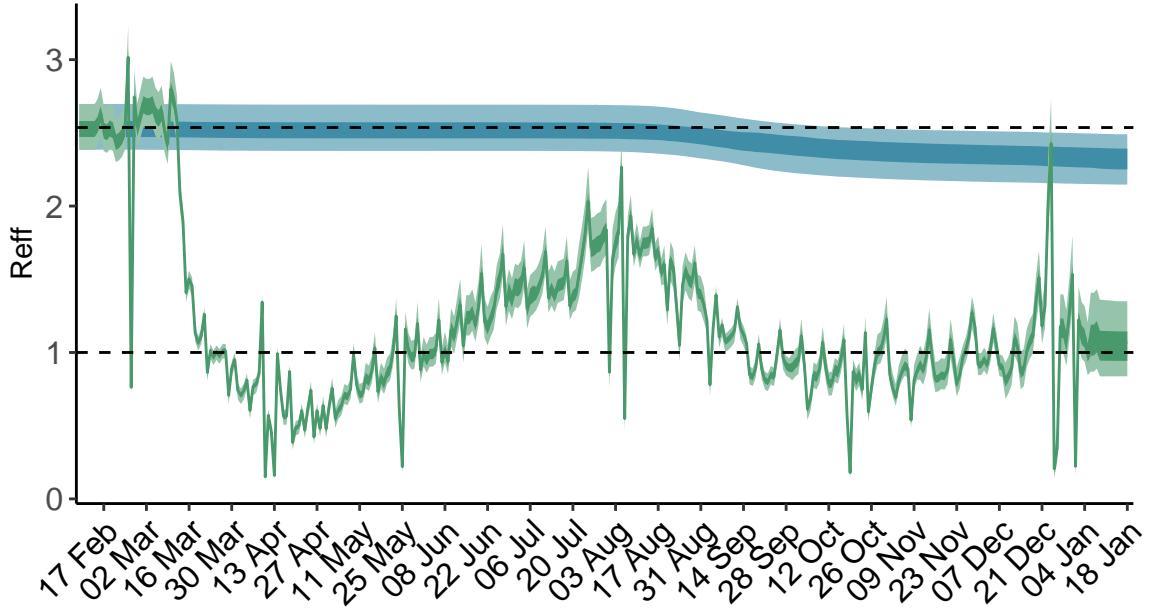


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

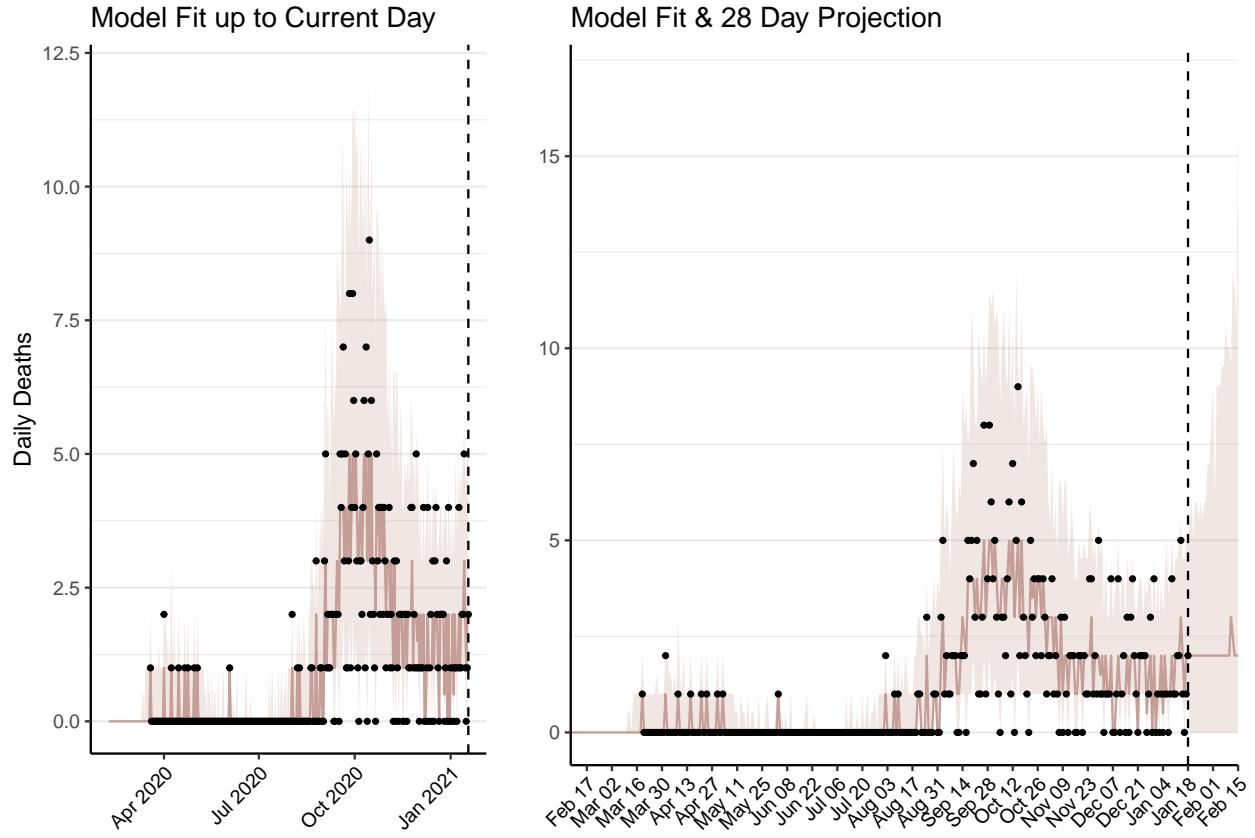


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 79 (95% CI: 74-85) patients requiring treatment with high-pressure oxygen at the current date to 131 (95% CI: 108-154) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 27 (95% CI: 25-29) patients requiring treatment with mechanical ventilation at the current date to 46 (95% CI: 38-53) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

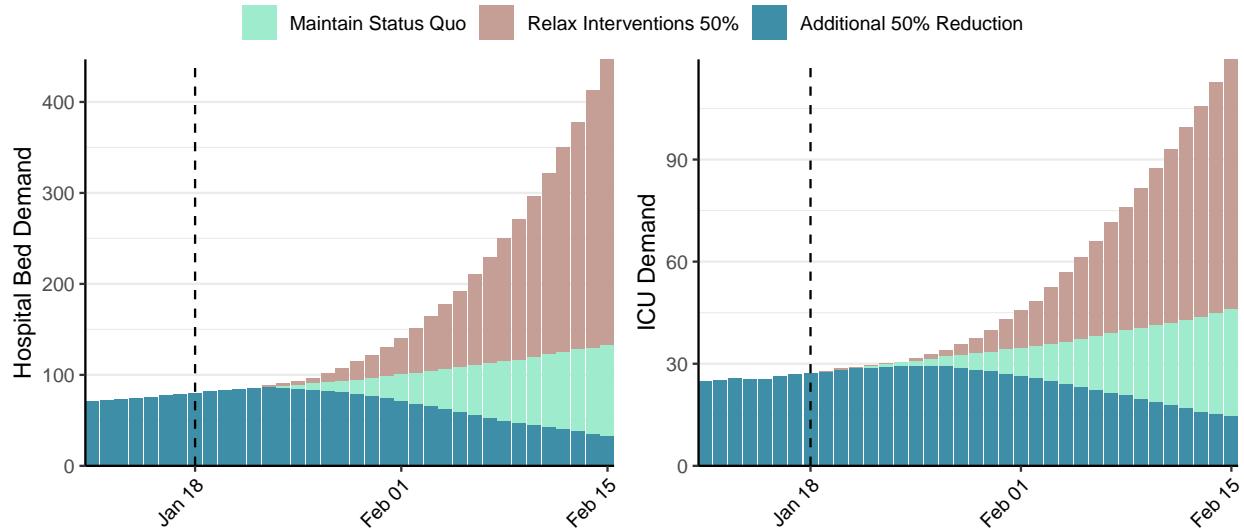


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 944 (95% CI: 851-1,037) at the current date to 123 (95% CI: 99-148) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 944 (95% CI: 851-1,037) at the current date to 9,200 (95% CI: 7,328-11,072) by 2021-02-15.

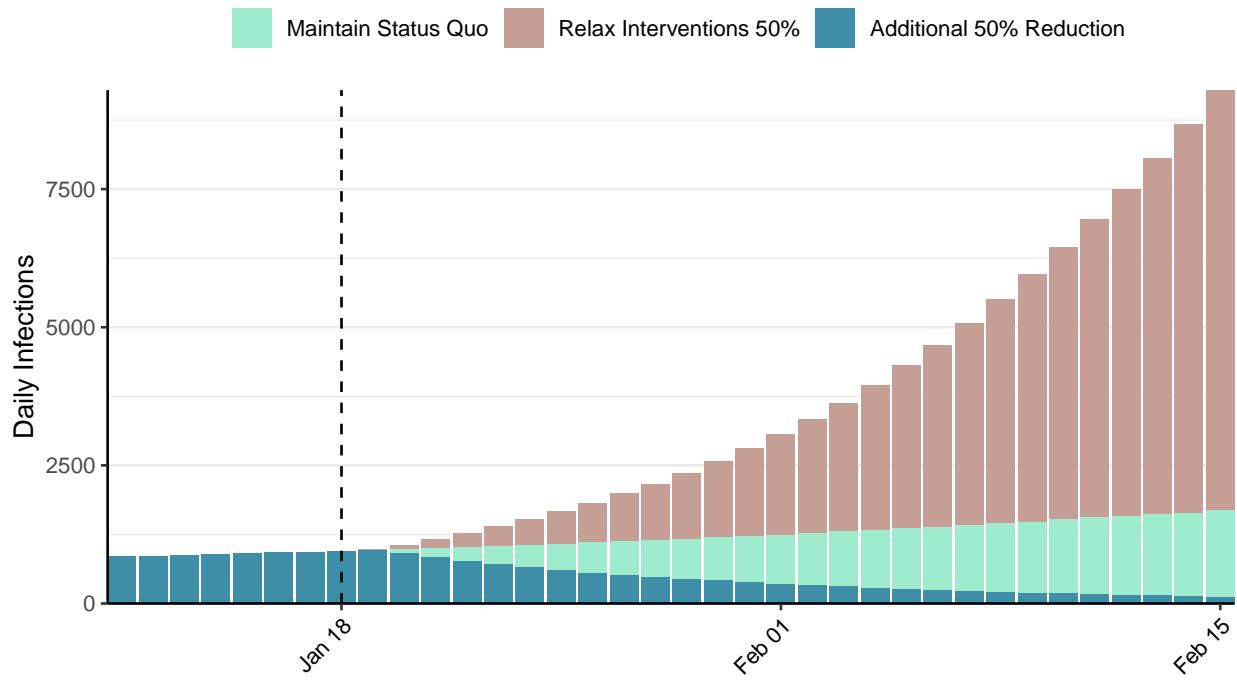


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Jordan, 2021-01-18

[Download the report for Jordan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,030	1,030	8	8	0.83 (95% CI: 0.62-1.11)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Jordan is not shown in the following plot as only 8 deaths have been reported to date**

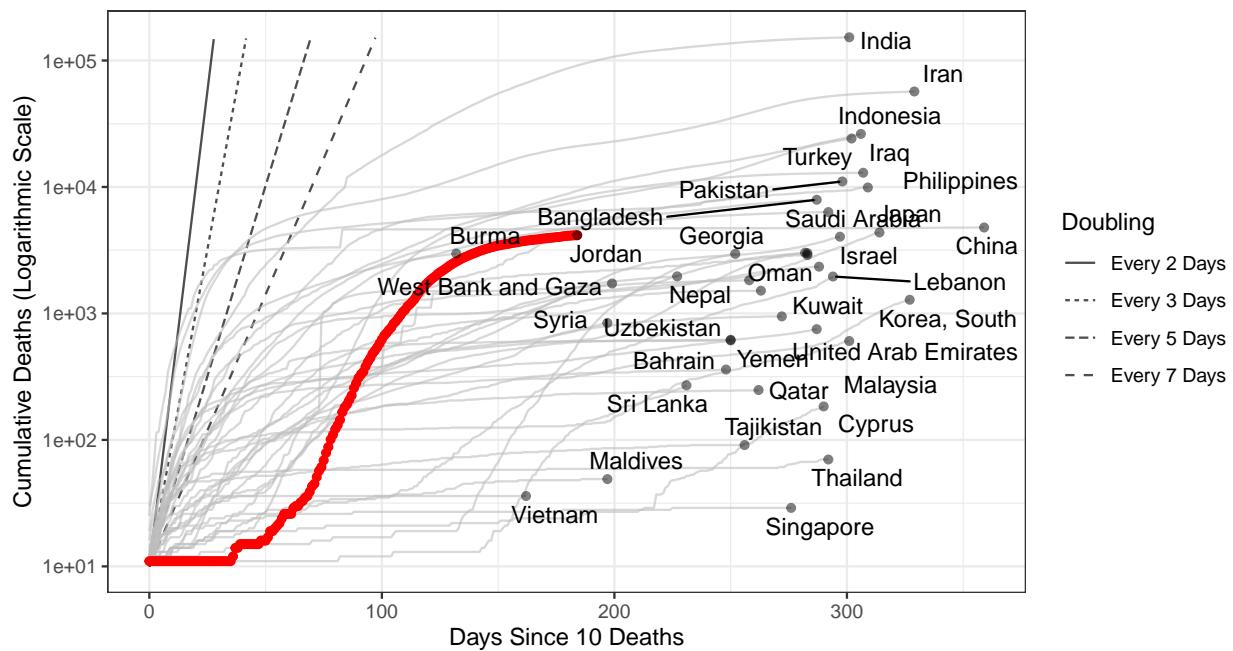


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 114,471 (95% CI: 107,498-121,444) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Jordan has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

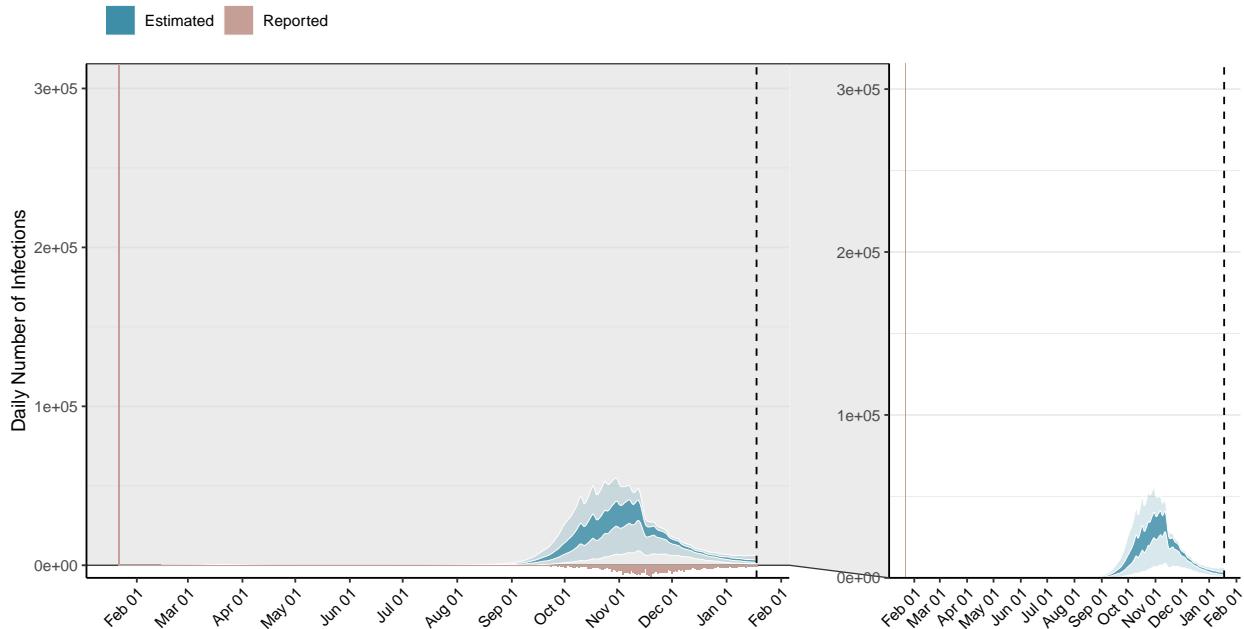
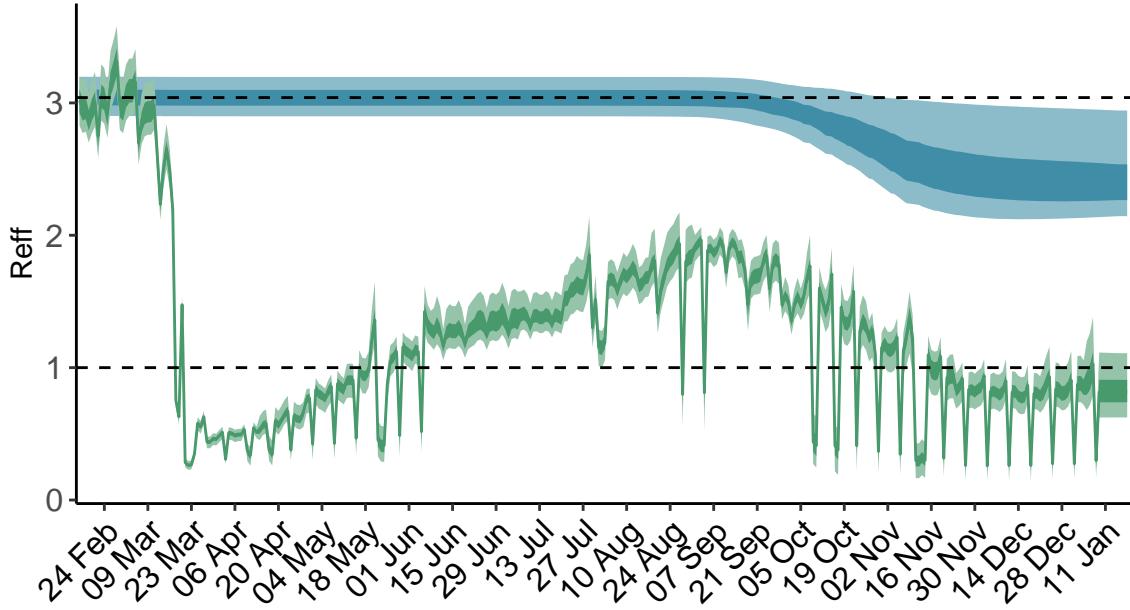


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Jordan is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

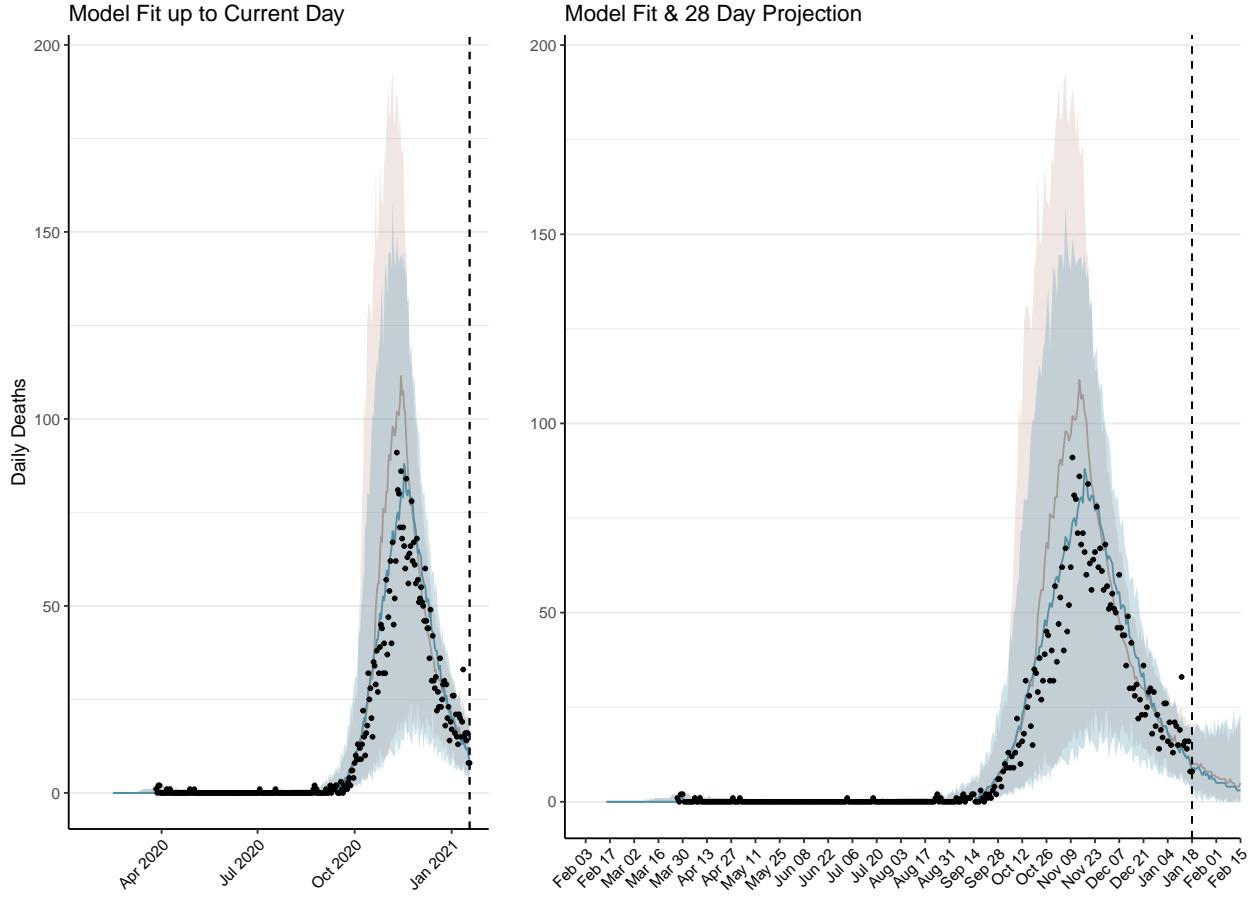


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 394 (95% CI: 368-420) patients requiring treatment with high-pressure oxygen at the current date to 231 (95% CI: 190-273) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 170 (95% CI: 160-181) patients requiring treatment with mechanical ventilation at the current date to 94 (95% CI: 78-109) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

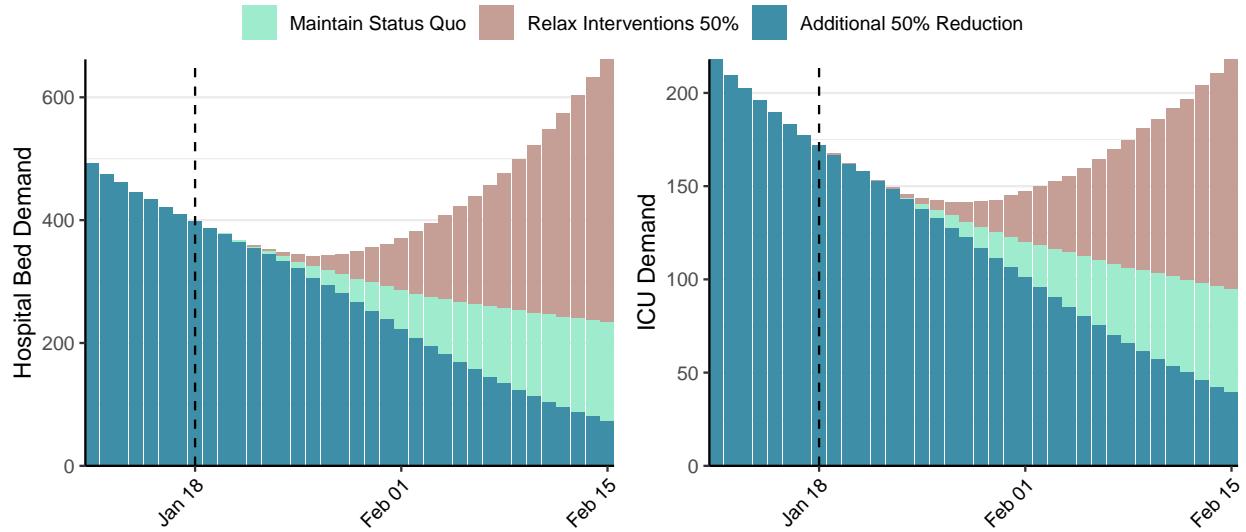


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 2,798 (95% CI: 2,502-3,095) at the current date to 173 (95% CI: 137-210) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,798 (95% CI: 2,502-3,095) at the current date to 10,381 (95% CI: 7,840-12,923) by 2021-02-15.

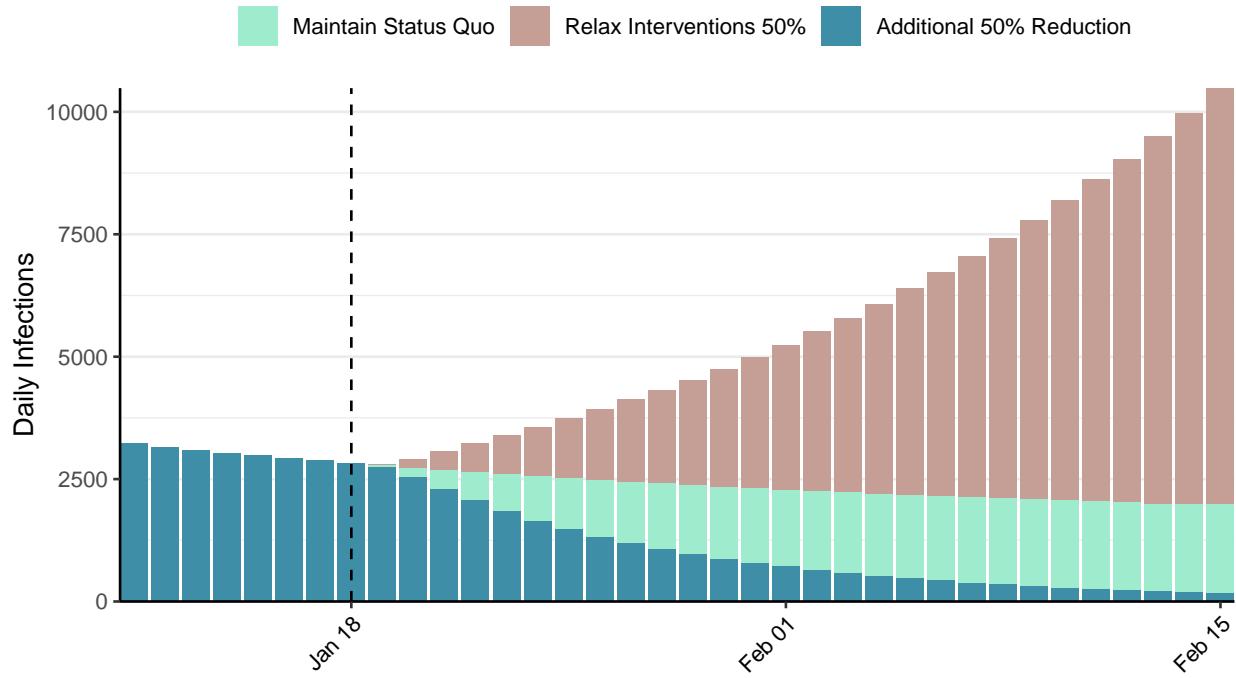


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool - https://covid19sim.org/](https://covid19sim.org/), which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Kazakhstan, 2021-01-18

[Download the report for Kazakhstan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.05 (95% CI: 0.89-1.32)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Kazakhstan is not shown in the following plot as only 0 deaths have been reported to date**

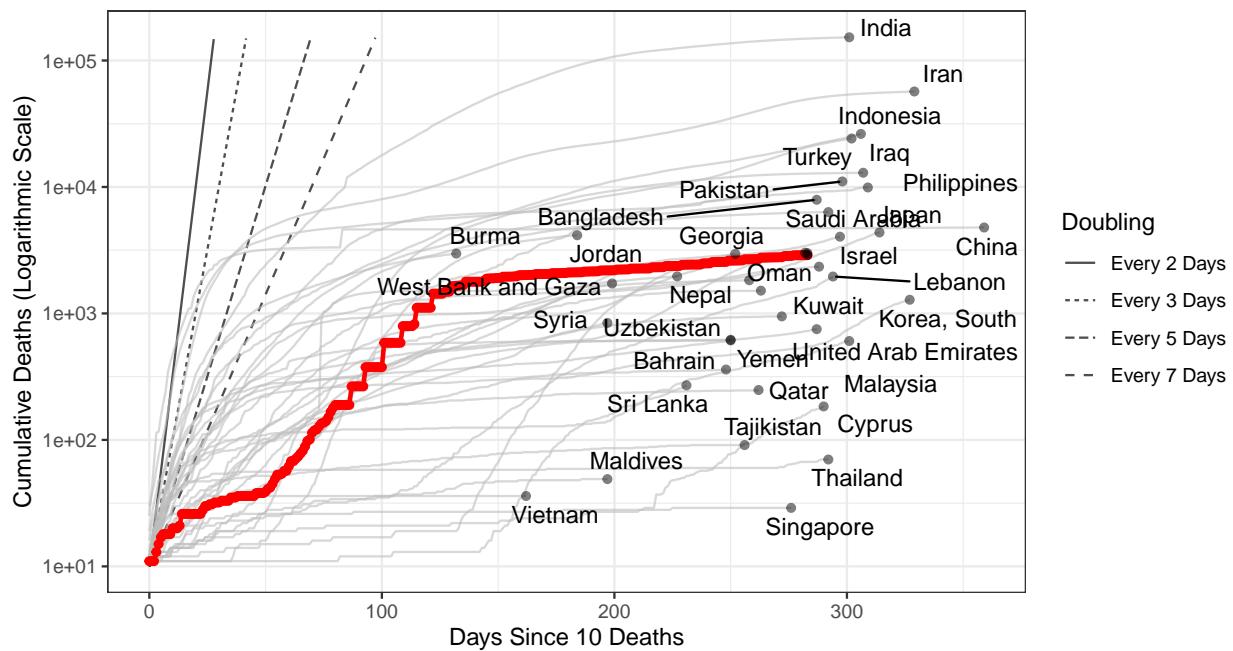


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 122,769 (95% CI: 115,732-129,805) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

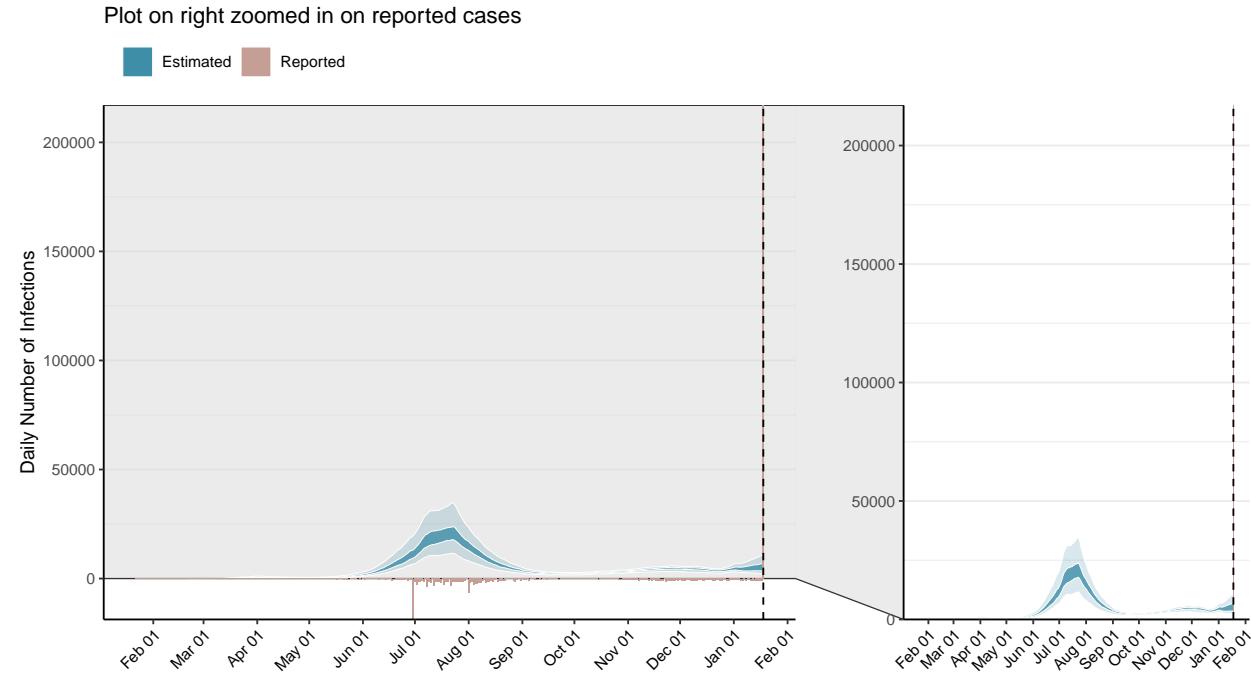
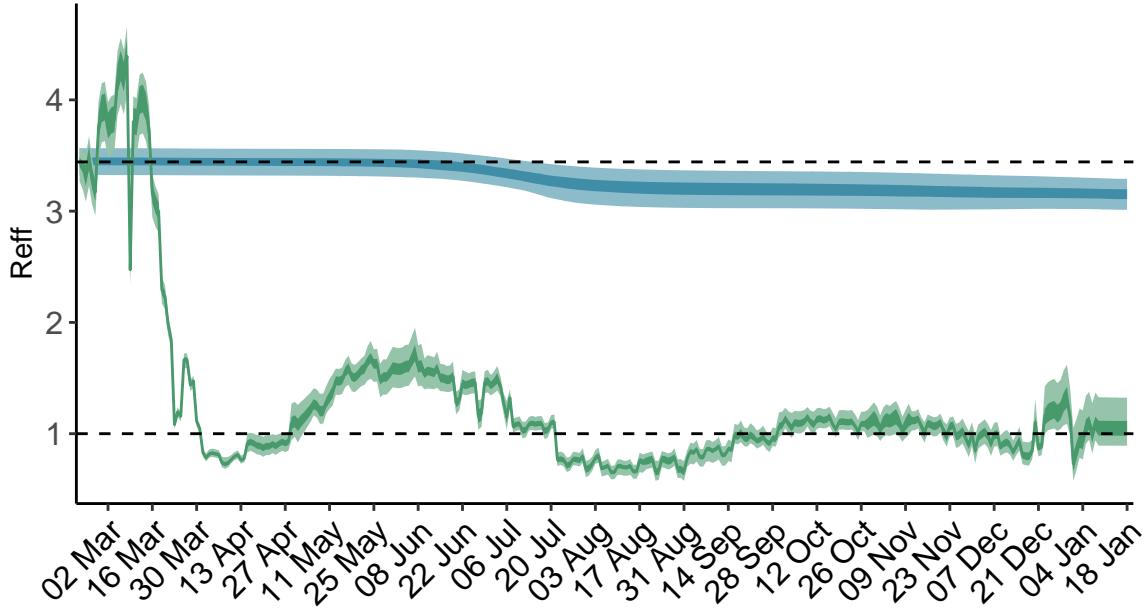


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

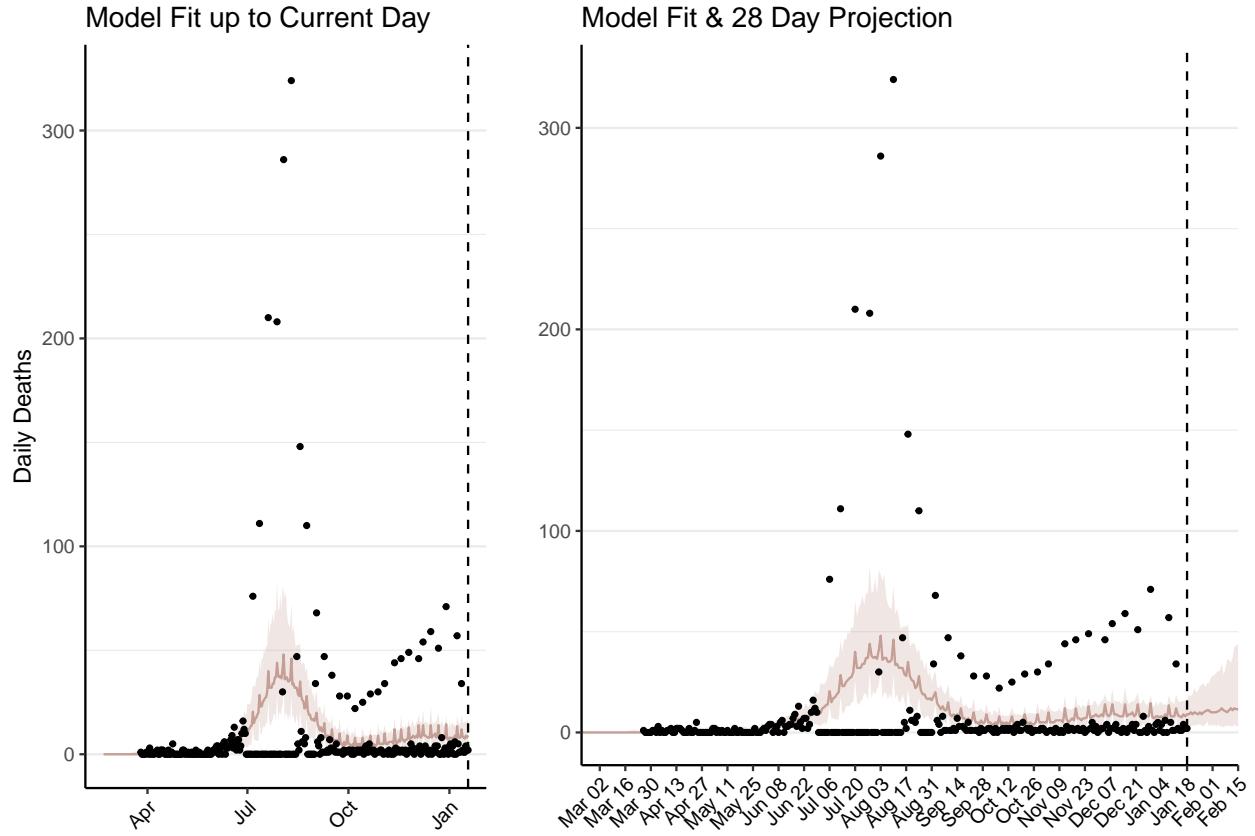


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 421 (95% CI: 395-447) patients requiring treatment with high-pressure oxygen at the current date to 655 (95% CI: 543-767) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 161 (95% CI: 152-171) patients requiring treatment with mechanical ventilation at the current date to 243 (95% CI: 203-282) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

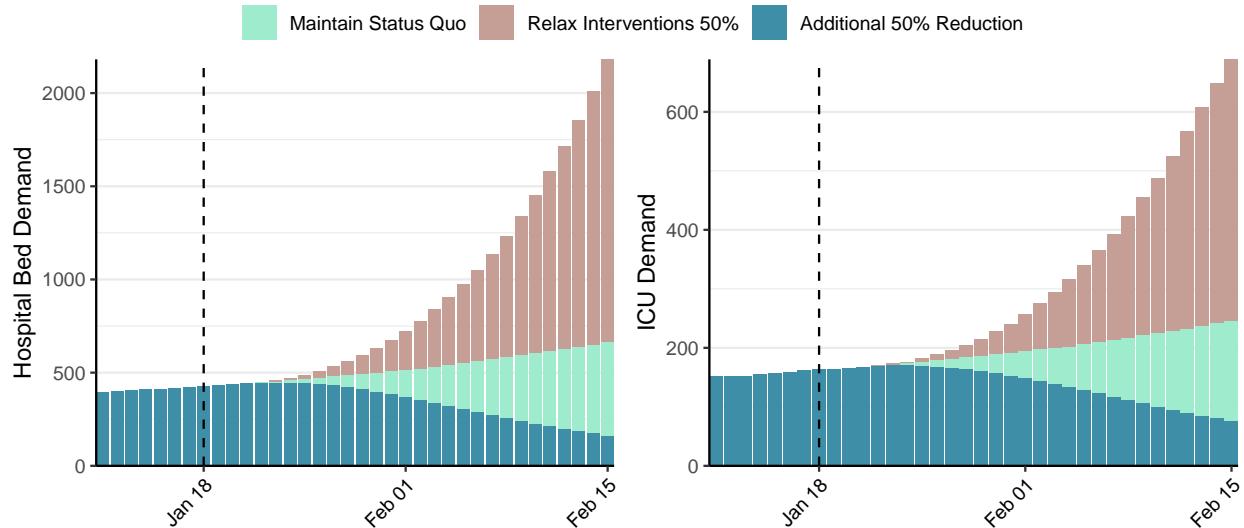


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 5,199 (95% CI: 4,698-5,700) at the current date to 648 (95% CI: 521-775) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 5,199 (95% CI: 4,698-5,700) at the current date to 47,920 (95% CI: 38,091-57,749) by 2021-02-15.

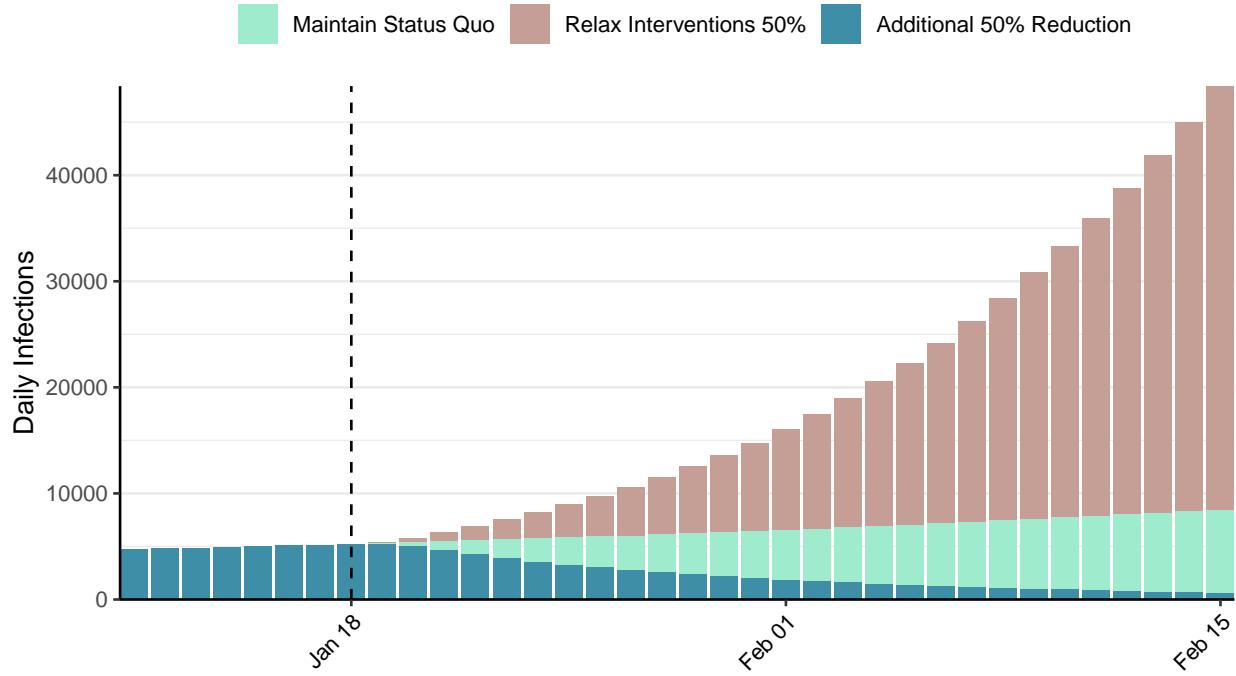


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Kenya, 2021-01-18

[Download the report for Kenya, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
65	65	3	3	0.92 (95% CI: 0.77-1.11)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Kenya is not shown in the following plot as only 3 deaths have been reported to date**

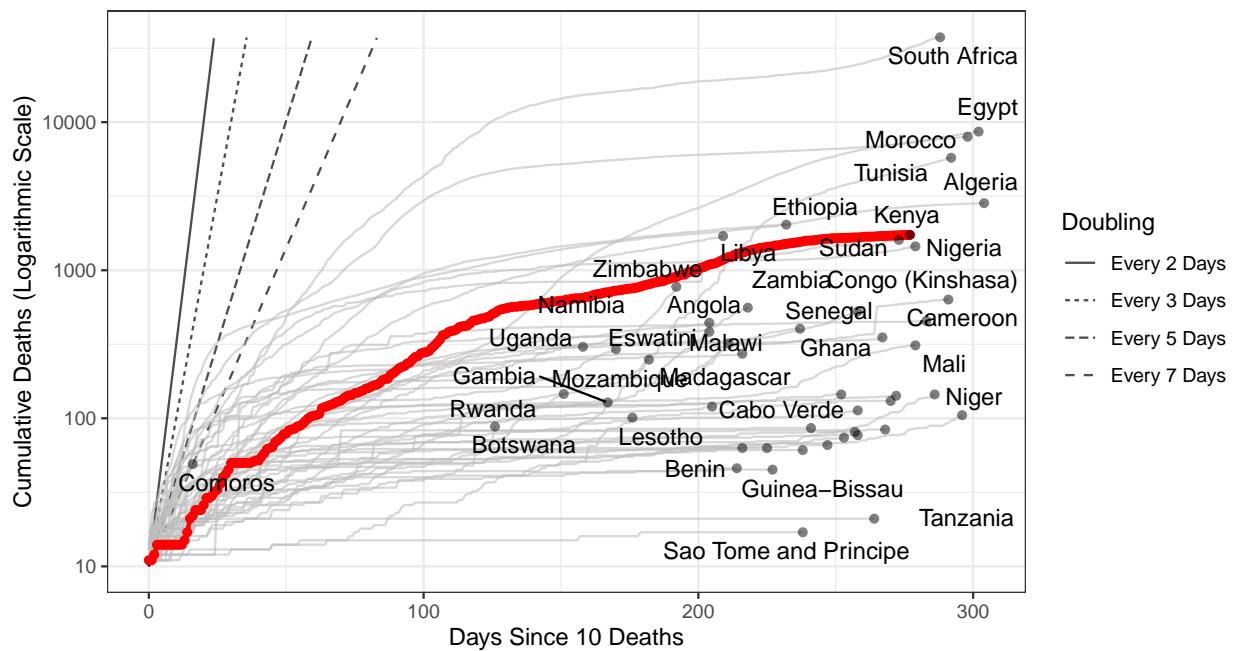


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 48,459 (95% CI: 46,209-50,710) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

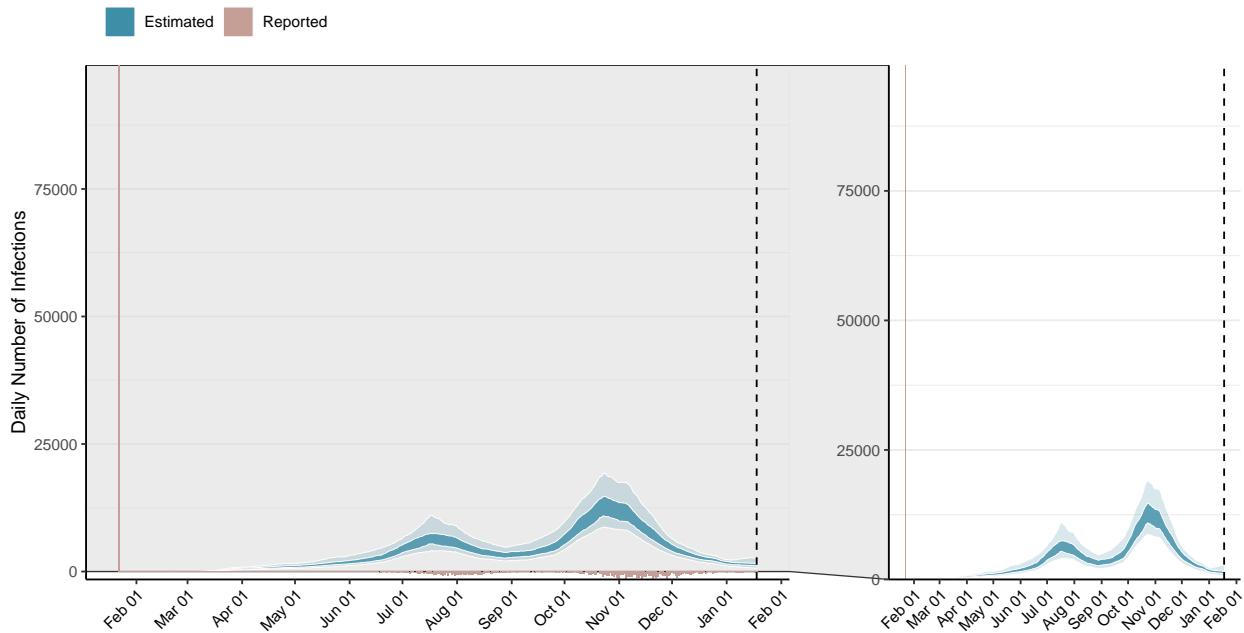
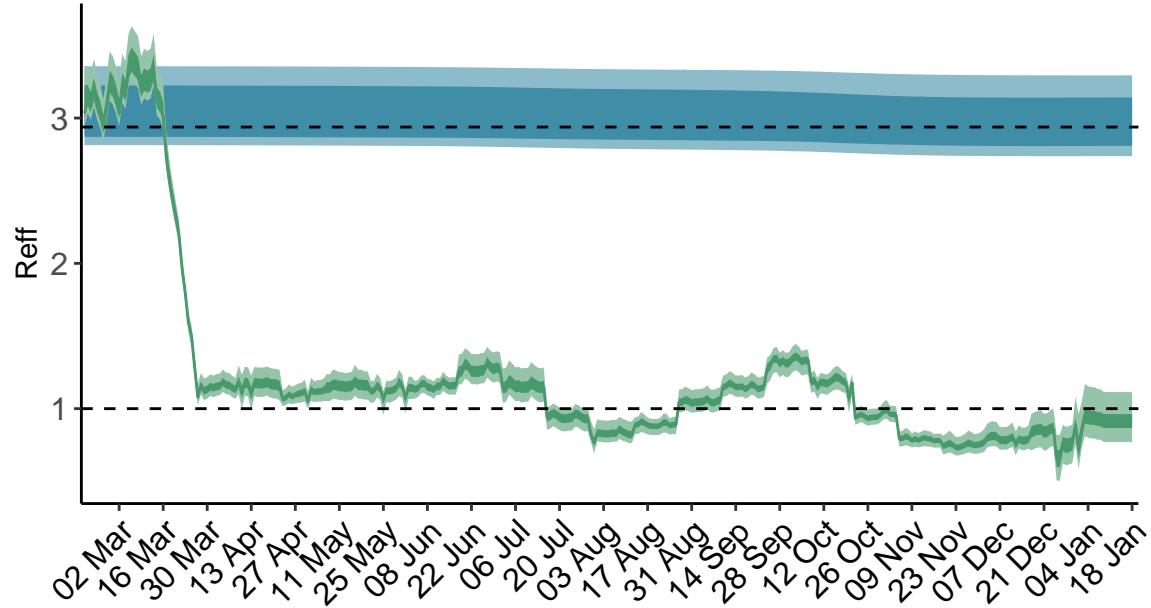


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

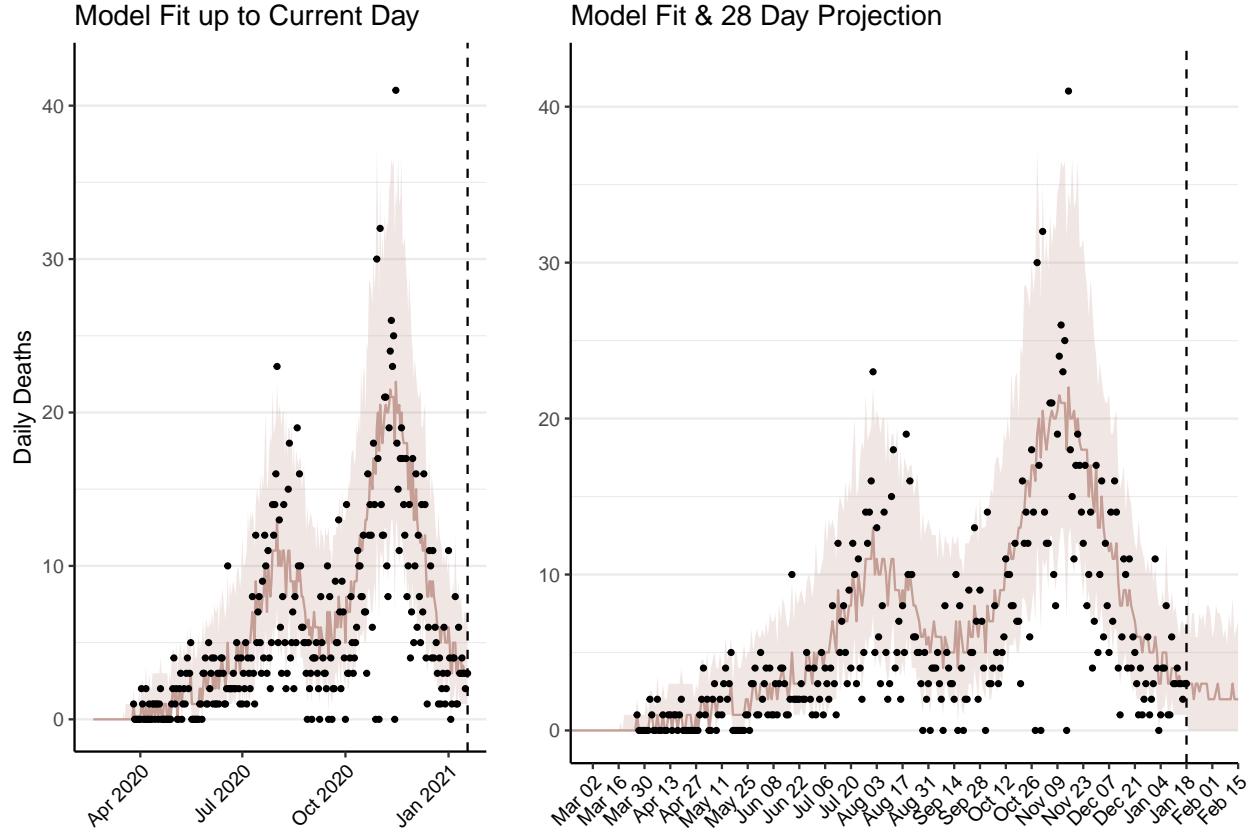


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 125 (95% CI: 119-132) patients requiring treatment with high-pressure oxygen at the current date to 97 (95% CI: 83-112) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 55 (95% CI: 52-58) patients requiring treatment with mechanical ventilation at the current date to 40 (95% CI: 34-45) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

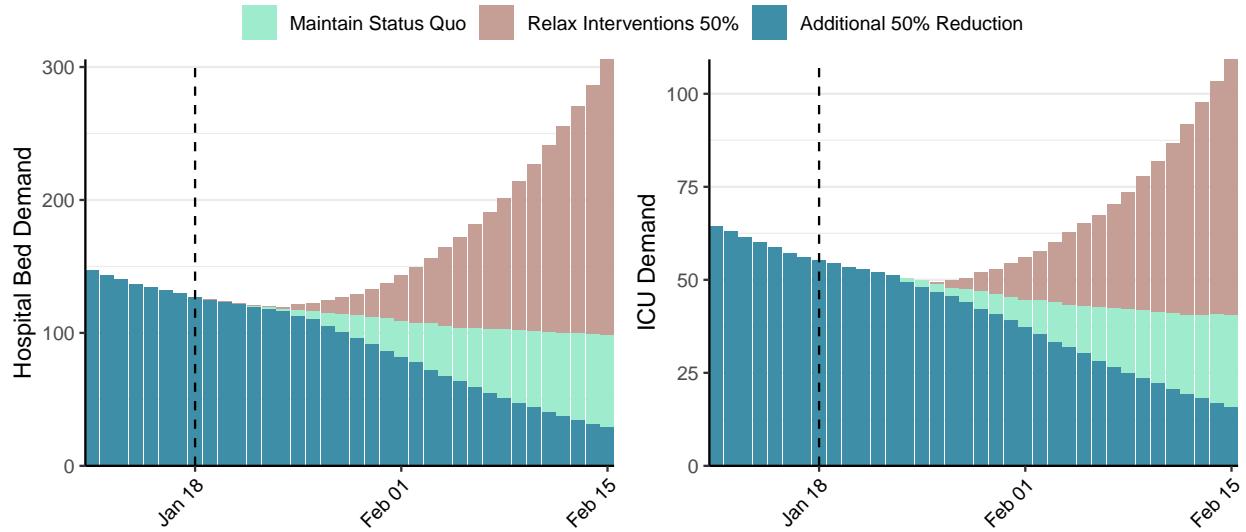


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,412 (95% CI: 1,306-1,519) at the current date to 106 (95% CI: 87-125) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,412 (95% CI: 1,306-1,519) at the current date to 7,292 (95% CI: 5,359-9,224) by 2021-02-15.

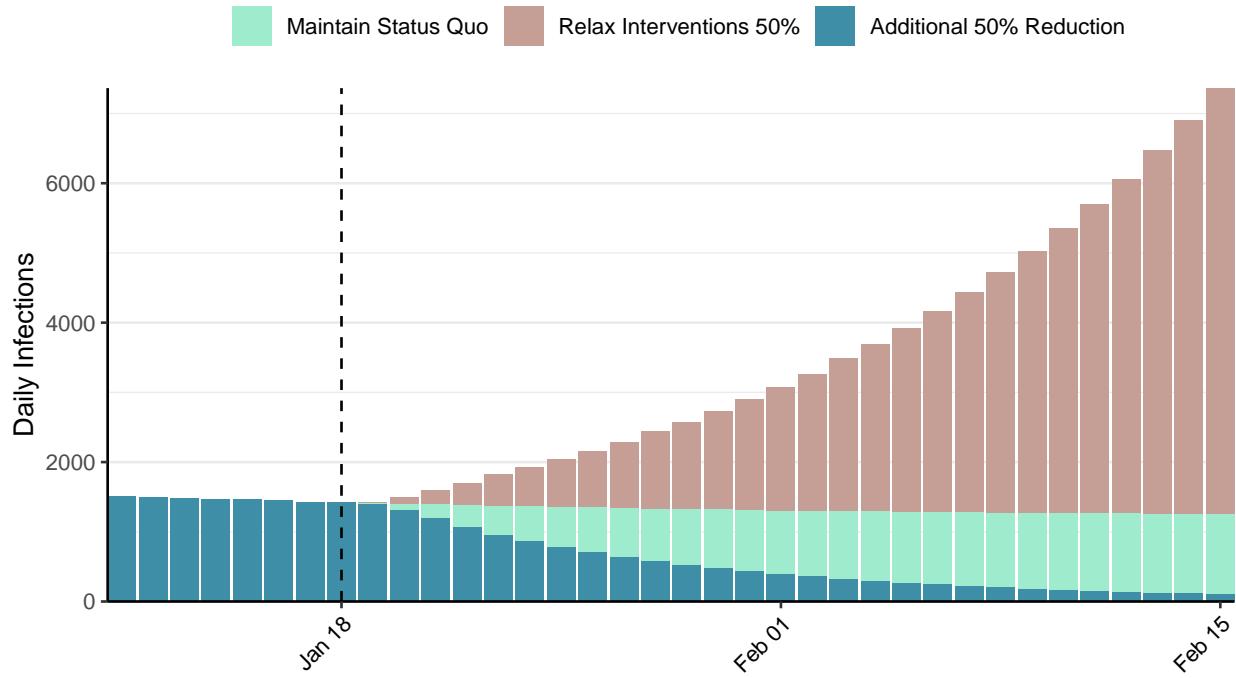


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Kyrgyz Republic, 2021-01-18

[Download the report for Kyrgyz Republic, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
90	90	3	3	0.74 (95% CI: 0.66-0.81)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Kyrgyz Republic is not shown in the following plot as only 3 deaths have been reported to date**

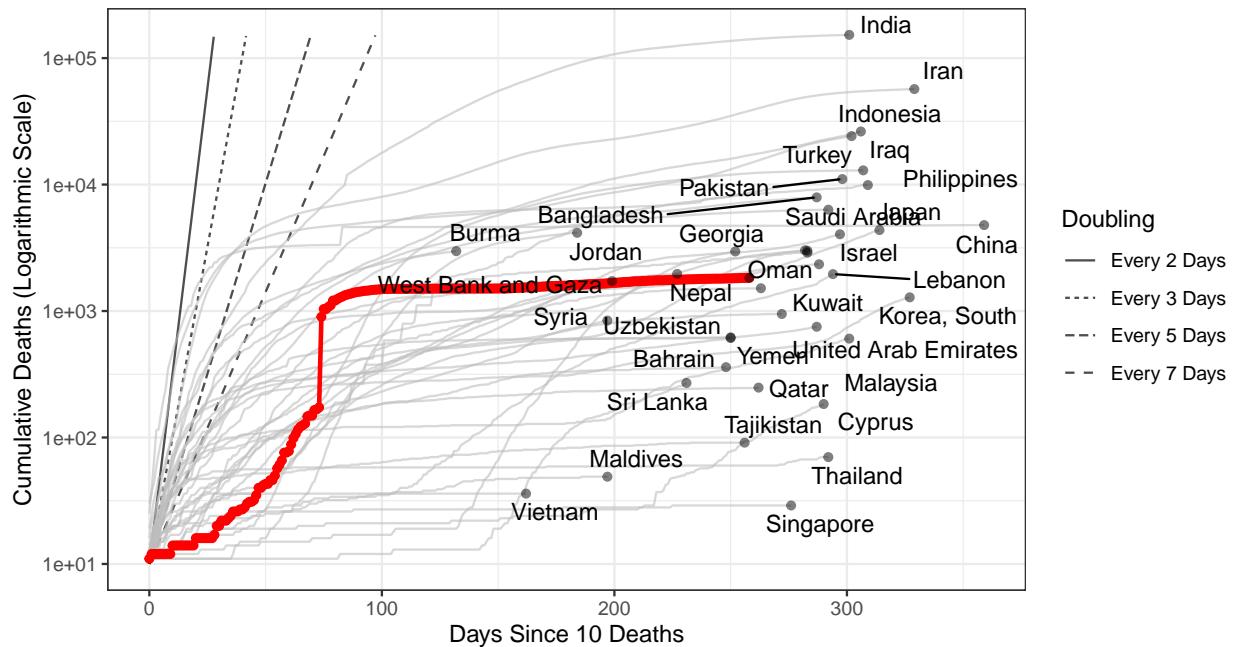


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 35,152 (95% CI: 33,099-37,206) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

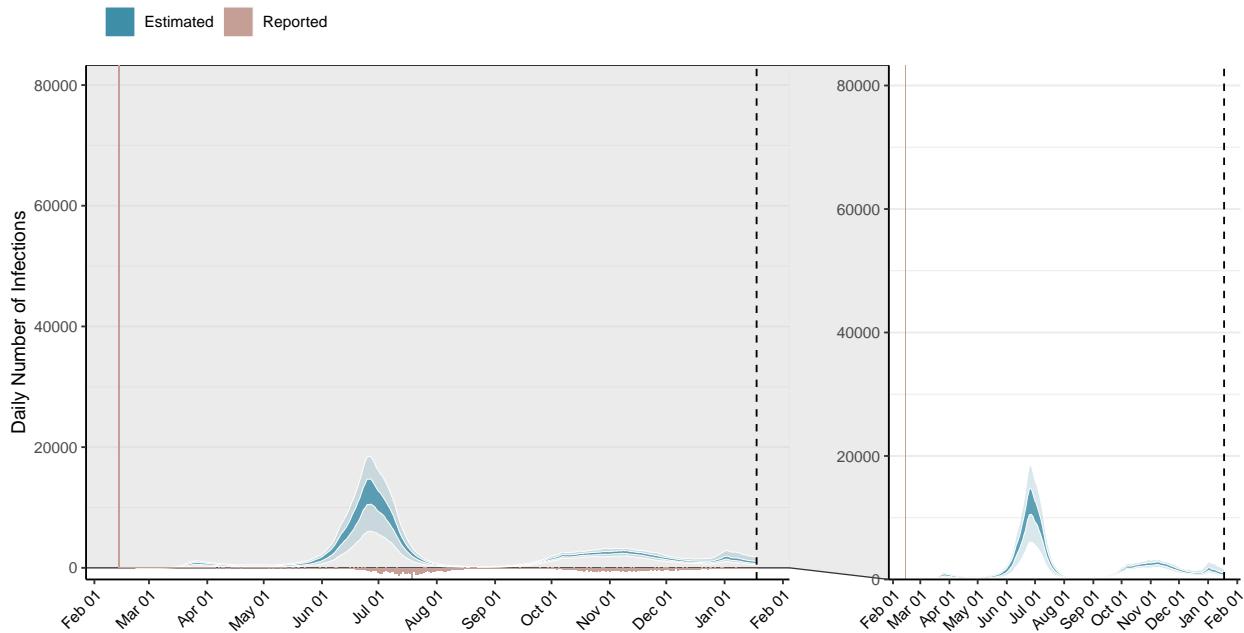
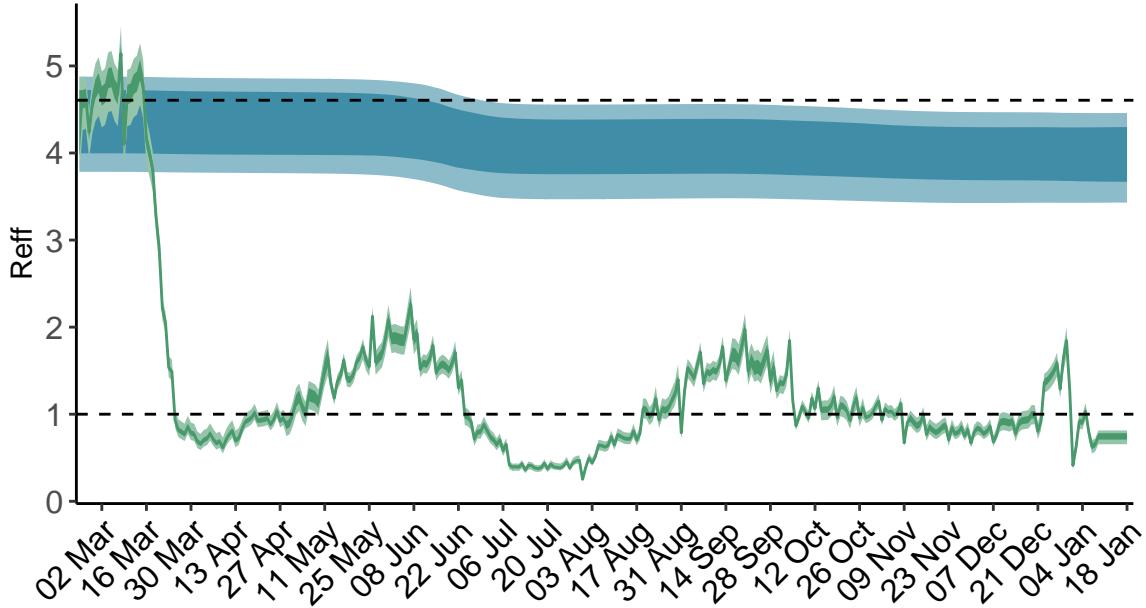


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

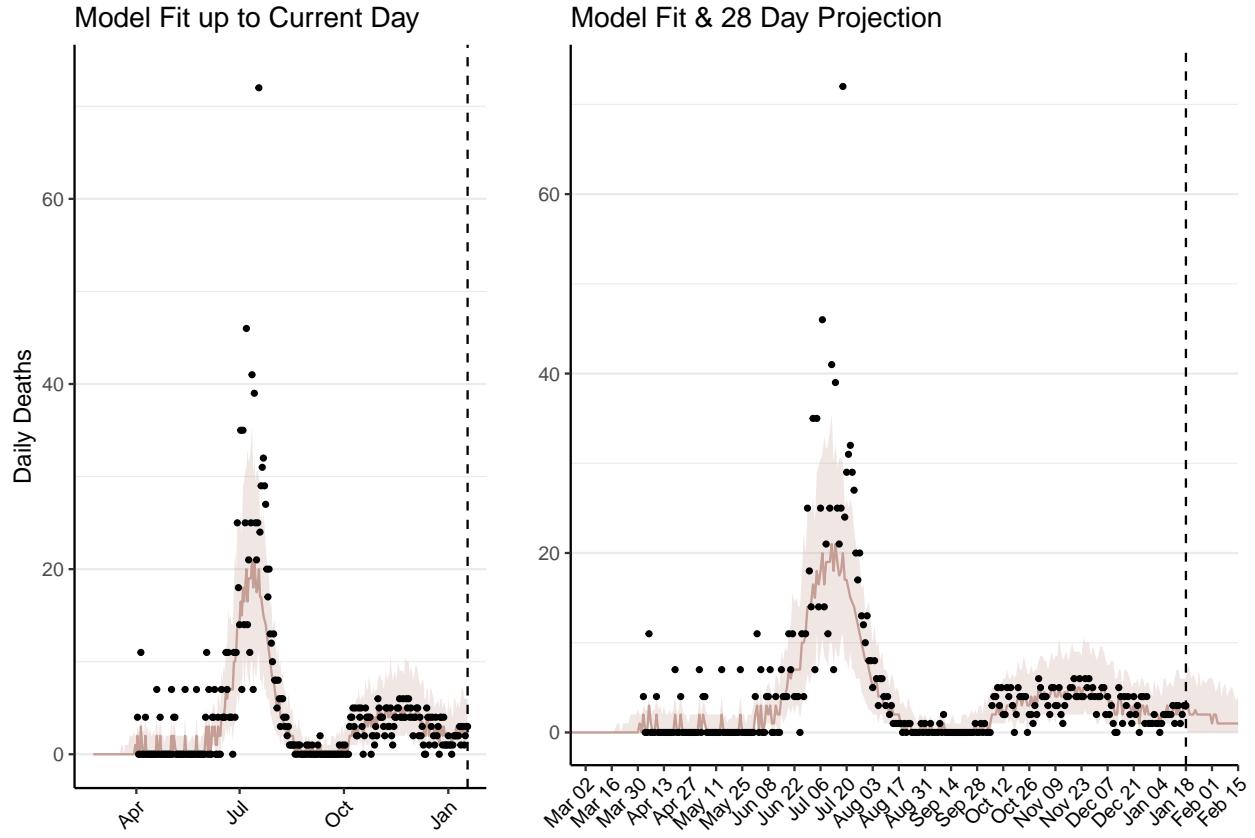


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 109 (95% CI: 102-115) patients requiring treatment with high-pressure oxygen at the current date to 42 (95% CI: 38-47) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 43 (95% CI: 40-45) patients requiring treatment with mechanical ventilation at the current date to 18 (95% CI: 16-20) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

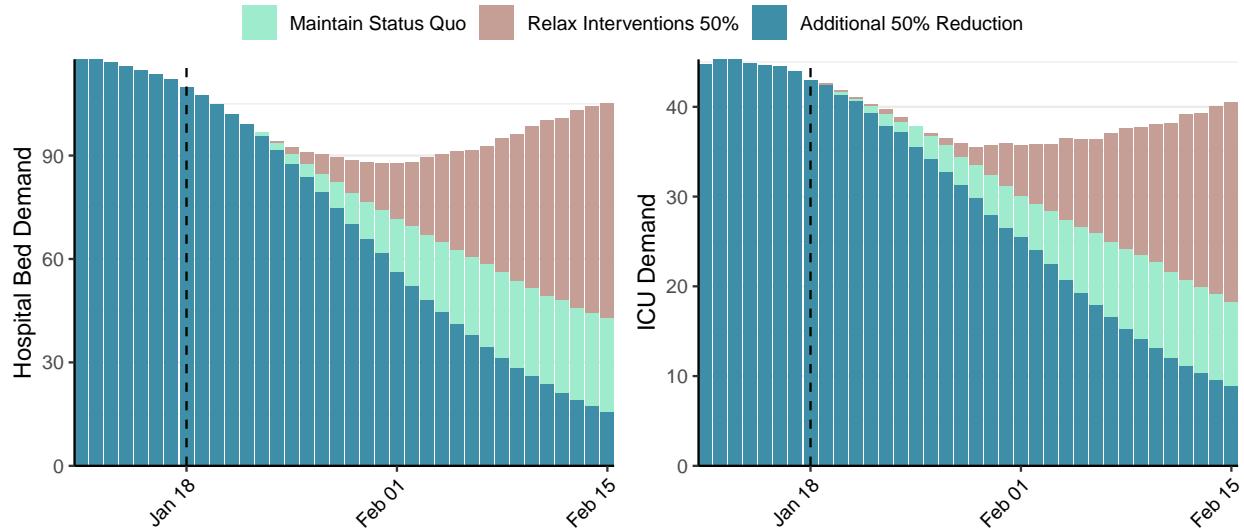


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 918 (95% CI: 849-987) at the current date to 32 (95% CI: 28-36) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 918 (95% CI: 849-987) at the current date to 1,551 (95% CI: 1,358-1,744) by 2021-02-15.

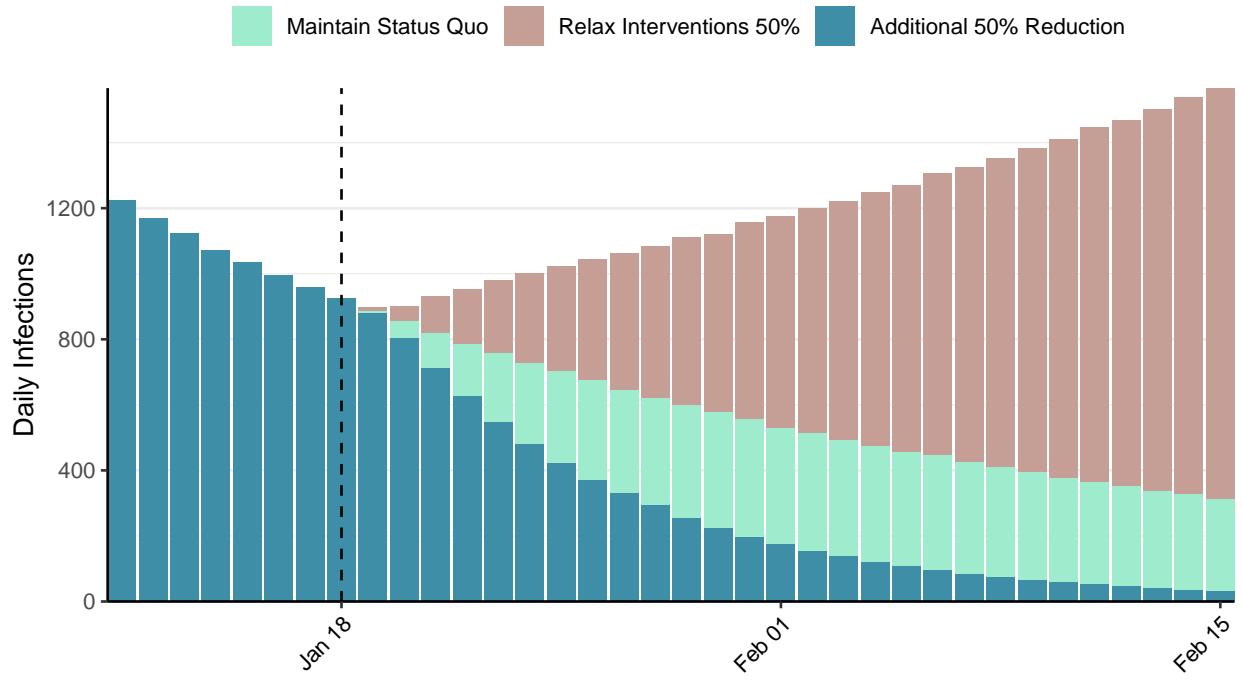


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: South Korea, 2021-01-18

[Download the report for South Korea, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
386	386	19	19	0.62 (95% CI: 0.47-0.8)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

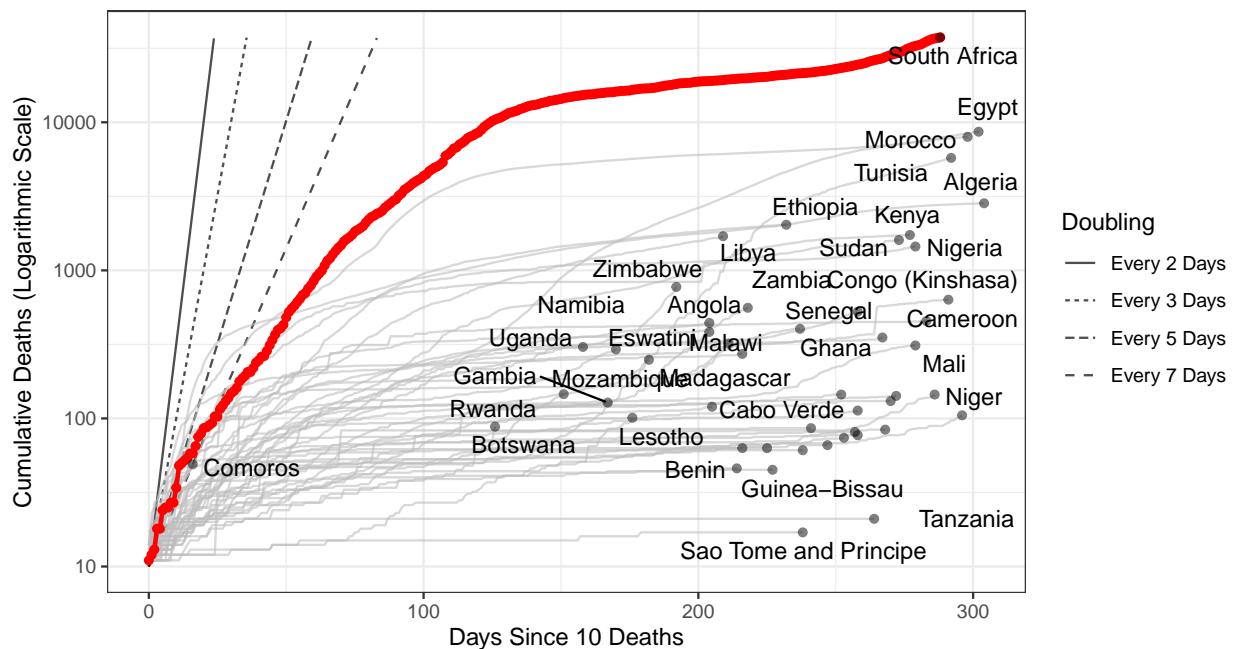


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 244,880 (95% CI: 232,293–257,467) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

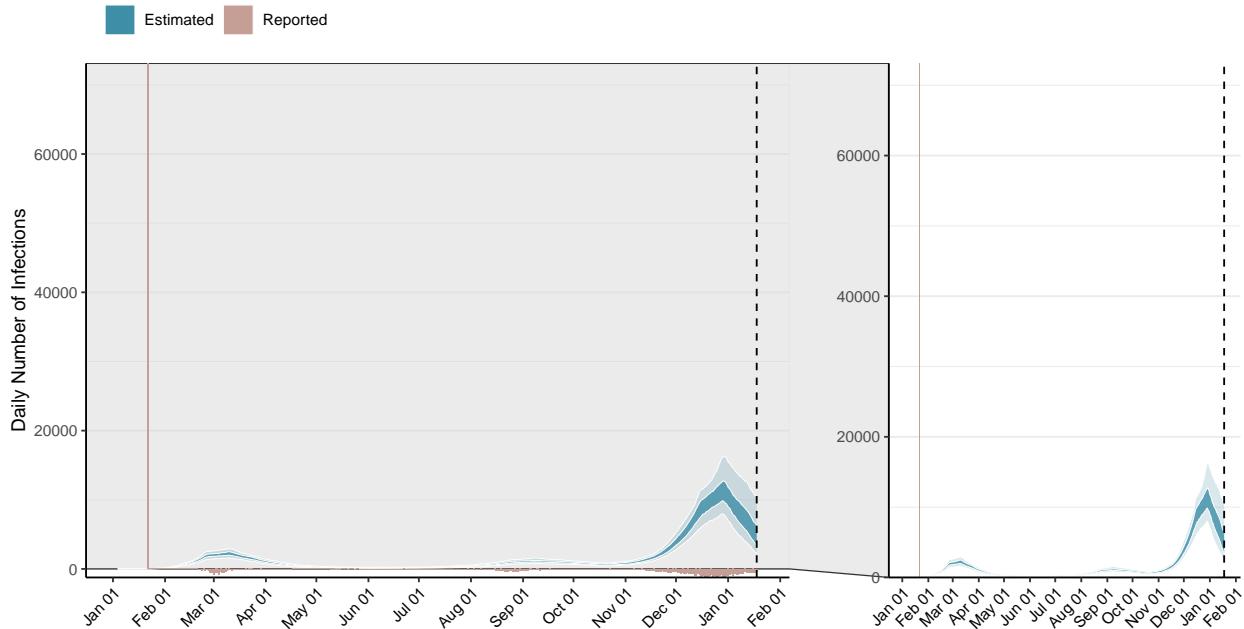
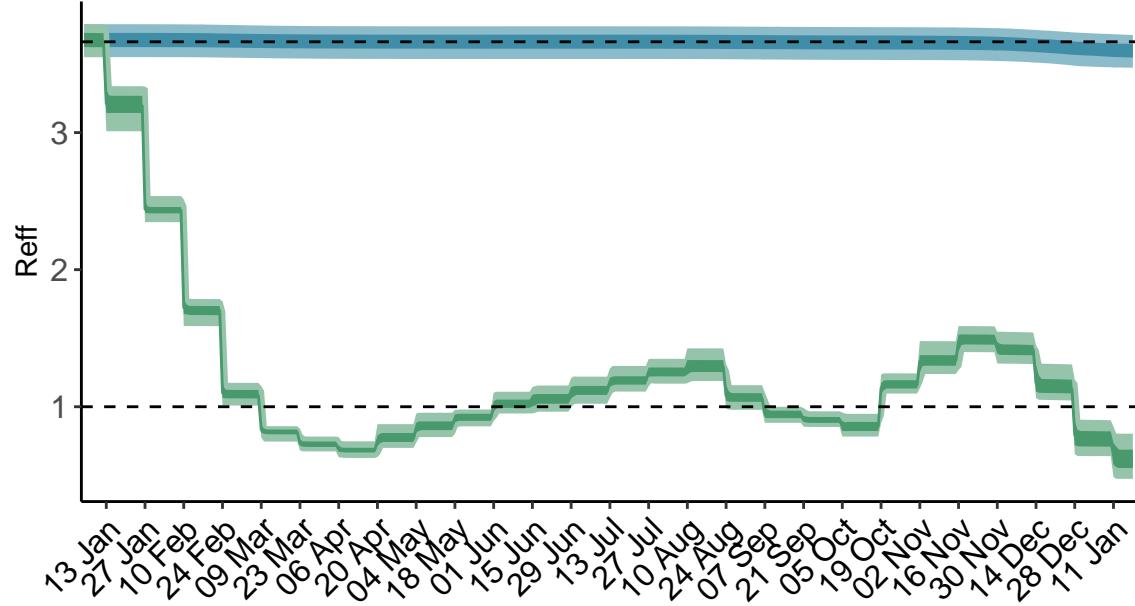


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

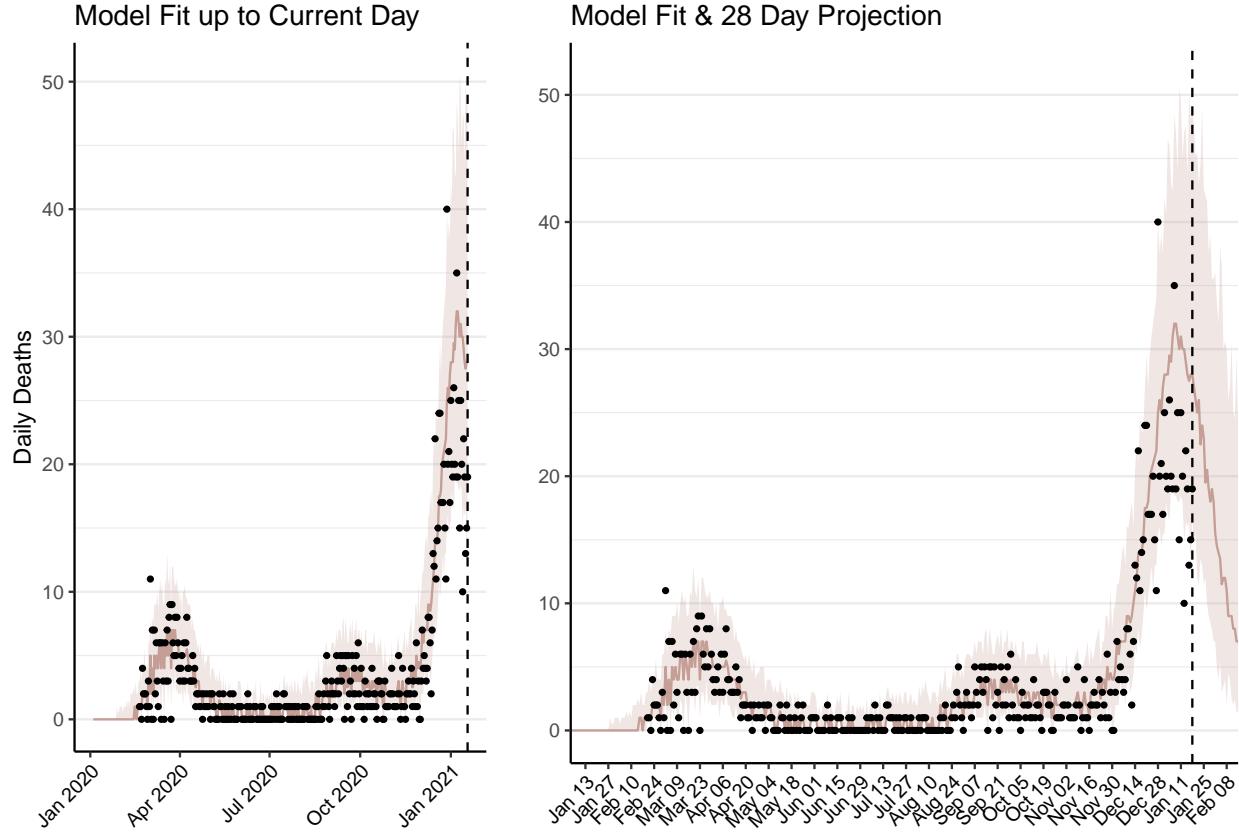


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 991 (95% CI: 934-1,049) patients requiring treatment with high-pressure oxygen at the current date to 261 (95% CI: 224-298) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 394 (95% CI: 373-415) patients requiring treatment with mechanical ventilation at the current date to 120 (95% CI: 105-135) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

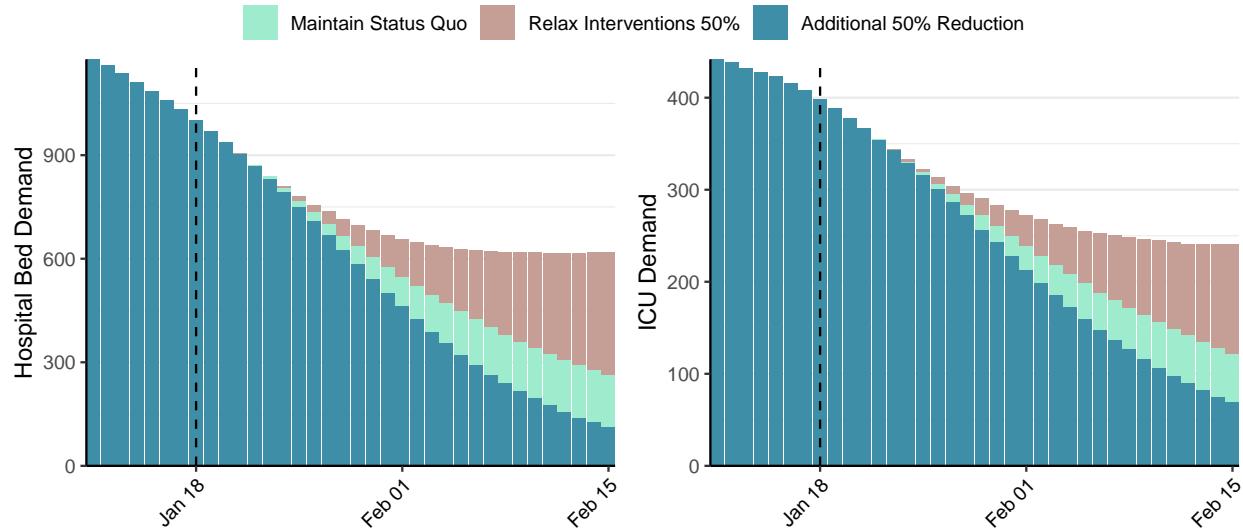
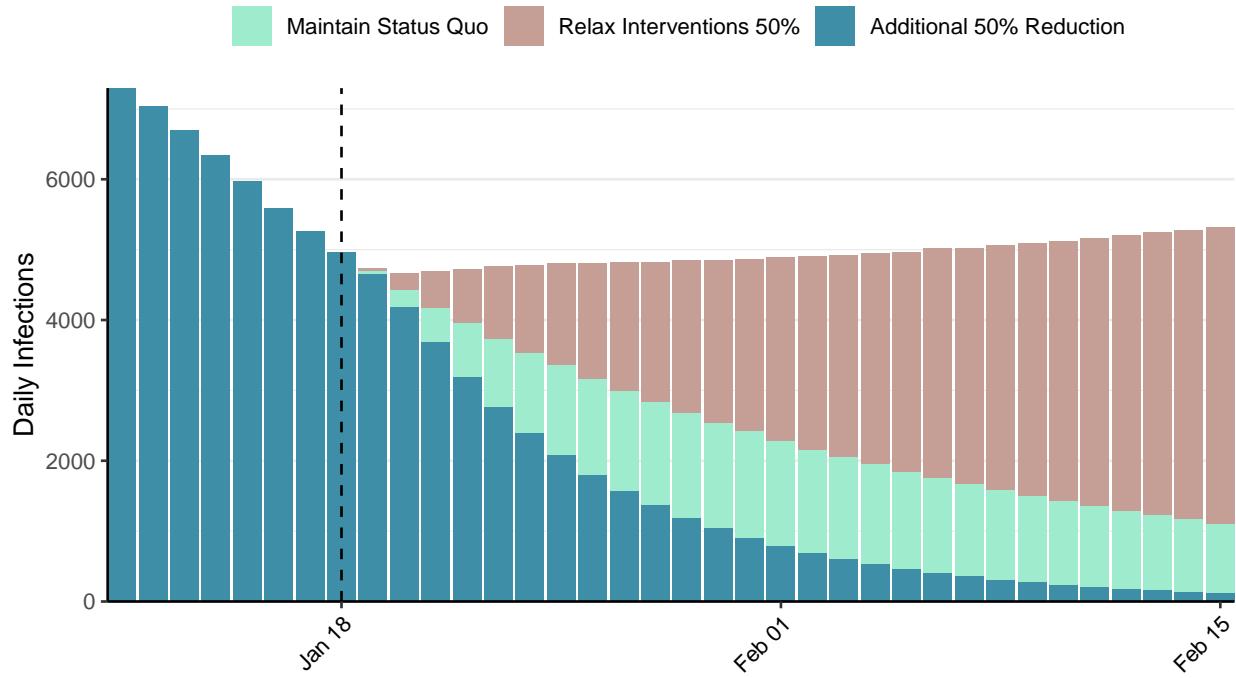


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,914 (95% CI: 4,469-5,360) at the current date to 122 (95% CI: 100-145) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,914 (95% CI: 4,469-5,360) at the current date to 5,266 (95% CI: 4,107-6,425) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Lebanon, 2021-01-18

[Download the report for Lebanon, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.93 (95% CI: 0.75-1.12)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Lebanon is not shown in the following plot as only 0 deaths have been reported to date**

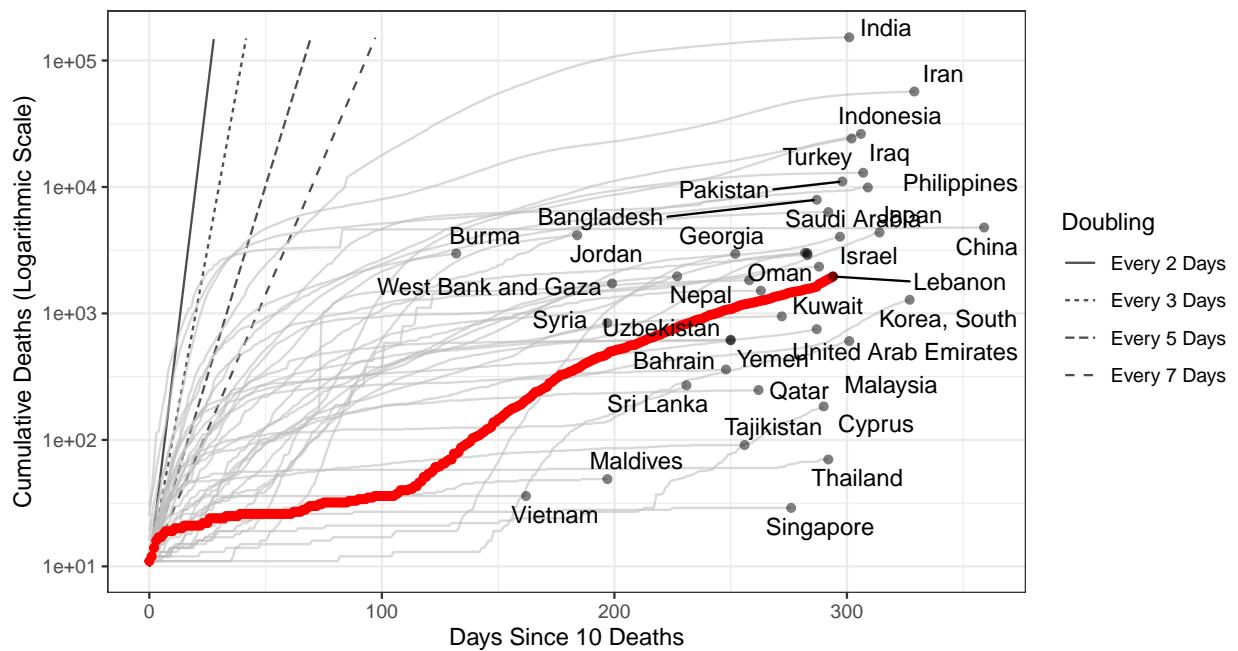


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 361,078 (95% CI: 350,328–371,828) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

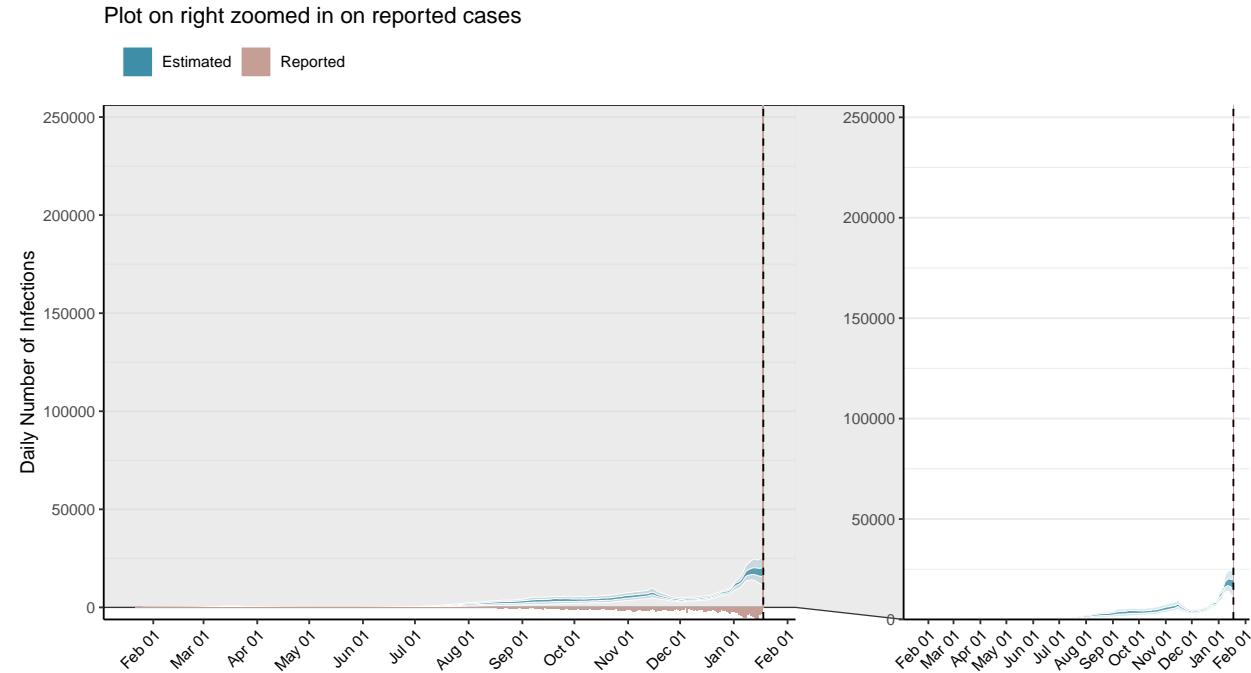
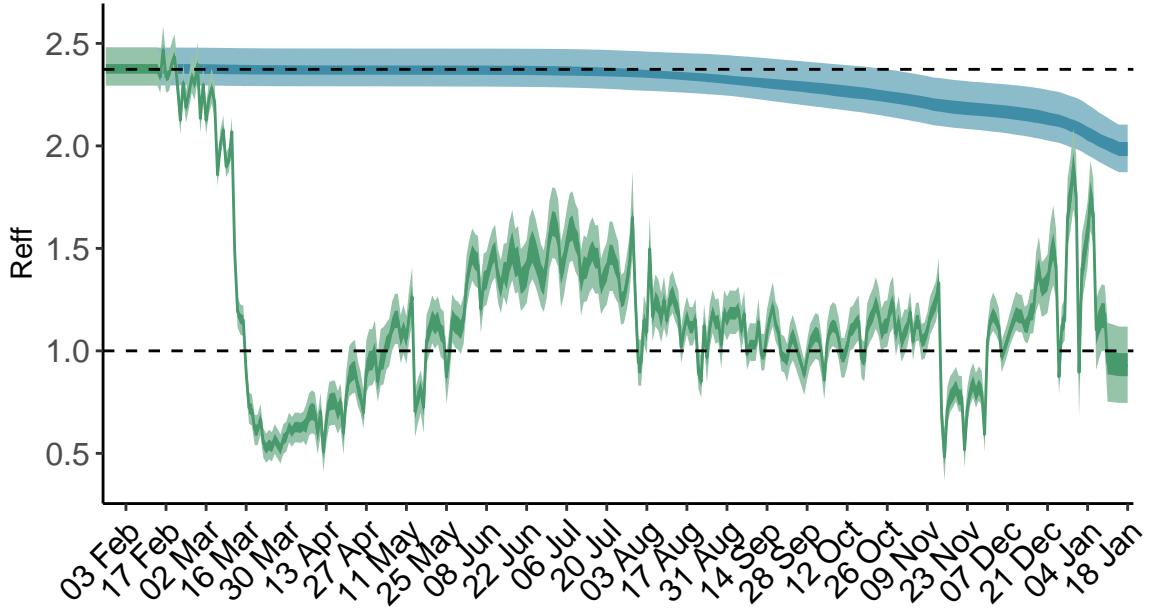


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Lebanon is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

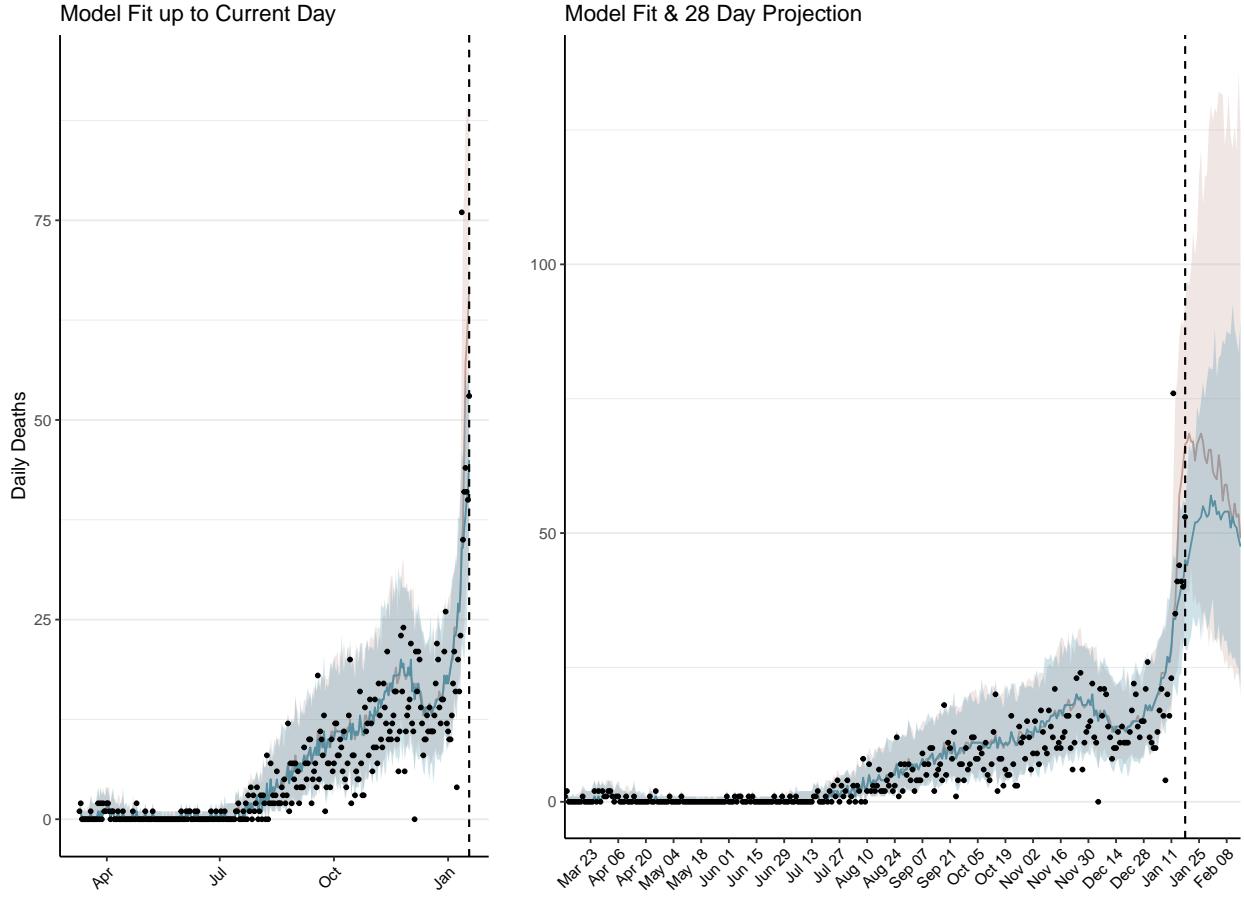


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,861 (95% CI: 1,802-1,920) patients requiring treatment with high-pressure oxygen at the current date to 1,851 (95% CI: 1,700-2,002) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 544 (95% CI: 532-555) patients requiring treatment with mechanical ventilation at the current date to 514 (95% CI: 496-533) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

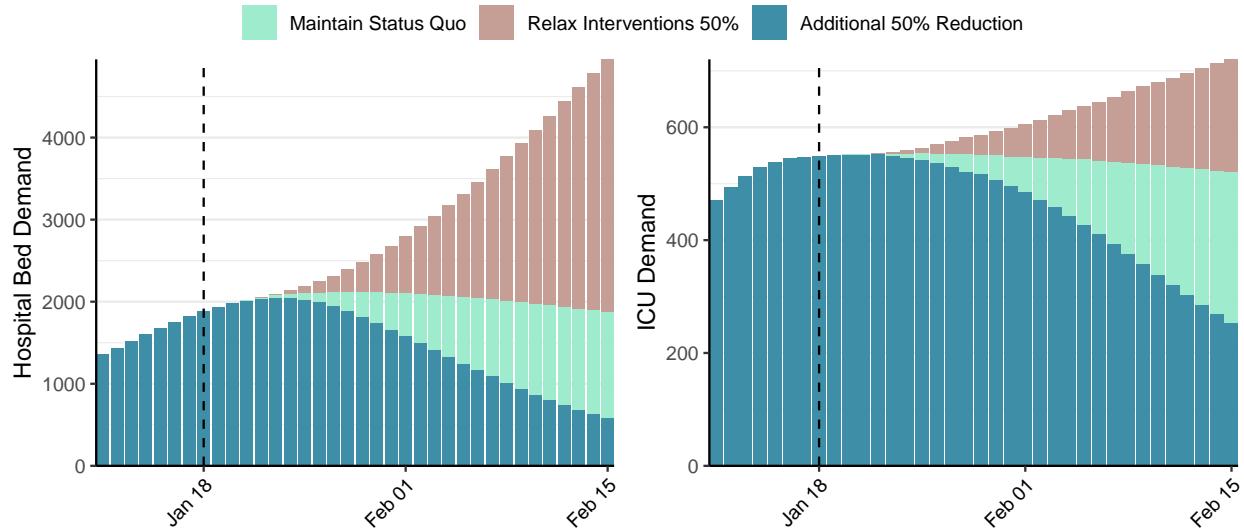


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 17,505 (95% CI: 16,722-18,288) at the current date to 1,241 (95% CI: 1,111-1,372) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 17,505 (95% CI: 16,722-18,288) at the current date to 51,443 (95% CI: 46,957-55,929) by 2021-02-15.

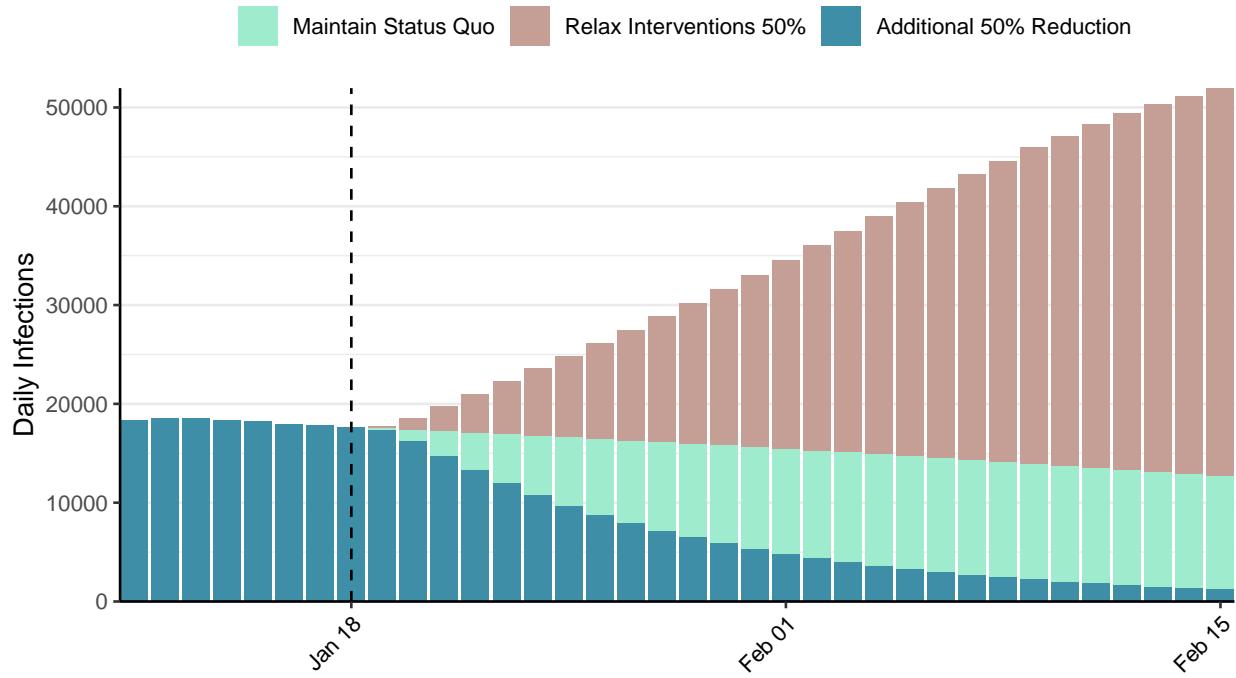


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Liberia, 2021-01-18

[Download the report for Liberia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9	9	0	0	0.97 (95% CI: 0.7-1.23)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Liberia is not shown in the following plot as only 0 deaths have been reported to date**

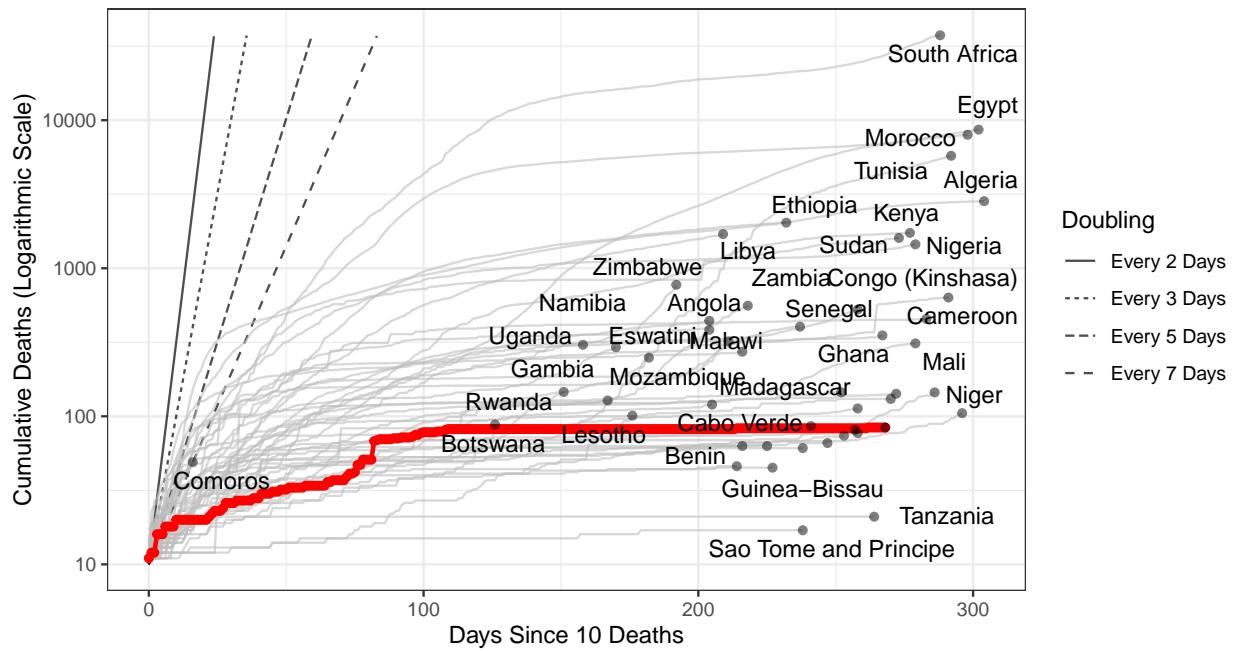


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 159 (95% CI: 106-213) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

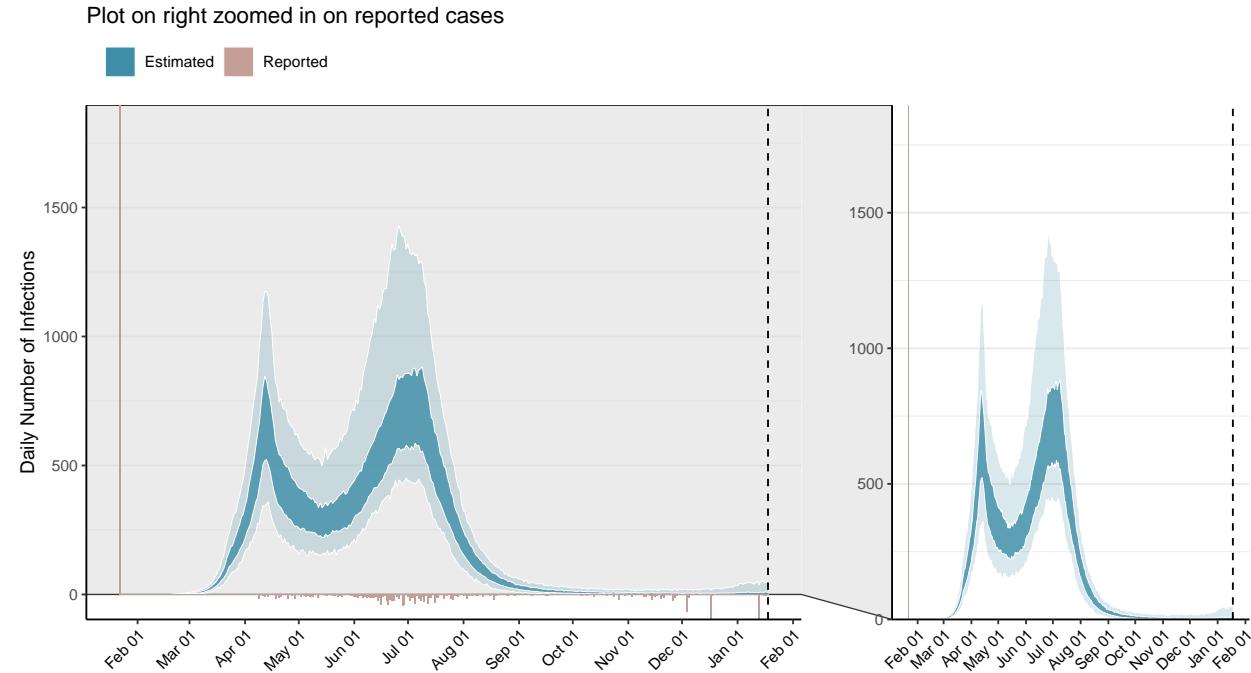
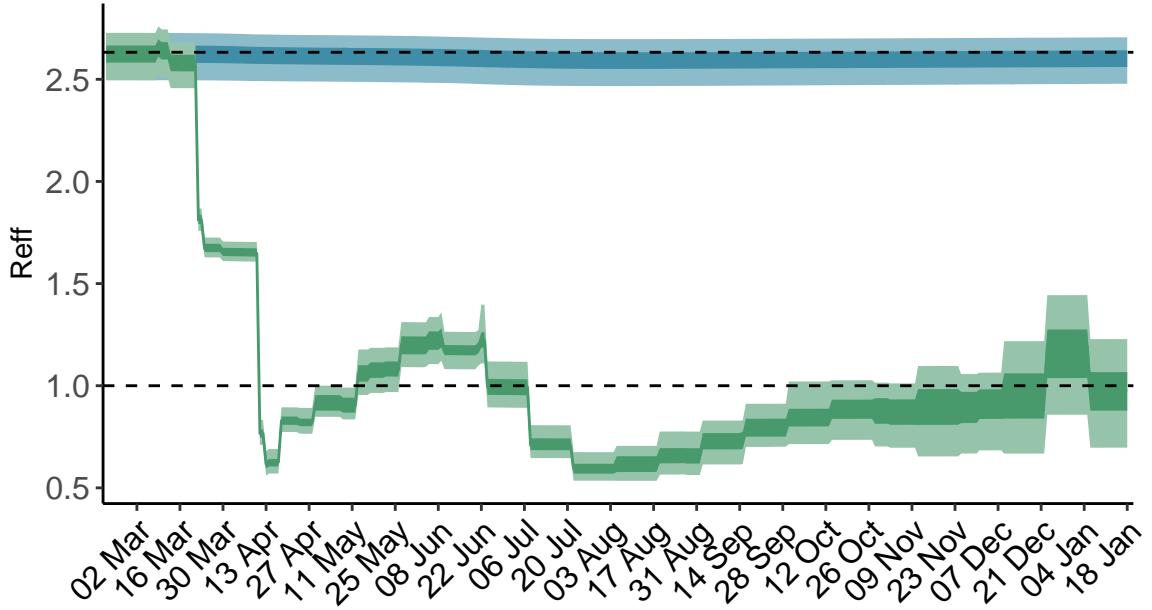


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

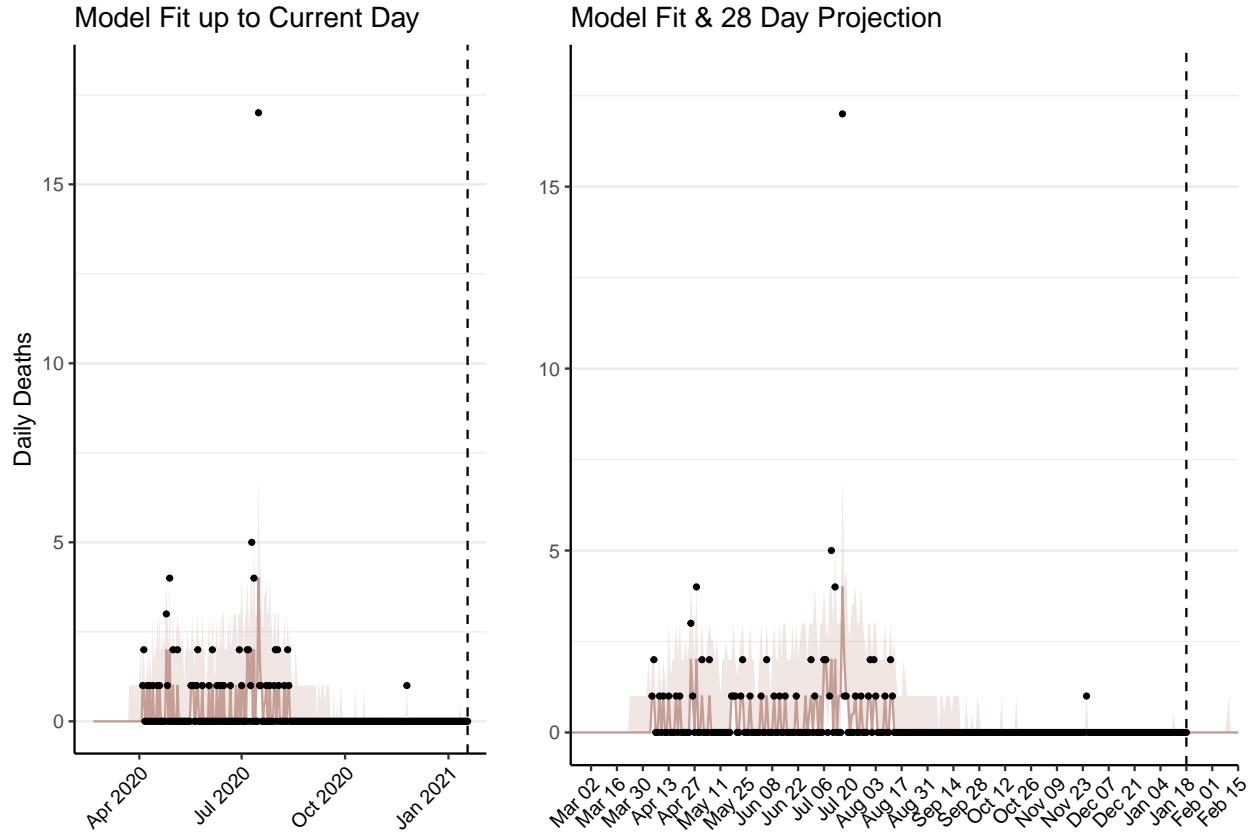


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-1) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 0-1) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

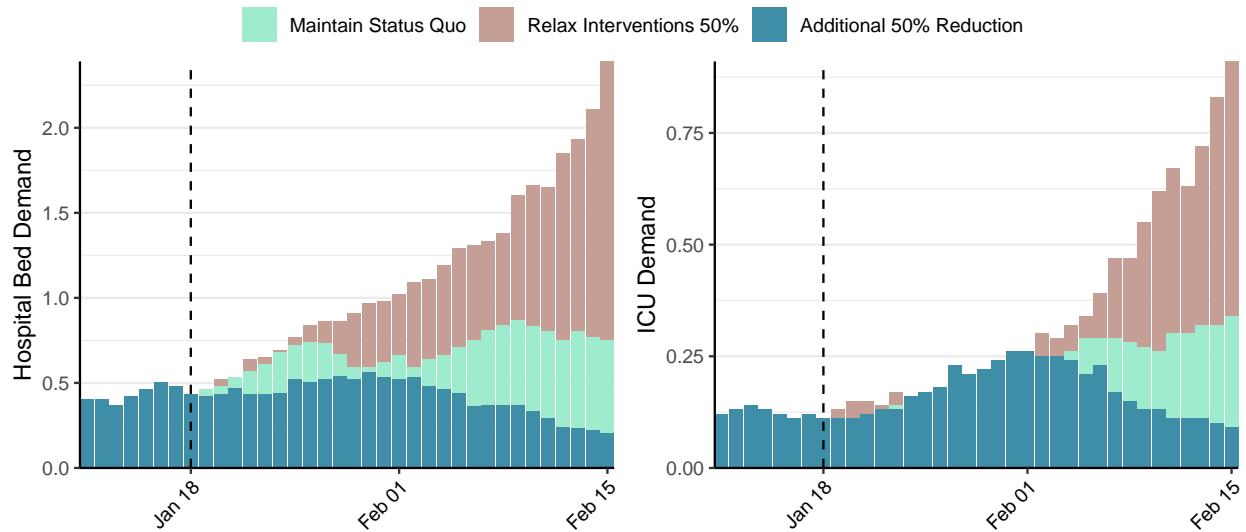


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 7 (95% CI: 4-10) at the current date to 1 (95% CI: 0-1) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7 (95% CI: 4-10) at the current date to 72 (95% CI: 37-106) by 2021-02-15.

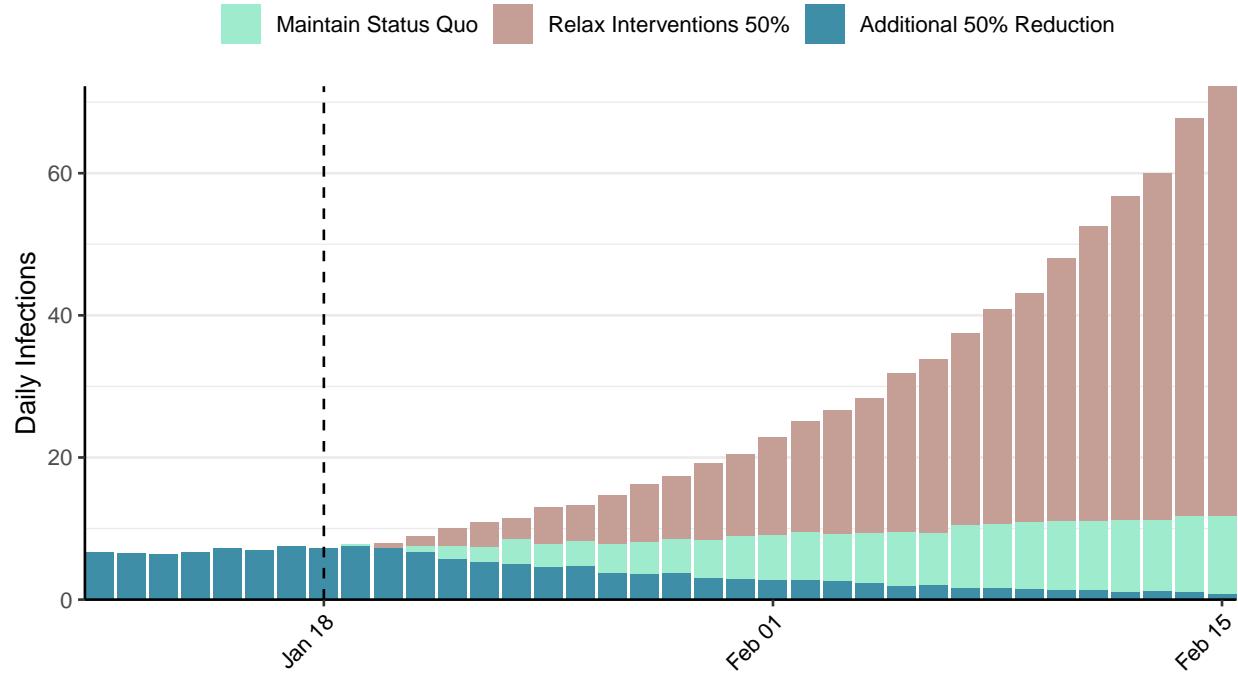


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Libya, 2021-01-18

[Download the report for Libya, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
781	781	33	33	1.12 (95% CI: 0.9-1.37)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

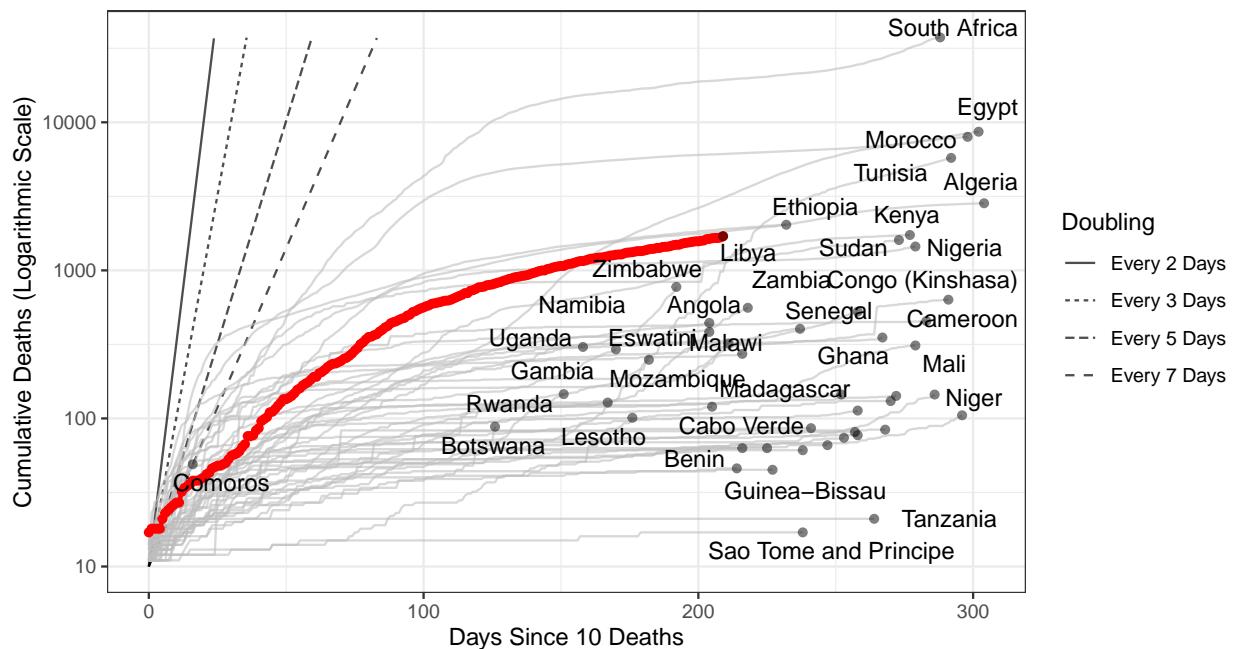


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 141,433 (95% CI: 135,185-147,681) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

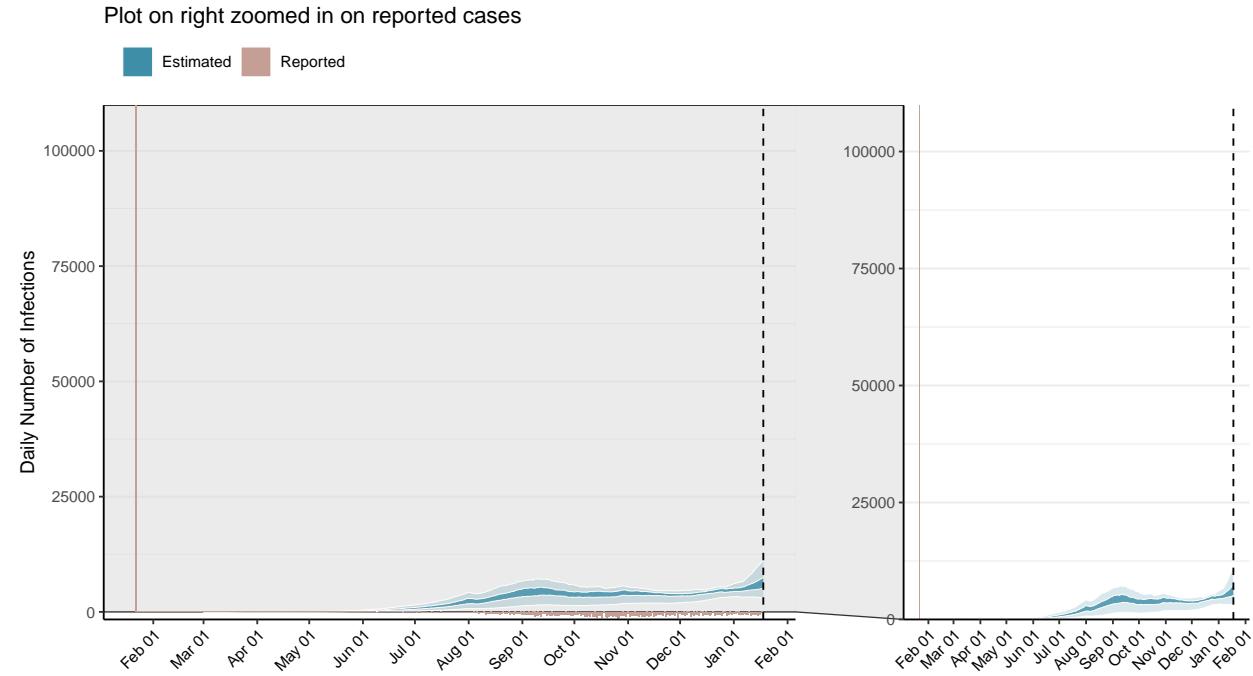
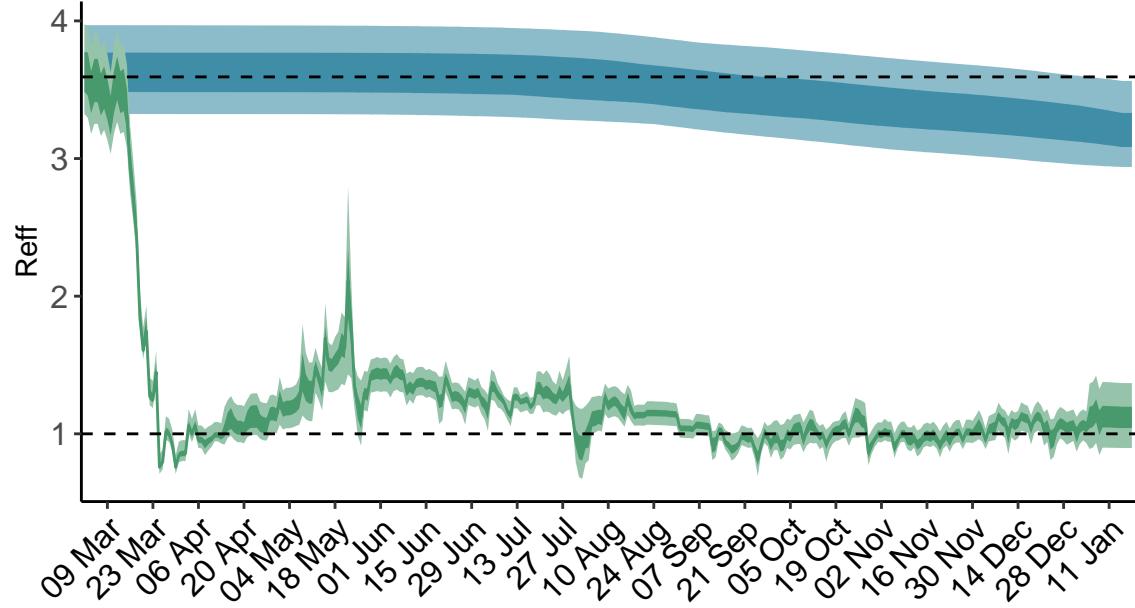


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

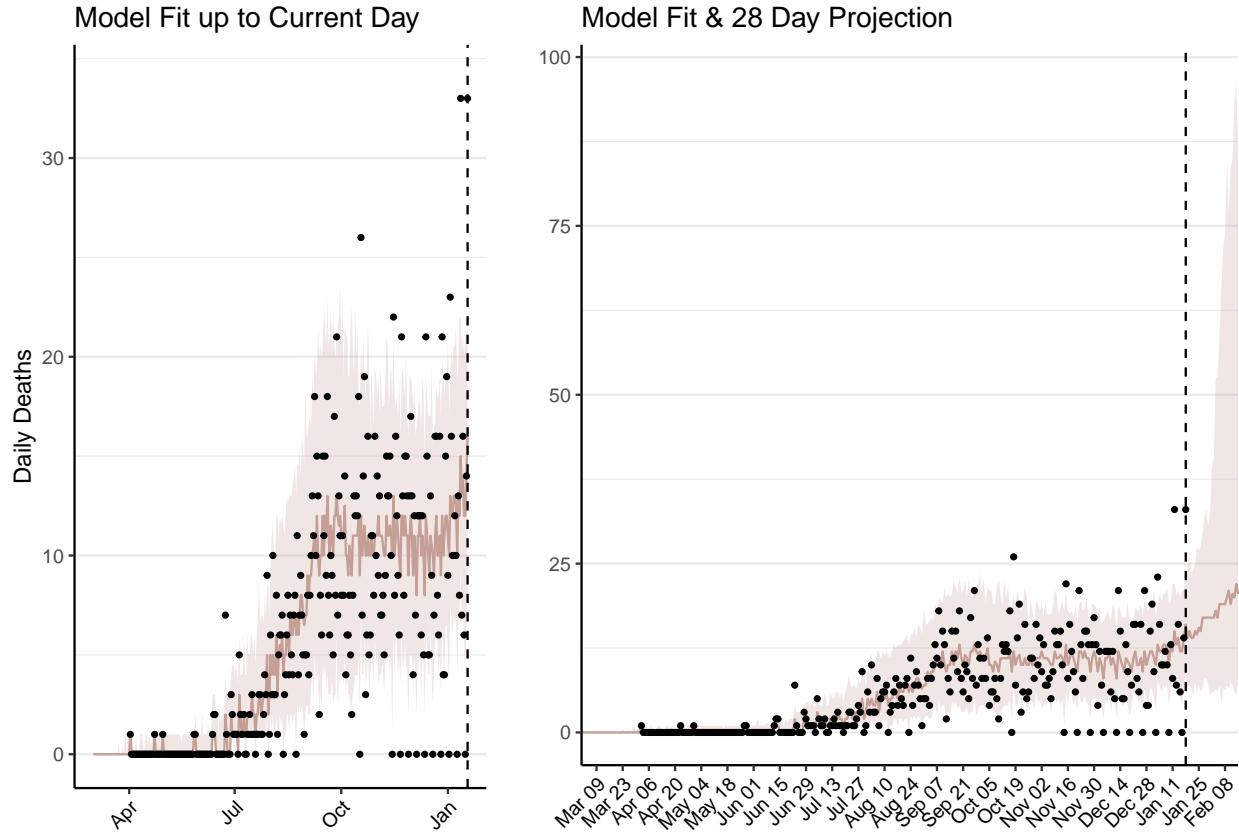


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 595 (95% CI: 566-624) patients requiring treatment with high-pressure oxygen at the current date to 1,070 (95% CI: 906-1,235) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 221 (95% CI: 211-231) patients requiring treatment with mechanical ventilation at the current date to 350 (95% CI: 319-381) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

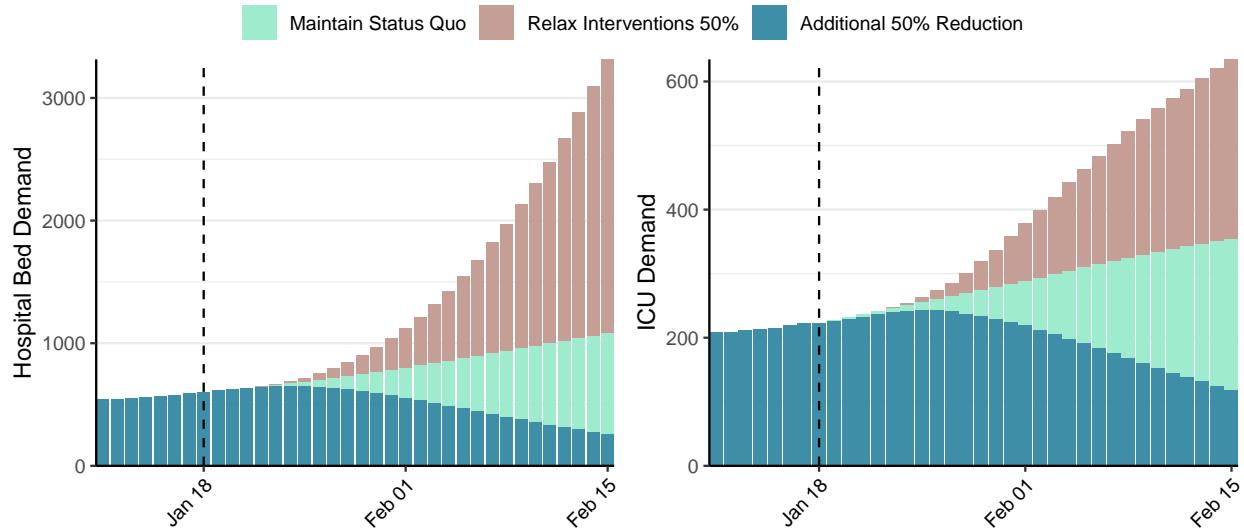


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 6,335 (95% CI: 5,836-6,834) at the current date to 928 (95% CI: 746-1,110) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 6,335 (95% CI: 5,836-6,834) at the current date to 54,747 (95% CI: 48,009-61,485) by 2021-02-15.

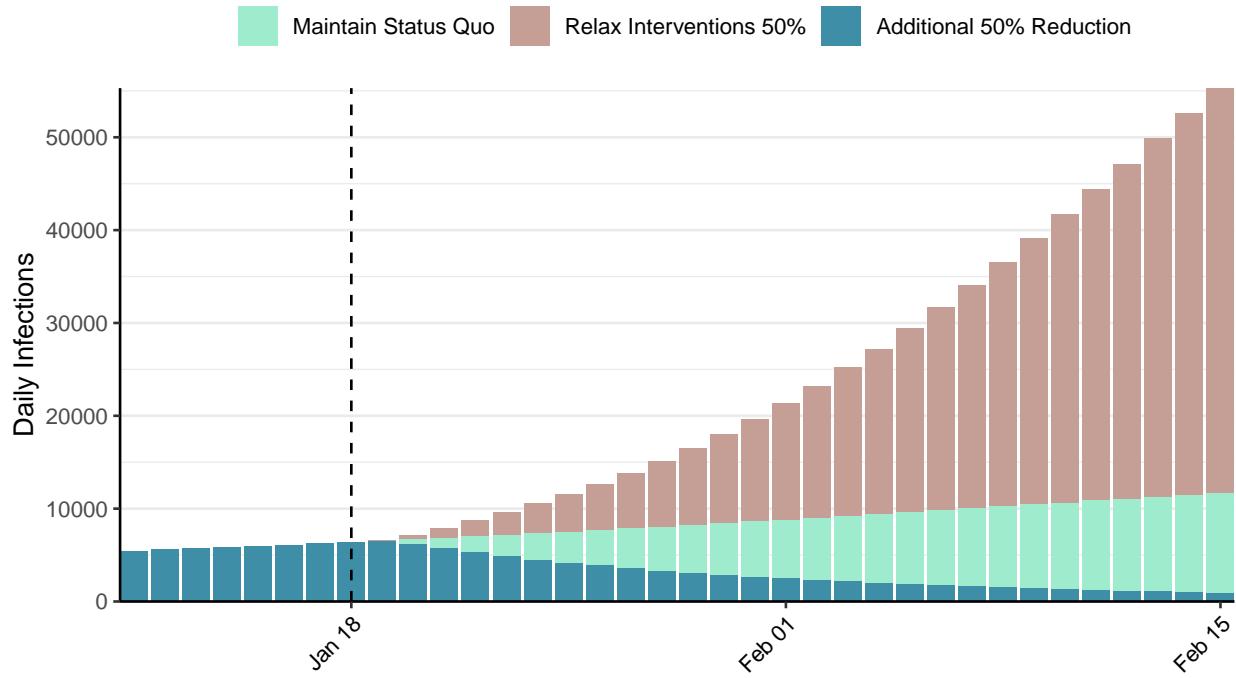


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: St. Lucia, 2021-01-18

[Download the report for St. Lucia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
10	10	0	0	1.12 (95% CI: 0.82-1.4)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. St. Lucia is not shown in the following plot as only 0 deaths have been reported to date**

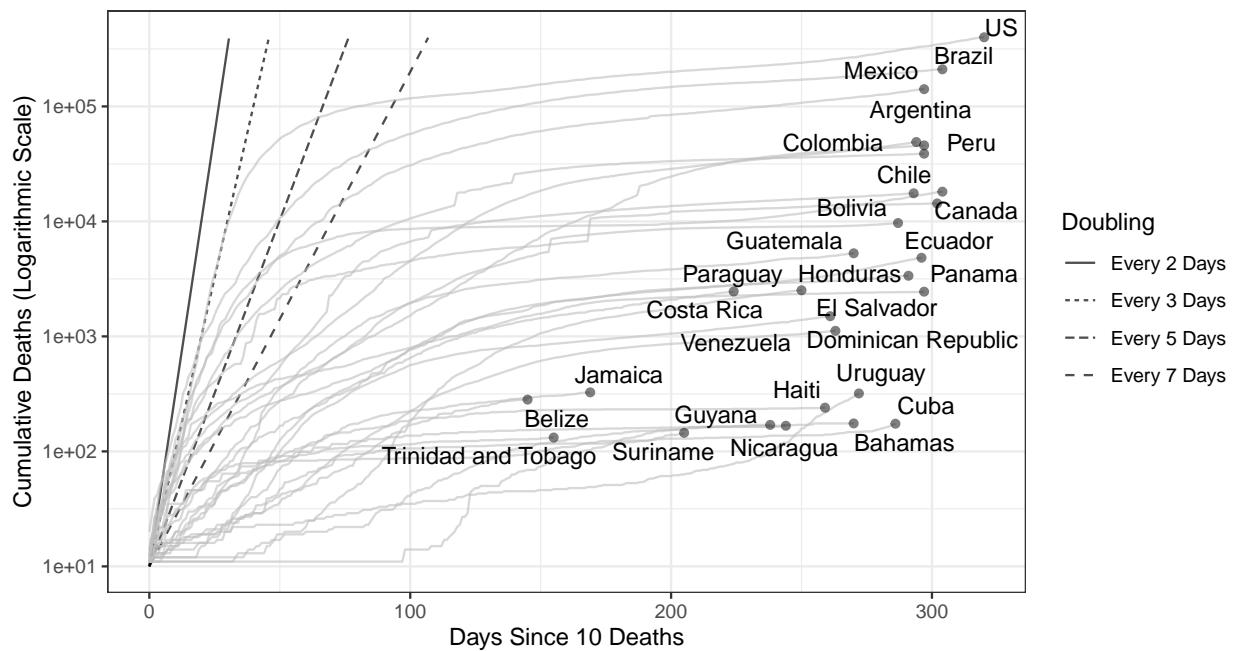


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3,537 (95% CI: 3,067-4,006) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

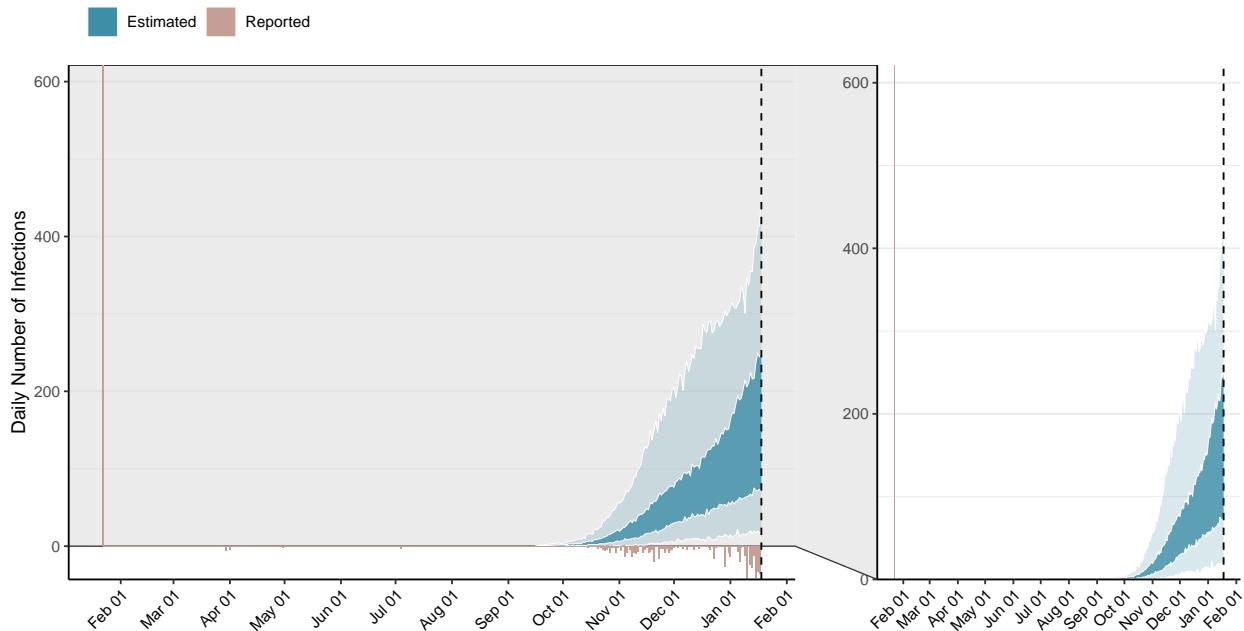
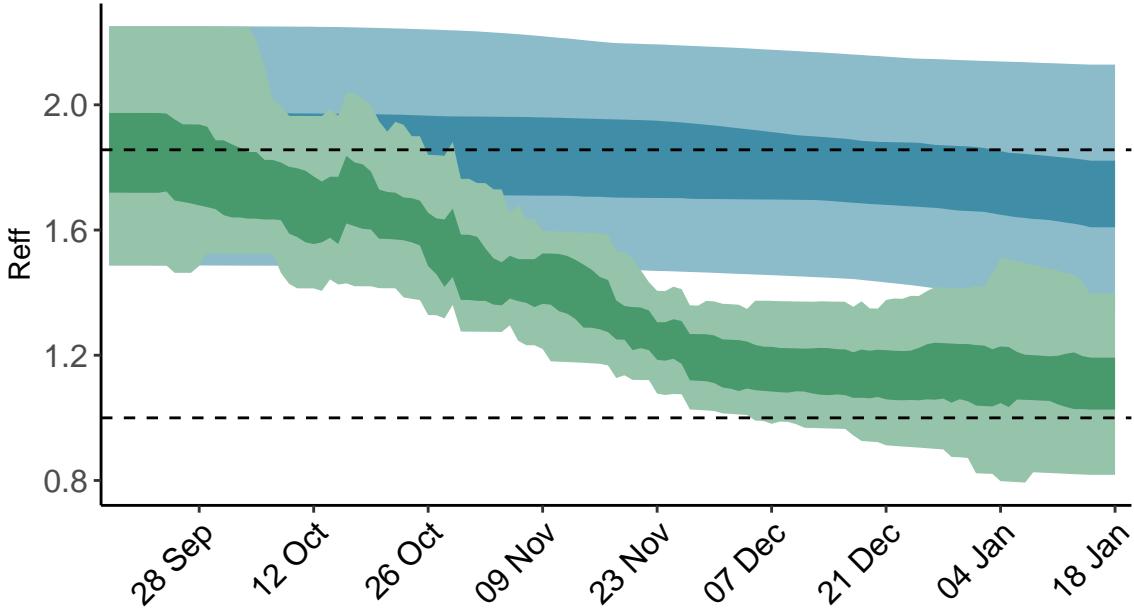


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

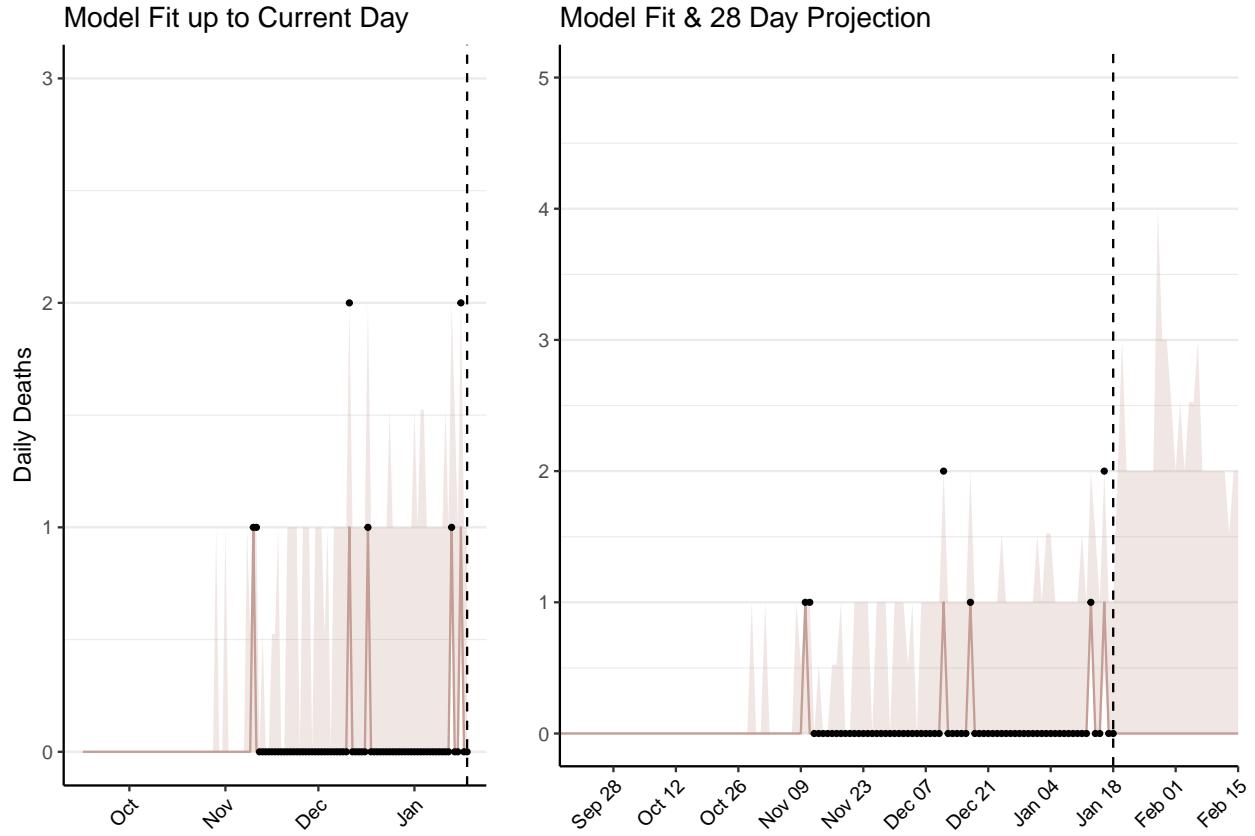


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 14 (95% CI: 12-16) patients requiring treatment with high-pressure oxygen at the current date to 8 (95% CI: 5-11) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 5 (95% CI: 4-6) patients requiring treatment with mechanical ventilation at the current date to 3 (95% CI: 2-4) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

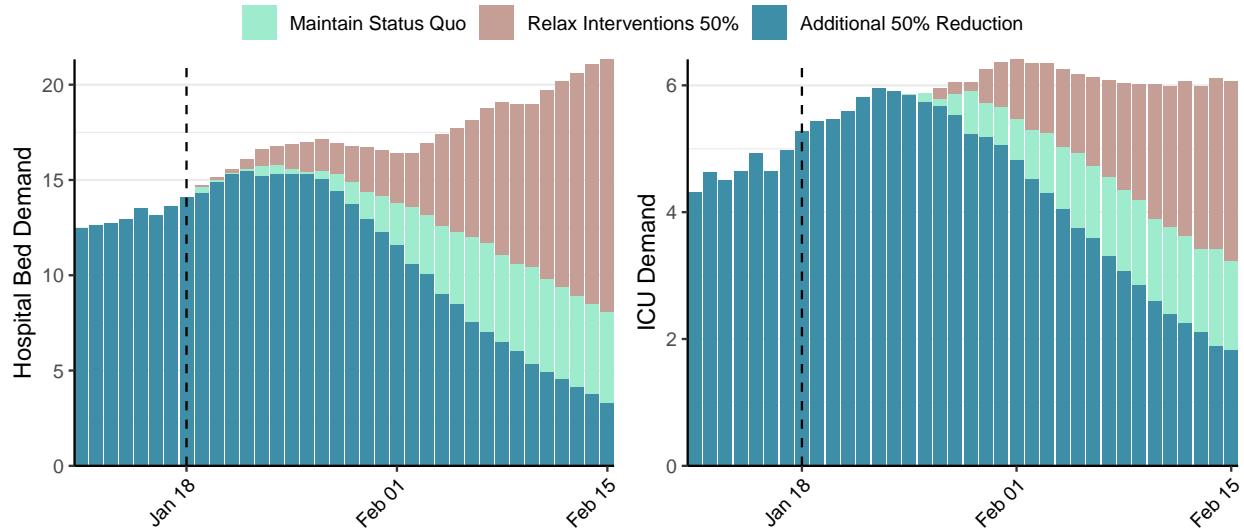


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 168 (95% CI: 144-193) at the current date to 5 (95% CI: 3-7) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 168 (95% CI: 144-193) at the current date to 227 (95% CI: 132-322) by 2021-02-15.

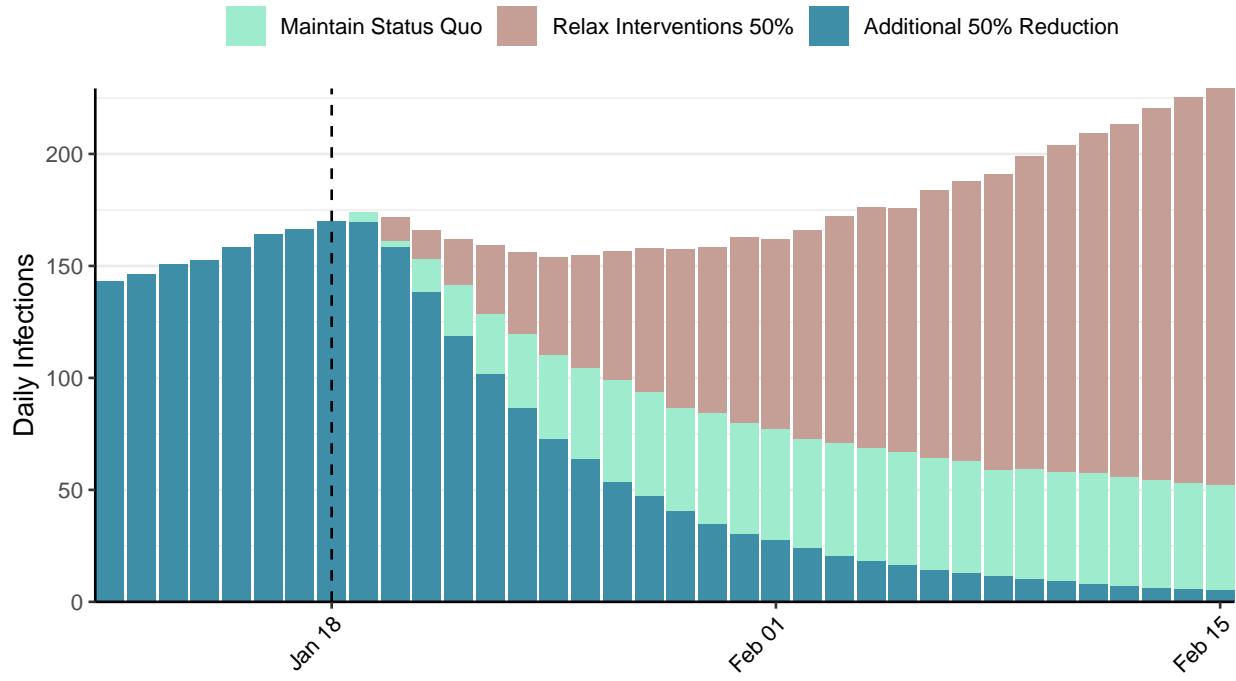


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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## Situation Report for COVID-19: Sri Lanka, 2021-01-18

[Download the report for Sri Lanka, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
688	688	6	6	0.94 (95% CI: 0.78-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Sri Lanka is not shown in the following plot as only 6 deaths have been reported to date**

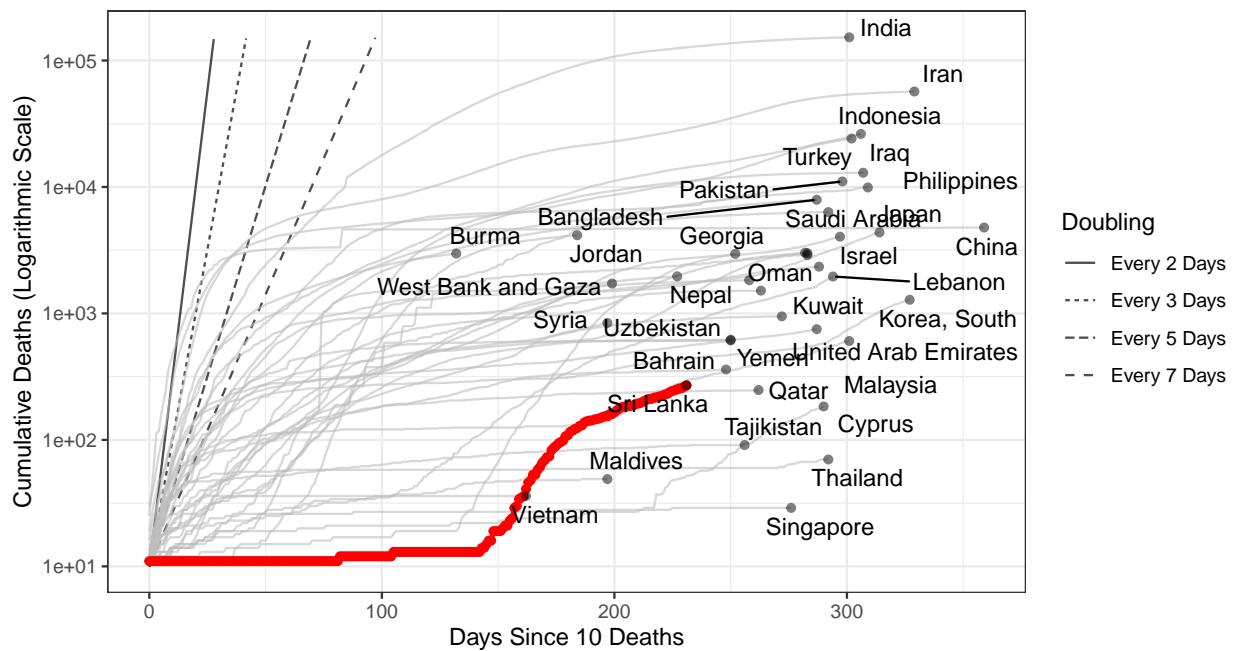


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 53,325 (95% CI: 44,476-62,173) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

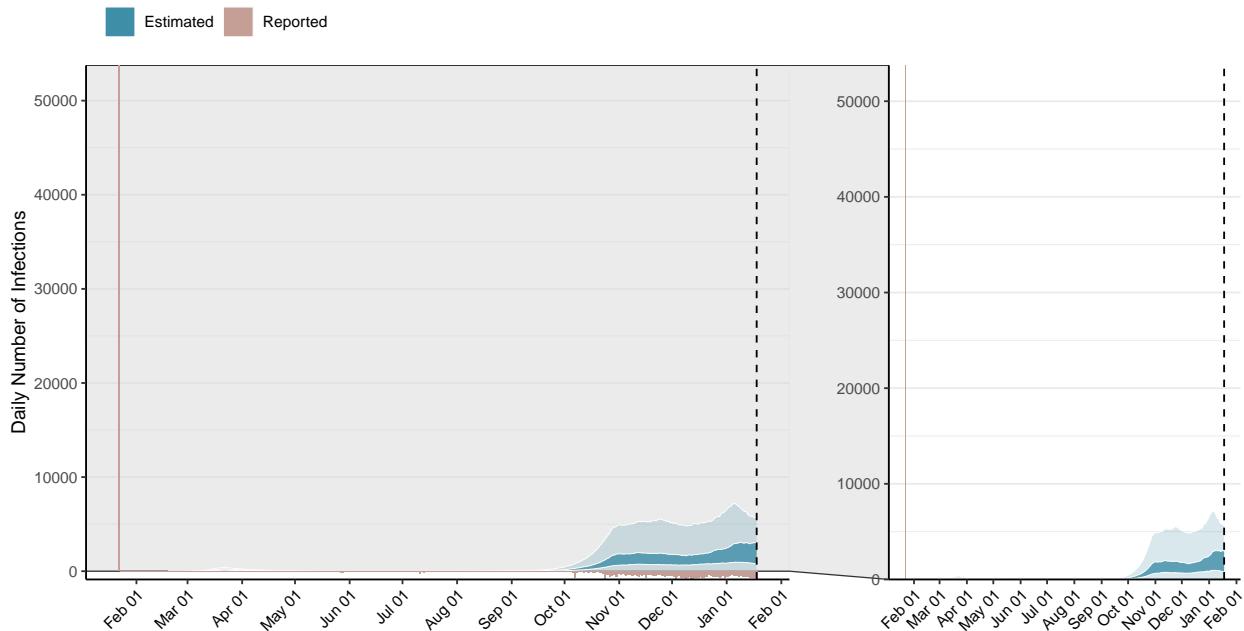
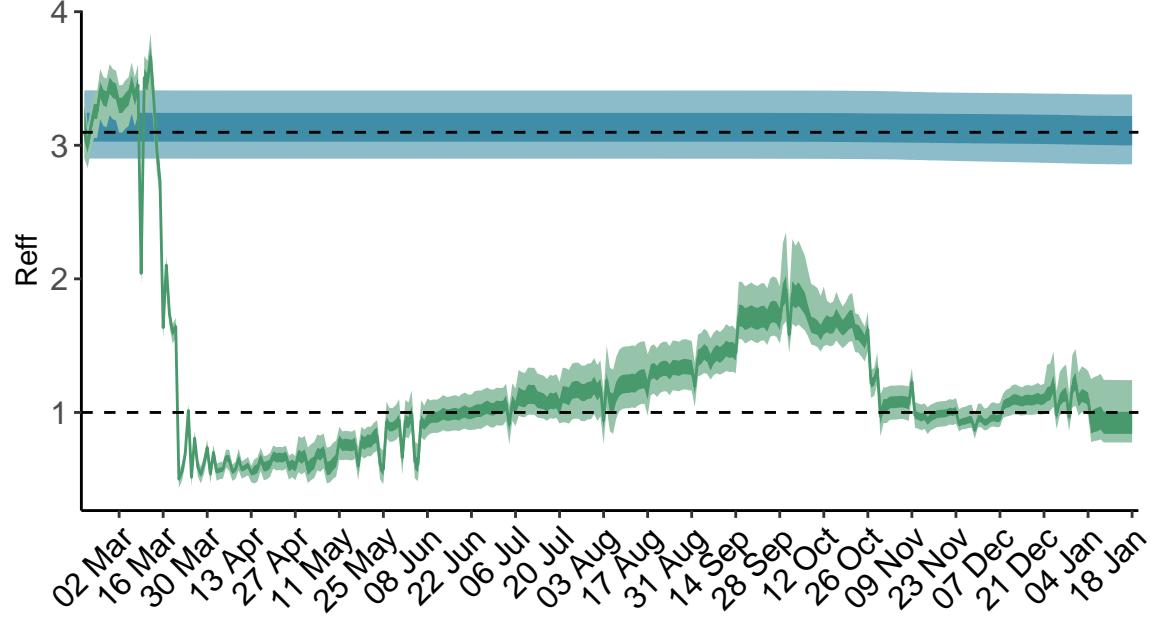


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

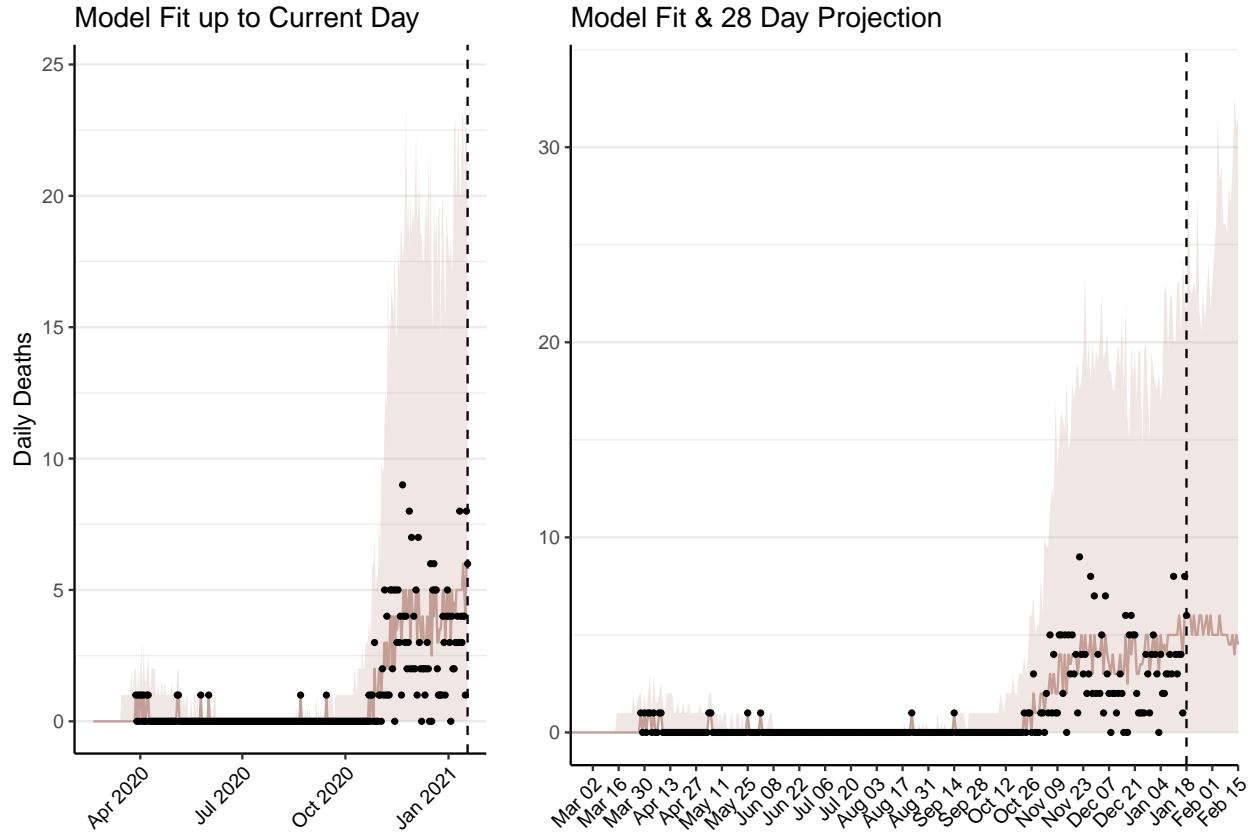


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 265 (95% CI: 220-309) patients requiring treatment with high-pressure oxygen at the current date to 266 (95% CI: 202-330) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 100 (95% CI: 83-117) patients requiring treatment with mechanical ventilation at the current date to 106 (95% CI: 82-130) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

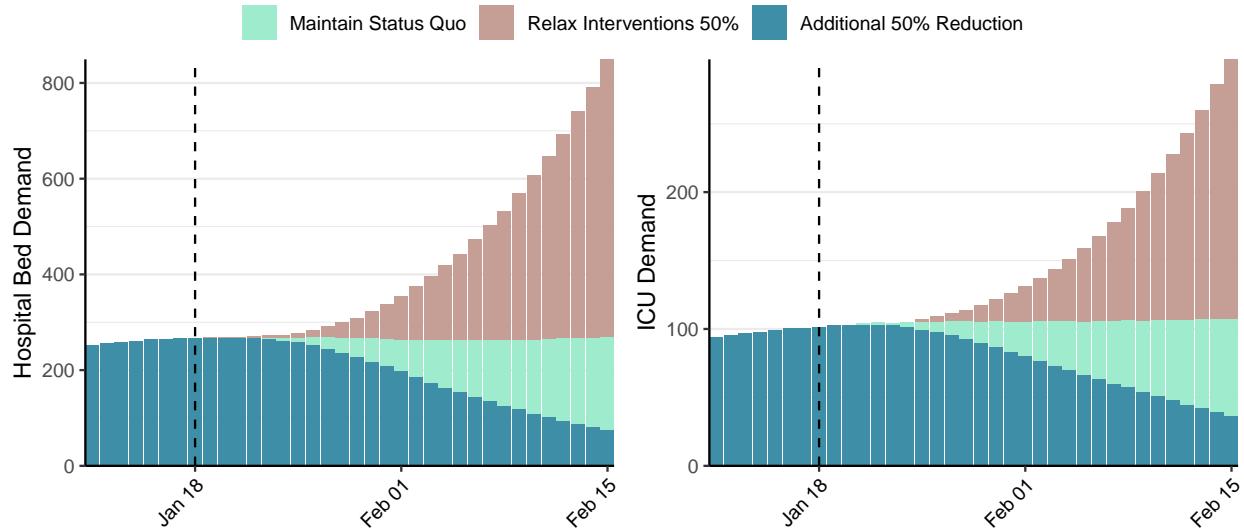
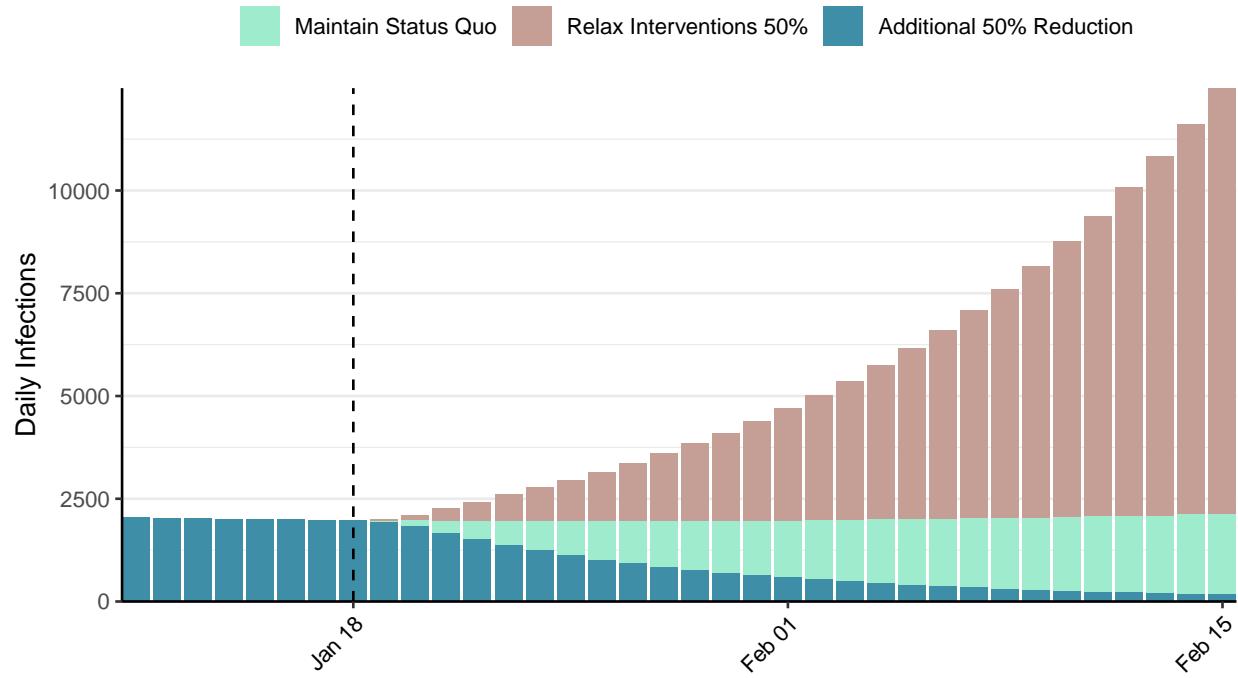


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,959 (95% CI: 1,609-2,308) at the current date to 169 (95% CI: 123-215) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,959 (95% CI: 1,609-2,308) at the current date to 12,368 (95% CI: 8,395-16,341) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Lesotho, 2021-01-18

[Download the report for Lesotho, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.48 (95% CI: 1.26-1.71)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Lesotho is not shown in the following plot as only 0 deaths have been reported to date**

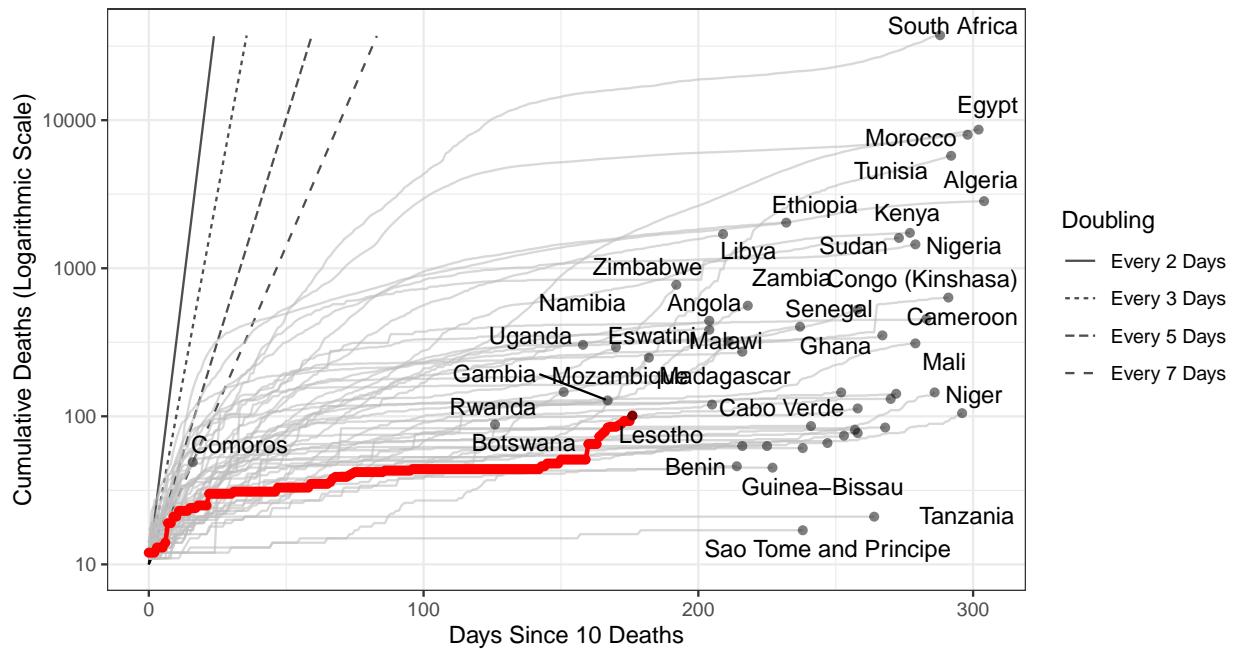


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 60,119 (95% CI: 56,857-63,381) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

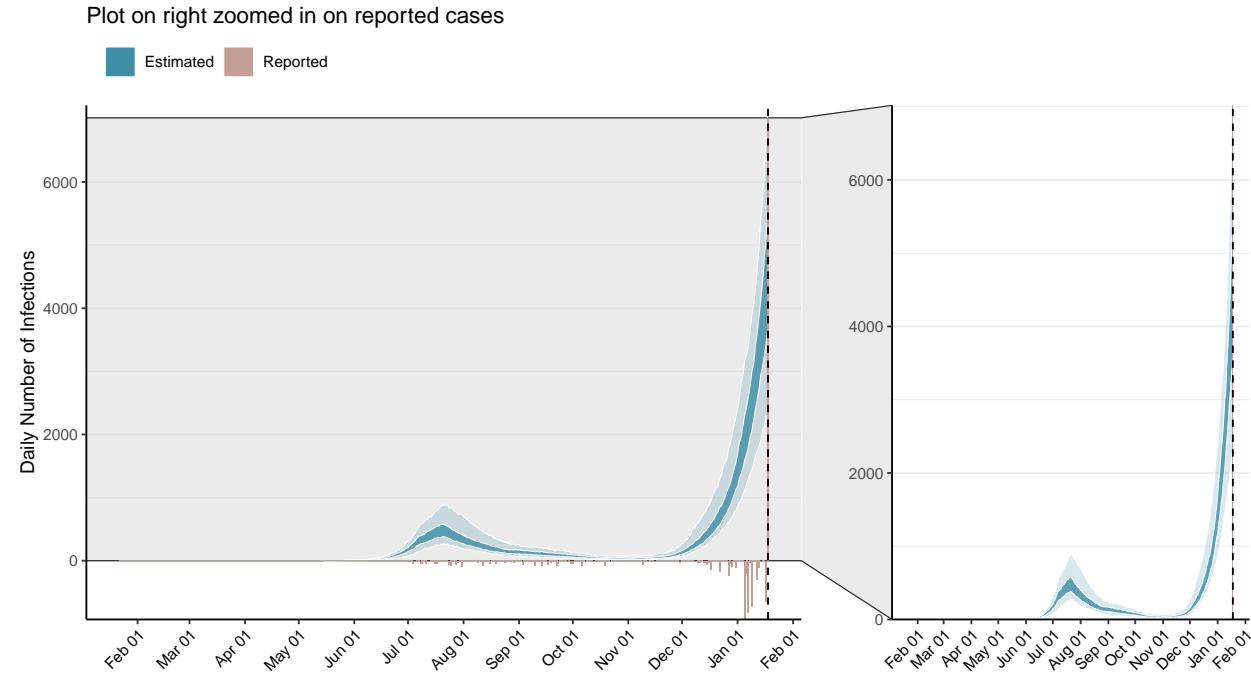
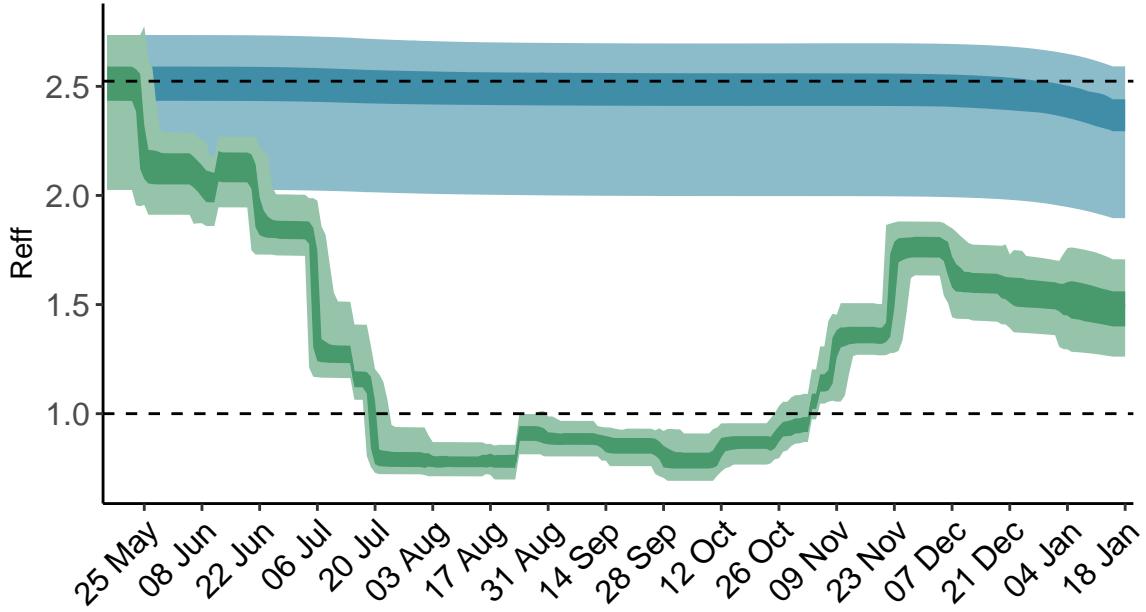


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Lesotho is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

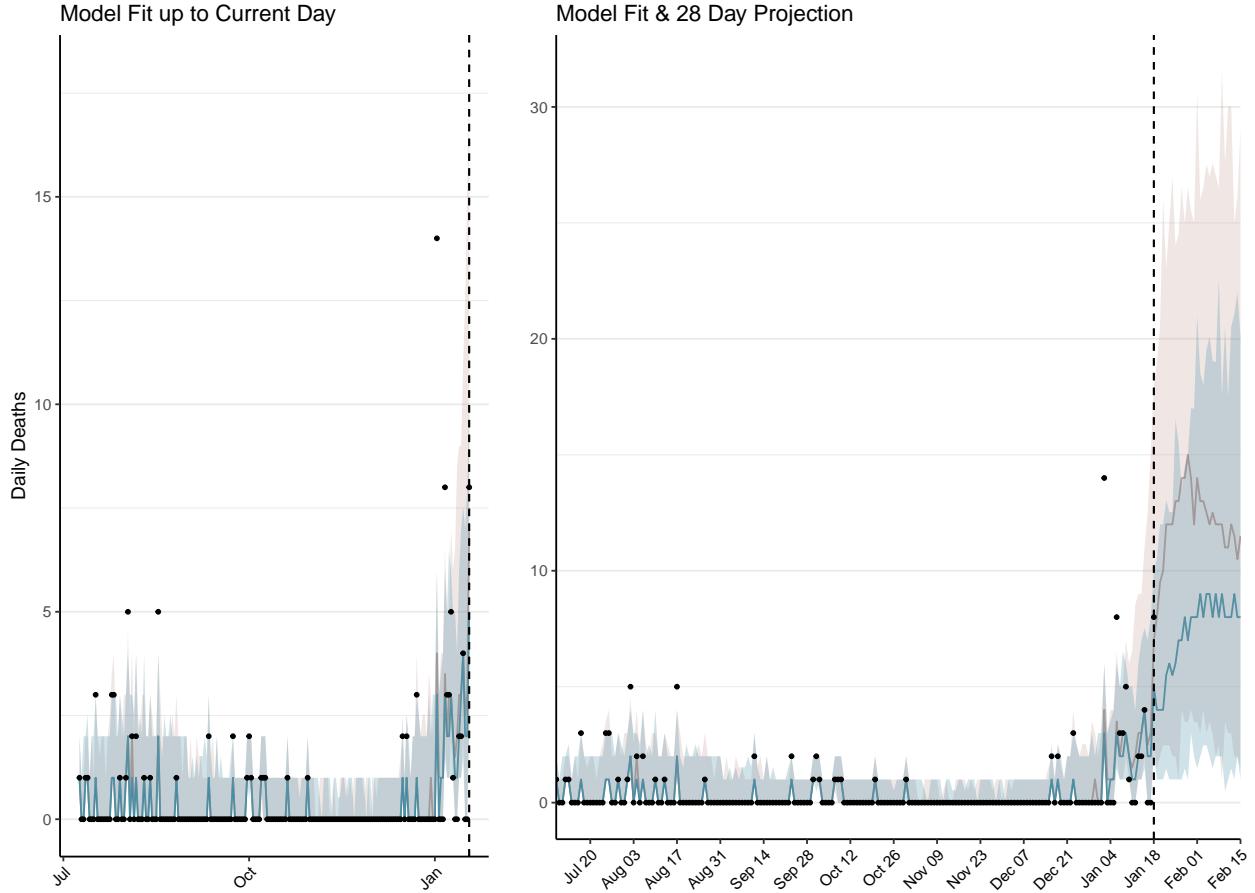


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 225 (95% CI: 212-238) patients requiring treatment with high-pressure oxygen at the current date to 364 (95% CI: 330-397) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 67 (95% CI: 64-69) patients requiring treatment with mechanical ventilation at the current date to 74 (95% CI: 71-77) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

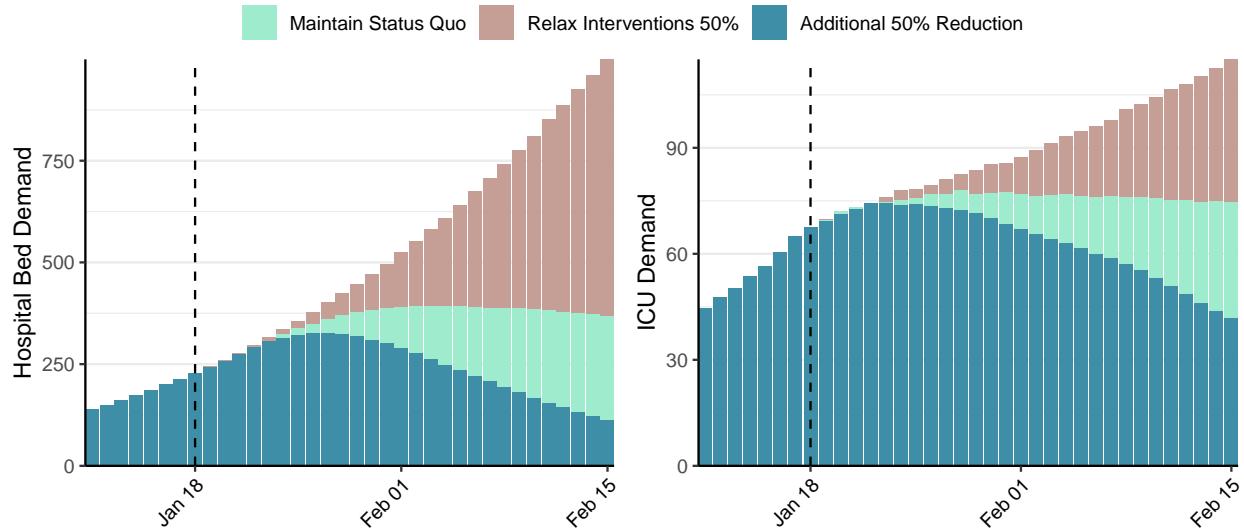


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,591 (95% CI: 4,324-4,859) at the current date to 341 (95% CI: 300-381) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,591 (95% CI: 4,324-4,859) at the current date to 15,425 (95% CI: 13,701-17,150) by 2021-02-15.

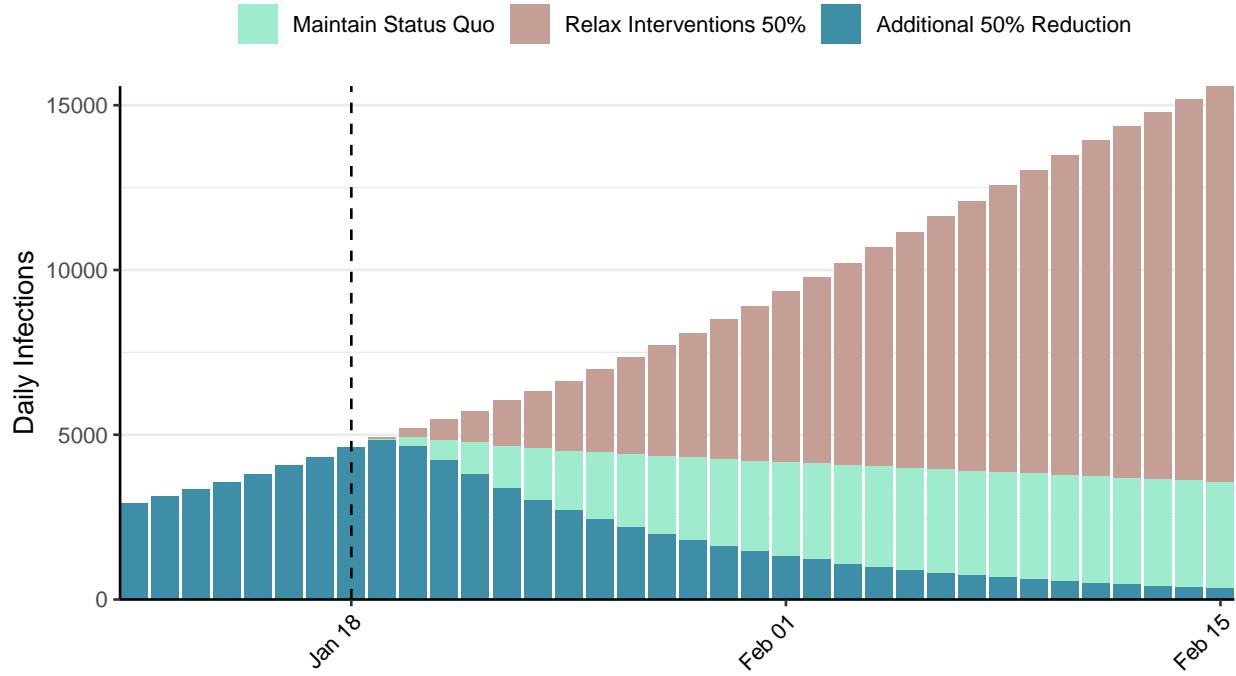


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Morocco, 2021-01-18

[Download the report for Morocco, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
473	473	35	35	0.89 (95% CI: 0.7-1.14)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

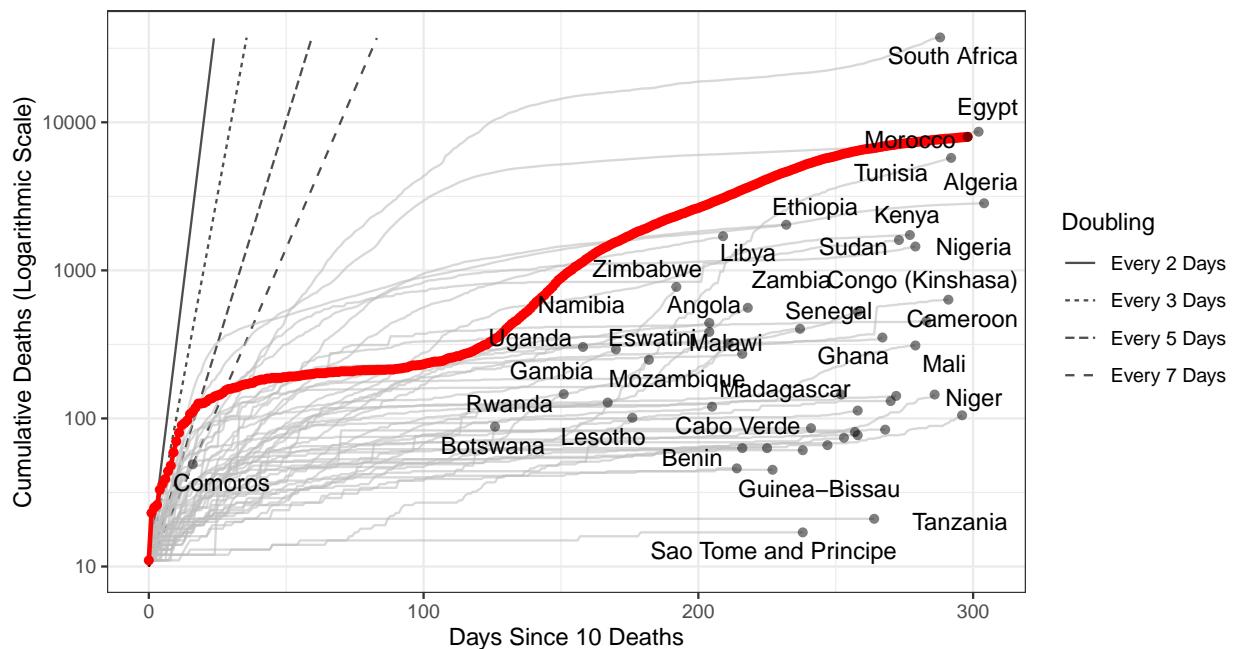


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 270,561 (95% CI: 259,342-281,779) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

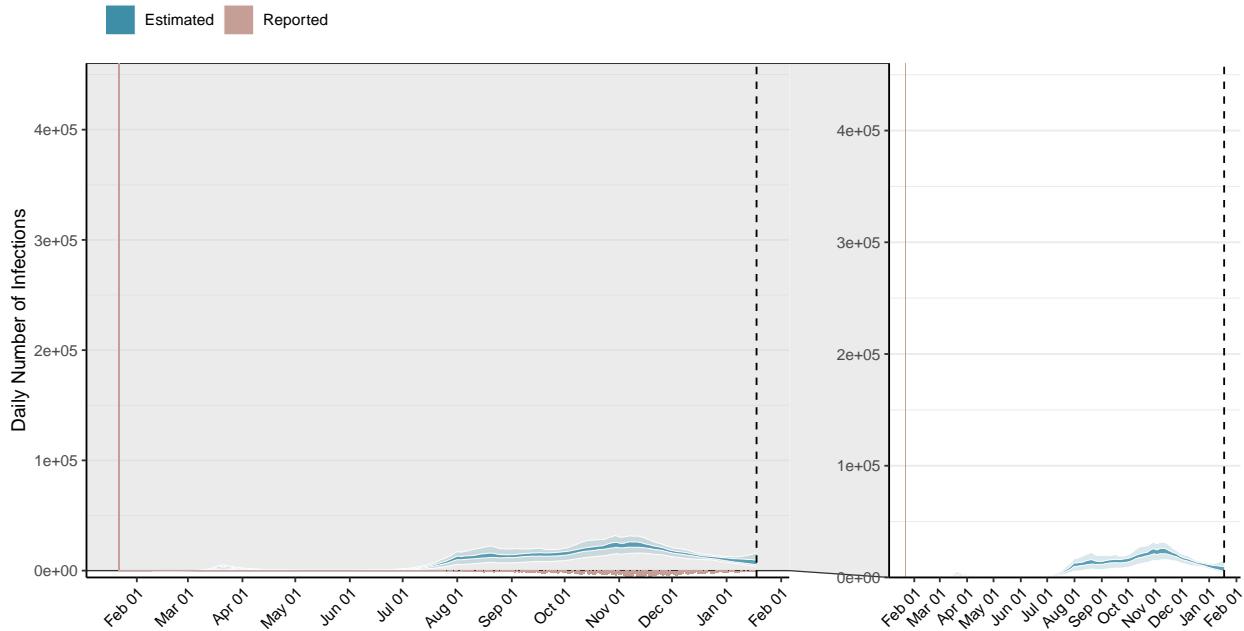
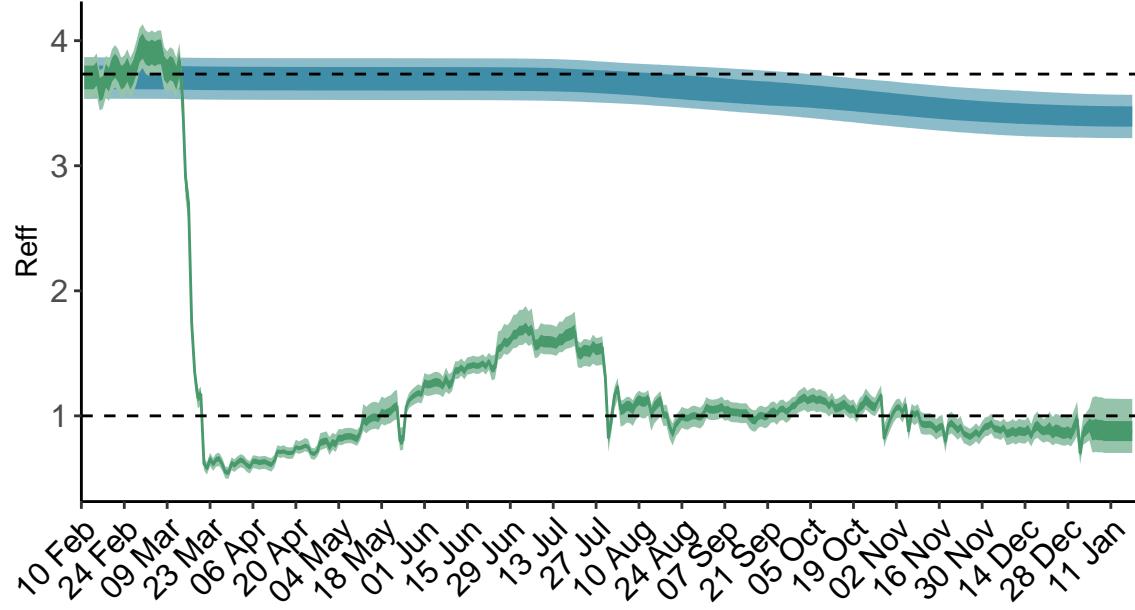


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Morocco is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information](#).

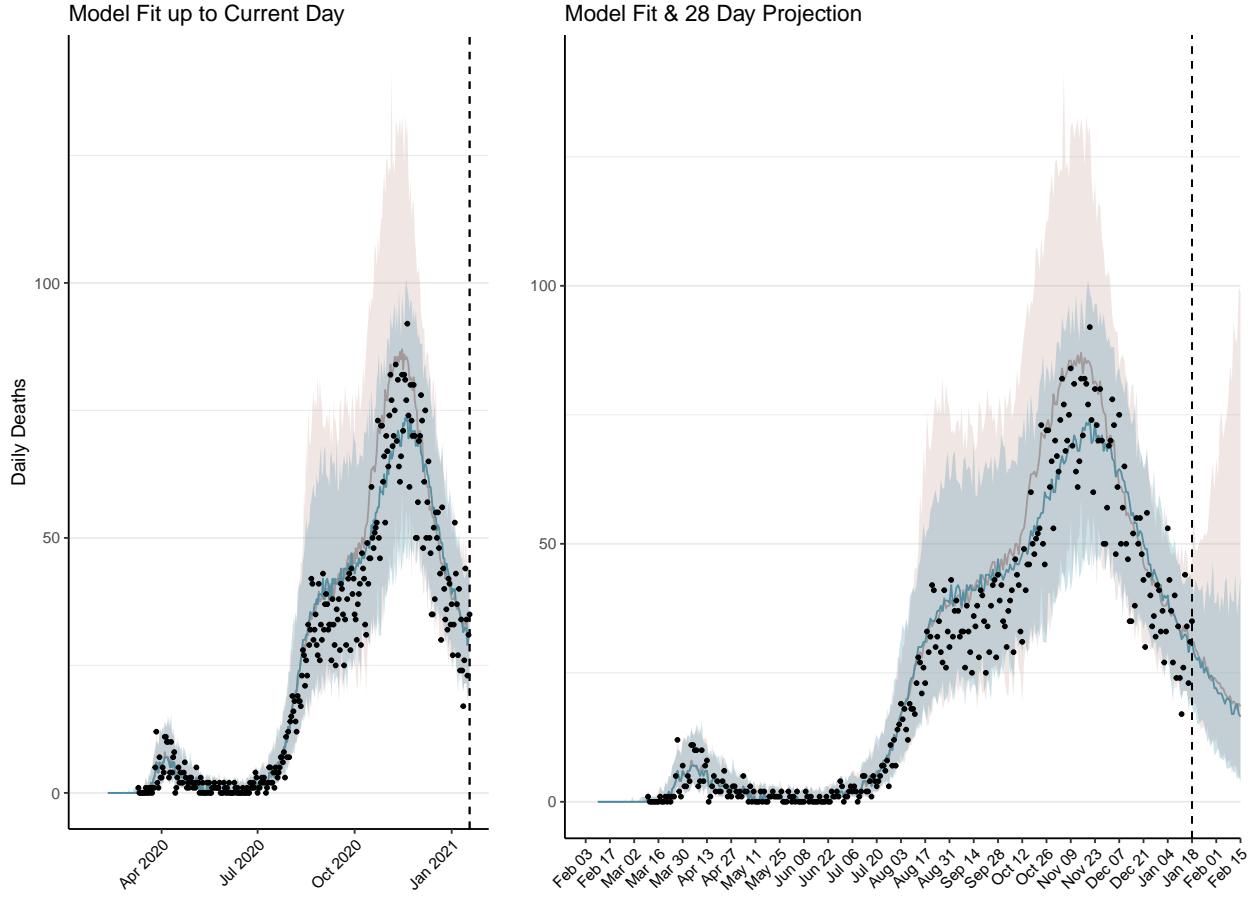


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,148 (95% CI: 1,095-1,201) patients requiring treatment with high-pressure oxygen at the current date to 865 (95% CI: 736-995) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 472 (95% CI: 452-492) patients requiring treatment with mechanical ventilation at the current date to 329 (95% CI: 293-364) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

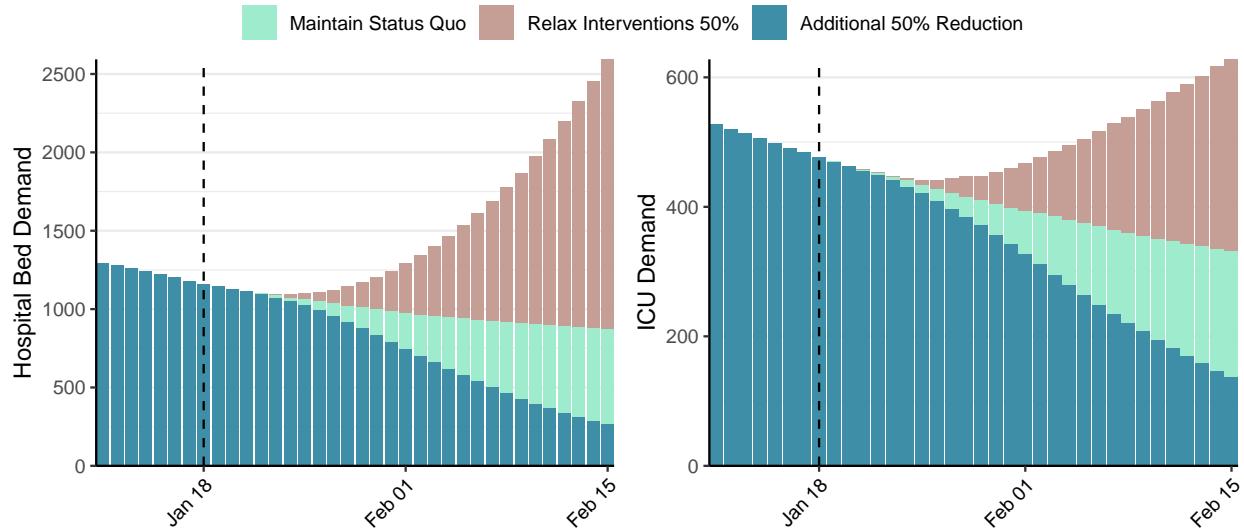
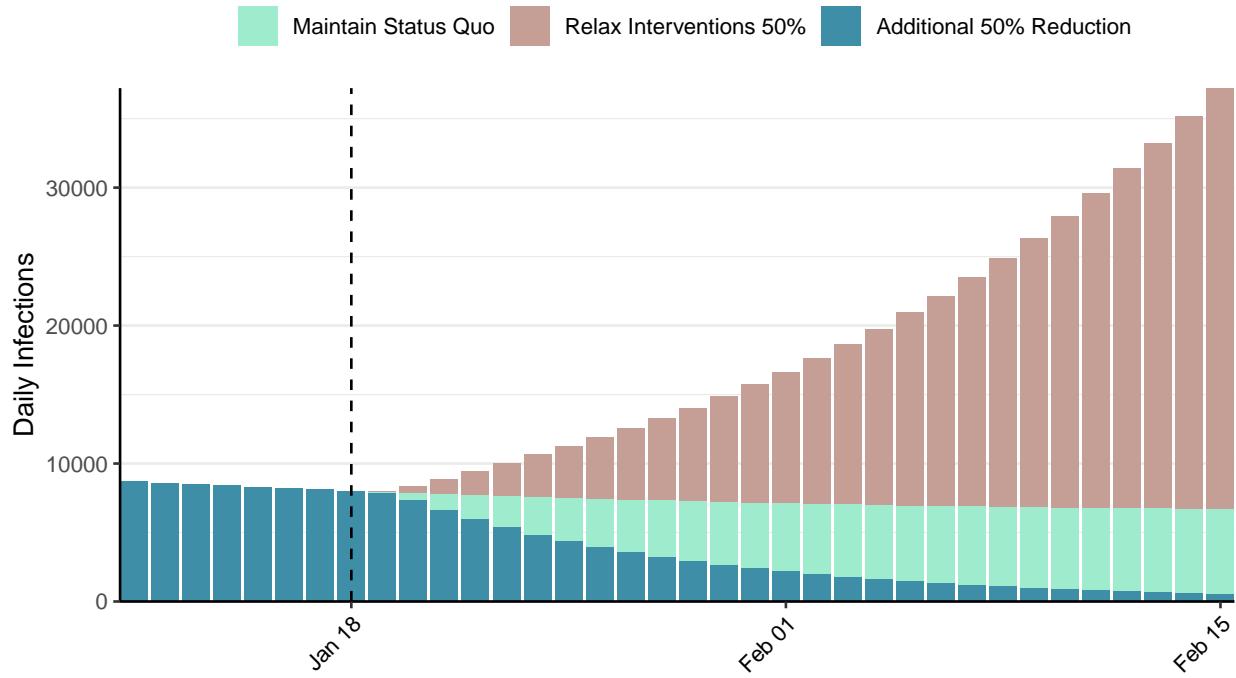


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 7,945 (95% CI: 7,298-8,591) at the current date to 570 (95% CI: 469-672) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,945 (95% CI: 7,298-8,591) at the current date to 36,844 (95% CI: 28,868-44,819) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Moldova, 2021-01-18

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### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
258	258	17	17	0.82 (95% CI: 0.67-0.98)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

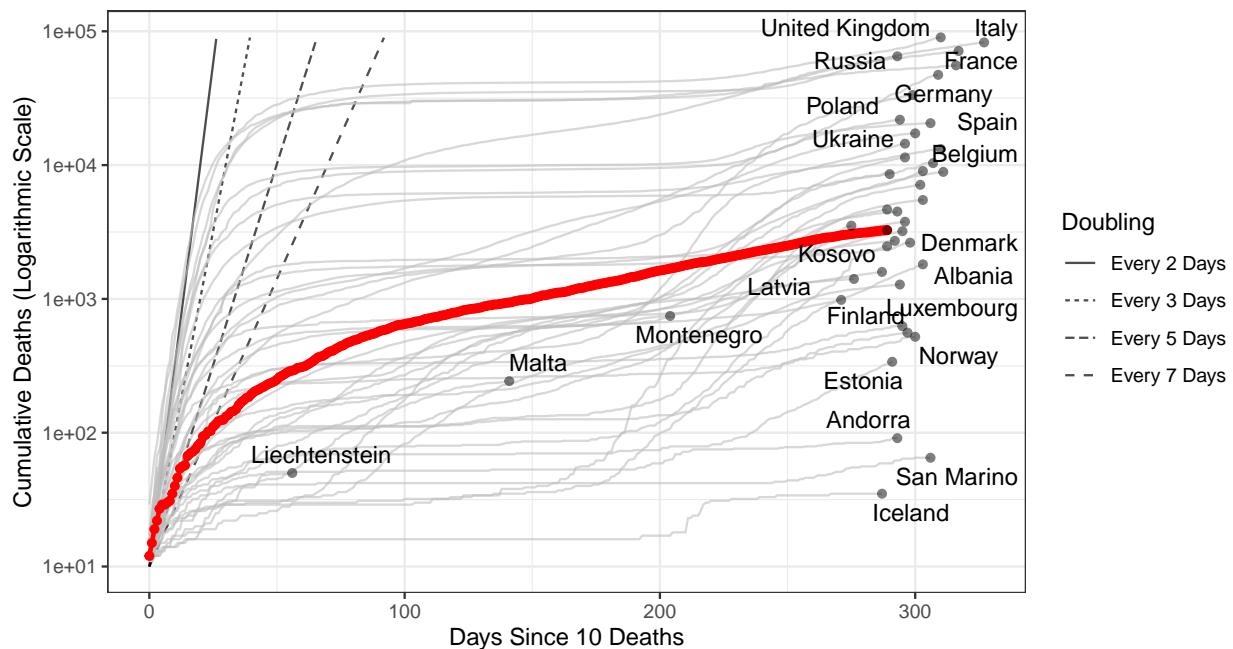


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 121,608 (95% CI: 117,264–125,953) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

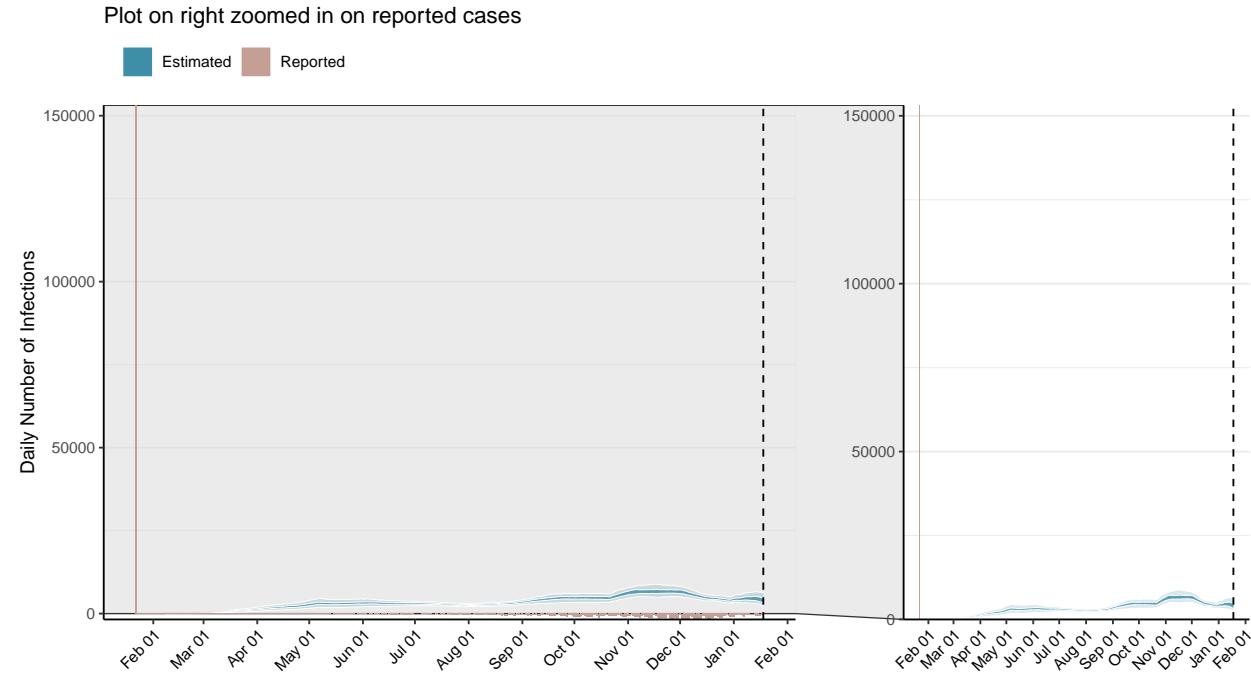
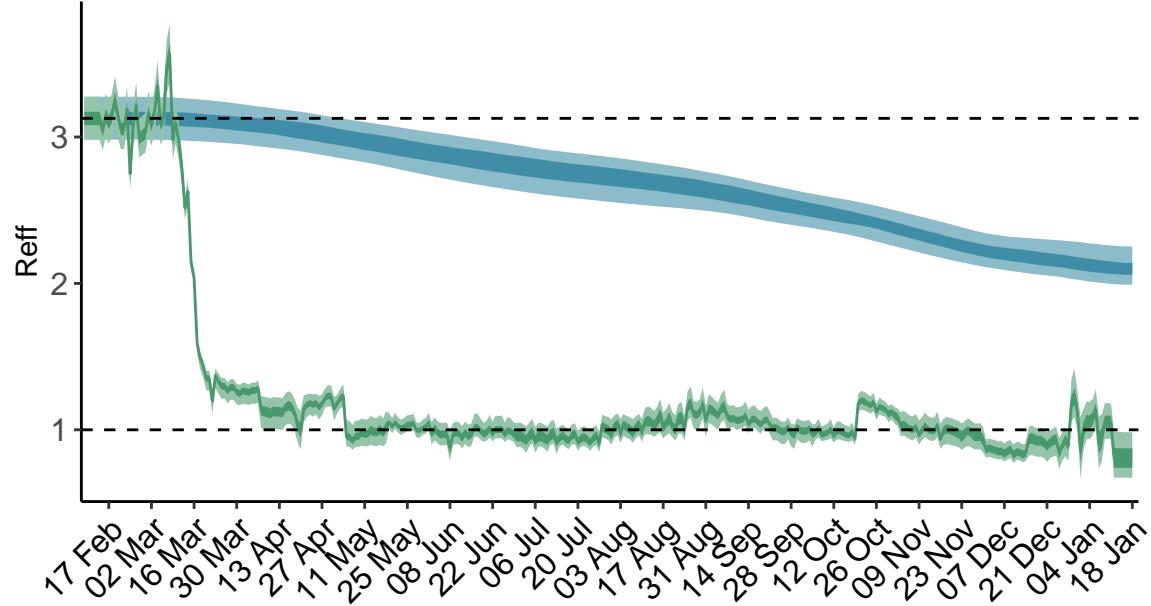


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

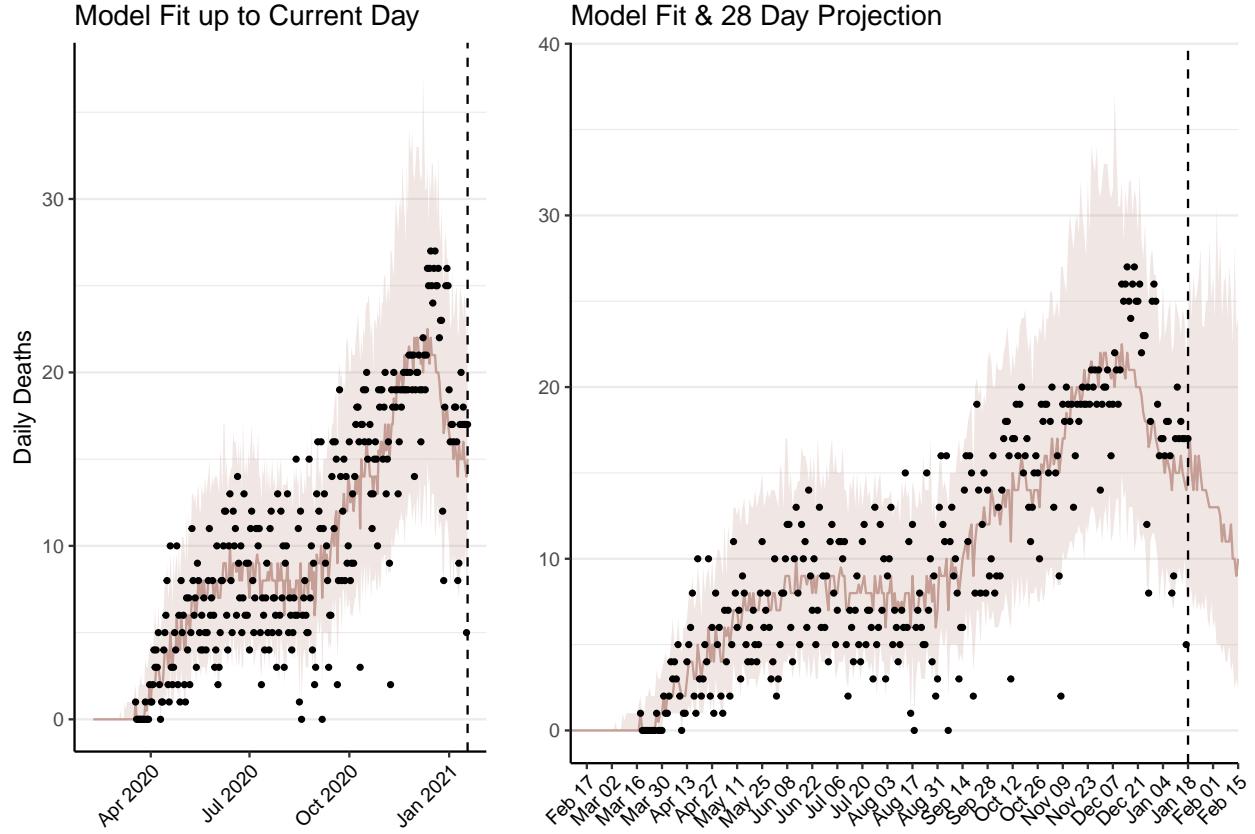


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 591 (95% CI: 567-614) patients requiring treatment with high-pressure oxygen at the current date to 365 (95% CI: 323-407) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 234 (95% CI: 225-243) patients requiring treatment with mechanical ventilation at the current date to 154 (95% CI: 139-169) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

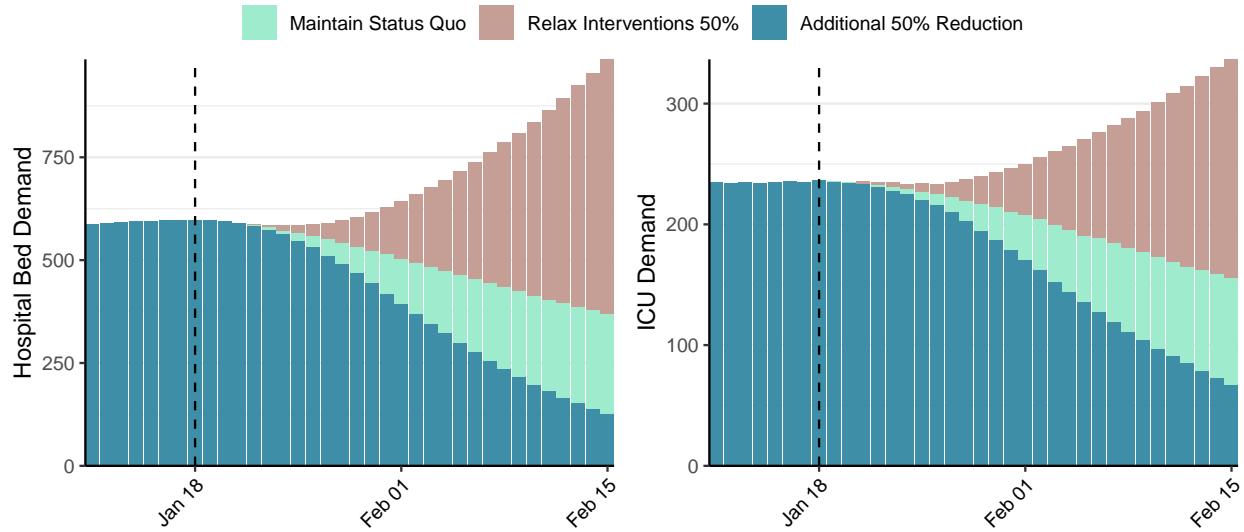


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,050 (95% CI: 3,807-4,292) at the current date to 206 (95% CI: 177-235) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,050 (95% CI: 3,807-4,292) at the current date to 9,787 (95% CI: 8,418-11,156) by 2021-02-15.

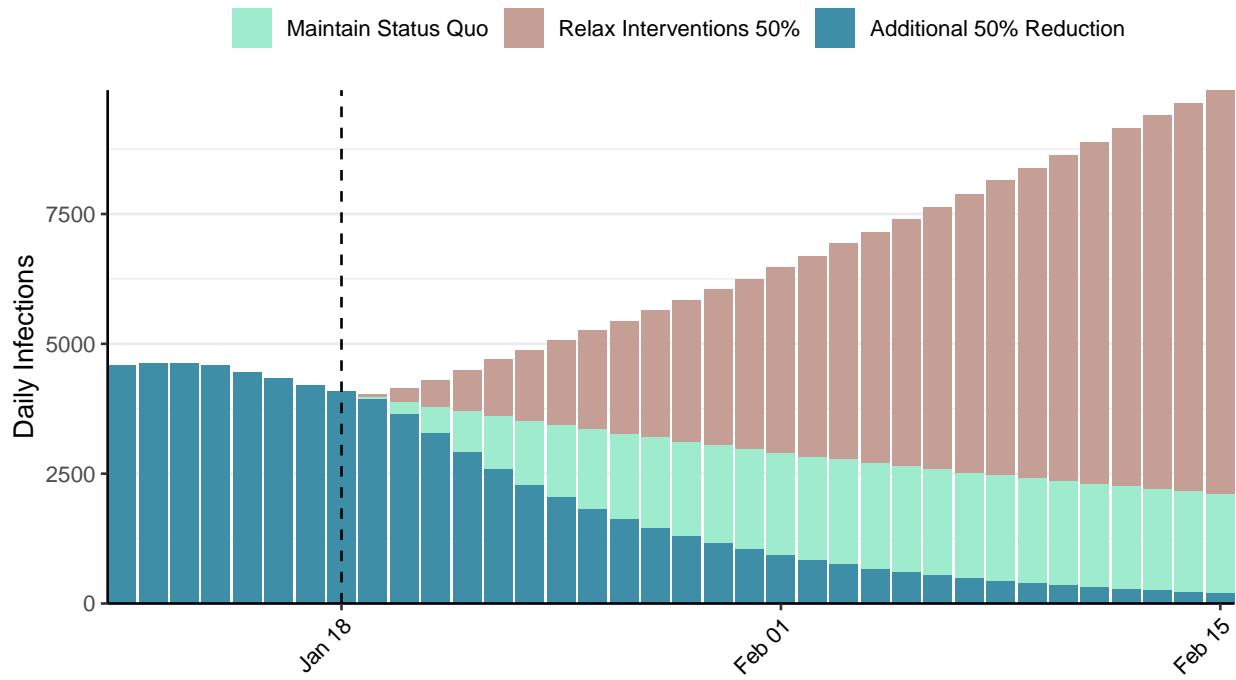


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Madagascar, 2021-01-18

[Download the report for Madagascar, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.41 (95% CI: 1.16-1.7)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Madagascar is not shown in the following plot as only 0 deaths have been reported to date**

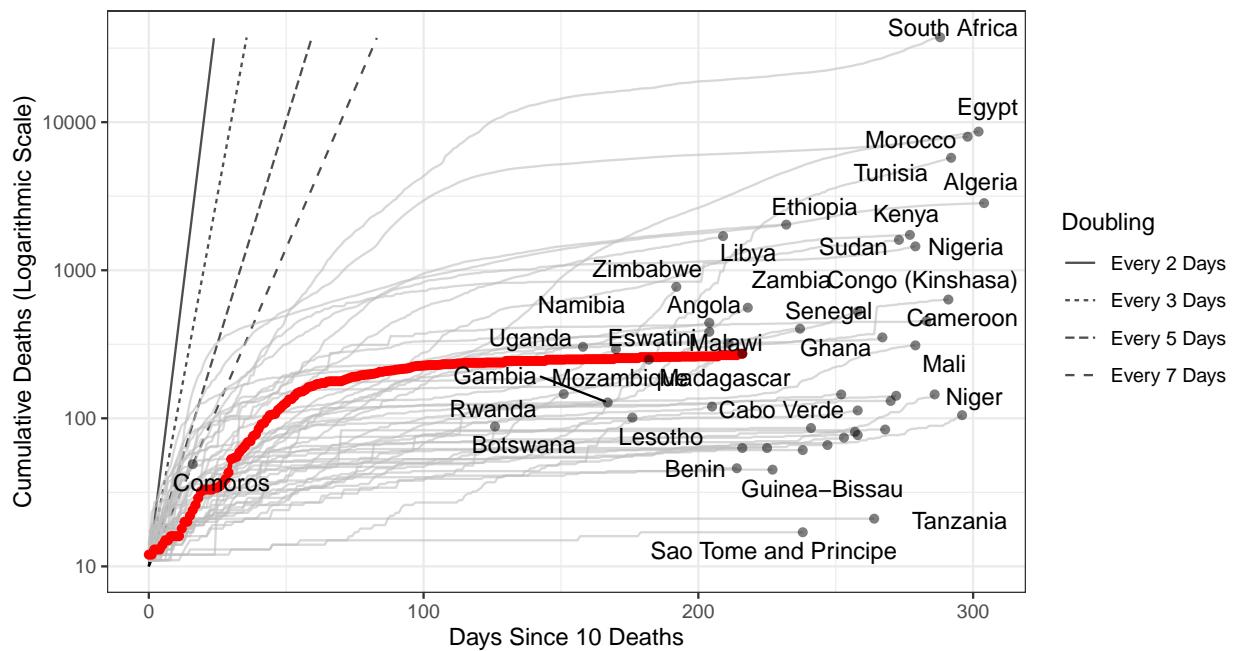


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 19,755 (95% CI: 18,181-21,329) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Madagascar has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

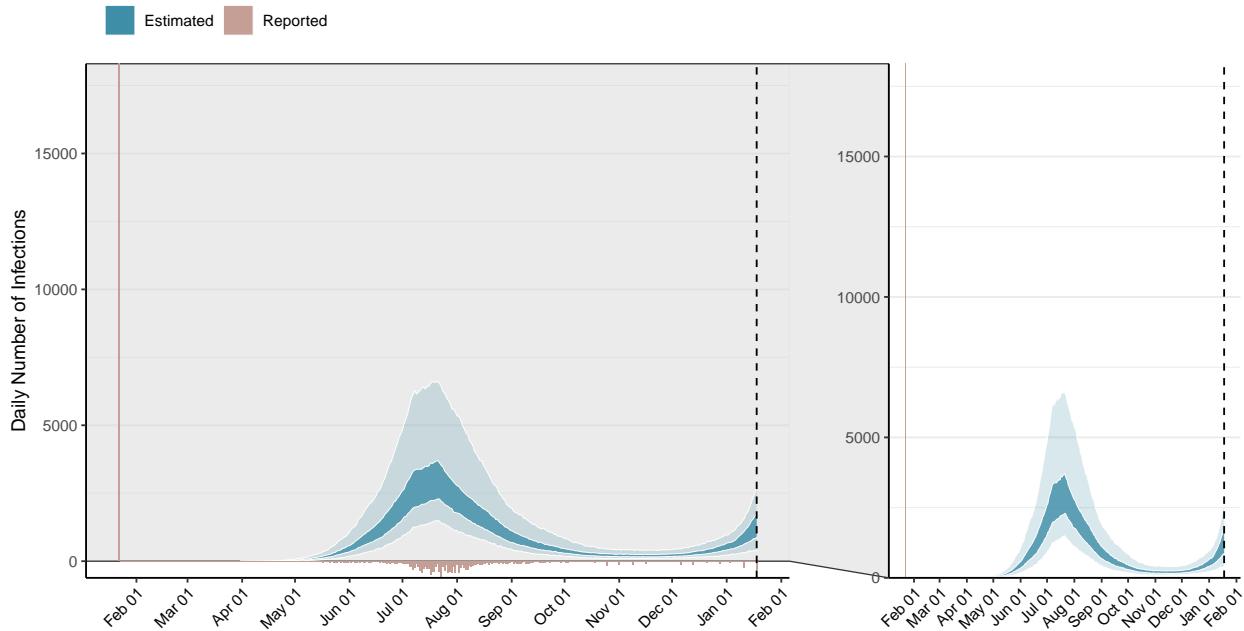
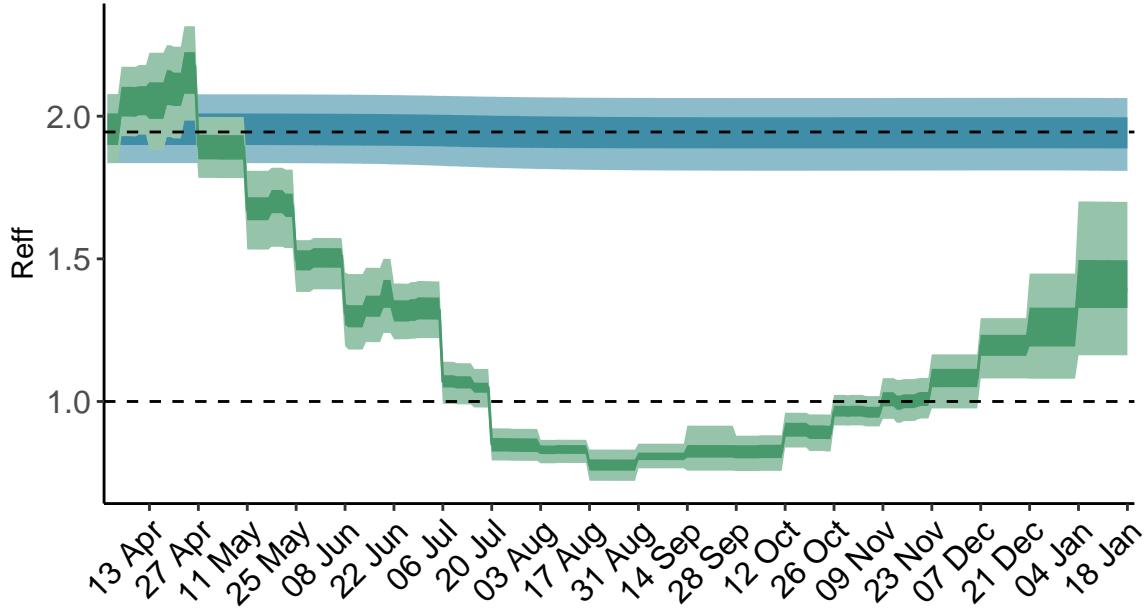


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Madagascar is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

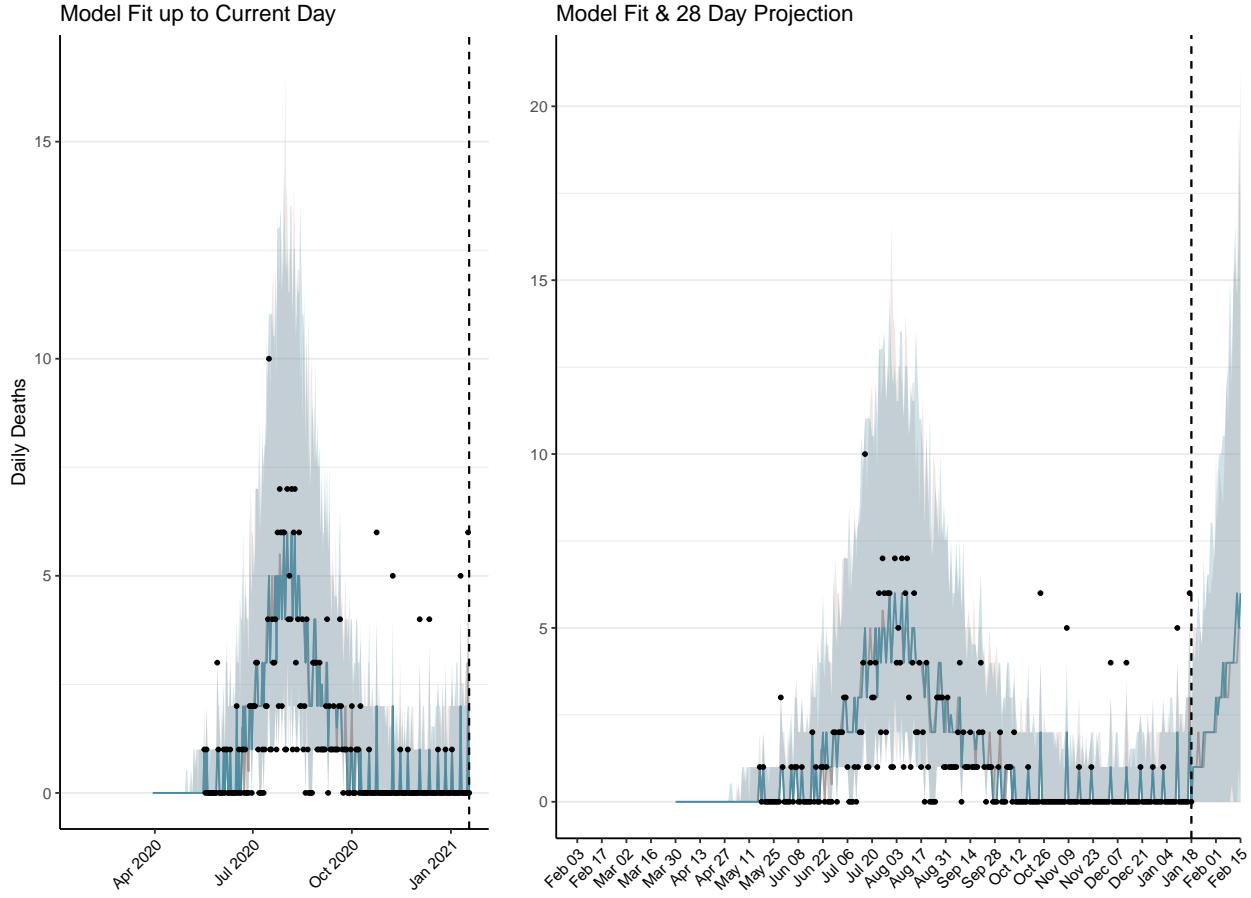


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 61 (95% CI: 56-66) patients requiring treatment with high-pressure oxygen at the current date to 331 (95% CI: 280-381) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 22 (95% CI: 20-24) patients requiring treatment with mechanical ventilation at the current date to 113 (95% CI: 96-131) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

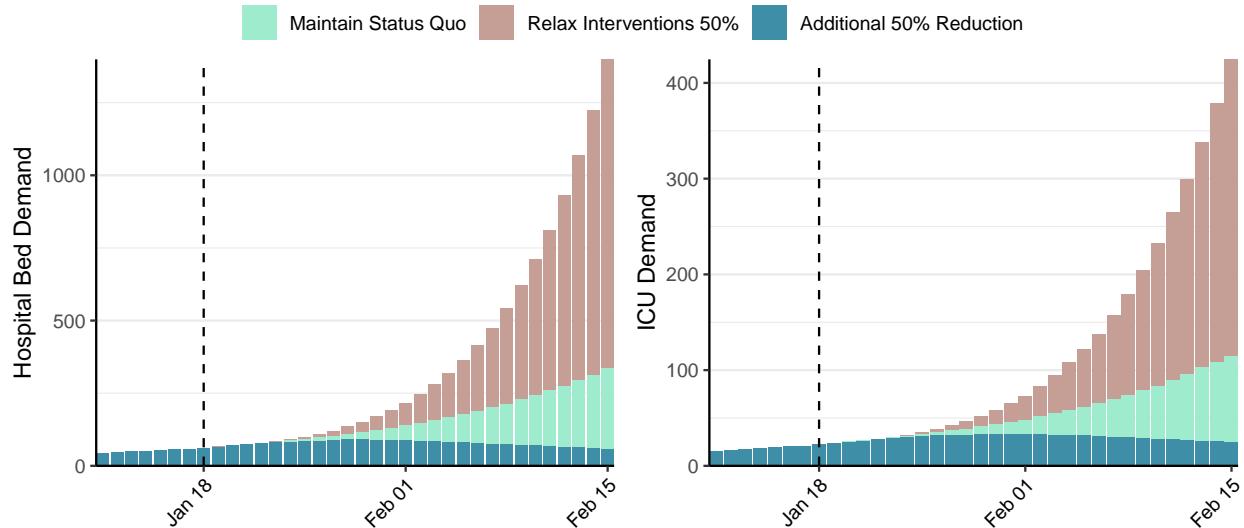


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,330 (95% CI: 1,204-1,456) at the current date to 443 (95% CI: 368-518) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,330 (95% CI: 1,204-1,456) at the current date to 56,095 (95% CI: 44,956-67,235) by 2021-02-15.

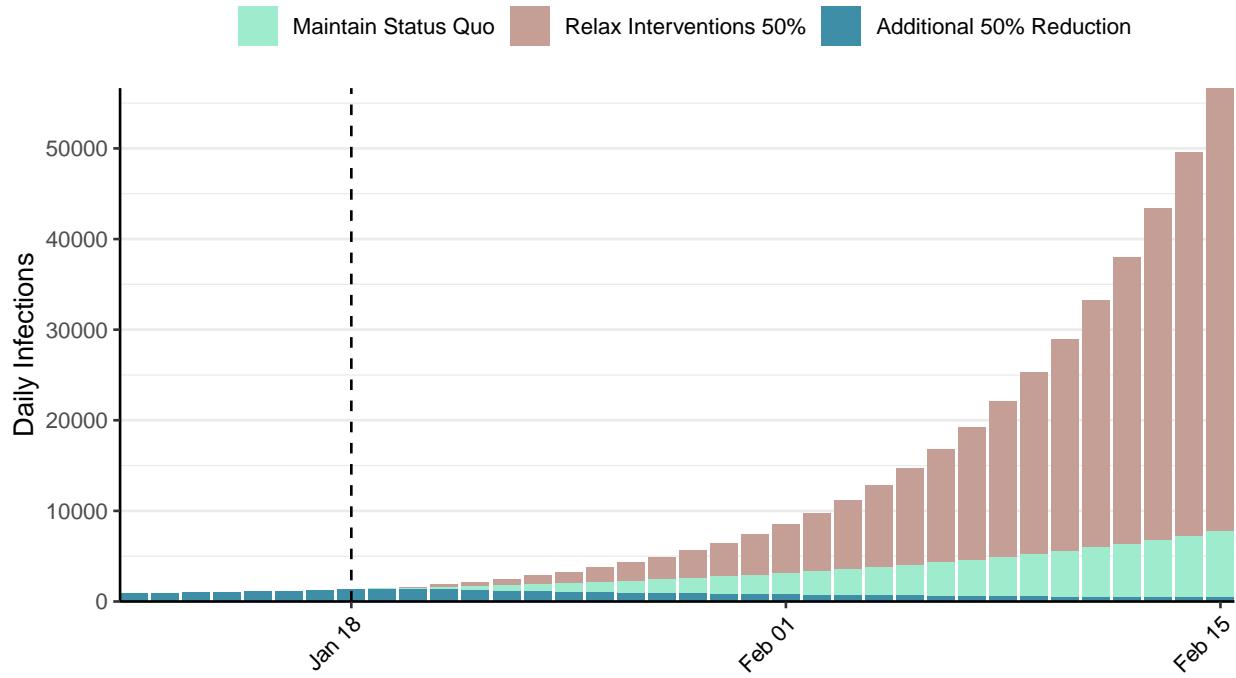


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Maldives, 2021-01-18

[Download the report for Maldives, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
69	69	0	0	1.16 (95% CI: 0.7-1.71)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Maldives is not shown in the following plot as only 0 deaths have been reported to date**

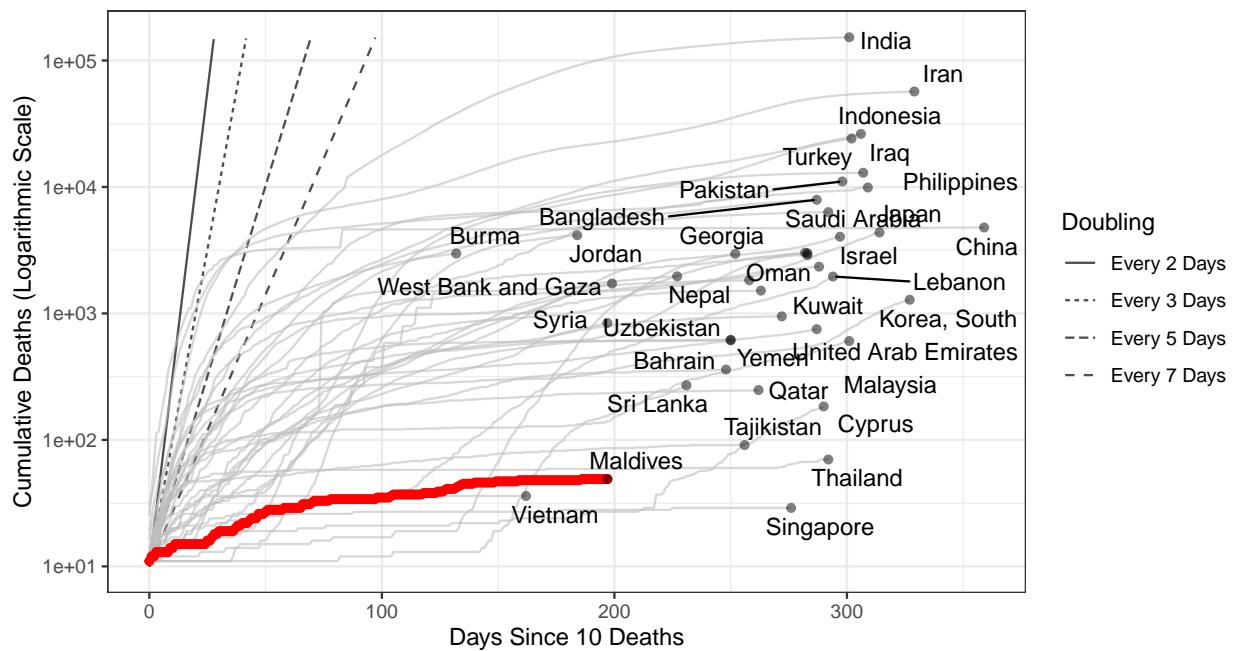


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 340 (95% CI: 266-413) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

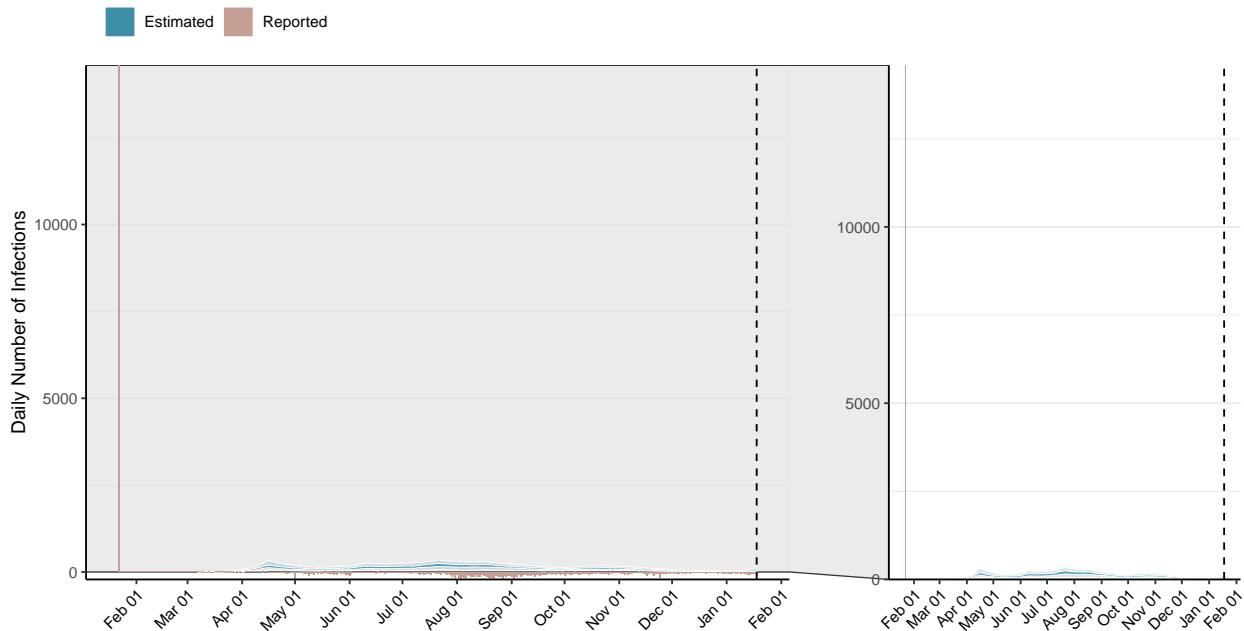
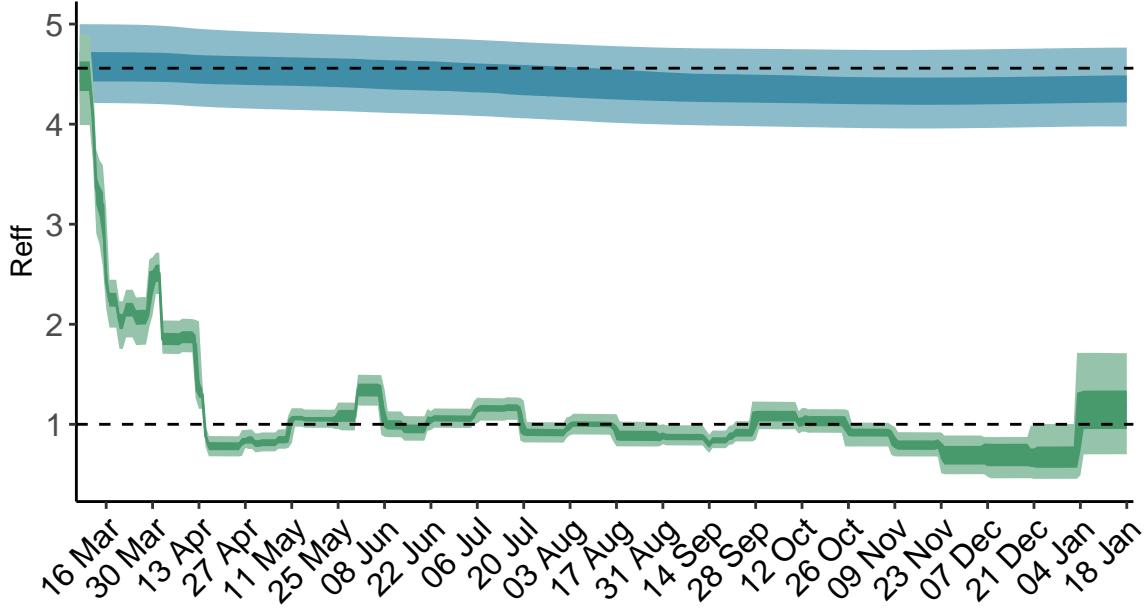


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

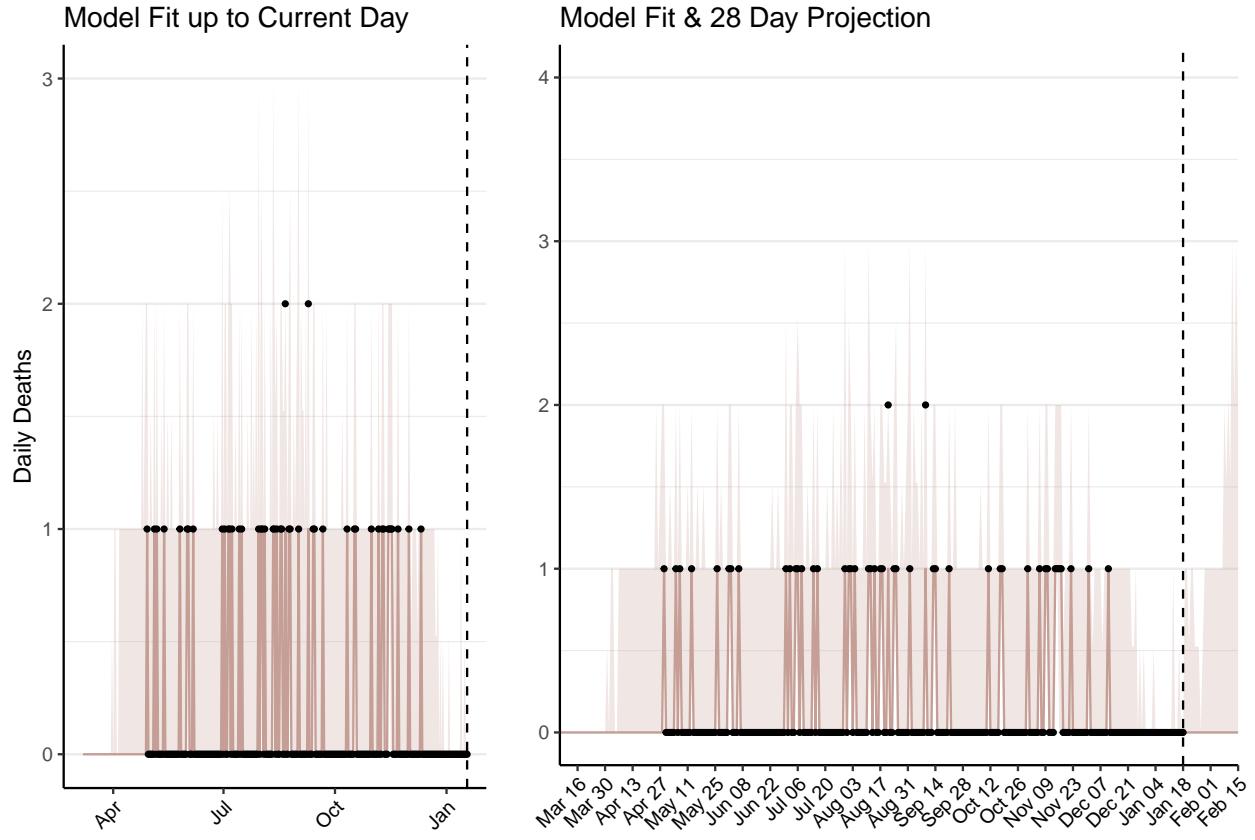


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1 (95% CI: 1-2) patients requiring treatment with high-pressure oxygen at the current date to 15 (95% CI: 8-21) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-1) patients requiring treatment with mechanical ventilation at the current date to 4 (95% CI: 3-6) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

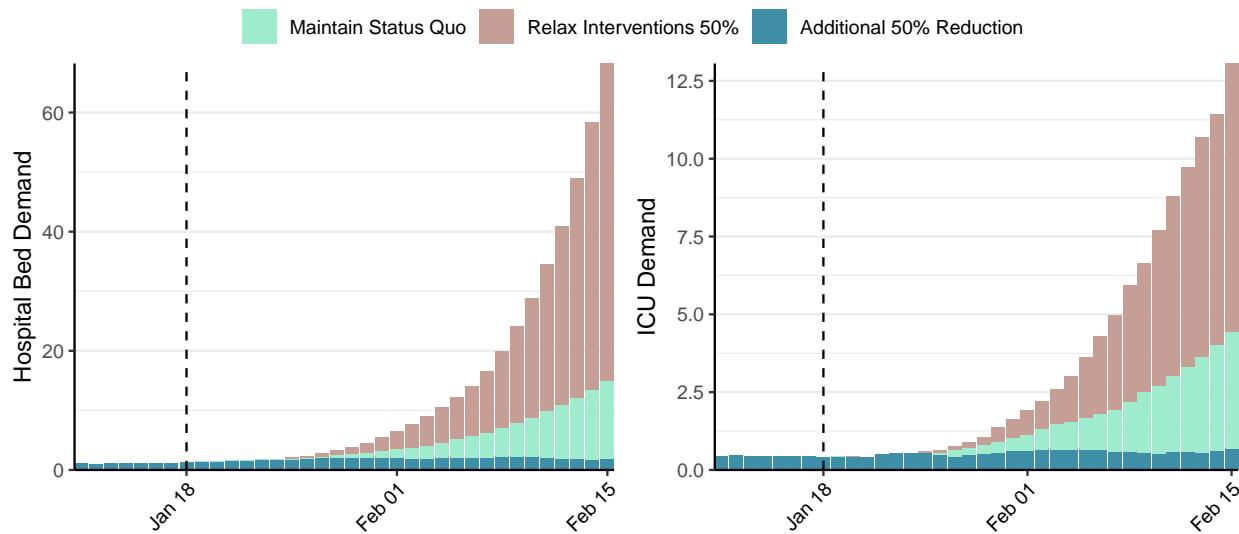


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 20 (95% CI: 14-26) at the current date to 16 (95% CI: 8-23) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 20 (95% CI: 14-26) at the current date to 2,398 (95% CI: 1,404-3,391) by 2021-02-15.

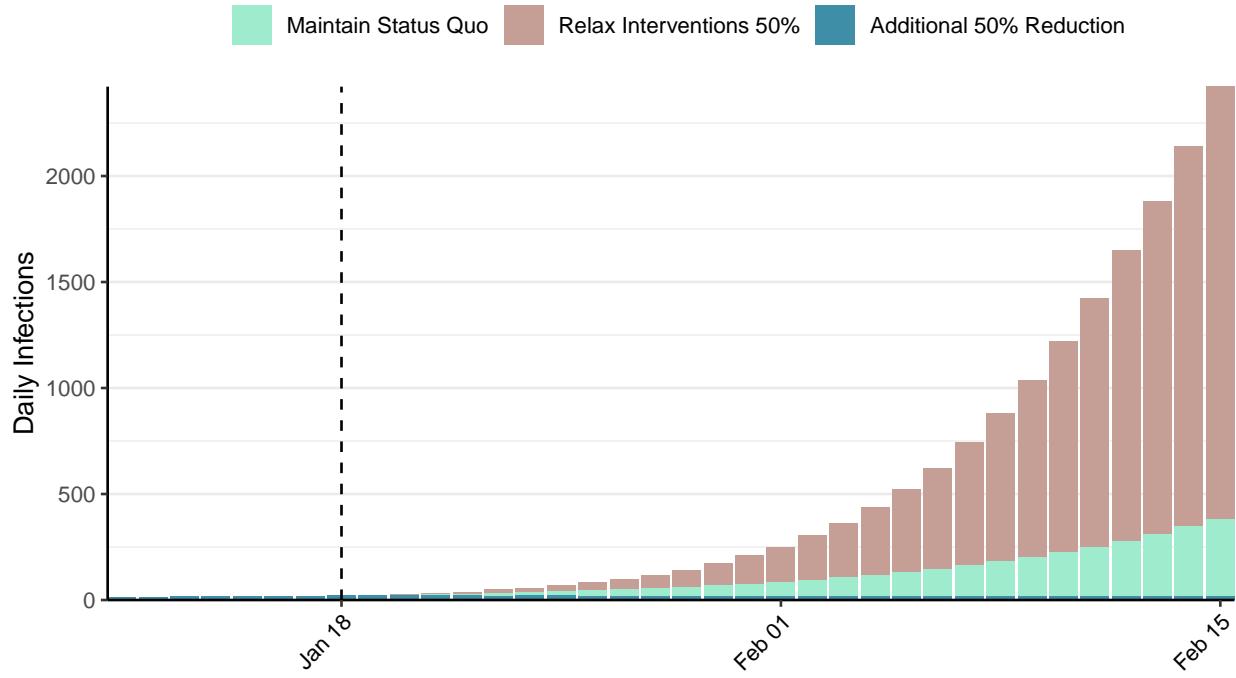


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Mexico, 2021-01-18

[Download the report for Mexico, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.97 (95% CI: 0.77-1.21)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mexico is not shown in the following plot as only 0 deaths have been reported to date**

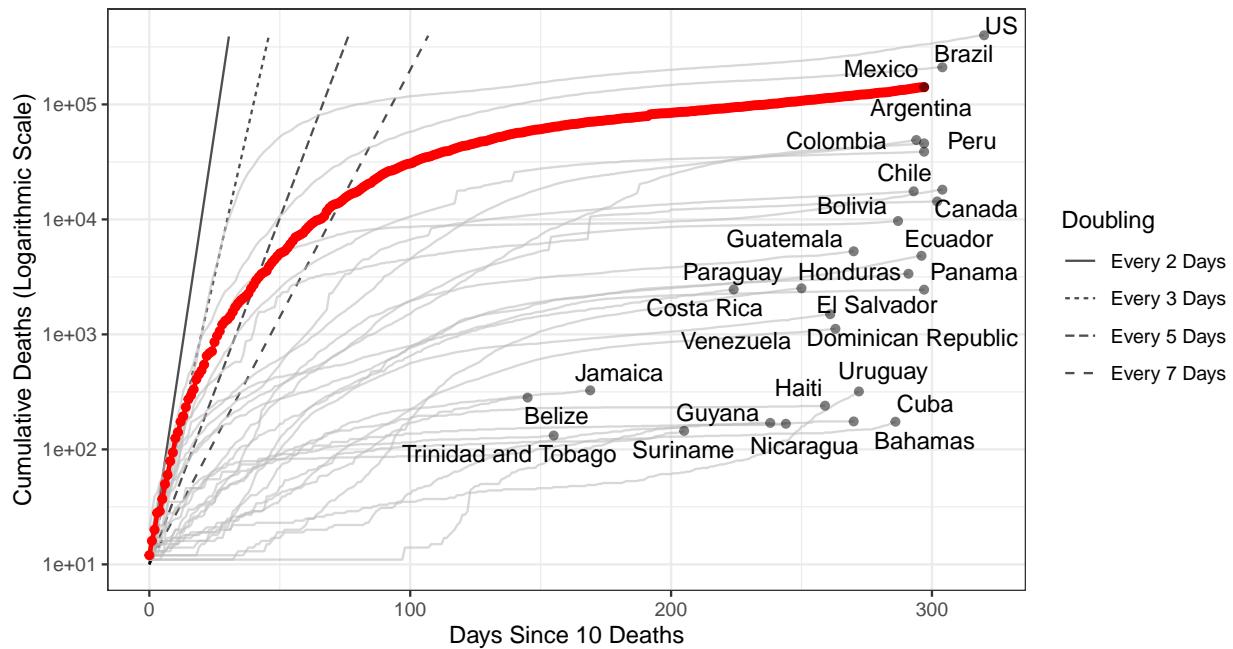


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 6,904,802 (95% CI: 6,654,721-7,154,882) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

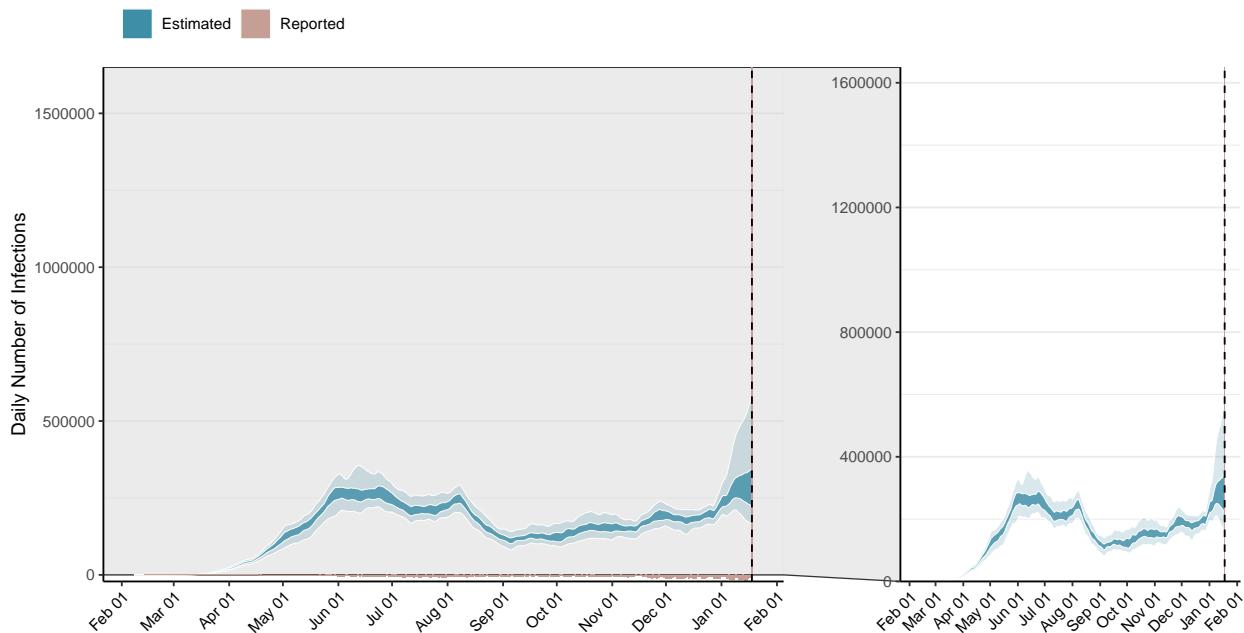
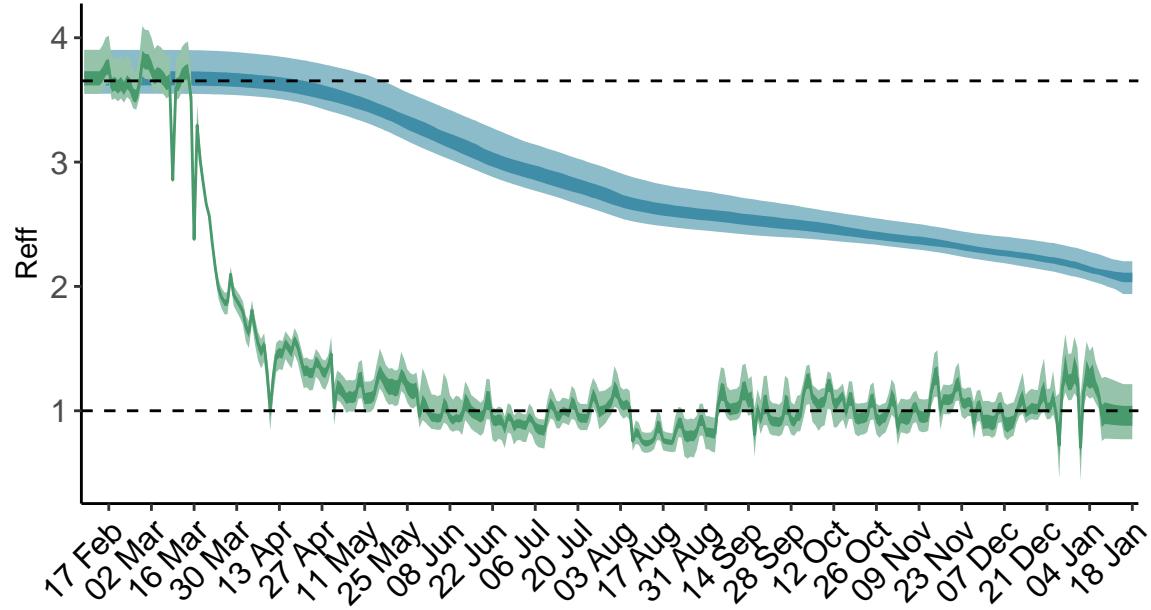


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Mexico is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

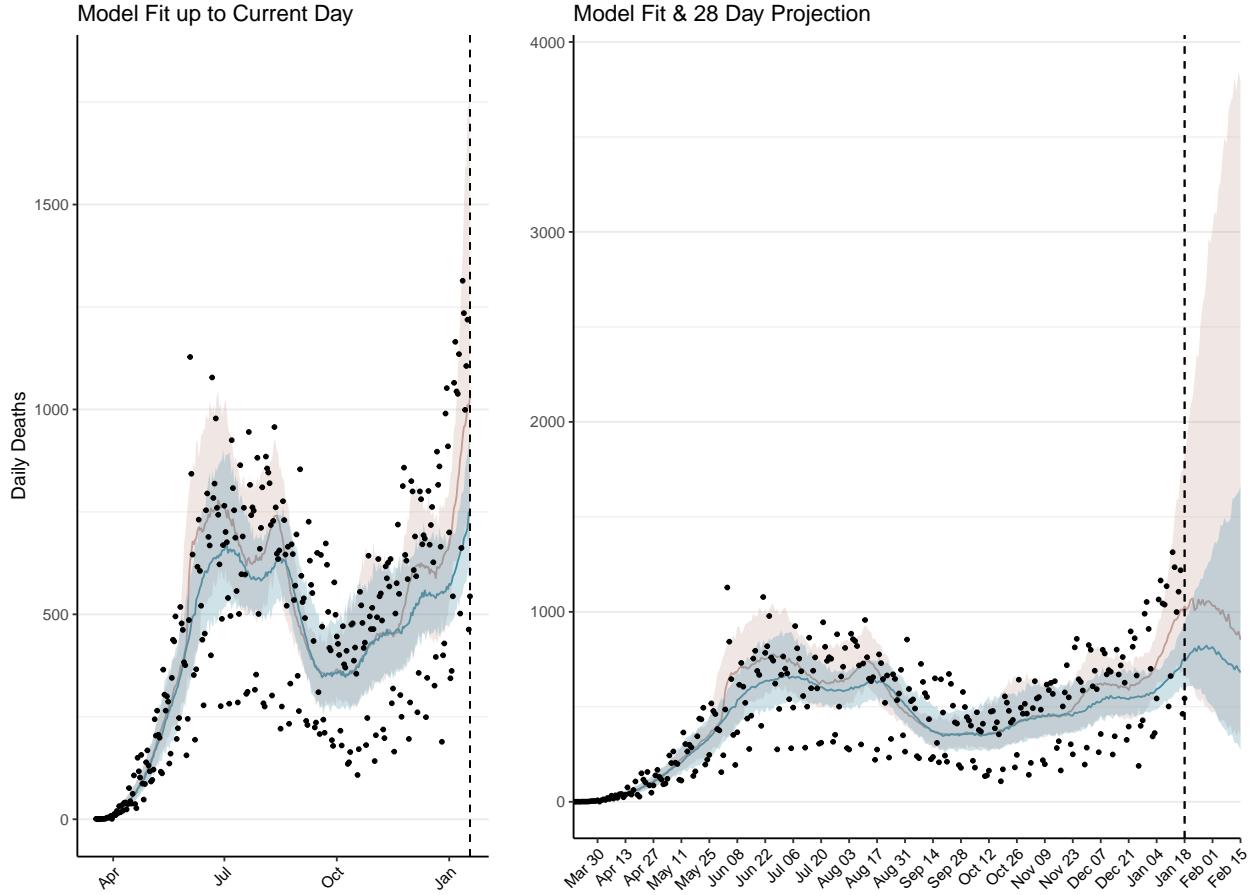


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 29,157 (95% CI: 27,986-30,329) patients requiring treatment with high-pressure oxygen at the current date to 32,768 (95% CI: 28,611-36,925) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 6,615 (95% CI: 6,470-6,761) patients requiring treatment with mechanical ventilation at the current date to 6,586 (95% CI: 6,295-6,876) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

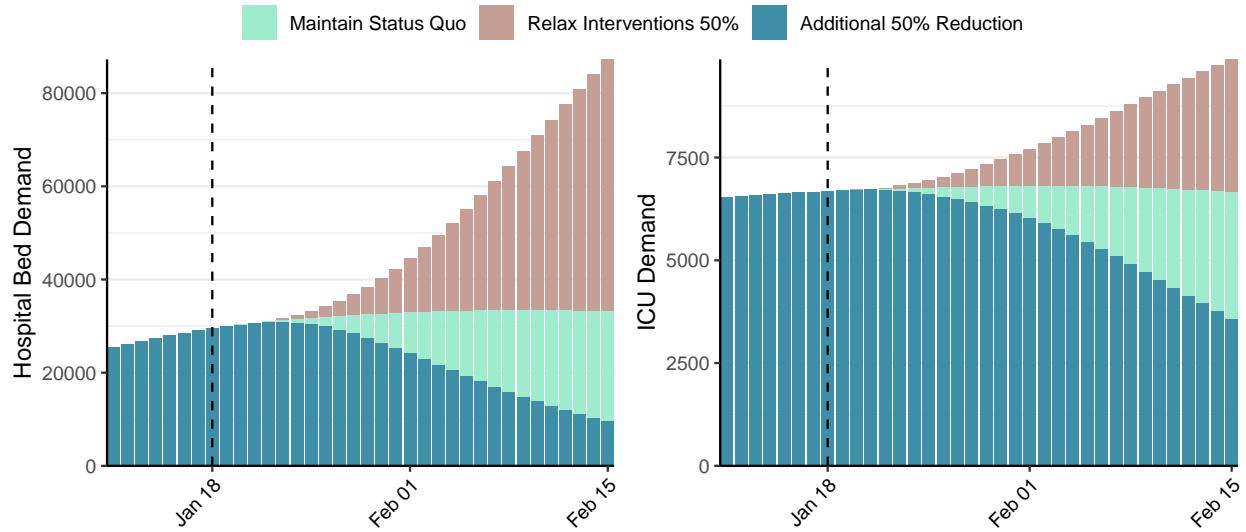
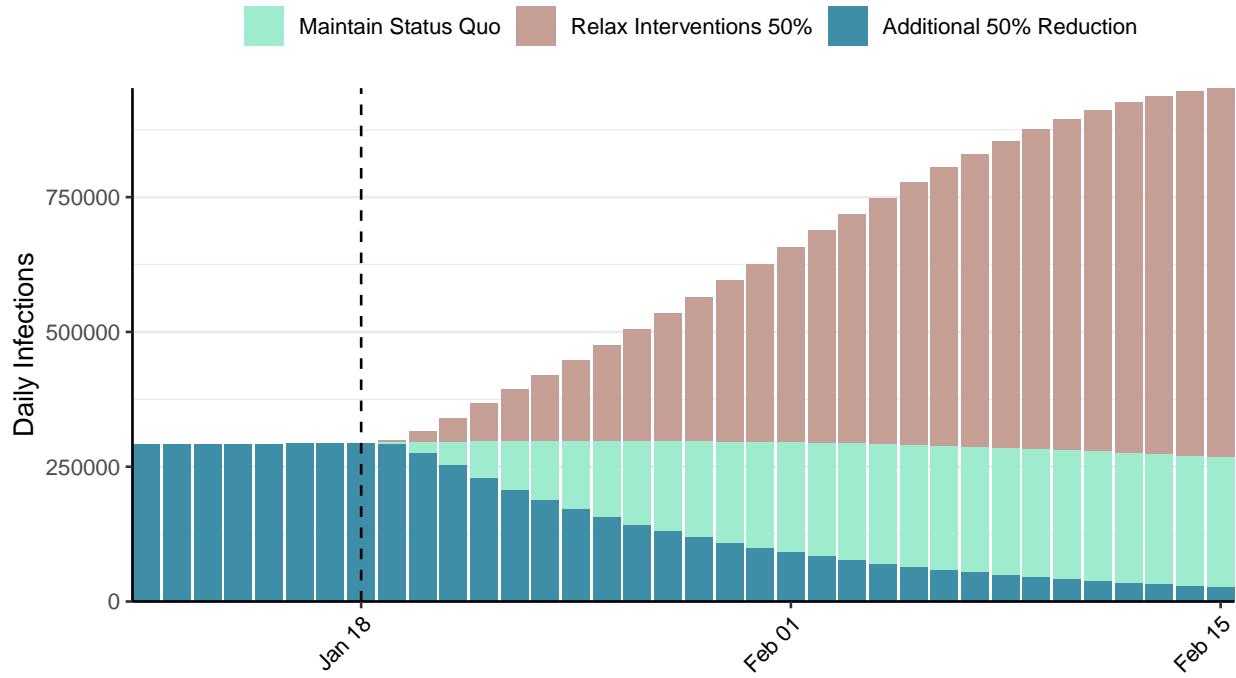


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 291,814 (95% CI: 271,129-312,499) at the current date to 26,856 (95% CI: 22,667-31,044) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 291,814 (95% CI: 271,129-312,499) at the current date to 942,777 (95% CI: 850,375-1,035,178) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: North Macedonia, 2021-01-18

[Download the report for North Macedonia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
54	54	13	13	0.78 (95% CI: 0.67-0.93)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

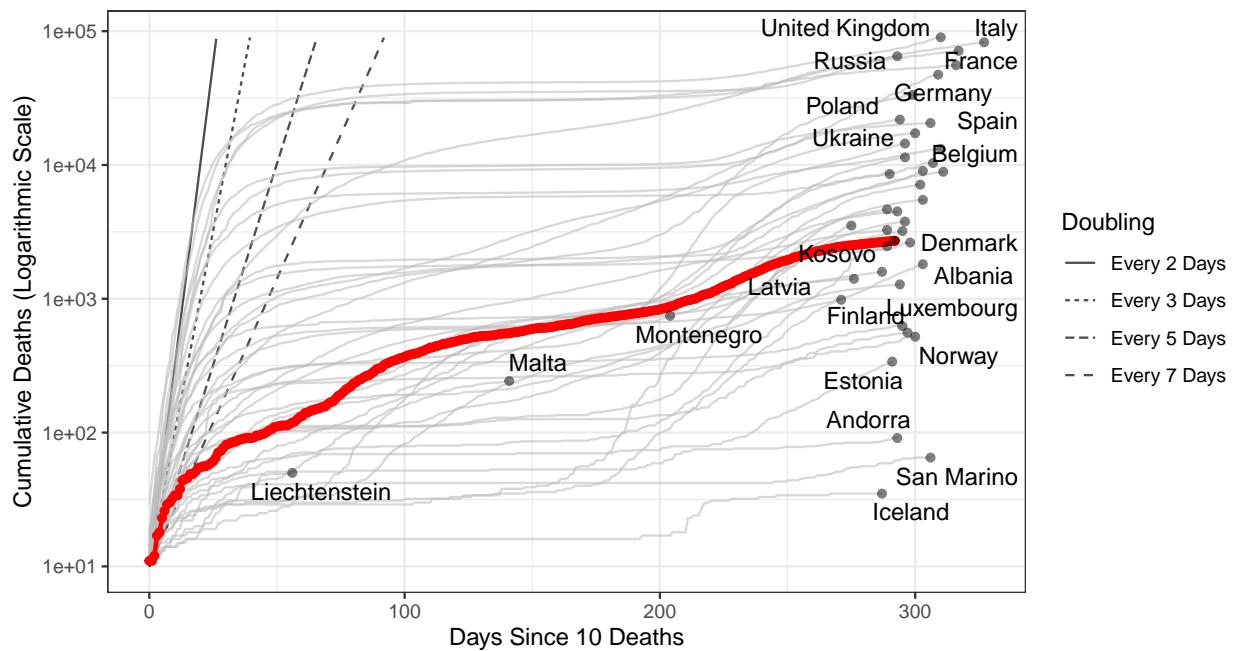


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 64,448 (95% CI: 61,932-66,963) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

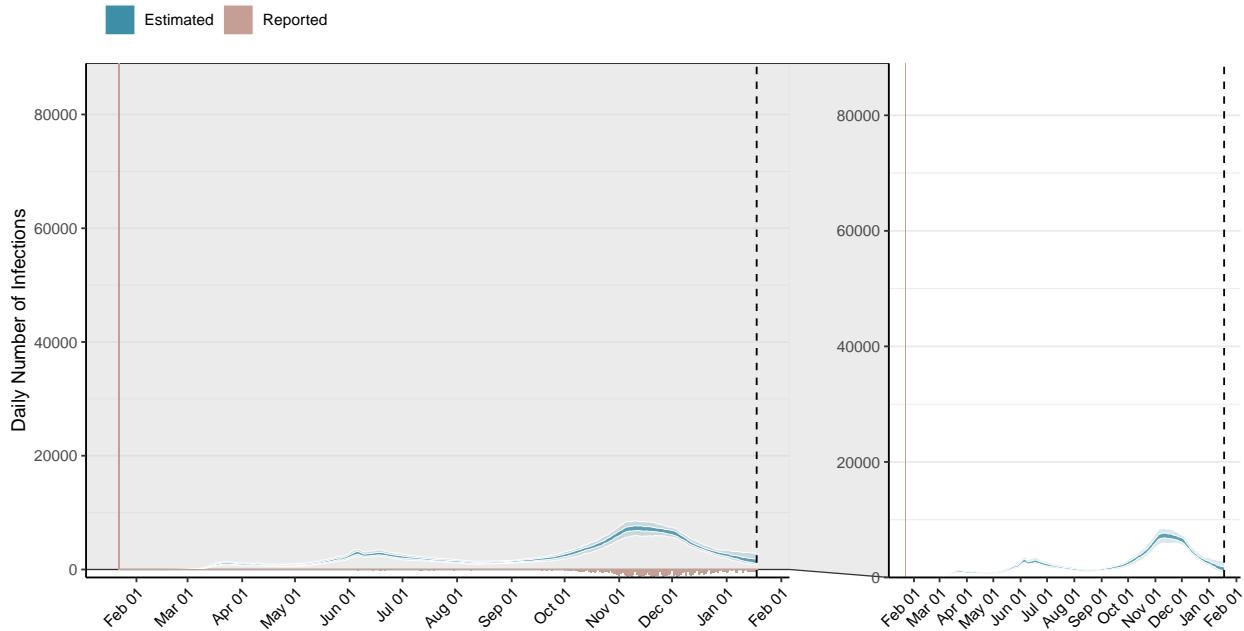
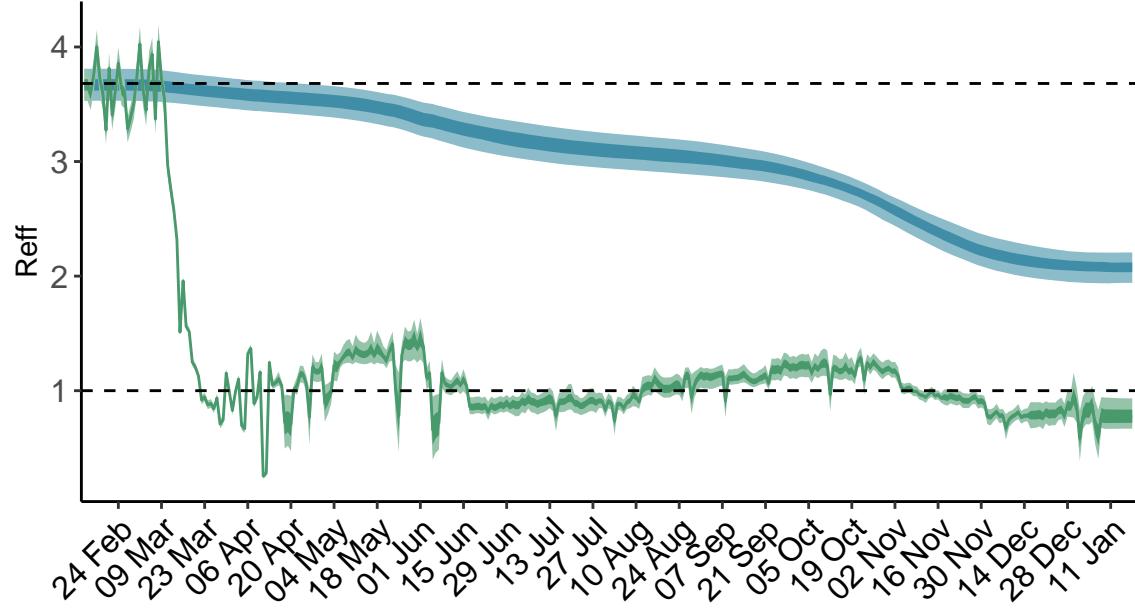


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

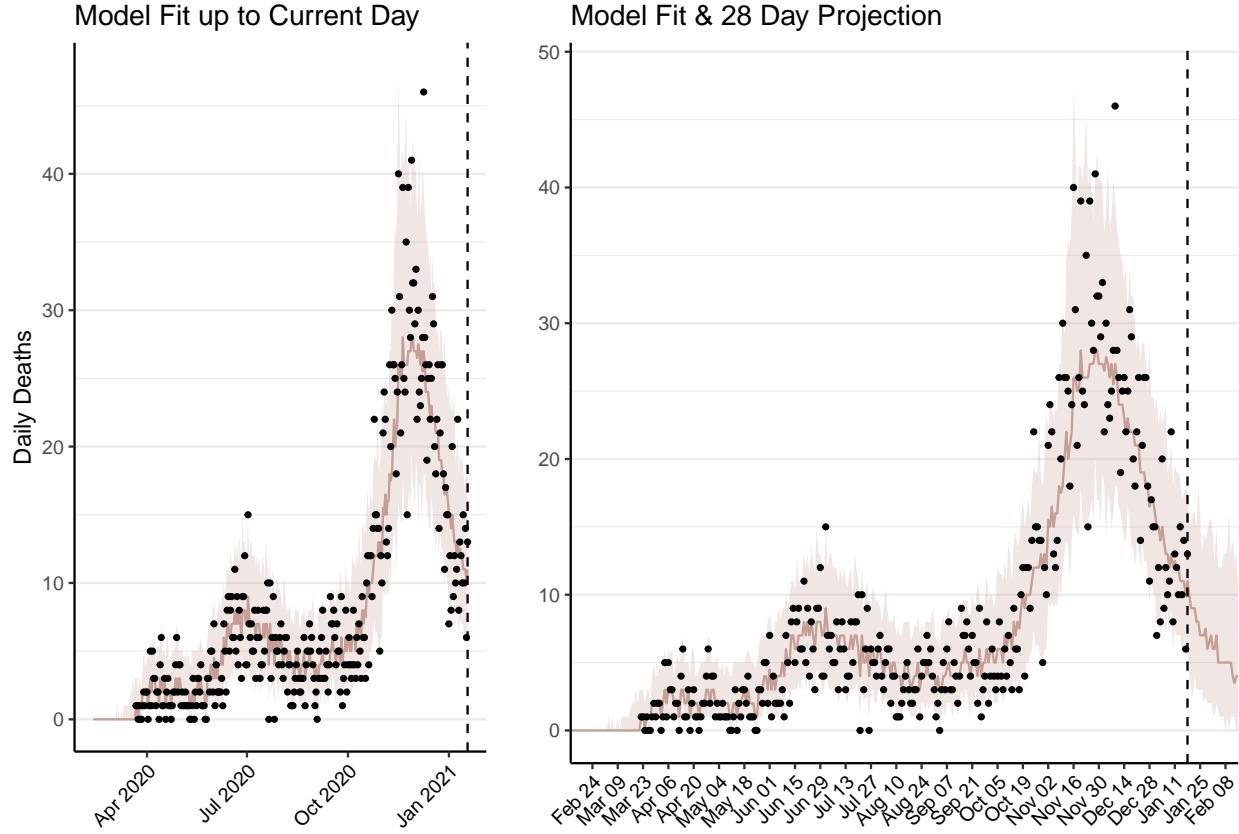


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 329 (95% CI: 314-344) patients requiring treatment with high-pressure oxygen at the current date to 145 (95% CI: 127-163) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 142 (95% CI: 135-148) patients requiring treatment with mechanical ventilation at the current date to 63 (95% CI: 56-71) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

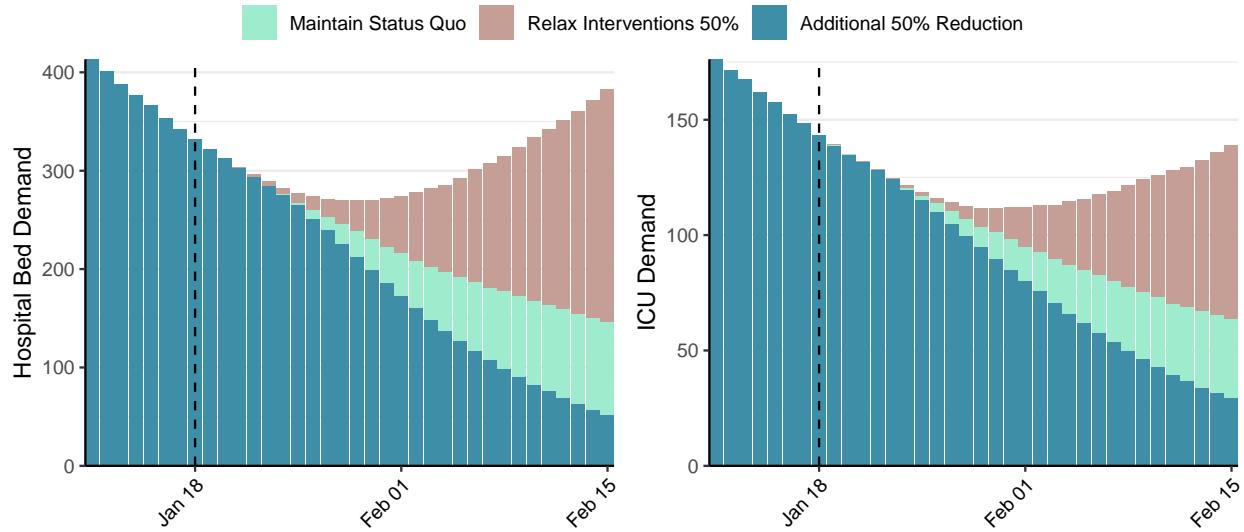
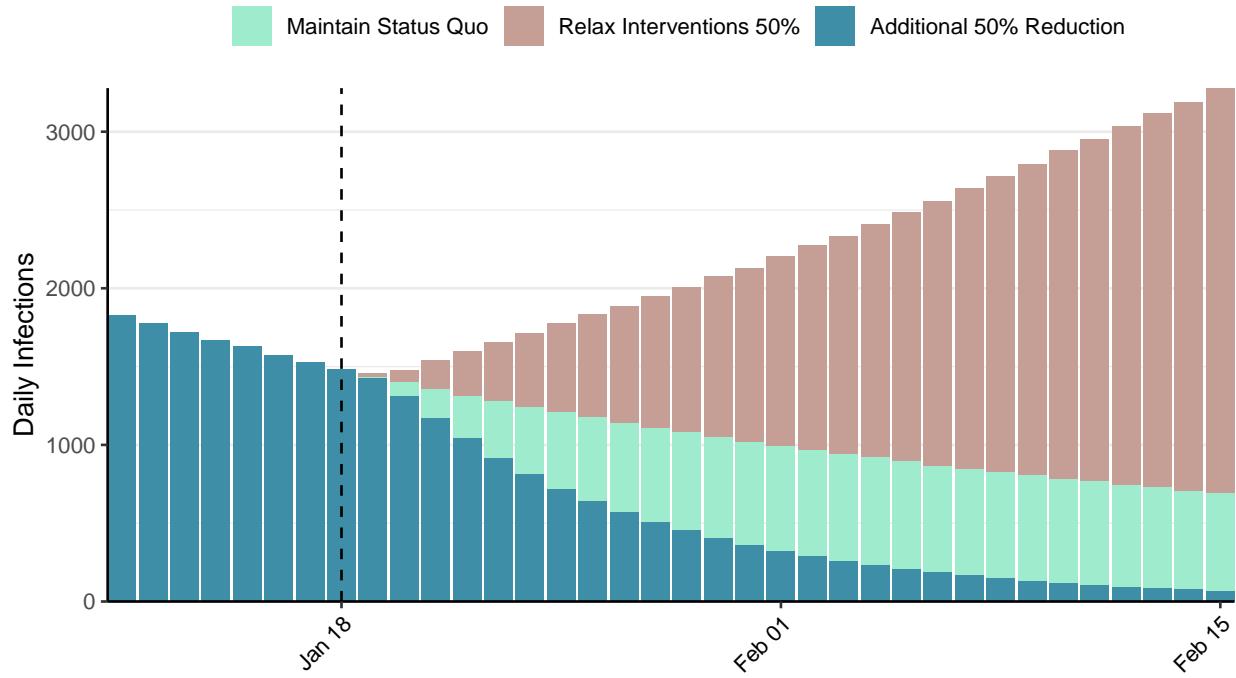


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,468 (95% CI: 1,354-1,582) at the current date to 68 (95% CI: 58-79) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,468 (95% CI: 1,354-1,582) at the current date to 3,246 (95% CI: 2,730-3,762) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Mali, 2021-01-18

[Download the report for Mali, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
16	16	1	1	0.61 (95% CI: 0.47-0.8)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mali is not shown in the following plot as only 1 deaths have been reported to date**

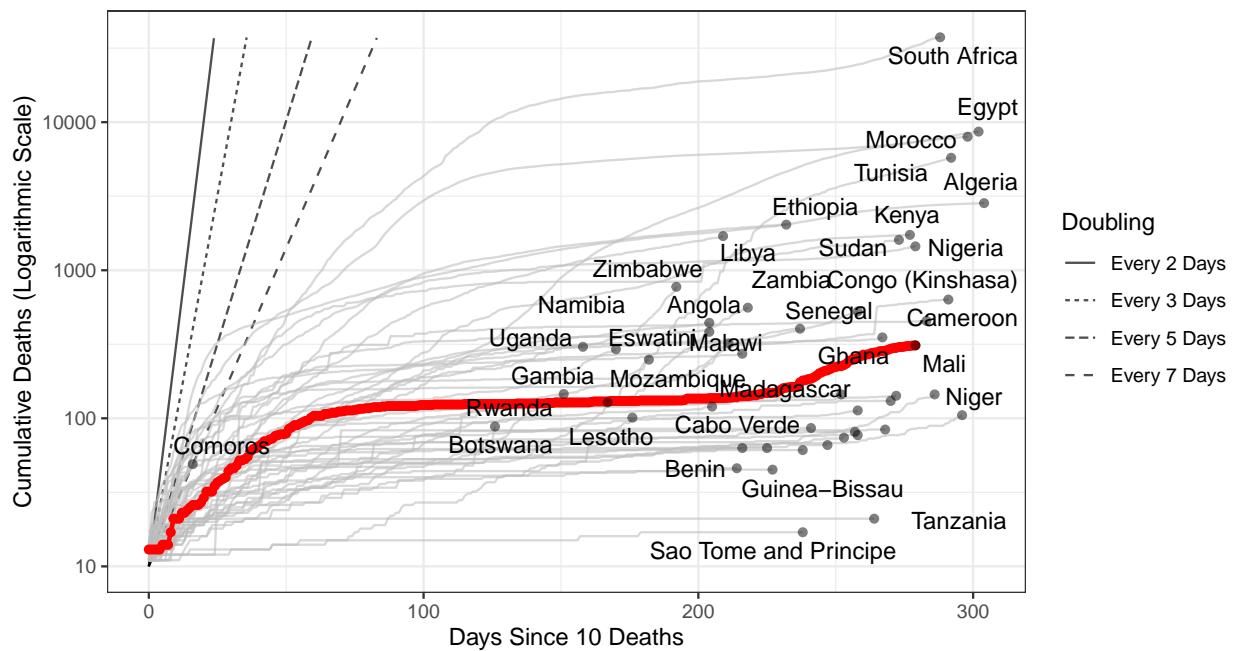


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 46,804 (95% CI: 43,797-49,812) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

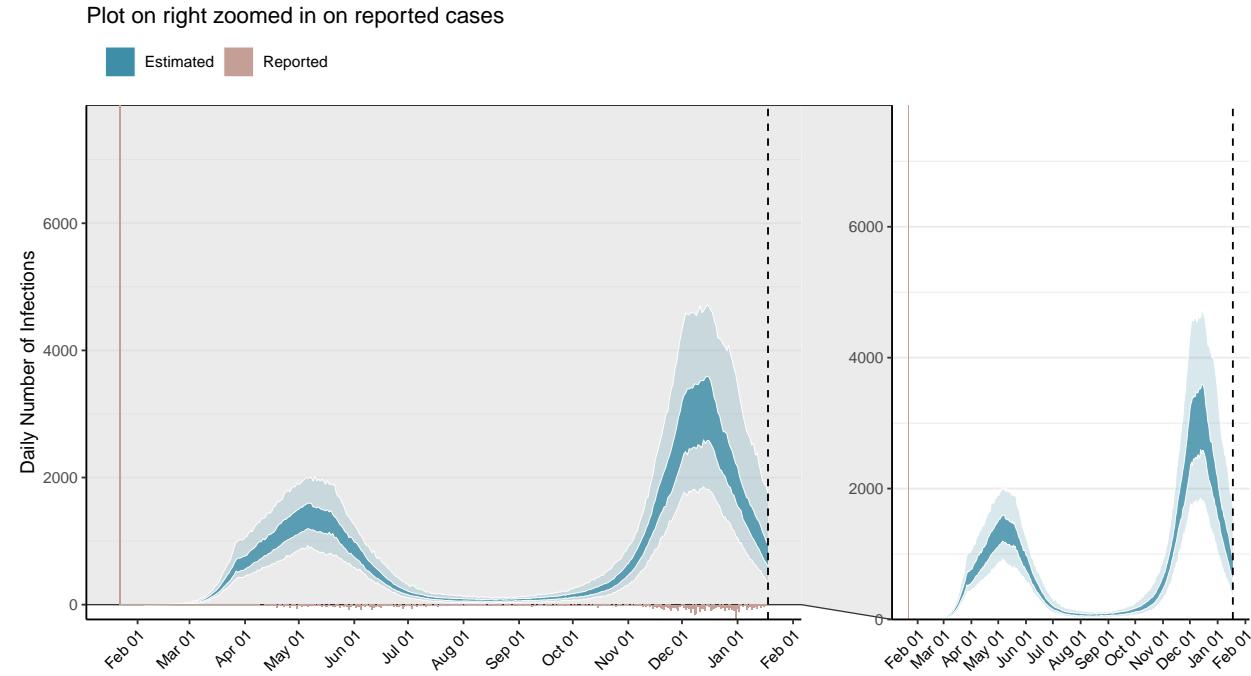
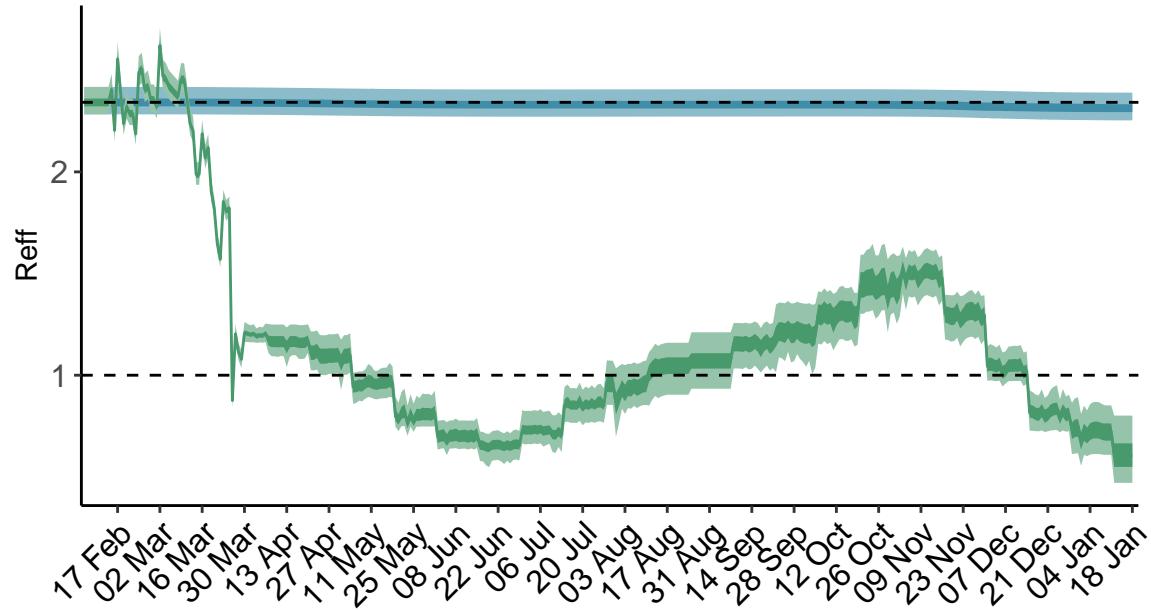


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

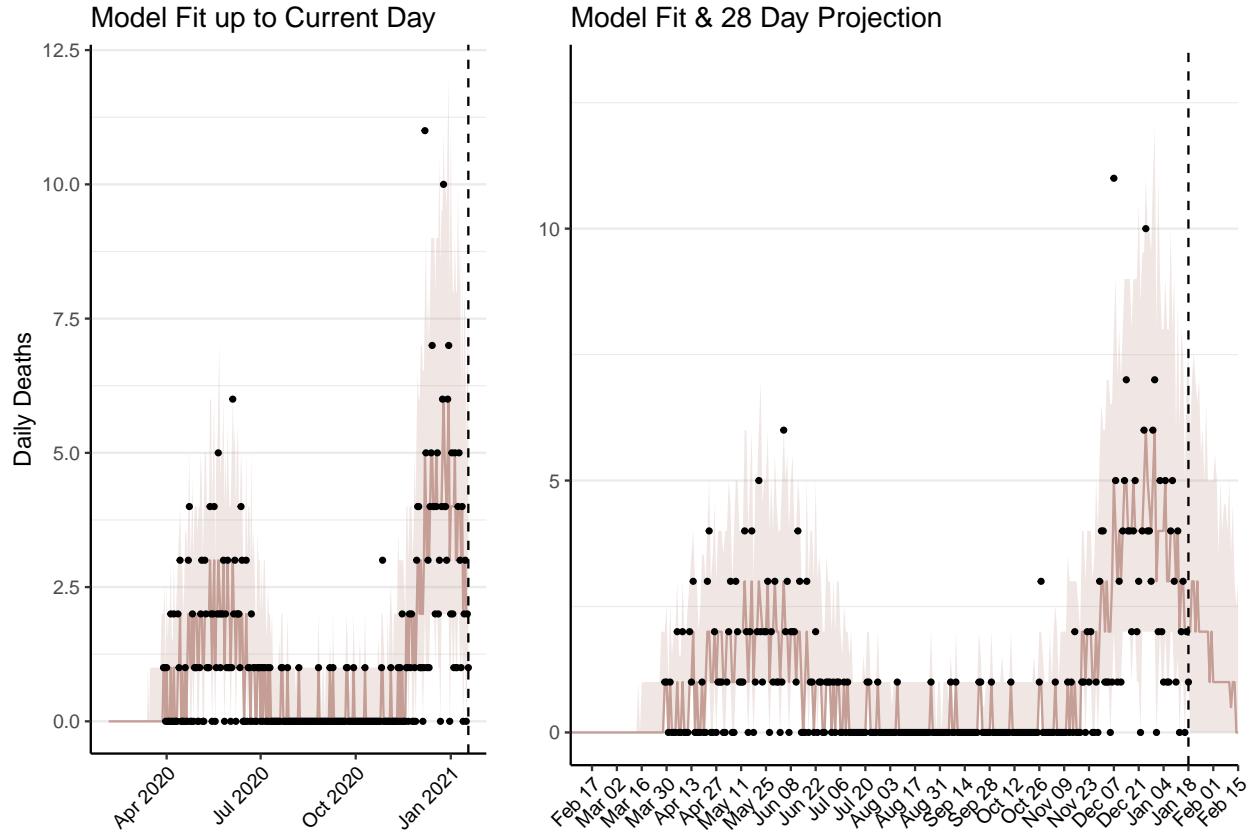


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 110 (95% CI: 103-117) patients requiring treatment with high-pressure oxygen at the current date to 26 (95% CI: 22-30) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 48 (95% CI: 45-51) patients requiring treatment with mechanical ventilation at the current date to 12 (95% CI: 11-14) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

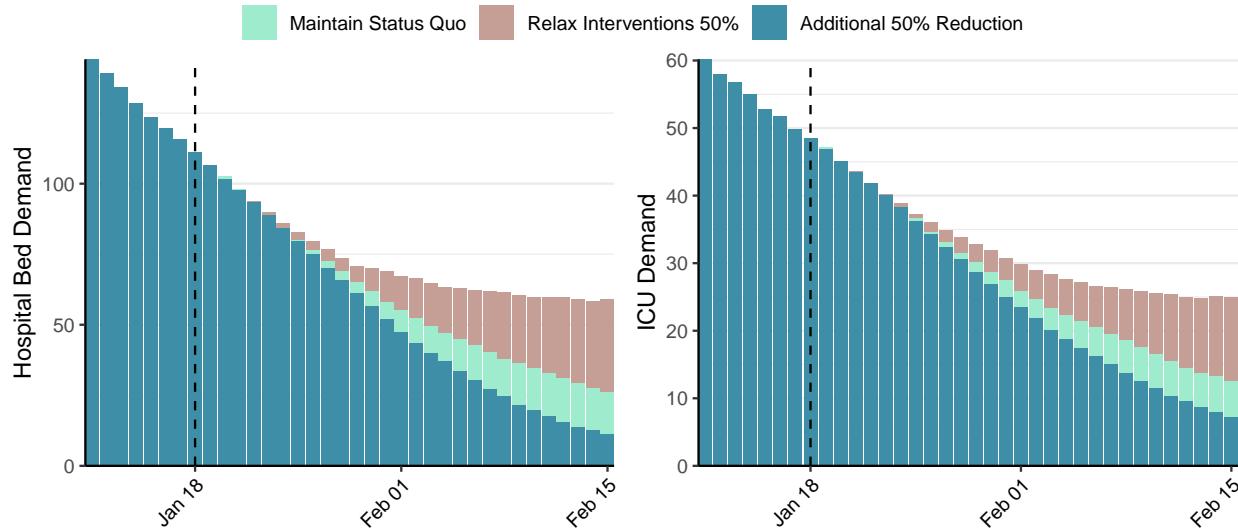
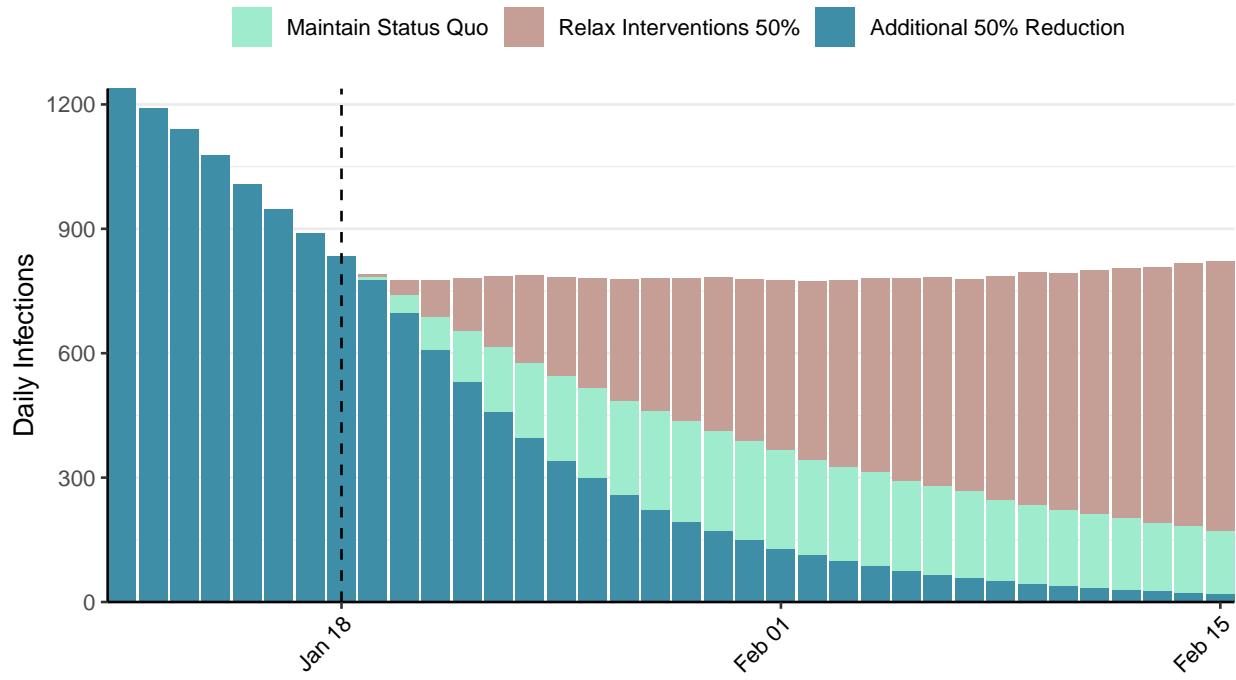


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 825 (95% CI: 745-904) at the current date to 19 (95% CI: 15-22) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 825 (95% CI: 745-904) at the current date to 812 (95% CI: 603-1,021) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Myanmar, 2021-01-18

[Download the report for Myanmar, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
477	477	18	18	1.08 (95% CI: 0.9-1.29)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

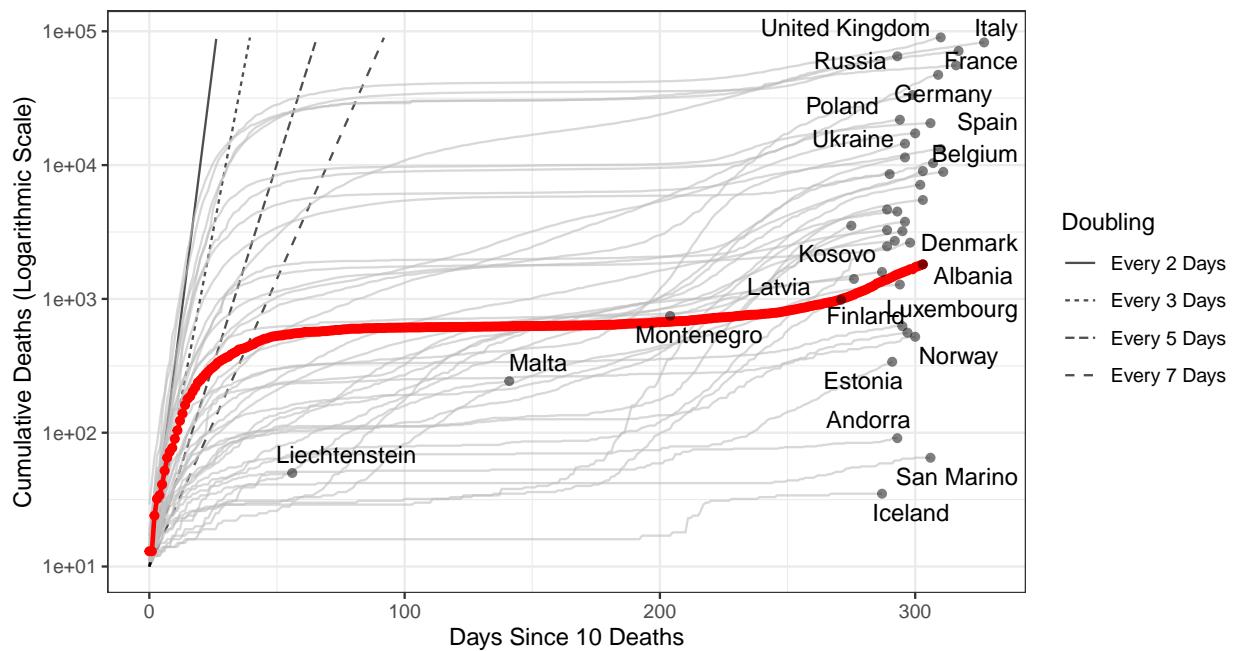


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 206,941 (95% CI: 195,244–218,638) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

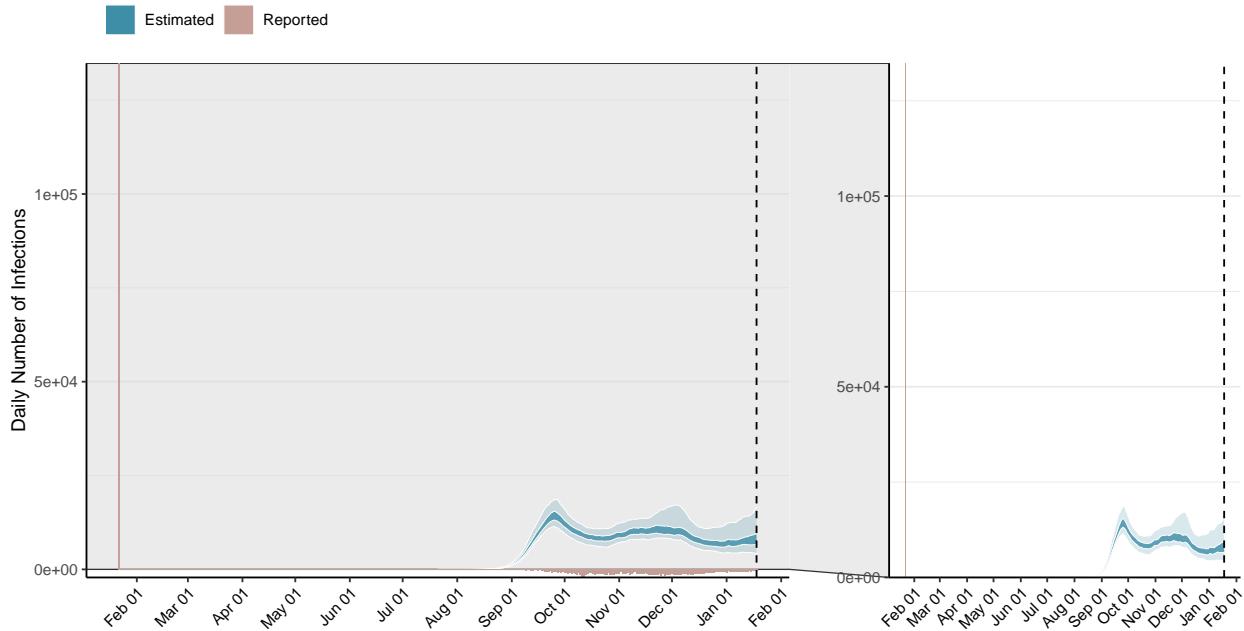
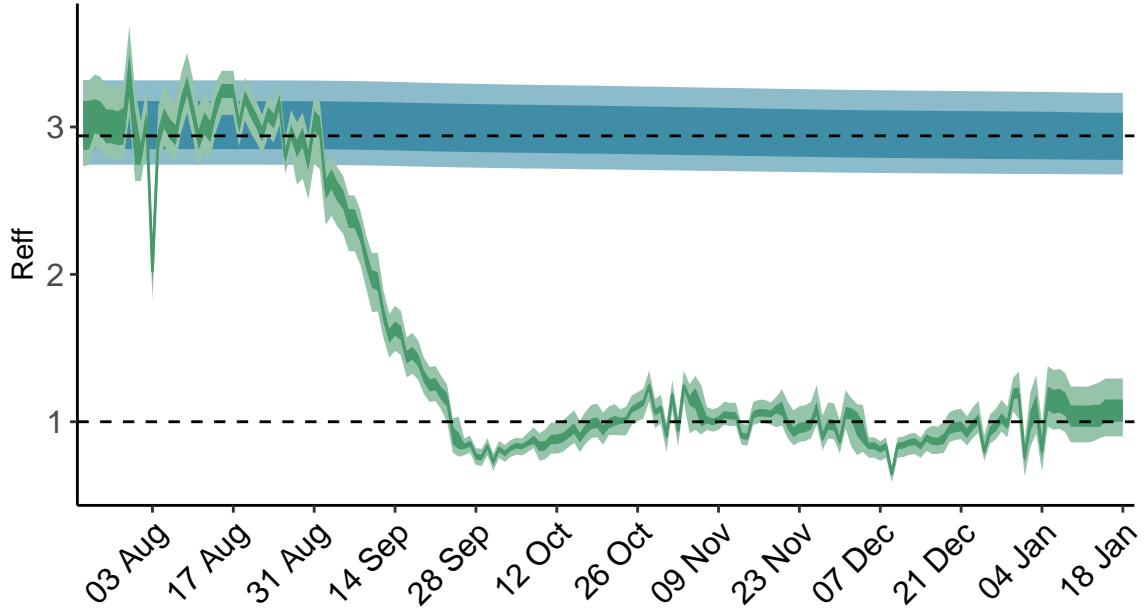


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

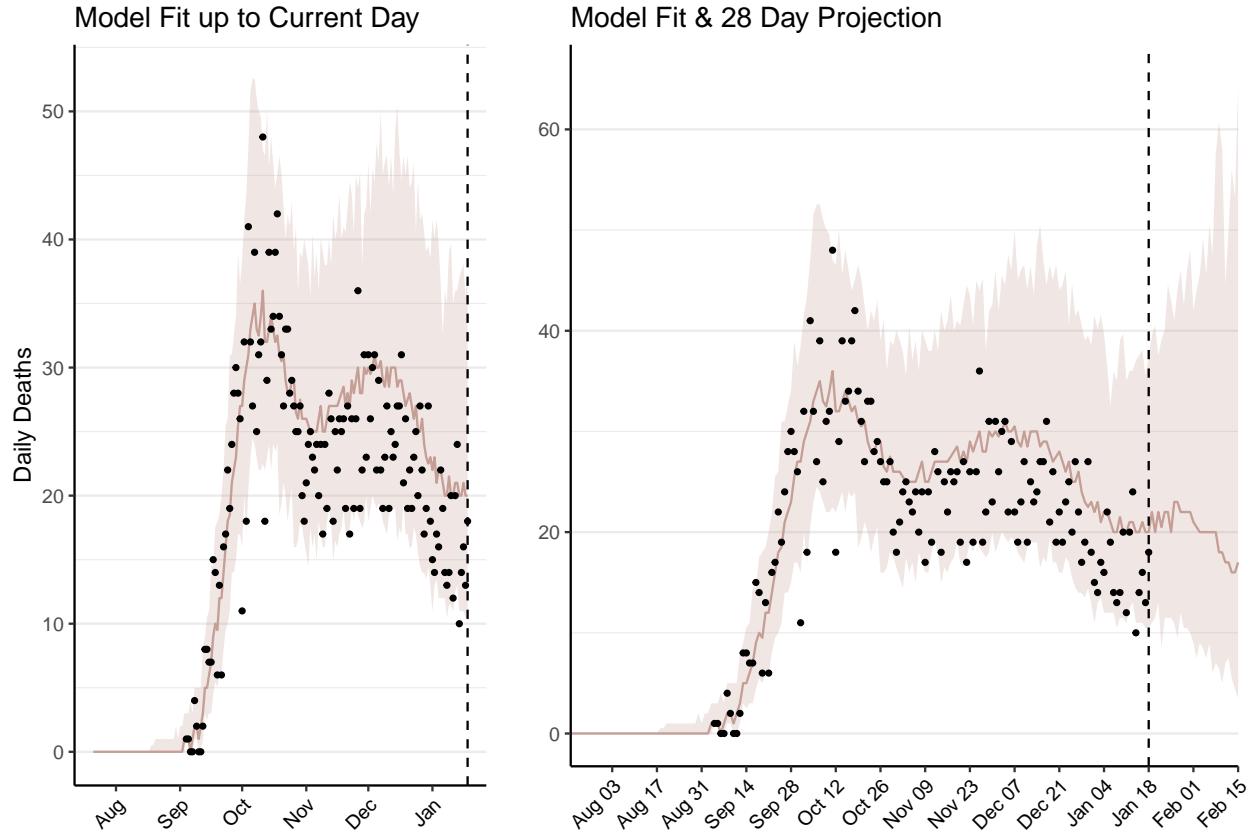


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 880 (95% CI: 830-931) patients requiring treatment with high-pressure oxygen at the current date to 801 (95% CI: 634-967) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 352 (95% CI: 333-372) patients requiring treatment with mechanical ventilation at the current date to 323 (95% CI: 266-381) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

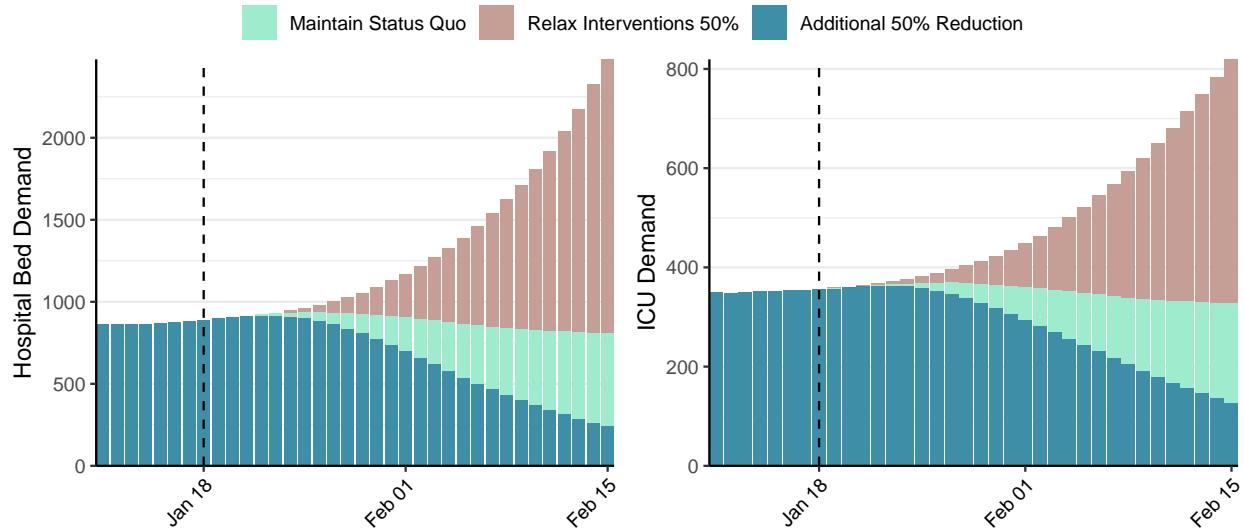


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 8,326 (95% CI: 7,727-8,925) at the current date to 558 (95% CI: 405-712) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 8,326 (95% CI: 7,727-8,925) at the current date to 41,473 (95% CI: 23,861-59,084) by 2021-02-15.

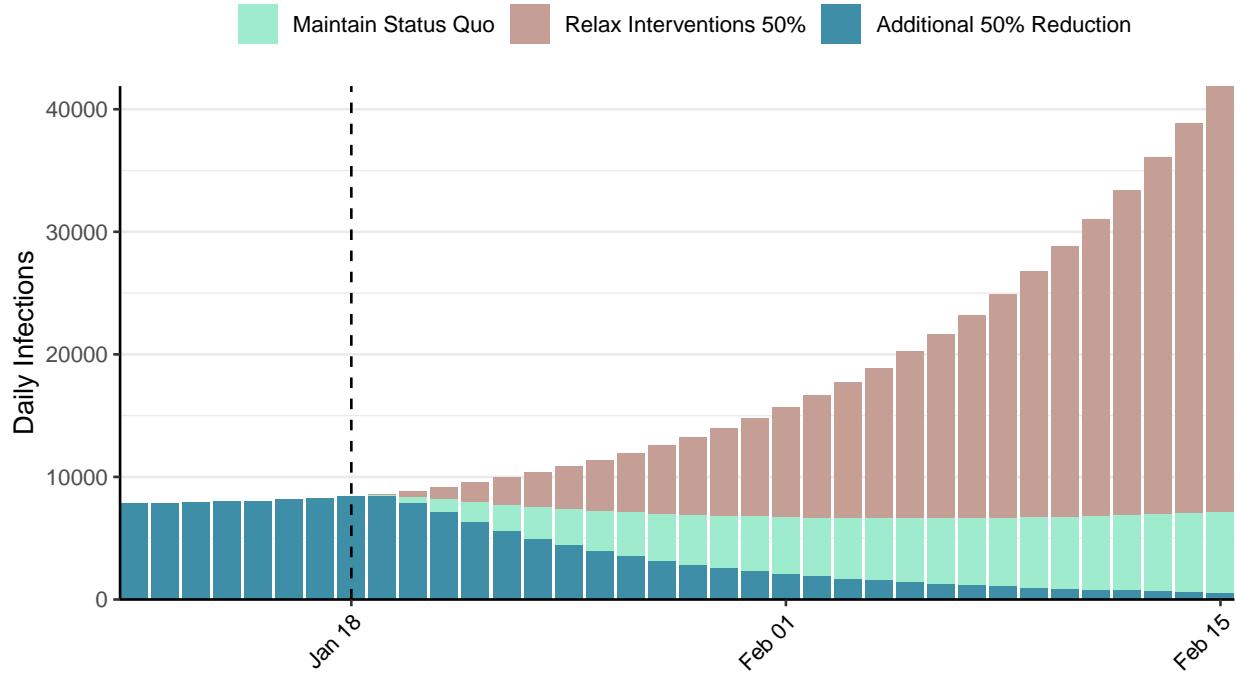


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Montenegro, 2021-01-18

[Download the report for Montenegro, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
310	310	1	1	1.02 (95% CI: 0.74-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Montenegro is not shown in the following plot as only 1 deaths have been reported to date**

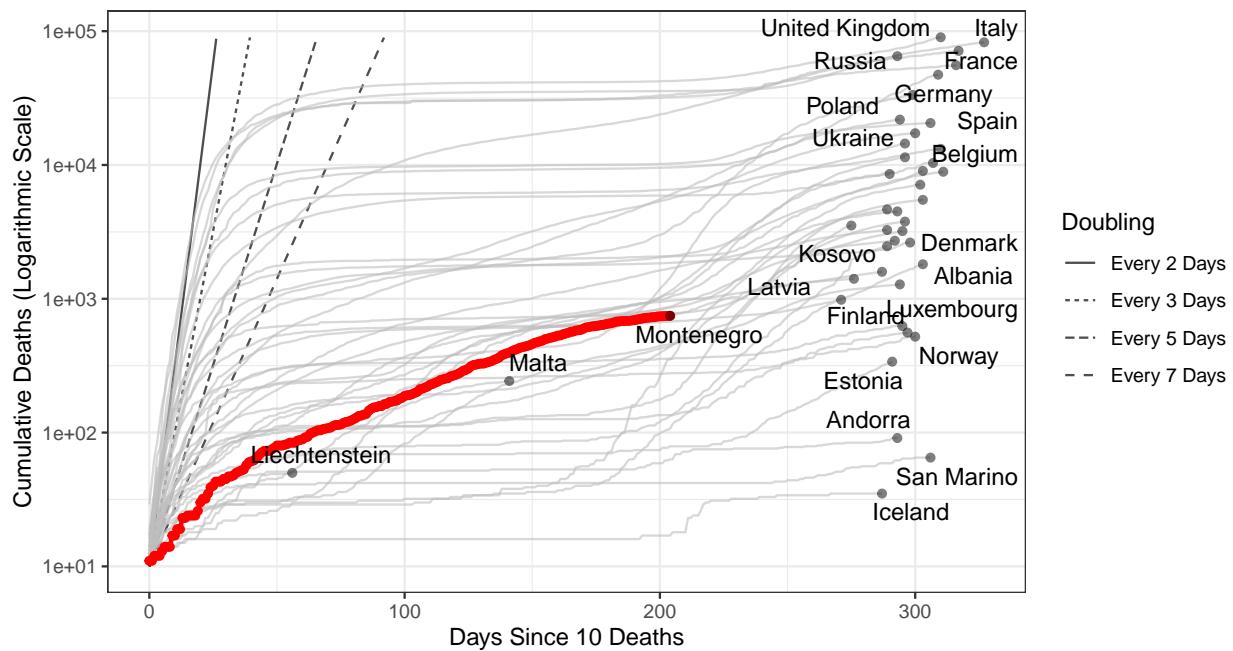


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 22,488 (95% CI: 21,617-23,358) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

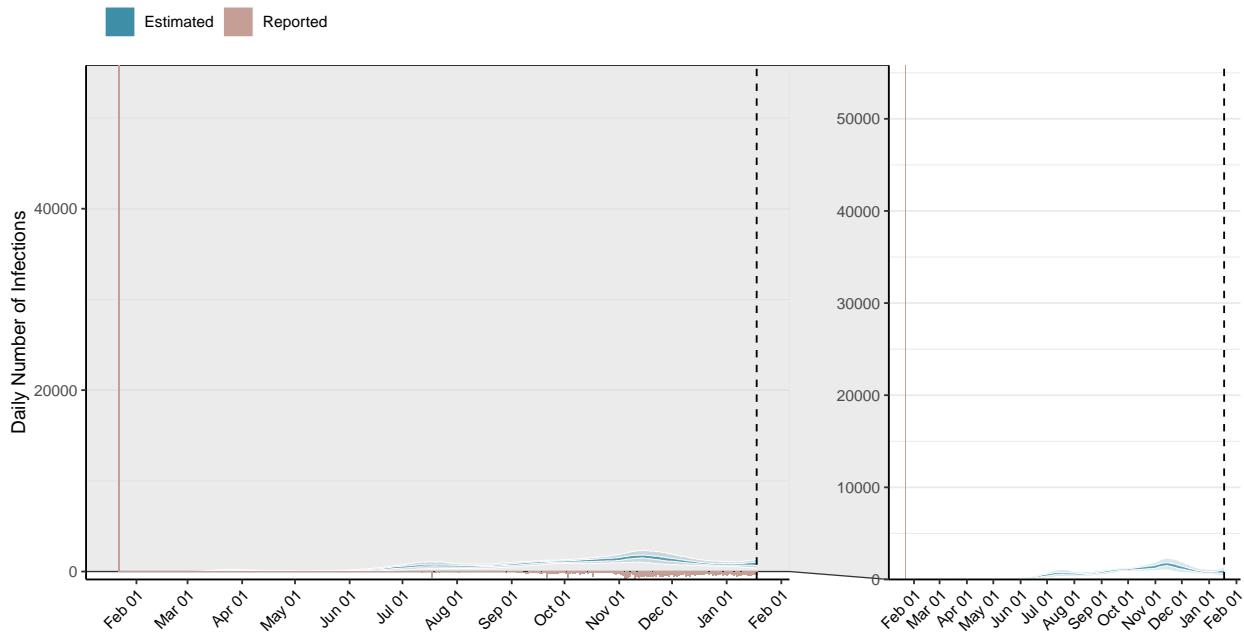
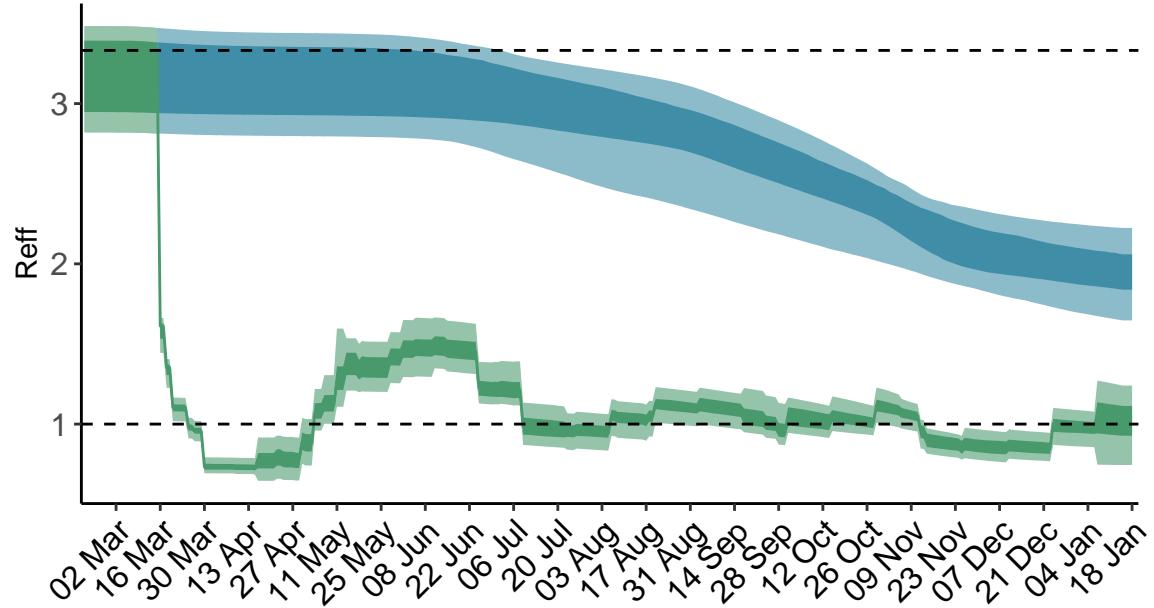


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Montenegro is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

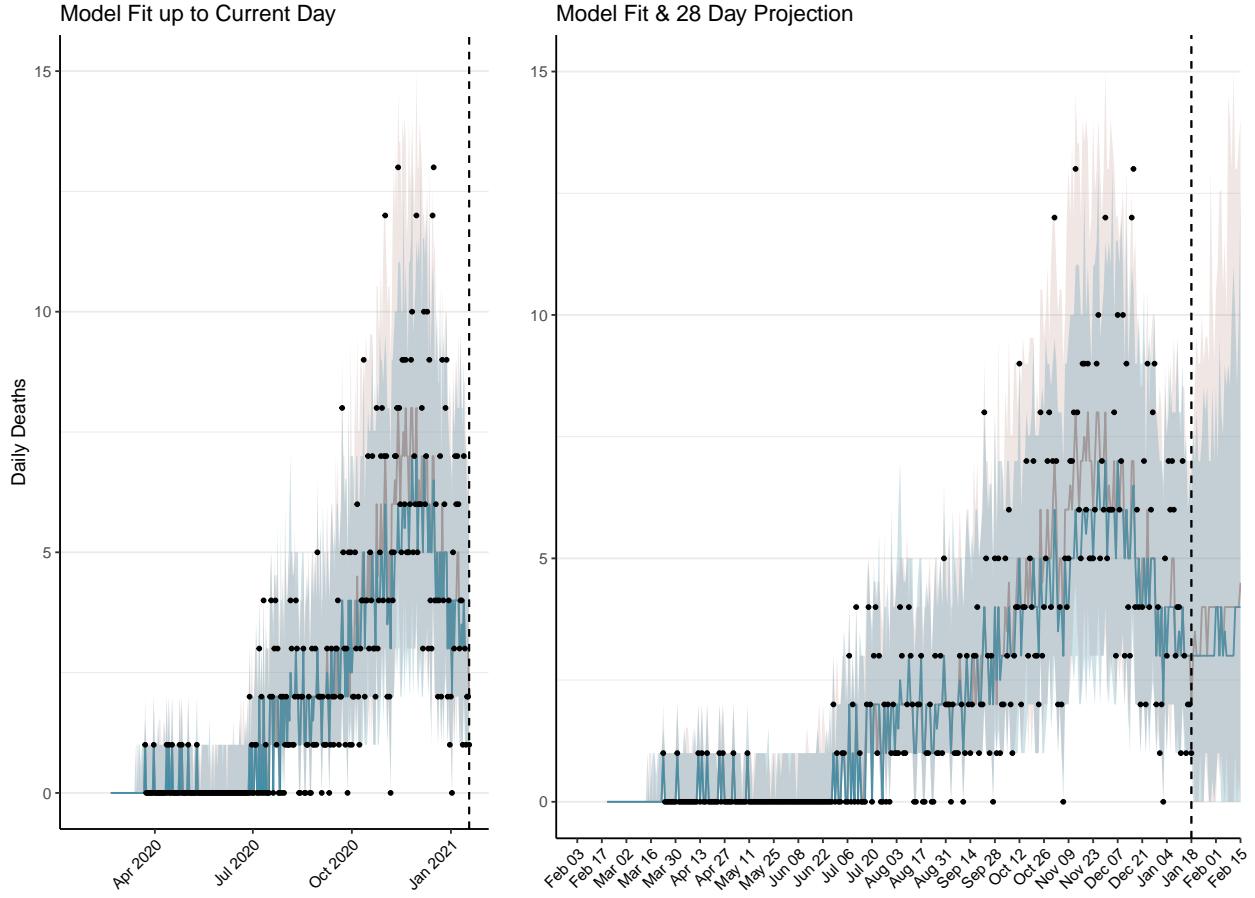


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 123 (95% CI: 117-129) patients requiring treatment with high-pressure oxygen at the current date to 150 (95% CI: 135-166) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 41 (95% CI: 40-43) patients requiring treatment with mechanical ventilation at the current date to 42 (95% CI: 39-45) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

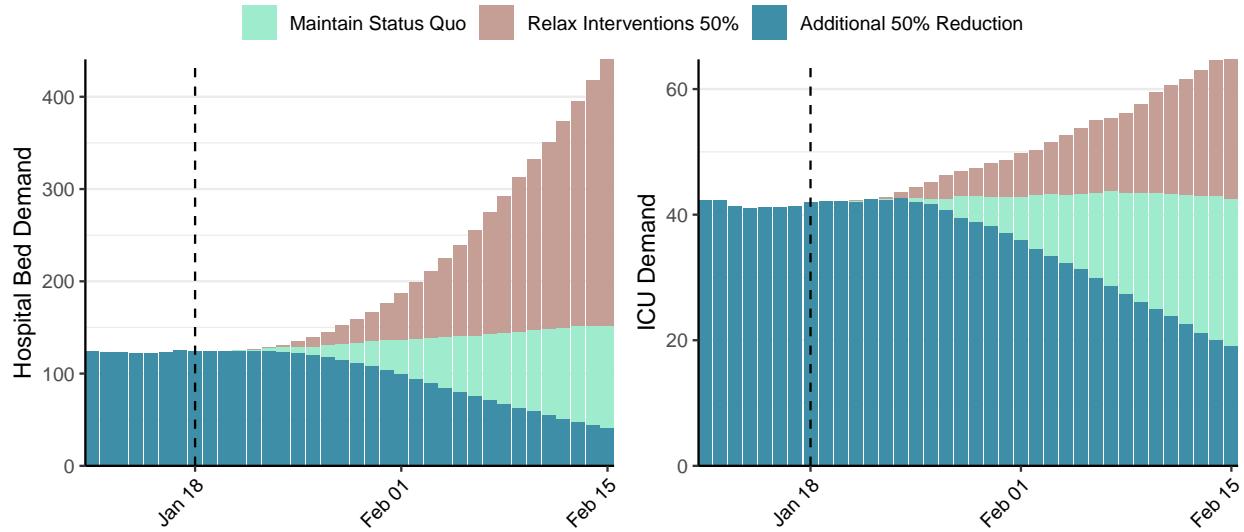


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 852 (95% CI: 799-905) at the current date to 91 (95% CI: 79-102) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 852 (95% CI: 799-905) at the current date to 4,292 (95% CI: 3,829-4,754) by 2021-02-15.

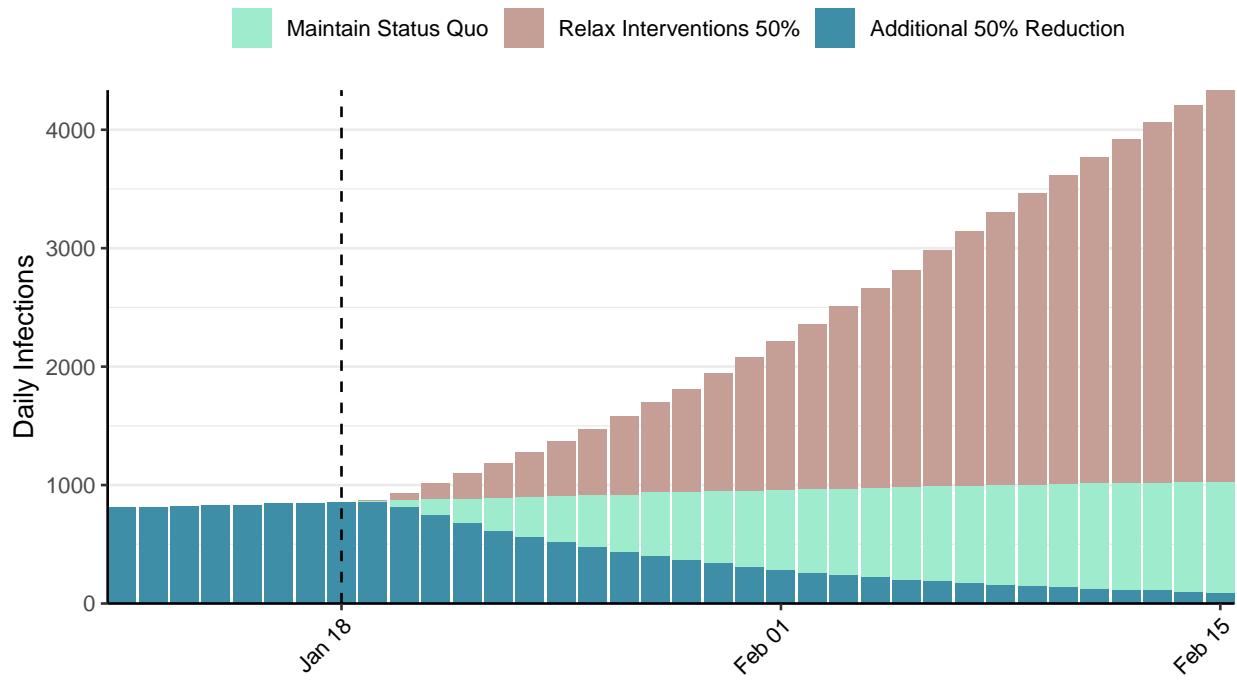


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Mongolia, 2021-01-18

[Download the report for Mongolia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
10	10	0	0	1.62 (95% CI: 1.31-2)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mongolia is not shown in the following plot as only 0 deaths have been reported to date**

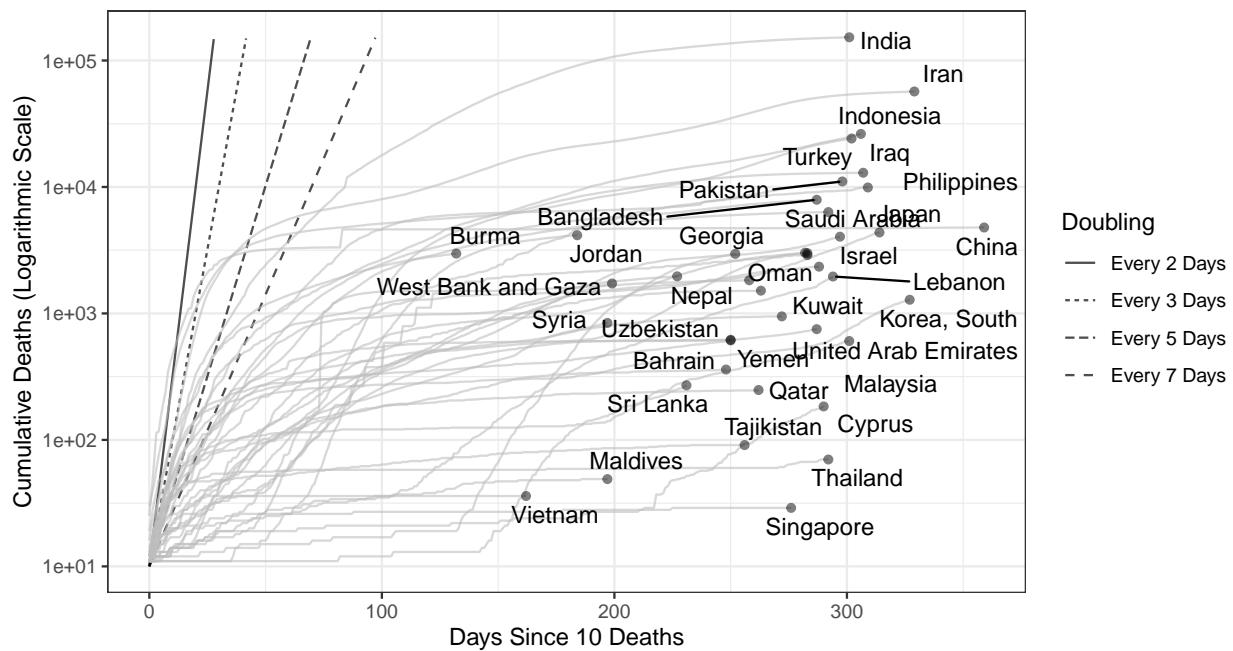


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,803 (95% CI: 2,379-3,227) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

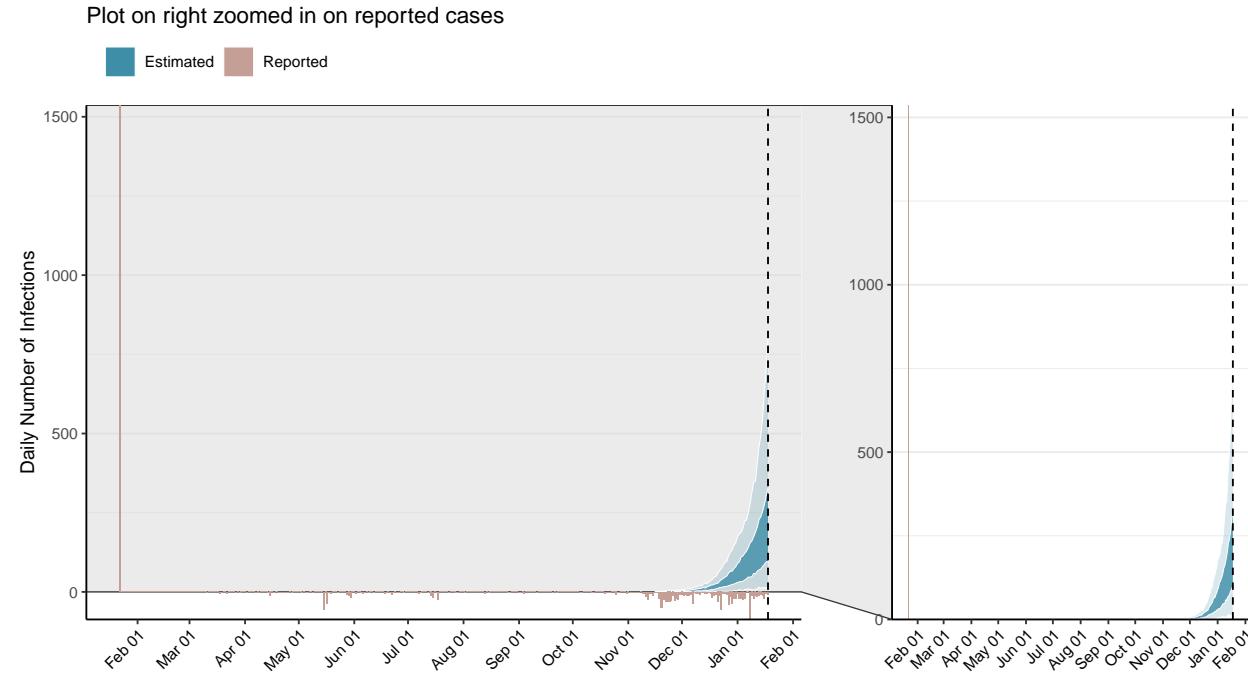
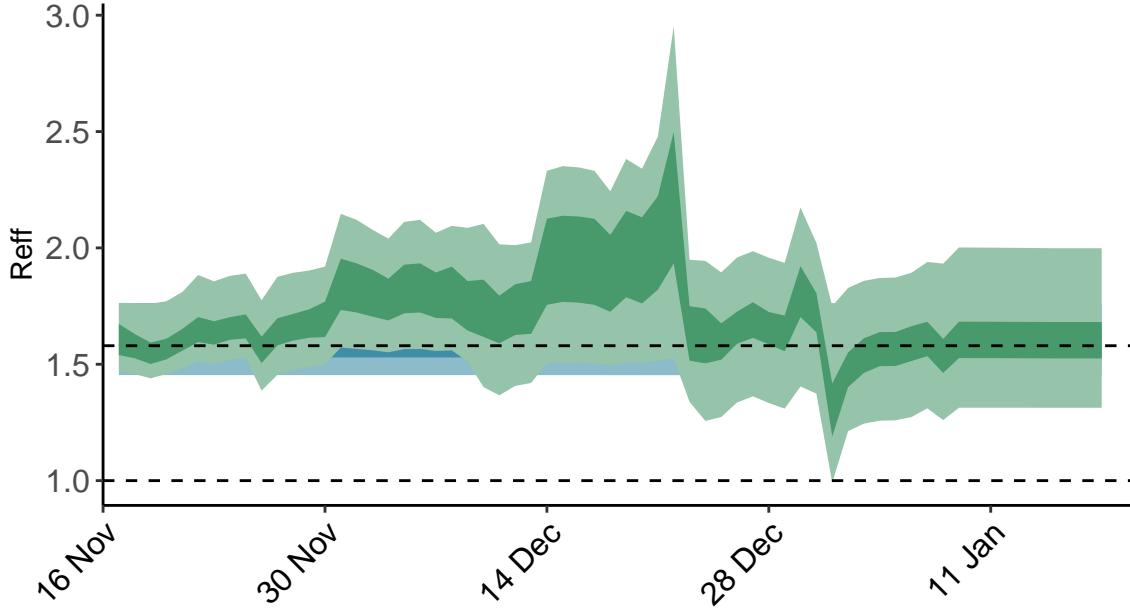


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

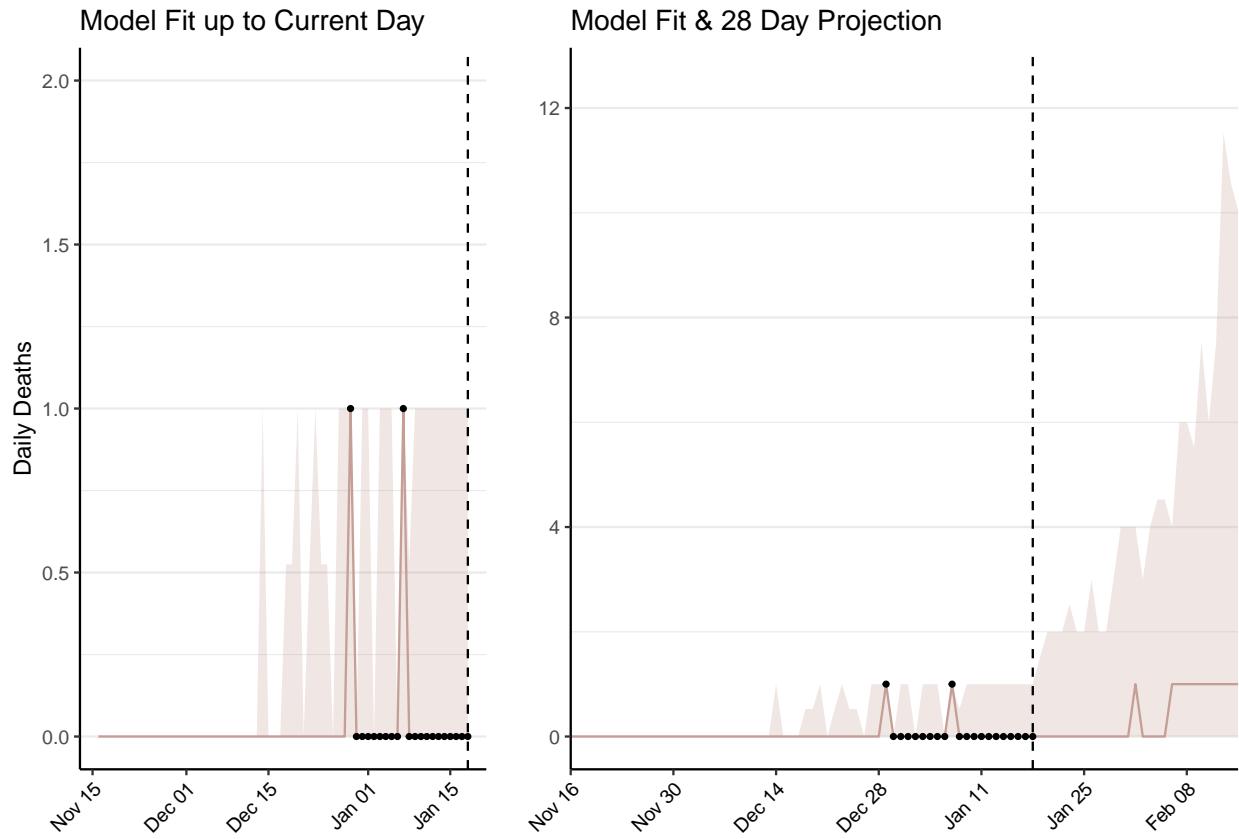


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 13 (95% CI: 11-15) patients requiring treatment with high-pressure oxygen at the current date to 123 (95% CI: 91-155) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 5 (95% CI: 4-5) patients requiring treatment with mechanical ventilation at the current date to 43 (95% CI: 32-54) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

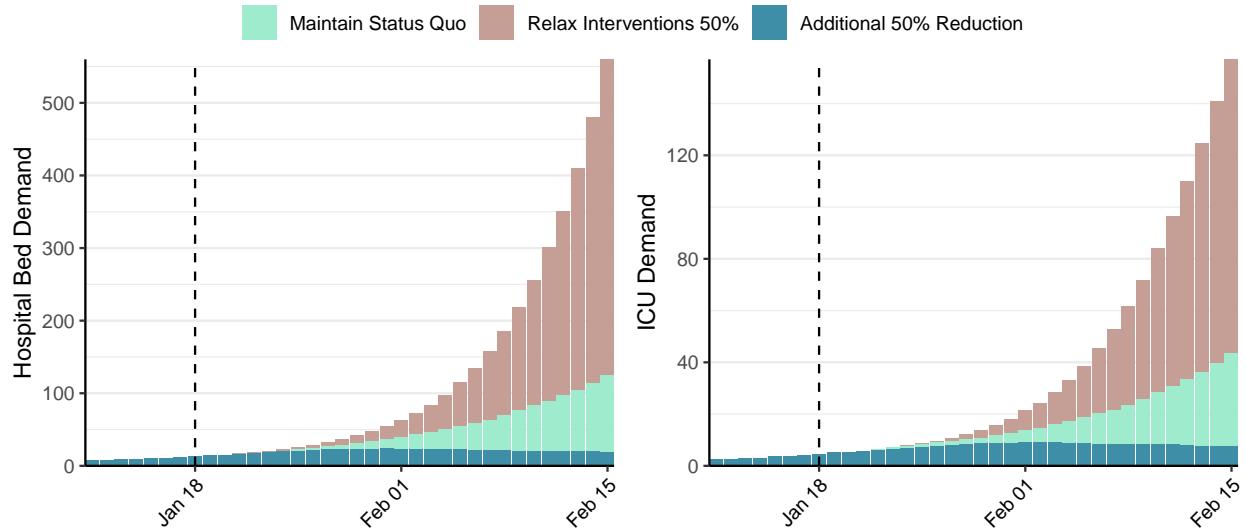


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 250 (95% CI: 207-293) at the current date to 128 (95% CI: 93-163) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 250 (95% CI: 207-293) at the current date to 17,328 (95% CI: 12,609-22,046) by 2021-02-15.

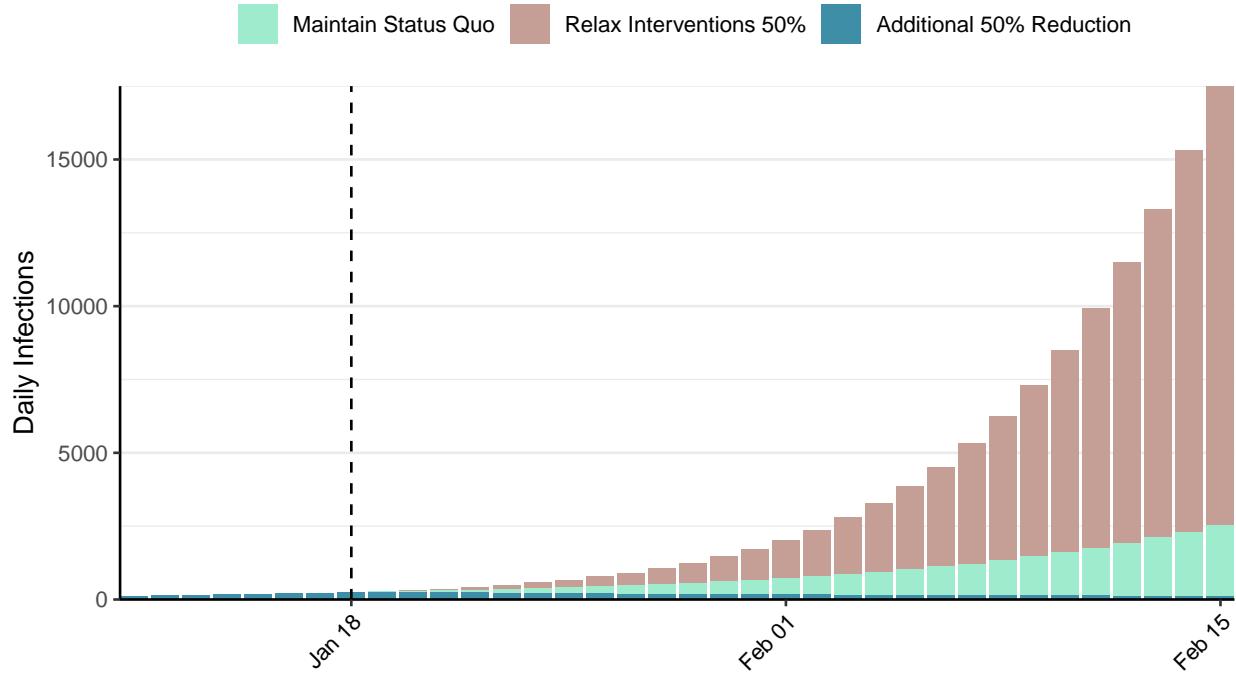


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Mozambique, 2021-01-18

[Download the report for Mozambique, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.15 (95% CI: 0.94-1.39)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mozambique is not shown in the following plot as only 0 deaths have been reported to date**

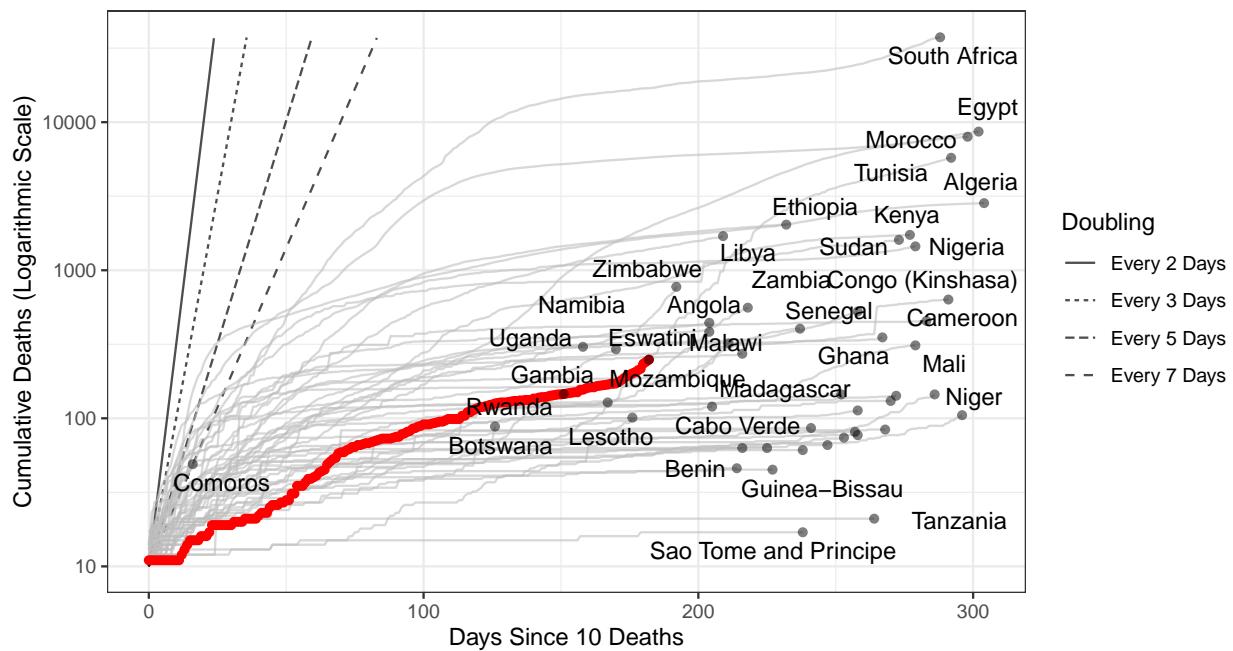


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 532,168 (95% CI: 435,320-629,017) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

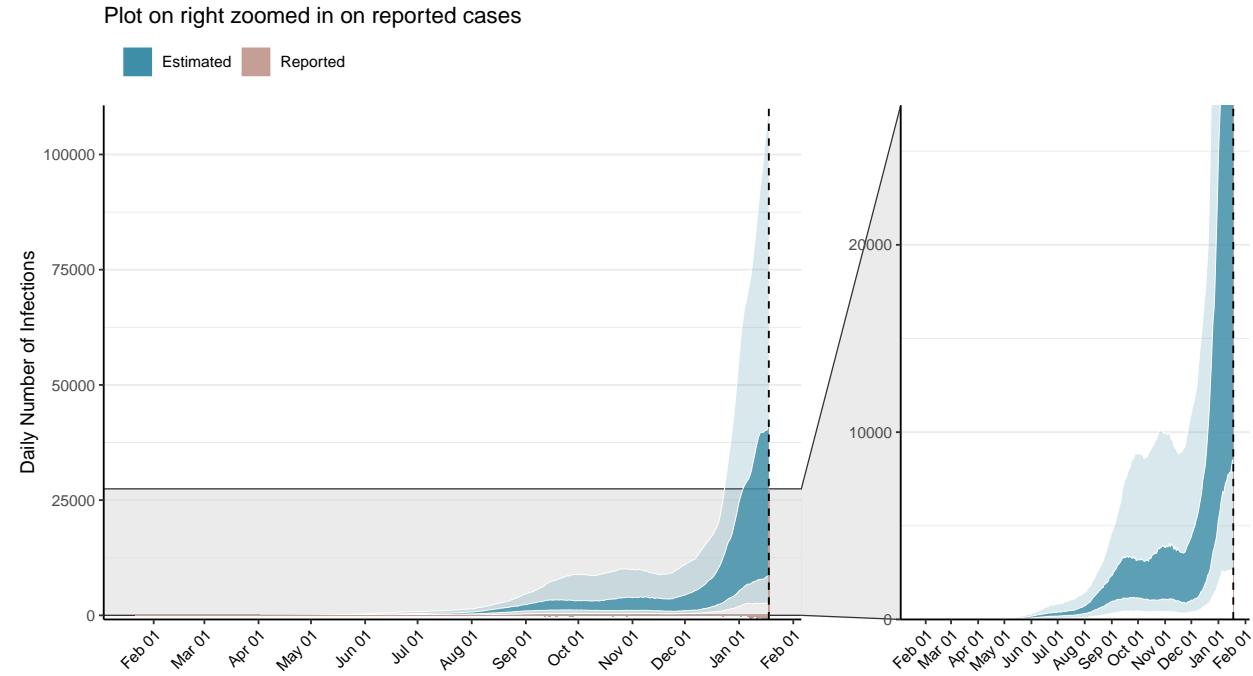
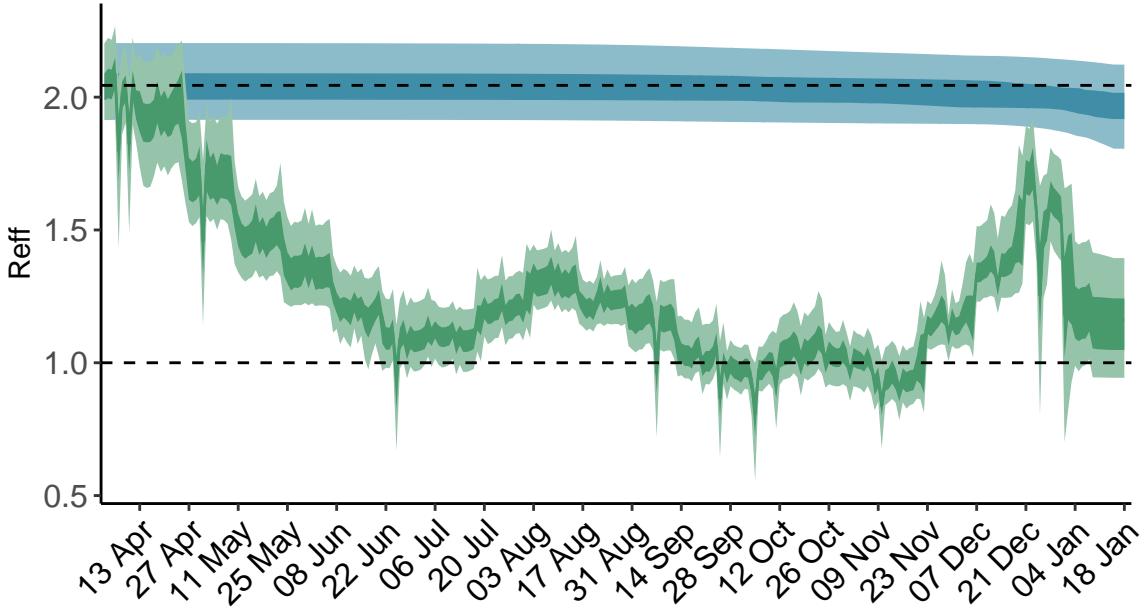


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Mozambique is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

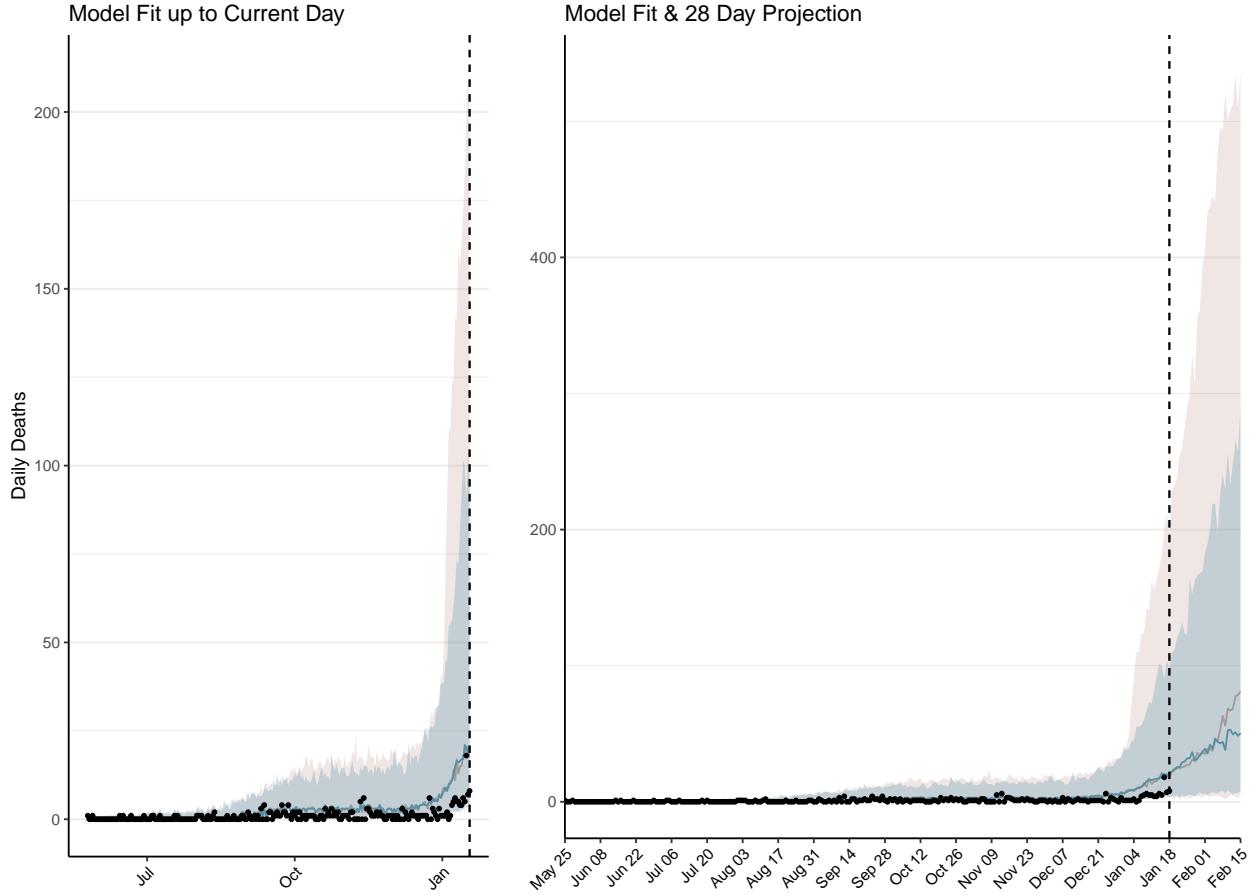


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,584 (95% CI: 1,299-1,869) patients requiring treatment with high-pressure oxygen at the current date to 3,544 (95% CI: 2,818-4,270) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 434 (95% CI: 378-489) patients requiring treatment with mechanical ventilation at the current date to 663 (95% CI: 594-733) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

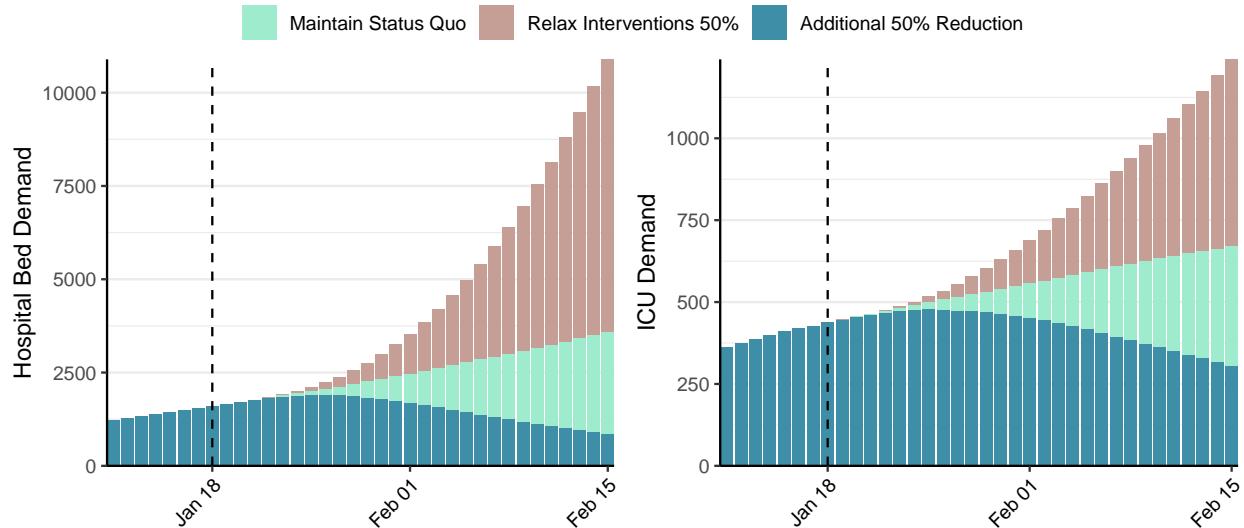
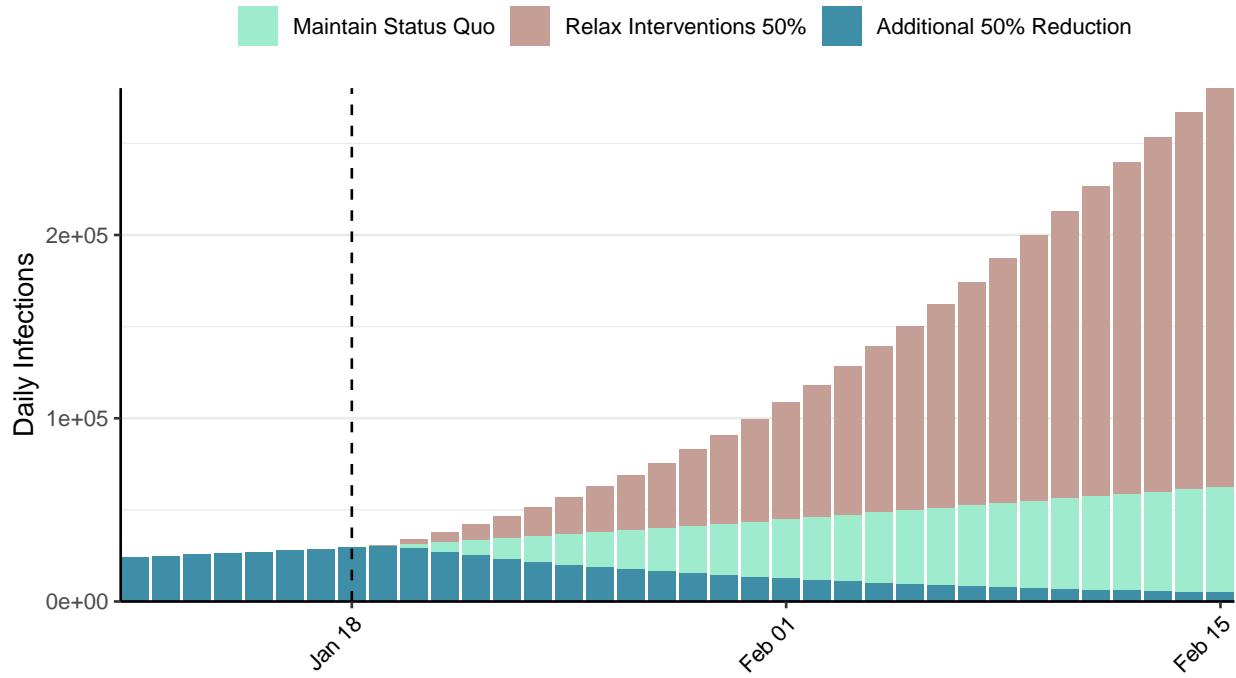


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 29,322 (95% CI: 23,609-35,035) at the current date to 4,968 (95% CI: 3,813-6,123) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 29,322 (95% CI: 23,609-35,035) at the current date to 277,378 (95% CI: 236,109-318,648) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Mauritania, 2021-01-18

[Download the report for Mauritania, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
42	42	1	1	0.69 (95% CI: 0.56-0.83)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mauritania is not shown in the following plot as only 1 deaths have been reported to date**

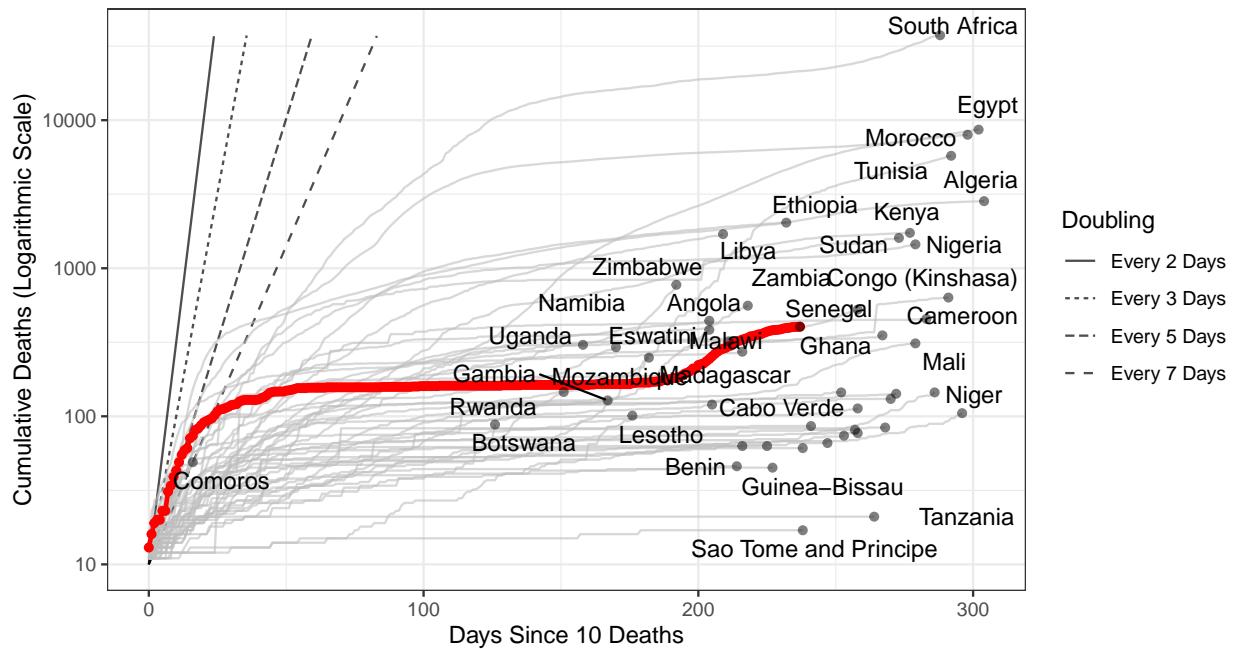


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 50,367 (95% CI: 47,641–53,094) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

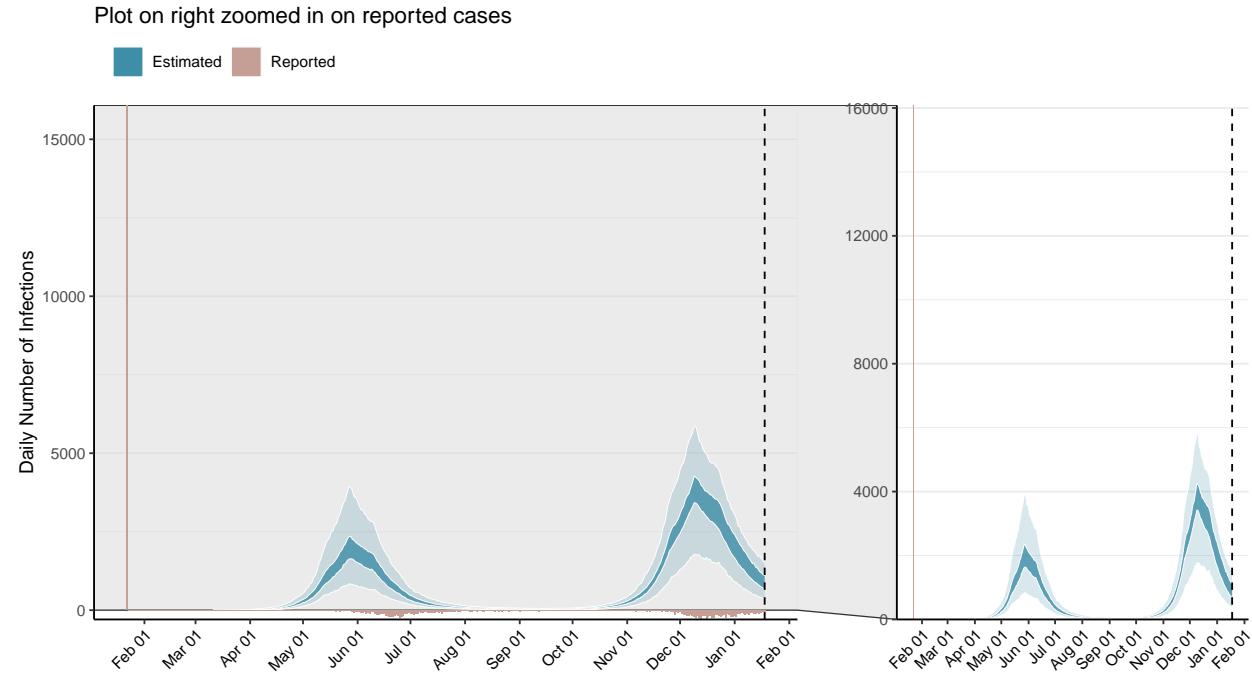
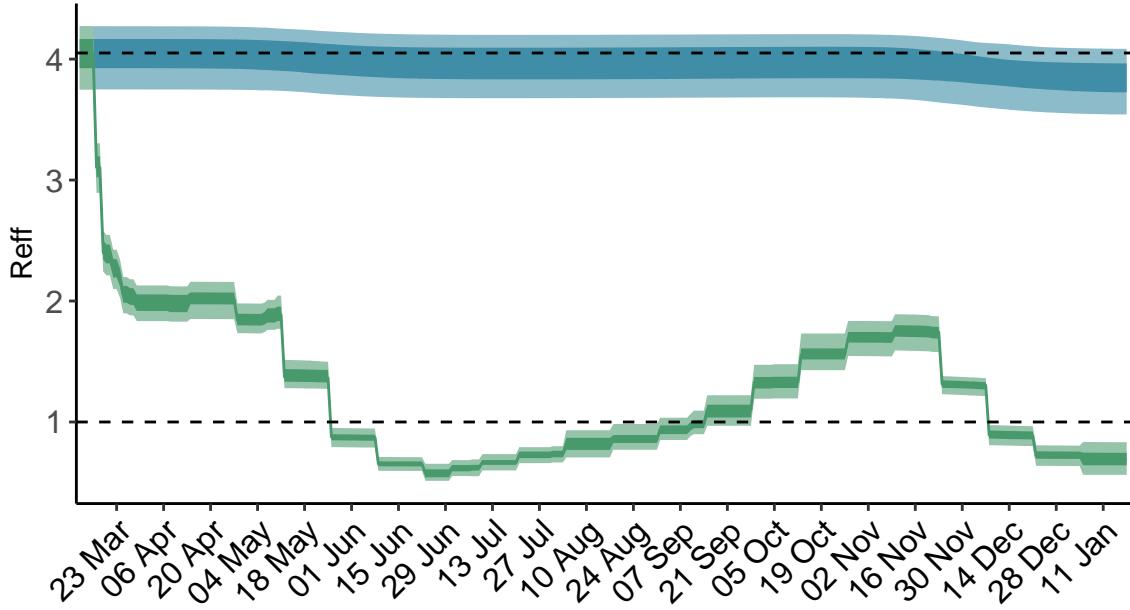


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

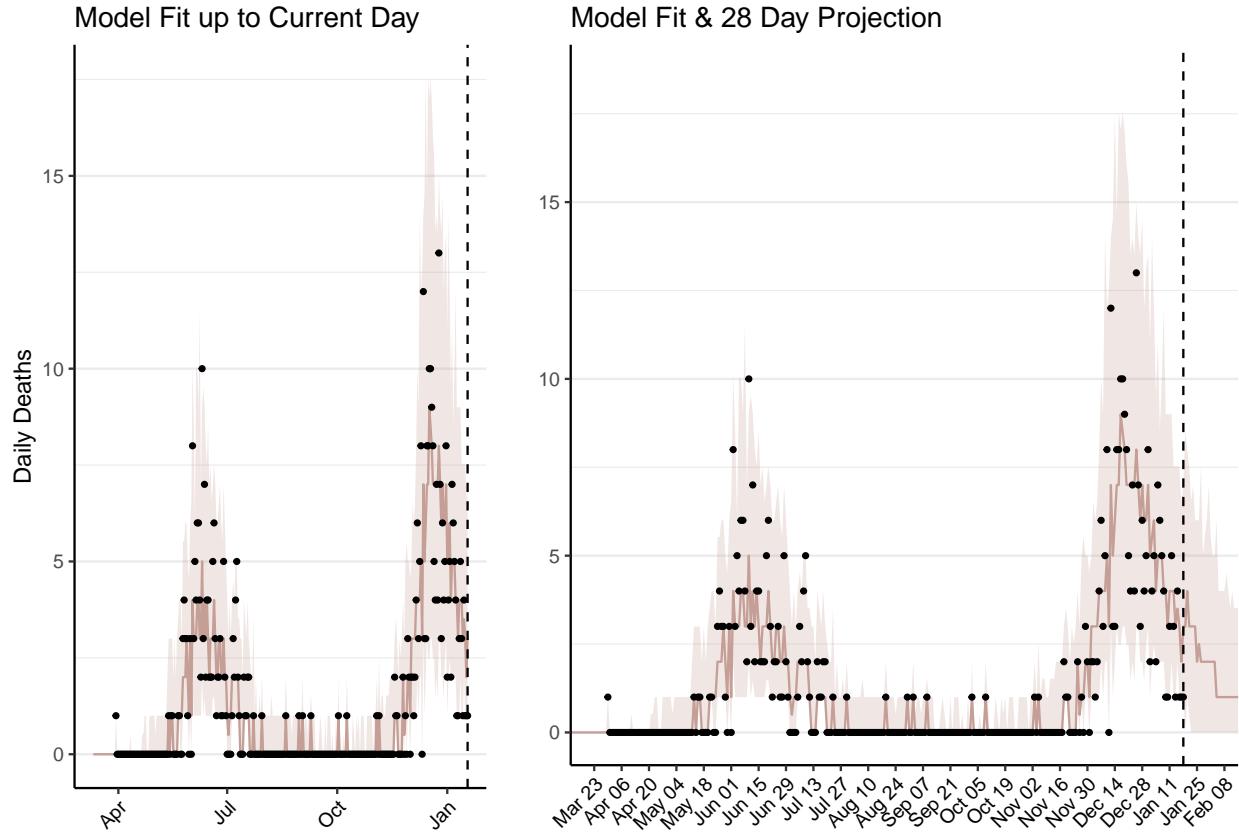


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 130 (95% CI: 122-137) patients requiring treatment with high-pressure oxygen at the current date to 36 (95% CI: 32-40) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 53 (95% CI: 50-56) patients requiring treatment with mechanical ventilation at the current date to 16 (95% CI: 15-18) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

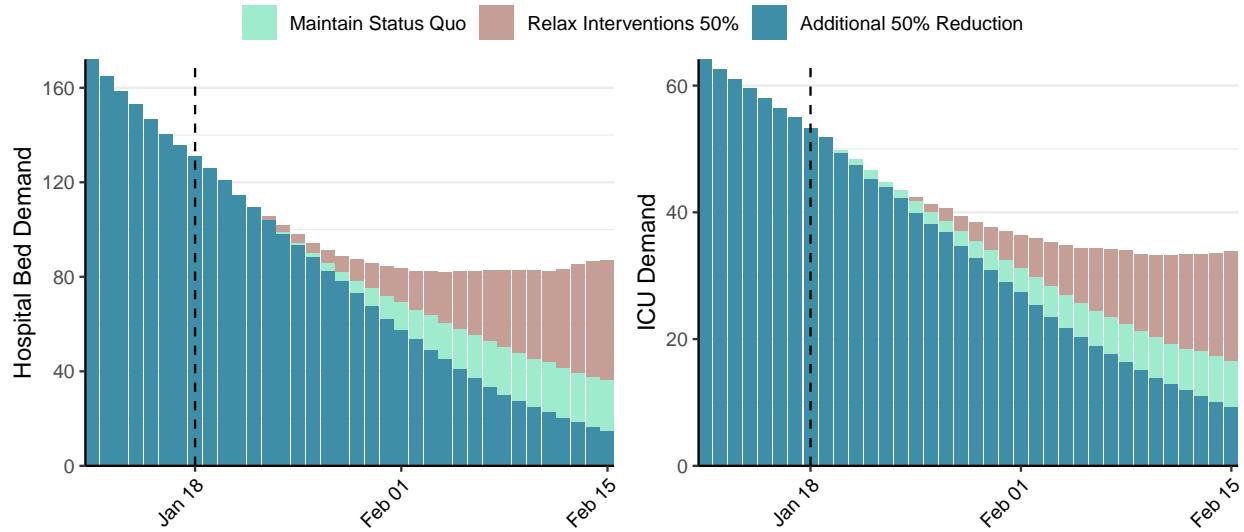


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 883 (95% CI: 820-946) at the current date to 27 (95% CI: 24-31) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 883 (95% CI: 820-946) at the current date to 1,207 (95% CI: 1,033-1,381) by 2021-02-15.

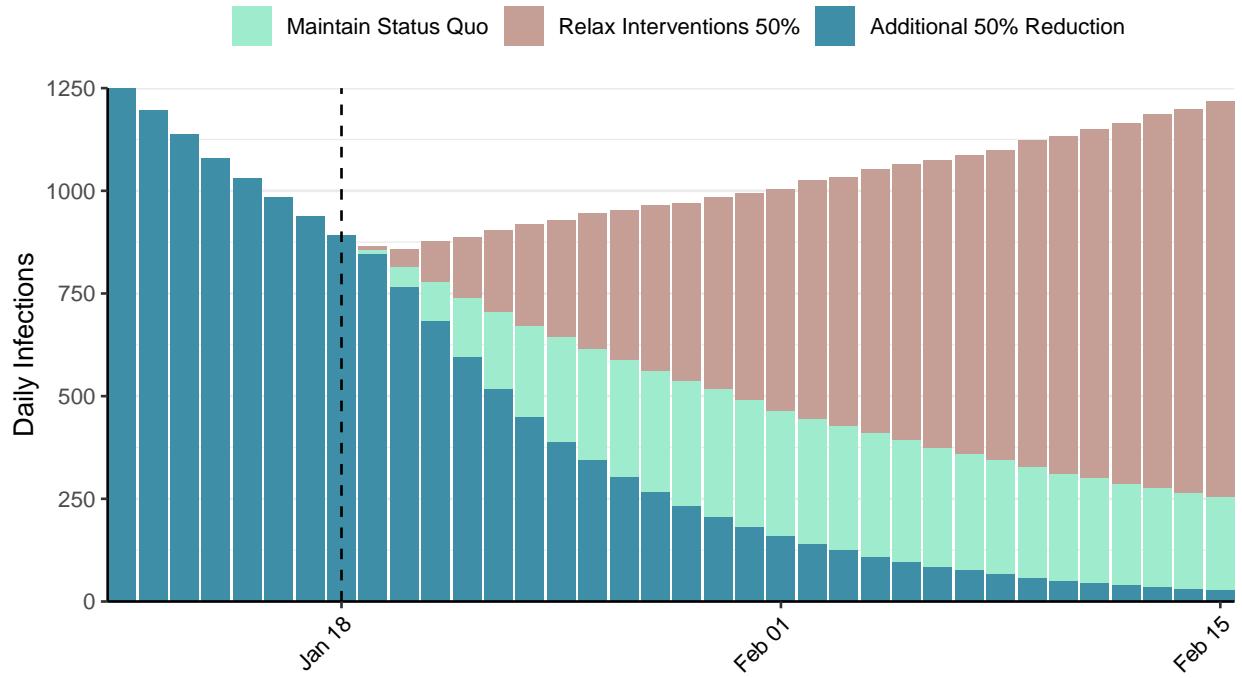


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Mauritius, 2021-01-18

[Download the report for Mauritius, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9	9	0	0	0.58 (95% CI: 0.21-1.28)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Mauritius is not shown in the following plot as only 0 deaths have been reported to date**

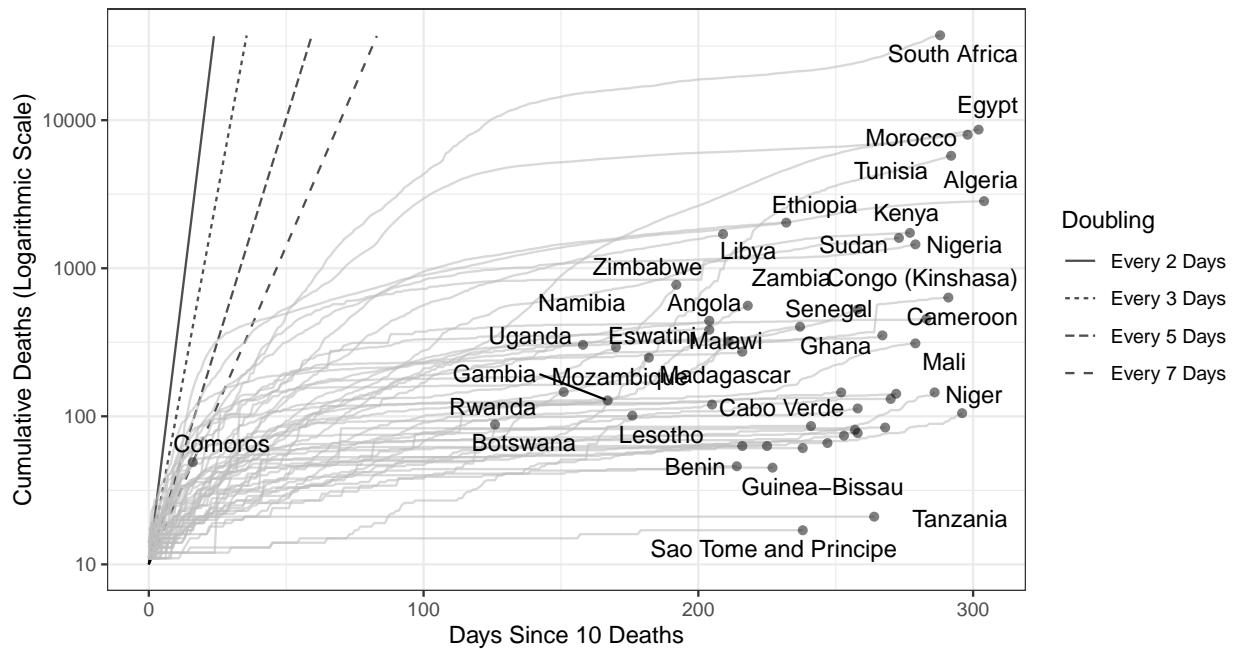


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 0 (95% CI: NaN-NaN) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Mauritius has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

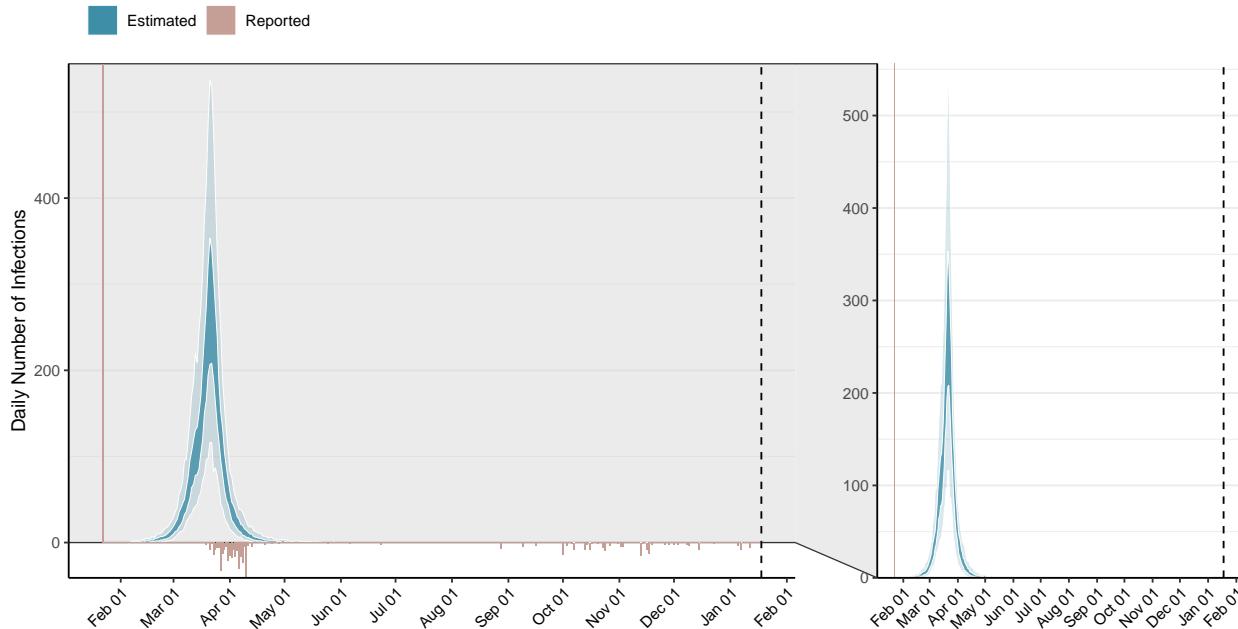
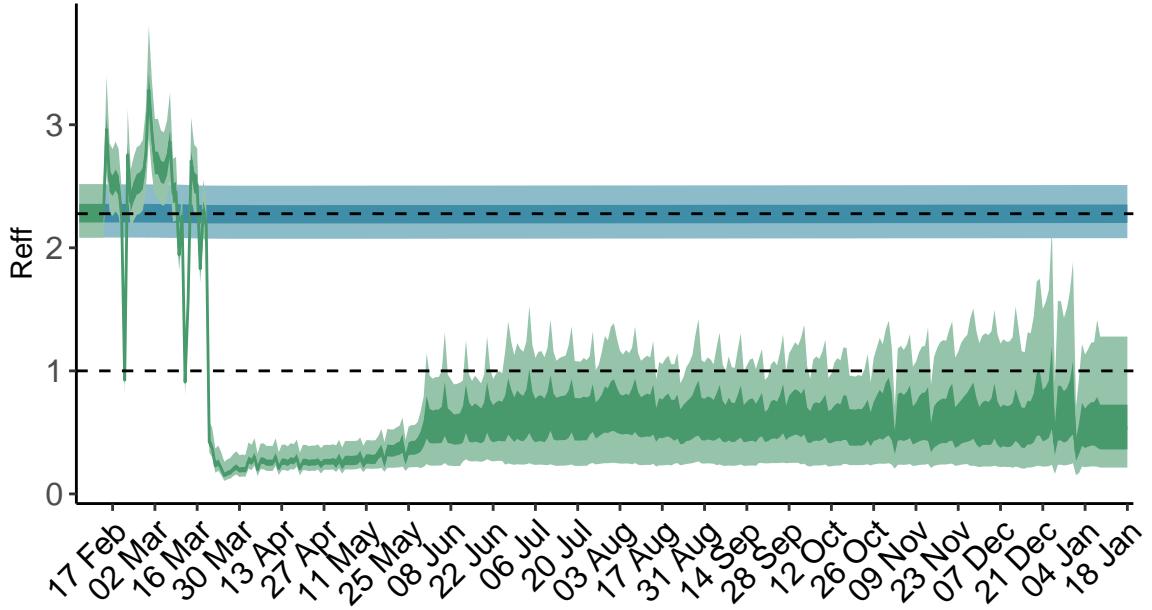


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

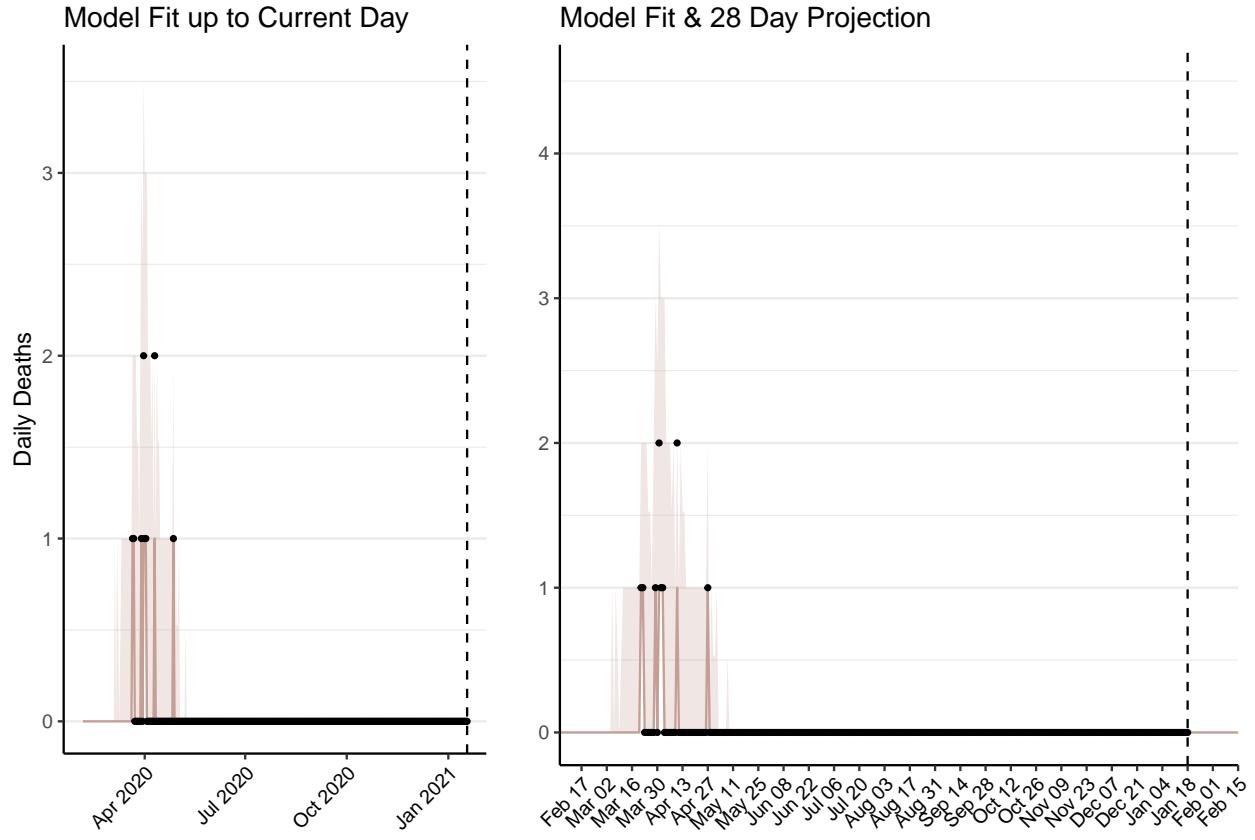


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: NaN-NaN) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

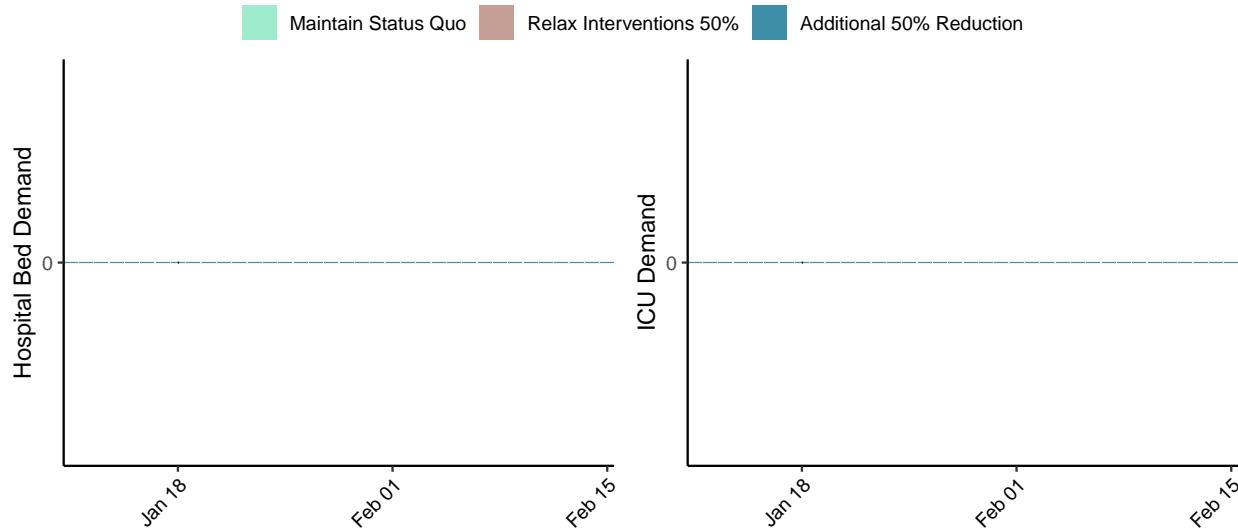


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: NaN-NaN) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: NaN-NaN) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15.

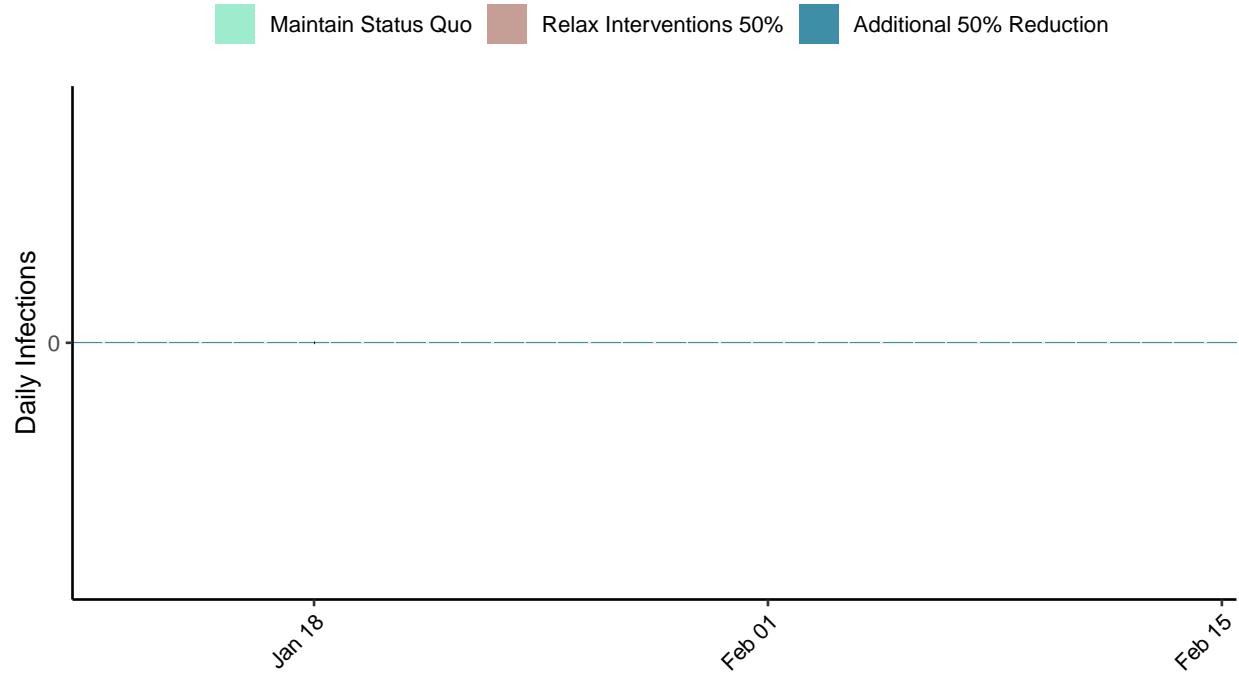


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Malawi, 2021-01-18

[Download the report for Malawi, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	2.13 (95% CI: 1.93-2.33)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Malawi is not shown in the following plot as only 0 deaths have been reported to date**

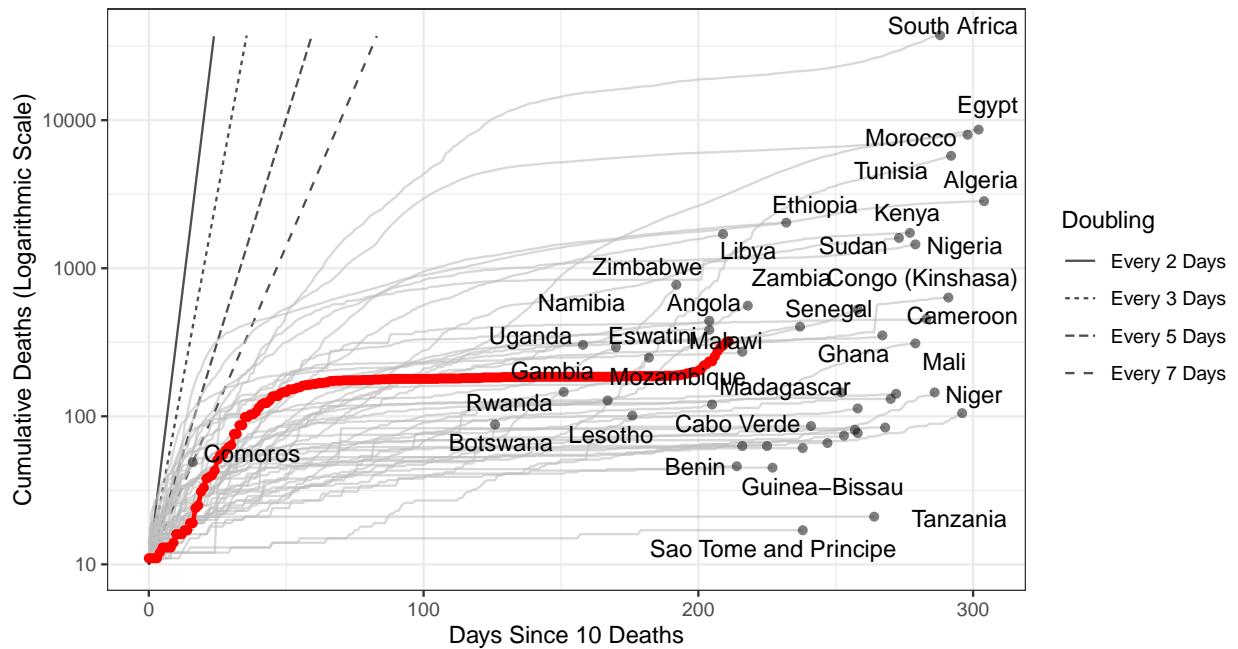


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 419,554 (95% CI: 386,985-452,122) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

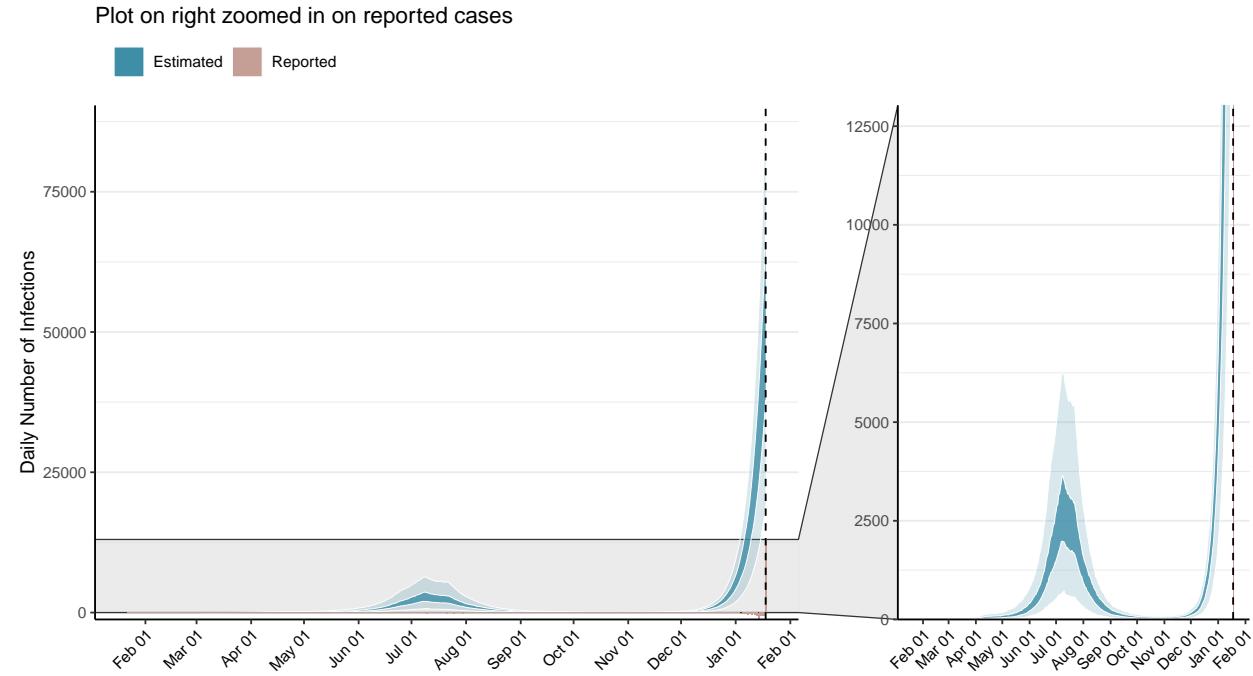
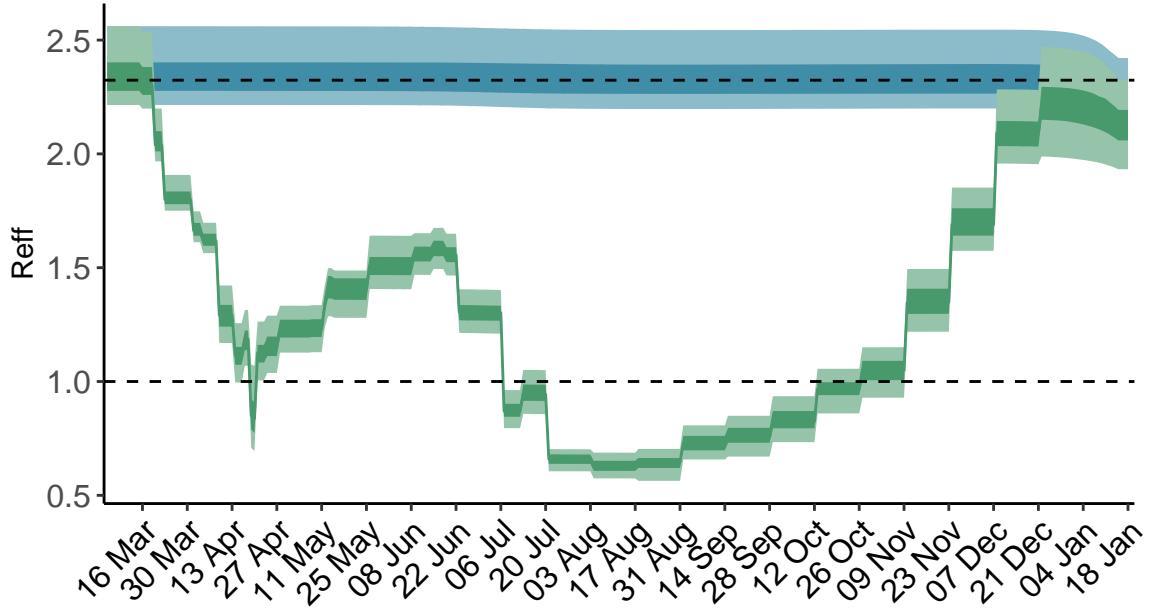


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Malawi is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

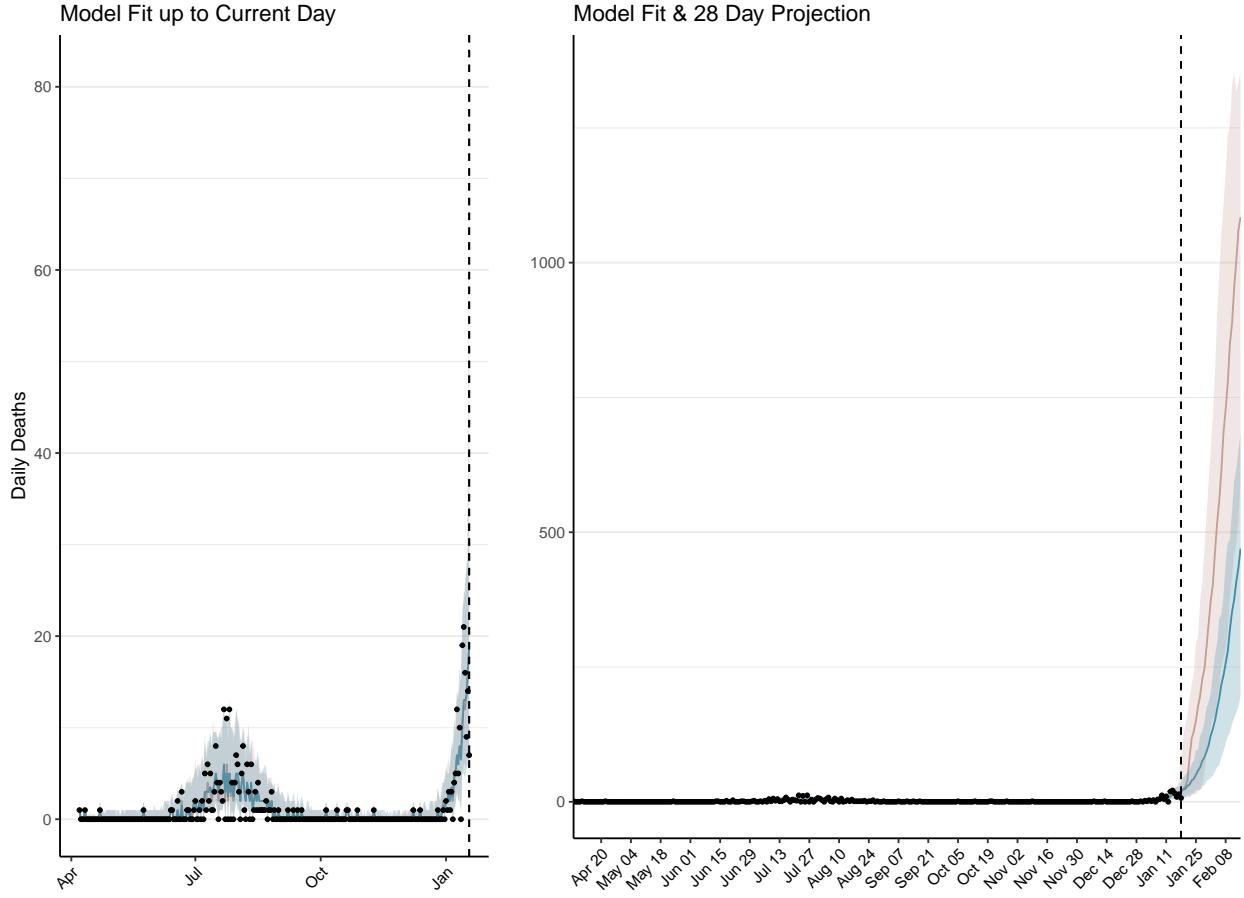


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,254 (95% CI: 1,159-1,350) patients requiring treatment with high-pressure oxygen at the current date to 23,178 (95% CI: 21,945-24,410) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 401 (95% CI: 372-429) patients requiring treatment with mechanical ventilation at the current date to 1,780 (95% CI: 1,716-1,844) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

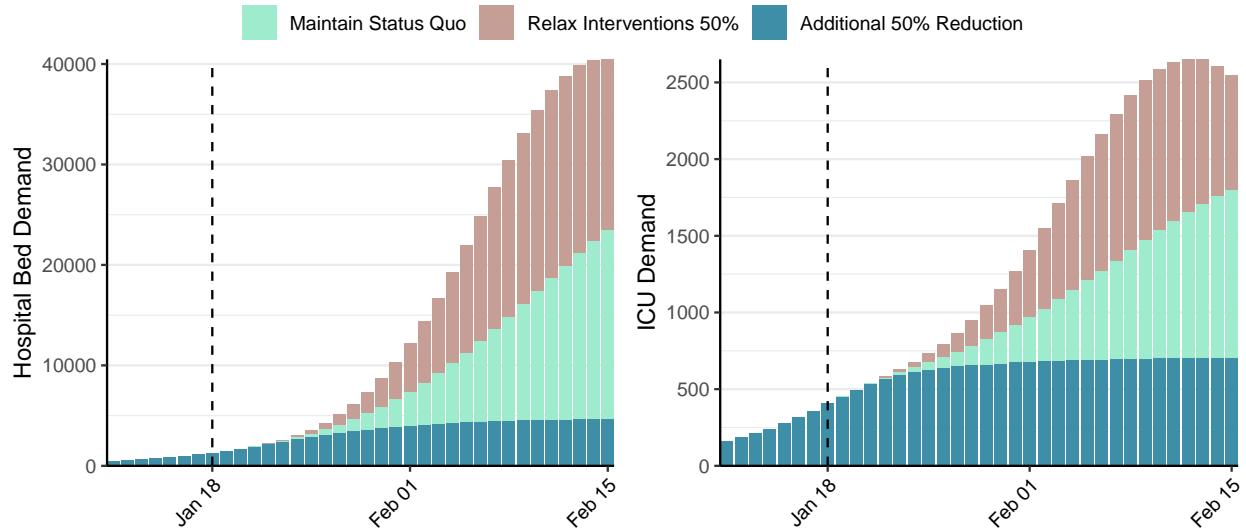


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 53,736 (95% CI: 49,298-58,173) at the current date to 62,612 (95% CI: 57,511-67,713) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 53,736 (95% CI: 49,298-58,173) at the current date to 509,698 (95% CI: 477,595-541,801) by 2021-02-15.

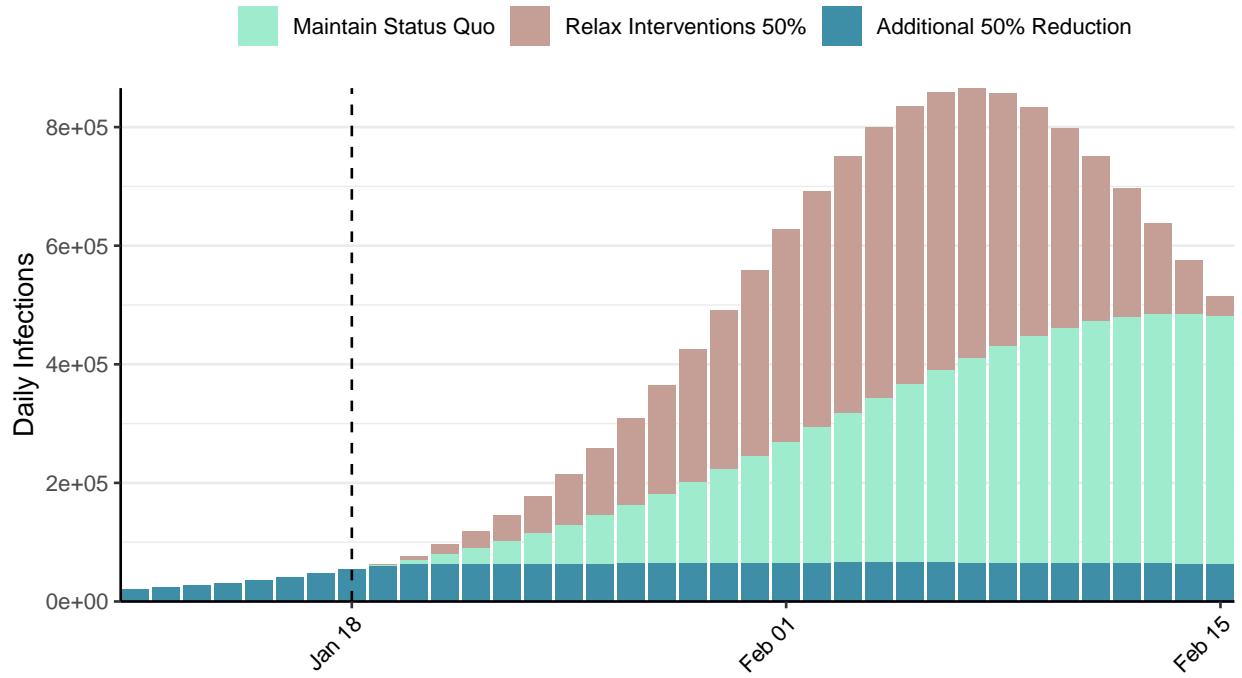


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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## Situation Report for COVID-19: Malaysia, 2021-01-18

[Download the report for Malaysia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.59 (95% CI: 1.38-1.86)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Malaysia is not shown in the following plot as only 0 deaths have been reported to date**

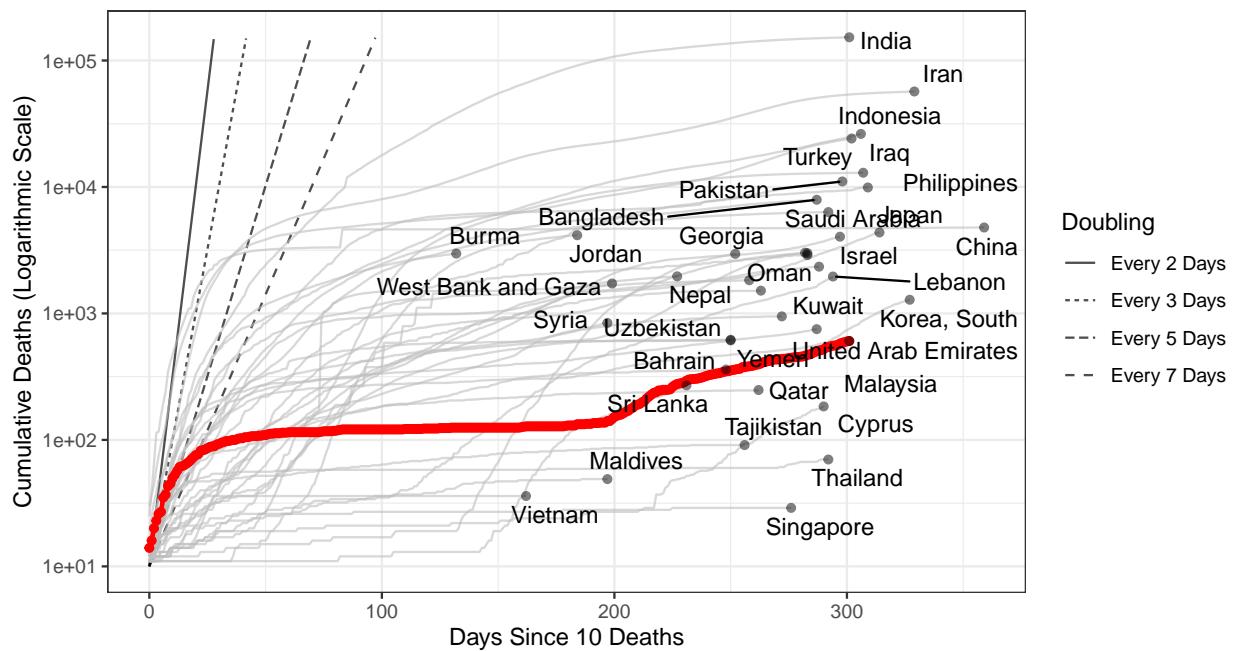


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 190,089 (95% CI: 178,338-201,841) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

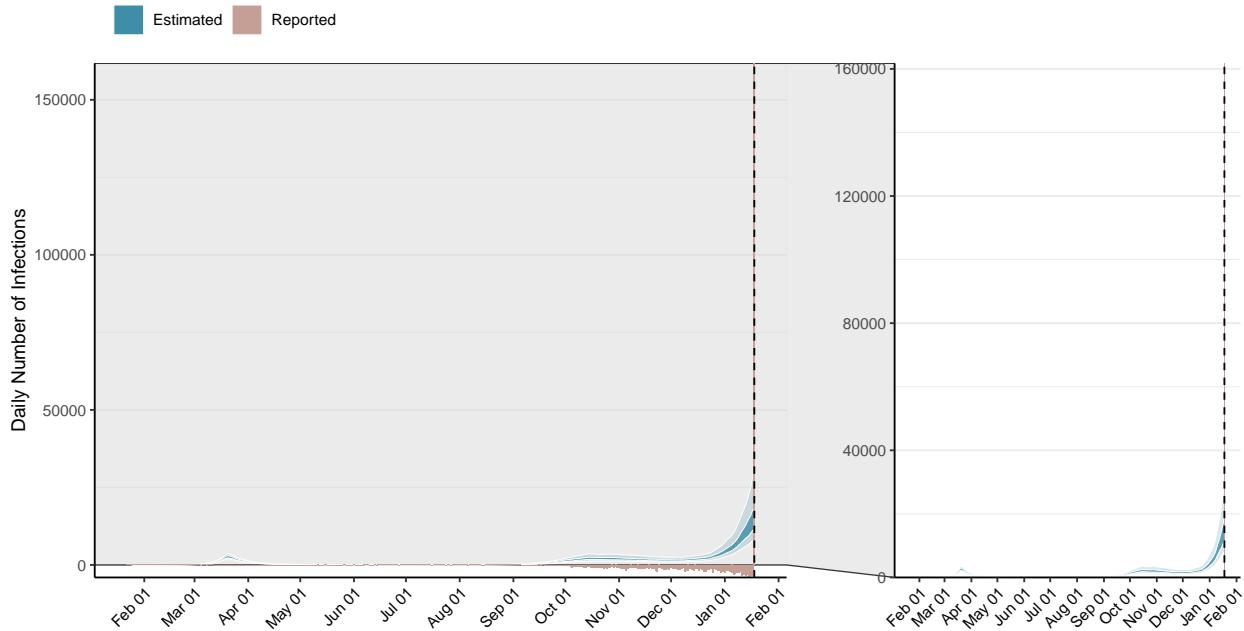
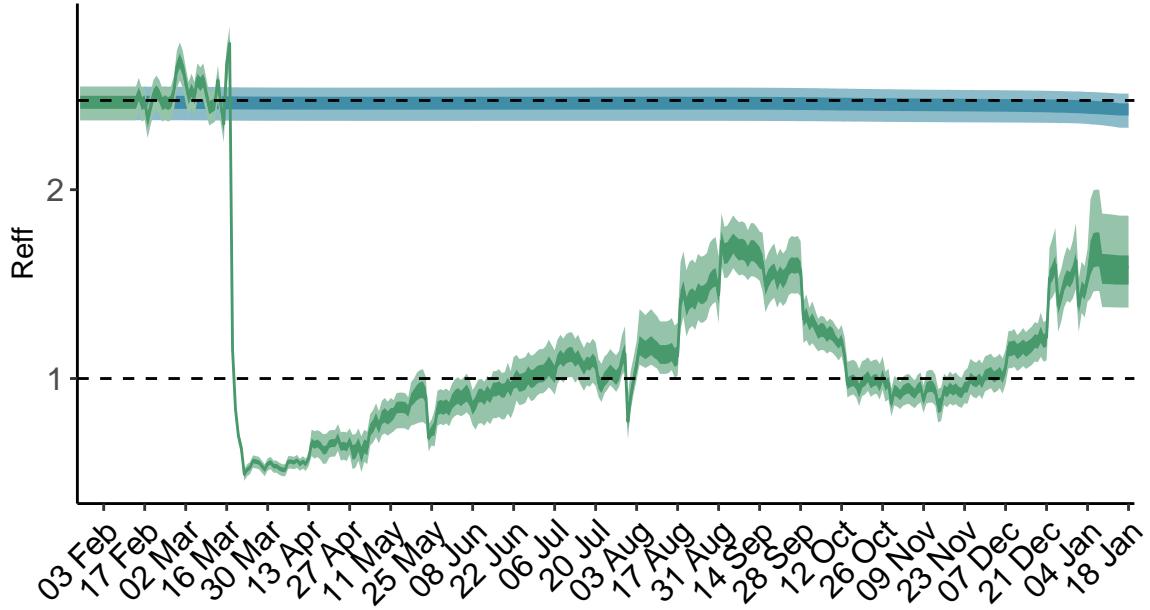


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Malaysia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

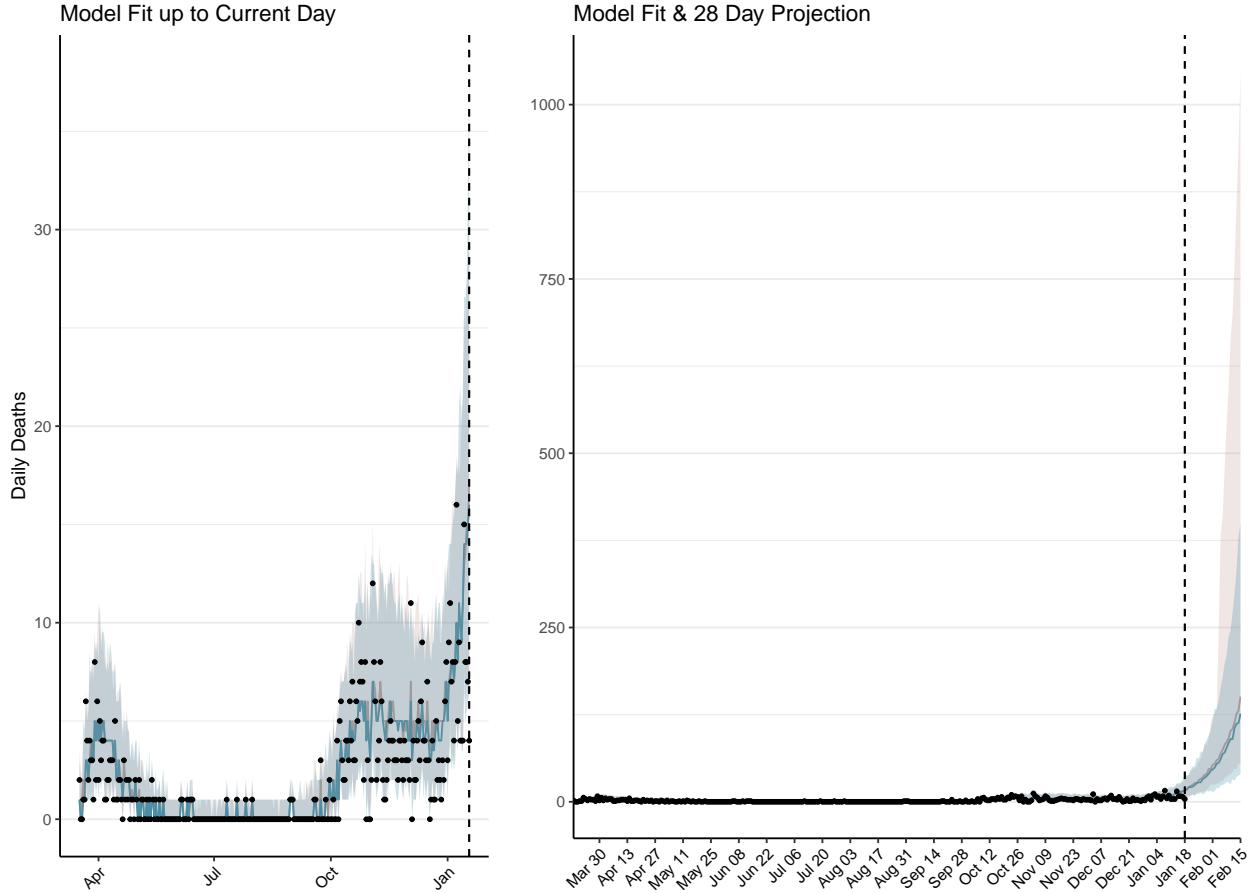


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 907 (95% CI: 851-963) patients requiring treatment with high-pressure oxygen at the current date to 7,983 (95% CI: 7,005-8,962) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 317 (95% CI: 298-337) patients requiring treatment with mechanical ventilation at the current date to 2,143 (95% CI: 2,000-2,285) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

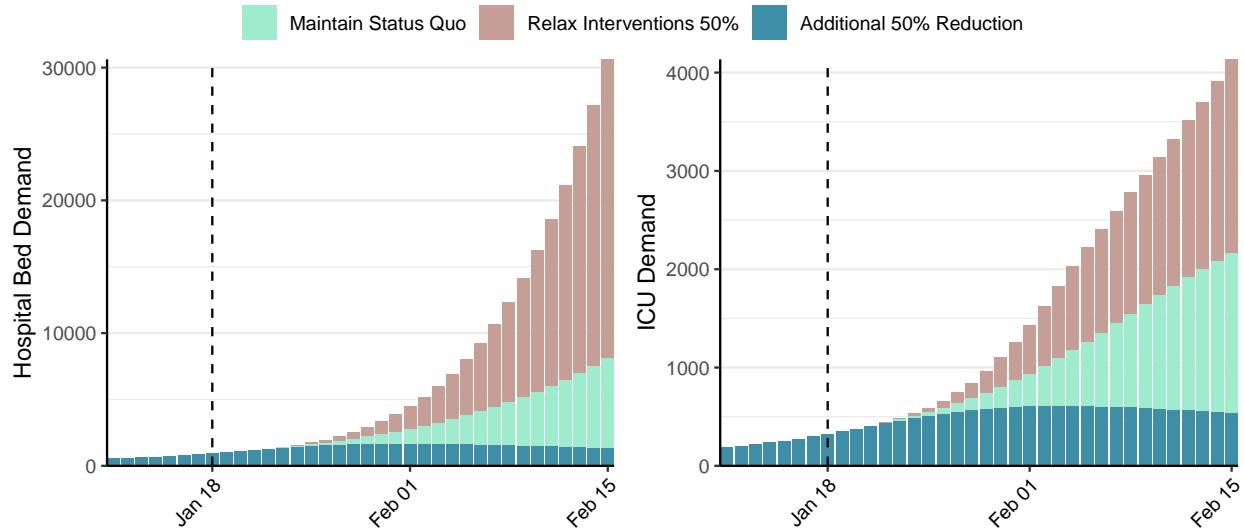


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 15,951 (95% CI: 14,741-17,162) at the current date to 7,906 (95% CI: 6,800-9,012) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 15,951 (95% CI: 14,741-17,162) at the current date to 645,592 (95% CI: 589,241-701,944) by 2021-02-15.

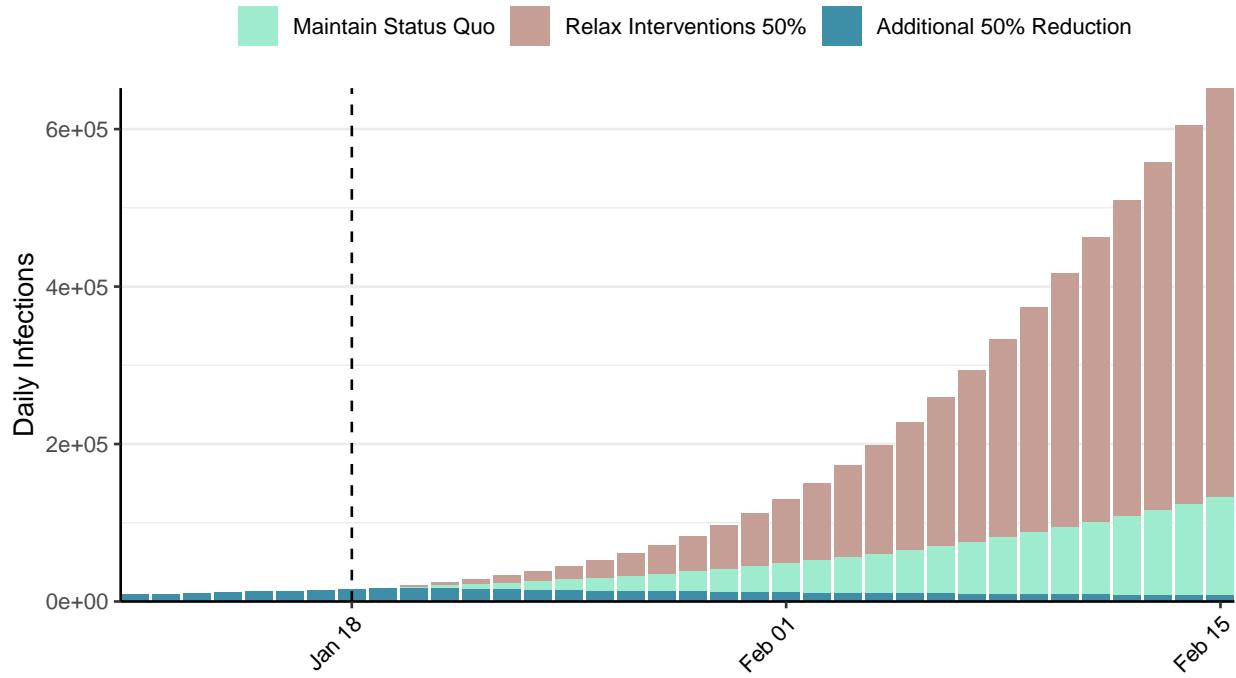


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Namibia, 2021-01-18

[Download the report for Namibia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
390	390	8	8	0.91 (95% CI: 0.7-1.21)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Namibia is not shown in the following plot as only 8 deaths have been reported to date**

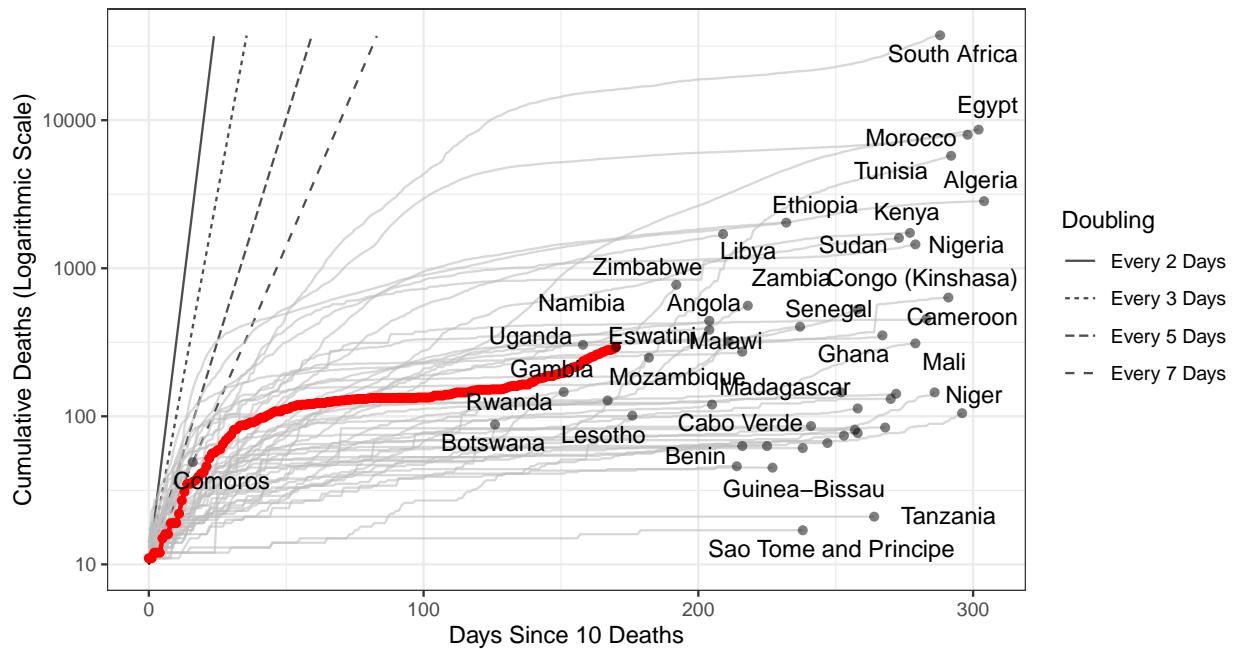


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 63,613 (95% CI: 60,190-67,036) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

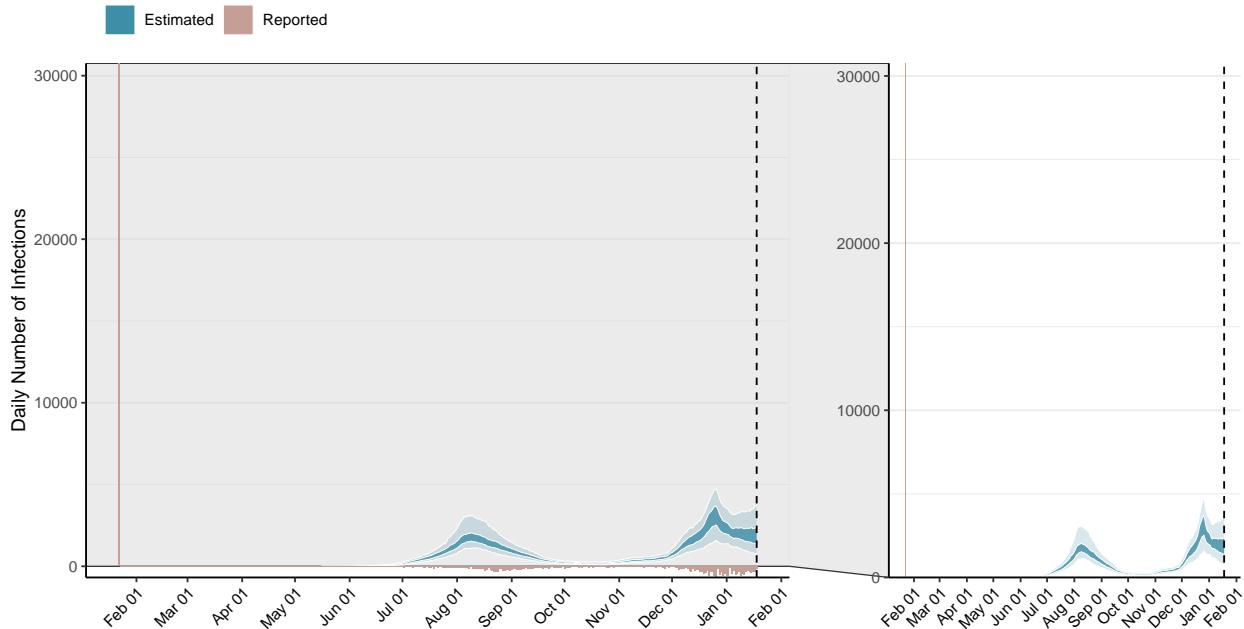
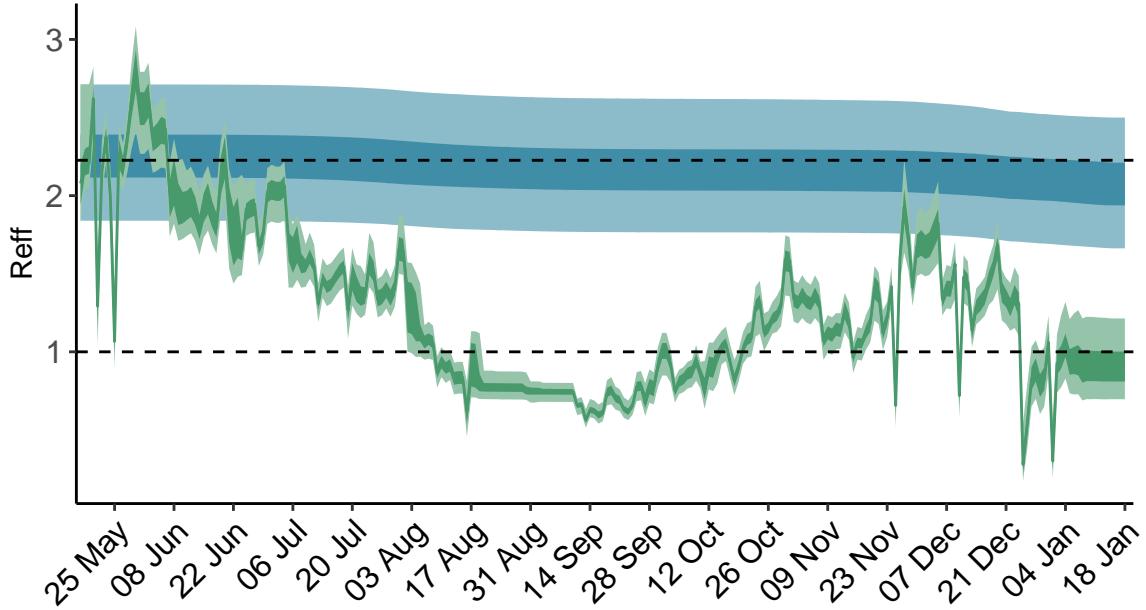


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

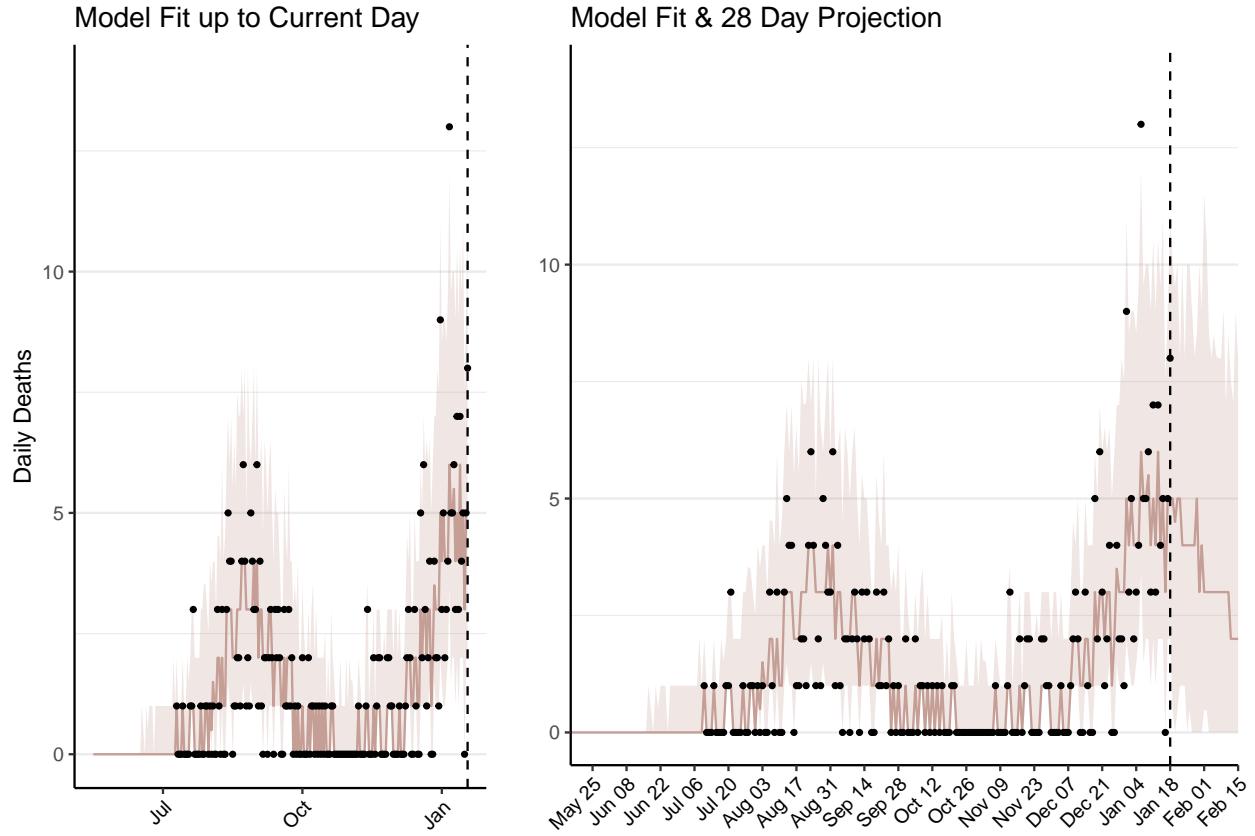


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 180 (95% CI: 169-191) patients requiring treatment with high-pressure oxygen at the current date to 97 (95% CI: 85-110) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 70 (95% CI: 66-74) patients requiring treatment with mechanical ventilation at the current date to 41 (95% CI: 36-46) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

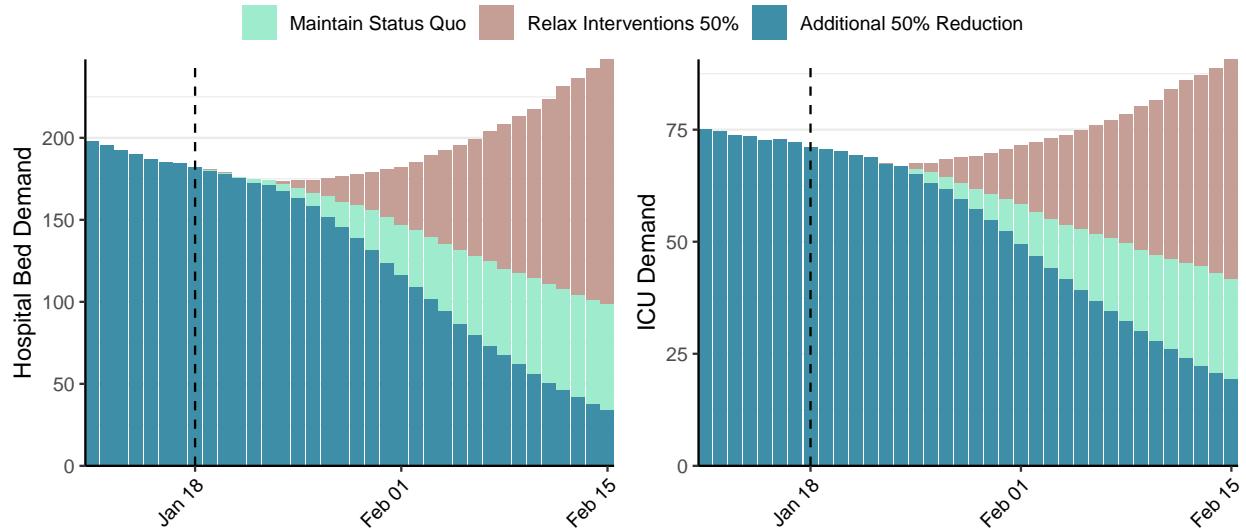


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,879 (95% CI: 1,721-2,038) at the current date to 81 (95% CI: 69-93) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,879 (95% CI: 1,721-2,038) at the current date to 3,861 (95% CI: 3,187-4,535) by 2021-02-15.

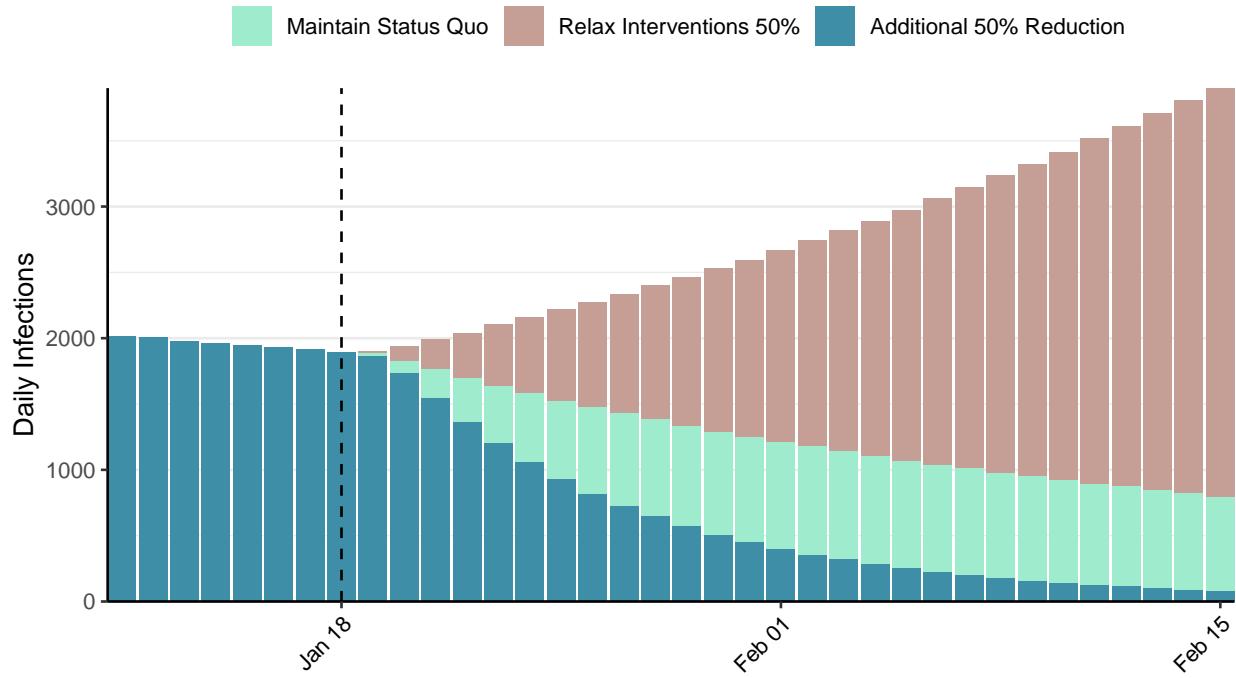


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Niger, 2021-01-18

[Download the report for Niger, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.95 (95% CI: 0.81-1.12)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Niger is not shown in the following plot as only 0 deaths have been reported to date**

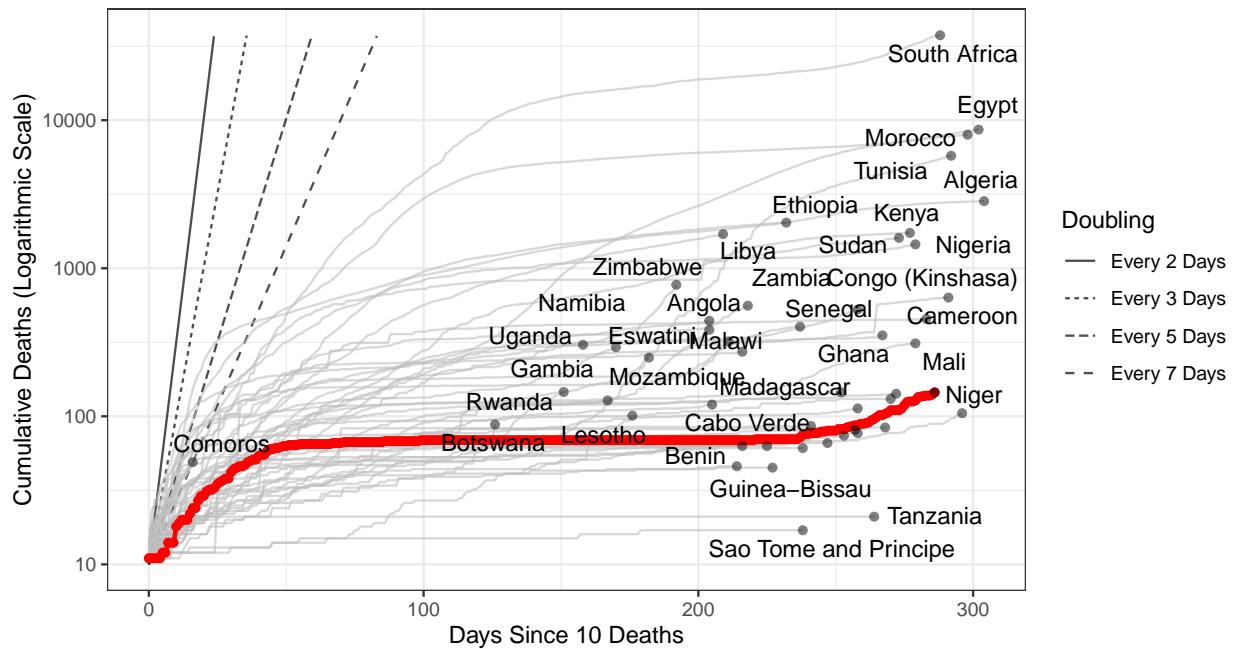


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 43,681 (95% CI: 40,295-47,067) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Niger has revised their historic reported cases and thus have reported negative cases.**

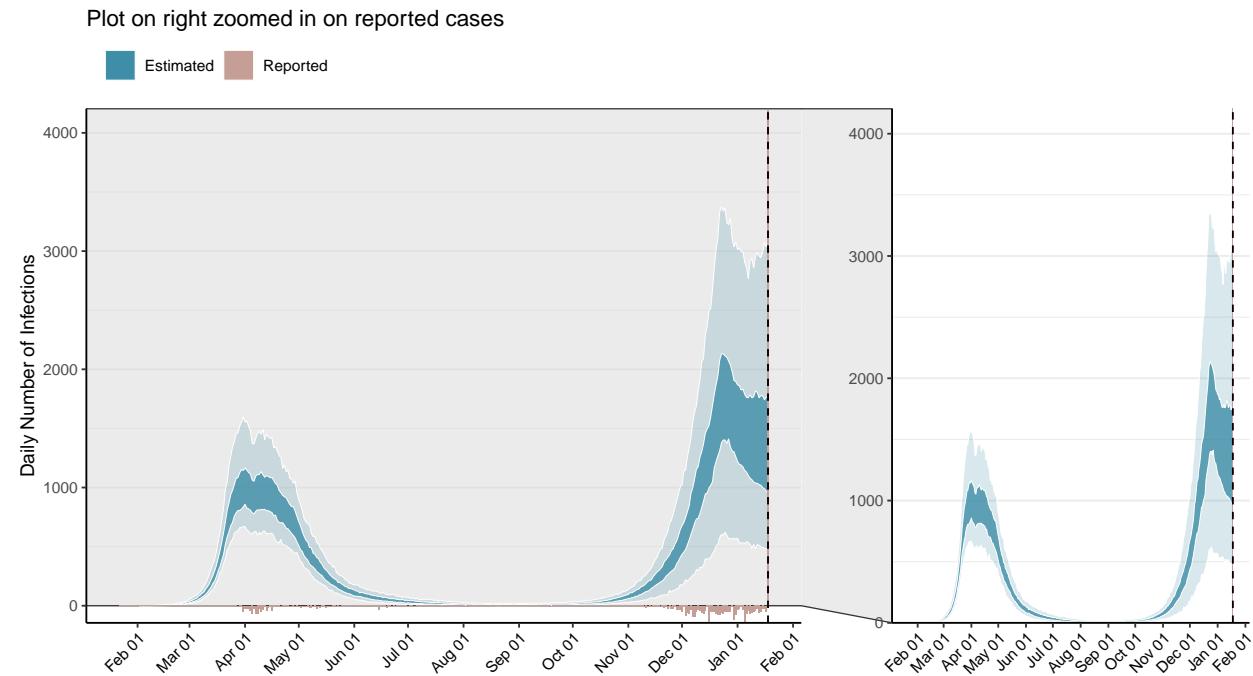
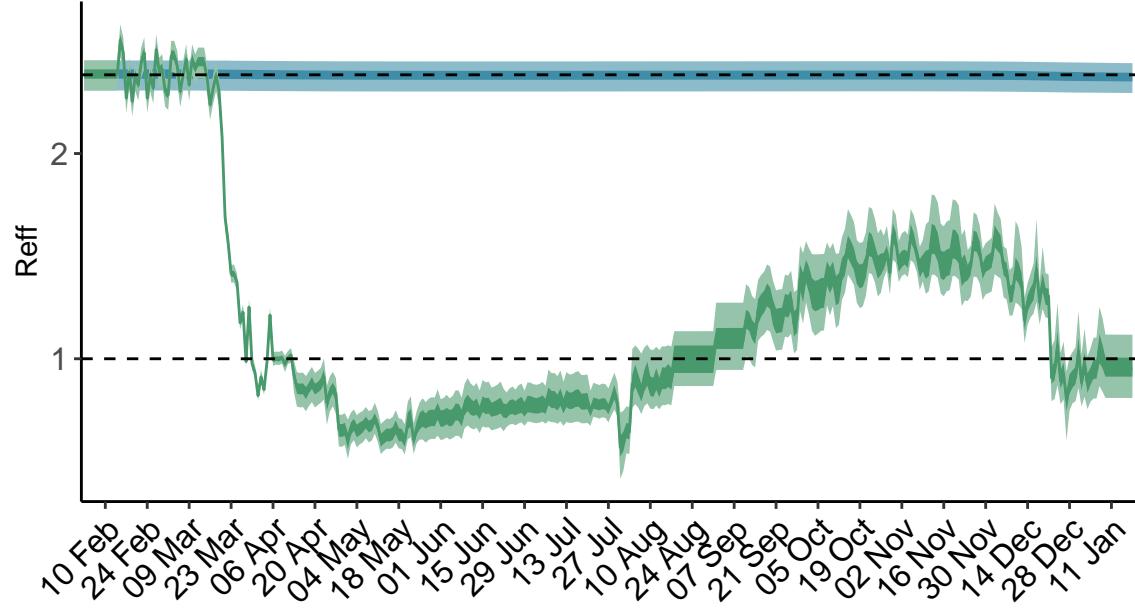


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

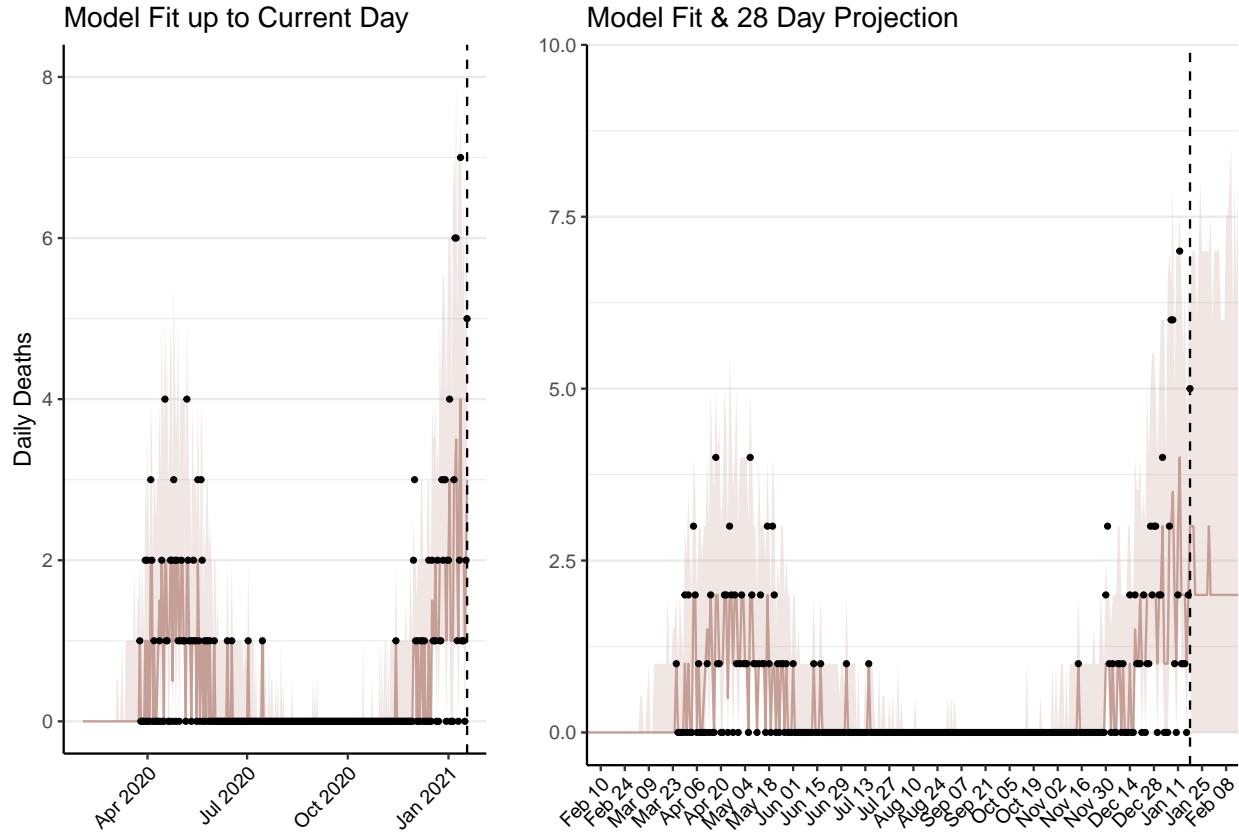


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 110 (95% CI: 101-119) patients requiring treatment with high-pressure oxygen at the current date to 103 (95% CI: 90-116) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 44 (95% CI: 41-48) patients requiring treatment with mechanical ventilation at the current date to 41 (95% CI: 36-45) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

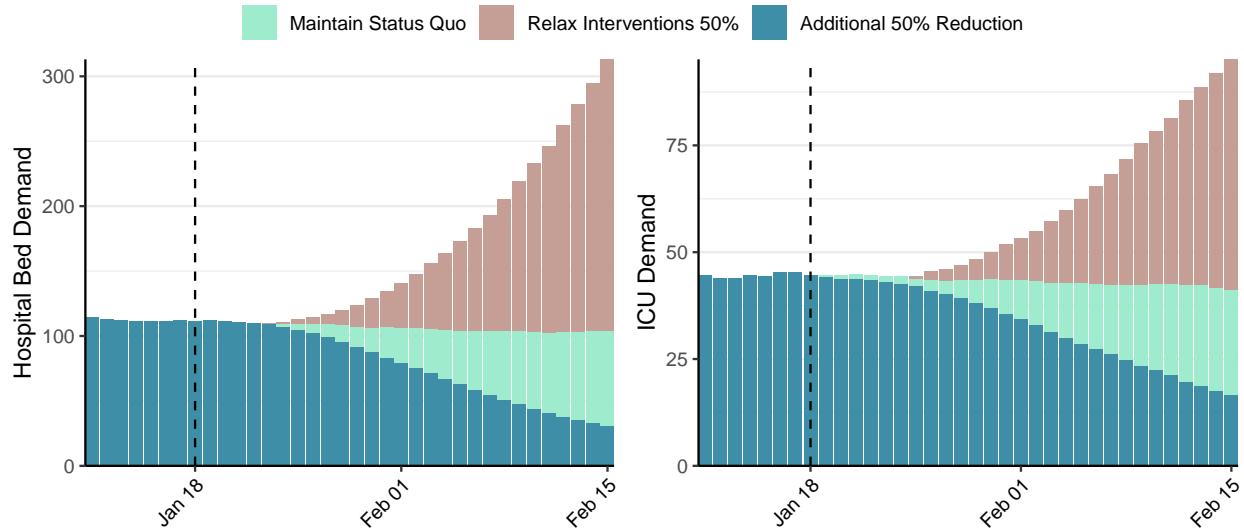


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,448 (95% CI: 1,314-1,581) at the current date to 113 (95% CI: 98-128) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,448 (95% CI: 1,314-1,581) at the current date to 7,966 (95% CI: 6,780-9,152) by 2021-02-15.

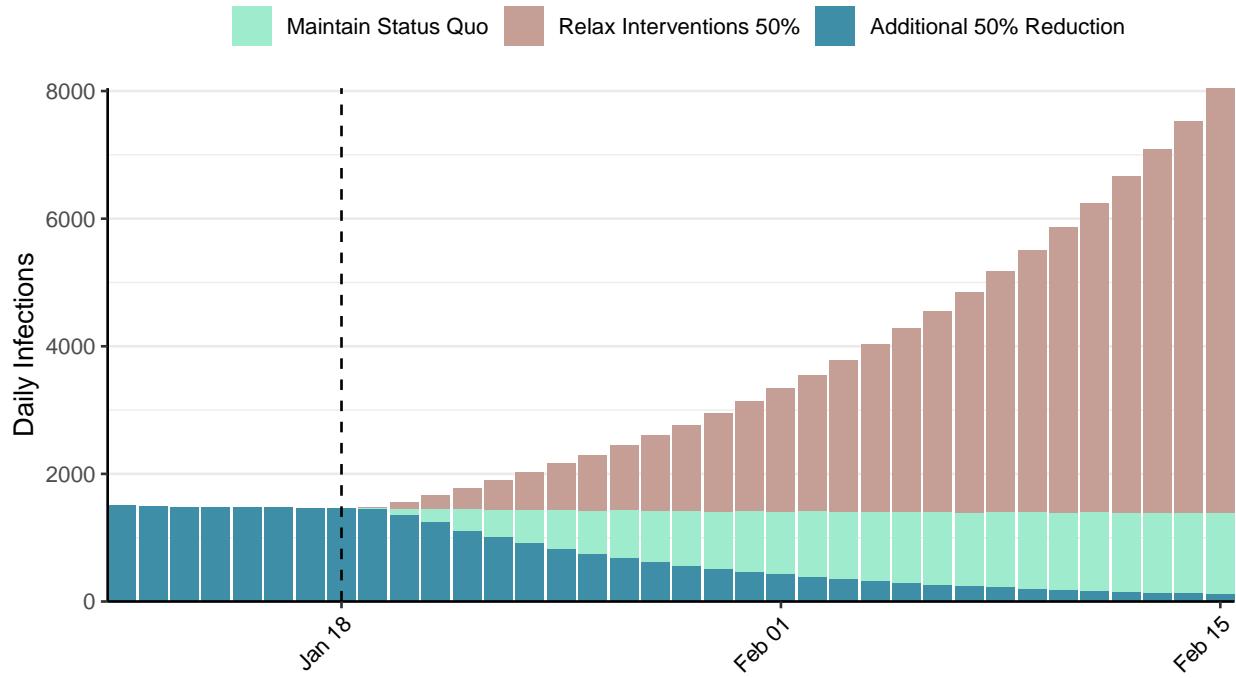


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Nigeria, 2021-01-18

[Download the report for Nigeria, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,617	1,617	14	14	1.09 (95% CI: 0.89-1.29)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

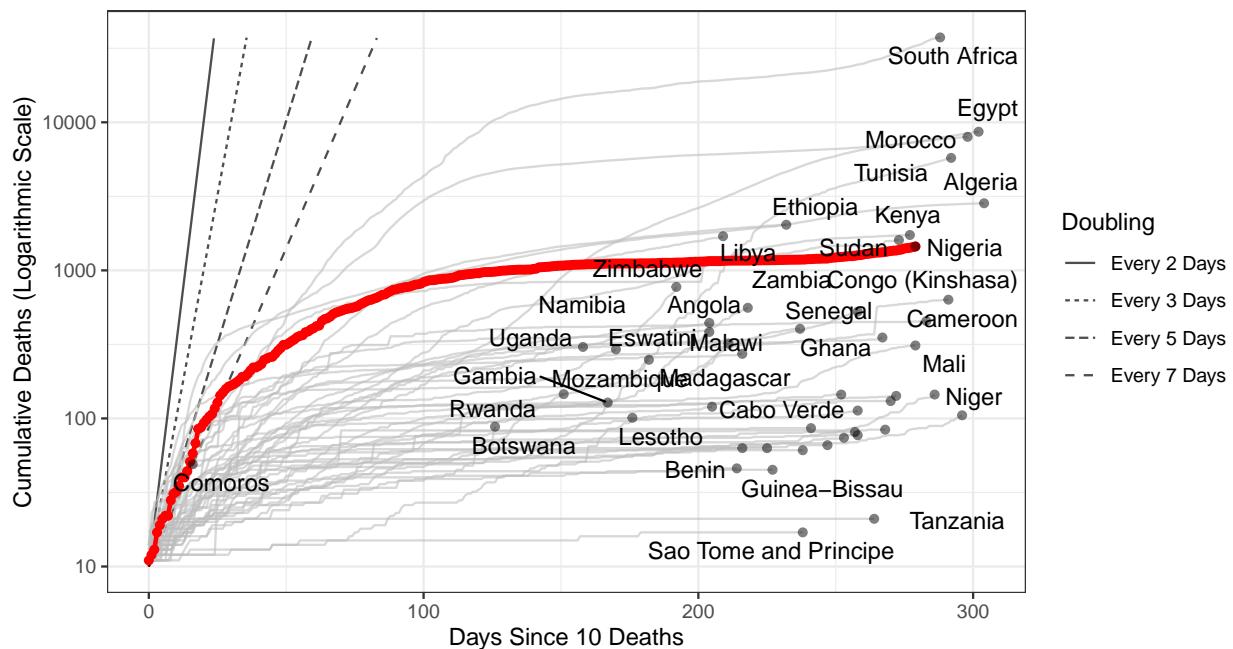


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 296,979 (95% CI: 279,844-314,114) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

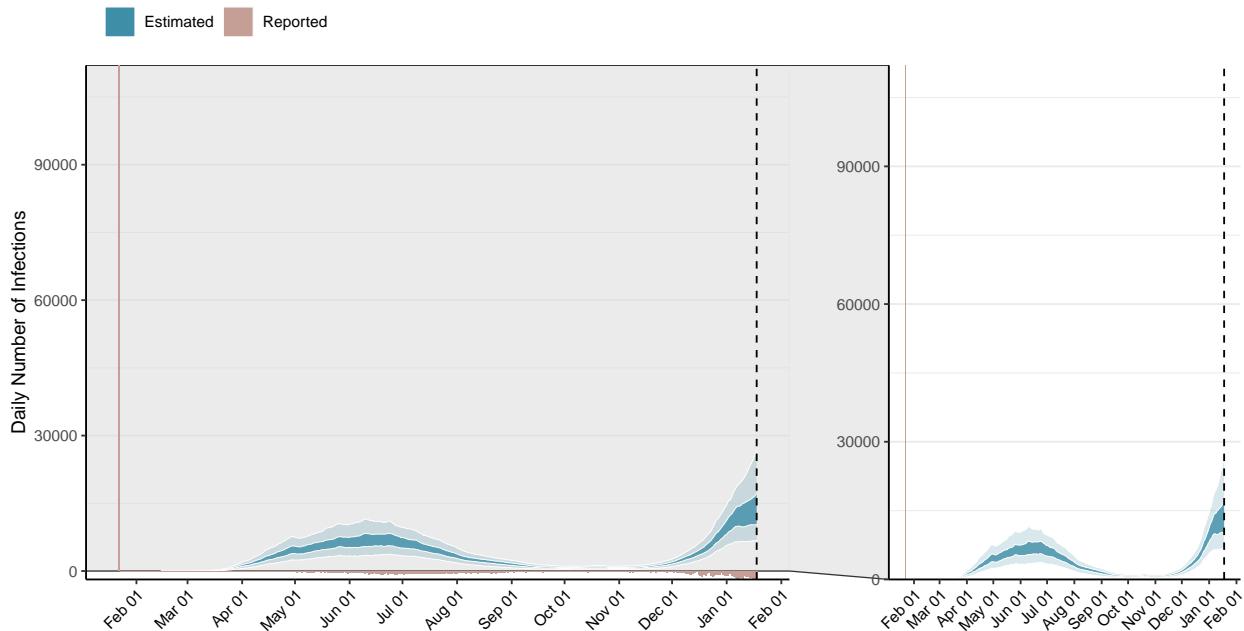
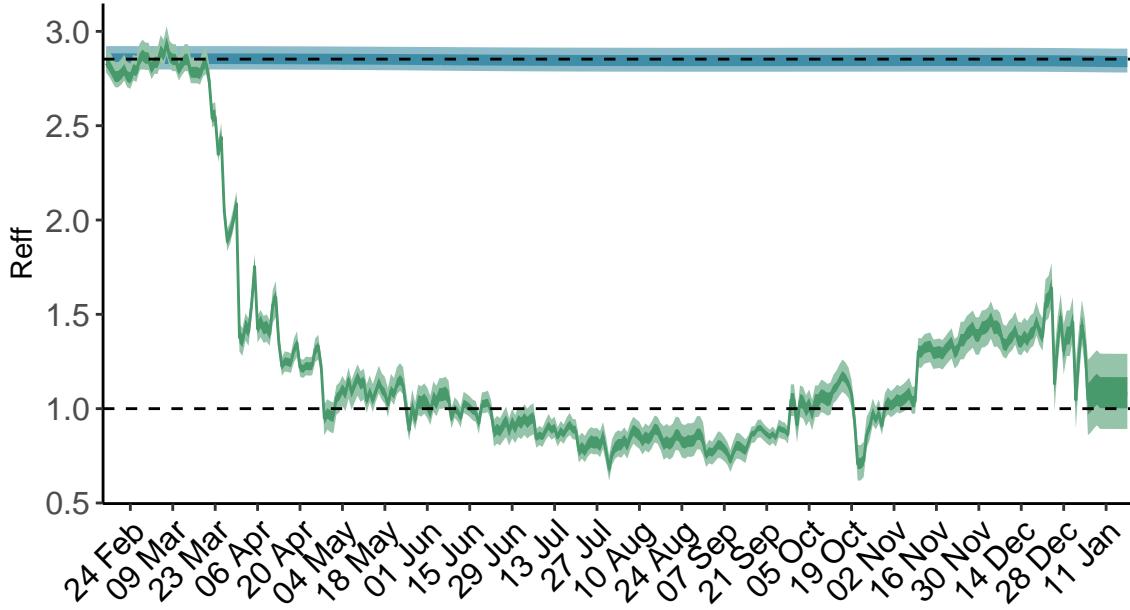


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

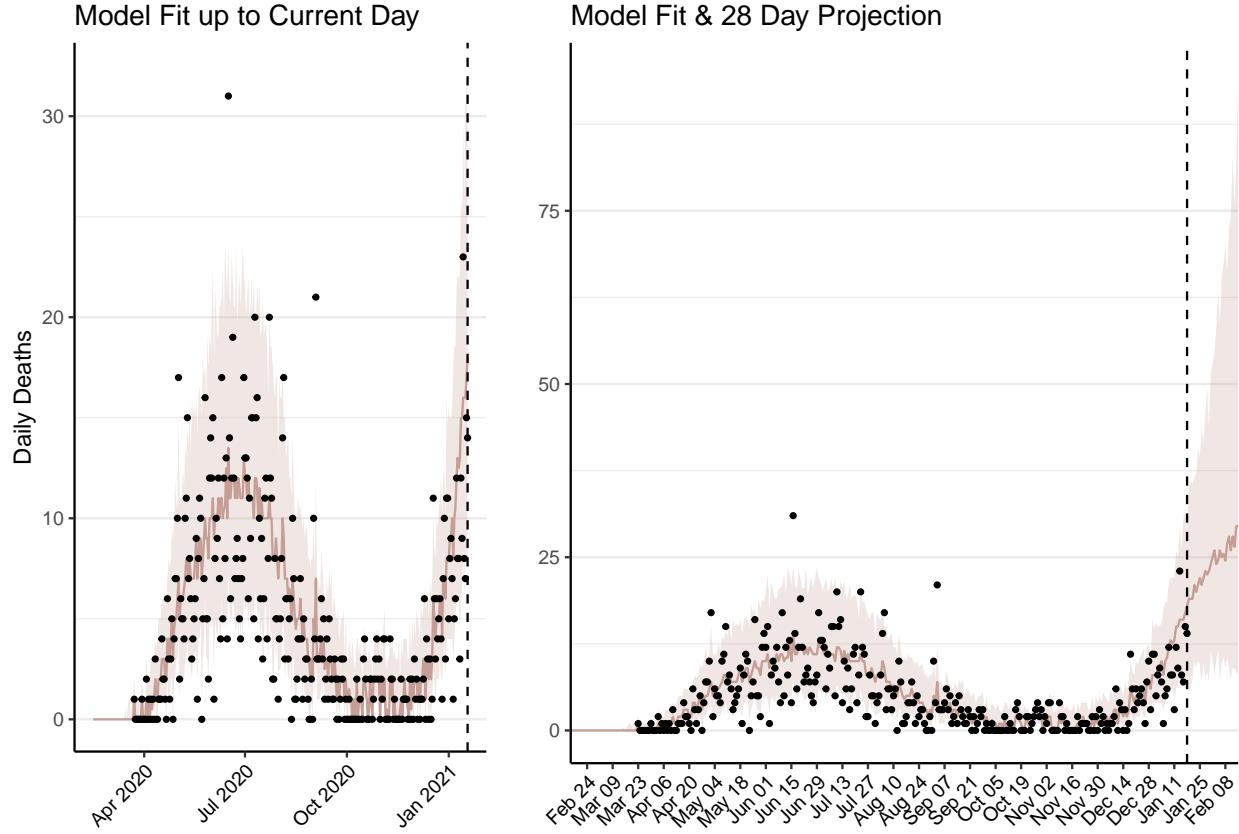


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 876 (95% CI: 824-928) patients requiring treatment with high-pressure oxygen at the current date to 1,509 (95% CI: 1,315-1,703) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 332 (95% CI: 313-351) patients requiring treatment with mechanical ventilation at the current date to 587 (95% CI: 515-659) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

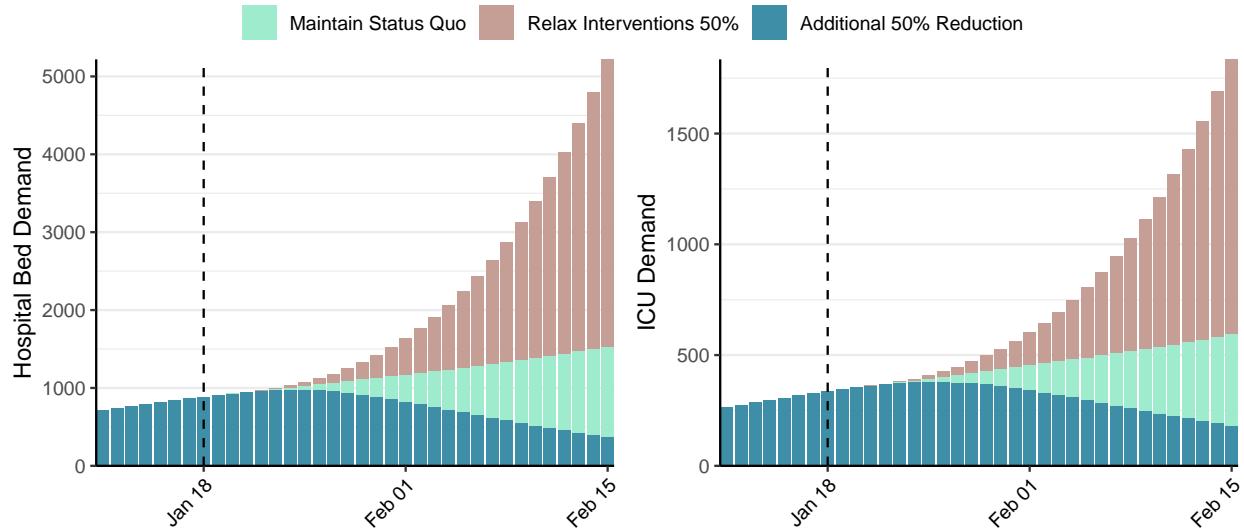


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 14,367 (95% CI: 13,240-15,494) at the current date to 1,829 (95% CI: 1,569-2,090) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14,367 (95% CI: 13,240-15,494) at the current date to 155,316 (95% CI: 128,946-181,687) by 2021-02-15.

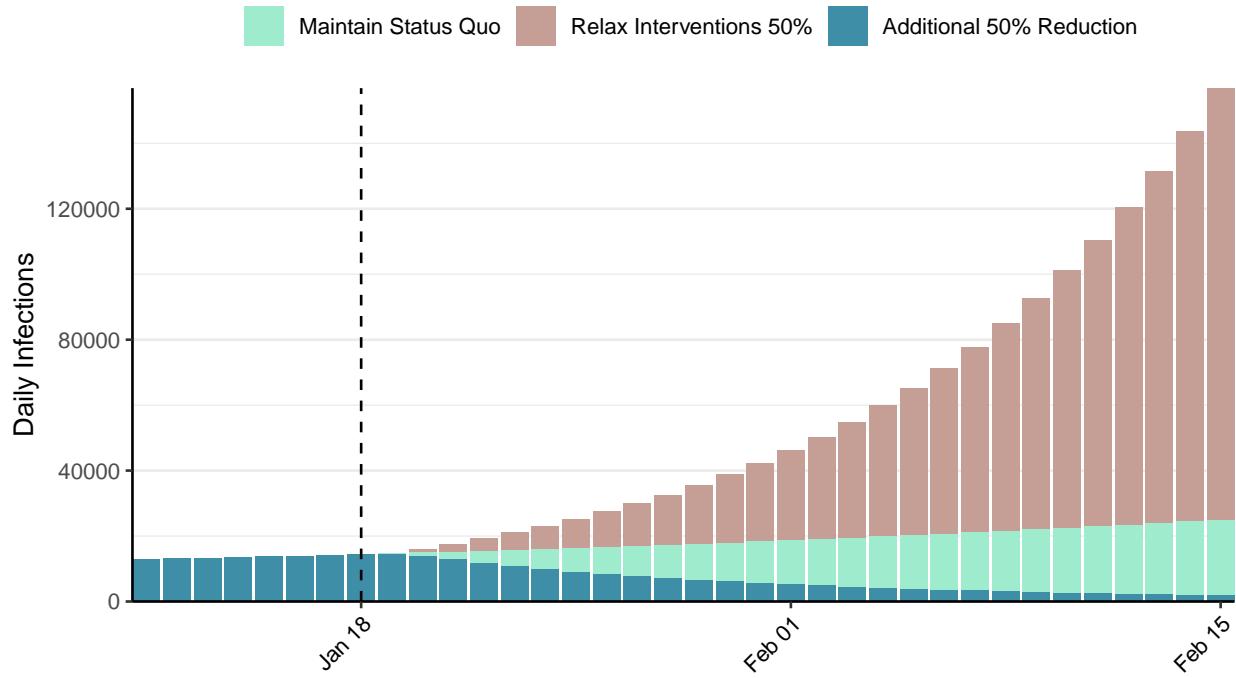


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Nicaragua, 2021-01-18

[Download the report for Nicaragua, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.82 (95% CI: 0.61-1.09)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Nicaragua is not shown in the following plot as only 0 deaths have been reported to date**

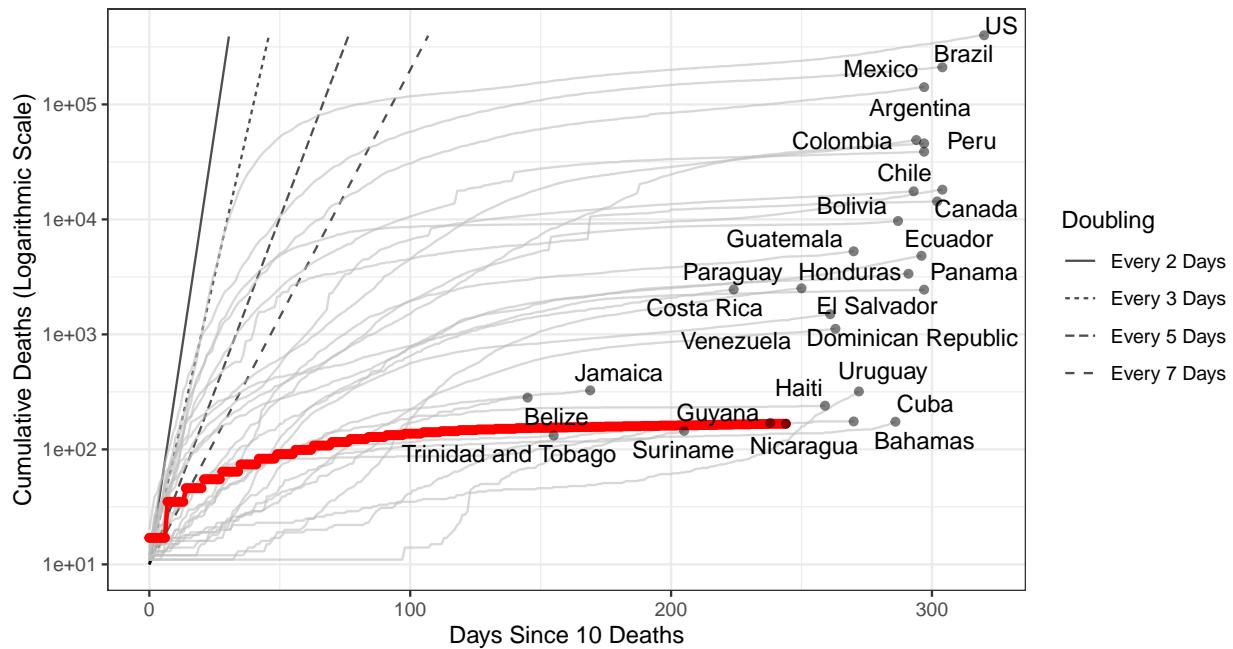


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,802 (95% CI: 1,598-2,005) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

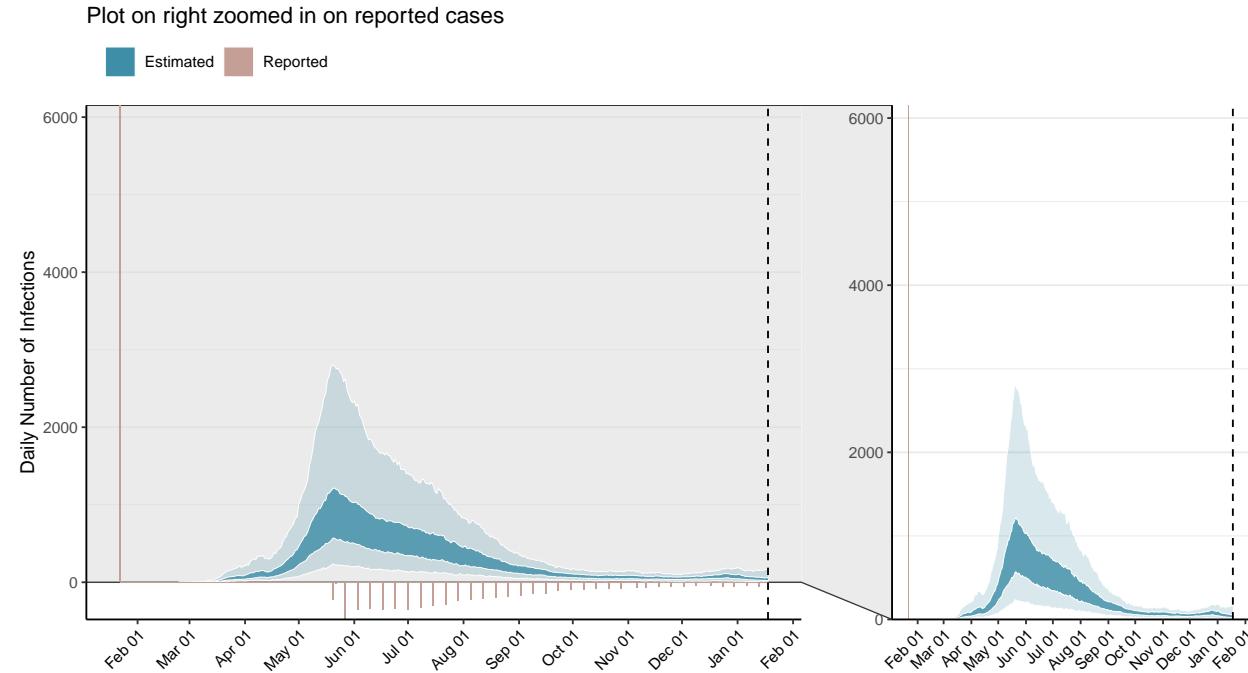
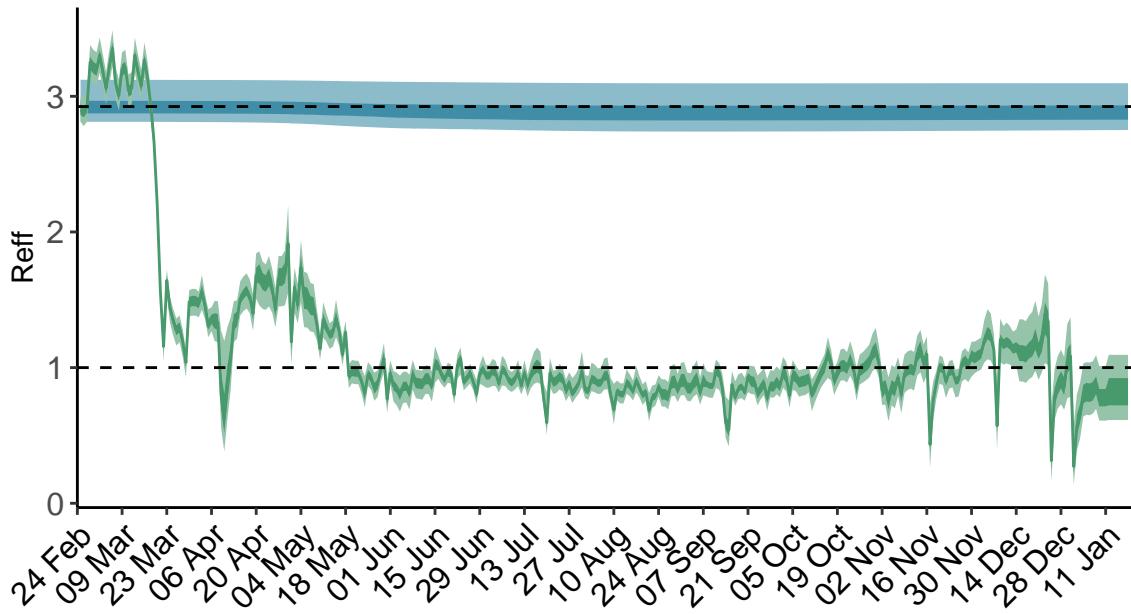


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

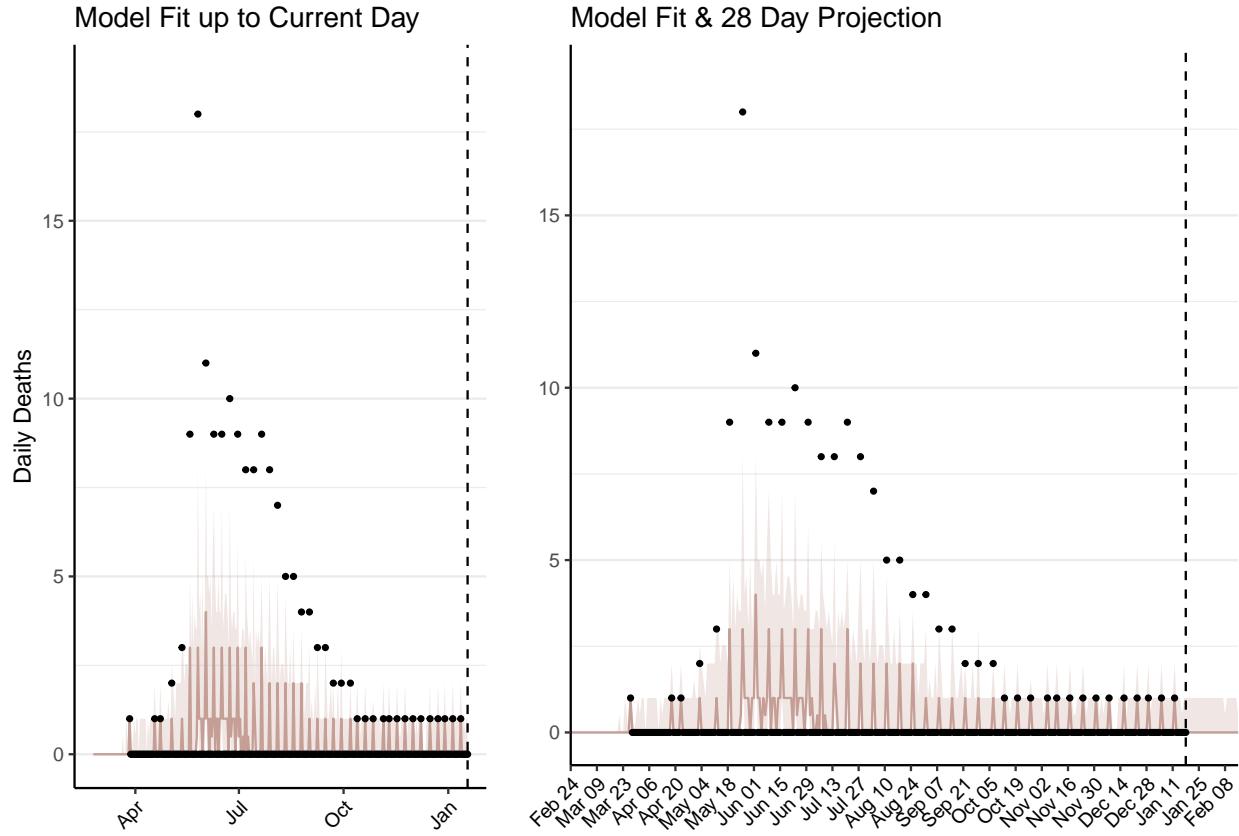


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 5 (95% CI: 4-5) patients requiring treatment with high-pressure oxygen at the current date to 3 (95% CI: 2-4) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2 (95% CI: 1-2) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

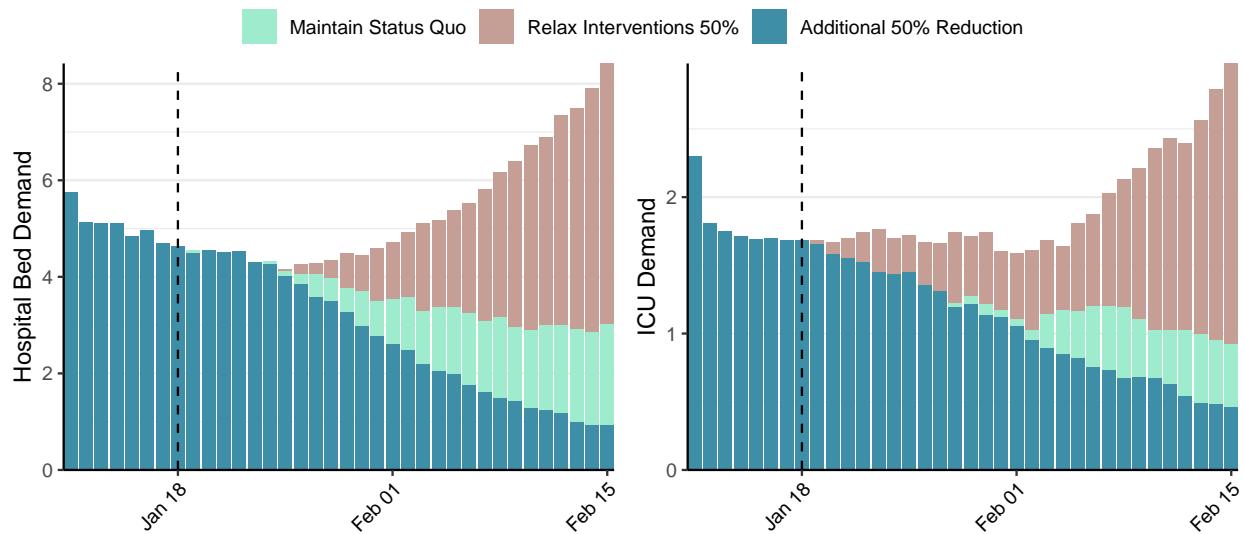


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 45 (95% CI: 37-52) at the current date to 3 (95% CI: 2-4) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 45 (95% CI: 37-52) at the current date to 199 (95% CI: 119-280) by 2021-02-15.

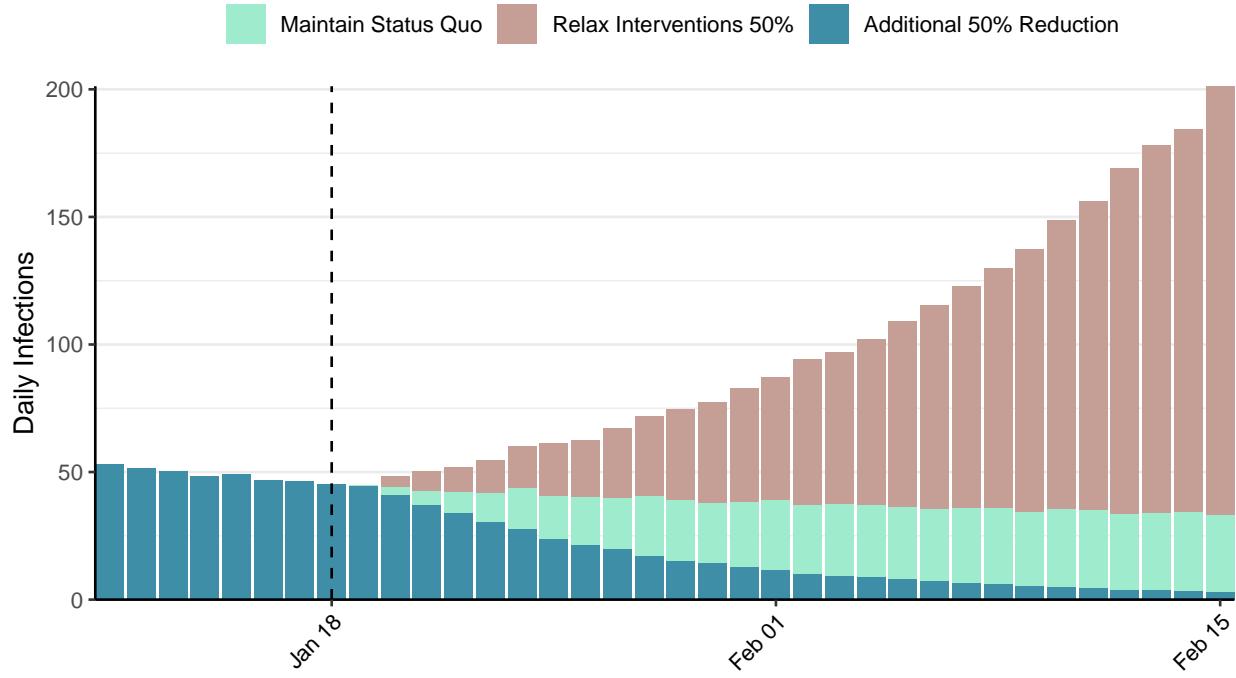


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Nepal, 2021-01-18

[Download the report for Nepal, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
322	322	6	6	0.69 (95% CI: 0.52-0.84)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Nepal is not shown in the following plot as only 6 deaths have been reported to date**

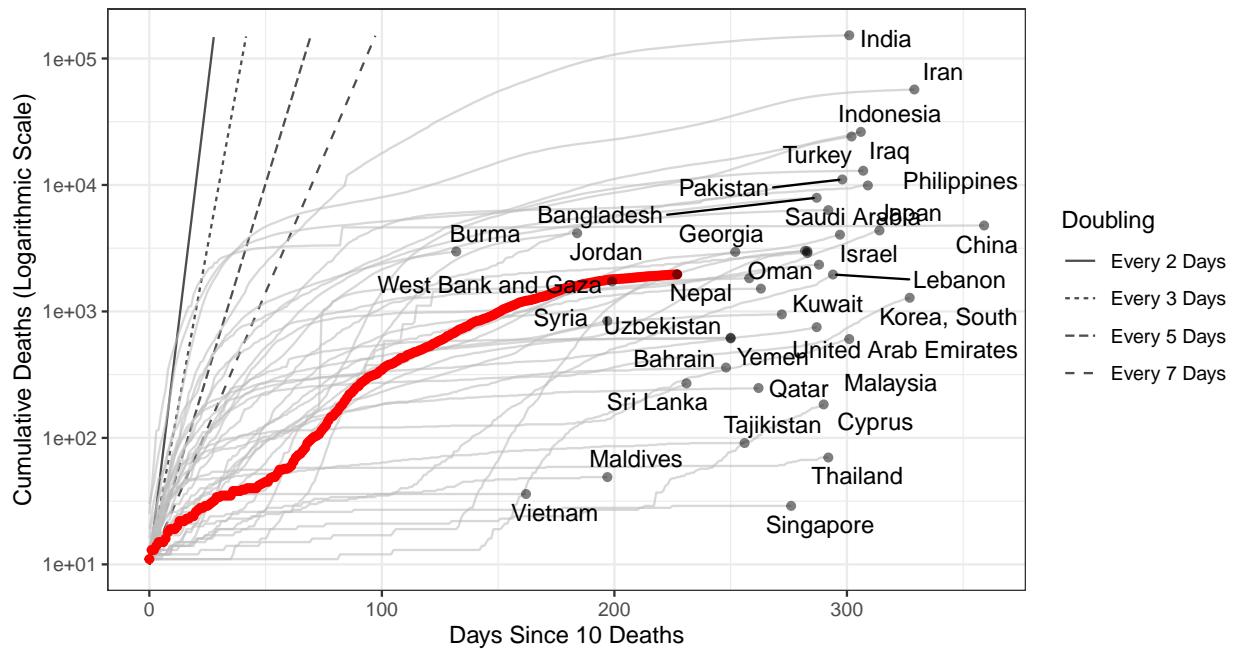


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 70,708 (95% CI: 67,348-74,067) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Nepal has revised their historic reported cases and thus have reported negative cases.**

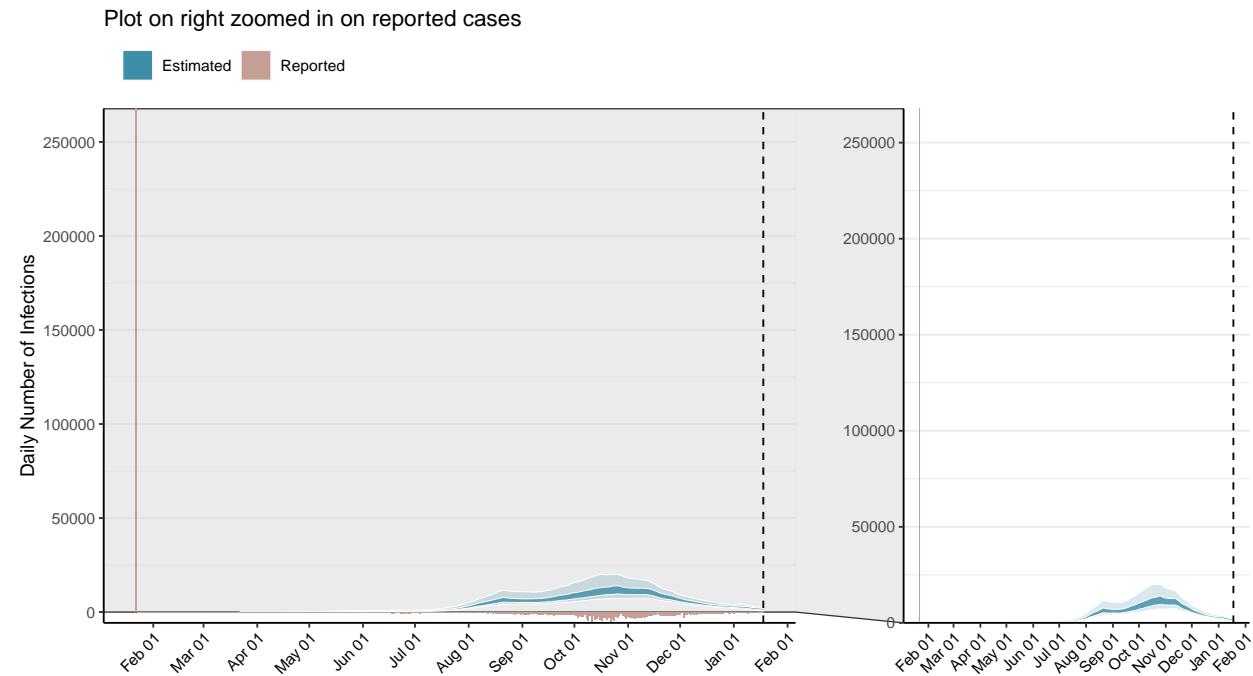
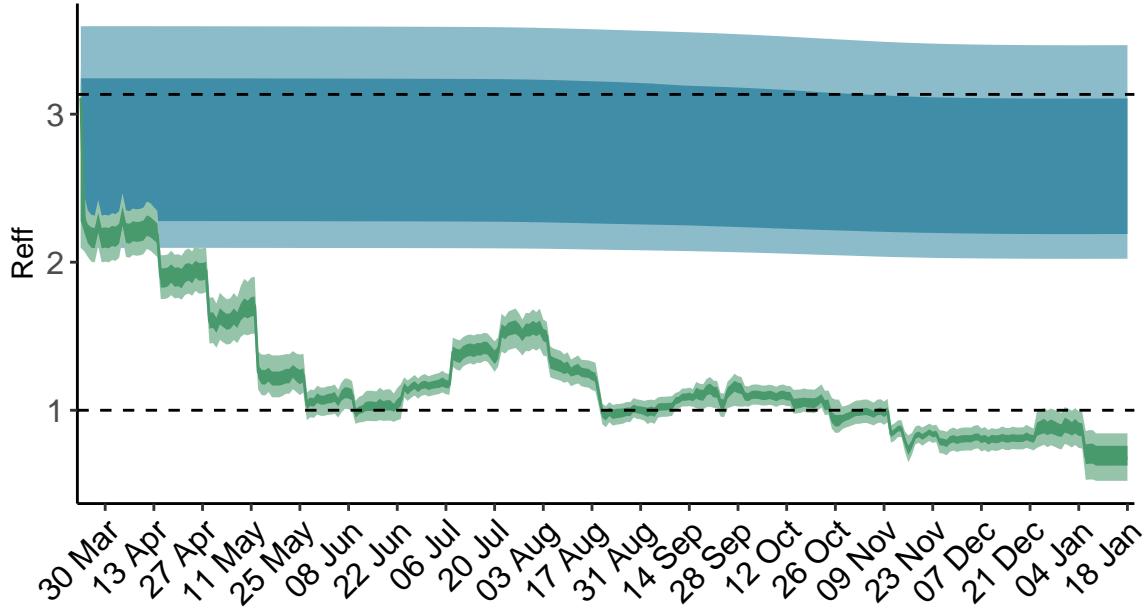


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

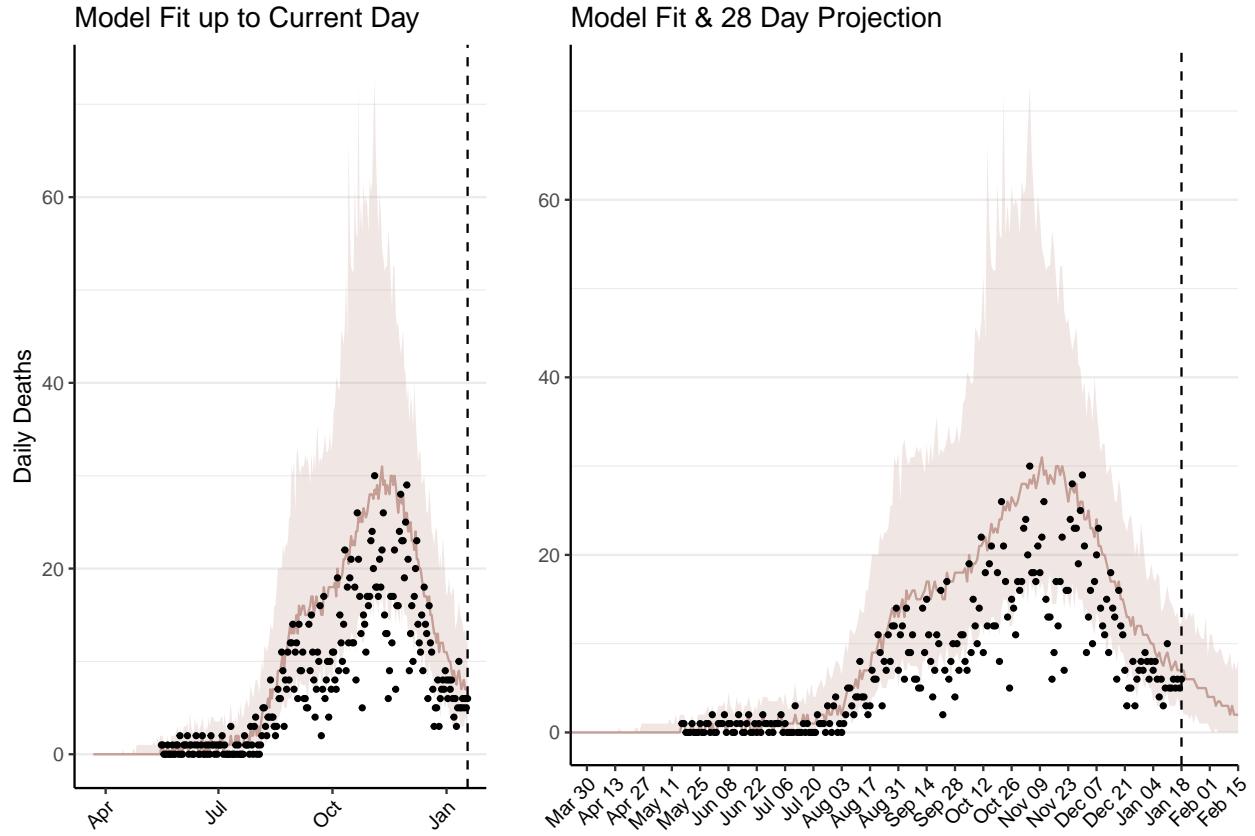


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 252 (95% CI: 239-265) patients requiring treatment with high-pressure oxygen at the current date to 79 (95% CI: 69-88) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 107 (95% CI: 102-113) patients requiring treatment with mechanical ventilation at the current date to 36 (95% CI: 32-40) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

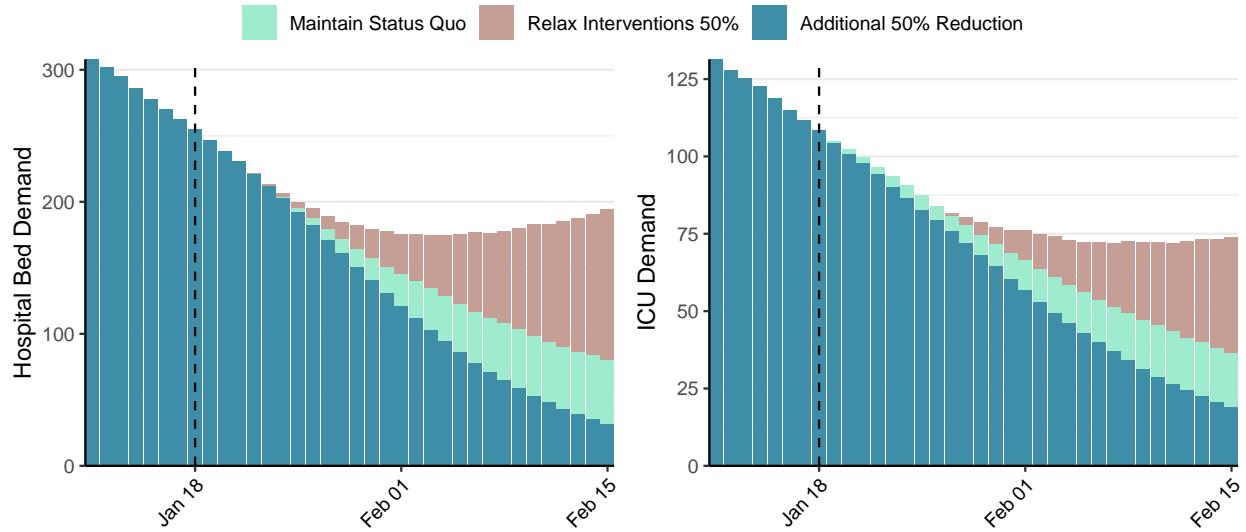


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1,475 (95% CI: 1,364-1,586) at the current date to 47 (95% CI: 40-54) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,475 (95% CI: 1,364-1,586) at the current date to 2,178 (95% CI: 1,780-2,577) by 2021-02-15.

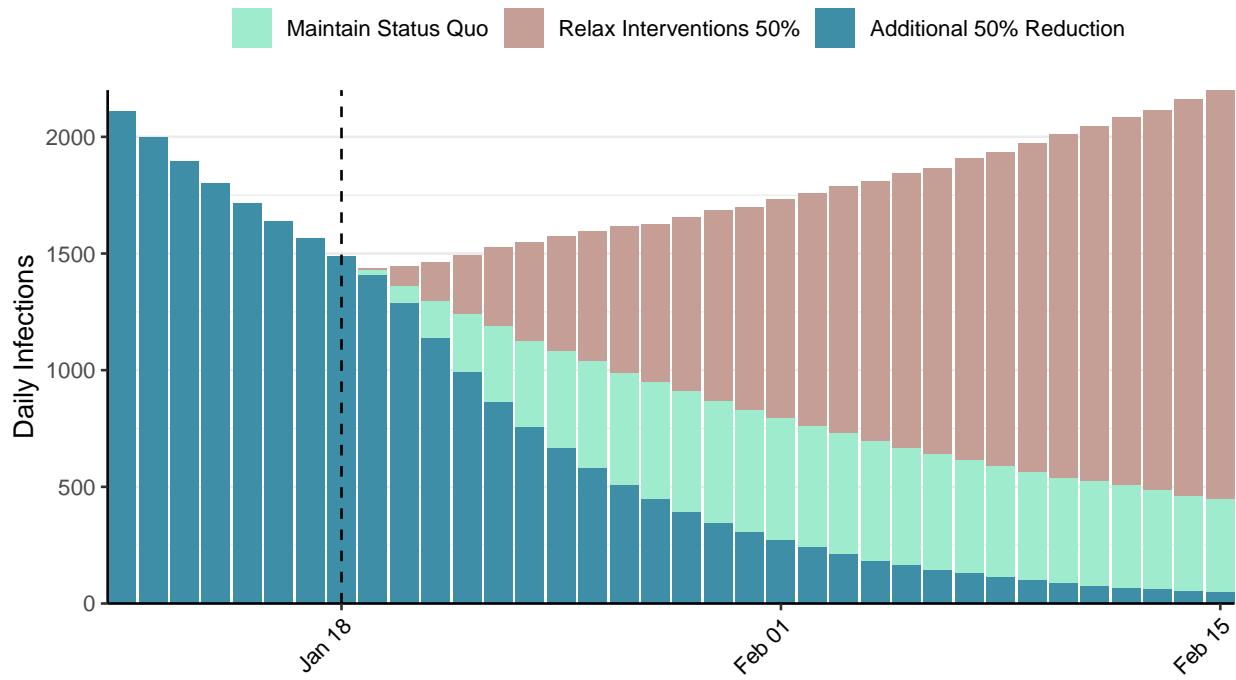


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Pakistan, 2021-01-18

[Download the report for Pakistan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,800	1,800	58	58	1.12 (95% CI: 0.9-1.4)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

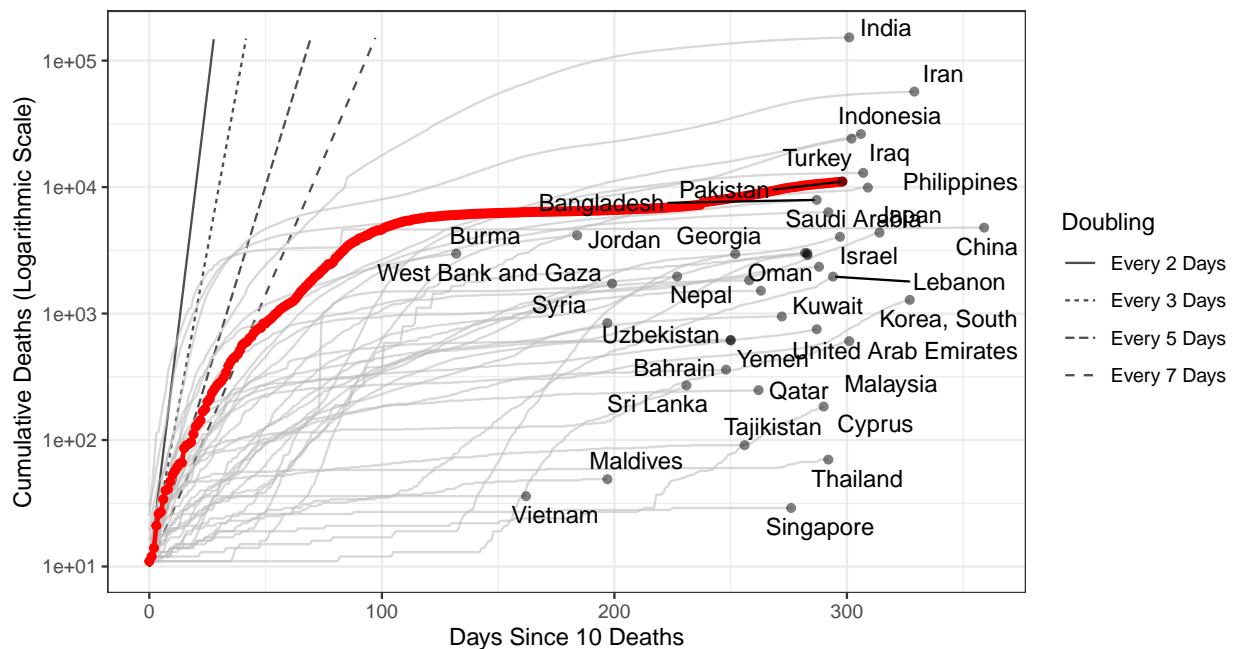


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 677,965 (95% CI: 650,863–705,067) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

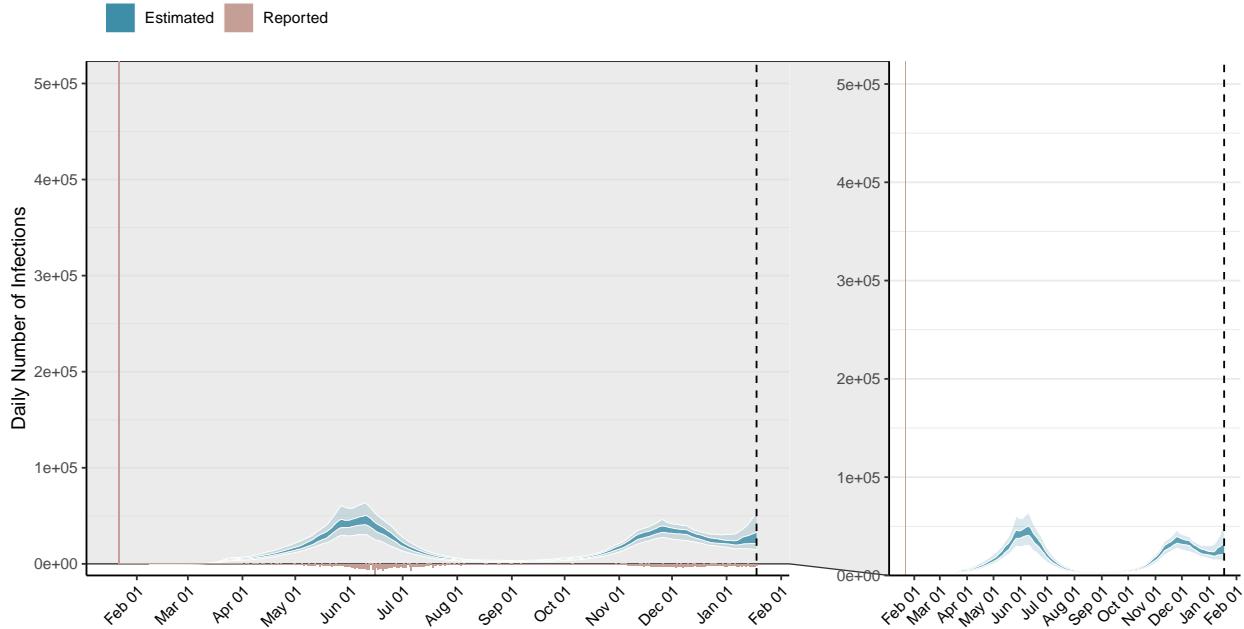
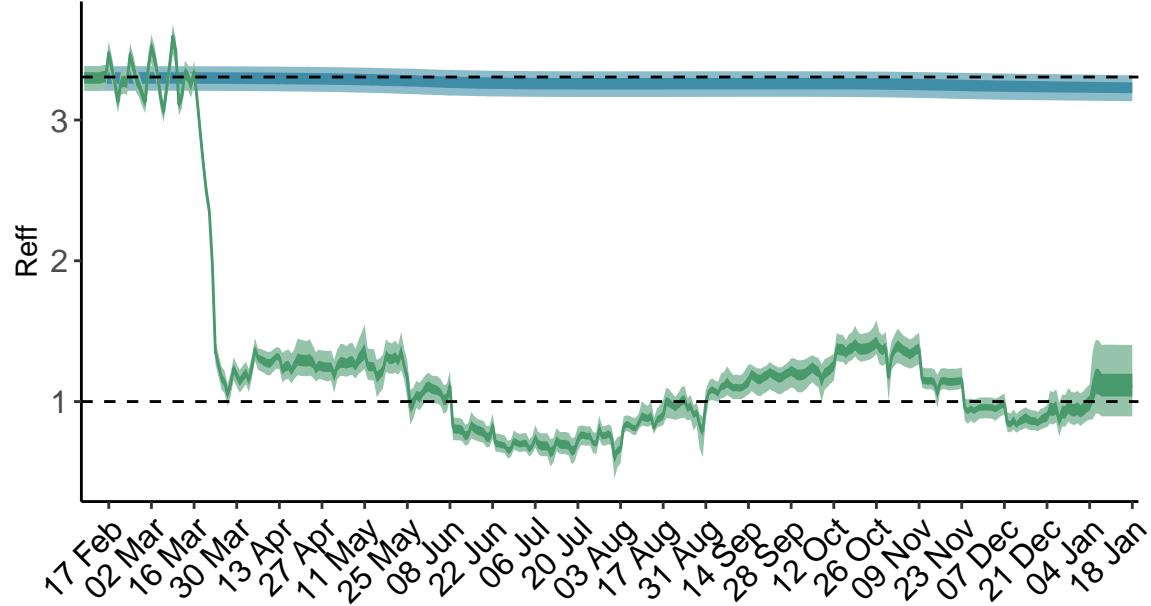


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Pakistan is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

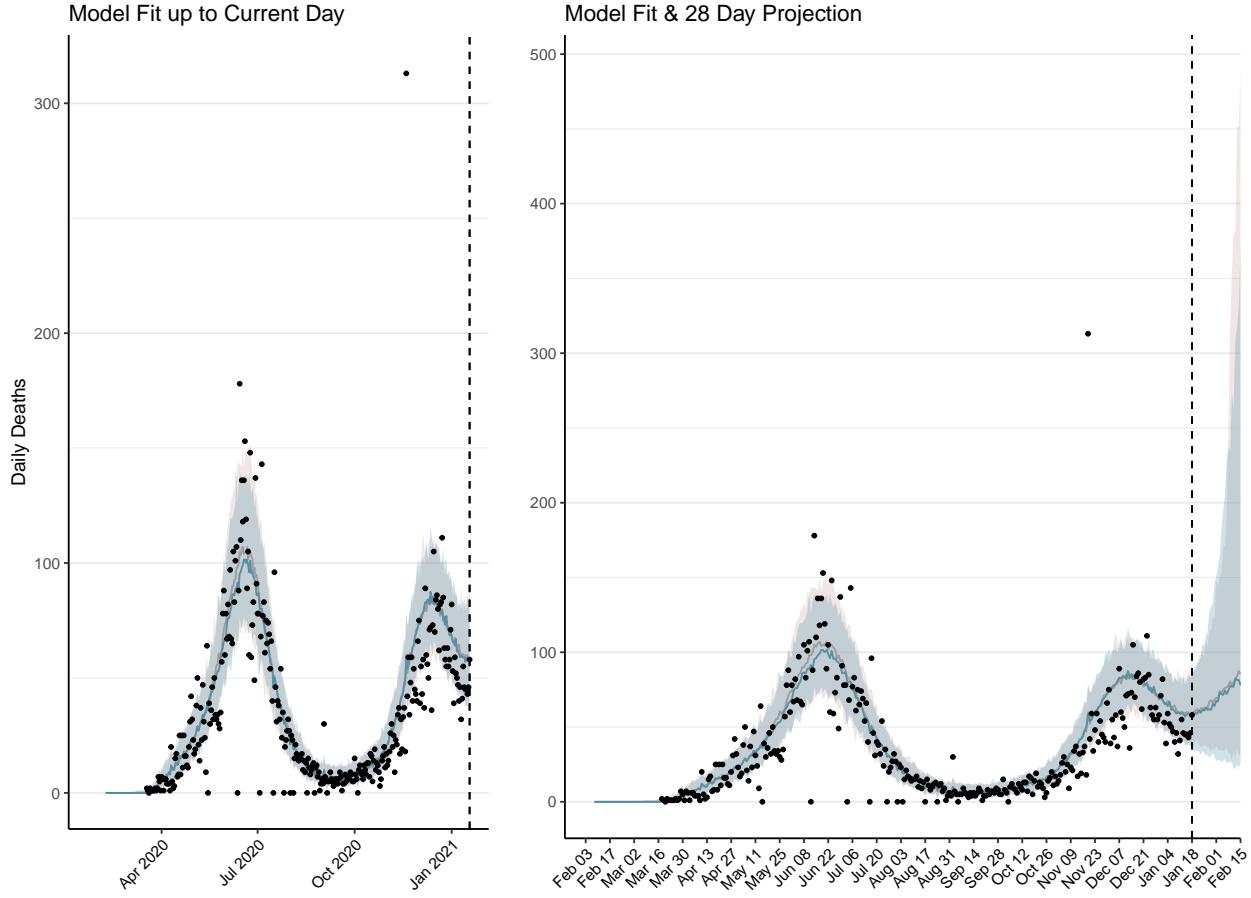


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 2,372 (95% CI: 2,270-2,473) patients requiring treatment with high-pressure oxygen at the current date to 4,344 (95% CI: 3,758-4,931) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 926 (95% CI: 889-962) patients requiring treatment with mechanical ventilation at the current date to 1,523 (95% CI: 1,359-1,687) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

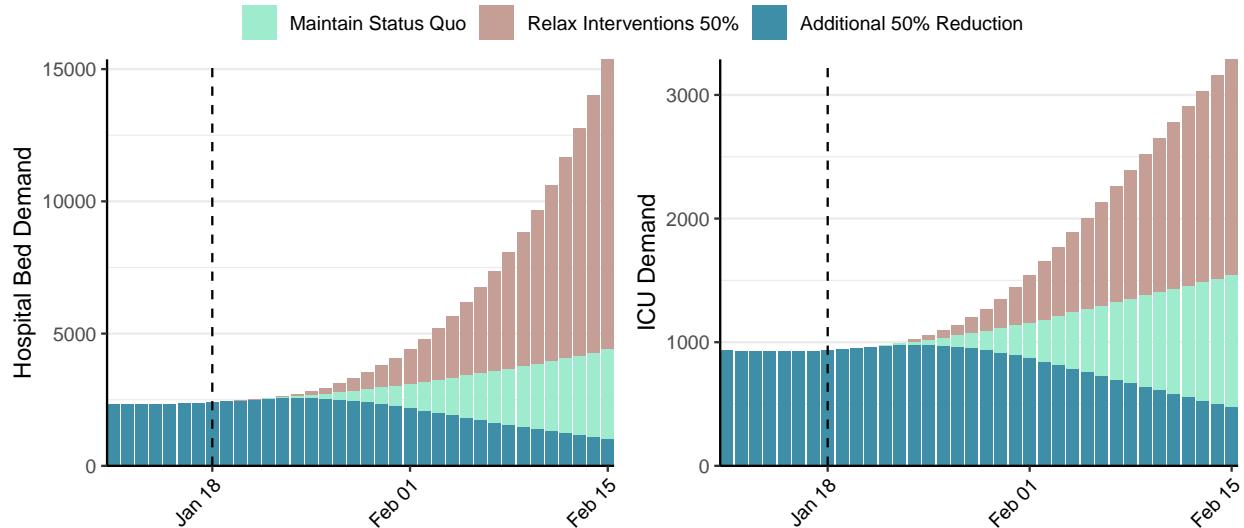
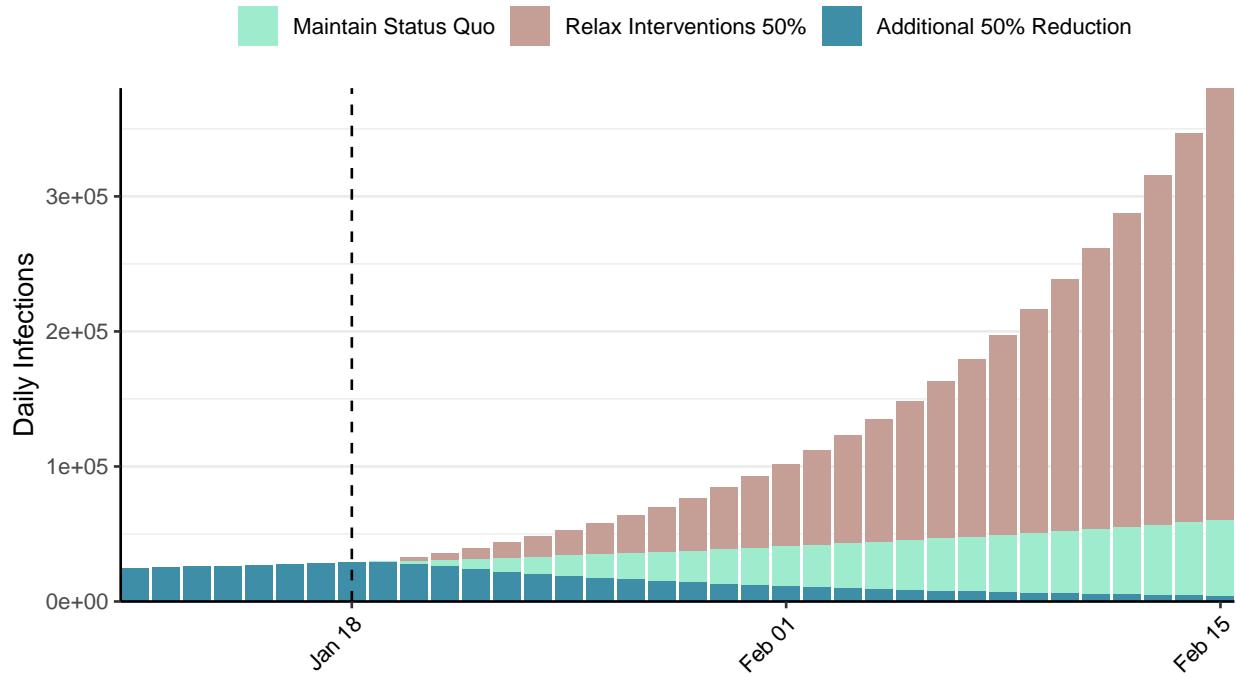


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 28,723 (95% CI: 26,717-30,728) at the current date to 4,267 (95% CI: 3,612-4,921) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 28,723 (95% CI: 26,717-30,728) at the current date to 376,418 (95% CI: 306,420-446,417) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Panama, 2021-01-18

[Download the report for Panama, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.87 (95% CI: 0.78-0.98)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Panama is not shown in the following plot as only 0 deaths have been reported to date**

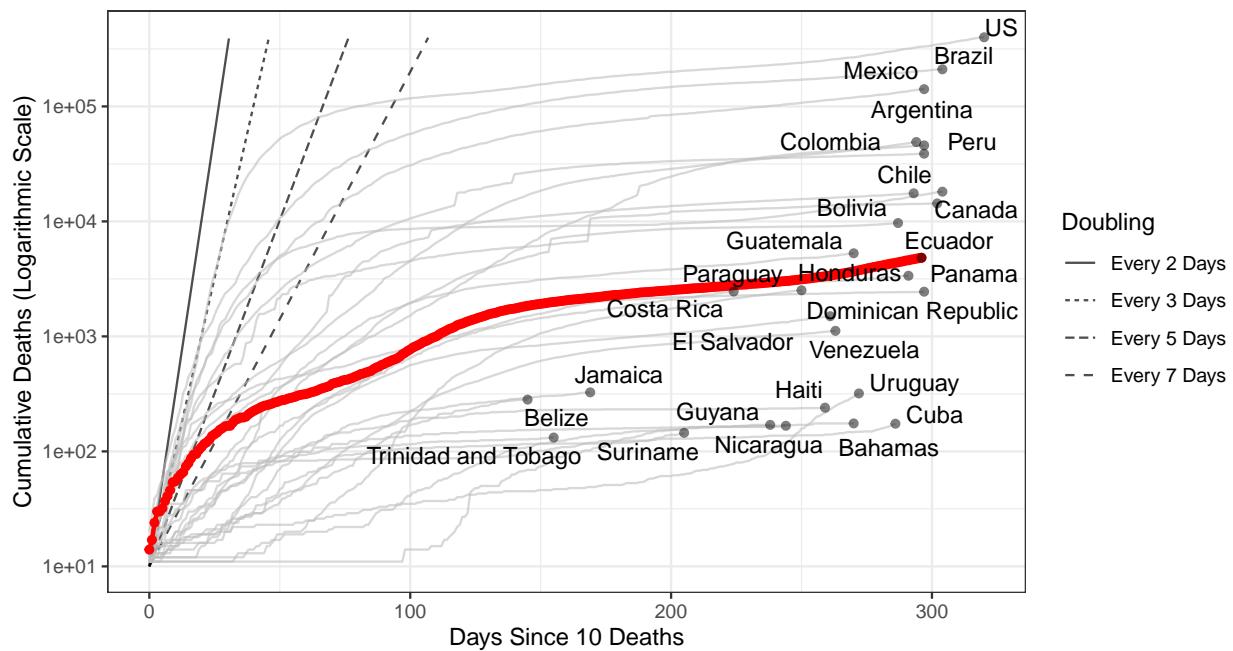


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 351,630 (95% CI: 341,565-361,695) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

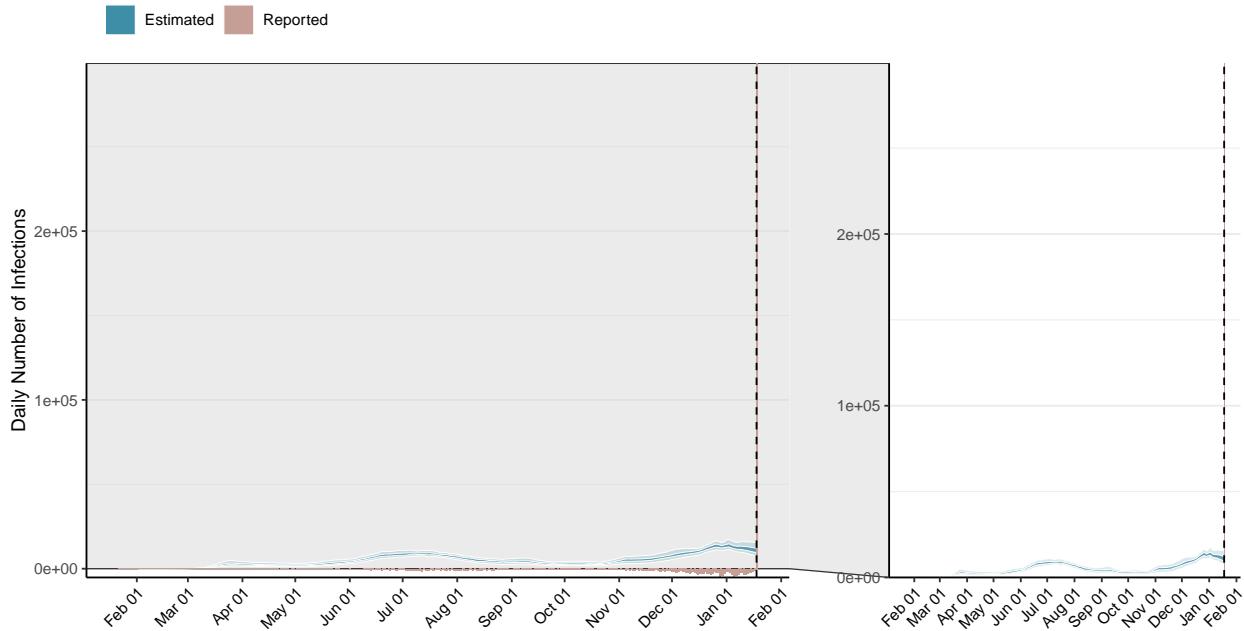
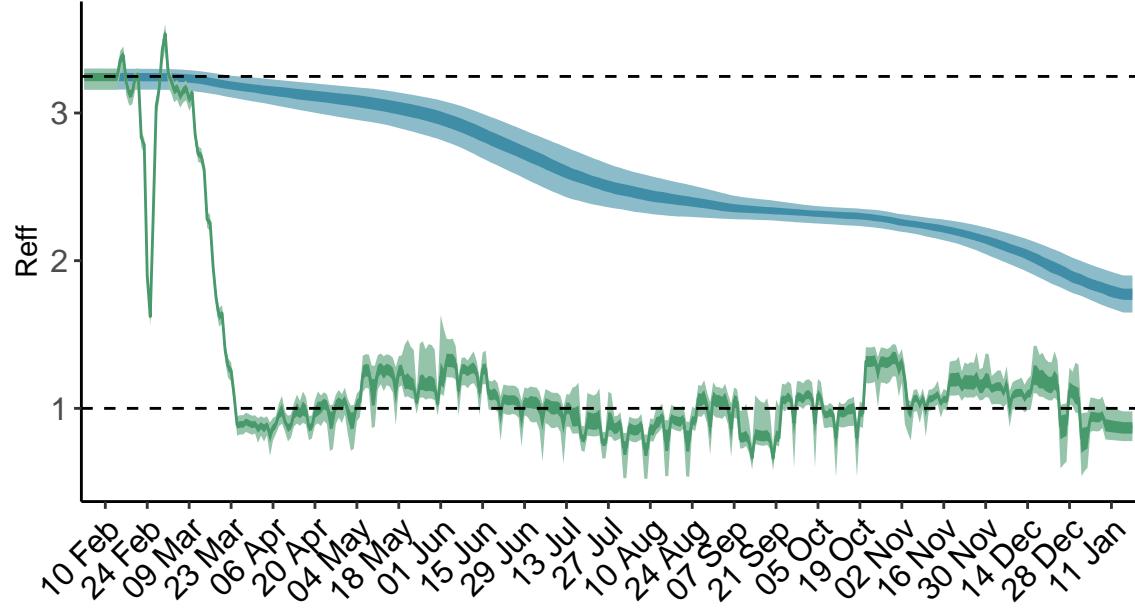


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Panama is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

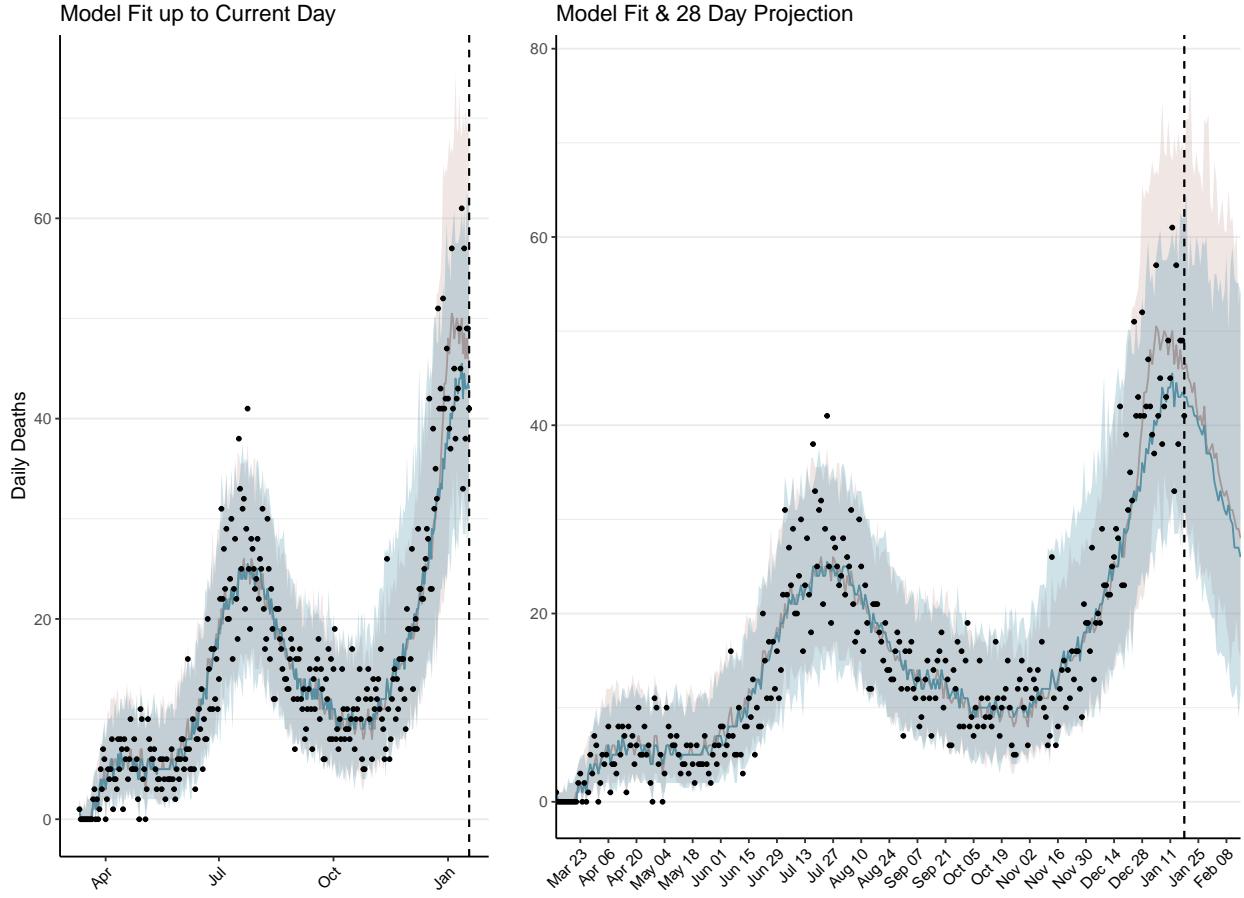


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,467 (95% CI: 1,422-1,512) patients requiring treatment with high-pressure oxygen at the current date to 958 (95% CI: 898-1,017) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 403 (95% CI: 395-411) patients requiring treatment with mechanical ventilation at the current date to 328 (95% CI: 314-342) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

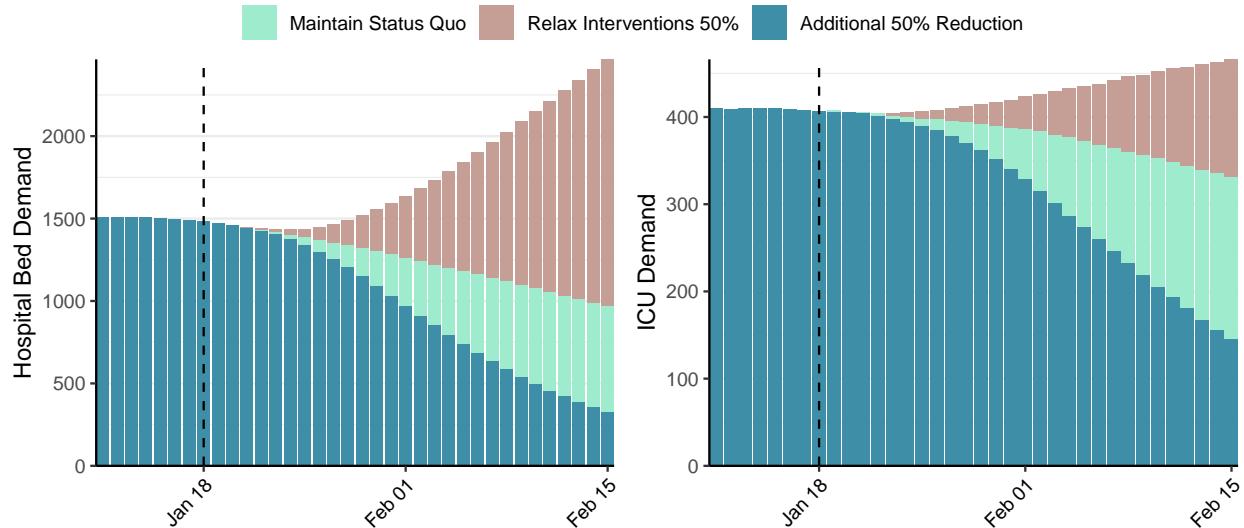


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 10,911 (95% CI: 10,443-11,378) at the current date to 611 (95% CI: 564-657) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10,911 (95% CI: 10,443-11,378) at the current date to 23,386 (95% CI: 21,919-24,853) by 2021-02-15.

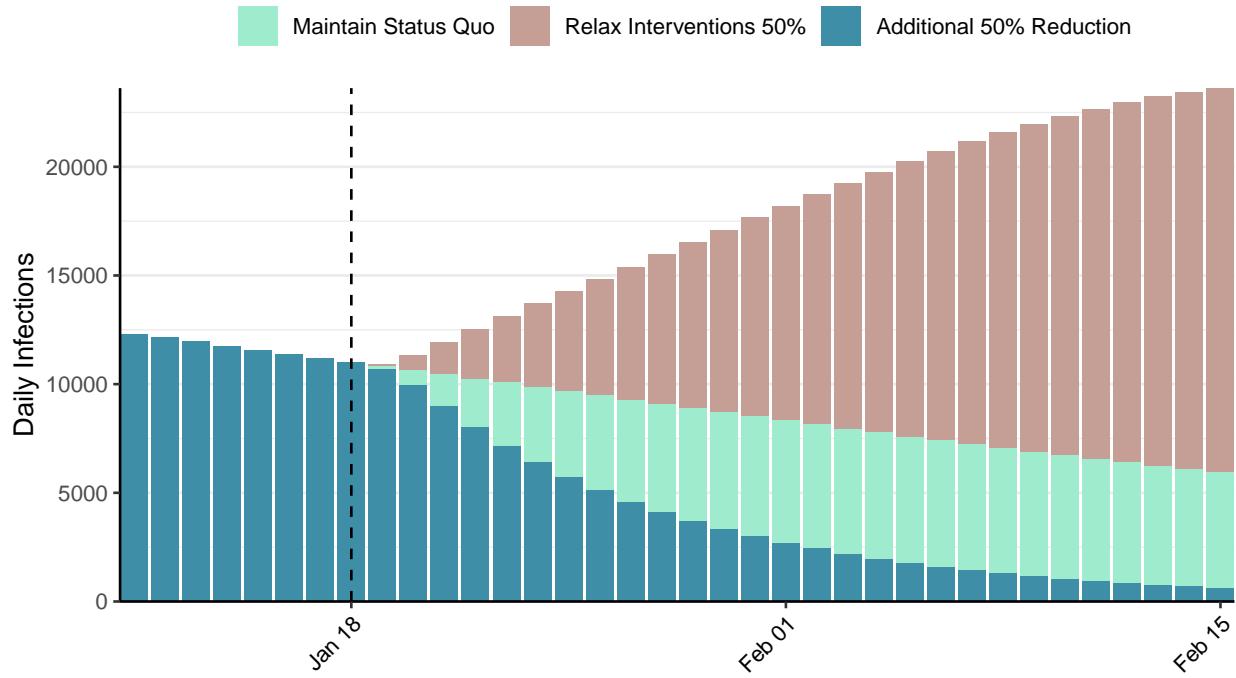


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Peru, 2021-01-18

[Download the report for Peru, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.1 (95% CI: 0.79-1.31)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Peru is not shown in the following plot as only 0 deaths have been reported to date**

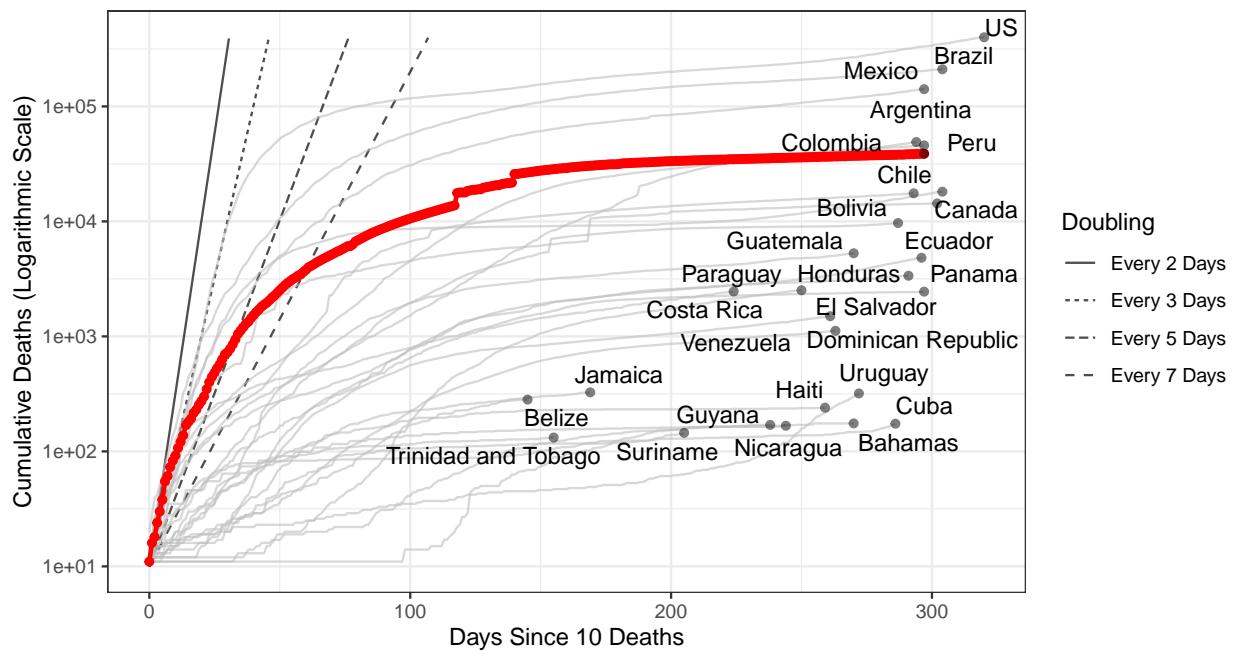


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 920,047 (95% CI: 875,025–965,068) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

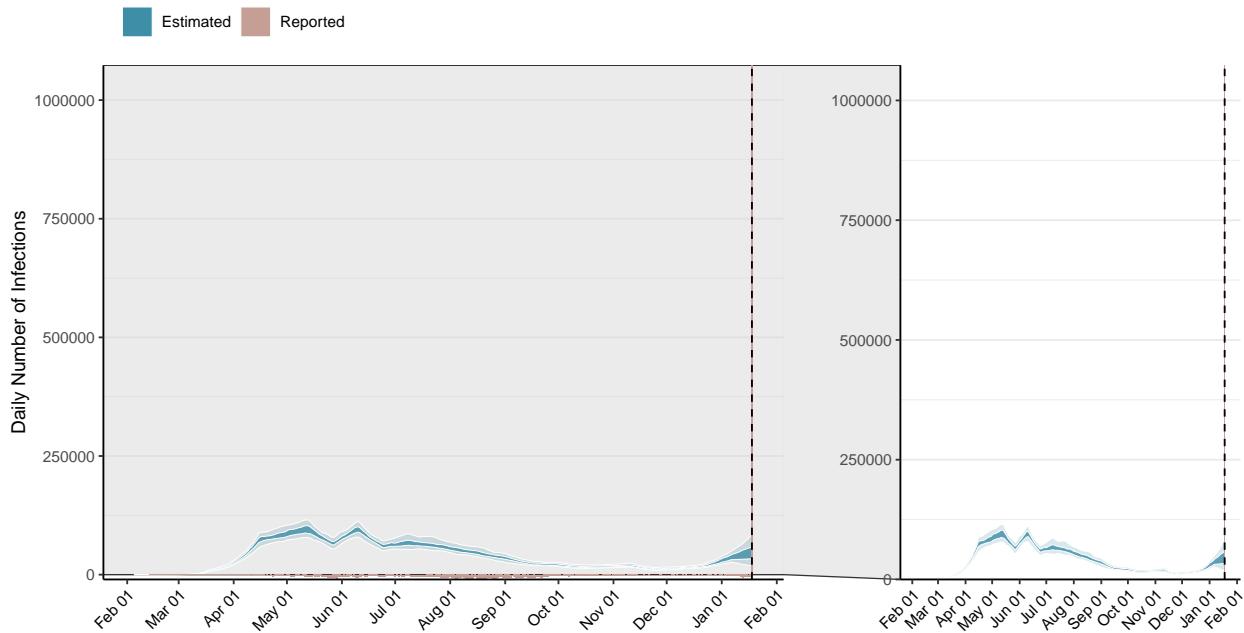
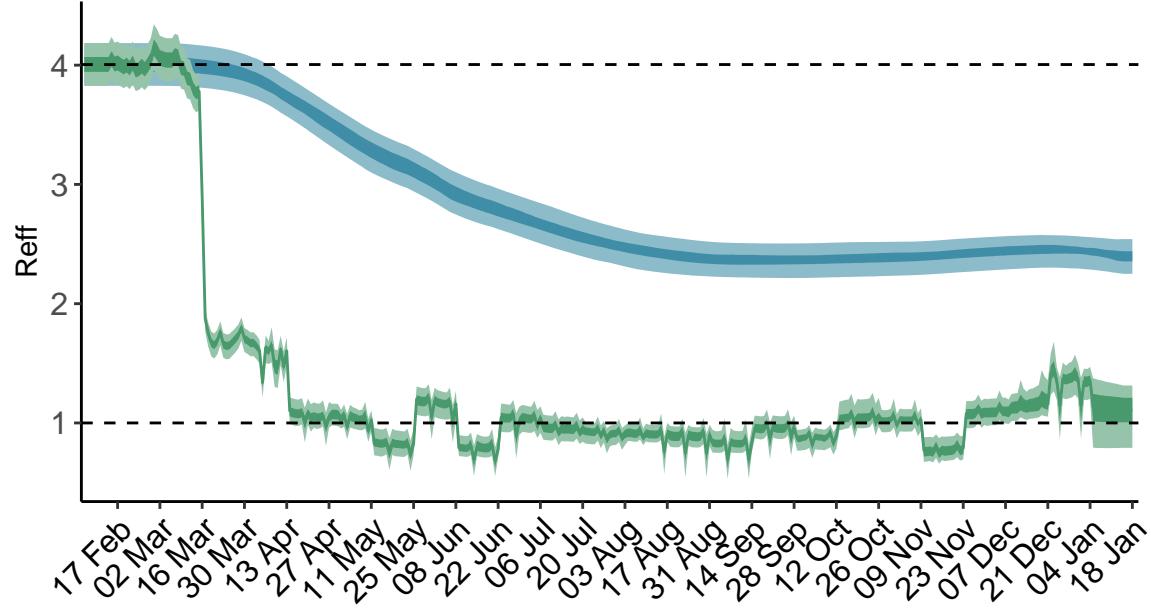


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Peru is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

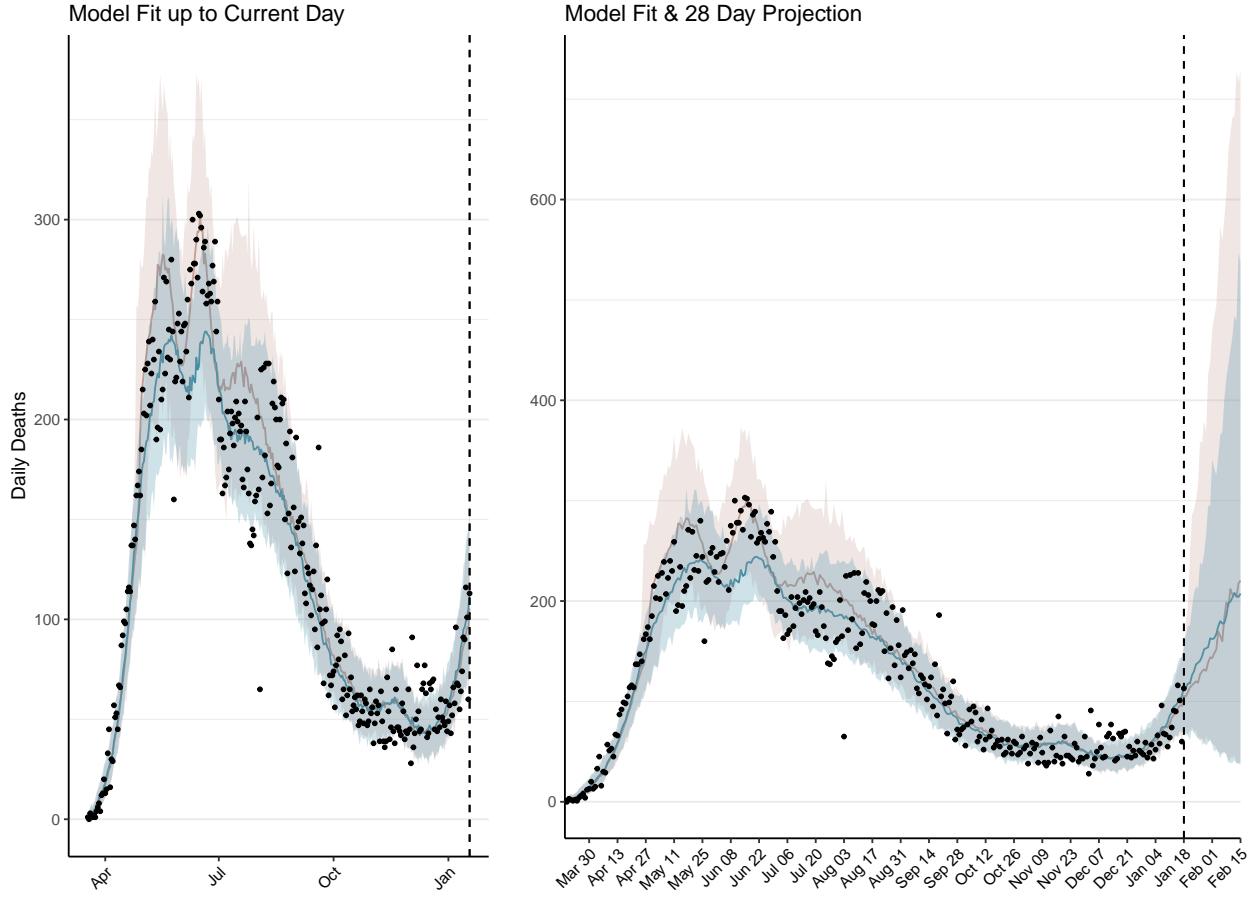


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 4,189 (95% CI: 3,976-4,403) patients requiring treatment with high-pressure oxygen at the current date to 7,716 (95% CI: 6,749-8,683) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1,417 (95% CI: 1,349-1,485) patients requiring treatment with mechanical ventilation at the current date to 1,877 (95% CI: 1,745-2,010) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

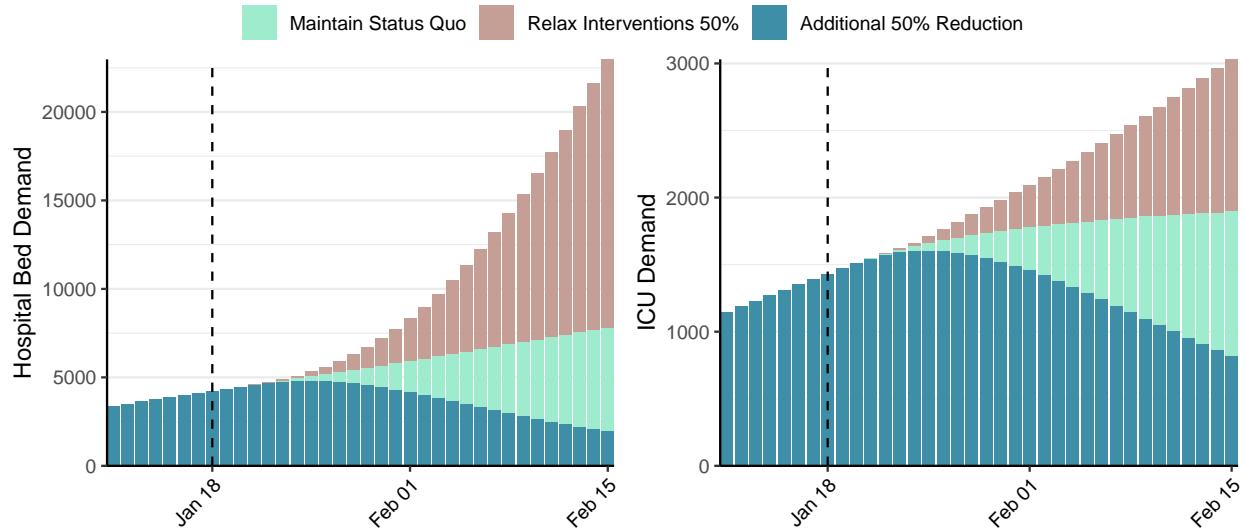
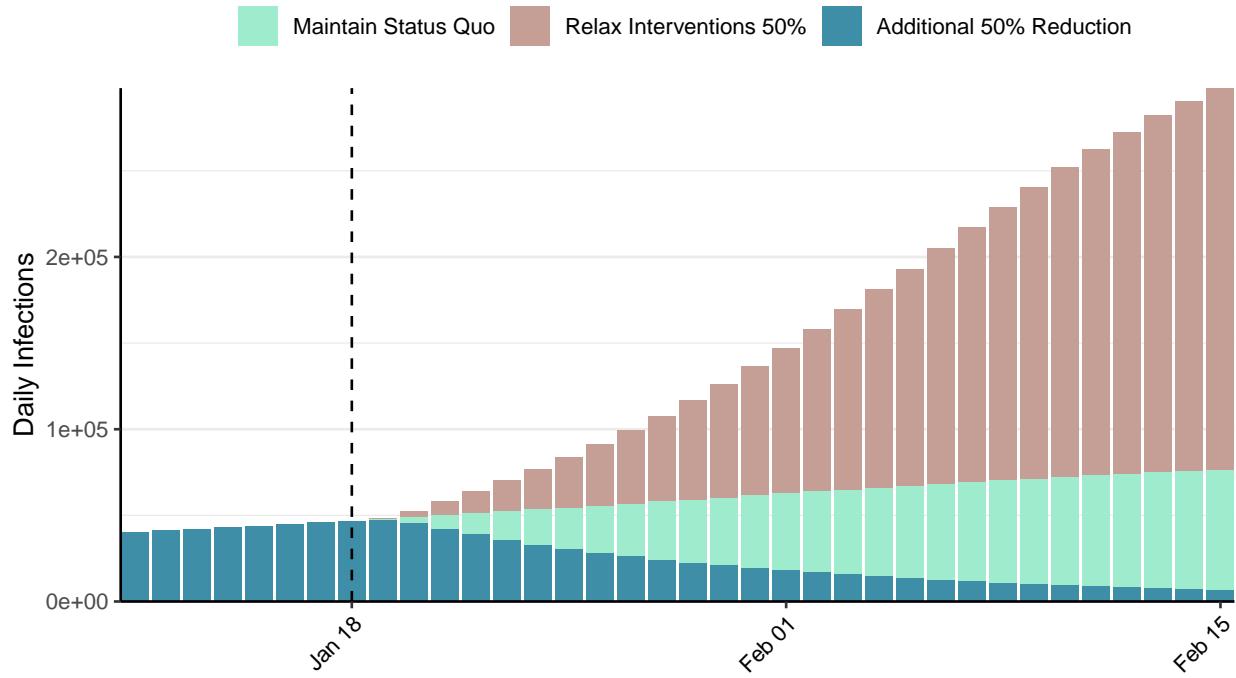


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 46,482 (95% CI: 42,724-50,241) at the current date to 6,641 (95% CI: 5,693-7,589) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 46,482 (95% CI: 42,724-50,241) at the current date to 295,043 (95% CI: 264,140-325,946) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Philippines, 2021-01-18

[Download the report for Philippines, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.2 (95% CI: 1.06-1.32)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Philippines is not shown in the following plot as only 0 deaths have been reported to date**

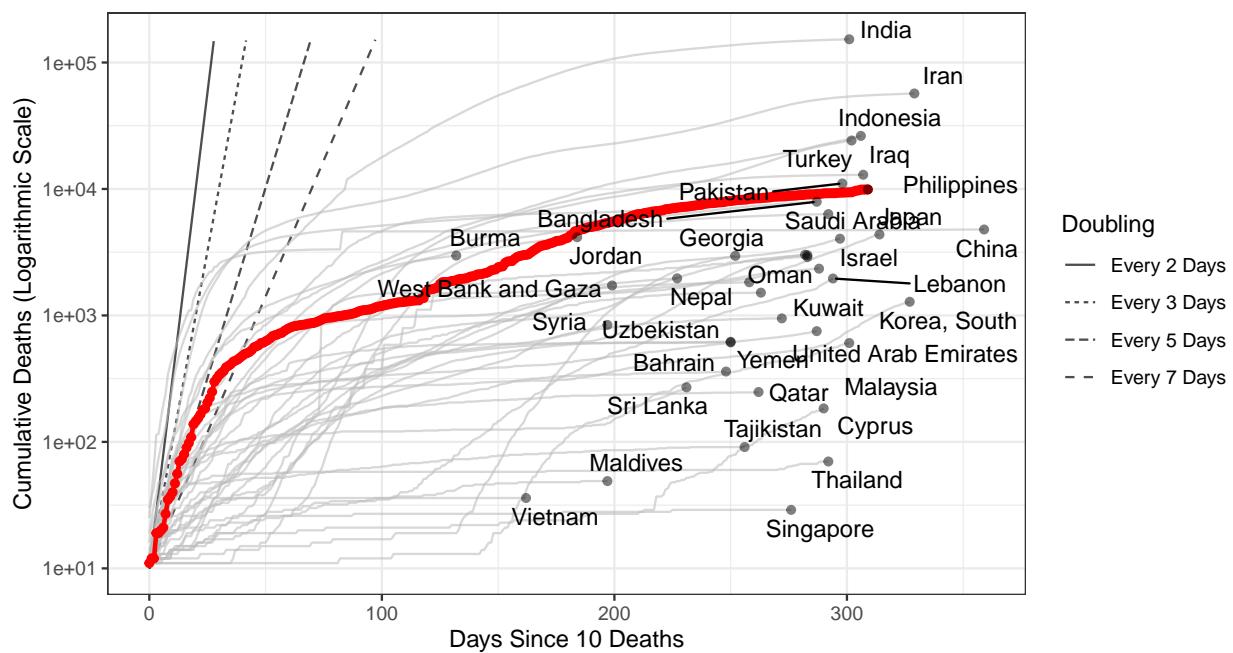


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 545,304 (95% CI: 524,359–566,248) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

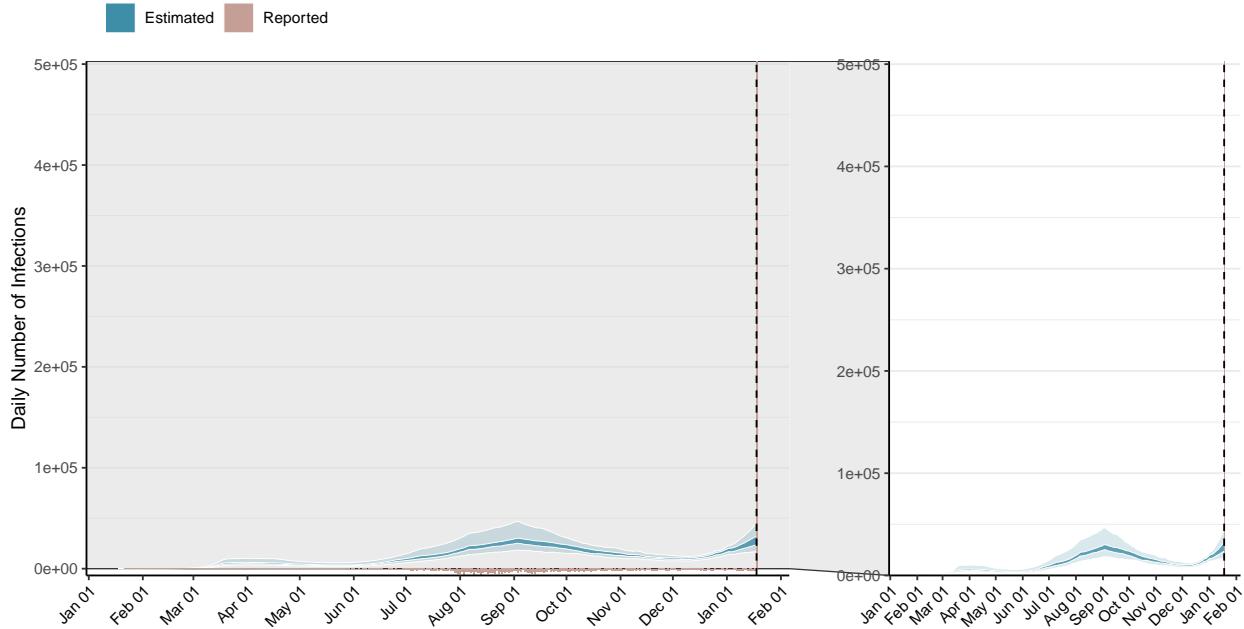
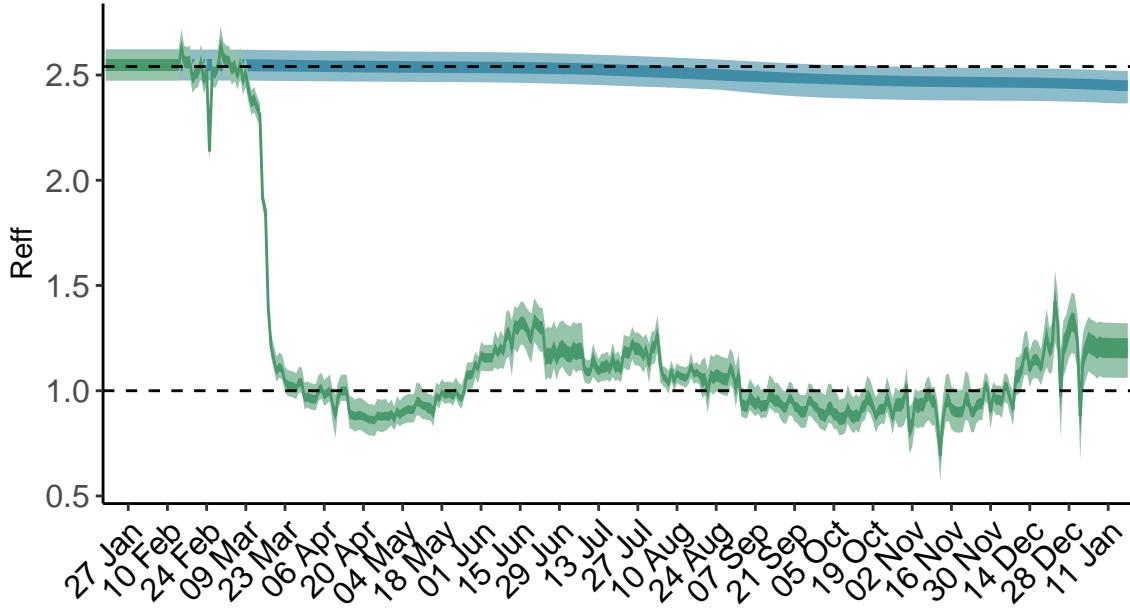


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Philippines is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

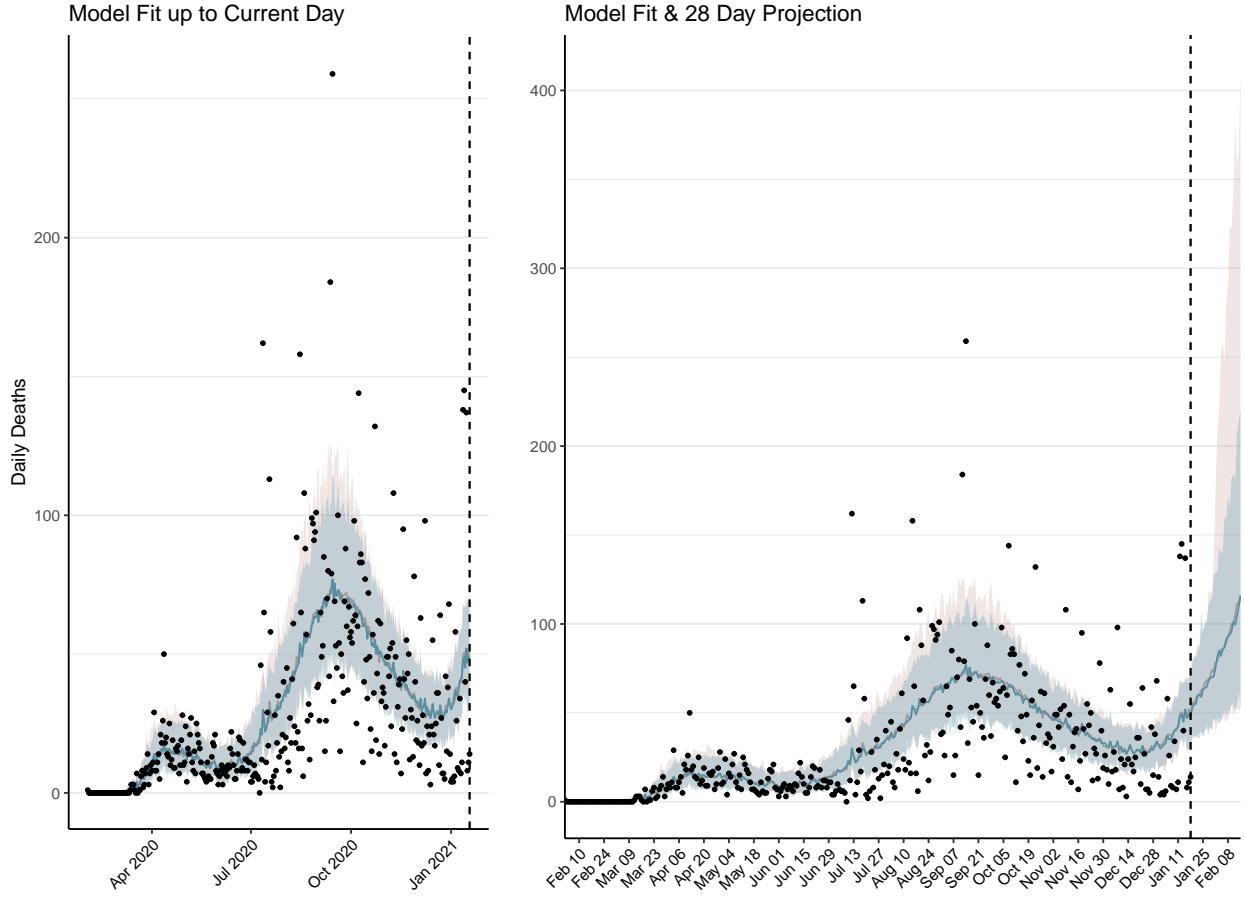


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 2,307 (95% CI: 2,213-2,401) patients requiring treatment with high-pressure oxygen at the current date to 5,332 (95% CI: 4,894-5,770) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 857 (95% CI: 823-891) patients requiring treatment with mechanical ventilation at the current date to 1,748 (95% CI: 1,655-1,842) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

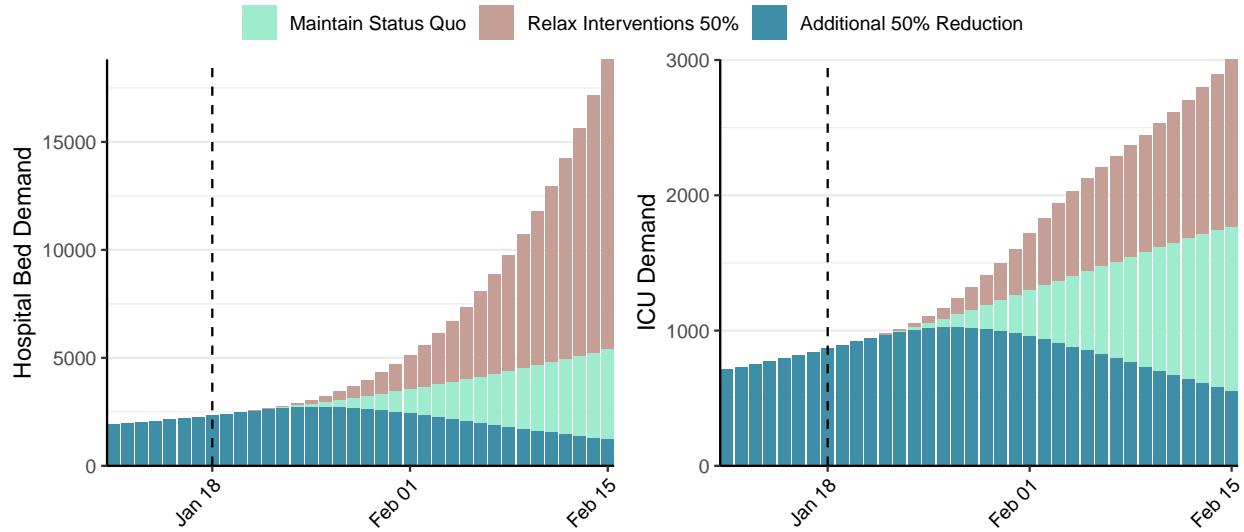


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 28,212 (95% CI: 26,690-29,734) at the current date to 4,676 (95% CI: 4,251-5,102) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 28,212 (95% CI: 26,690-29,734) at the current date to 399,914 (95% CI: 360,745-439,083) by 2021-02-15.

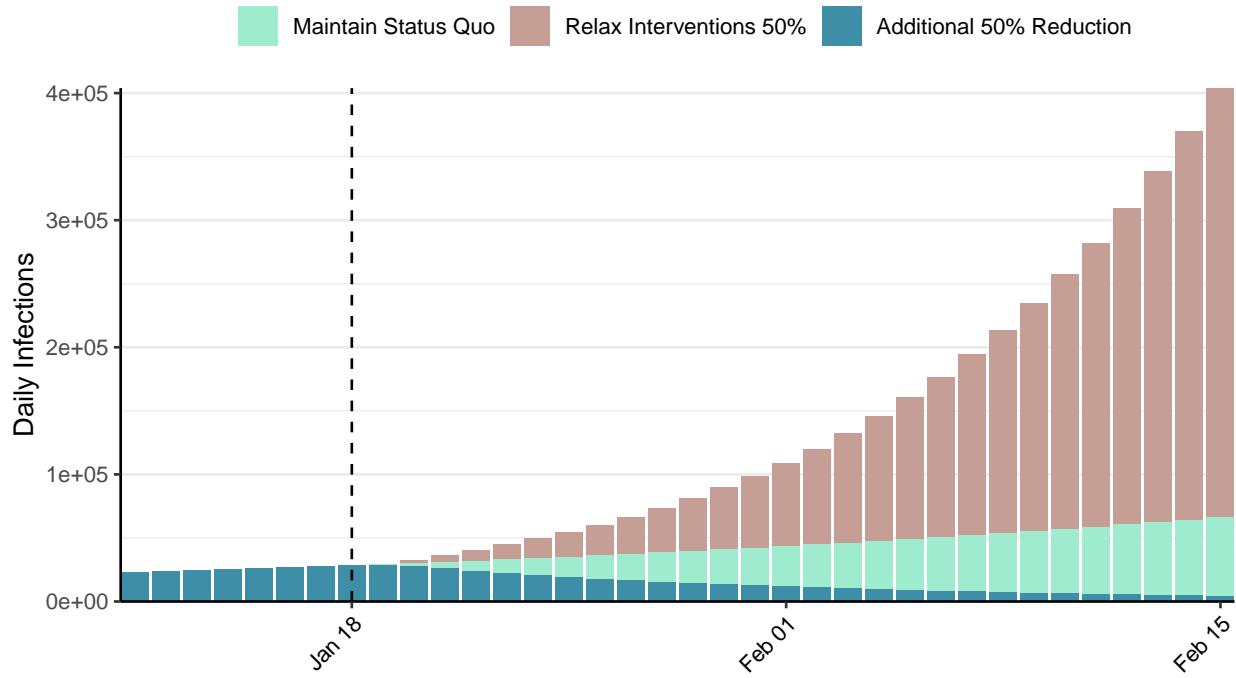


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Papua New Guinea, 2021-01-18

[Download the report for Papua New Guinea, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.92 (95% CI: 0.66-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Papua New Guinea is not shown in the following plot as only 0 deaths have been reported to date

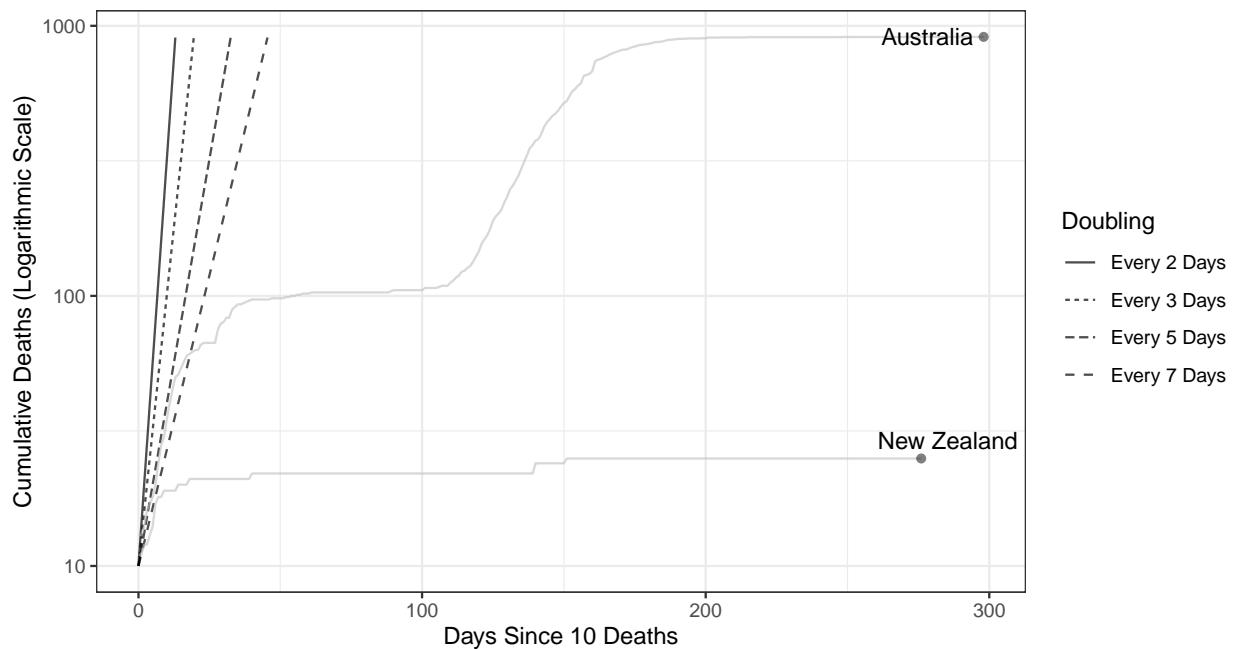


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 395 (95% CI: 316-473) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Papua New Guinea has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

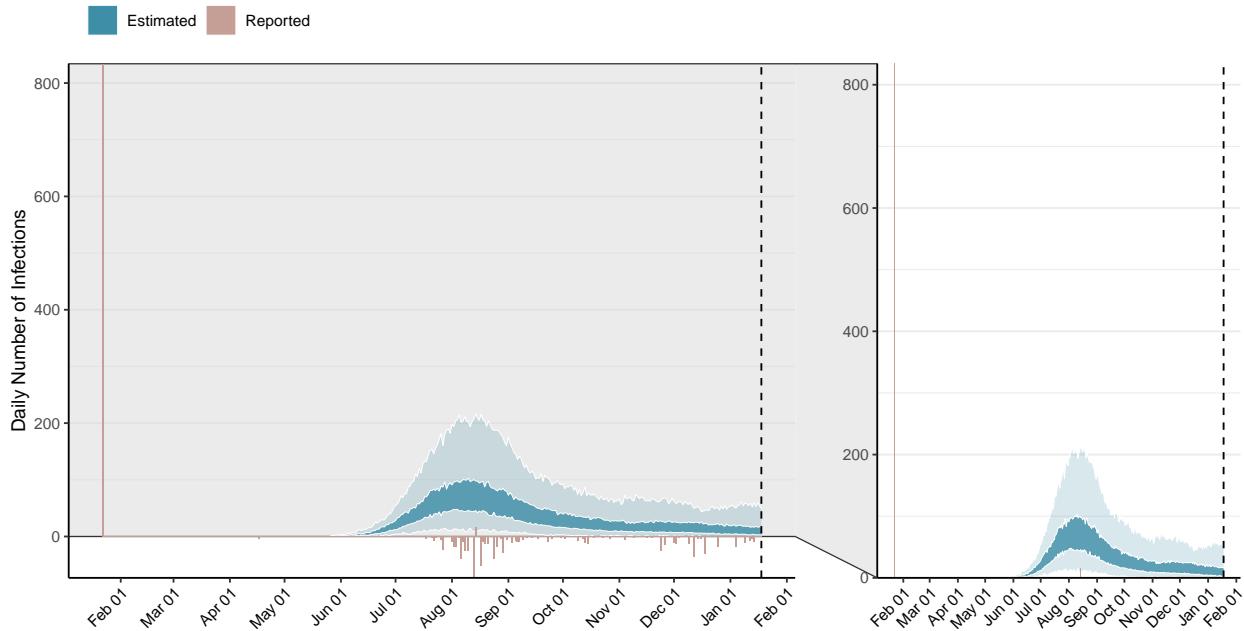
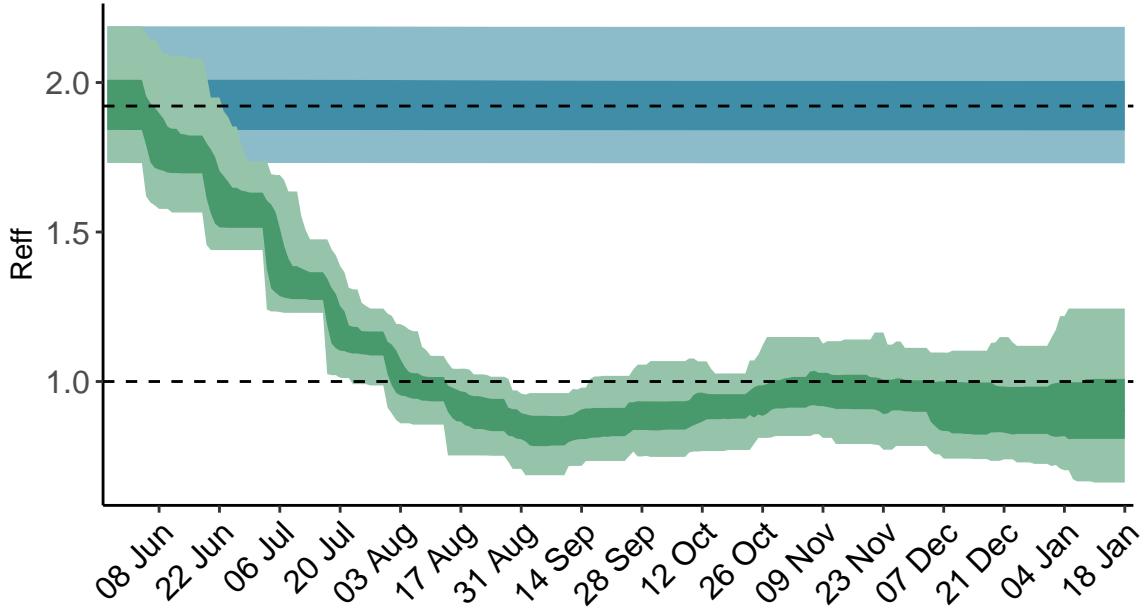


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

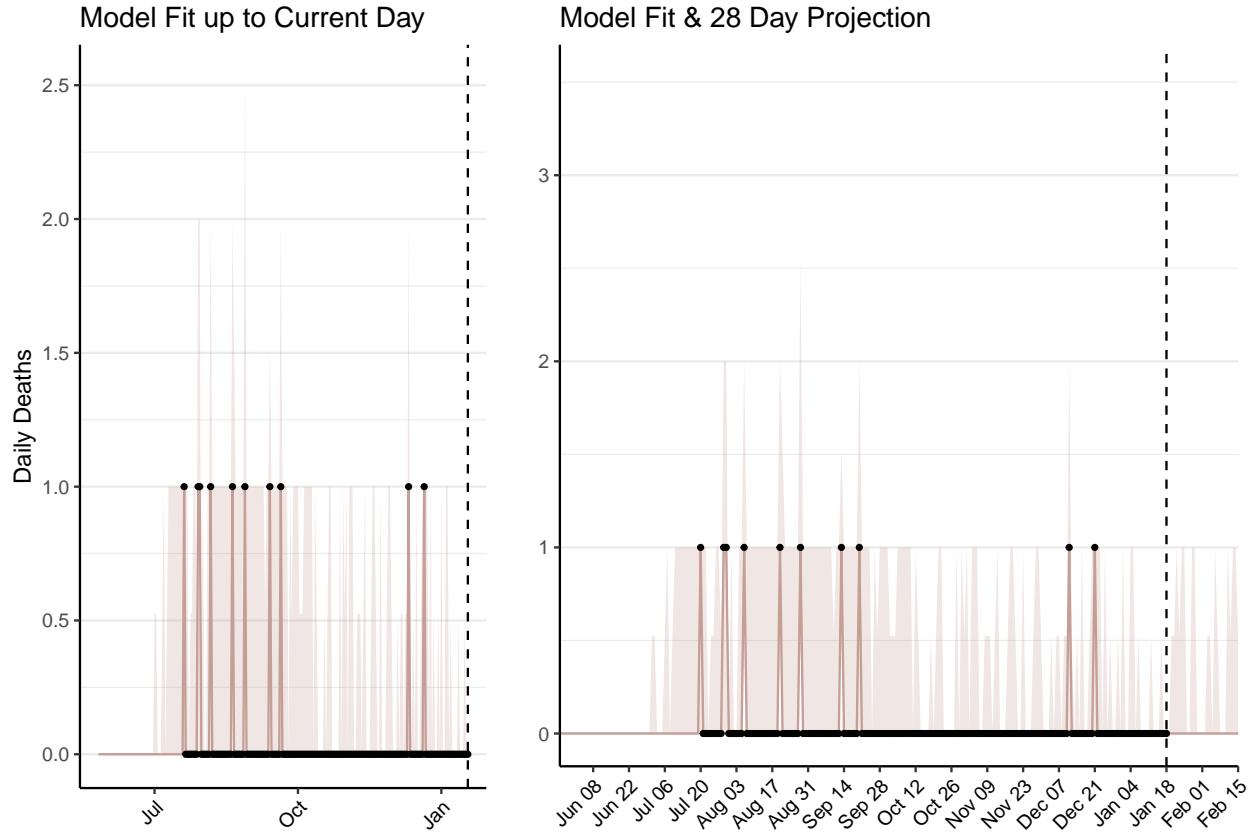


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1 (95% CI: 1-2) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 1-2) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-1) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 0-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

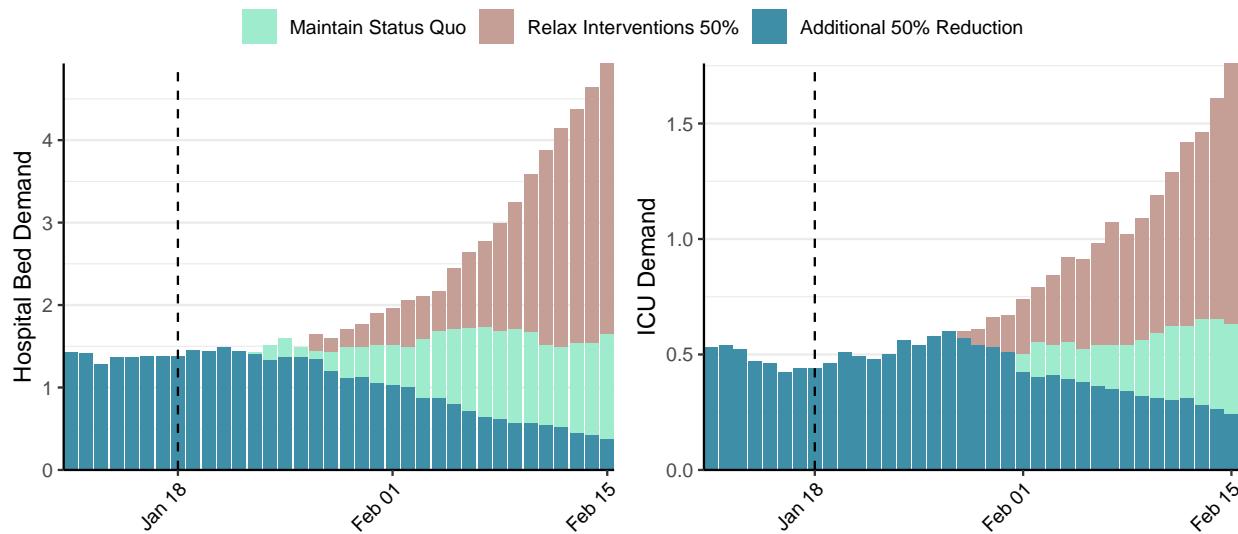


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 13 (95% CI: 9-16) at the current date to 1 (95% CI: 1-2) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 13 (95% CI: 9-16) at the current date to 98 (95% CI: 58-139) by 2021-02-15.

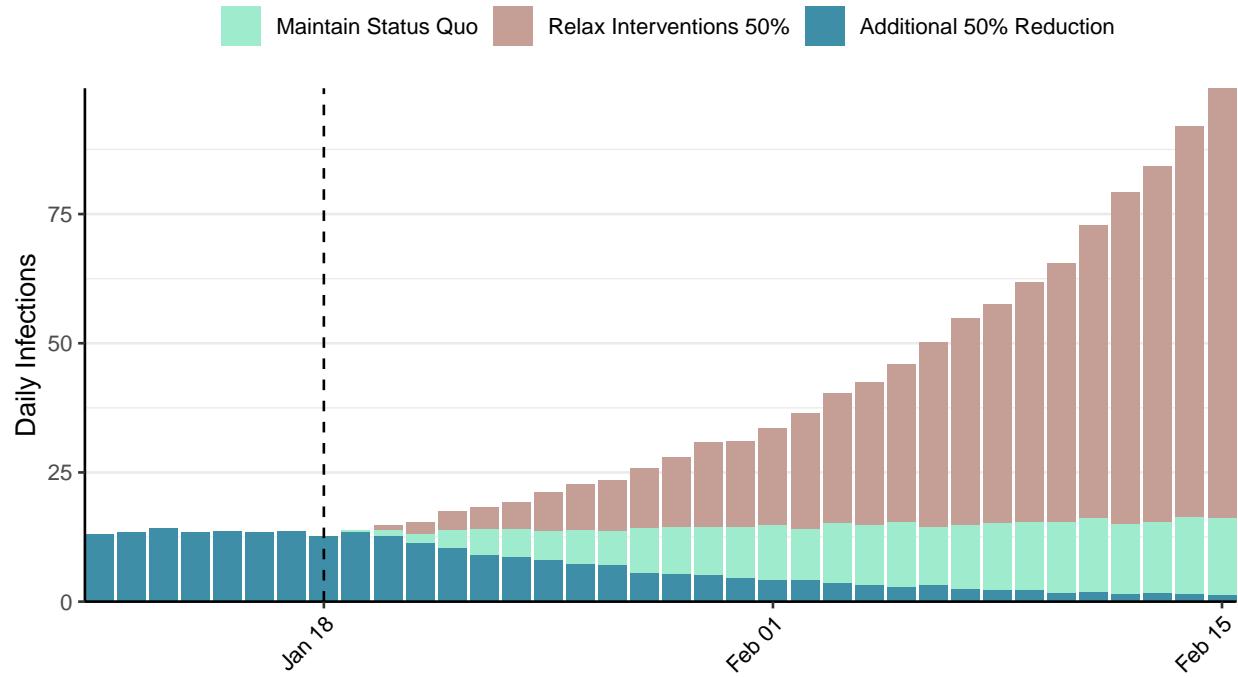


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Paraguay, 2021-01-18

[Download the report for Paraguay, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.93 (95% CI: 0.83-1.03)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Paraguay is not shown in the following plot as only 0 deaths have been reported to date**

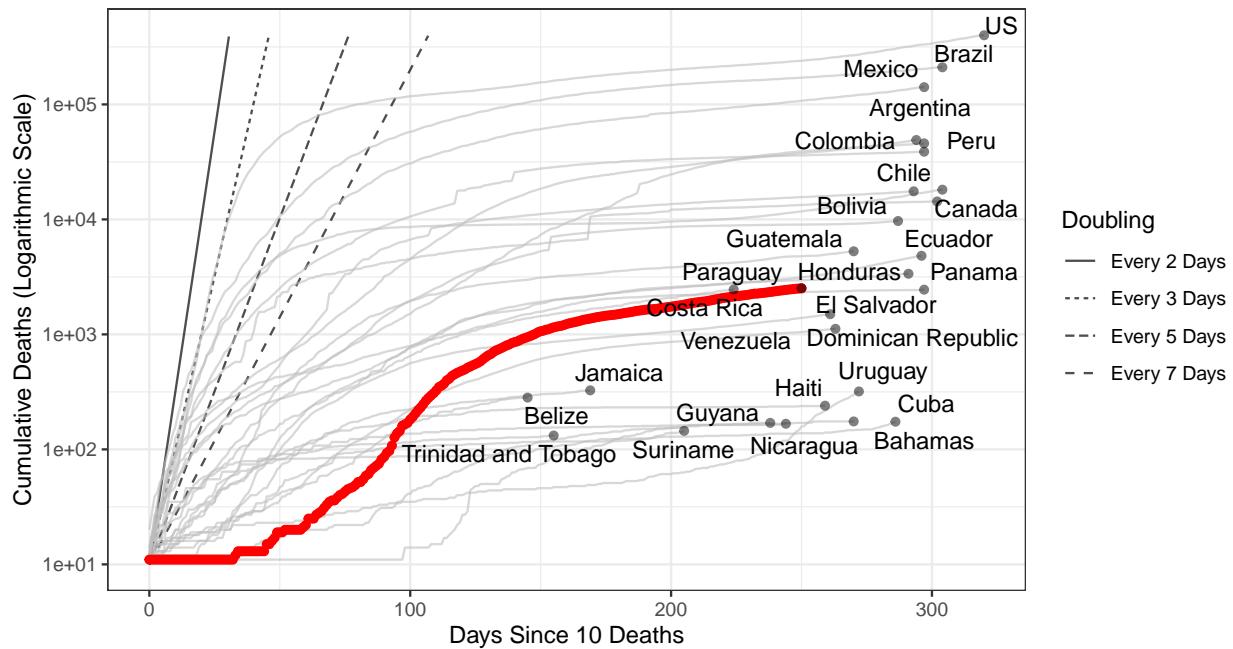


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 150,769 (95% CI: 140,313-161,225) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

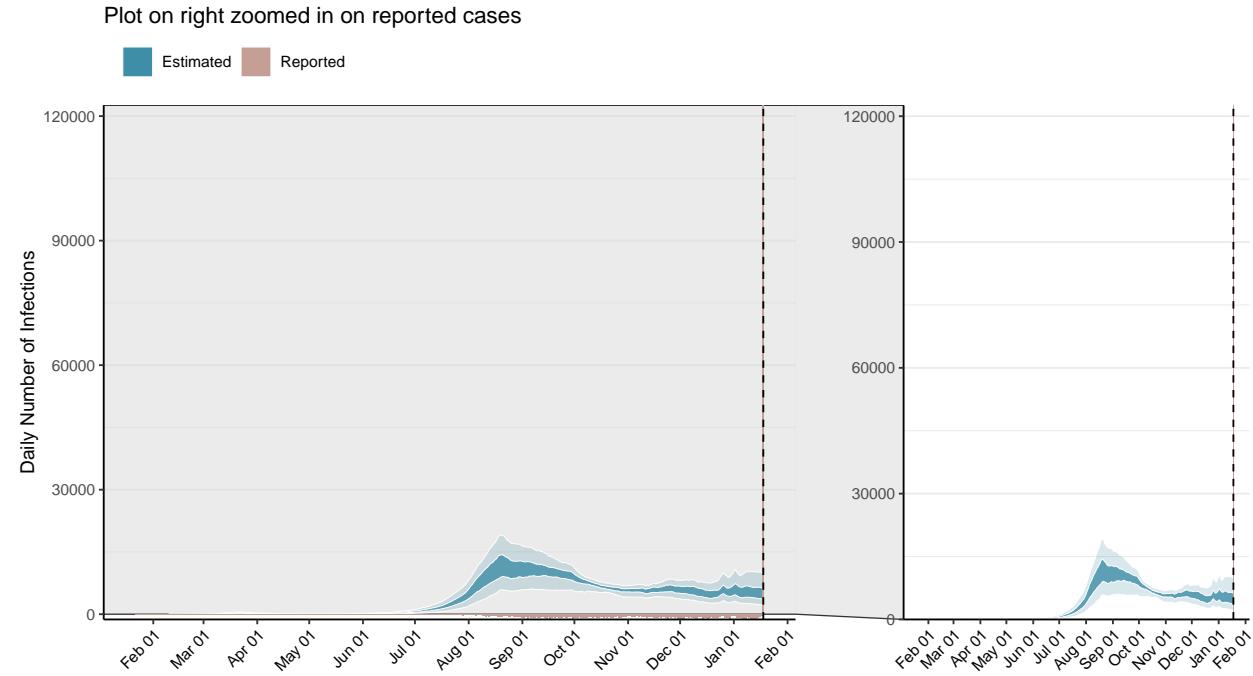
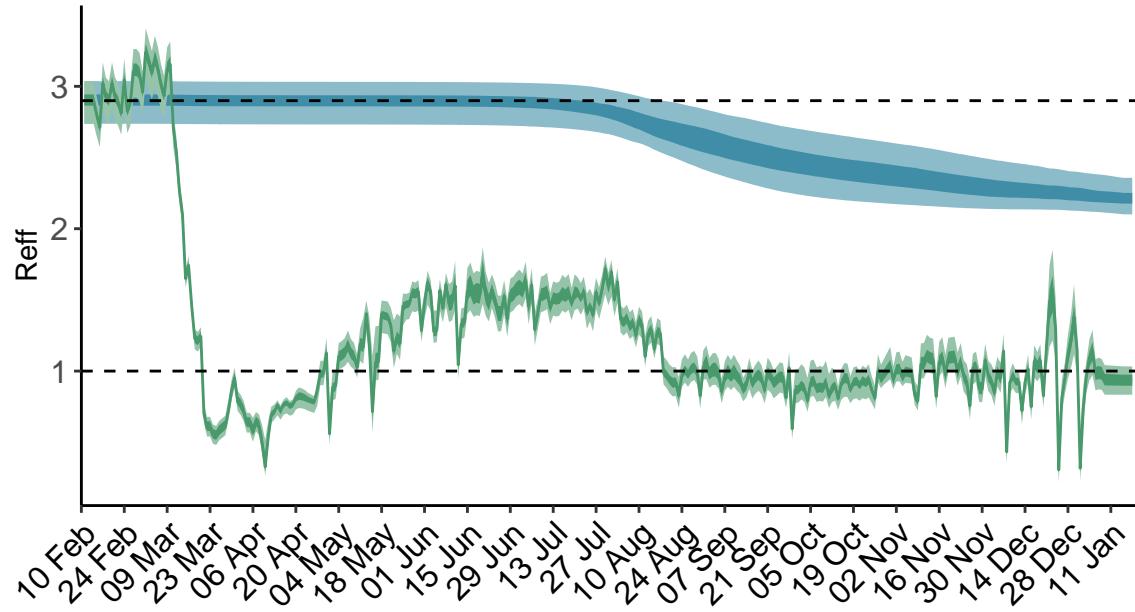


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

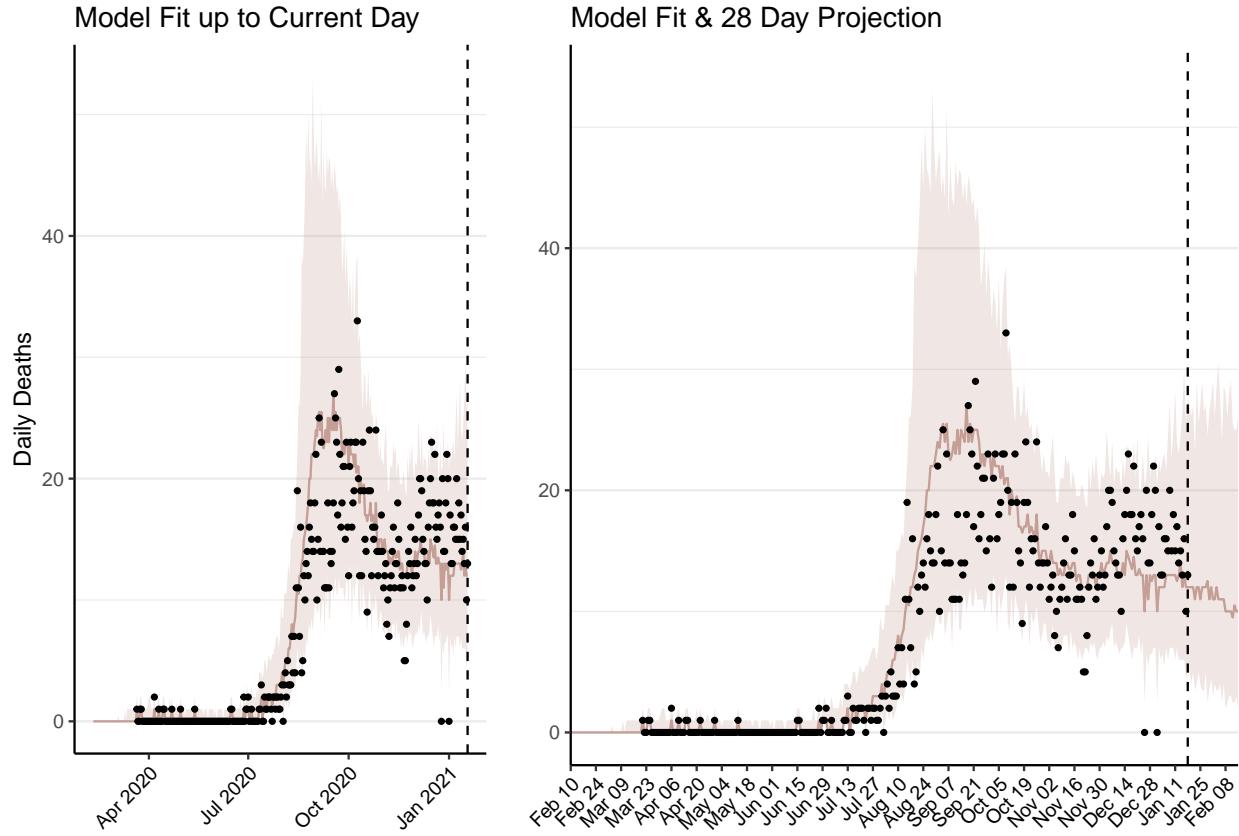


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 485 (95% CI: 451-520) patients requiring treatment with high-pressure oxygen at the current date to 409 (95% CI: 368-449) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 175 (95% CI: 164-186) patients requiring treatment with mechanical ventilation at the current date to 148 (95% CI: 134-161) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

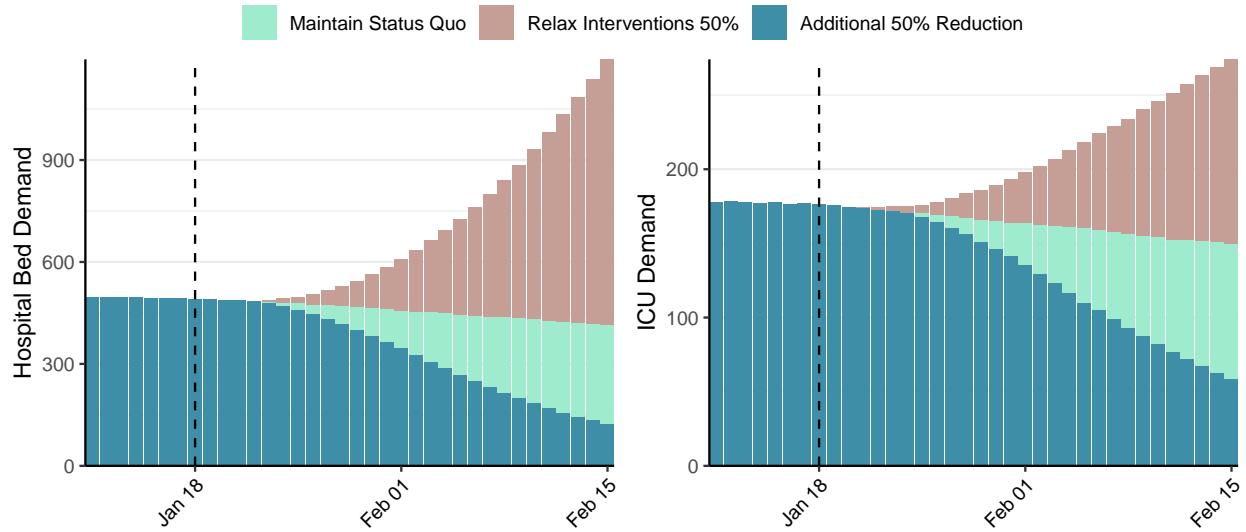


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 5,141 (95% CI: 4,709-5,572) at the current date to 367 (95% CI: 327-407) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 5,141 (95% CI: 4,709-5,572) at the current date to 20,721 (95% CI: 18,554-22,889) by 2021-02-15.

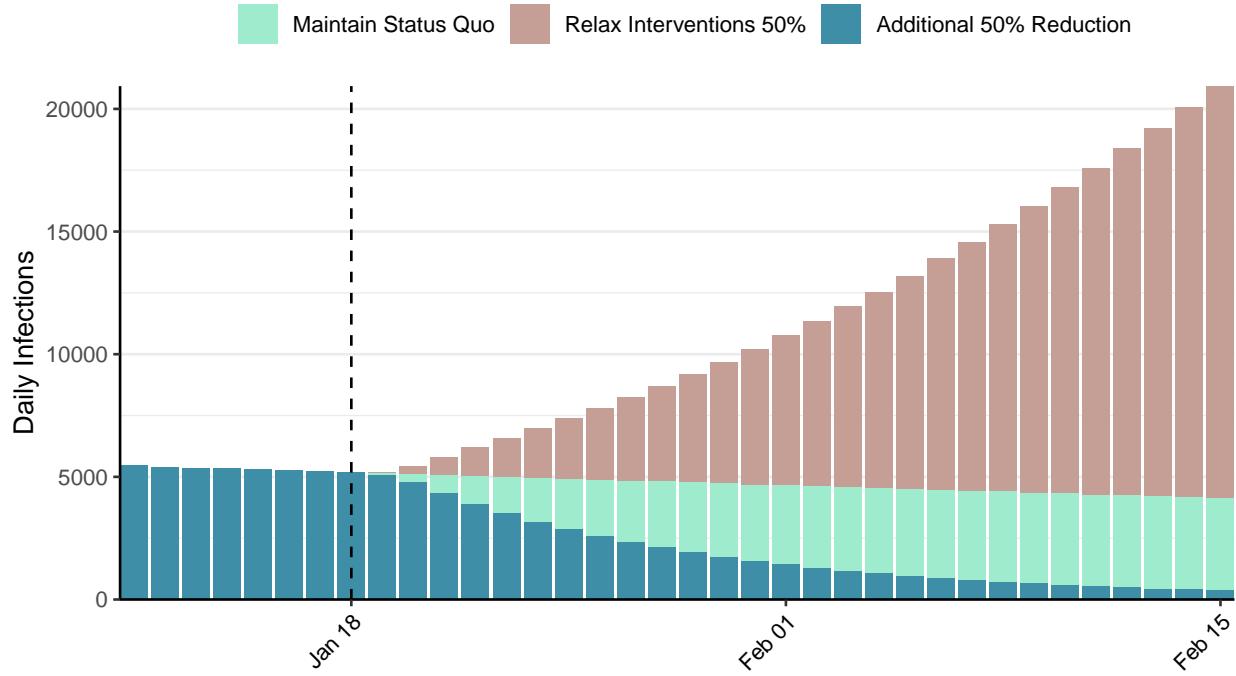


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: State of Palestine, 2021-01-18

[Download the report for State of Palestine, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.84 (95% CI: 0.7-1.01)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. State of Palestine is not shown in the following plot as only 0 deaths have been reported to date**

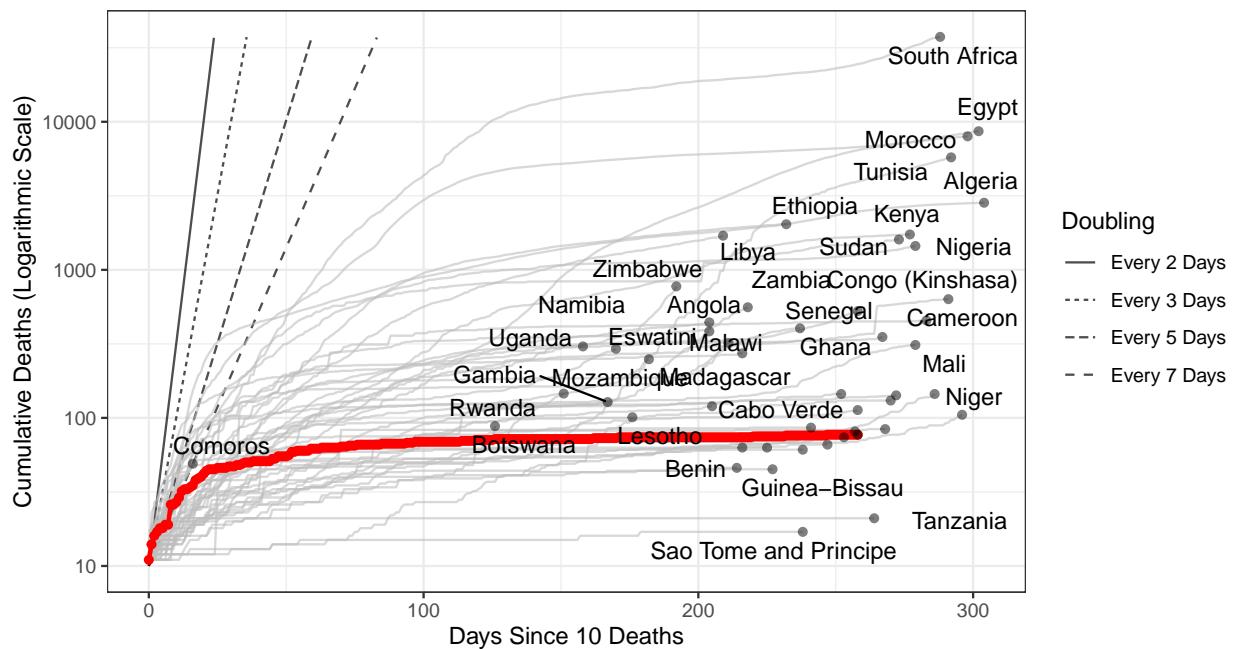


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 182,265 (95% CI: 175,680-188,849) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

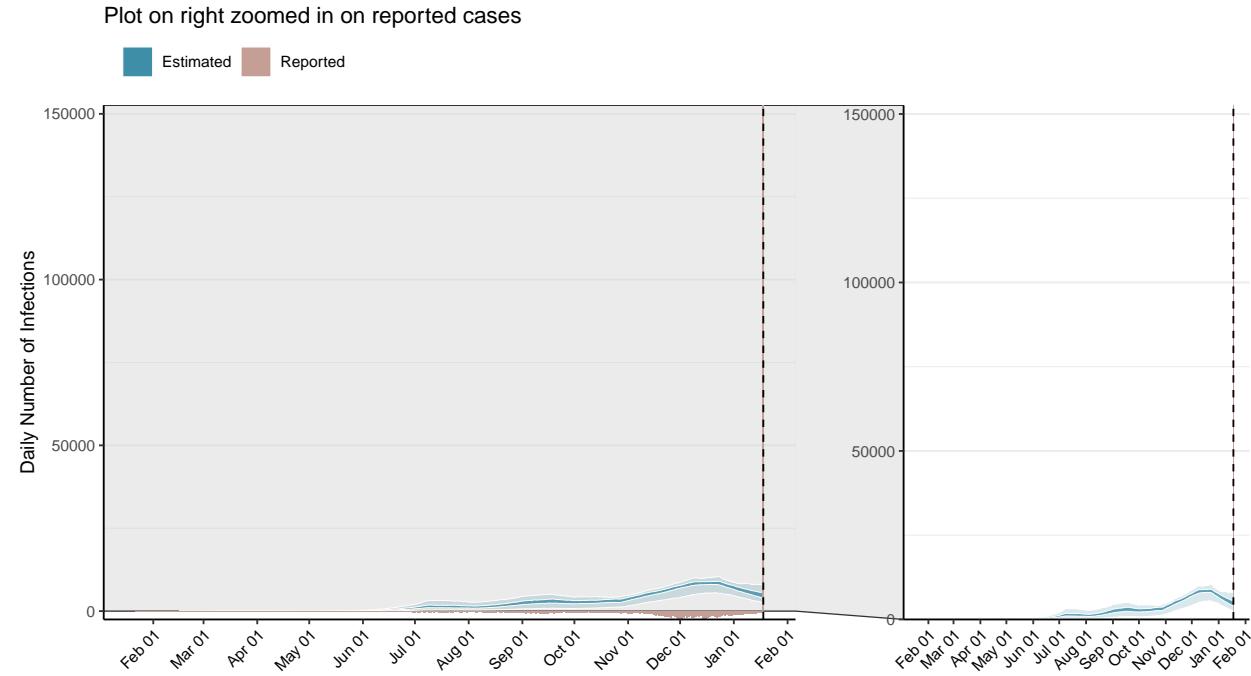
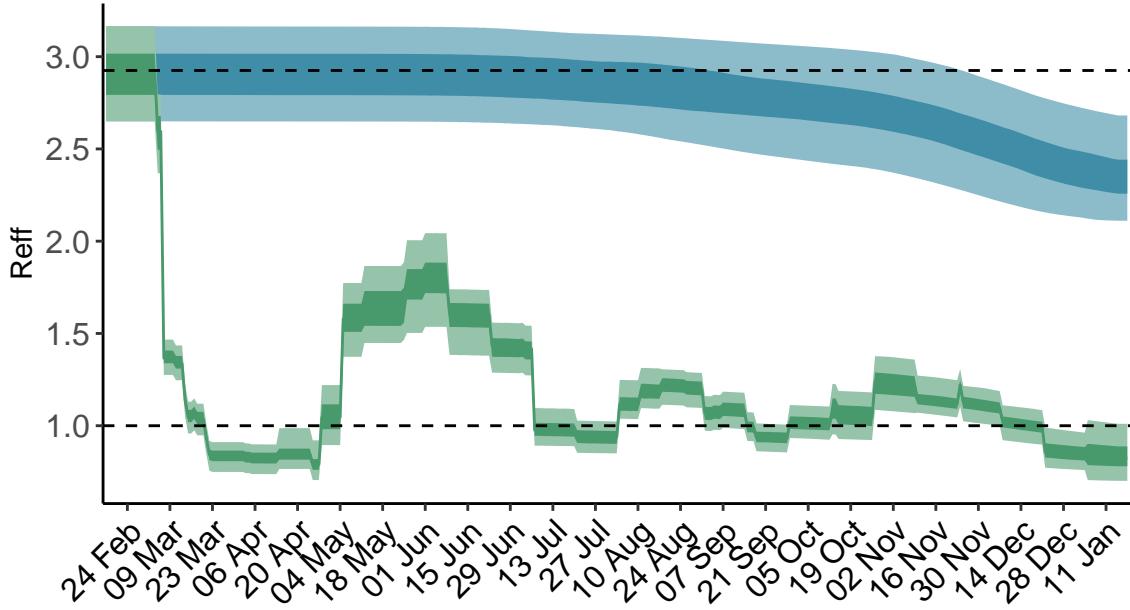


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. State of Palestine is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

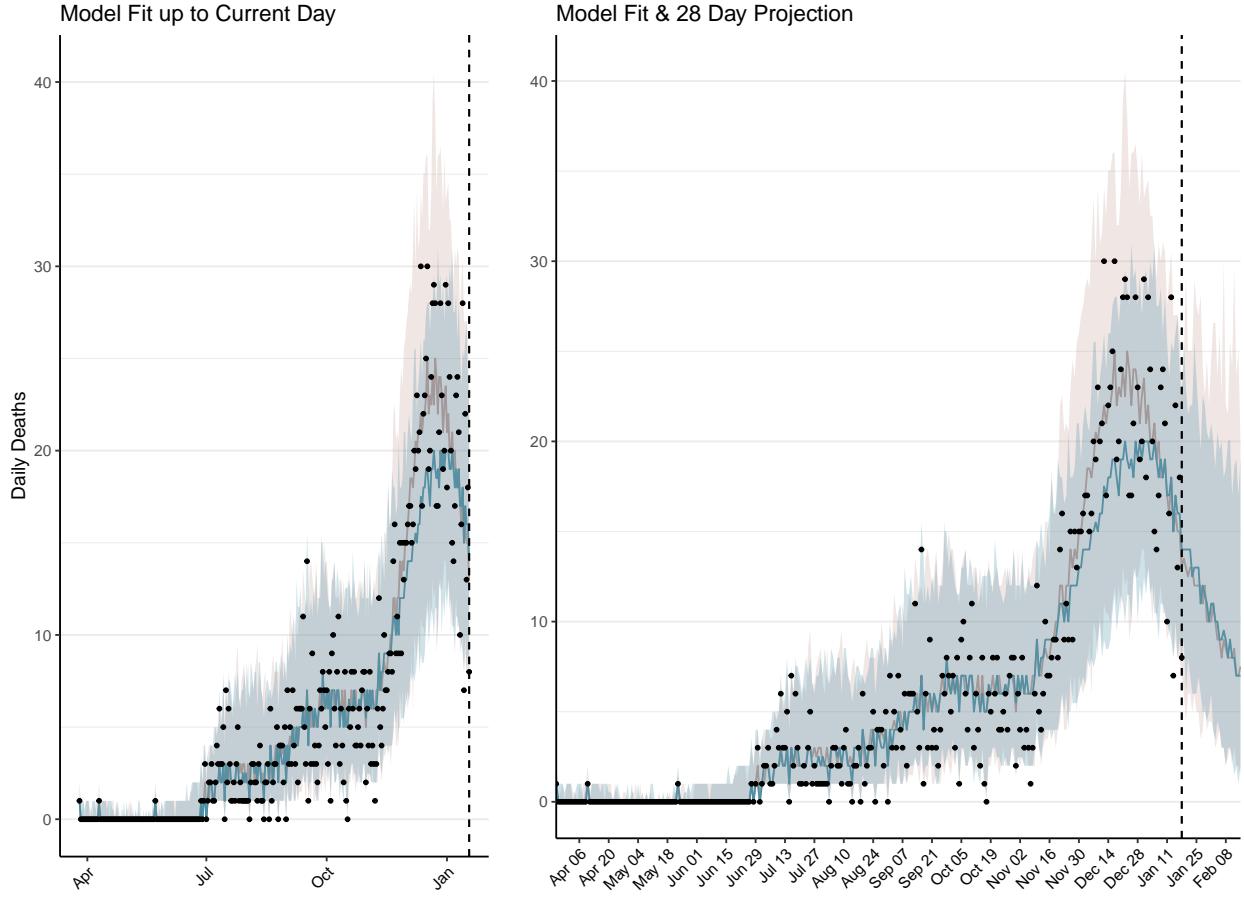


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 575 (95% CI: 551-598) patients requiring treatment with high-pressure oxygen at the current date to 318 (95% CI: 282-354) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 178 (95% CI: 173-182) patients requiring treatment with mechanical ventilation at the current date to 121 (95% CI: 112-129) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

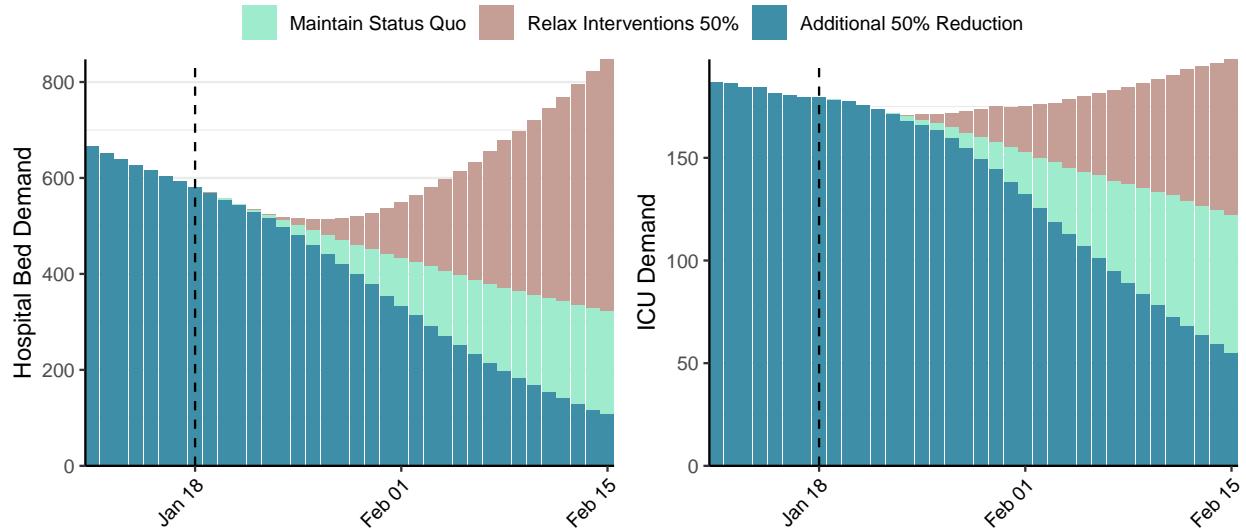
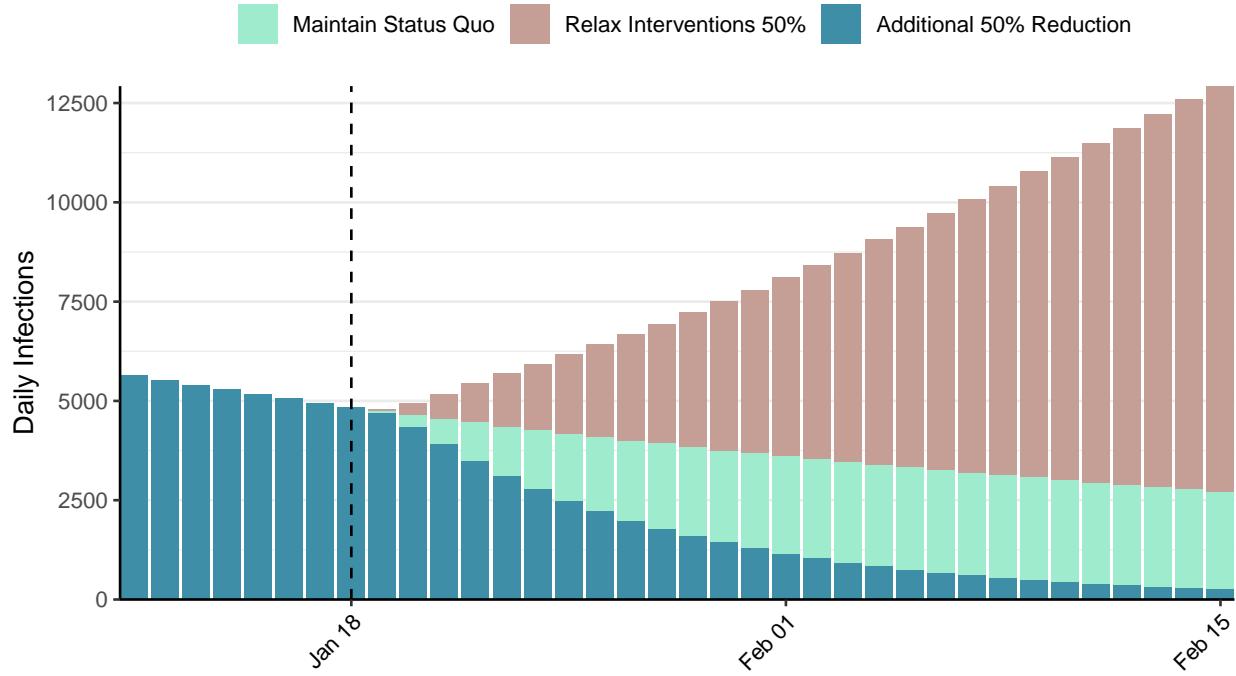


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 4,799 (95% CI: 4,493-5,106) at the current date to 258 (95% CI: 221-296) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,799 (95% CI: 4,493-5,106) at the current date to 12,798 (95% CI: 10,945-14,652) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Romania, 2021-01-18

[Download the report for Romania, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1,509	1,509	50	50	0.99 (95% CI: 0.76-1.24)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

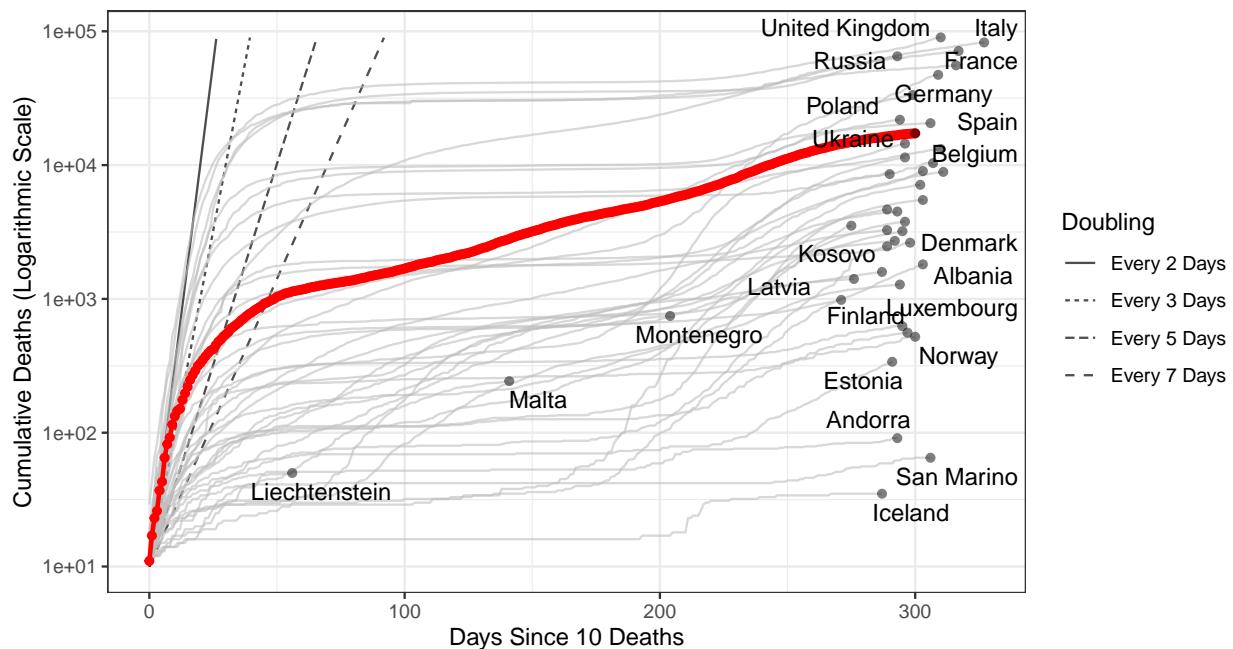


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 426,458 (95% CI: 411,190-441,726) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

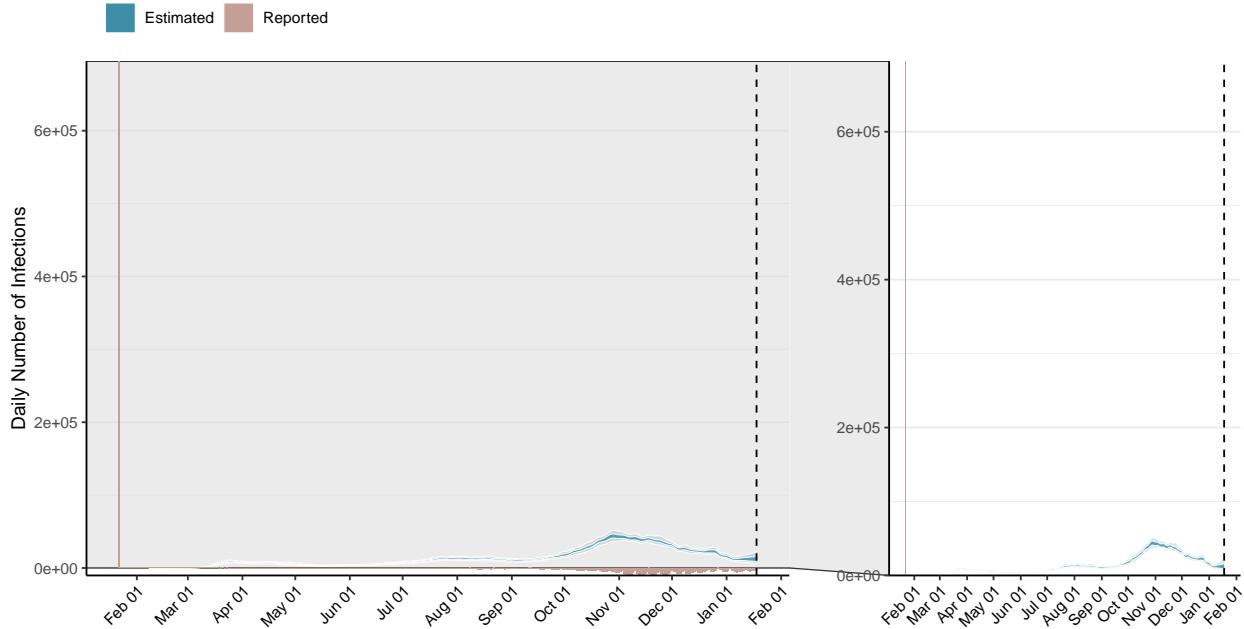
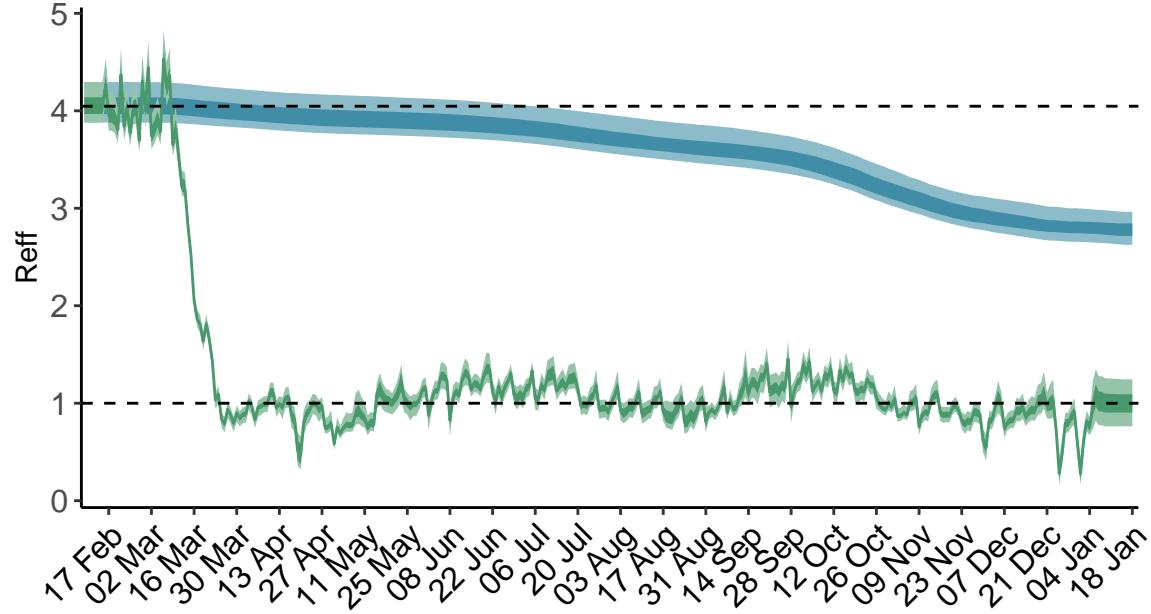


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

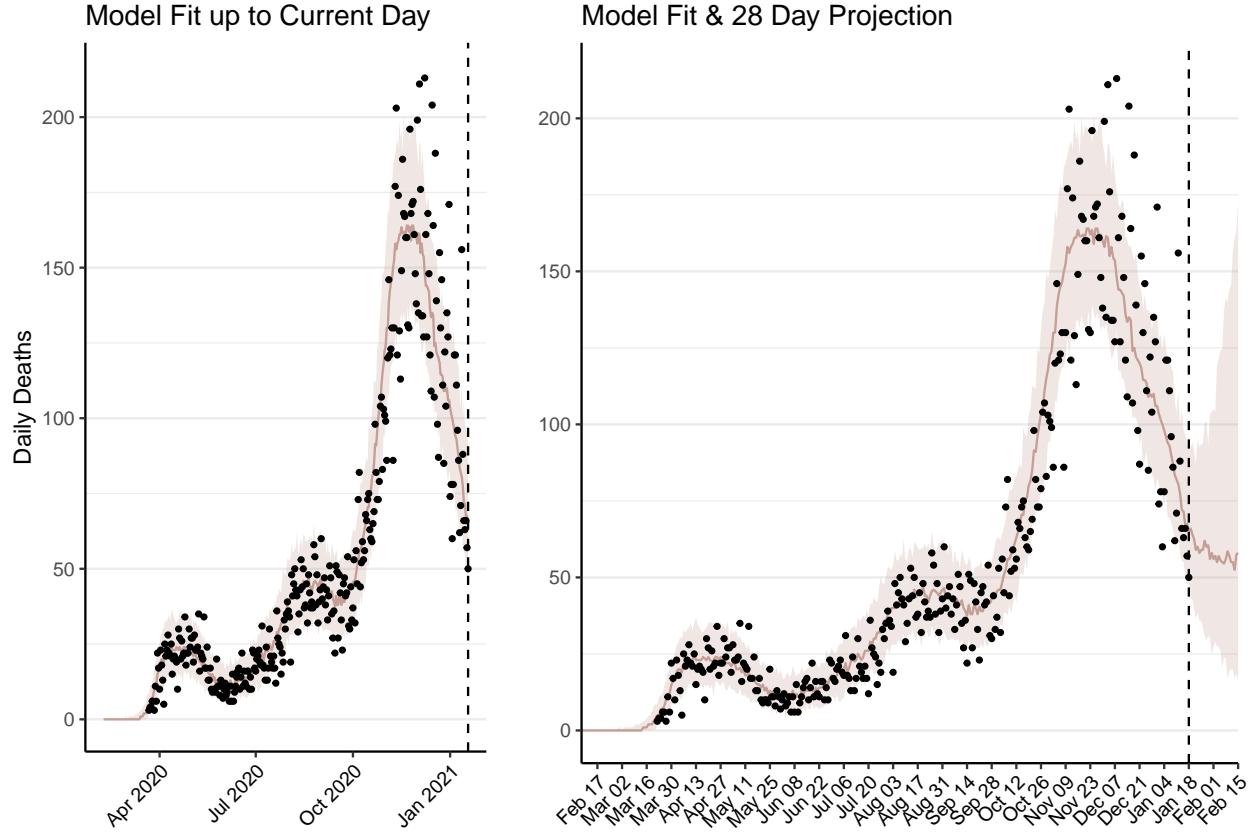


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 2,172 (95% CI: 2,085-2,259) patients requiring treatment with high-pressure oxygen at the current date to 2,314 (95% CI: 2,002-2,626) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 854 (95% CI: 824-884) patients requiring treatment with mechanical ventilation at the current date to 830 (95% CI: 726-934) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

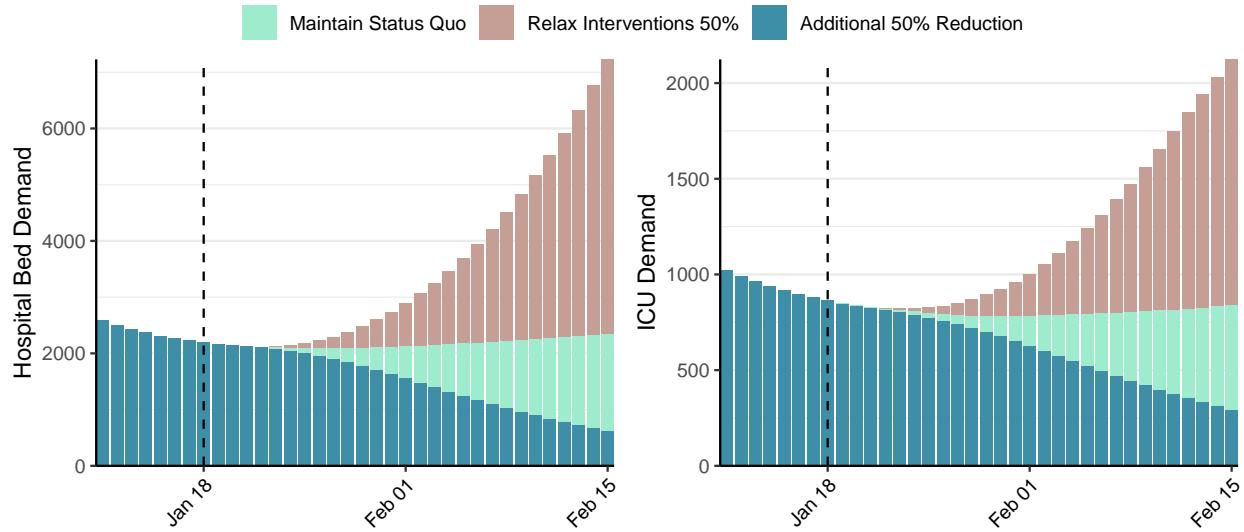


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 12,573 (95% CI: 11,650-13,497) at the current date to 1,296 (95% CI: 1,092-1,499) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 12,573 (95% CI: 11,650-13,497) at the current date to 77,452 (95% CI: 65,568-89,337) by 2021-02-15.

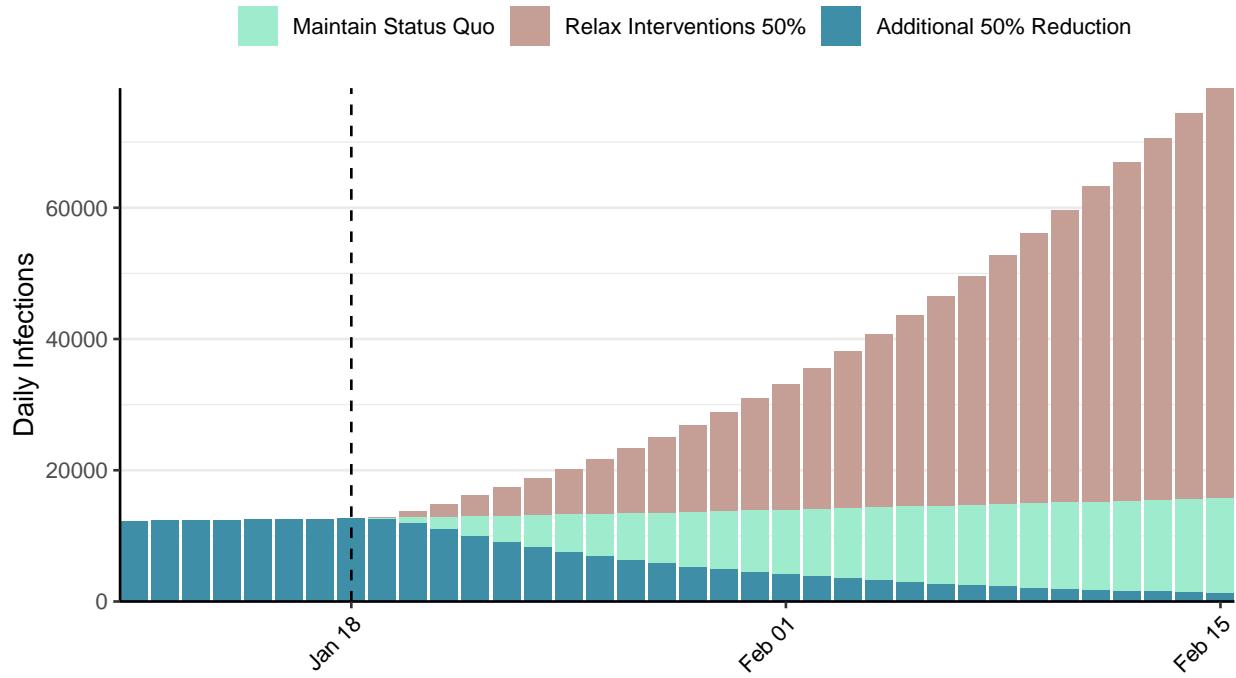


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Russia, 2021-01-18

[Download the report for Russia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
22,509	22,509	458	458	0.83 (95% CI: 0.55-0.98)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

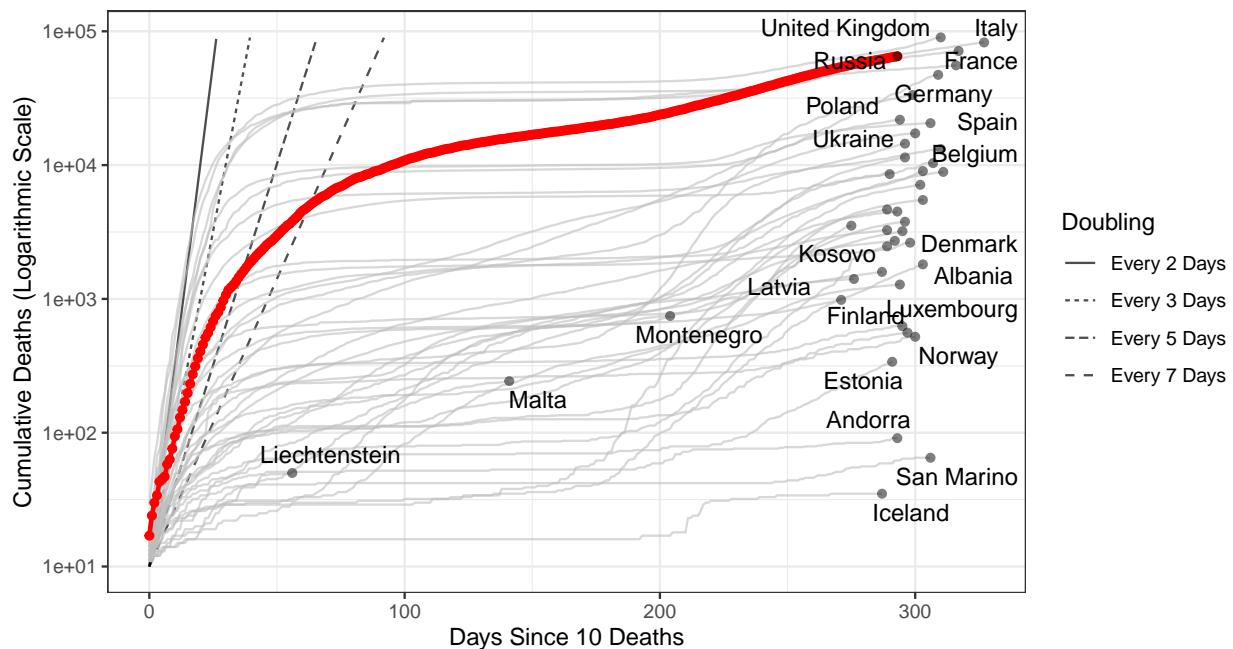


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3,856,570 (95% CI: 3,712,644-4,000,496) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

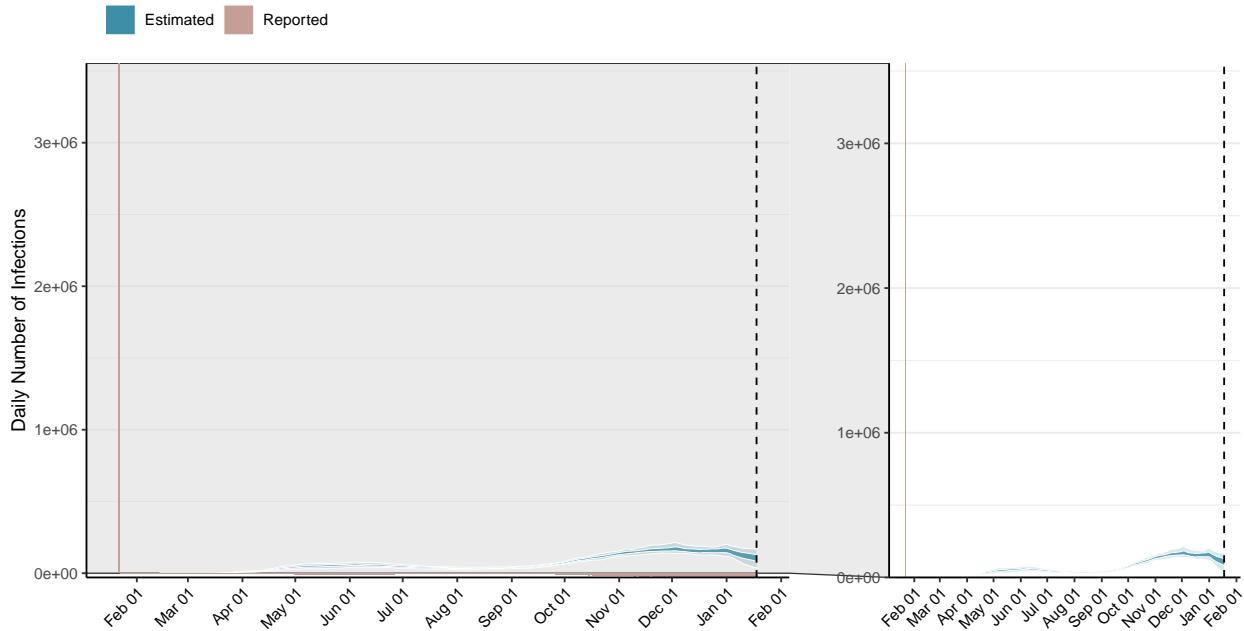
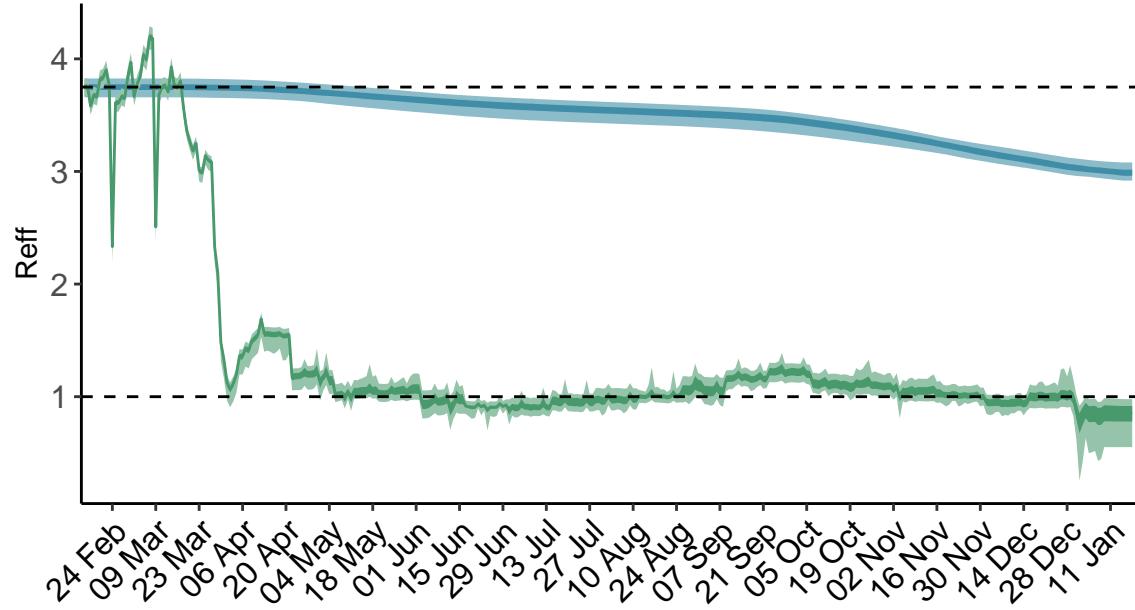


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

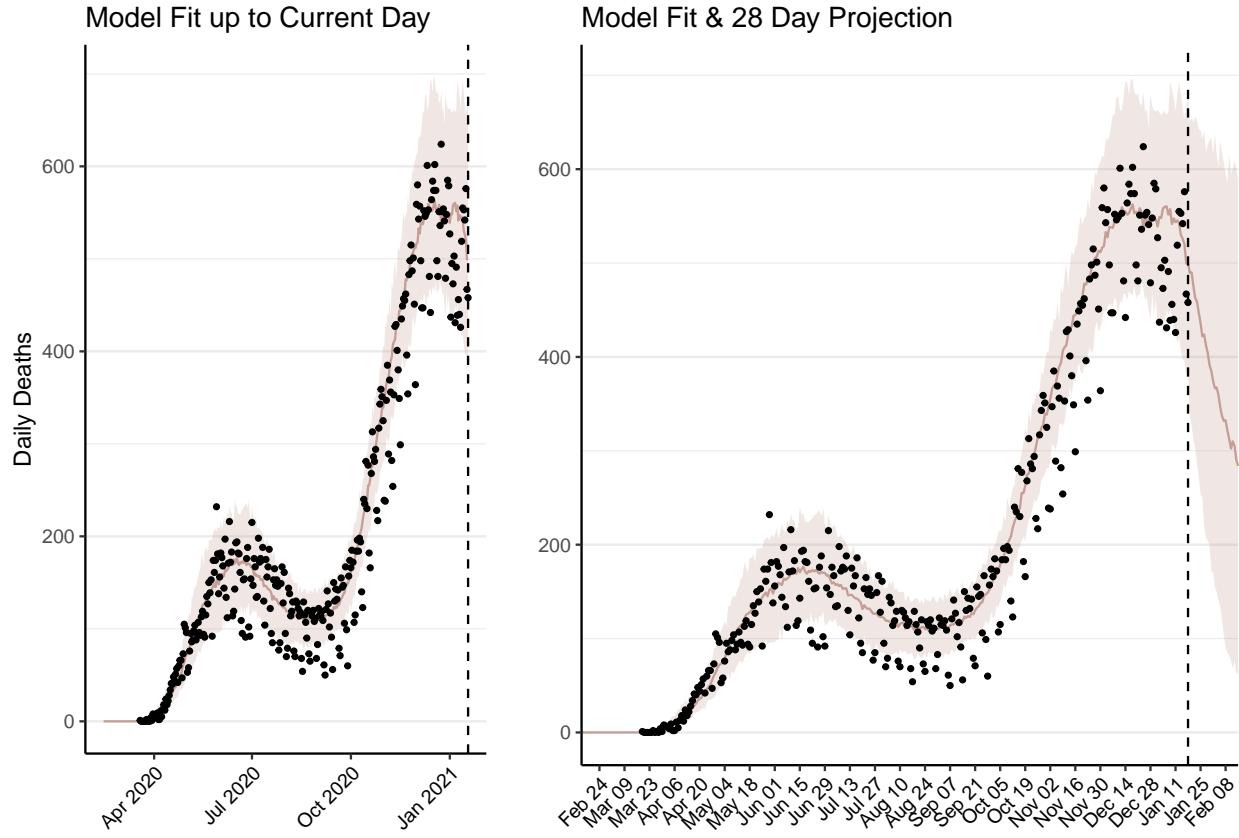


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 17,330 (95% CI: 16,600-18,060) patients requiring treatment with high-pressure oxygen at the current date to 10,055 (95% CI: 8,964-11,147) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 6,730 (95% CI: 6,471-6,989) patients requiring treatment with mechanical ventilation at the current date to 3,997 (95% CI: 3,594-4,400) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

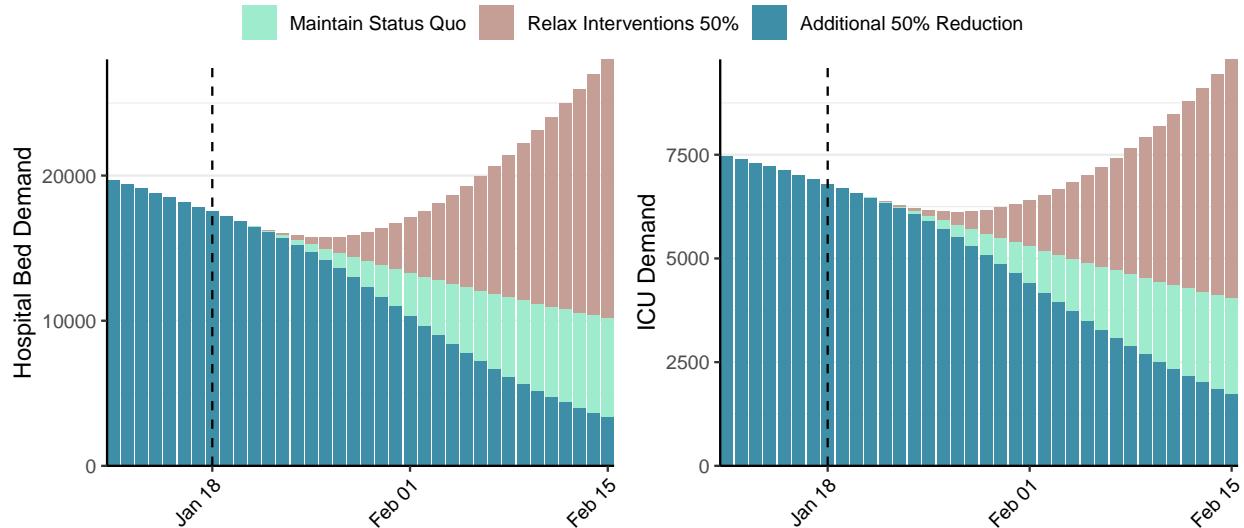


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 103,291 (95% CI: 95,760-110,823) at the current date to 5,700 (95% CI: 4,998-6,401) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 103,291 (95% CI: 95,760-110,823) at the current date to 298,269 (95% CI: 258,923-337,615) by 2021-02-15.

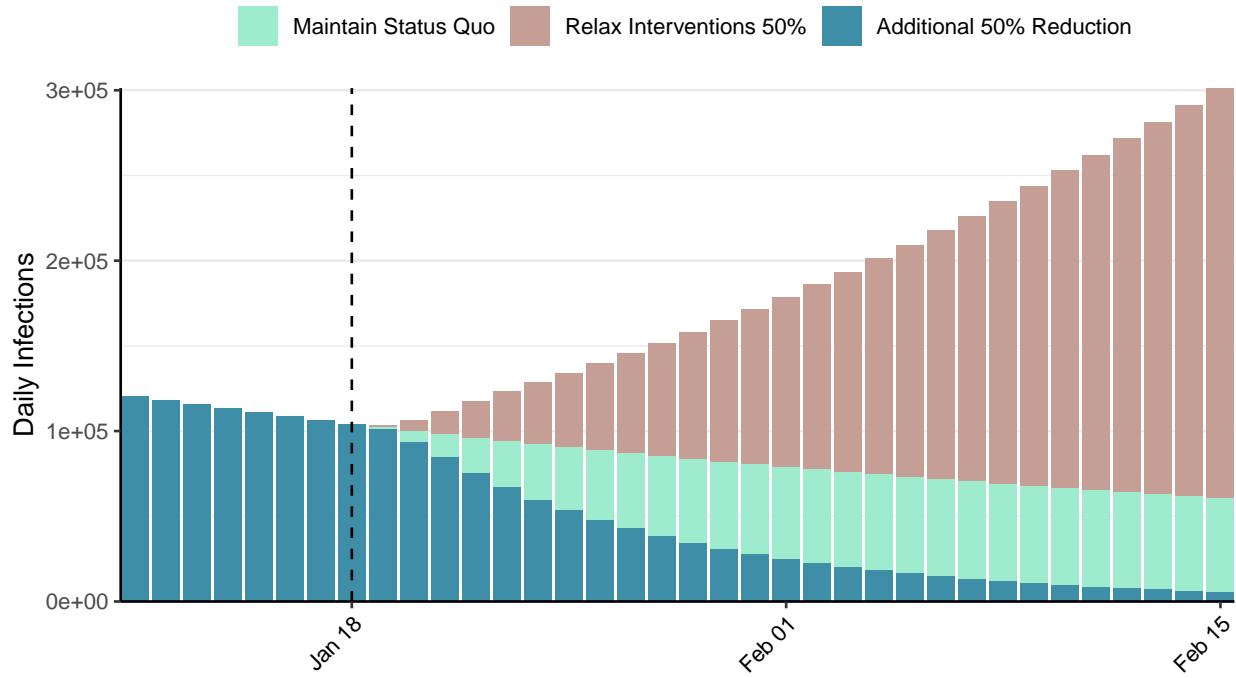


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool - https://covid19sim.org/](https://covid19sim.org/), which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Rwanda, 2021-01-18

[Download the report for Rwanda, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
227	227	4	4	1.44 (95% CI: 1.26-1.63)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Rwanda is not shown in the following plot as only 4 deaths have been reported to date**

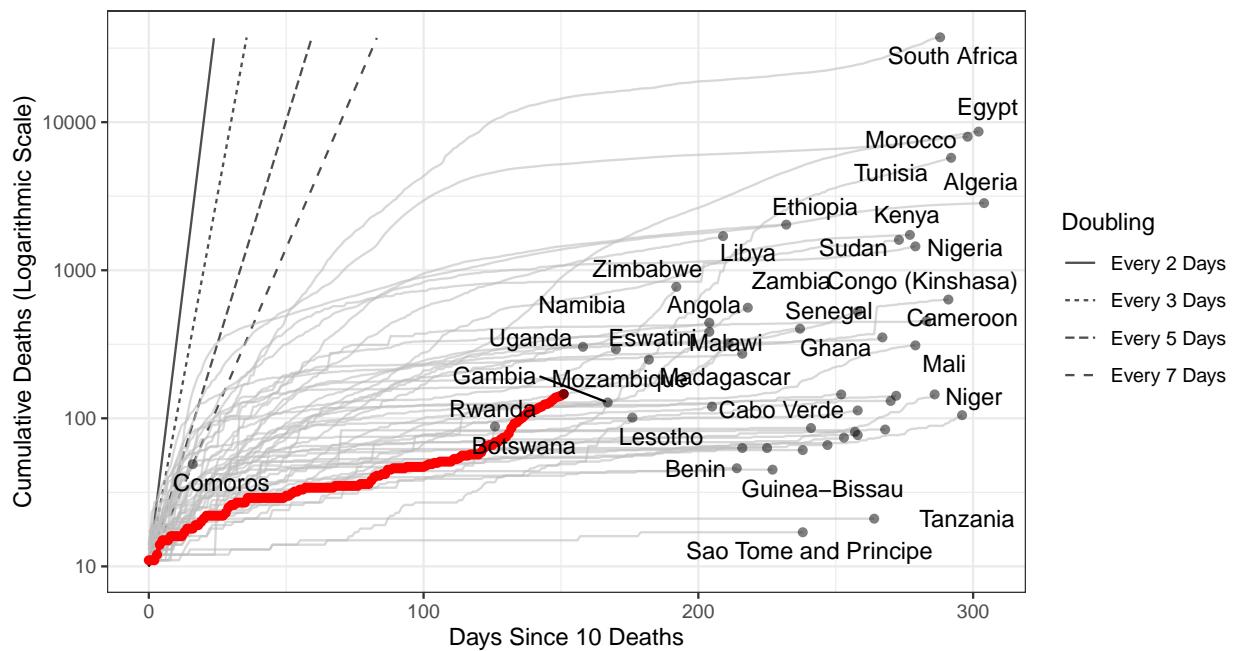


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 124,300 (95% CI: 110,923-137,678) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

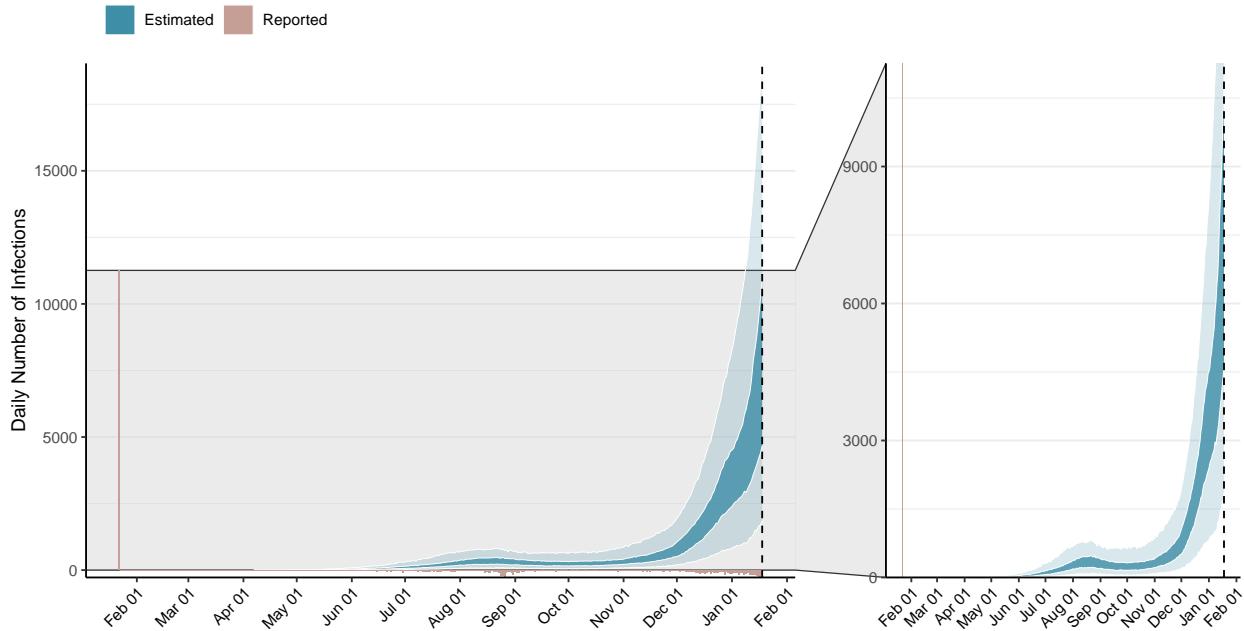
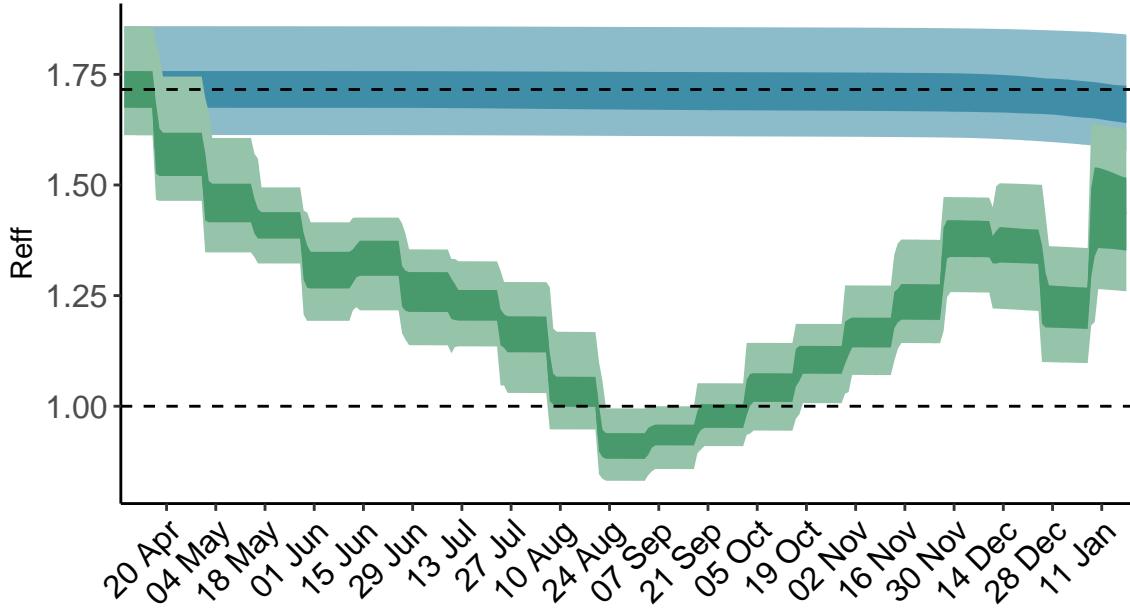


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Rwanda is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

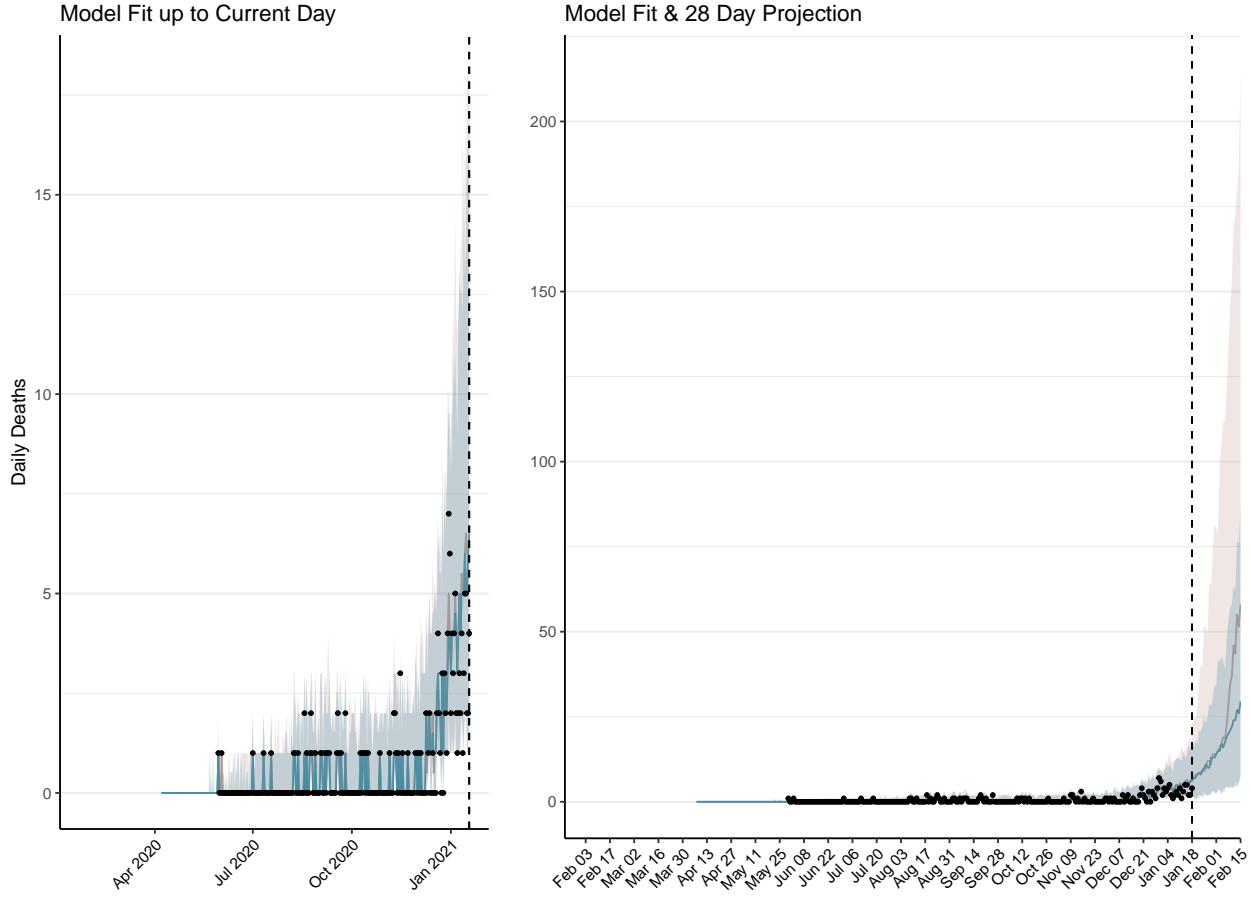


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 377 (95% CI: 337-418) patients requiring treatment with high-pressure oxygen at the current date to 1,806 (95% CI: 1,571-2,040) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 138 (95% CI: 123-152) patients requiring treatment with mechanical ventilation at the current date to 379 (95% CI: 356-401) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

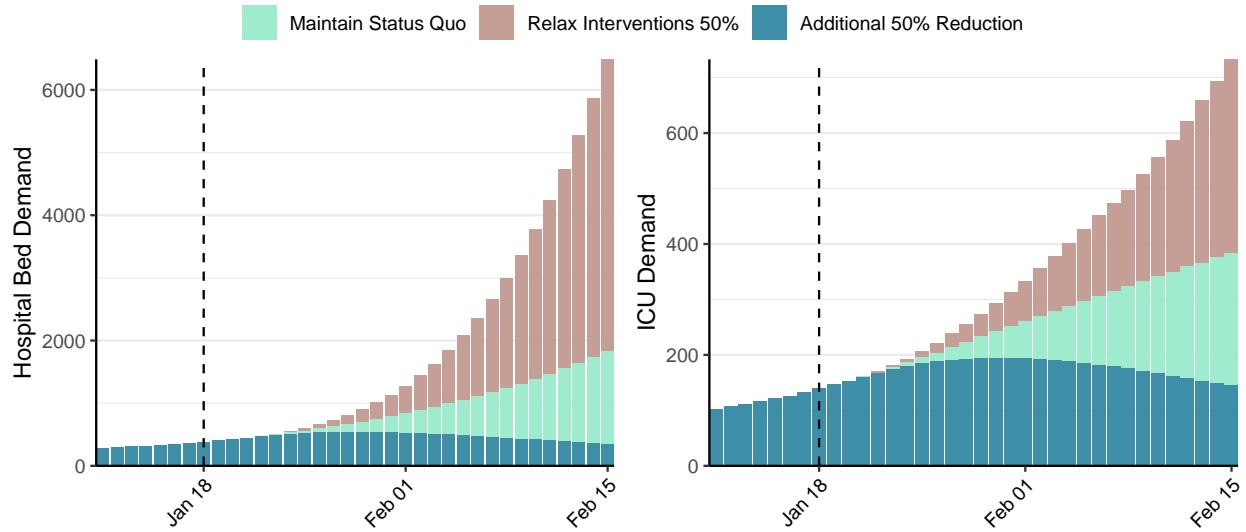


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 8,076 (95% CI: 7,137-9,014) at the current date to 2,578 (95% CI: 2,212-2,945) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 8,076 (95% CI: 7,137-9,014) at the current date to 196,890 (95% CI: 176,837-216,944) by 2021-02-15.

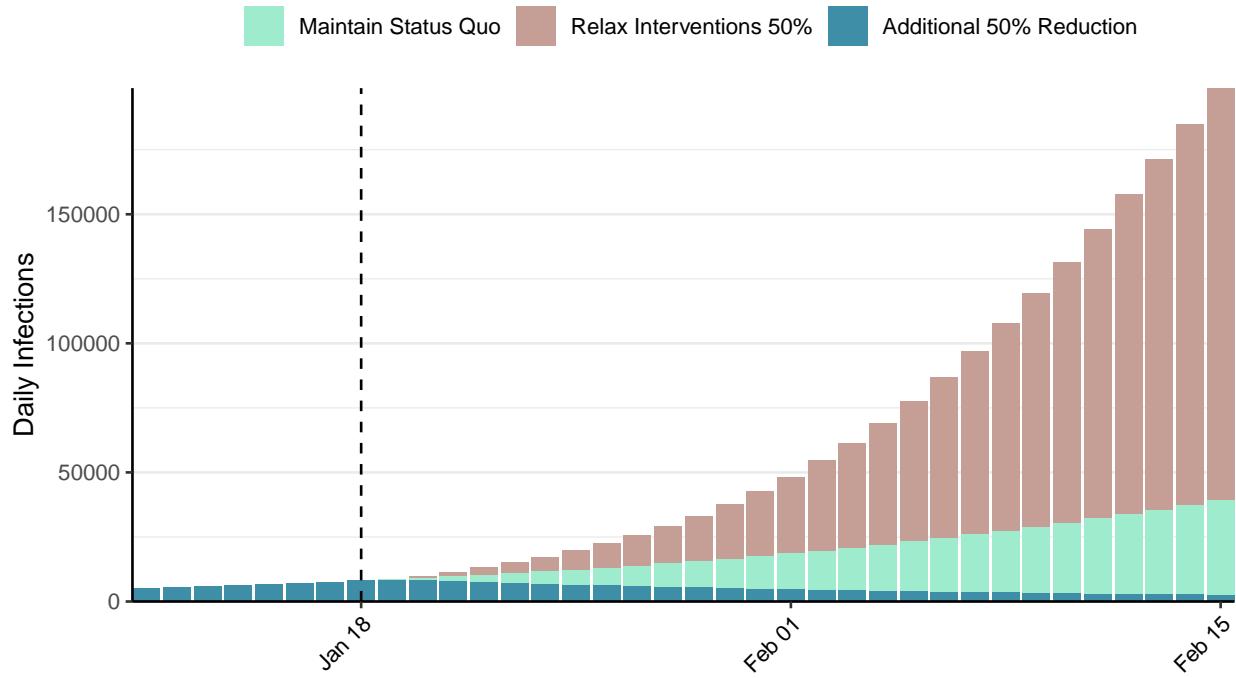


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Sudan, 2021-01-18

[Download the report for Sudan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.22 (95% CI: 0.92-1.57)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Sudan is not shown in the following plot as only 0 deaths have been reported to date**

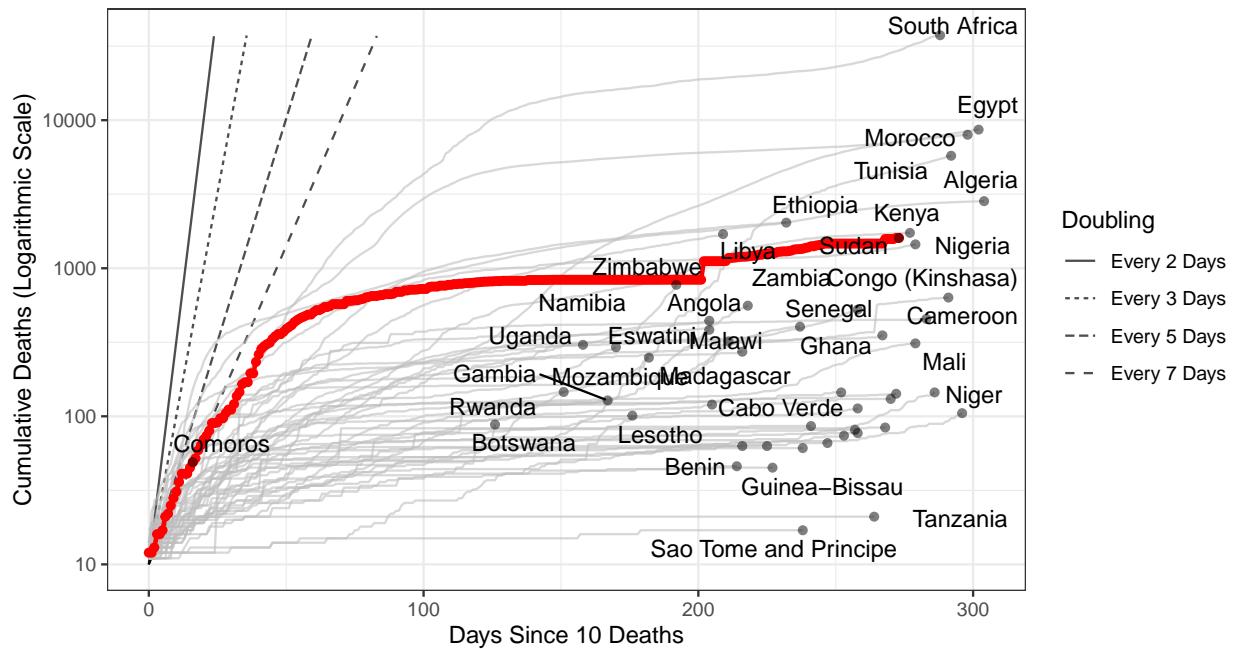


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 136,997 (95% CI: 128,484-145,509) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

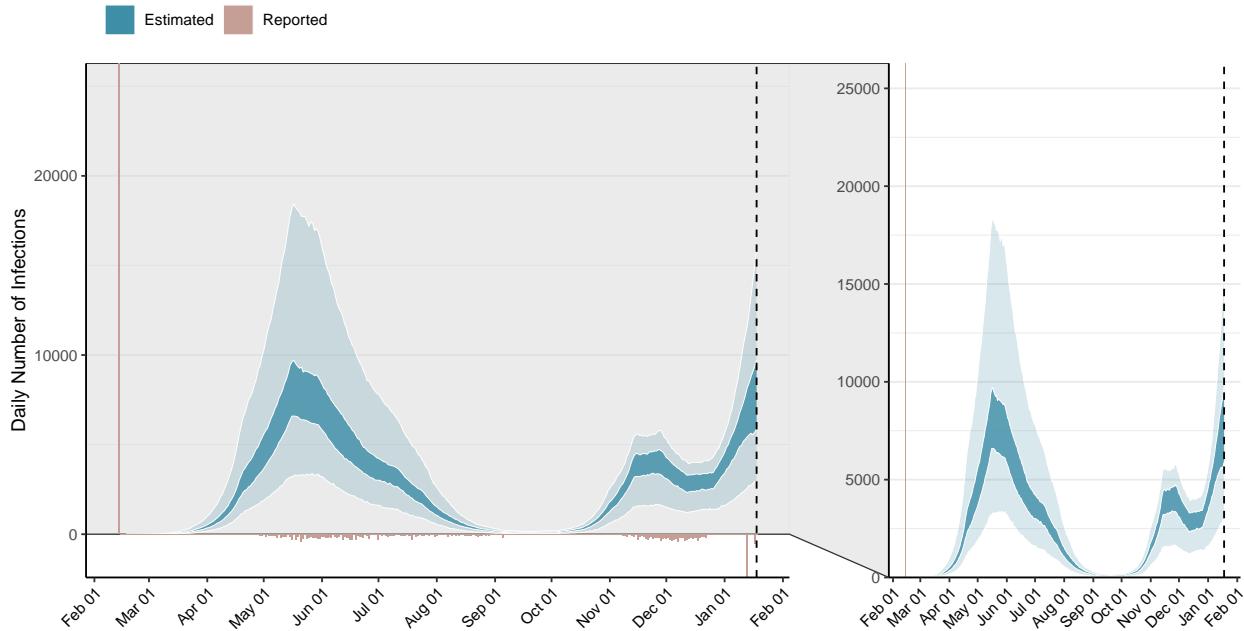


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.

We are aware of under-reporting of deaths in Khartoum, Sudan. This is not represented in this report, but please see [Report 39](#)

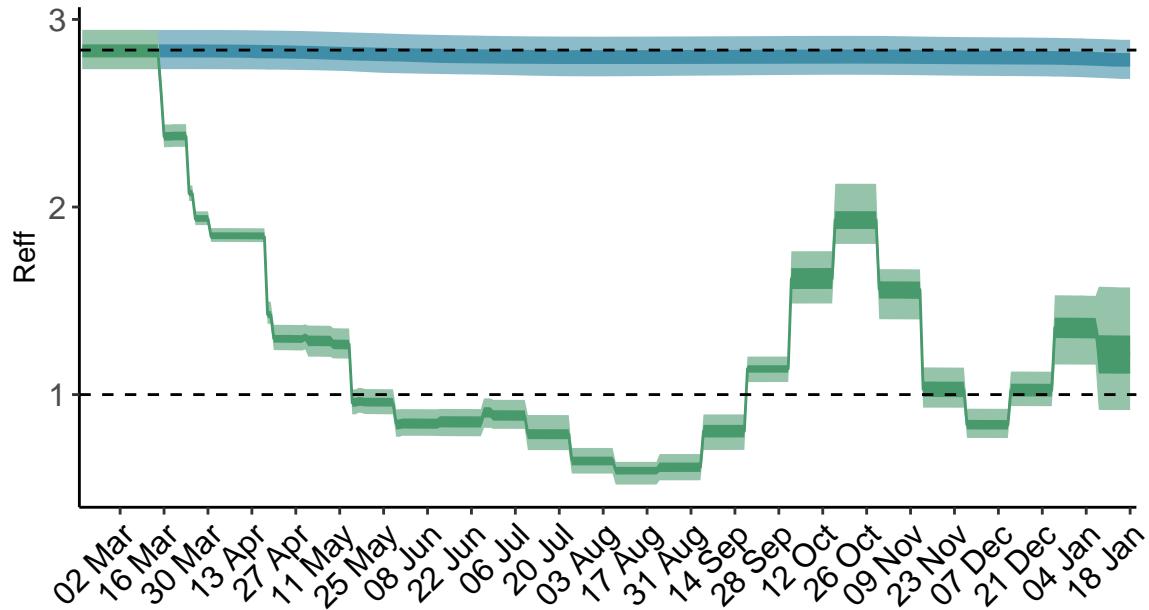


Figure 3: **Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

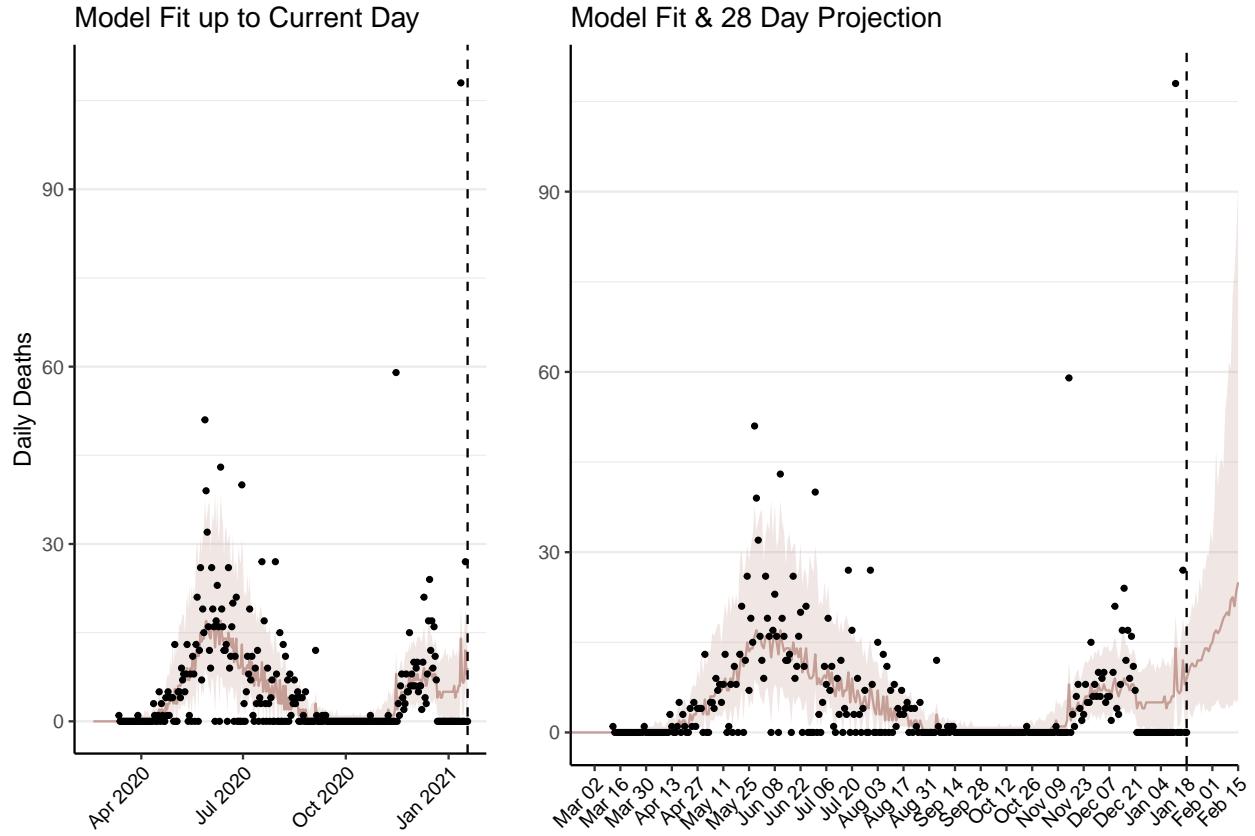


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 453 (95% CI: 424-481) patients requiring treatment with high-pressure oxygen at the current date to 1,316 (95% CI: 1,118-1,514) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 161 (95% CI: 151-172) patients requiring treatment with mechanical ventilation at the current date to 471 (95% CI: 406-536) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

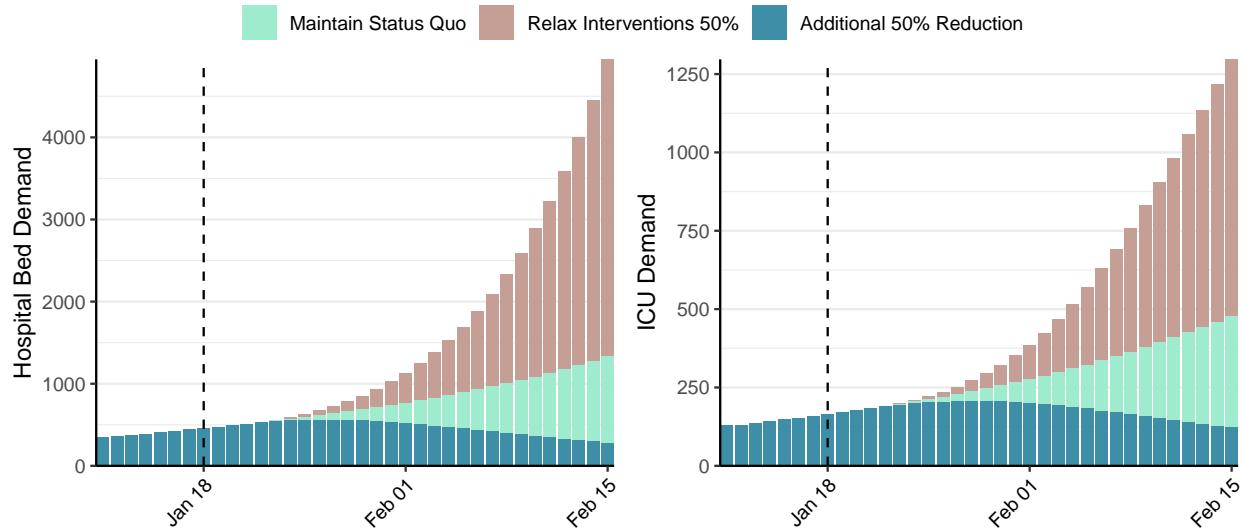


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 7,899 (95% CI: 7,259-8,538) at the current date to 1,610 (95% CI: 1,342-1,878) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,899 (95% CI: 7,259-8,538) at the current date to 153,879 (95% CI: 124,664-183,095) by 2021-02-15.

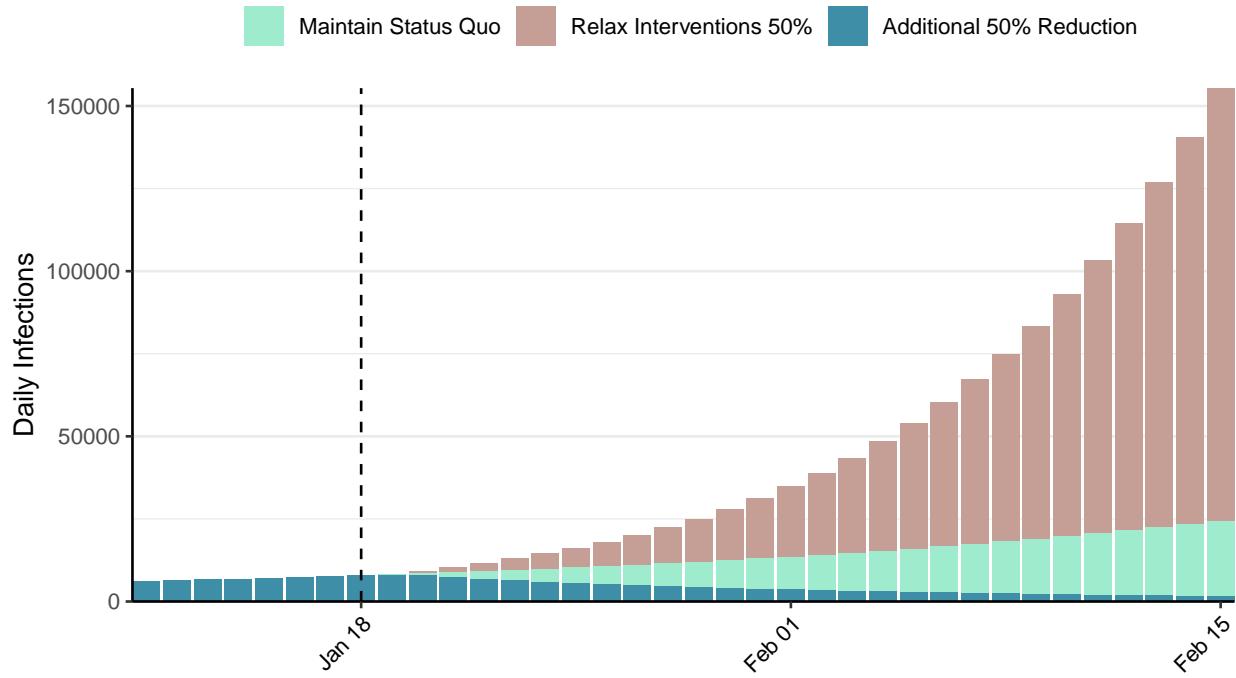


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Senegal, 2021-01-18

[Download the report for Senegal, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
196	196	11	11	1.14 (95% CI: 0.98-1.38)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

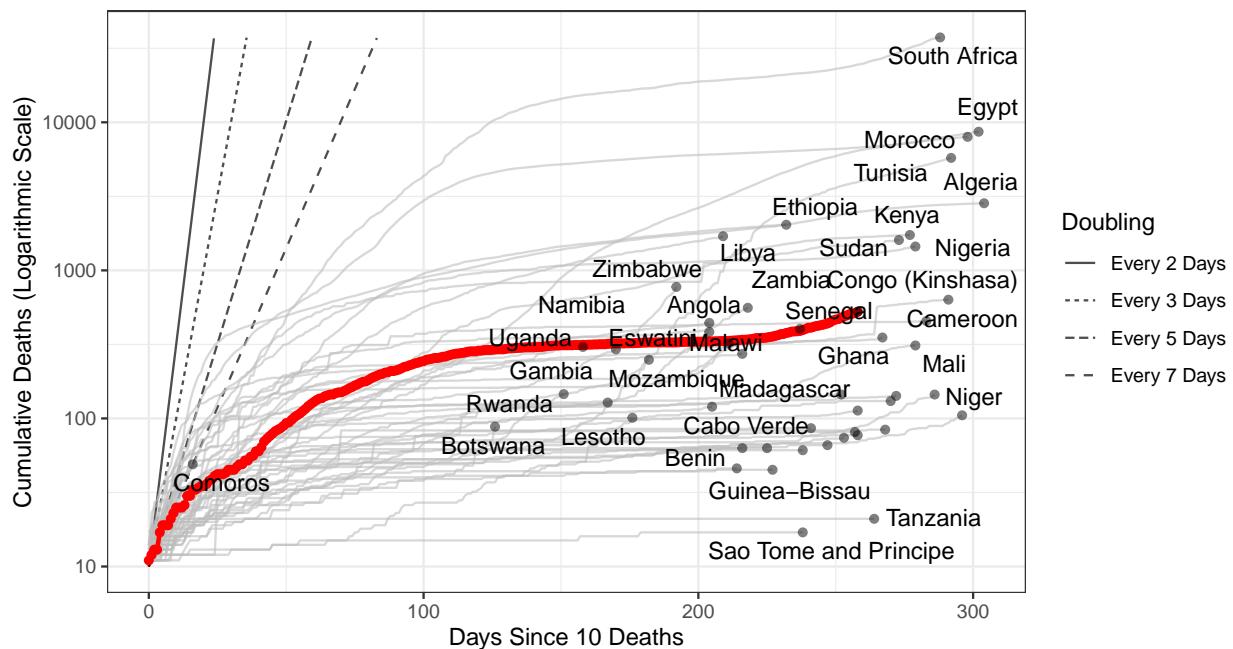


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 206,501 (95% CI: 194,891–218,112) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

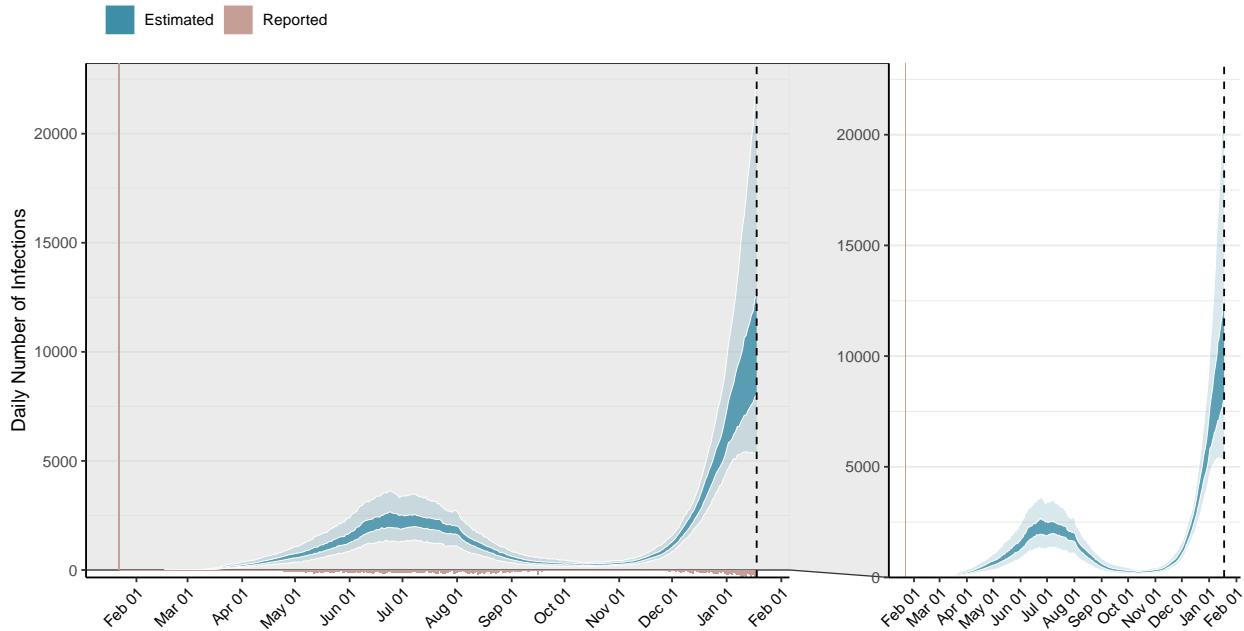
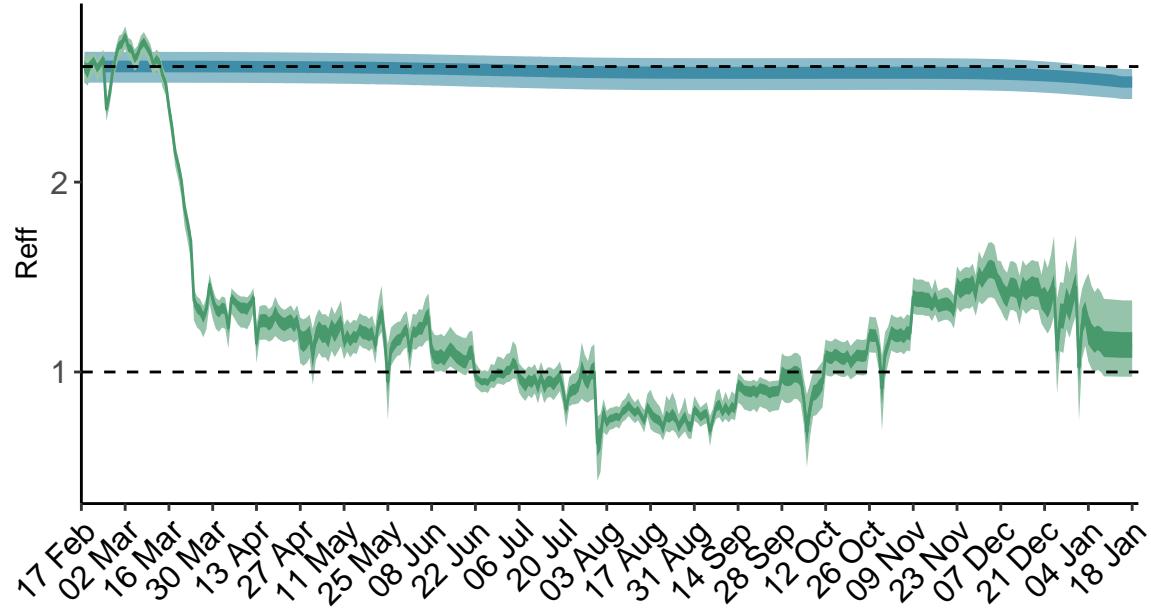


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

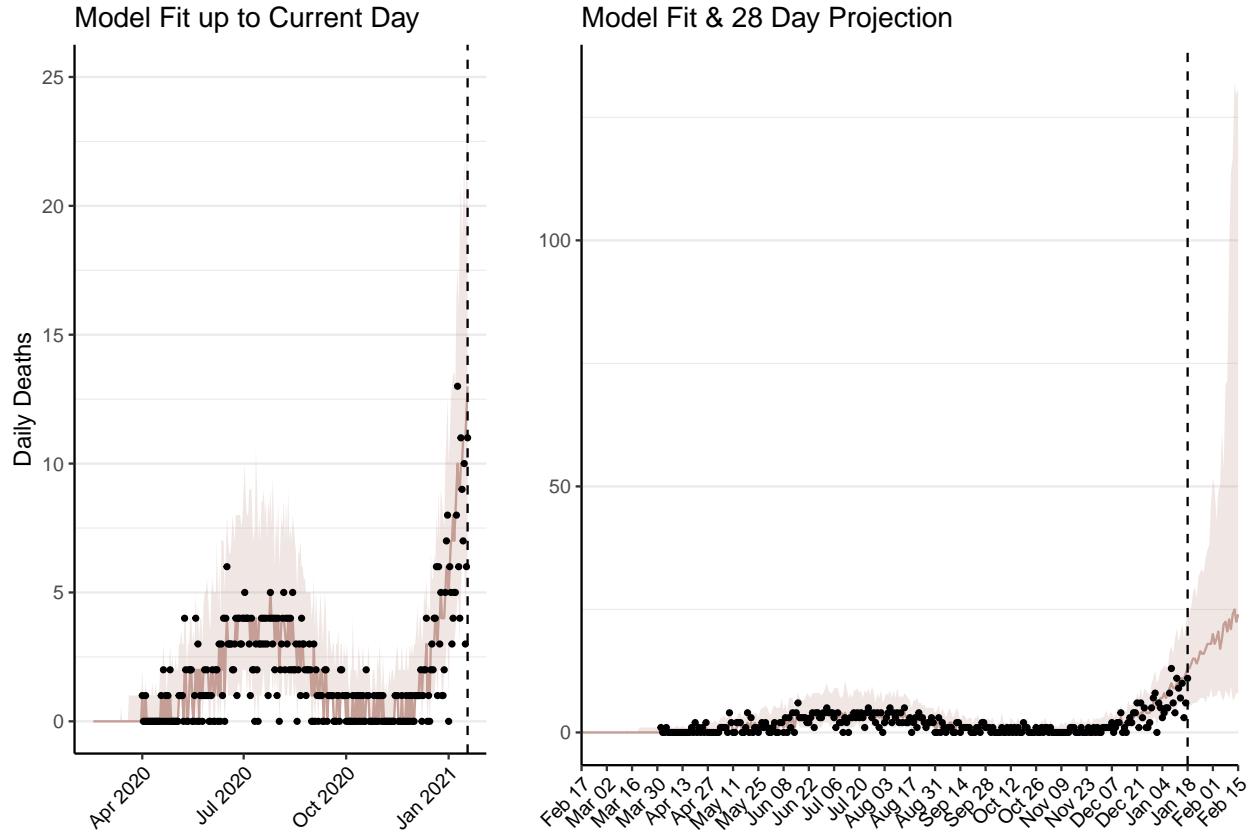


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 628 (95% CI: 590-665) patients requiring treatment with high-pressure oxygen at the current date to 1,318 (95% CI: 1,124-1,513) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 228 (95% CI: 214-241) patients requiring treatment with mechanical ventilation at the current date to 463 (95% CI: 413-513) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

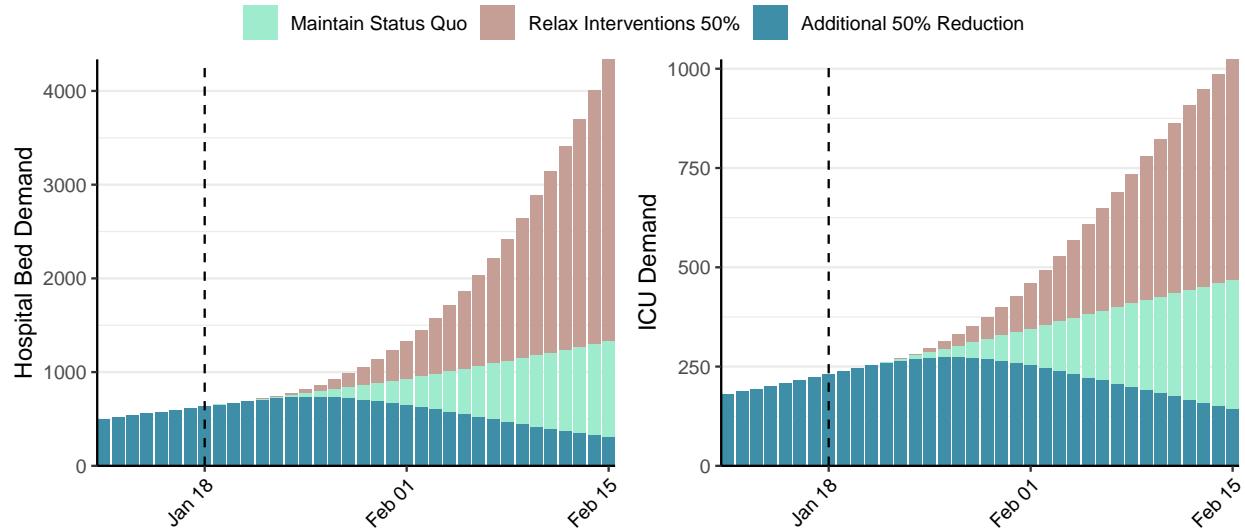
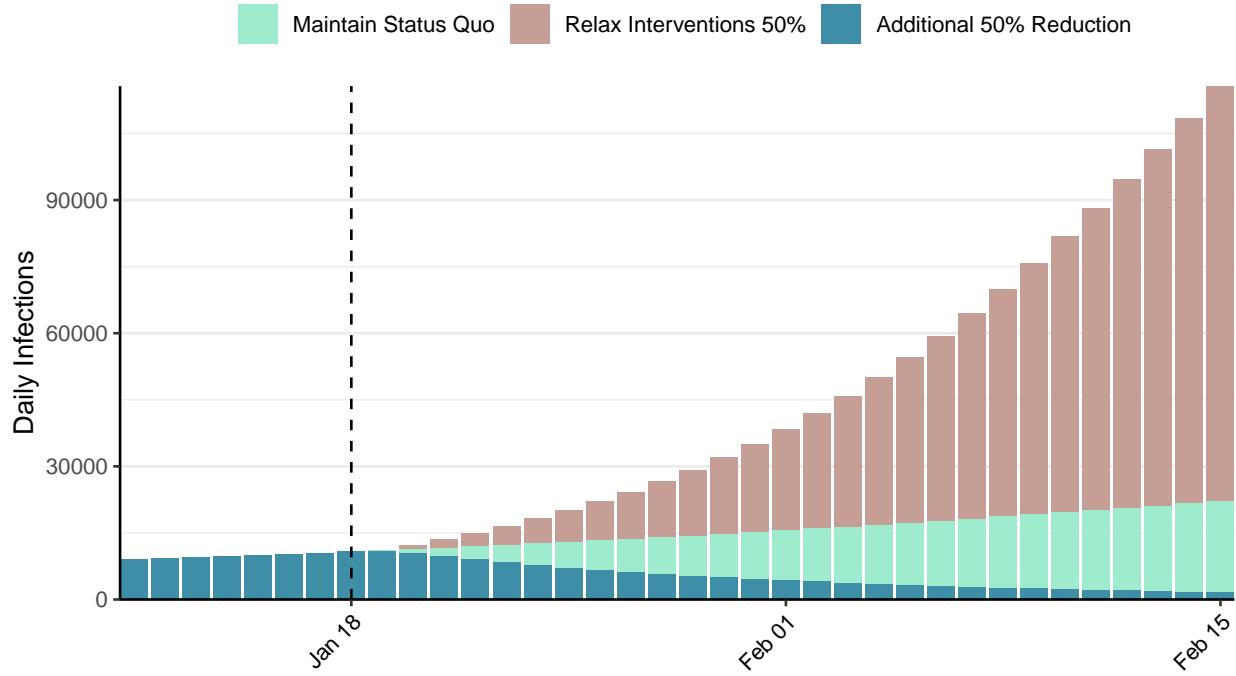


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 10,712 (95% CI: 9,811-11,613) at the current date to 1,651 (95% CI: 1,358-1,945) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10,712 (95% CI: 9,811-11,613) at the current date to 114,526 (95% CI: 97,659-131,393) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Sierra Leone, 2021-01-18

[Download the report for Sierra Leone, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
8	8	0	0	1.18 (95% CI: 0.8-1.59)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Sierra Leone is not shown in the following plot as only 0 deaths have been reported to date**

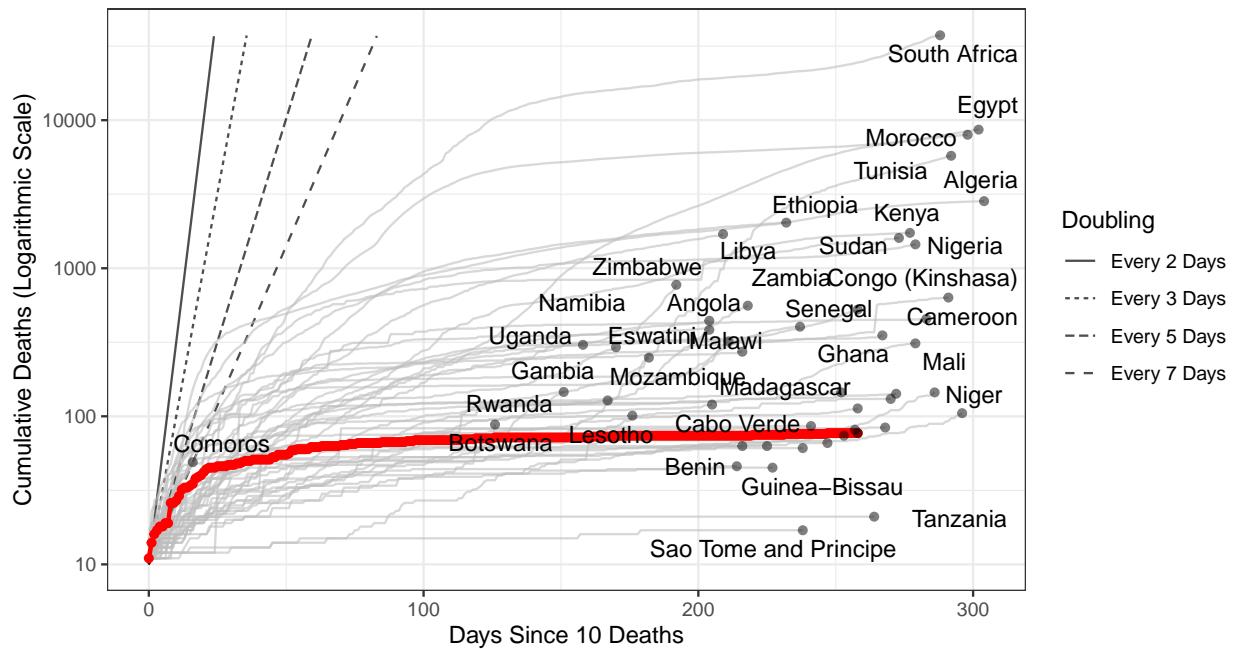


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,235 (95% CI: 1,013-1,457) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

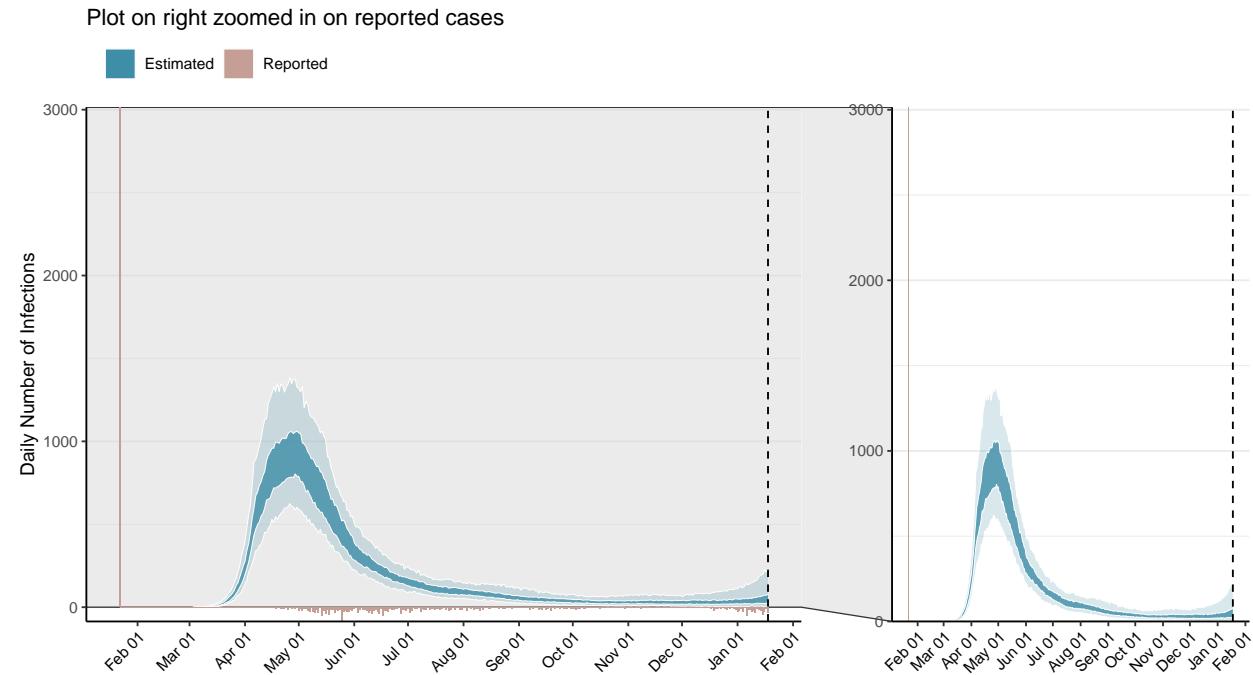
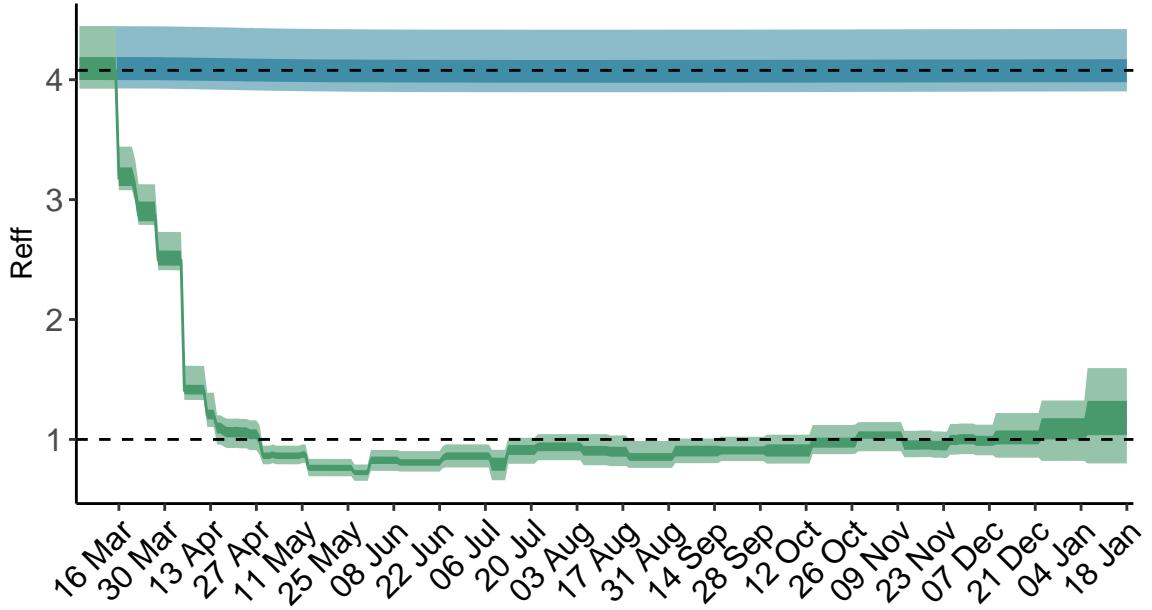


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

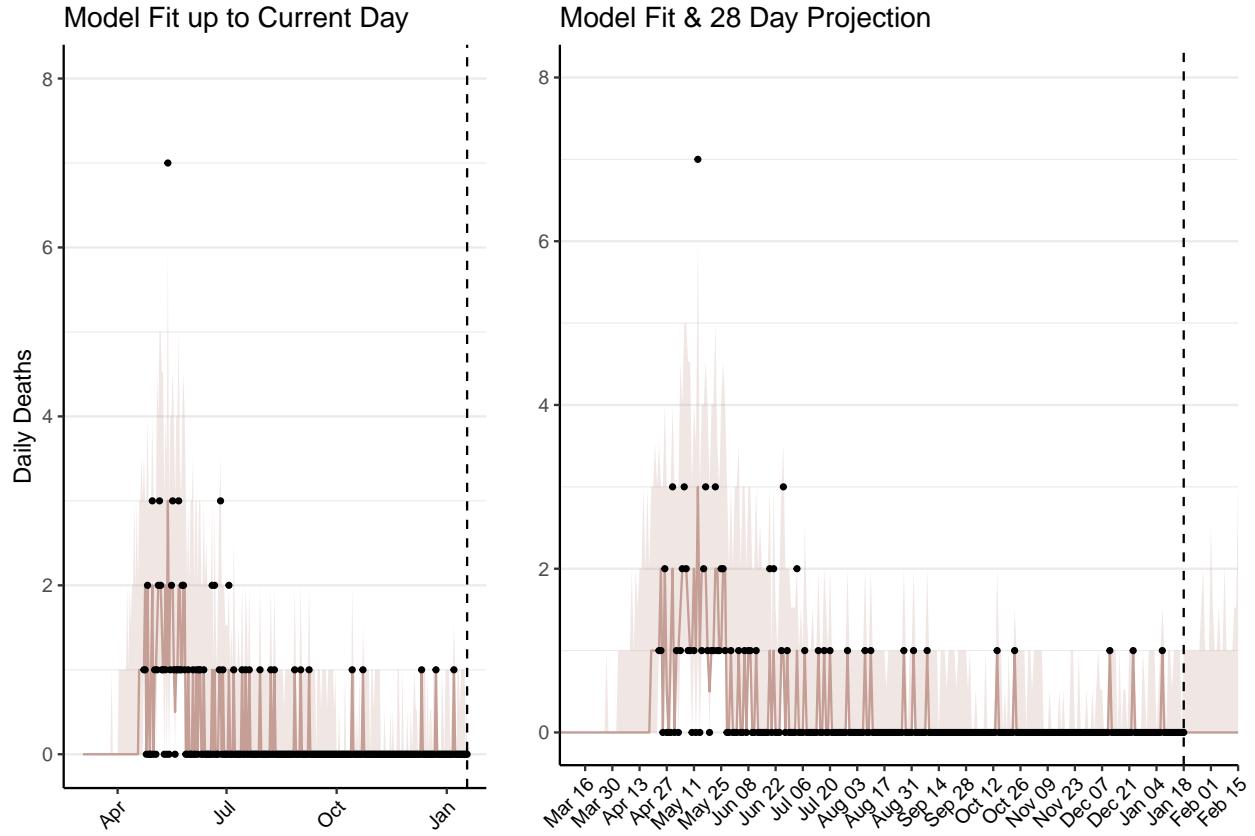


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 3 (95% CI: 3-4) patients requiring treatment with high-pressure oxygen at the current date to 14 (95% CI: 6-22) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1 (95% CI: 1-2) patients requiring treatment with mechanical ventilation at the current date to 5 (95% CI: 2-8) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

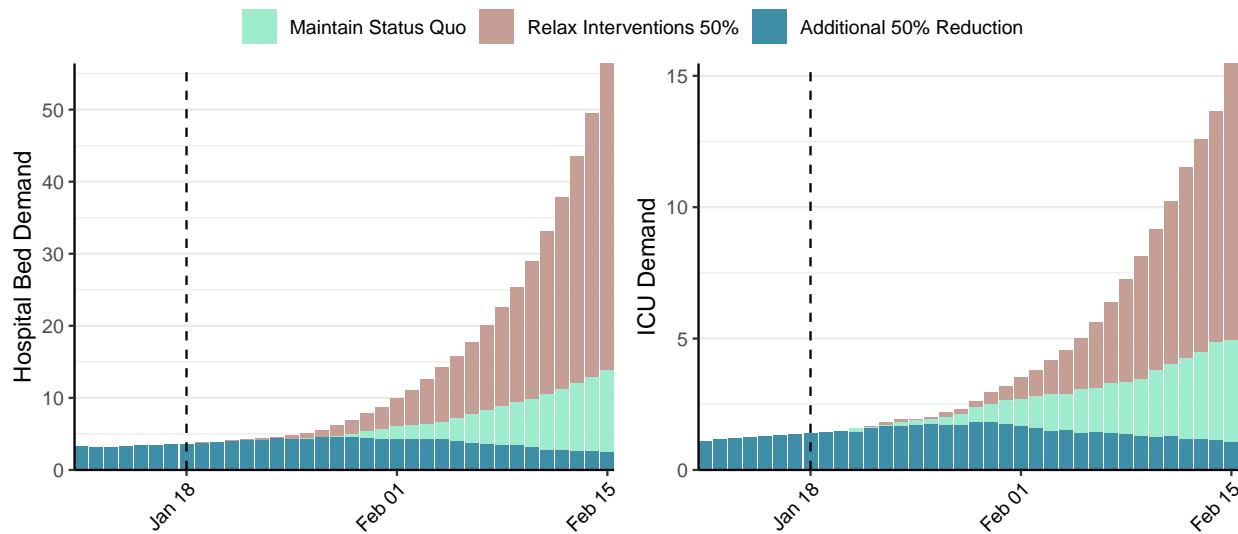


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 65 (95% CI: 46-84) at the current date to 17 (95% CI: 6-29) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 65 (95% CI: 46-84) at the current date to 2,298 (95% CI: 476-4,121) by 2021-02-15.

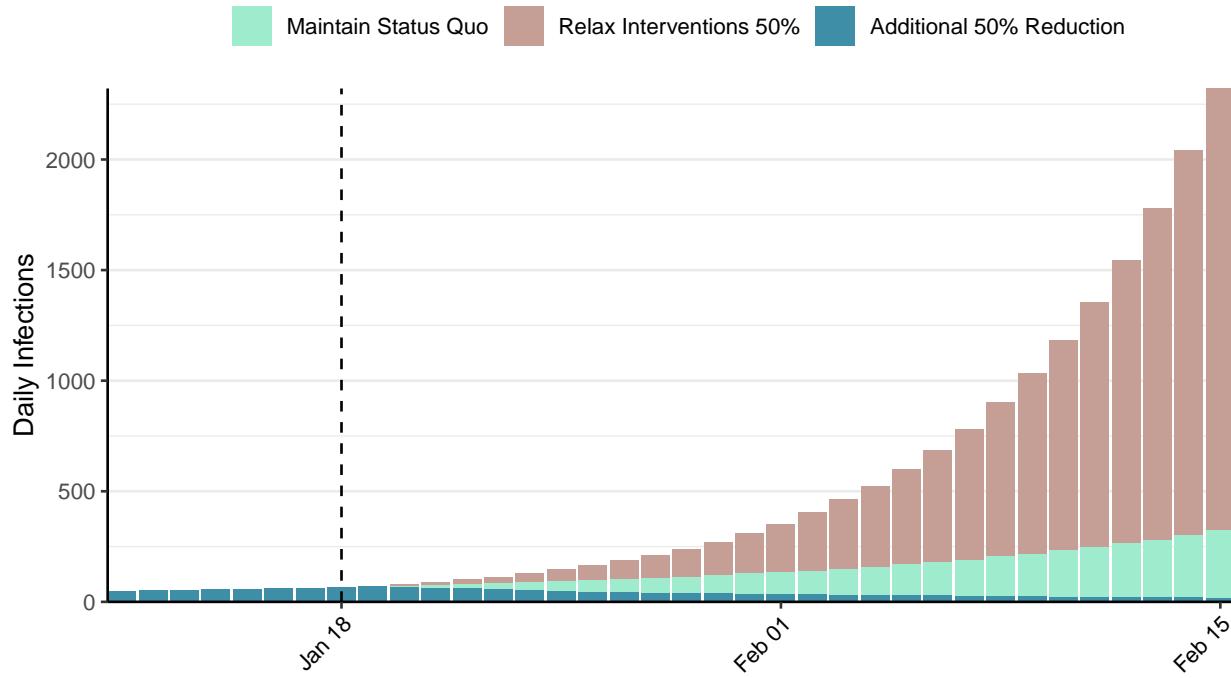


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: El Salvador, 2021-01-18

[Download the report for El Salvador, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.93 (95% CI: 0.8-1.03)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. El Salvador is not shown in the following plot as only 0 deaths have been reported to date**

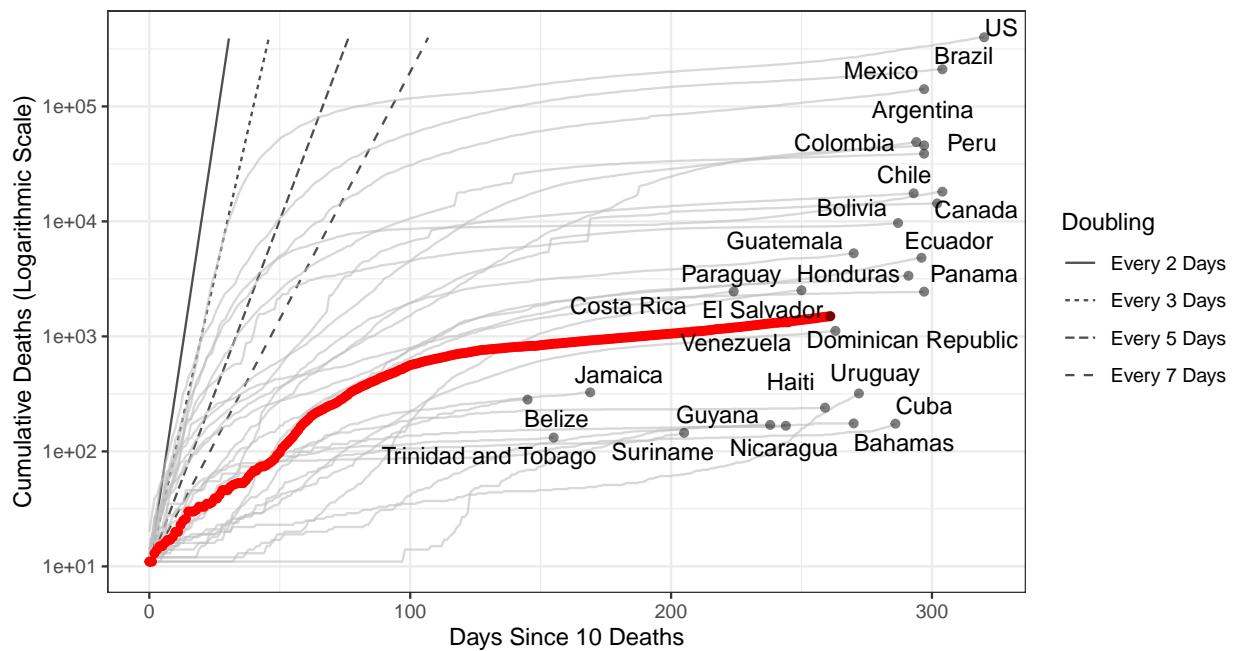


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 74,907 (95% CI: 70,570-79,243) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

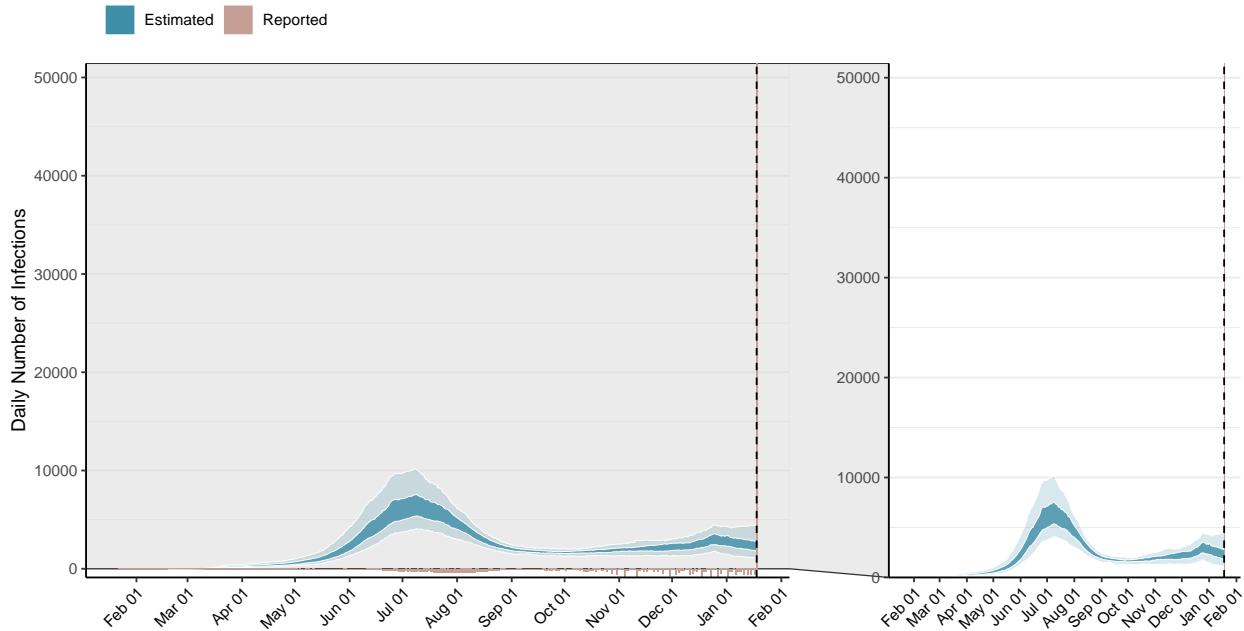
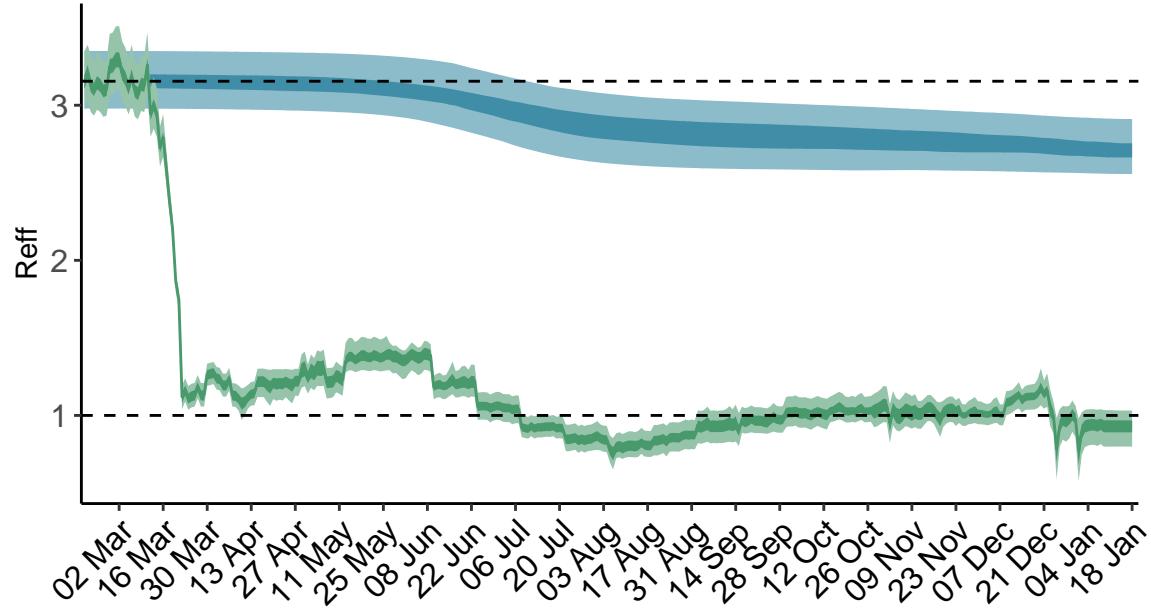


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

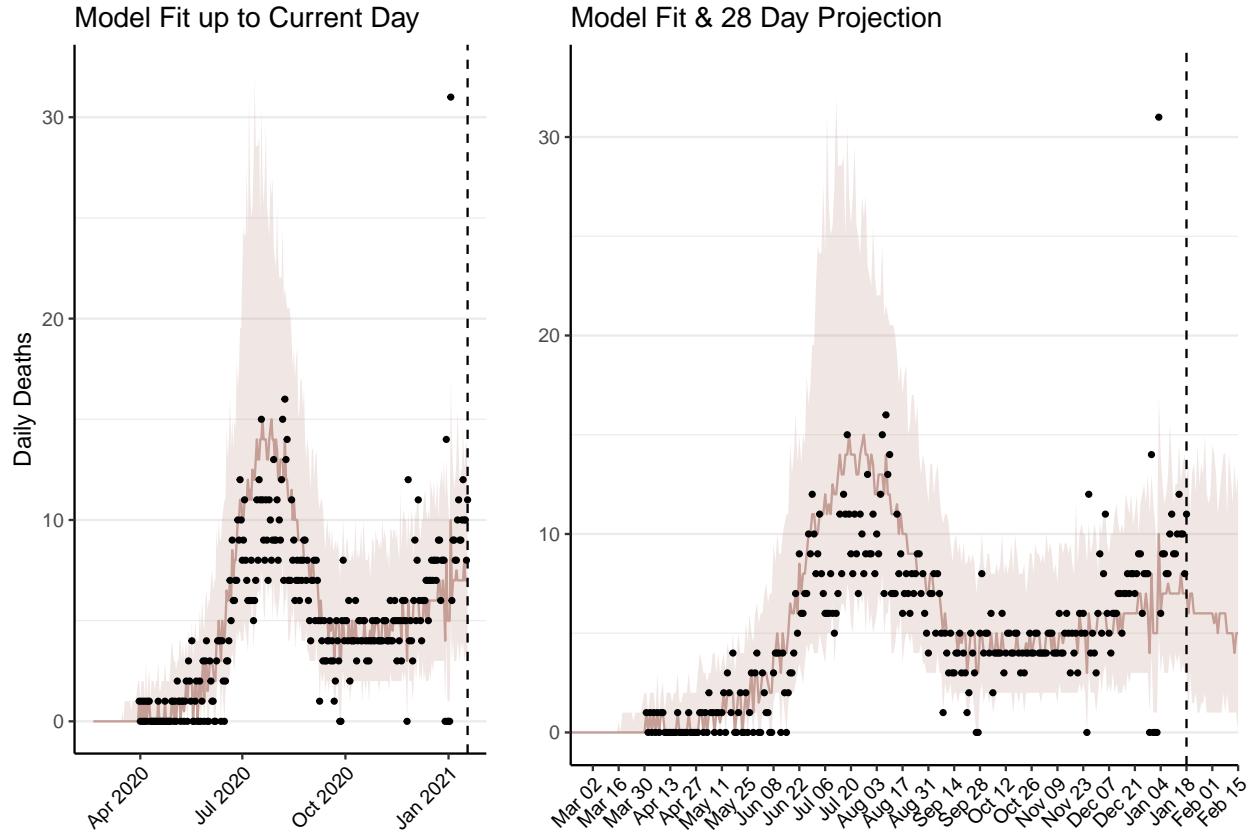


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 248 (95% CI: 234-263) patients requiring treatment with high-pressure oxygen at the current date to 196 (95% CI: 178-215) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 89 (95% CI: 83-95) patients requiring treatment with mechanical ventilation at the current date to 71 (95% CI: 65-78) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

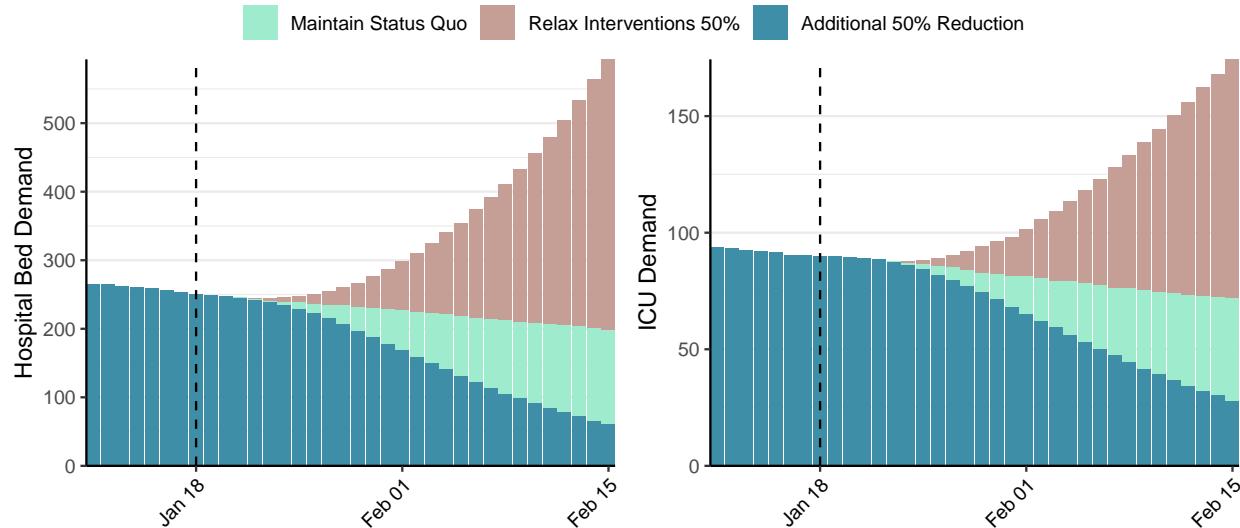


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 2,373 (95% CI: 2,203-2,543) at the current date to 164 (95% CI: 147-181) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,373 (95% CI: 2,203-2,543) at the current date to 10,083 (95% CI: 9,024-11,142) by 2021-02-15.

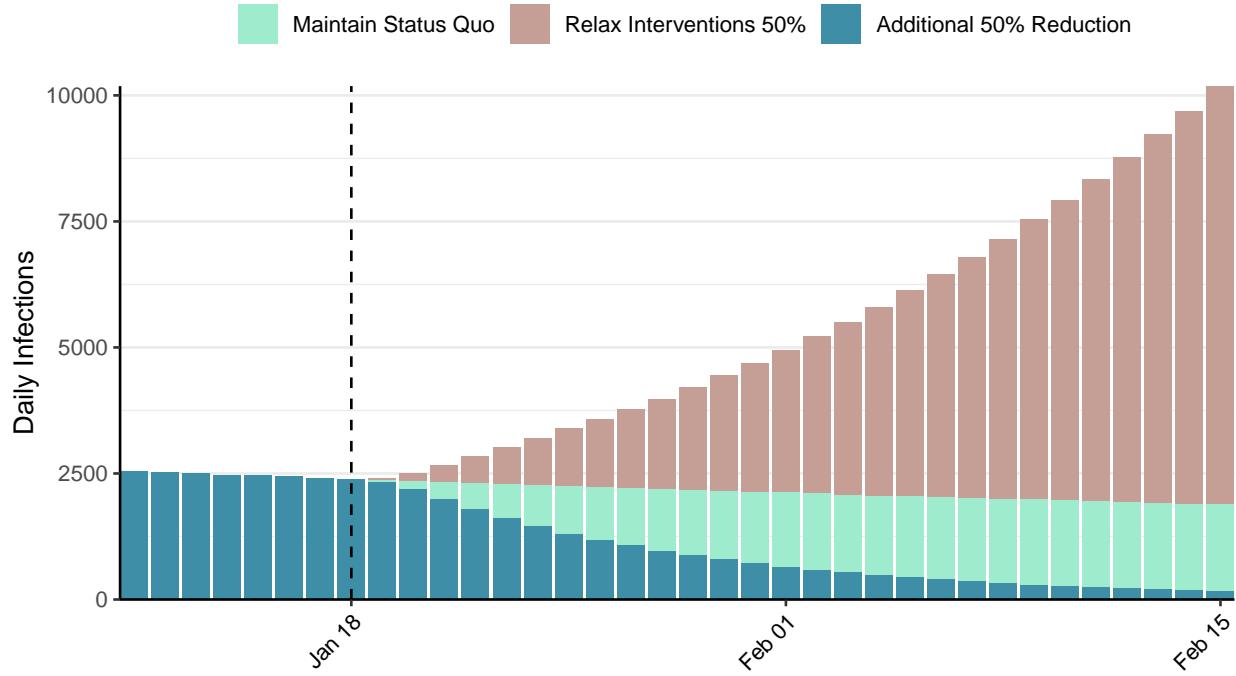


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Somalia, 2021-01-18

[Download the report for Somalia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.73 (95% CI: 0.53-0.91)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Somalia is not shown in the following plot as only 0 deaths have been reported to date**

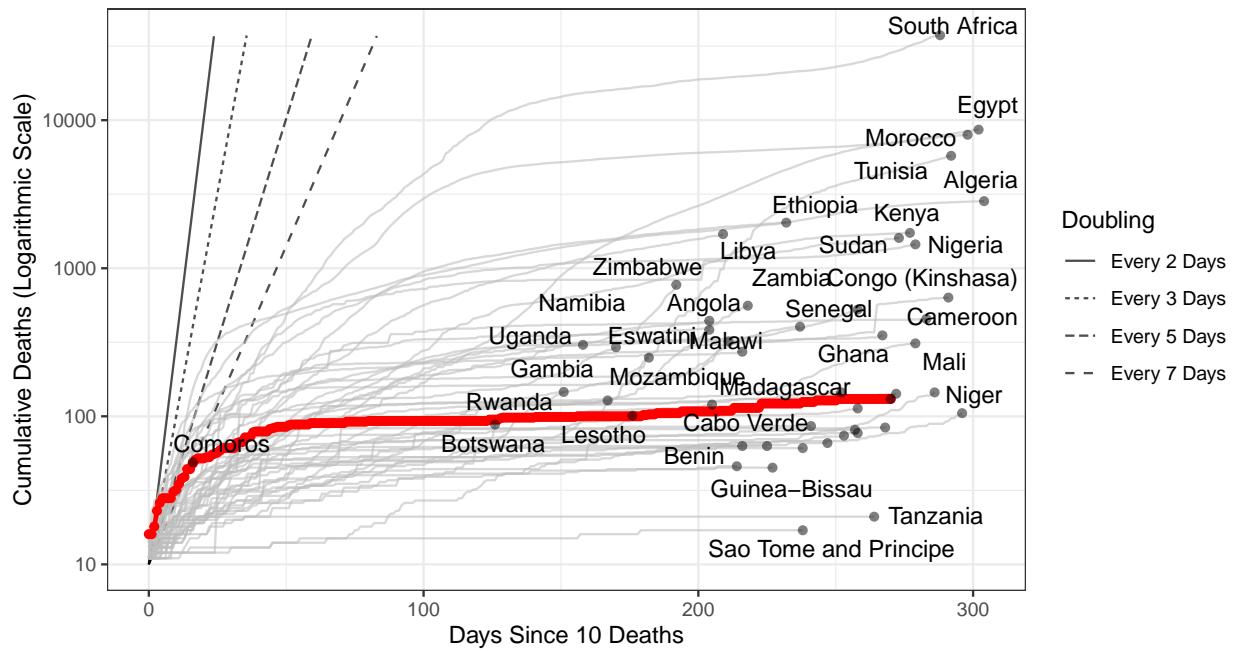


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,227 (95% CI: 2,009-2,446) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

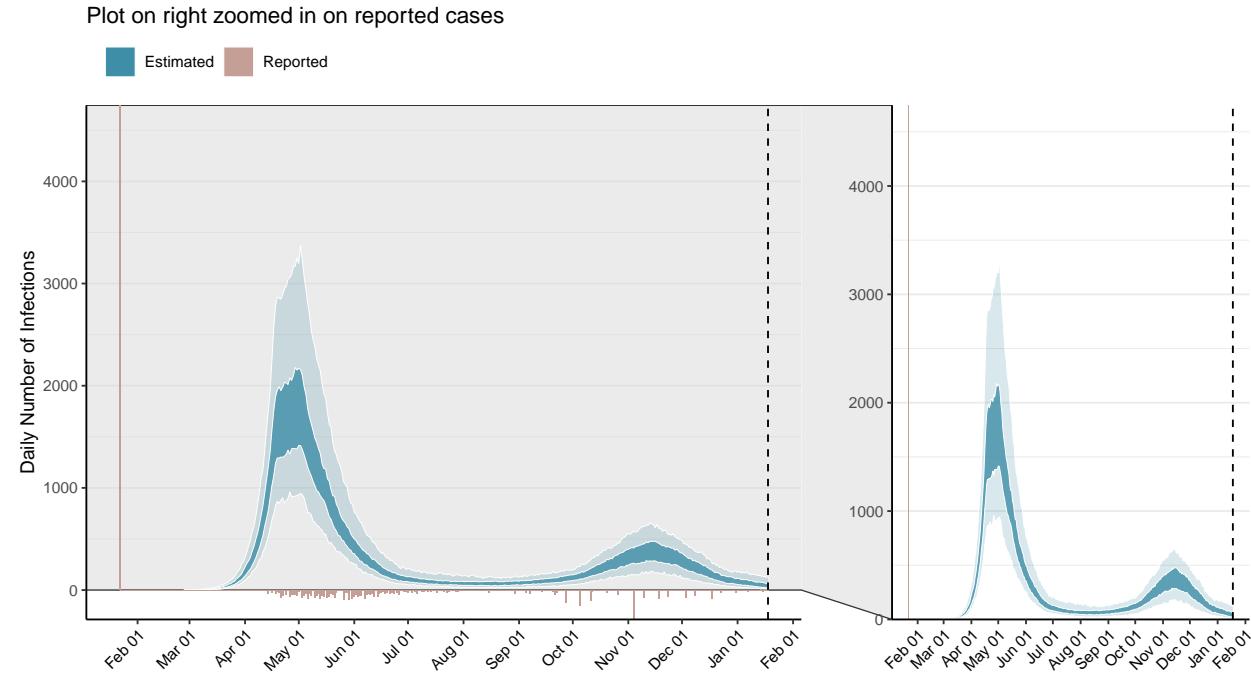
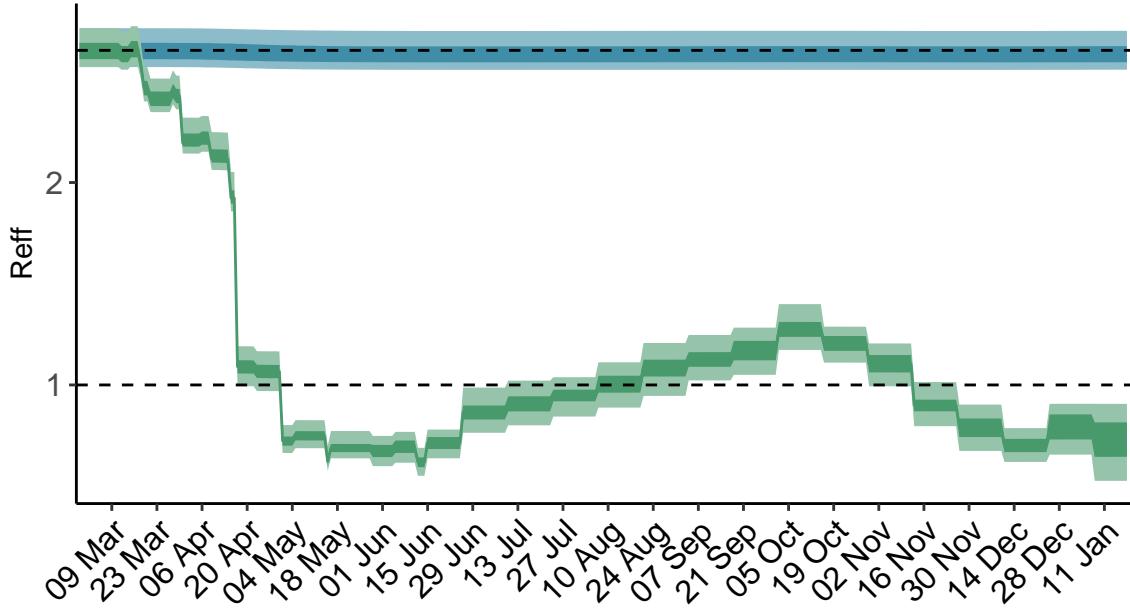


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

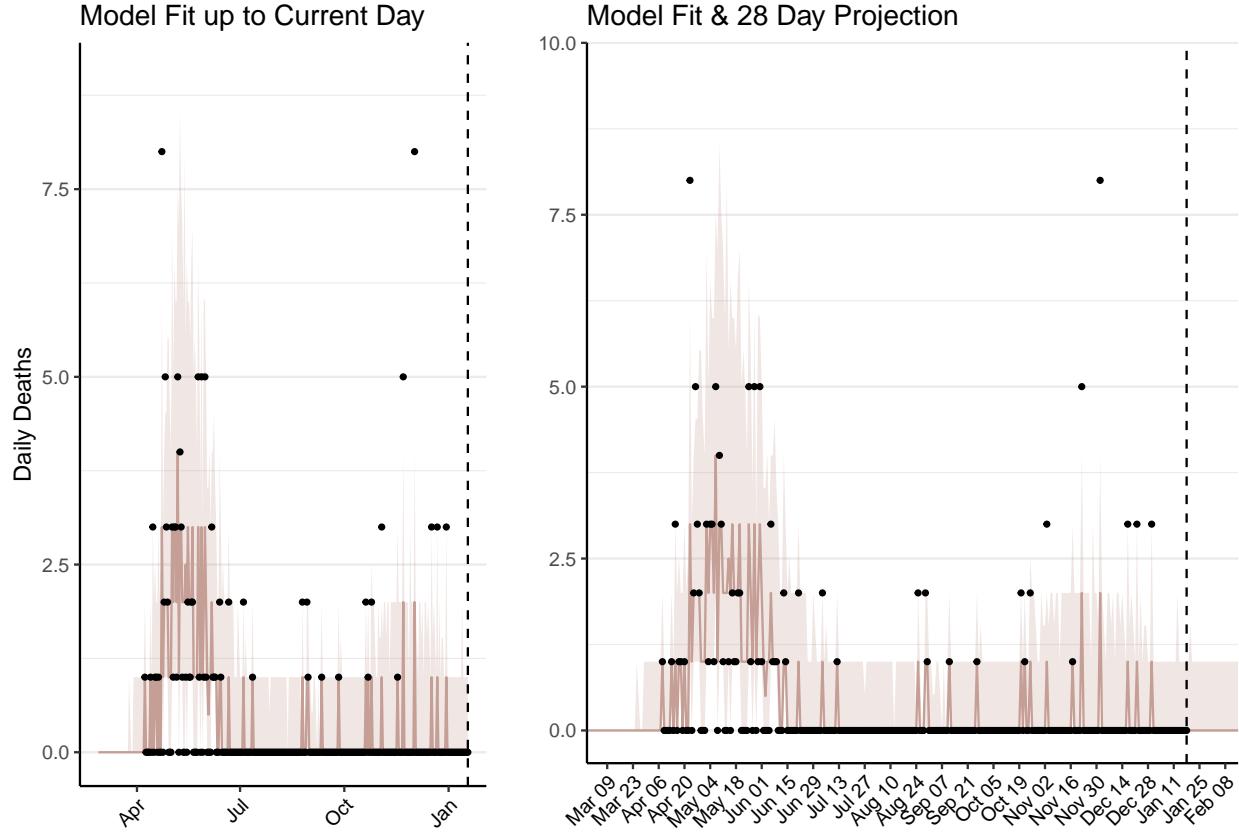


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 6 (95% CI: 5-6) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 2-2) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 3 (95% CI: 2-3) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

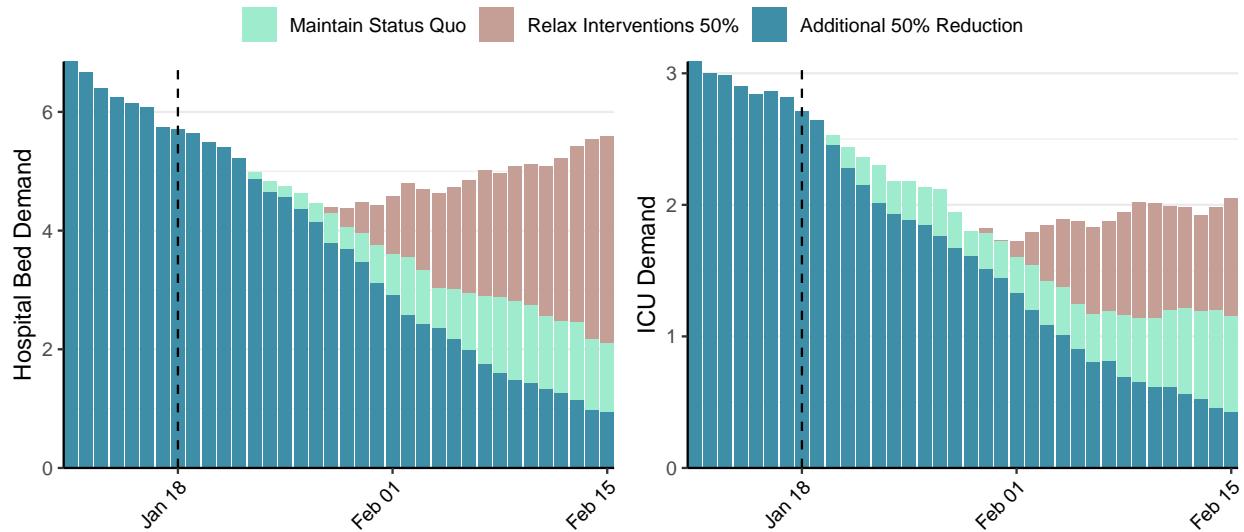


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 49 (95% CI: 42-55) at the current date to 2 (95% CI: 1-2) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 49 (95% CI: 42-55) at the current date to 103 (95% CI: 81-125) by 2021-02-15.

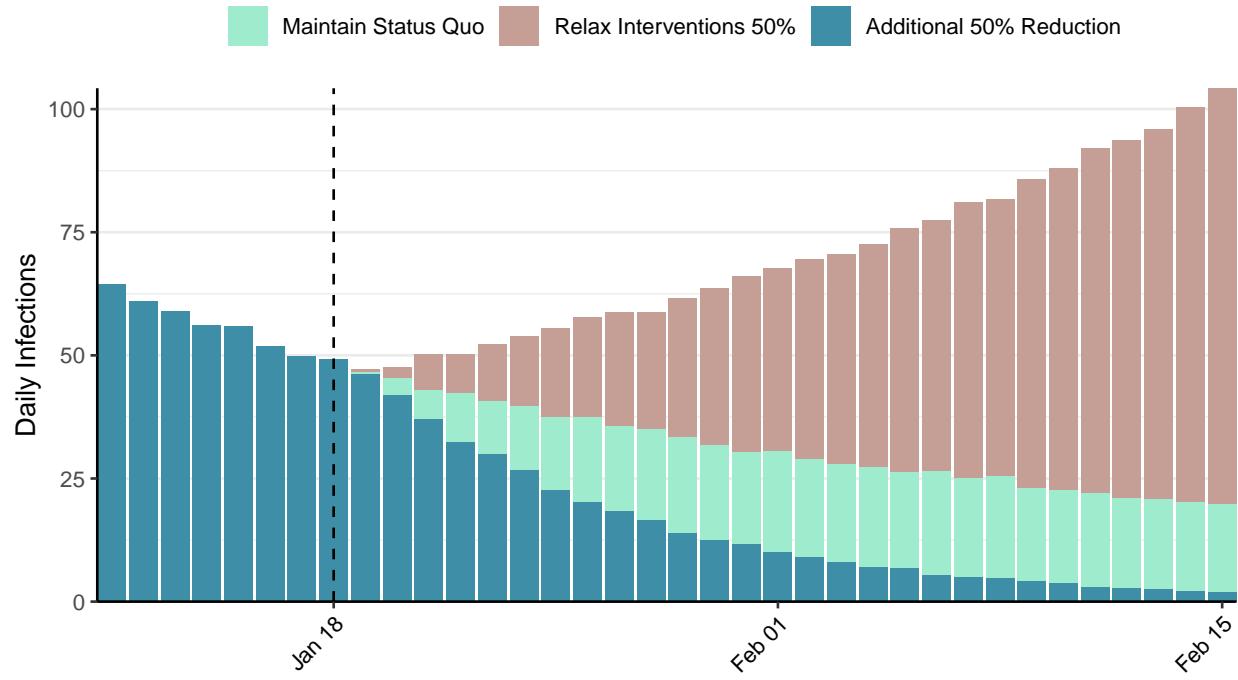


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Serbia, 2021-01-18

[Download the report for Serbia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.71 (95% CI: 0.64-0.8)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Serbia is not shown in the following plot as only 0 deaths have been reported to date**

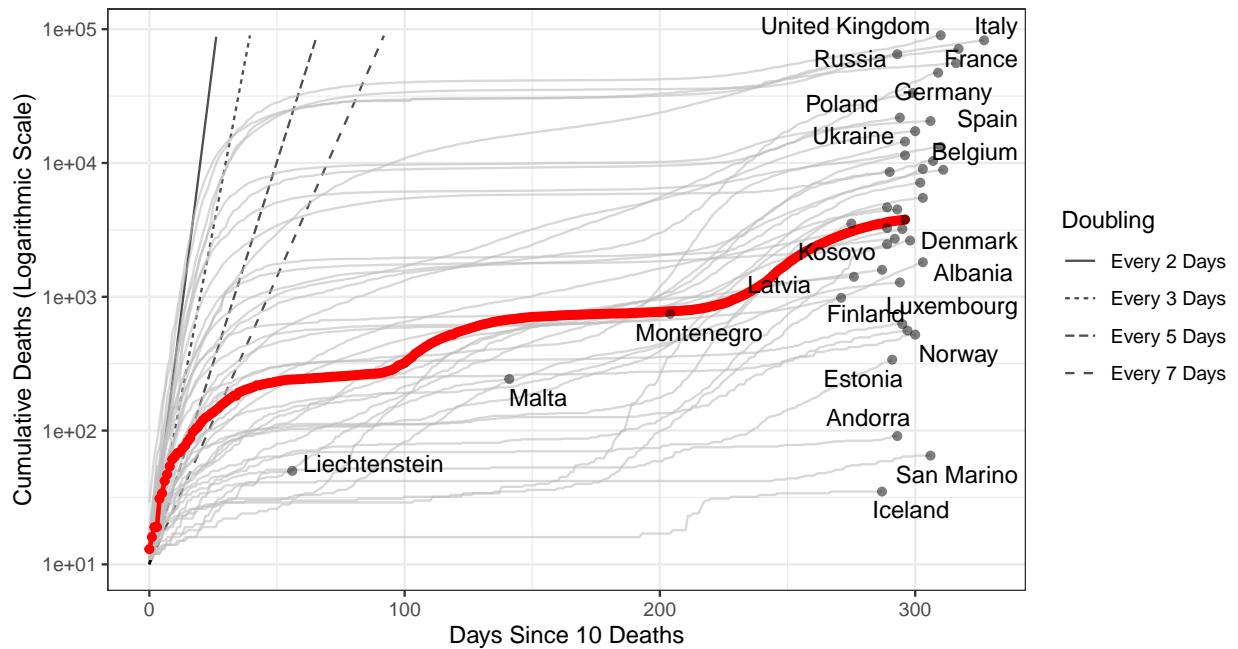


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 161,648 (95% CI: 156,946-166,351) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

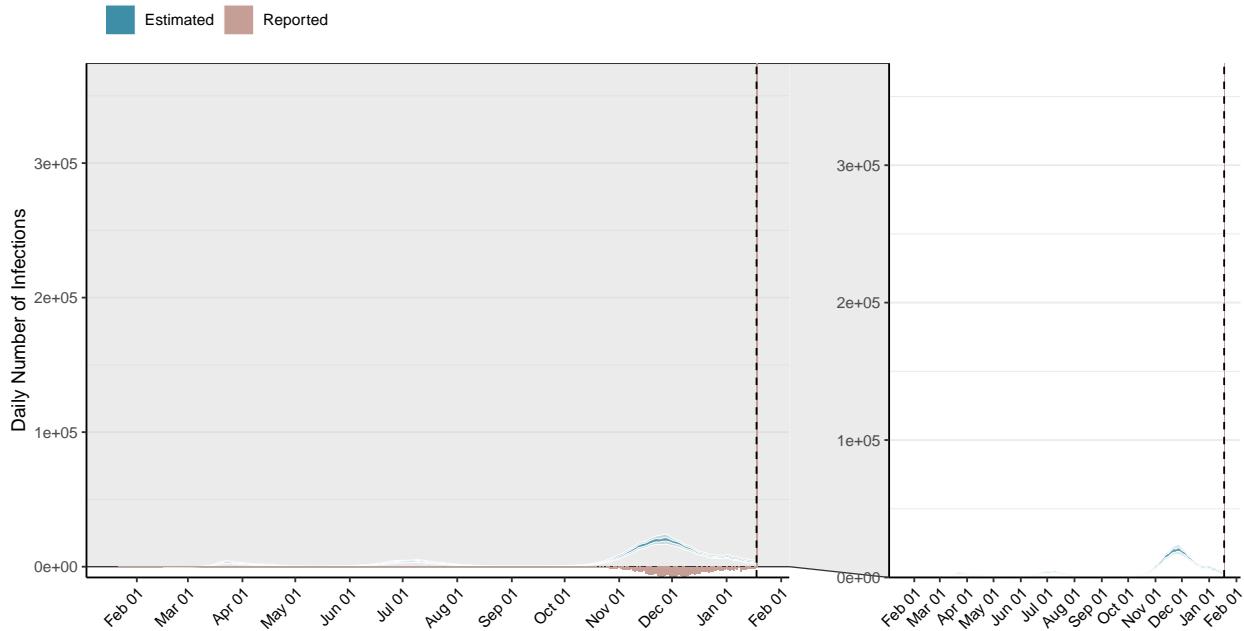
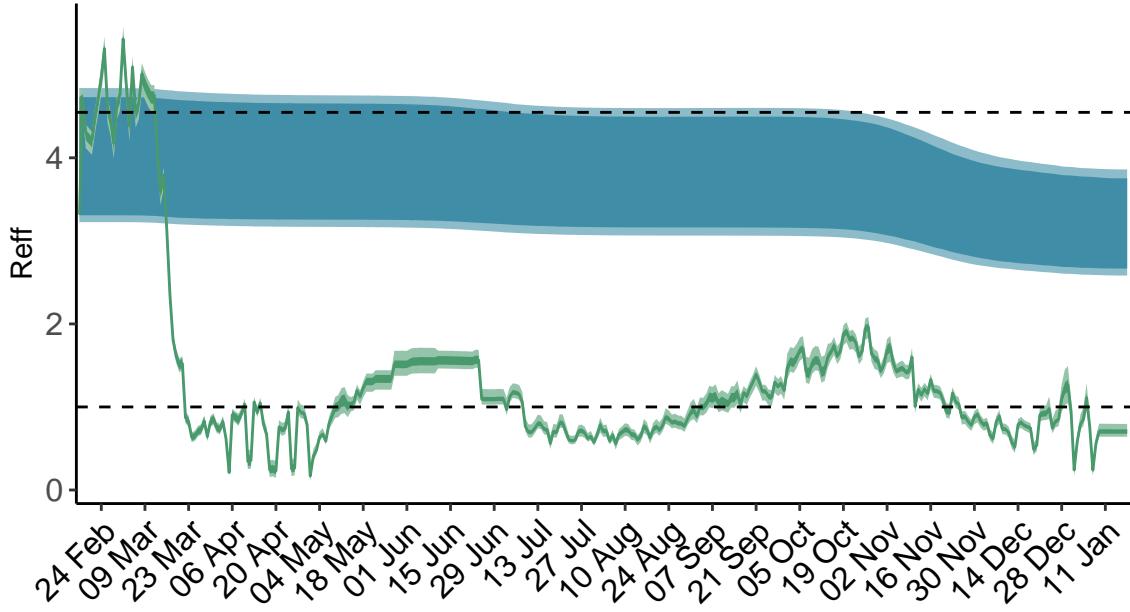


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

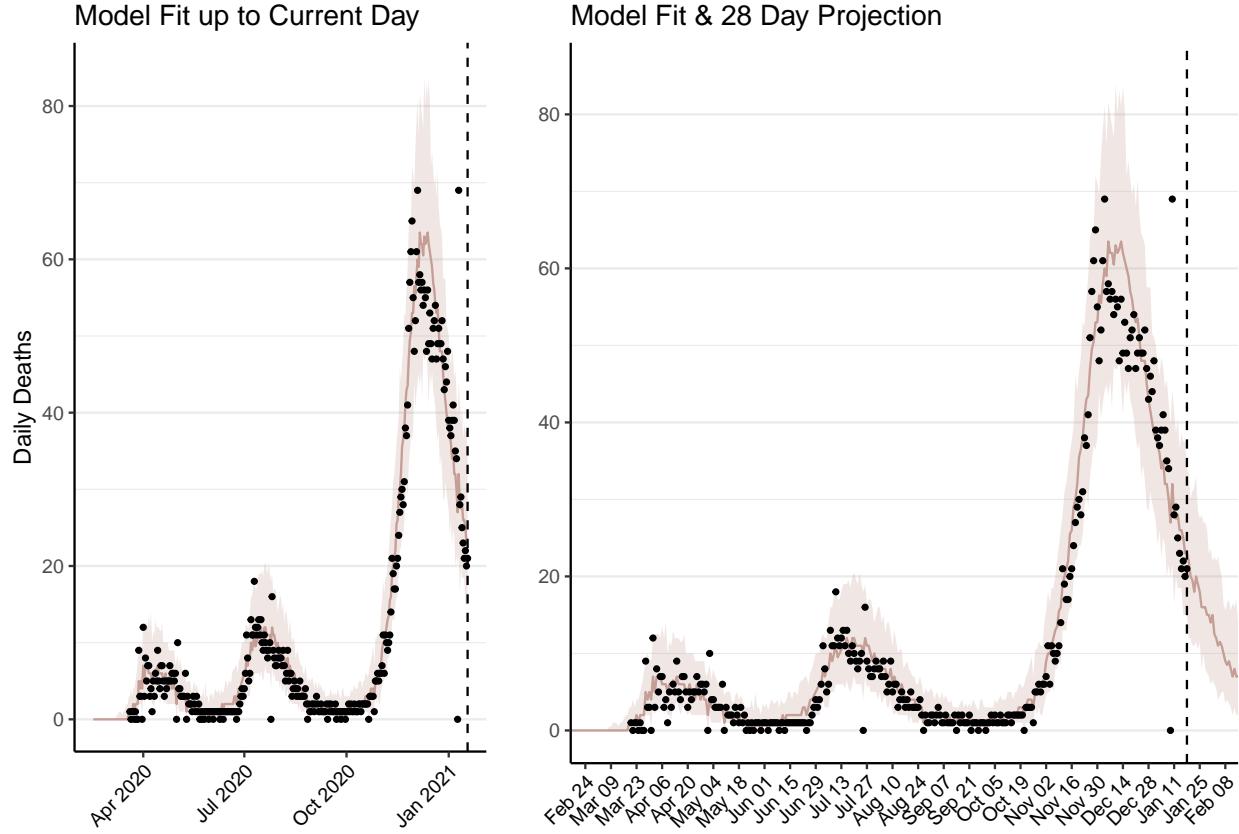


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 759 (95% CI: 734-783) patients requiring treatment with high-pressure oxygen at the current date to 220 (95% CI: 204-236) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 315 (95% CI: 305-325) patients requiring treatment with mechanical ventilation at the current date to 98 (95% CI: 92-105) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

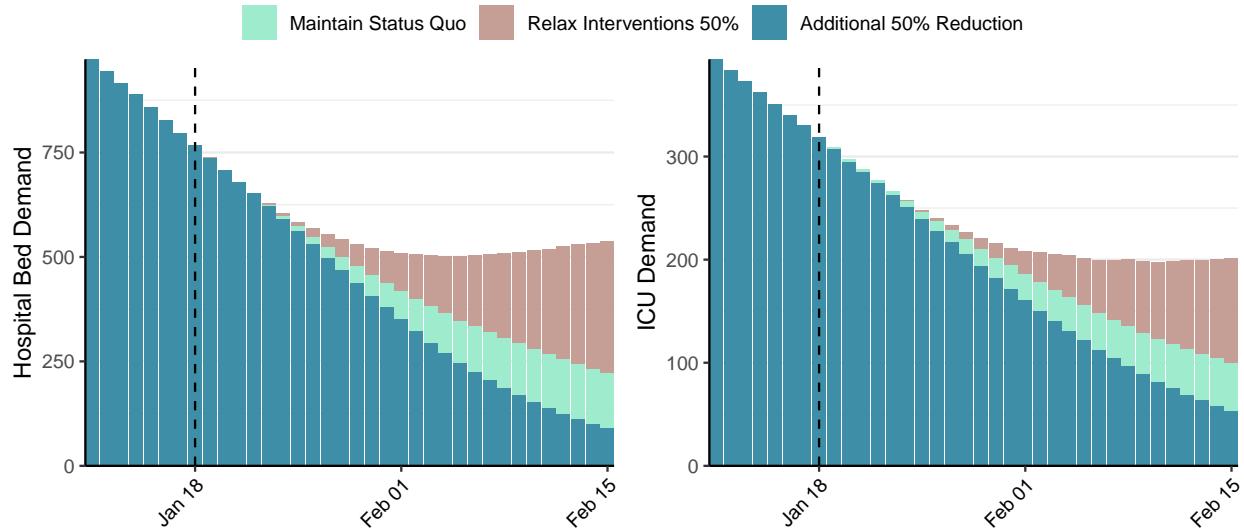


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,162 (95% CI: 3,013-3,310) at the current date to 96 (95% CI: 88-104) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,162 (95% CI: 3,013-3,310) at the current date to 4,184 (95% CI: 3,764-4,603) by 2021-02-15.

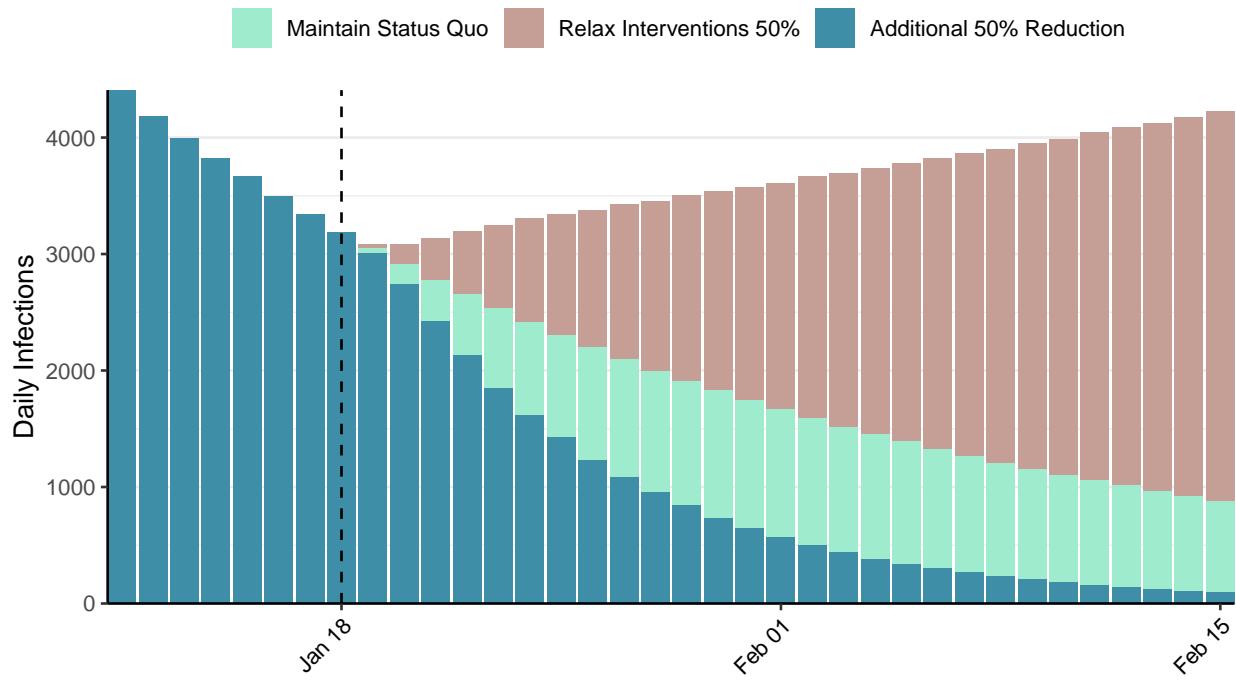


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: South Sudan, 2021-01-18

[Download the report for South Sudan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
10	10	0	0	0.55 (95% CI: 0.34-0.79)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. South Sudan is not shown in the following plot as only 0 deaths have been reported to date**

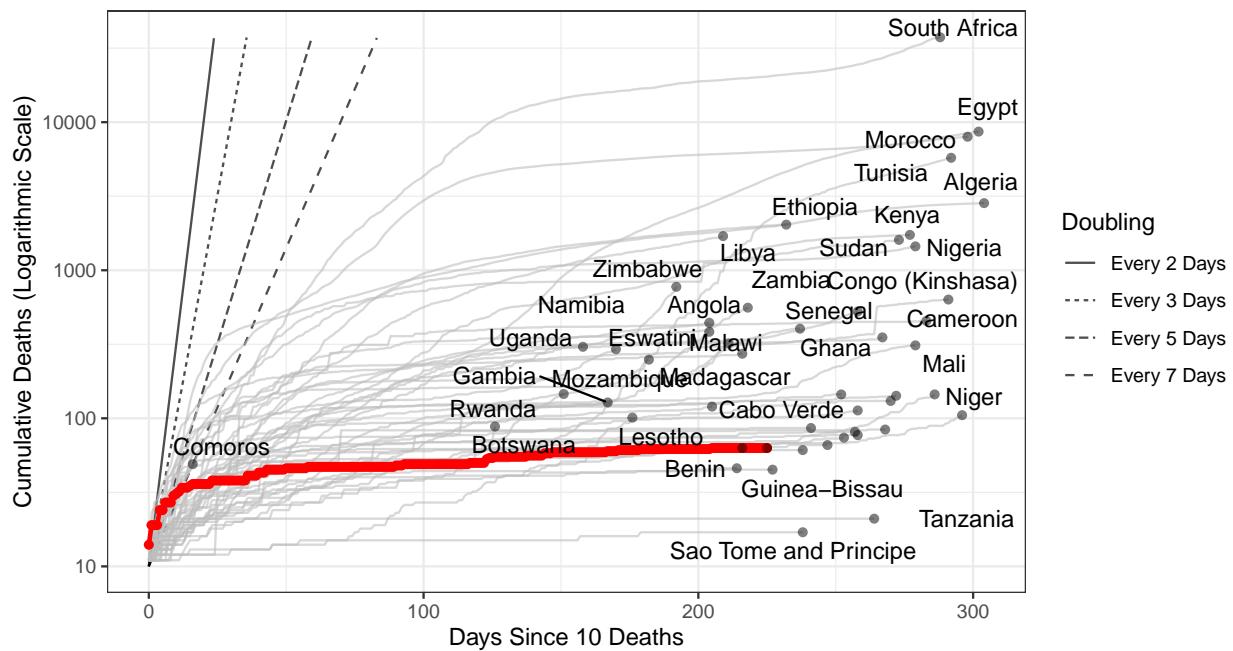


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 103 (95% CI: 79-126) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

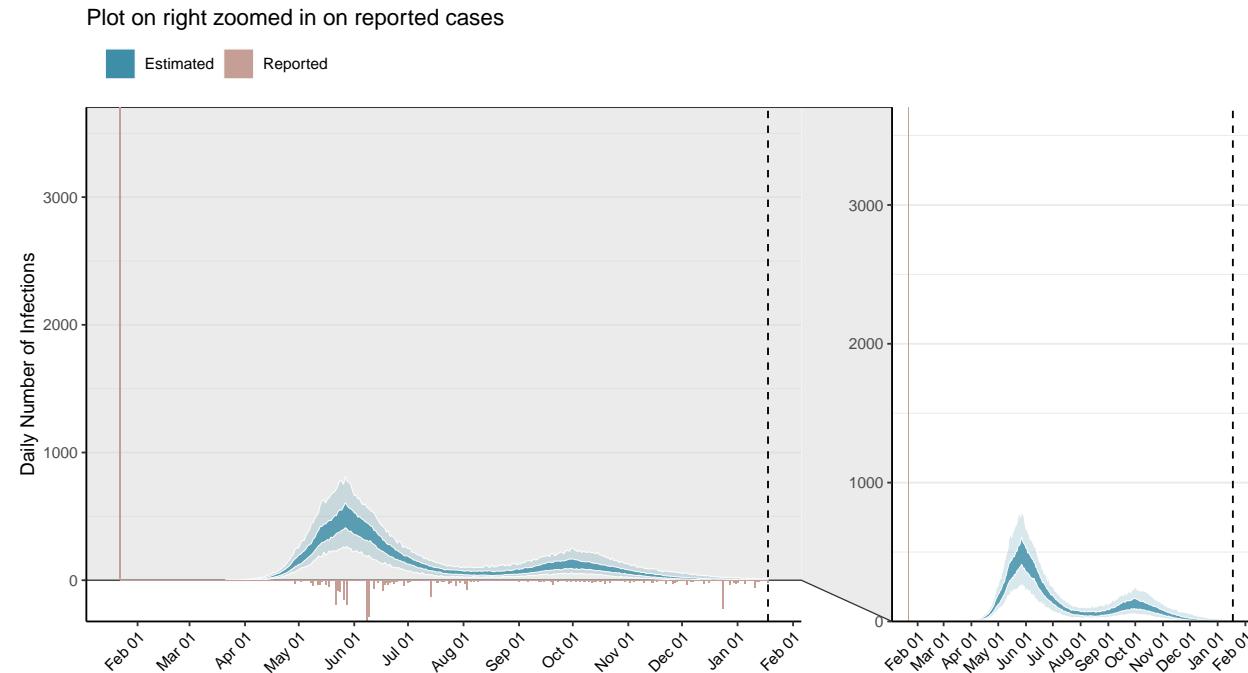
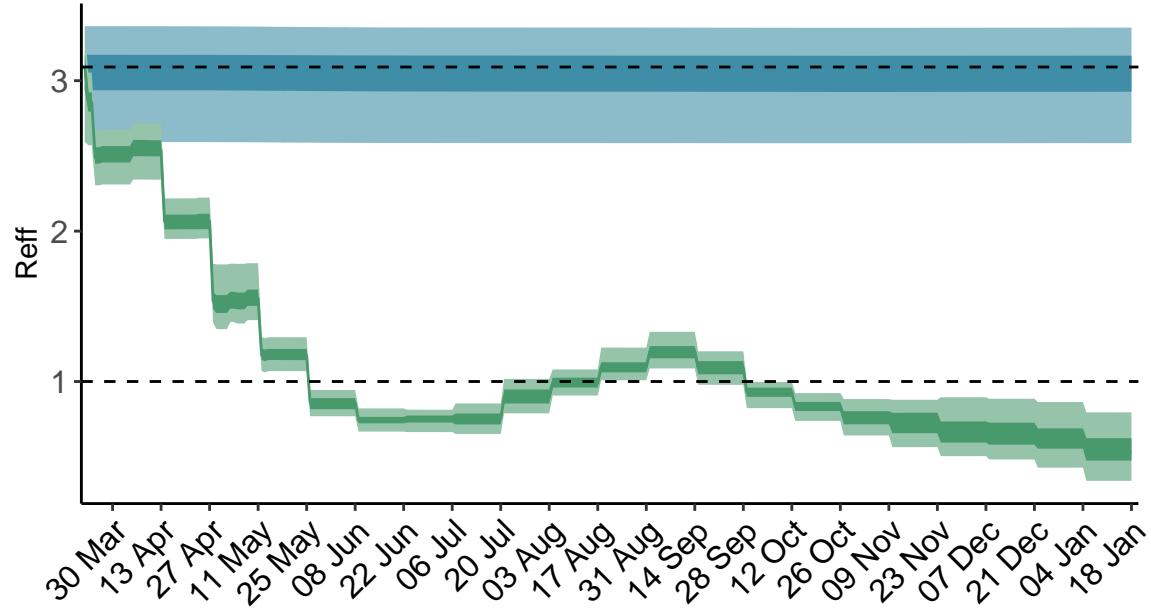


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

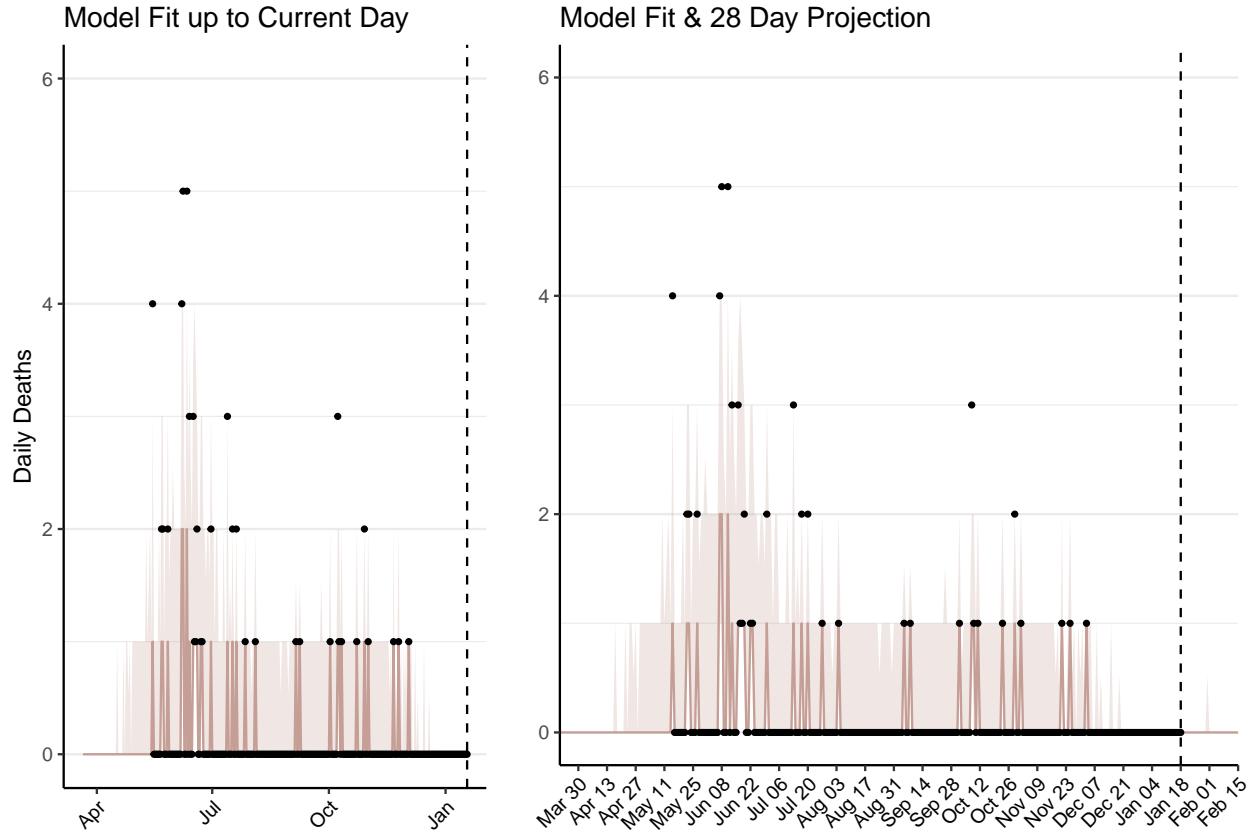


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

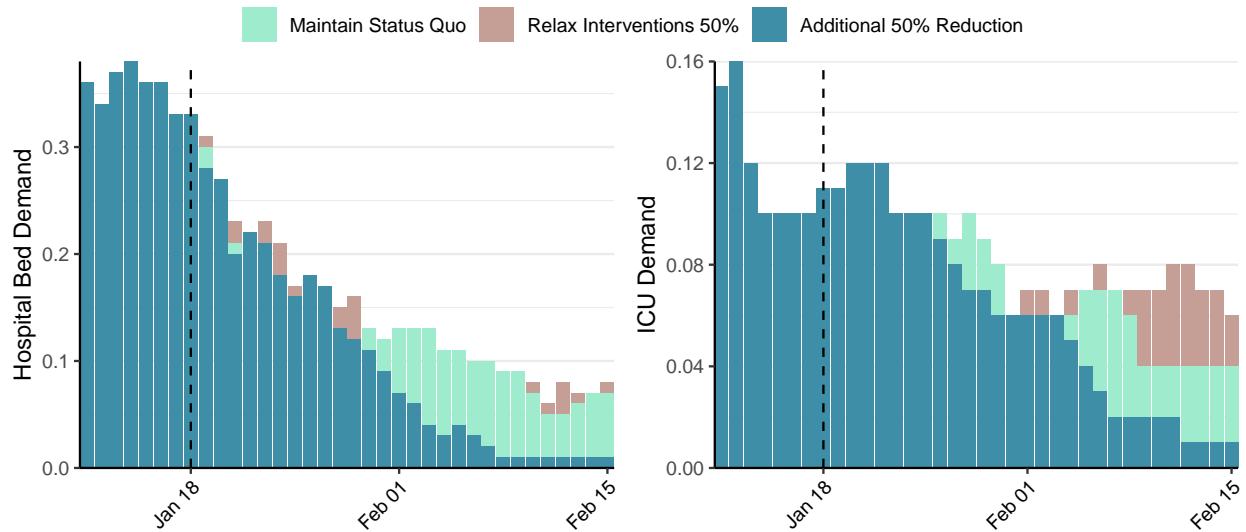


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 0 (95% CI: 0-0) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 1-2) at the current date to 2 (95% CI: 1-3) by 2021-02-15.

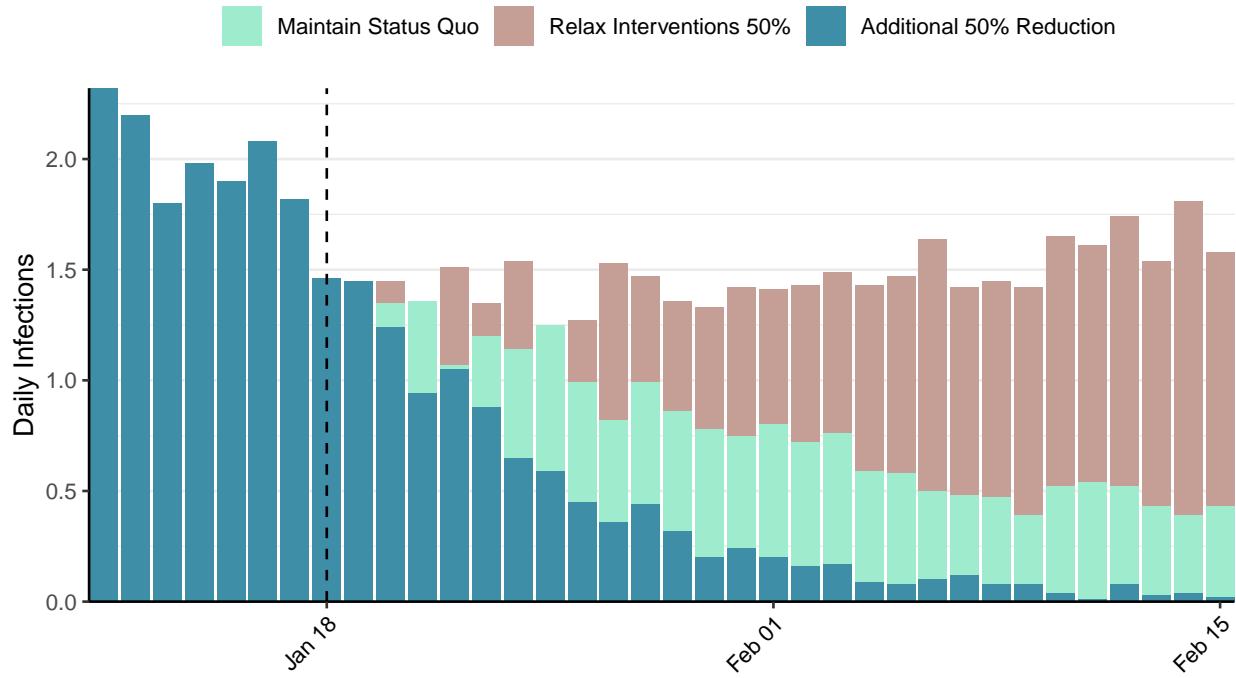


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Sao Tome and Principe, 2021-01-18

[Download the report for Sao Tome and Principe, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.89 (95% CI: 0.53-1.17)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** Sao Tome and Principe is not shown in the following plot as only 0 deaths have been reported to date

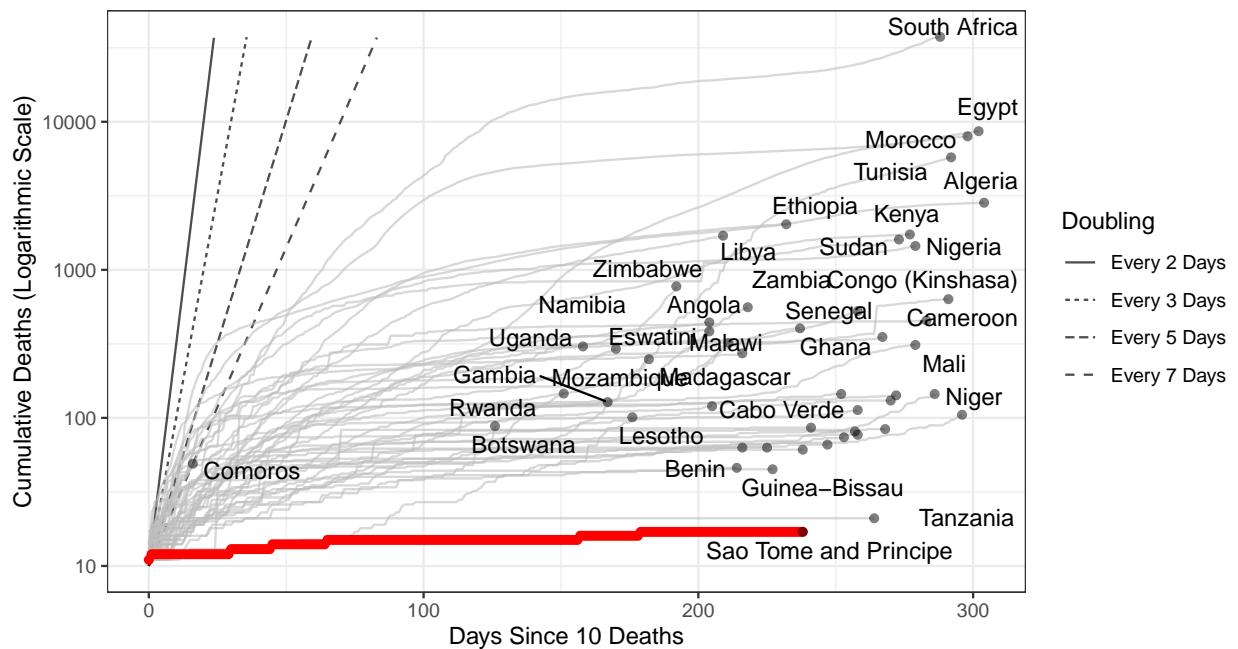


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 89 (95% CI: 50-127) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

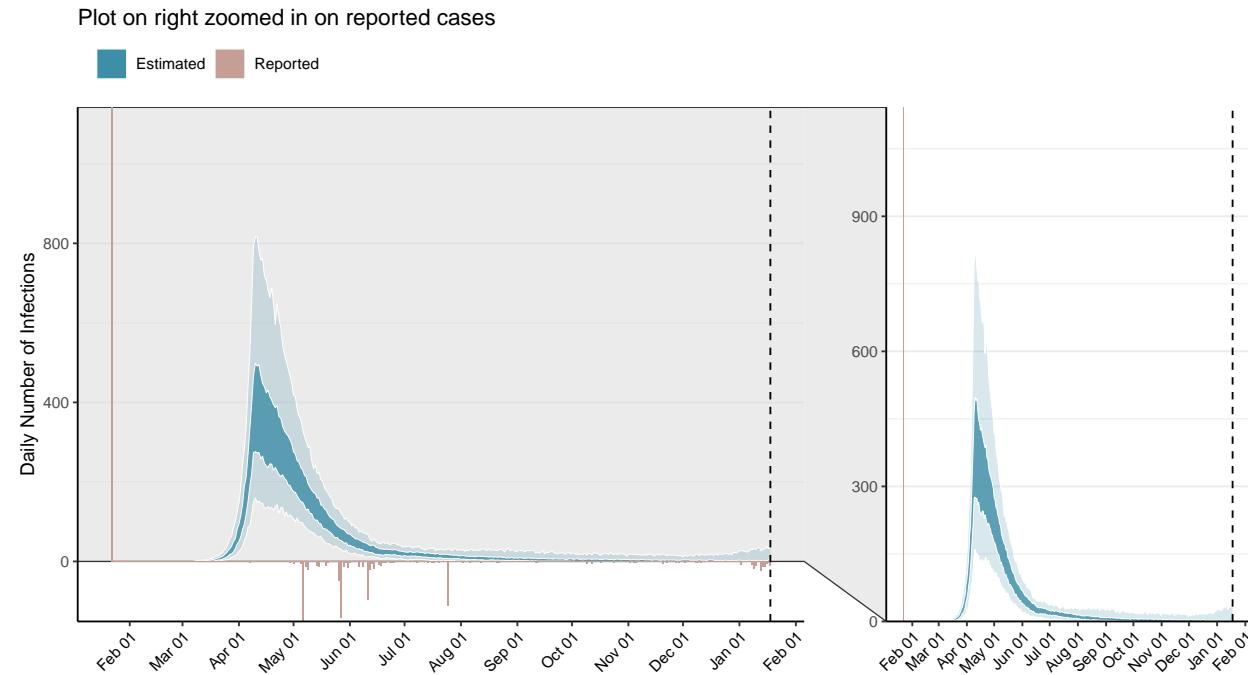
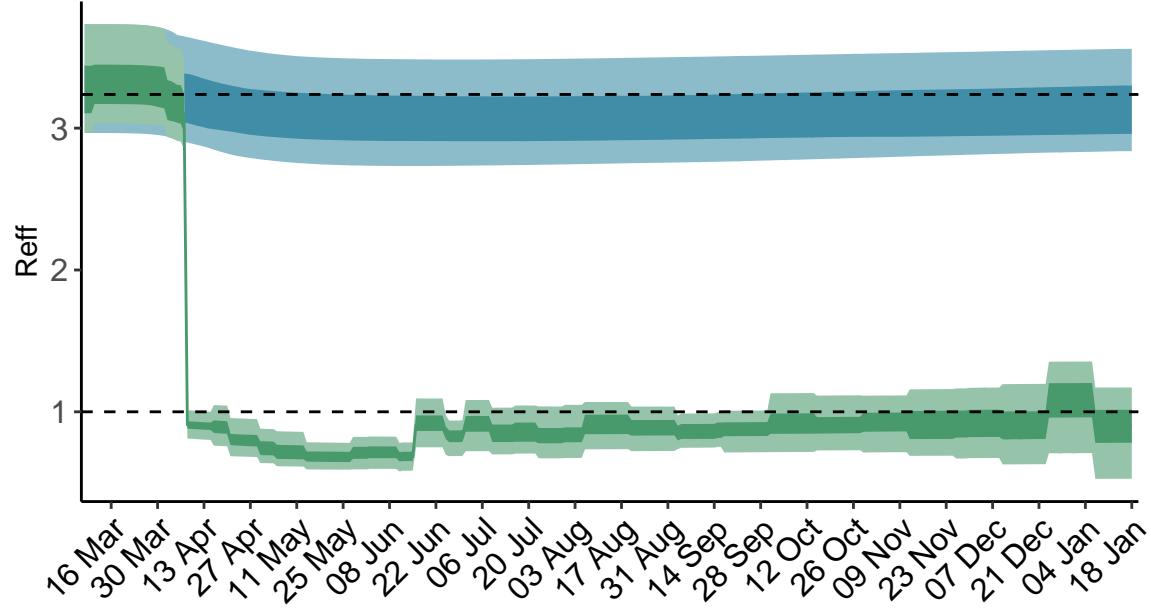


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

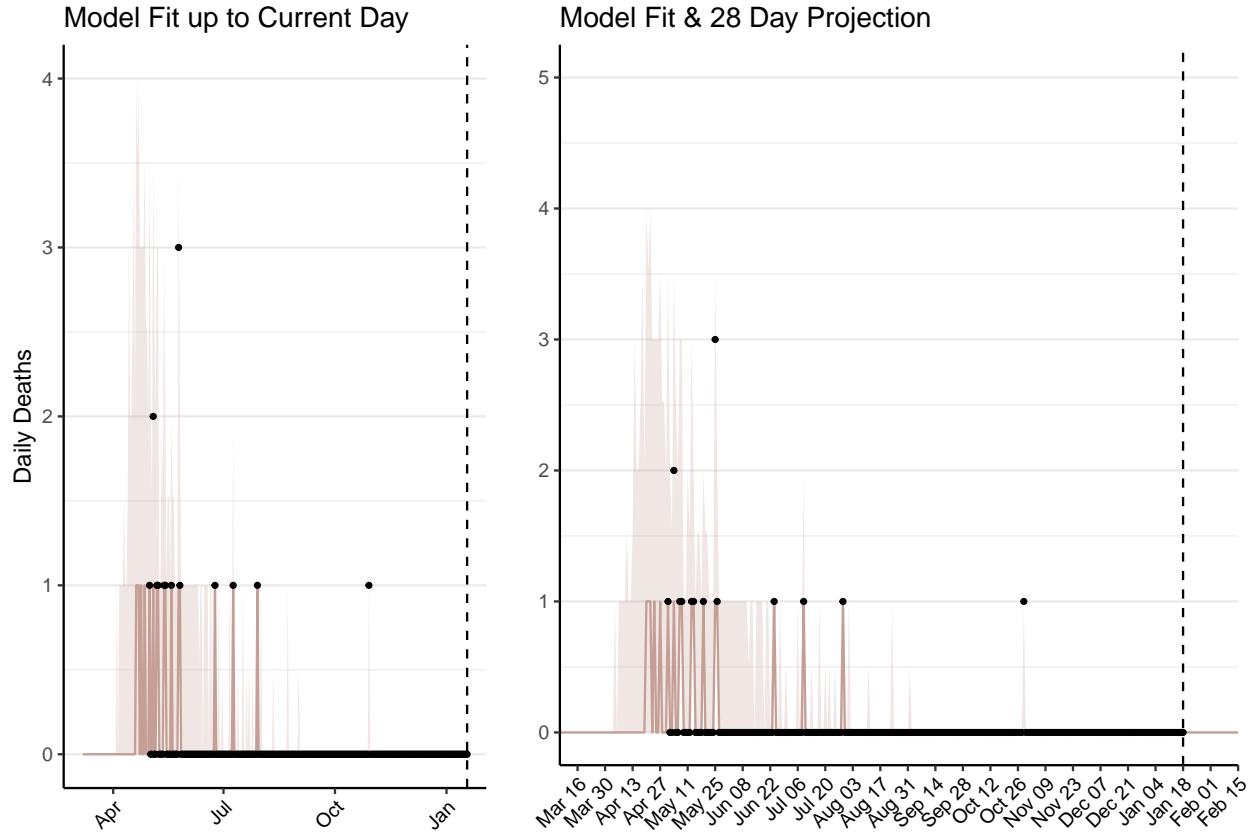


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-1) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: 0-0) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

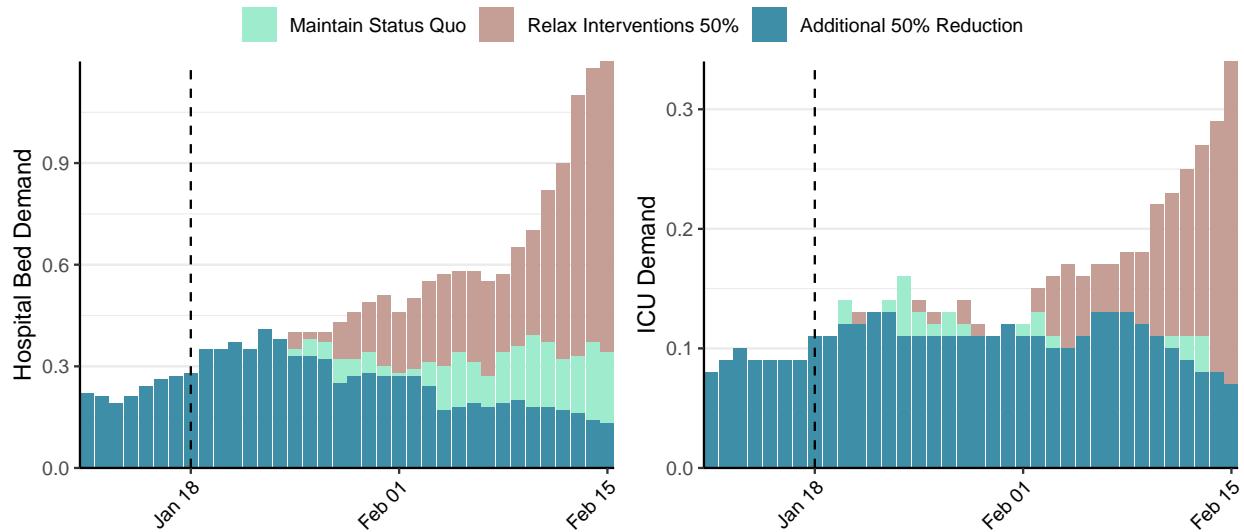


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3 (95% CI: 2-5) at the current date to 0 (95% CI: 0-1) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3 (95% CI: 2-5) at the current date to 25 (95% CI: 10-39) by 2021-02-15.

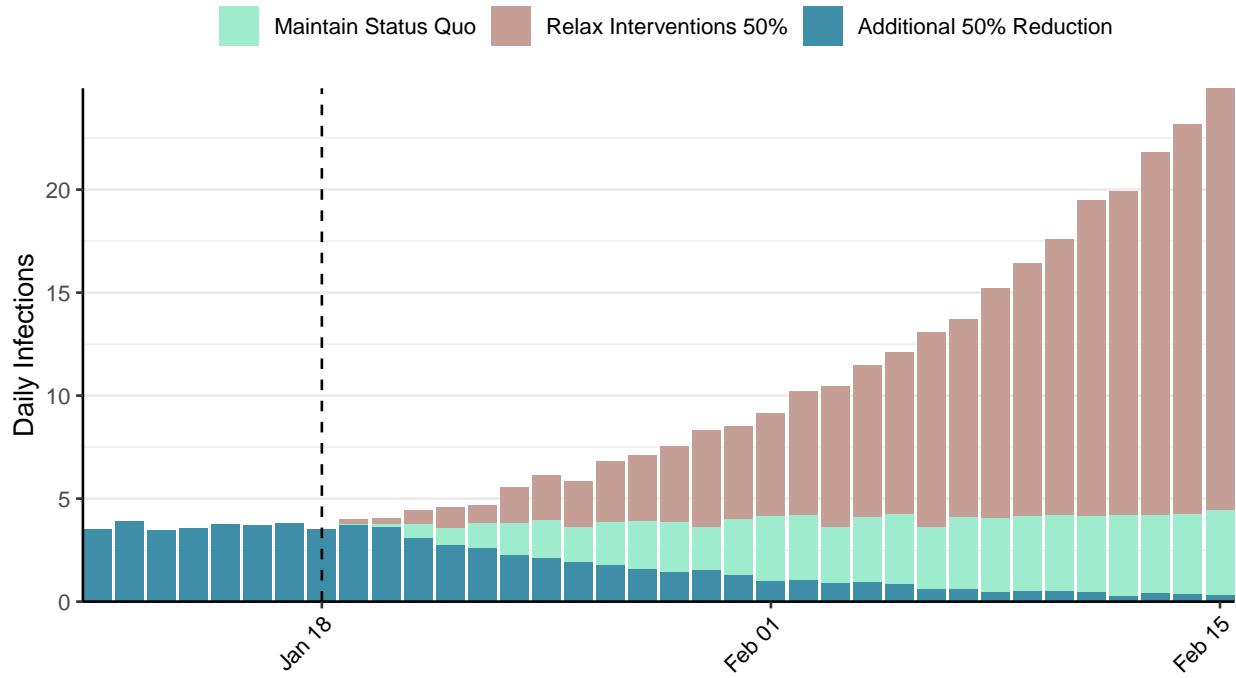


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Suriname, 2021-01-18

[Download the report for Suriname, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1 (95% CI: 0.88-1.13)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Suriname is not shown in the following plot as only 0 deaths have been reported to date**

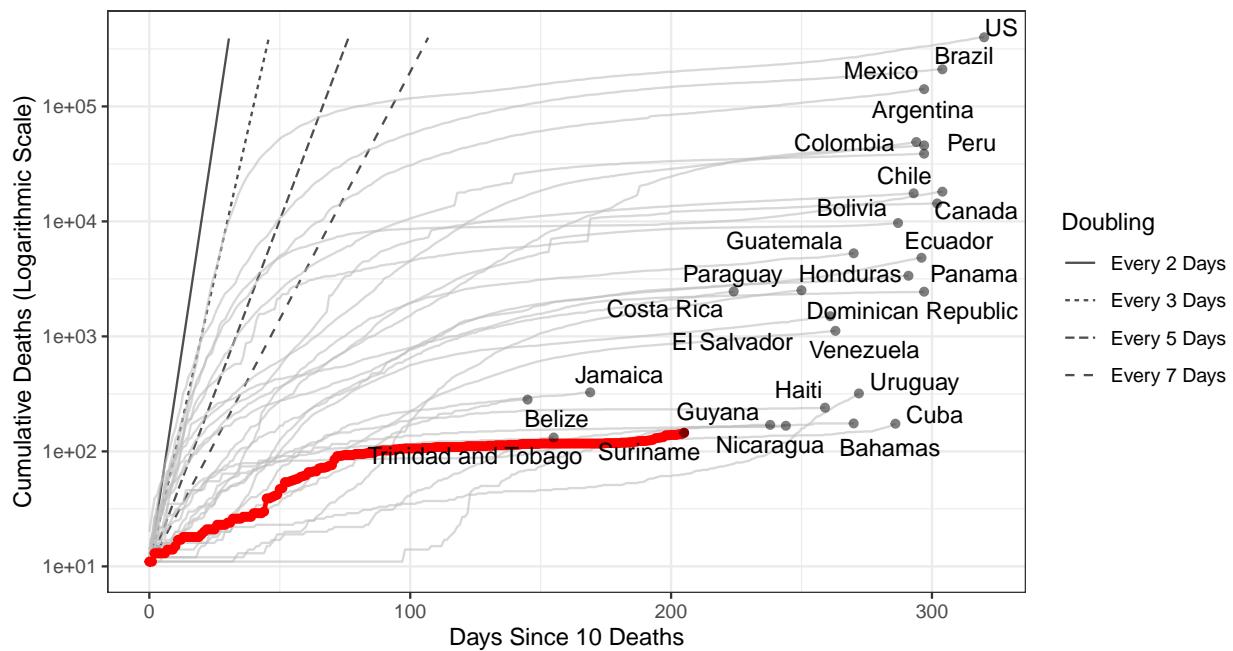


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 11,353 (95% CI: 10,212-12,495) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

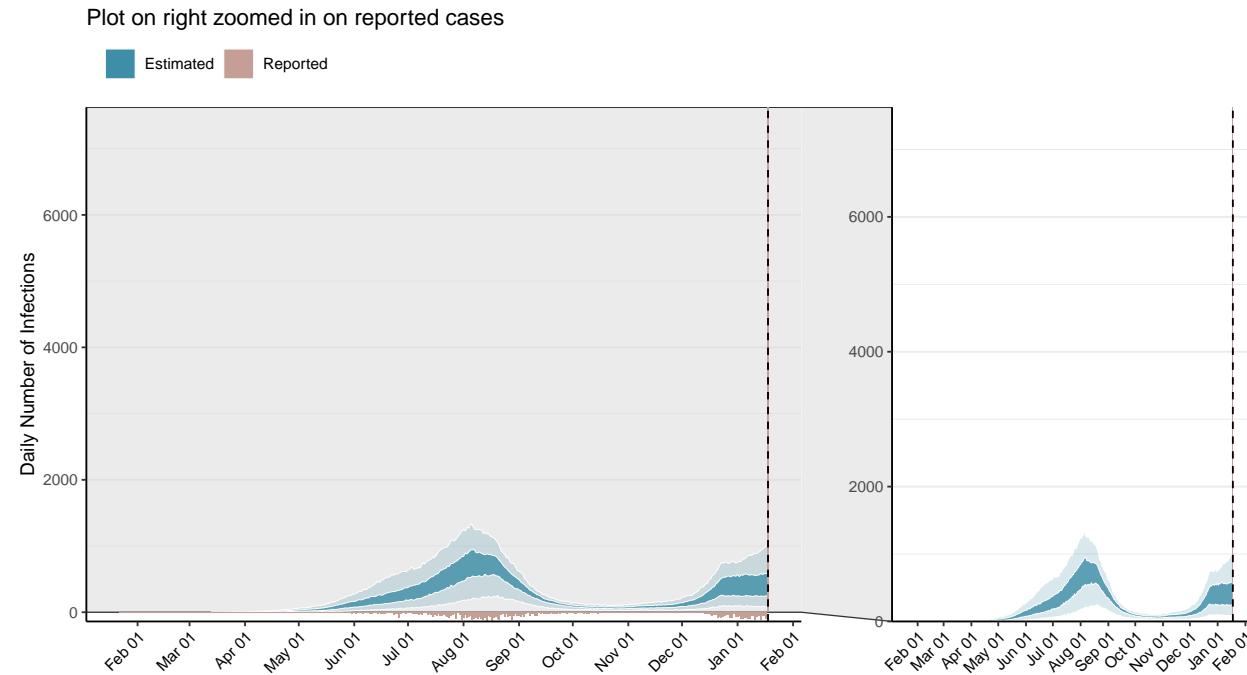
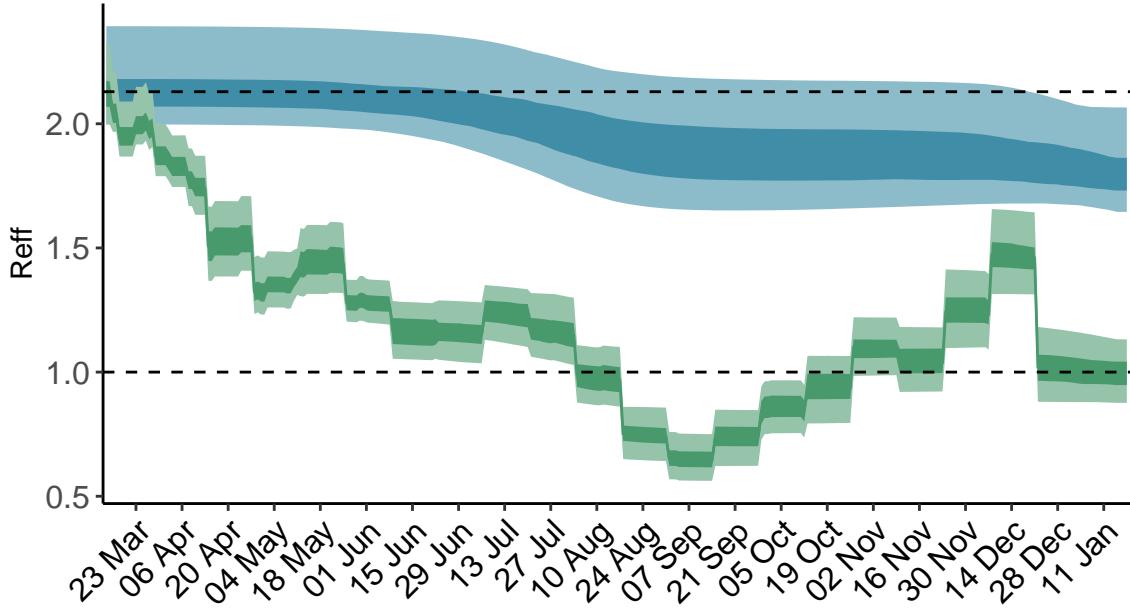


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

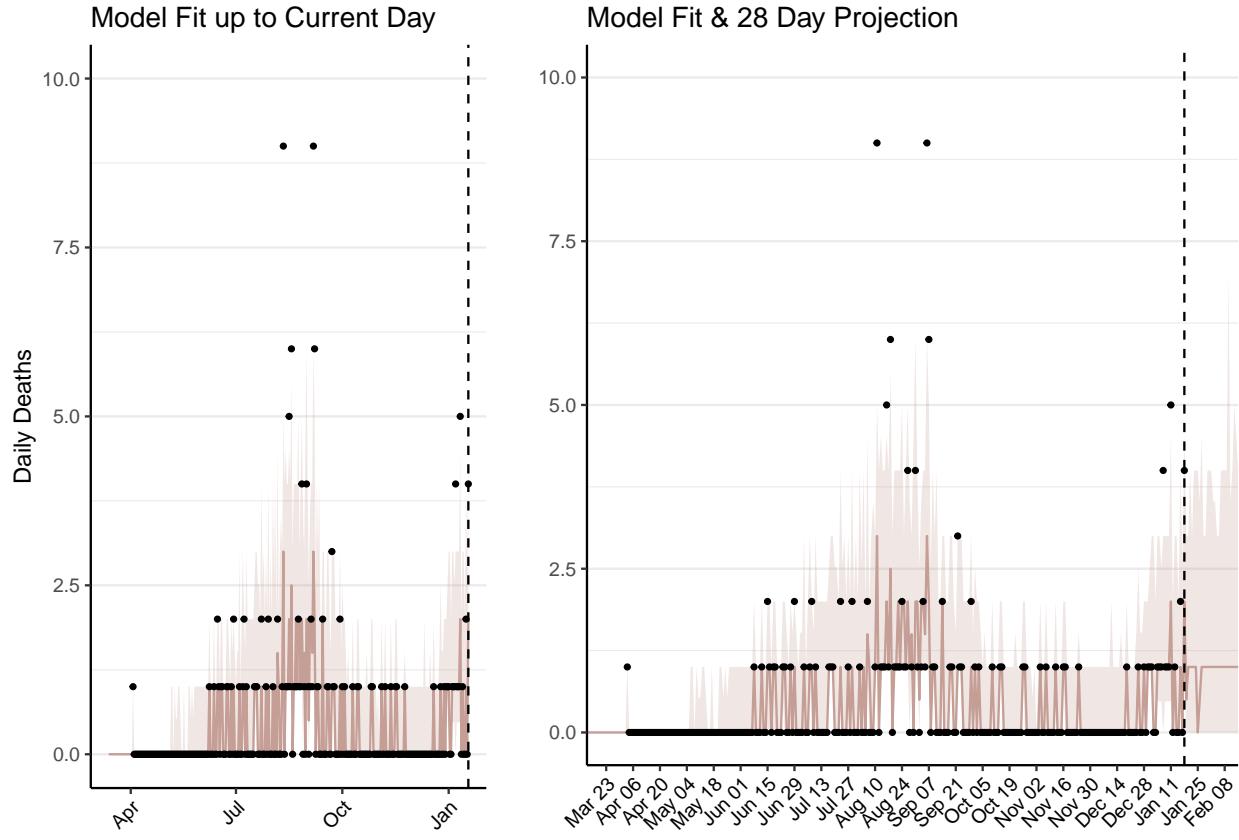


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 37 (95% CI: 33-41) patients requiring treatment with high-pressure oxygen at the current date to 42 (95% CI: 36-48) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 13 (95% CI: 12-15) patients requiring treatment with mechanical ventilation at the current date to 16 (95% CI: 13-18) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

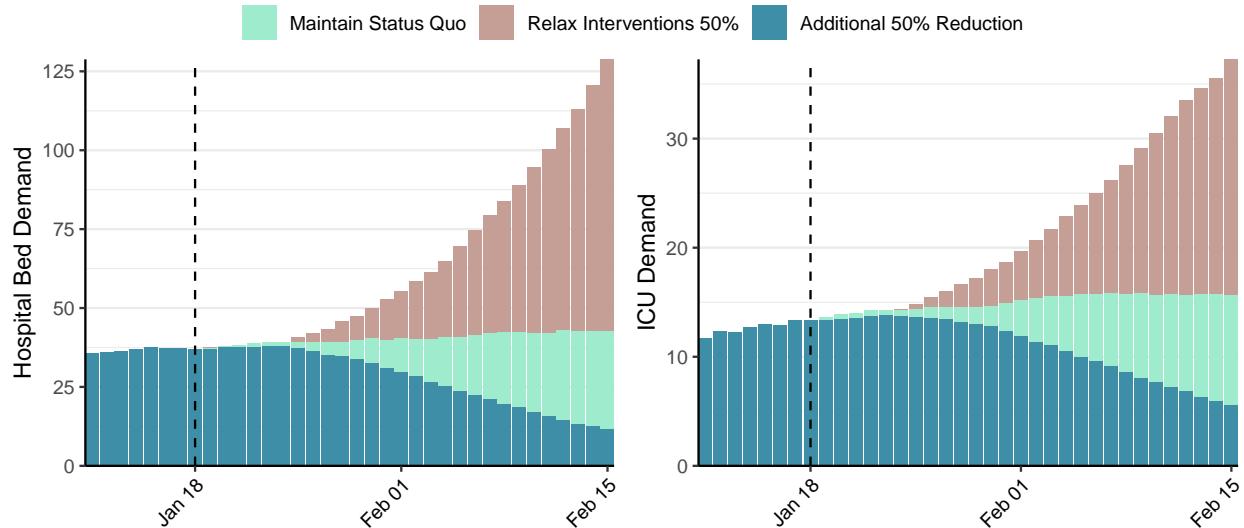


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 431 (95% CI: 381-480) at the current date to 39 (95% CI: 33-45) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 431 (95% CI: 381-480) at the current date to 2,277 (95% CI: 1,971-2,583) by 2021-02-15.

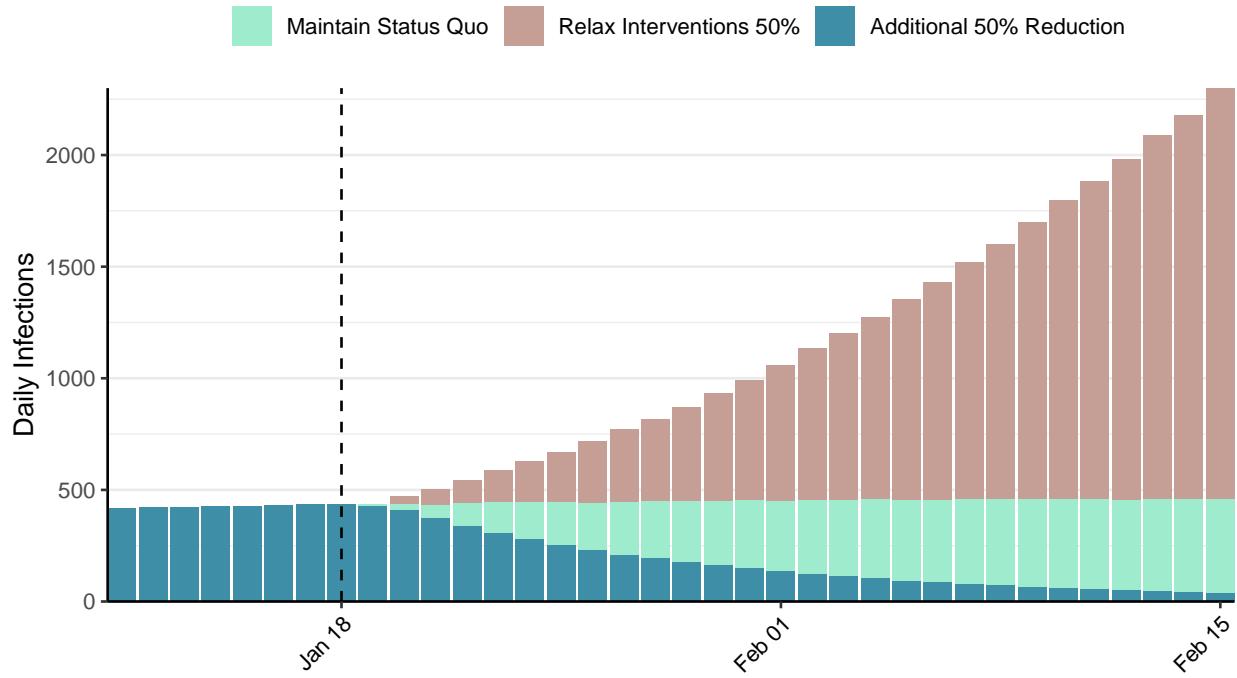


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Eswatini, 2021-01-18

[Download the report for Eswatini, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
243	243	8	8	0.87 (95% CI: 0.73-1.03)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Eswatini is not shown in the following plot as only 8 deaths have been reported to date**

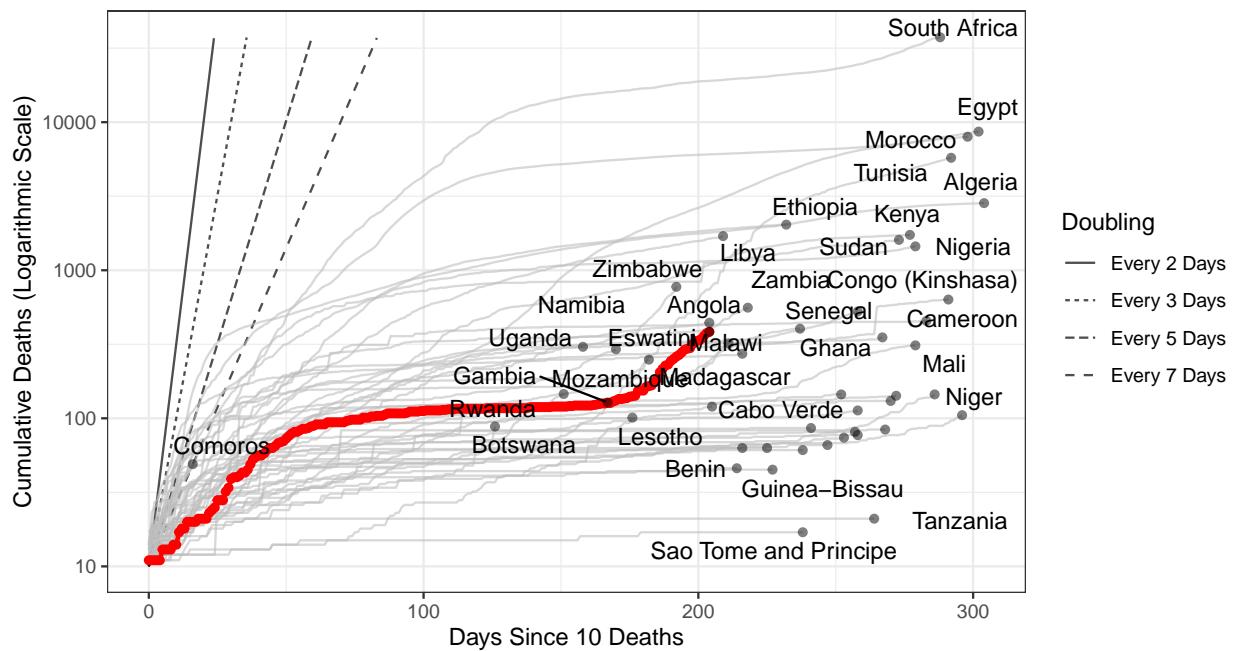


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 106,031 (95% CI: 101,824-110,238) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

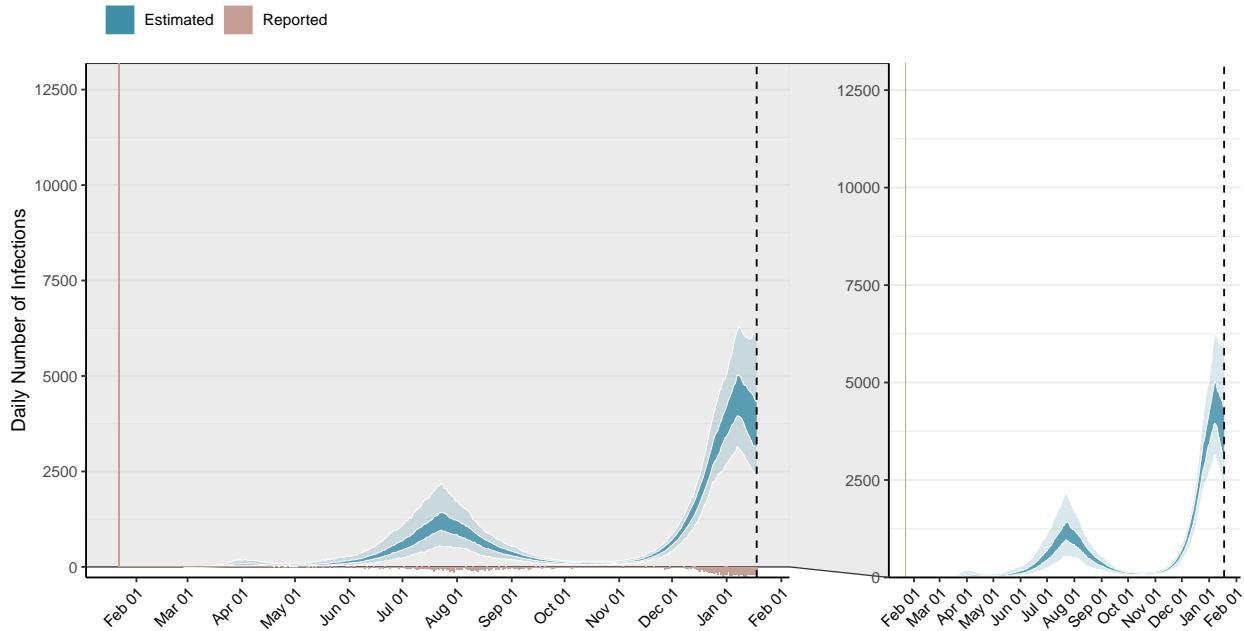
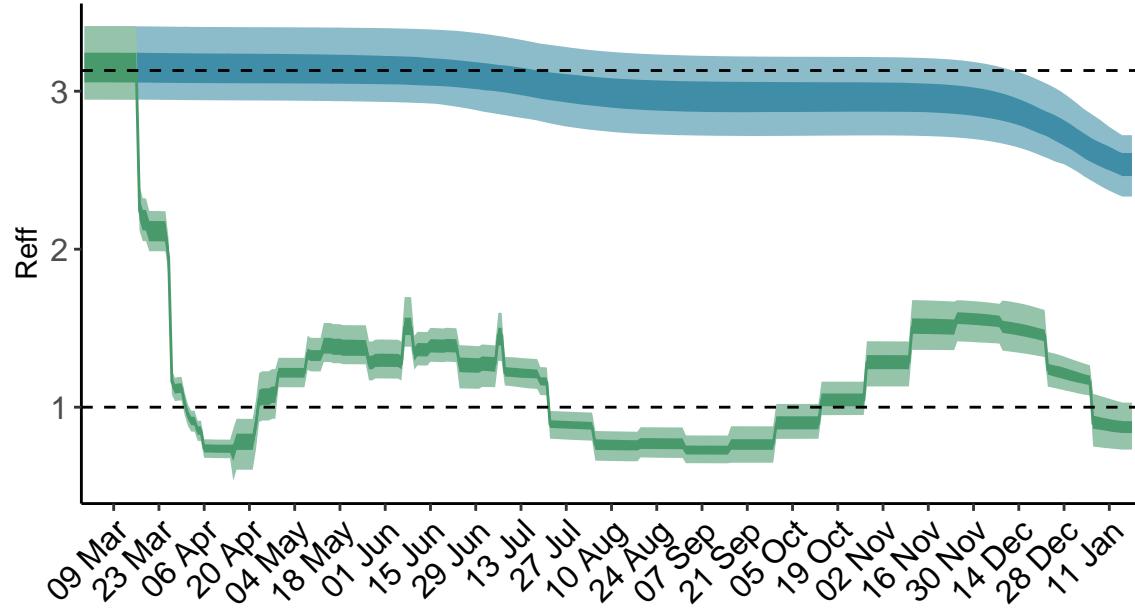


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Eswatini is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

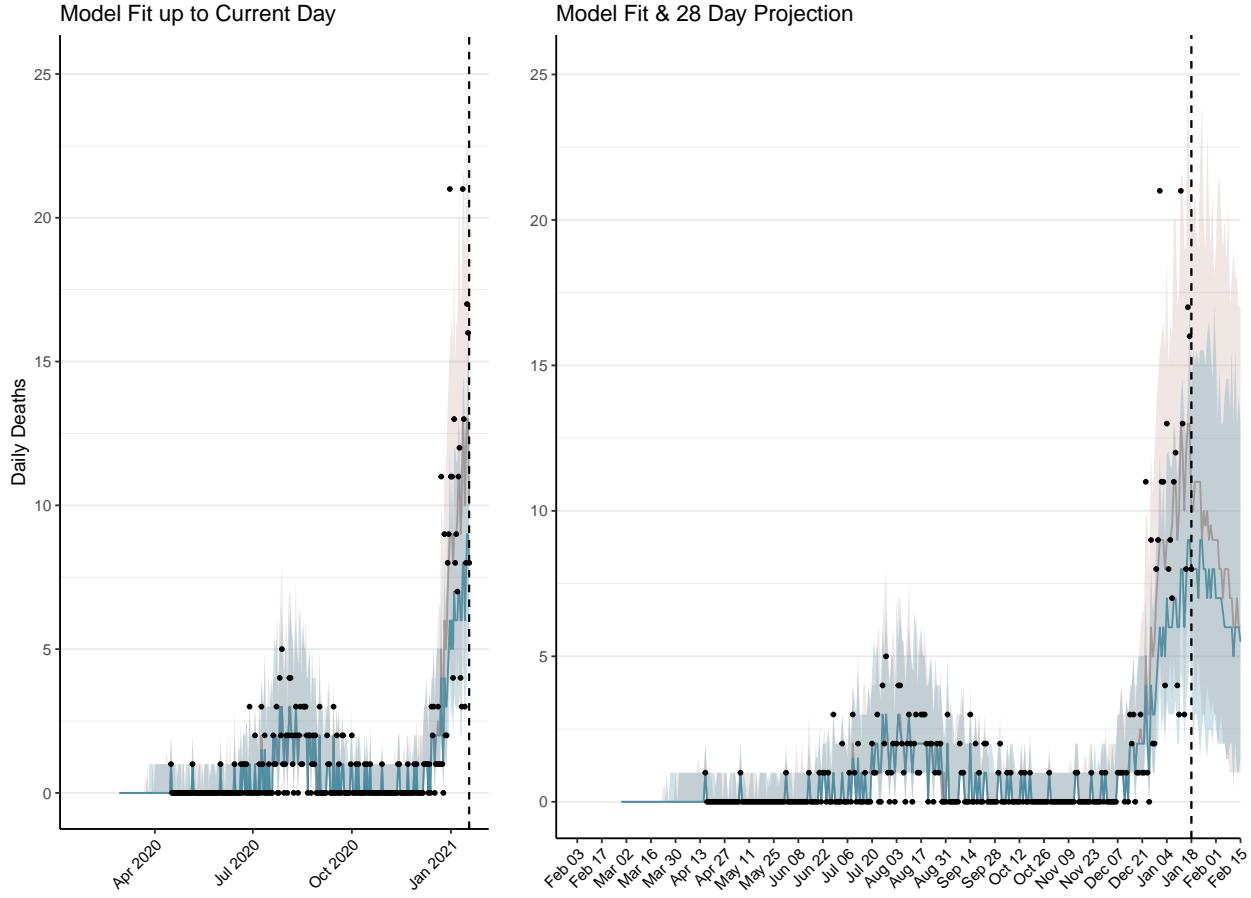


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 330 (95% CI: 316-344) patients requiring treatment with high-pressure oxygen at the current date to 219 (95% CI: 201-238) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 50 (95% CI: 49-52) patients requiring treatment with mechanical ventilation at the current date to 44 (95% CI: 42-45) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

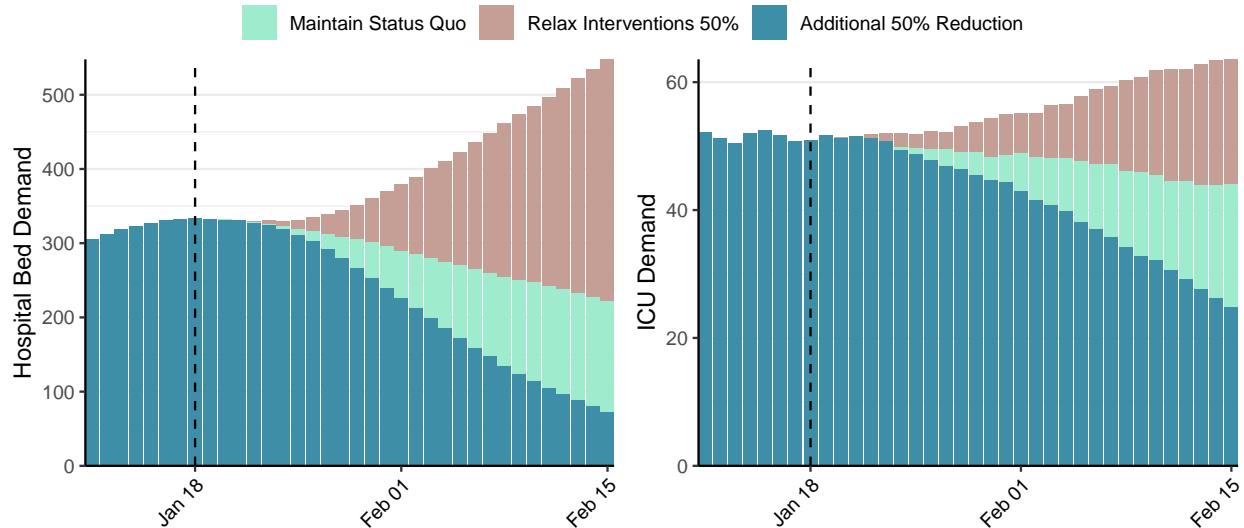


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,791 (95% CI: 3,585-3,998) at the current date to 212 (95% CI: 191-233) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,791 (95% CI: 3,585-3,998) at the current date to 7,975 (95% CI: 7,351-8,598) by 2021-02-15.

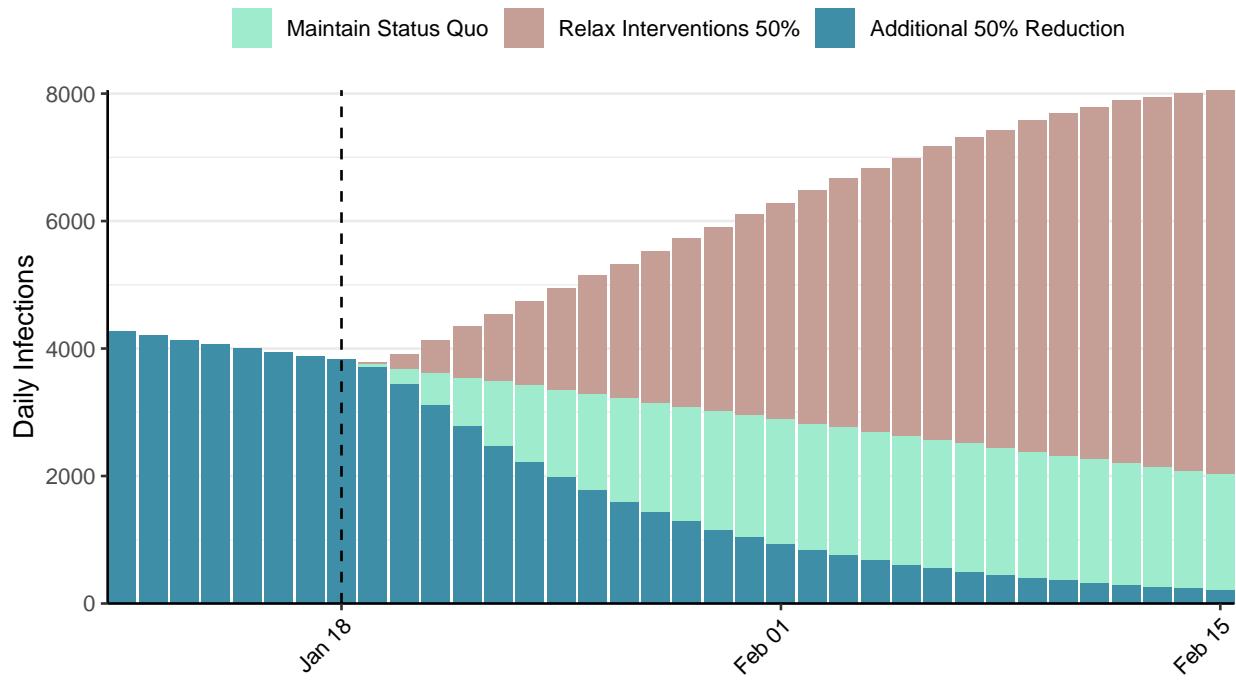


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Syria, 2021-01-18

[Download the report for Syria, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
96	96	9	9	1.01 (95% CI: 0.86-1.18)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Syria is not shown in the following plot as only 9 deaths have been reported to date**

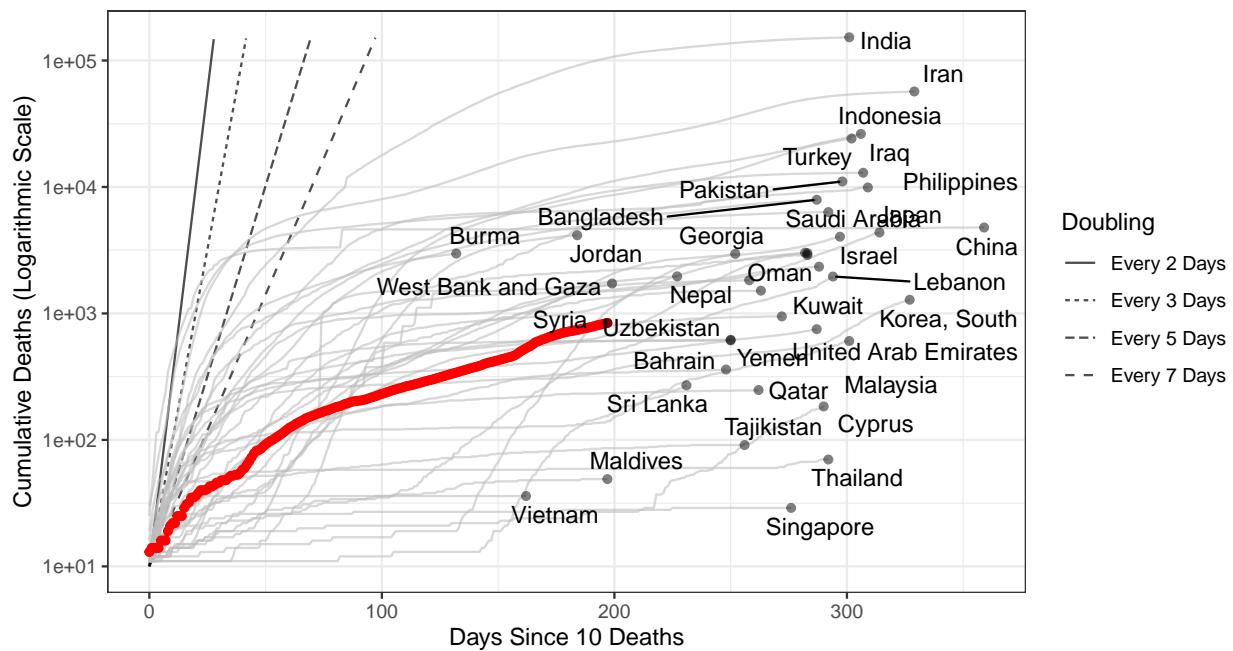


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 115,793 (95% CI: 105,470-126,116) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

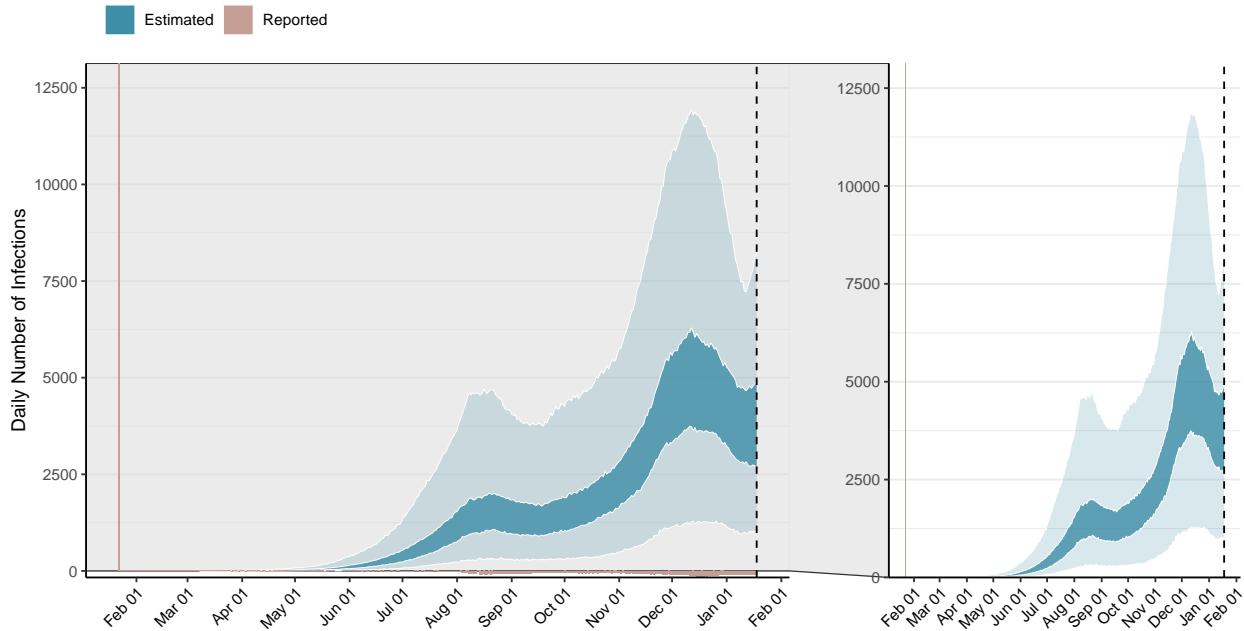


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.

We are aware of under-reporting of deaths in Damascus, Syria. This is not represented in this report, but please see [Report 31](#)

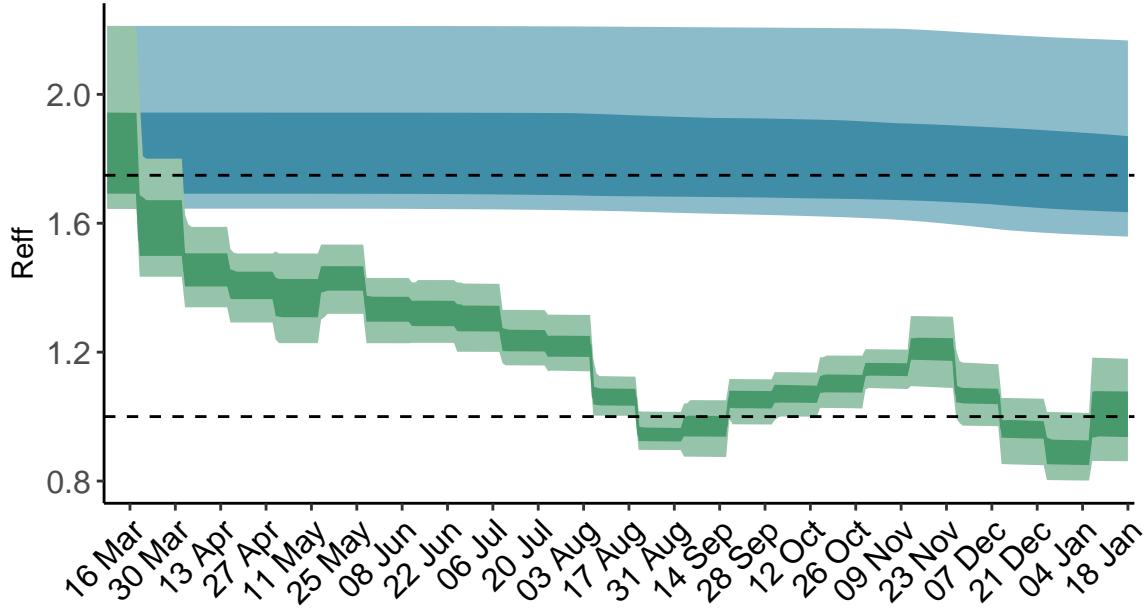


Figure 3: **Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

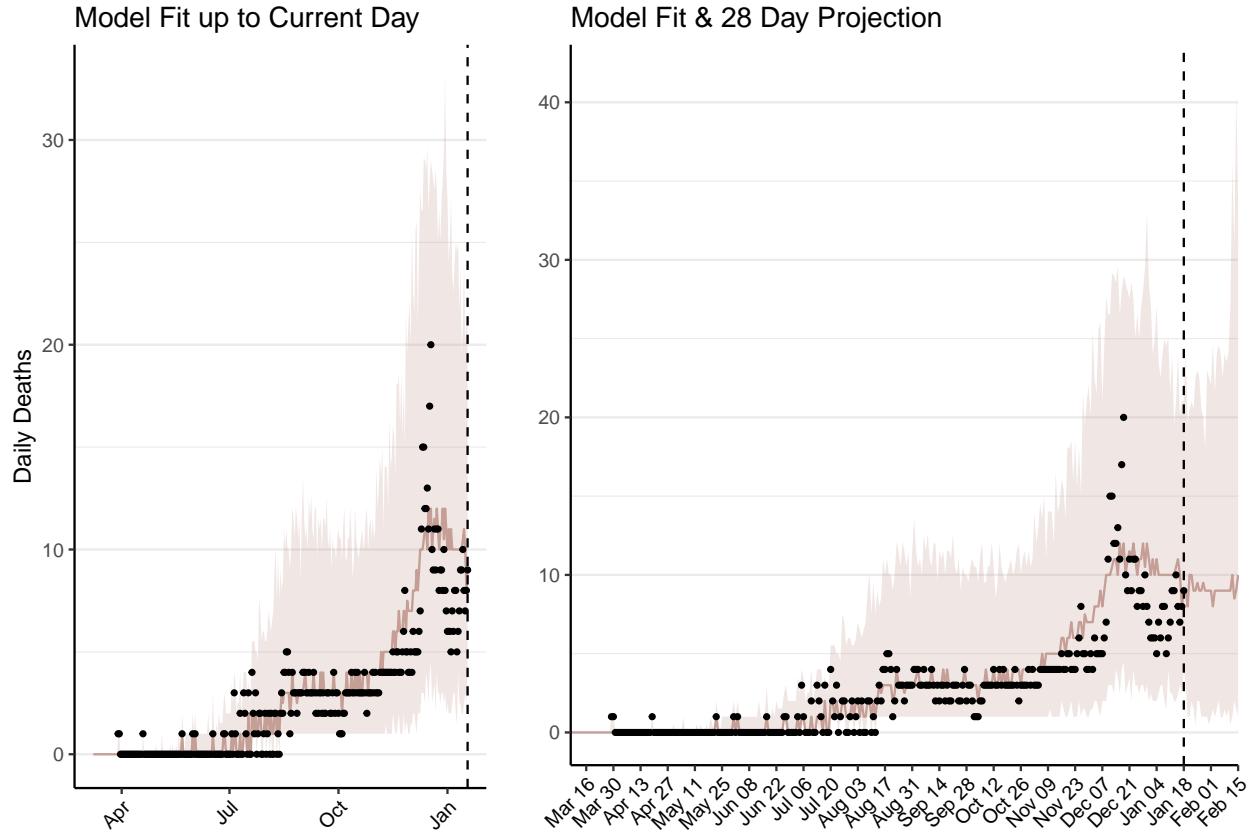


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 381 (95% CI: 347-415) patients requiring treatment with high-pressure oxygen at the current date to 405 (95% CI: 356-454) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 152 (95% CI: 138-165) patients requiring treatment with mechanical ventilation at the current date to 154 (95% CI: 137-171) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

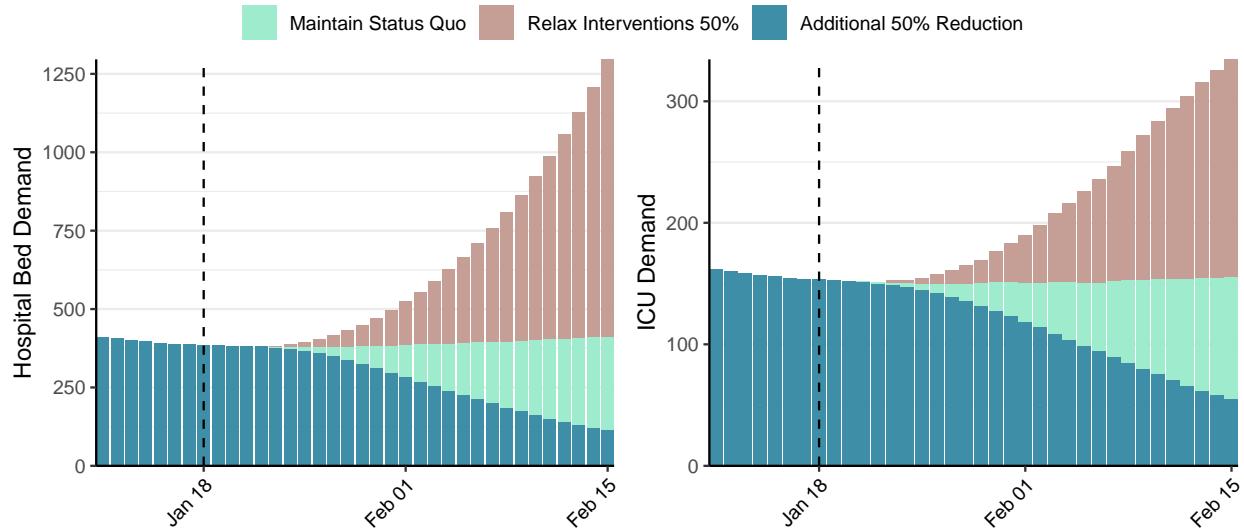


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,876 (95% CI: 3,514-4,239) at the current date to 368 (95% CI: 318-417) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,876 (95% CI: 3,514-4,239) at the current date to 26,345 (95% CI: 22,365-30,325) by 2021-02-15.

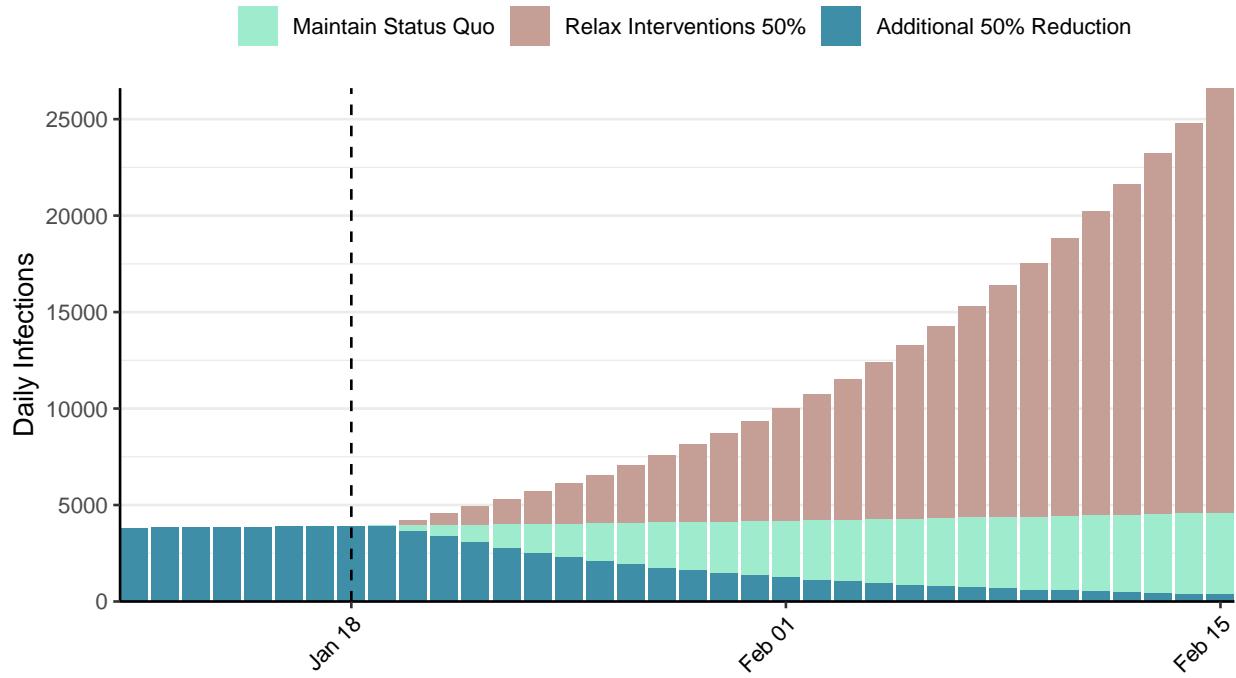


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Chad, 2021-01-18

[Download the report for Chad, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
24	24	2	2	1.27 (95% CI: 1.03-1.52)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Chad is not shown in the following plot as only 2 deaths have been reported to date**

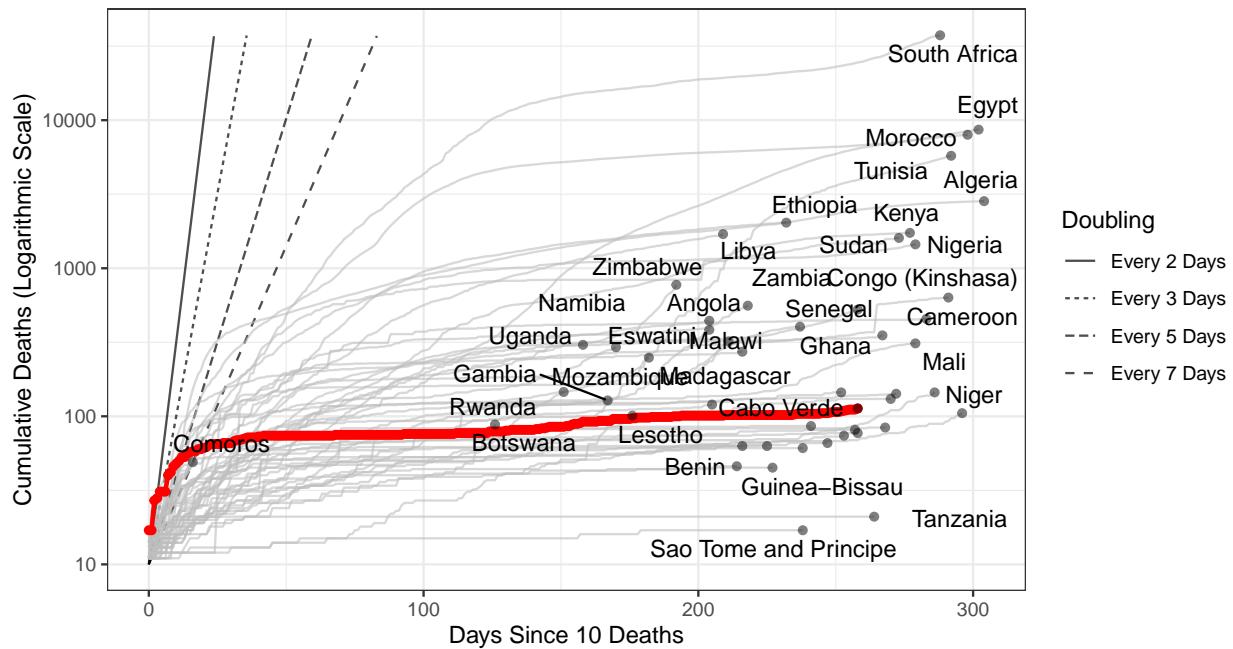


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 14,968 (95% CI: 13,730-16,206) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

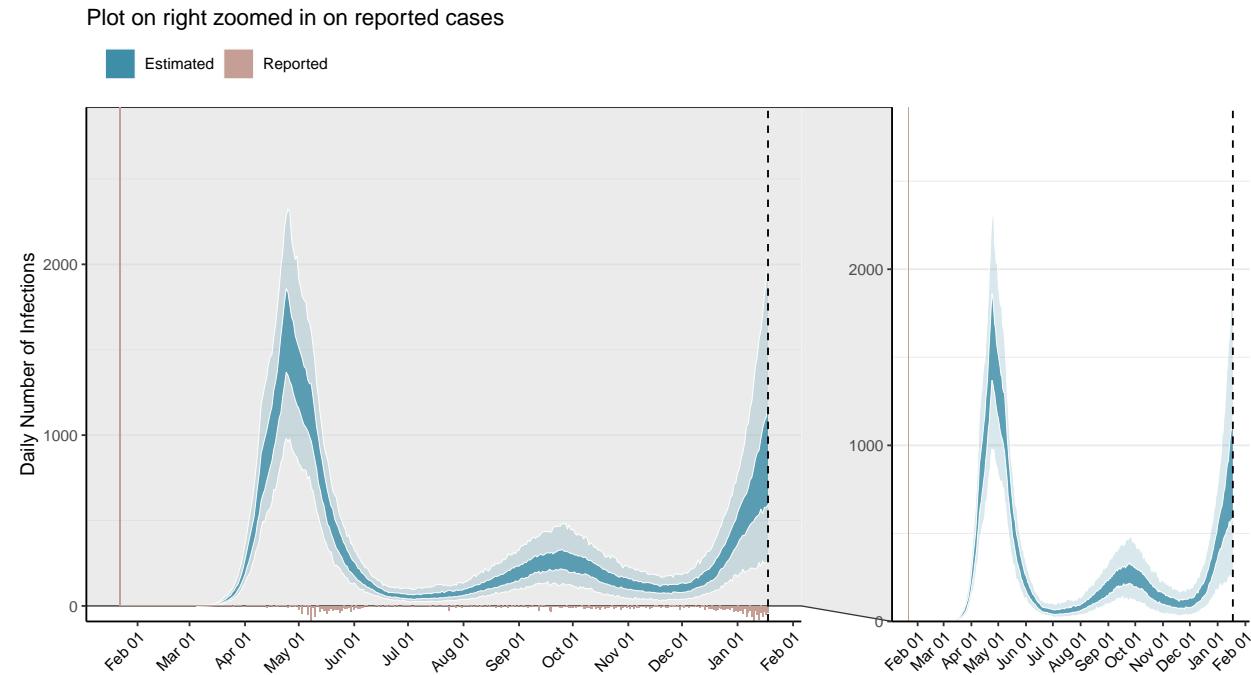
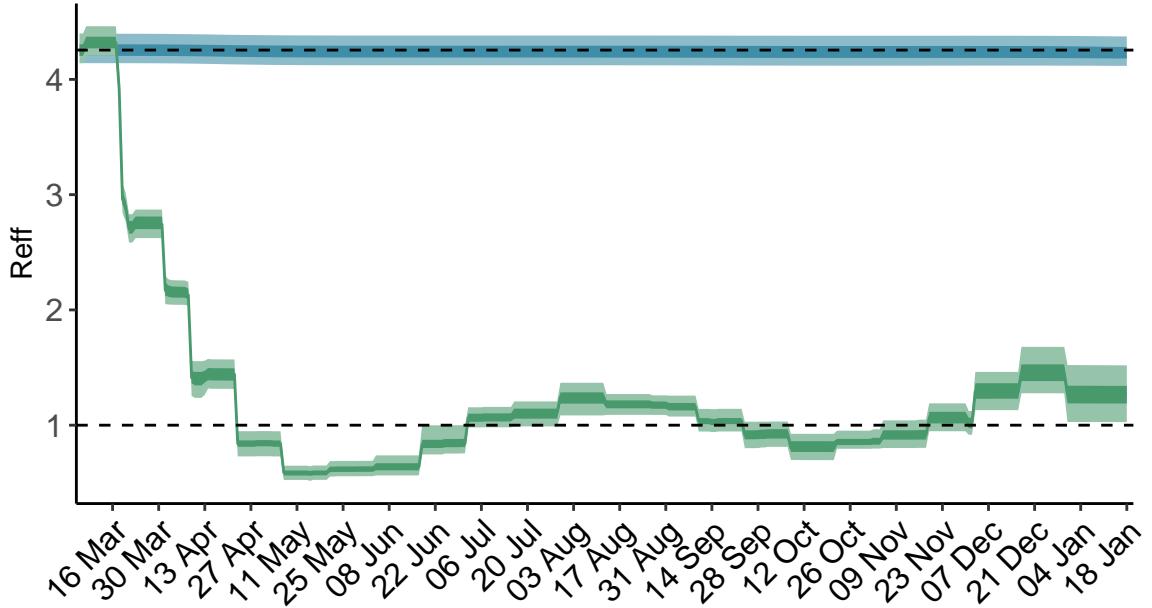


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Chad is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

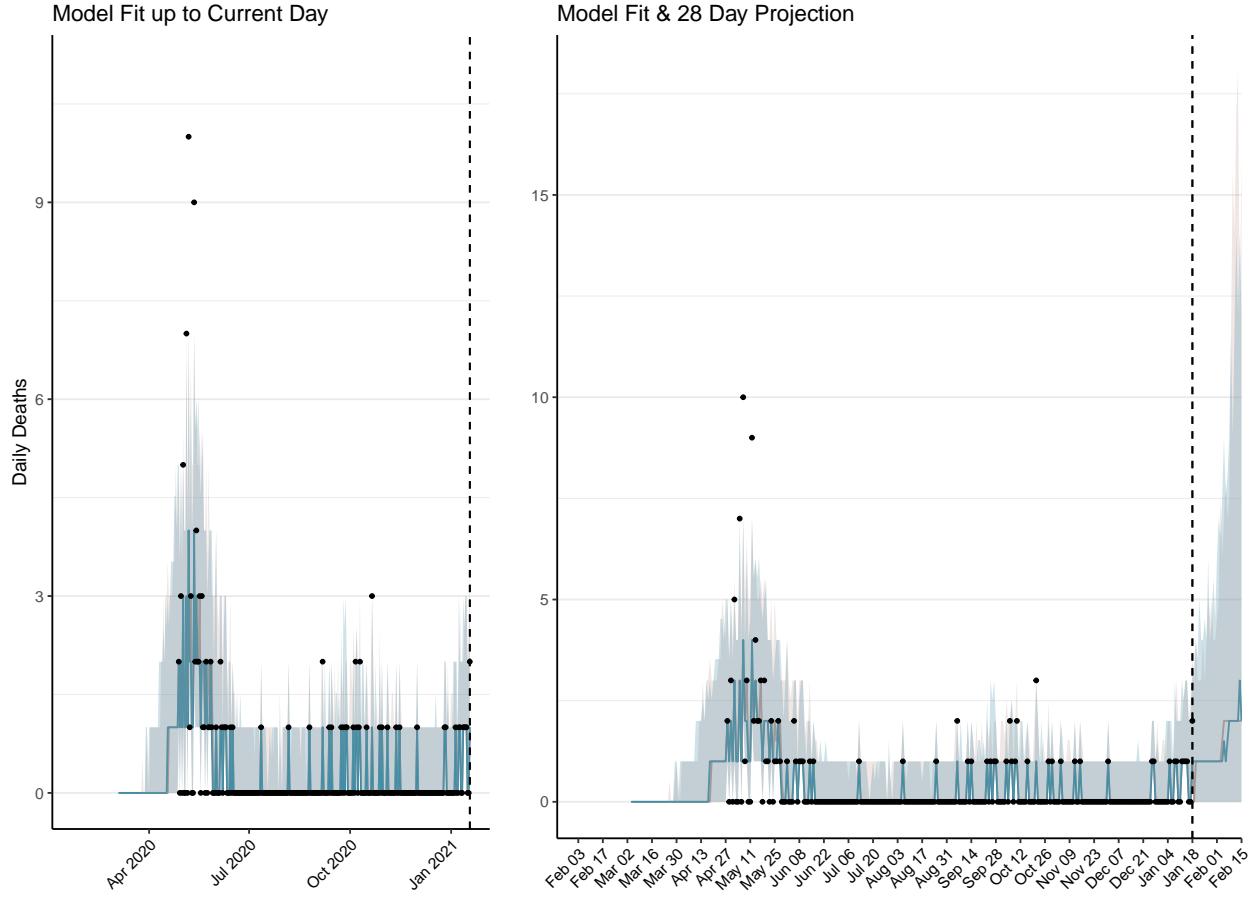


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 43 (95% CI: 39-47) patients requiring treatment with high-pressure oxygen at the current date to 147 (95% CI: 122-171) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 15 (95% CI: 14-17) patients requiring treatment with mechanical ventilation at the current date to 48 (95% CI: 42-54) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

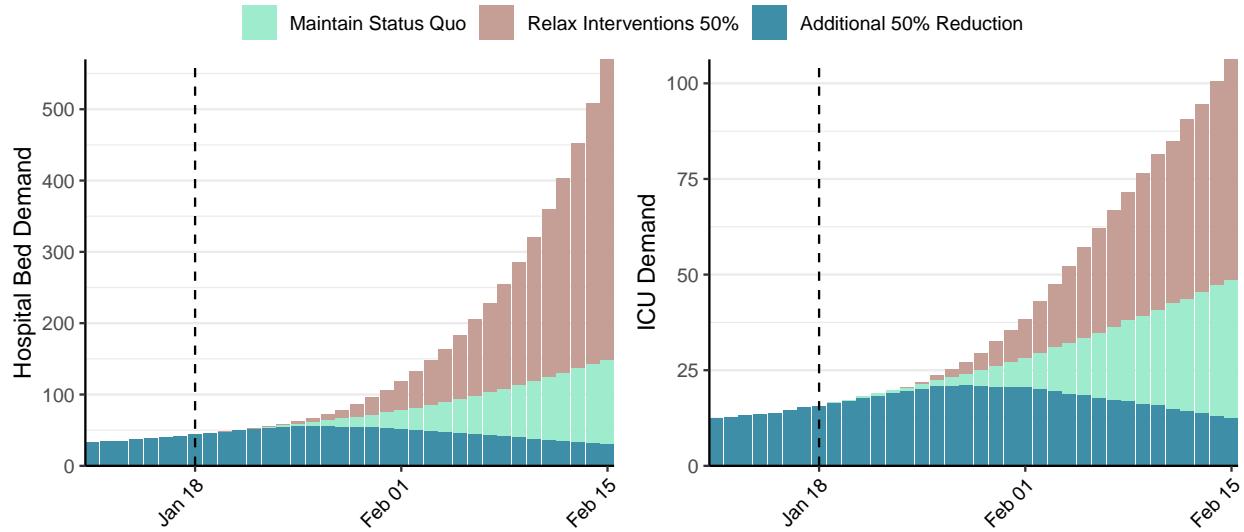


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 902 (95% CI: 805-999) at the current date to 205 (95% CI: 168-241) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 902 (95% CI: 805-999) at the current date to 21,938 (95% CI: 17,509-26,367) by 2021-02-15.

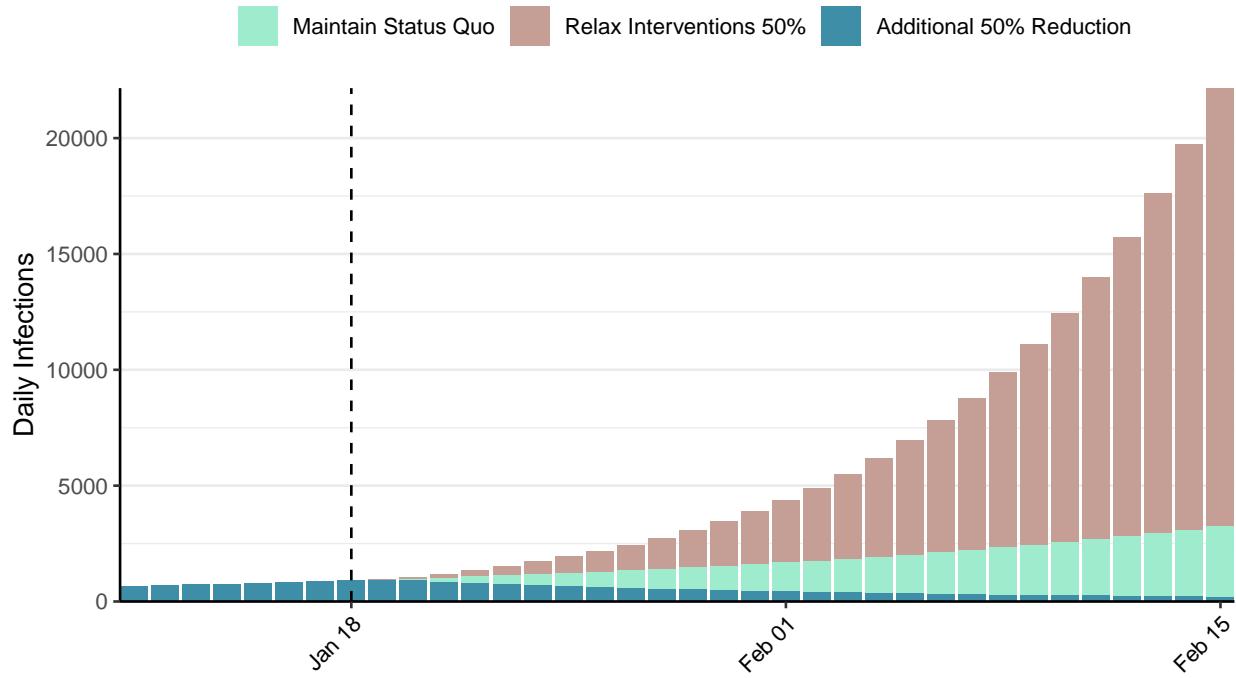


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Togo, 2021-01-18

[Download the report for Togo, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
22	22	1	1	1.37 (95% CI: 1.07-1.71)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Togo is not shown in the following plot as only 1 deaths have been reported to date**

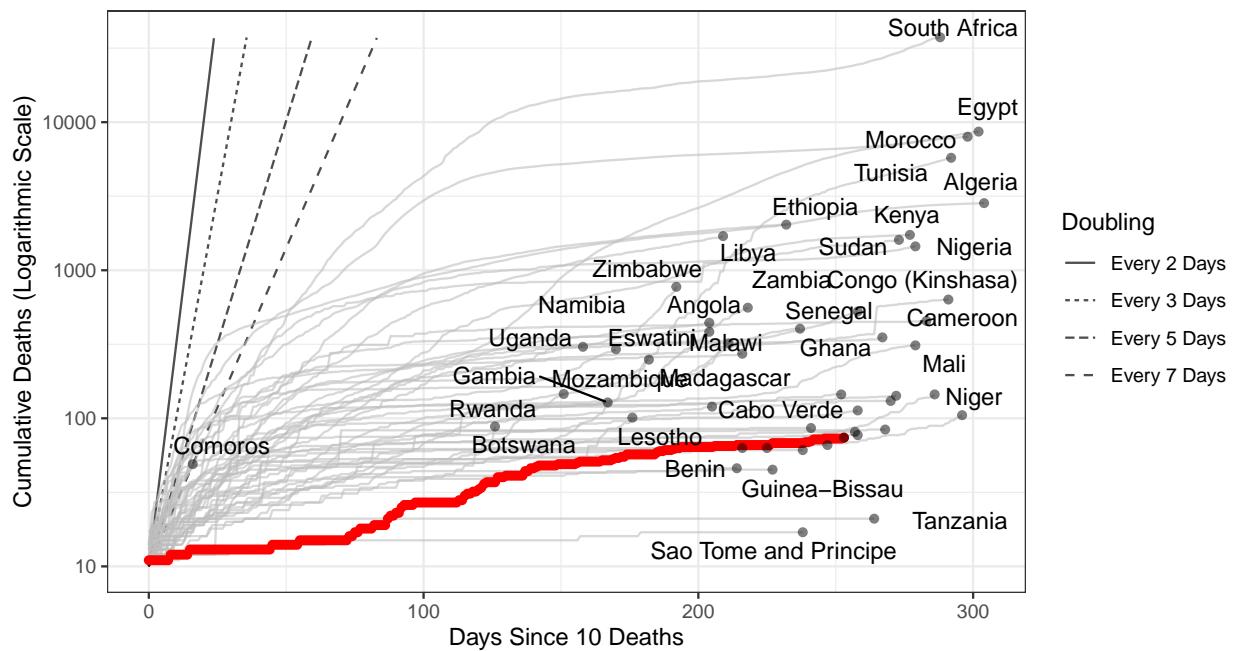


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 11,717 (95% CI: 10,649-12,784) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

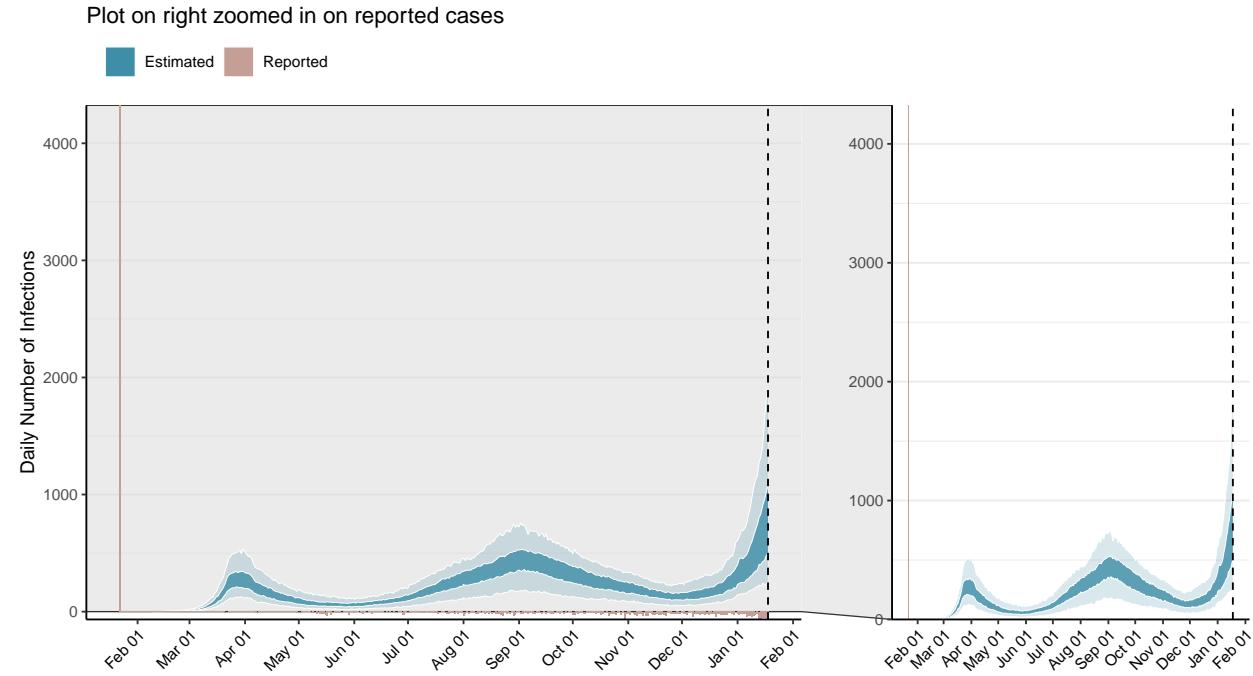
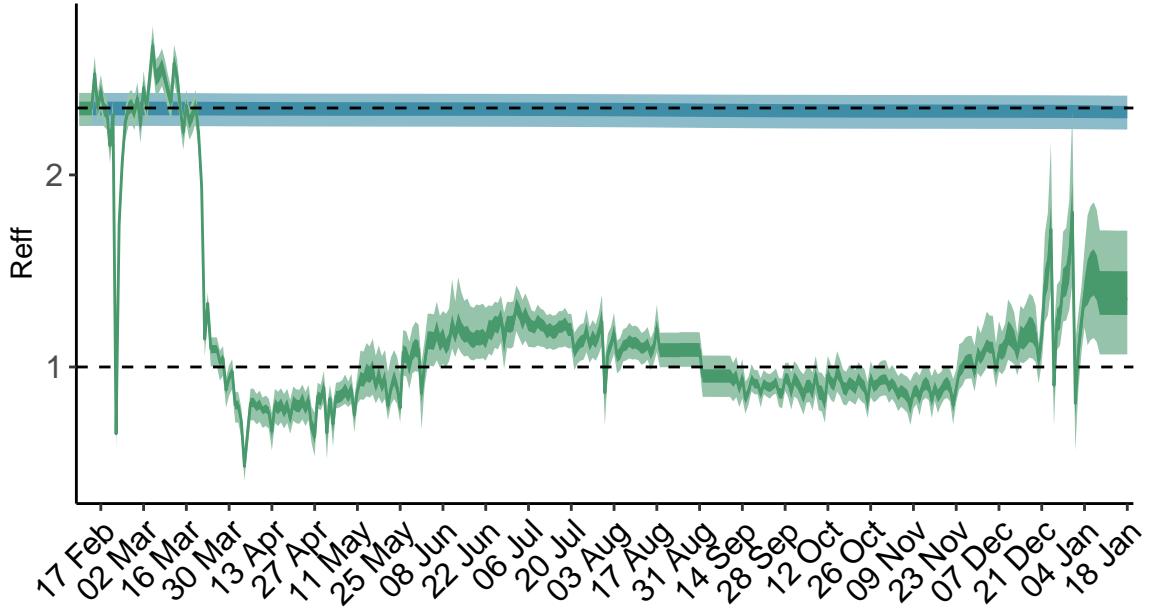


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Togo is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

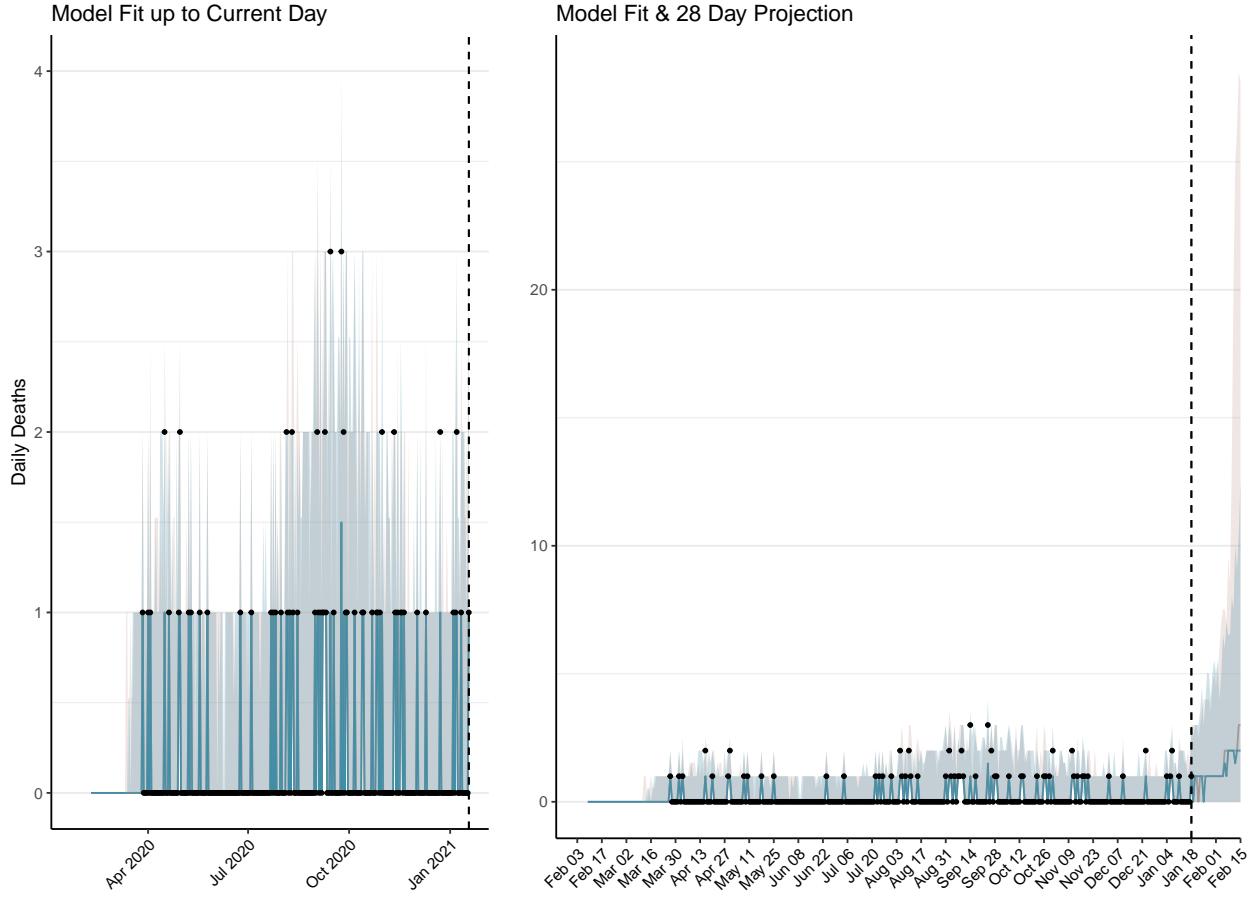


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 35 (95% CI: 31-38) patients requiring treatment with high-pressure oxygen at the current date to 184 (95% CI: 150-218) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 13 (95% CI: 11-14) patients requiring treatment with mechanical ventilation at the current date to 62 (95% CI: 53-72) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

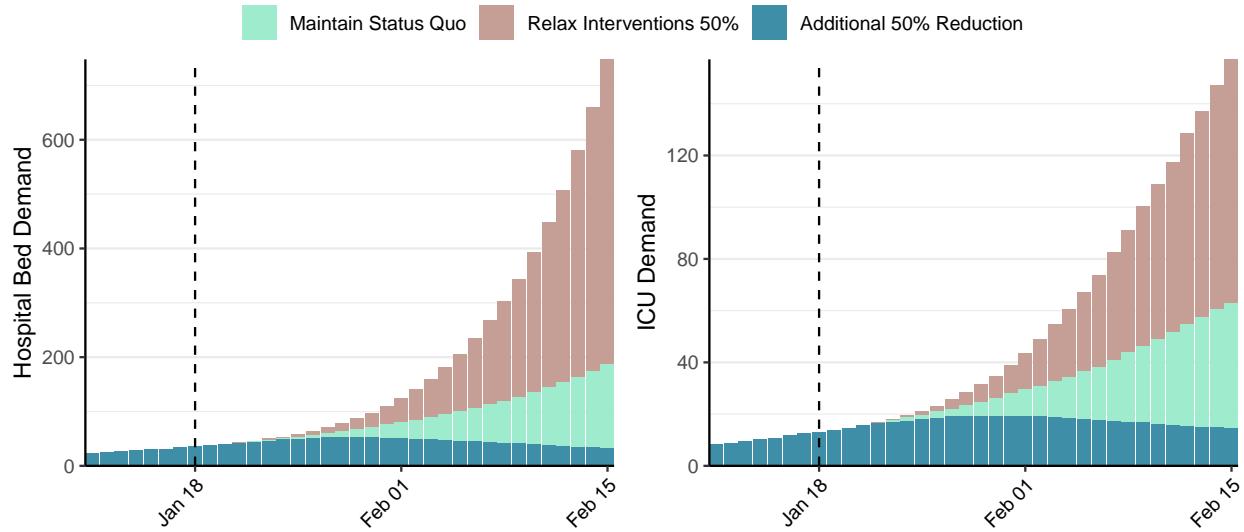


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 802 (95% CI: 709-895) at the current date to 256 (95% CI: 205-307) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 802 (95% CI: 709-895) at the current date to 29,381 (95% CI: 23,146-35,616) by 2021-02-15.

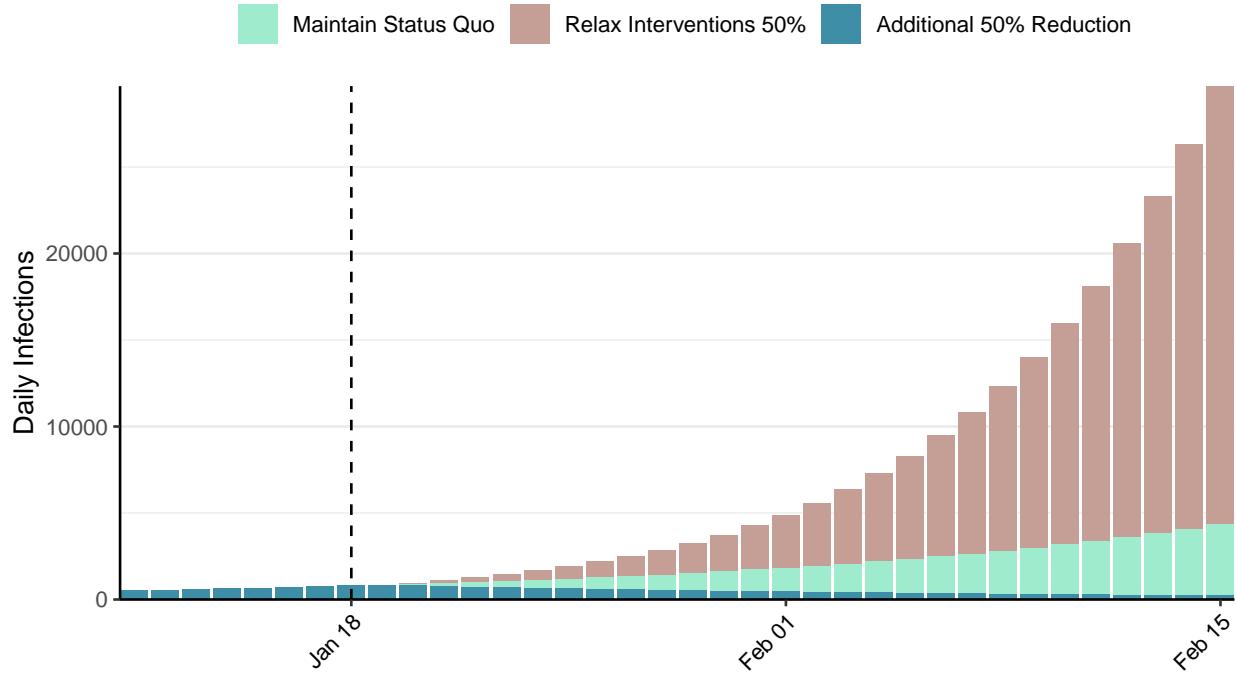


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Thailand, 2021-01-18

[Download the report for Thailand, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
171	171	0	0	1.02 (95% CI: 0.8-1.22)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Thailand is not shown in the following plot as only 0 deaths have been reported to date**

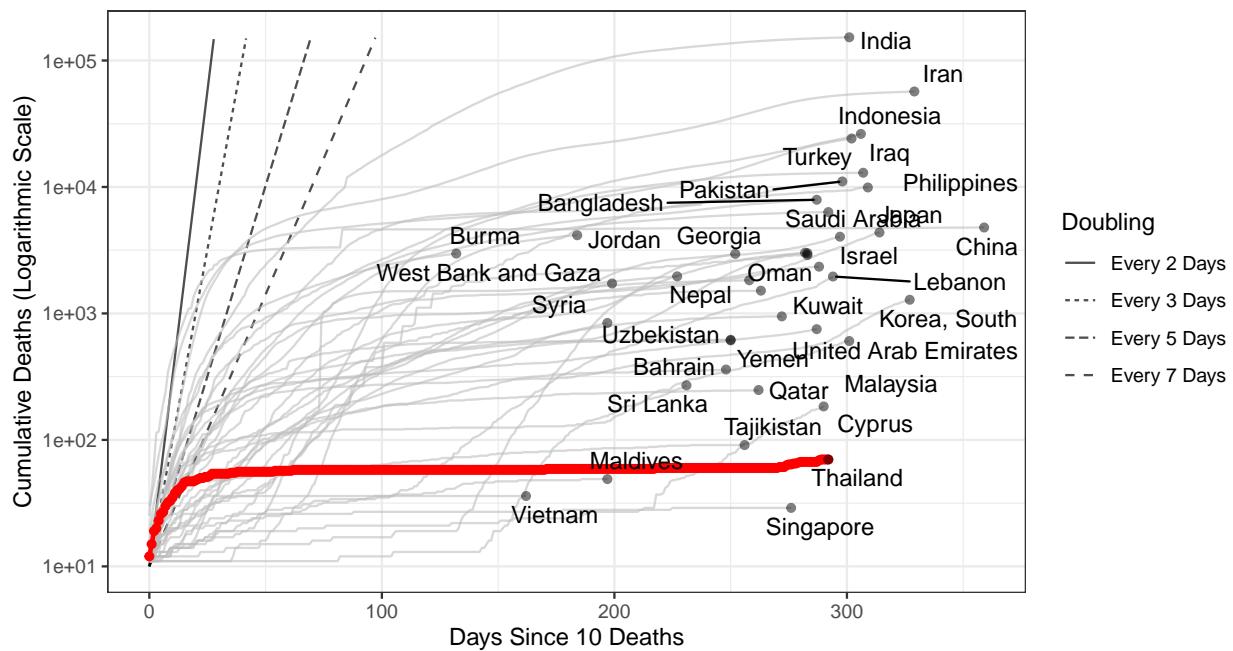


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3,968 (95% CI: 3,142-4,795) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Thailand has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

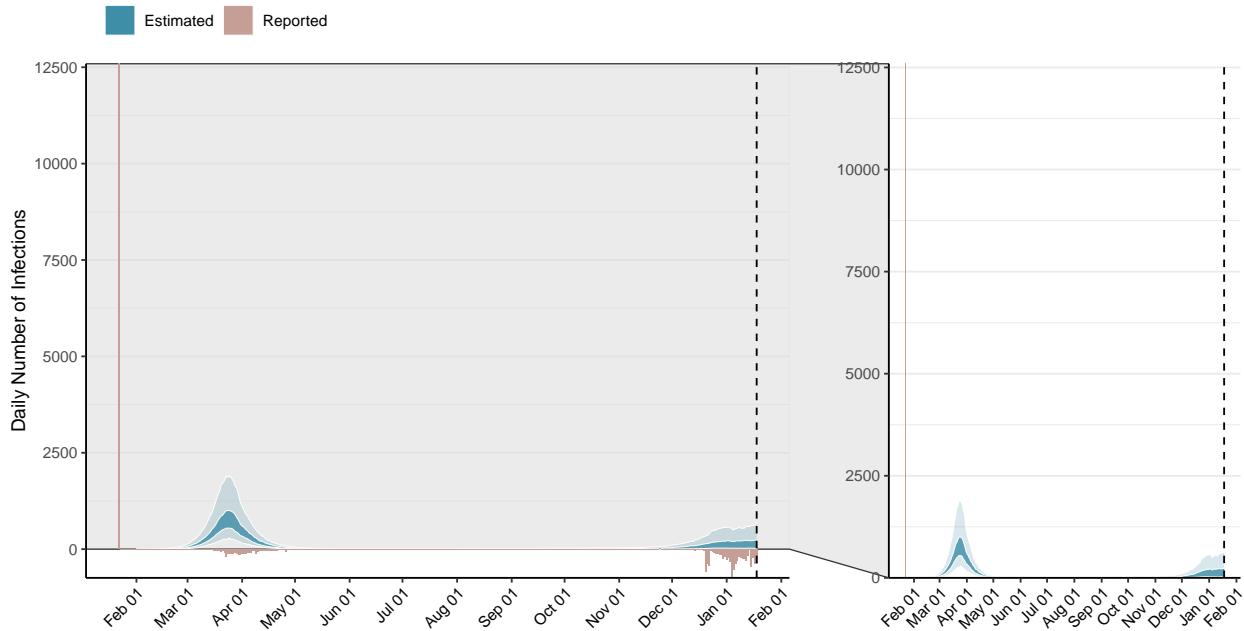
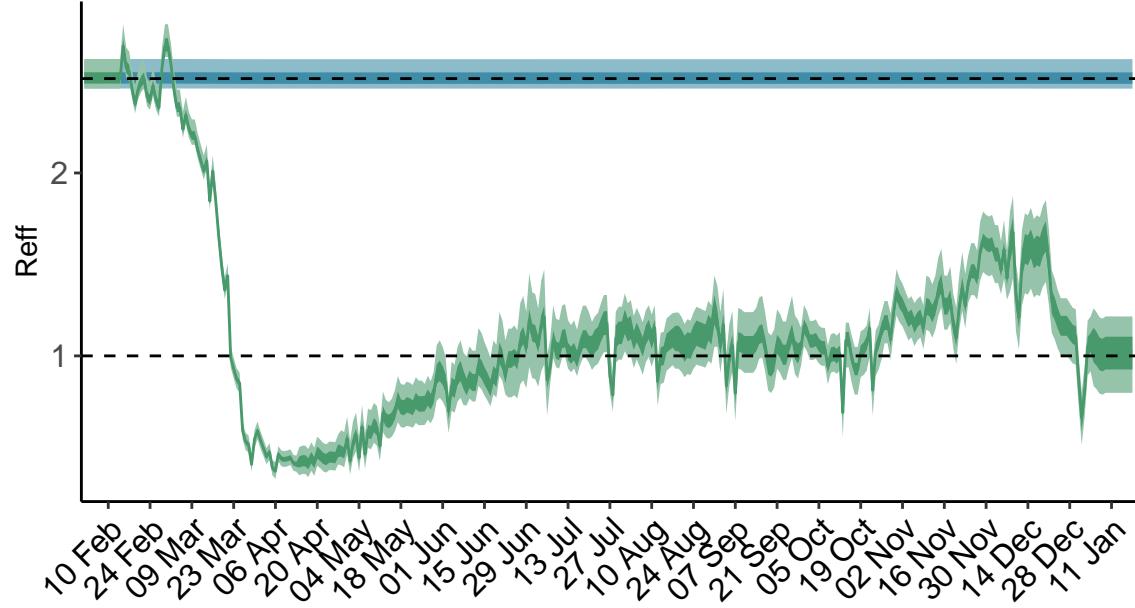


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

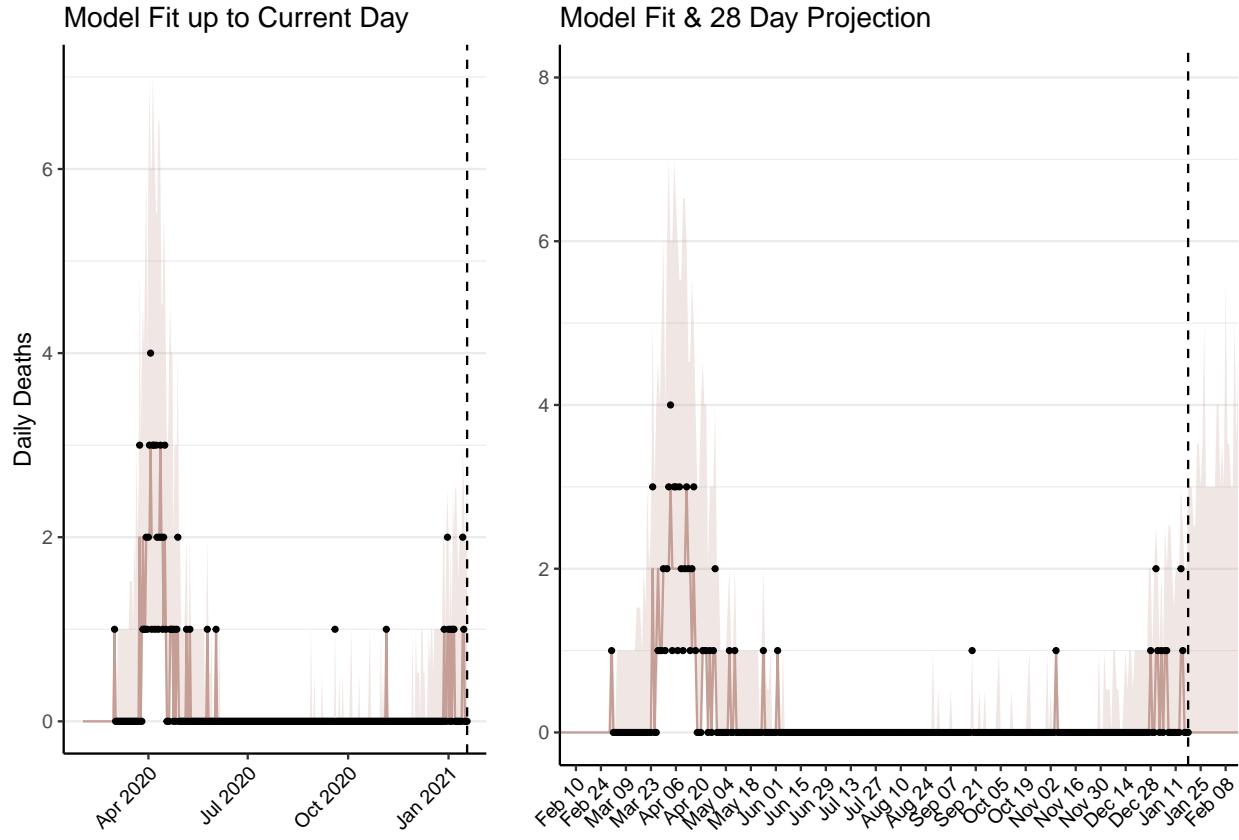


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 20 (95% CI: 16-25) patients requiring treatment with high-pressure oxygen at the current date to 28 (95% CI: 20-36) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 8 (95% CI: 6-10) patients requiring treatment with mechanical ventilation at the current date to 11 (95% CI: 8-14) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

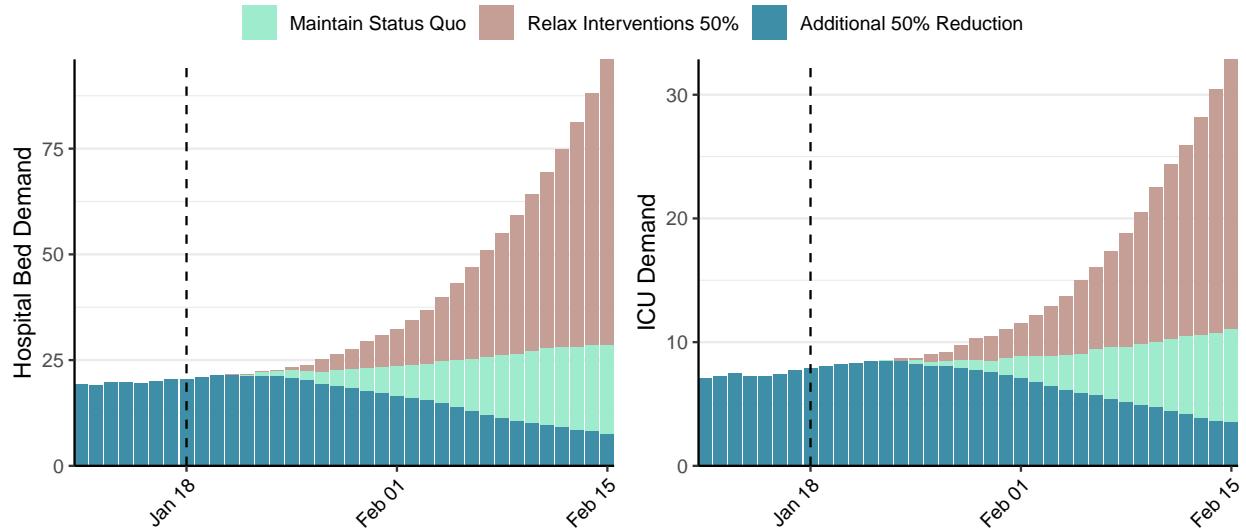


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 157 (95% CI: 120-194) at the current date to 18 (95% CI: 13-24) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 157 (95% CI: 120-194) at the current date to 1,464 (95% CI: 974-1,954) by 2021-02-15.

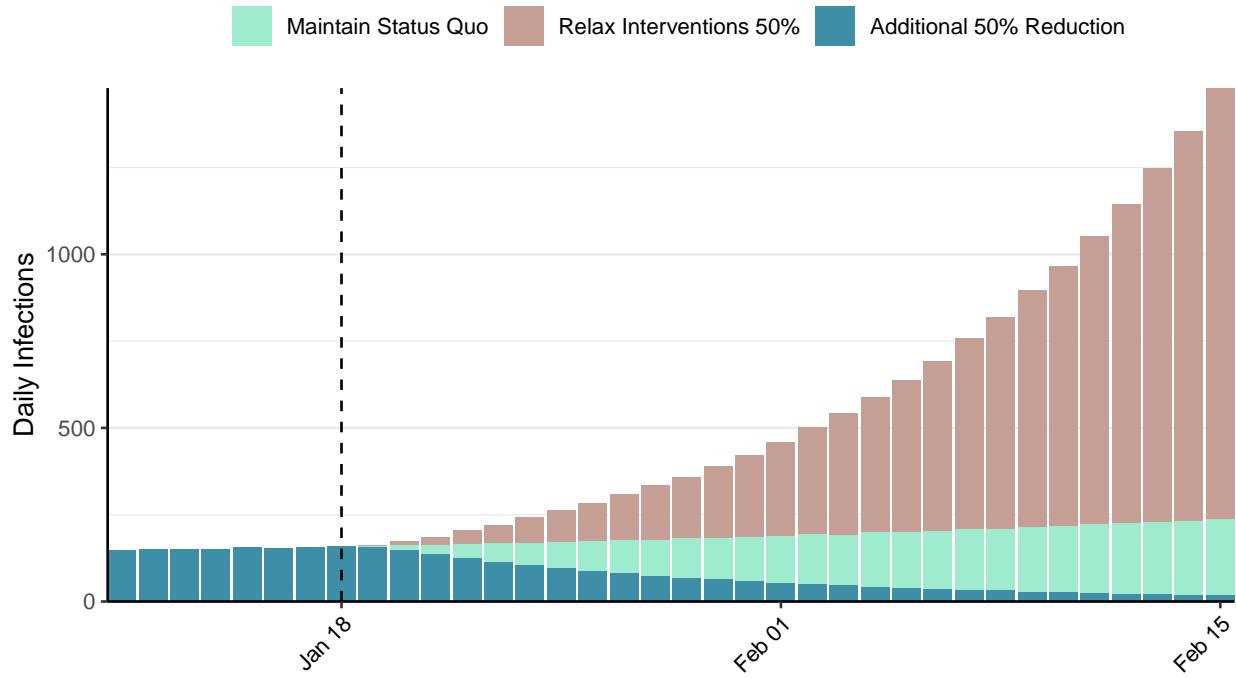


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Tajikistan, 2021-01-18

[Download the report for Tajikistan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.7 (95% CI: 0.48-0.96)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Tajikistan is not shown in the following plot as only 0 deaths have been reported to date**

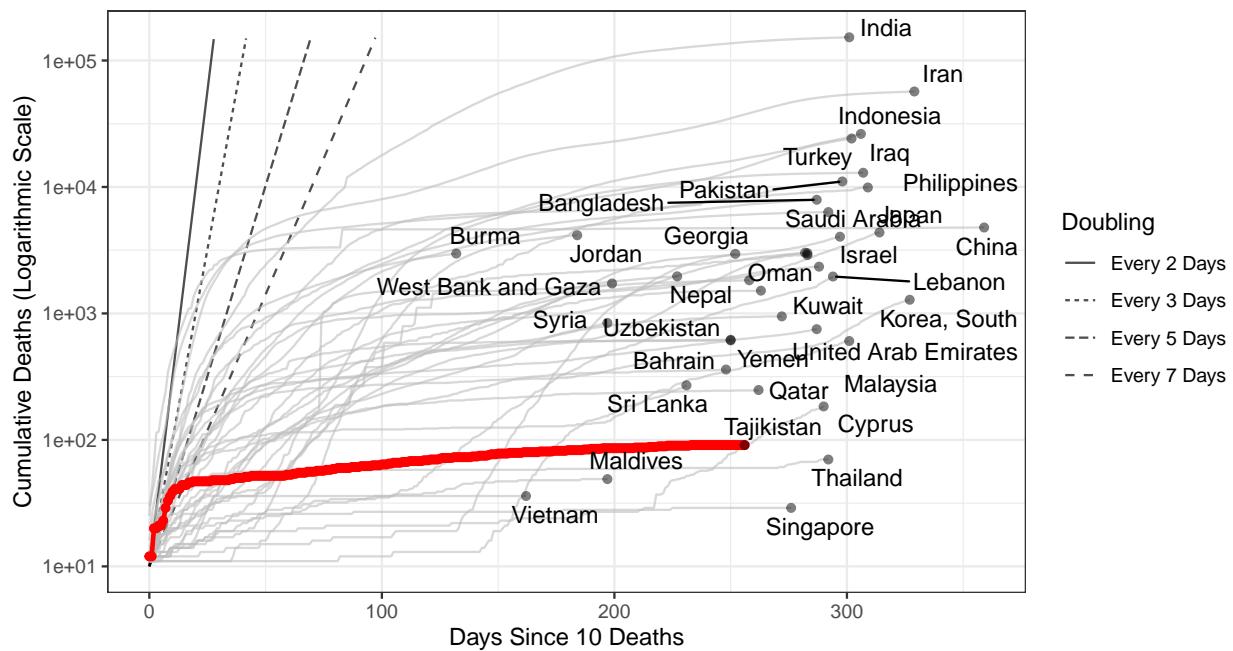


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,300 (95% CI: 1,141-1,458) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

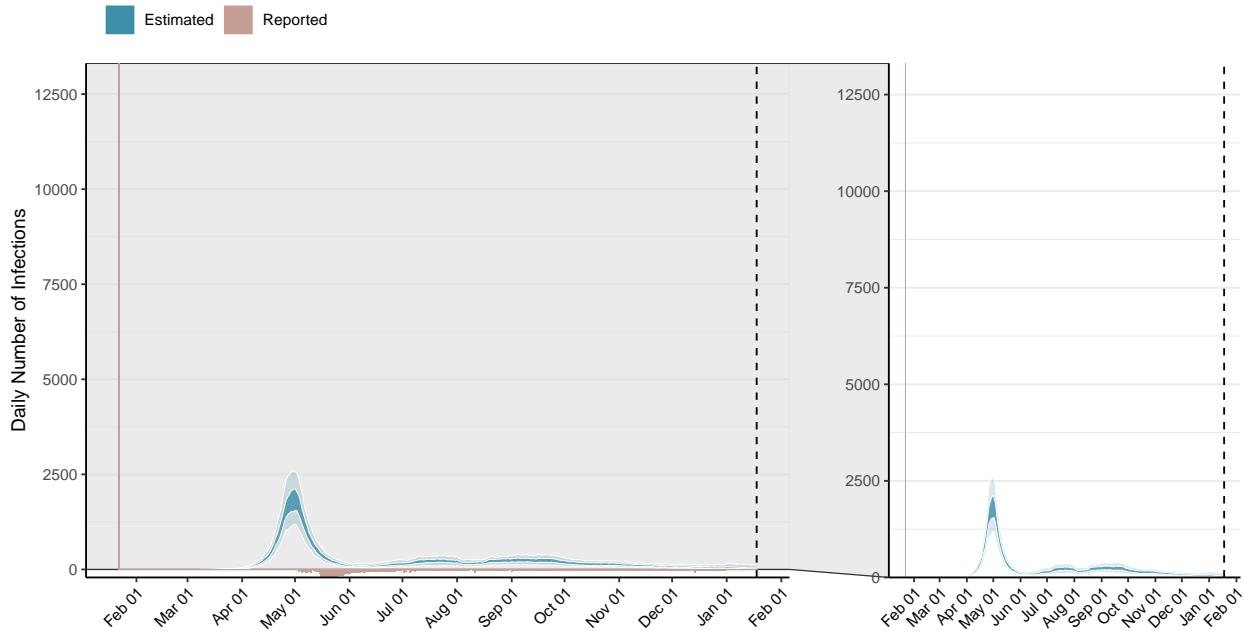
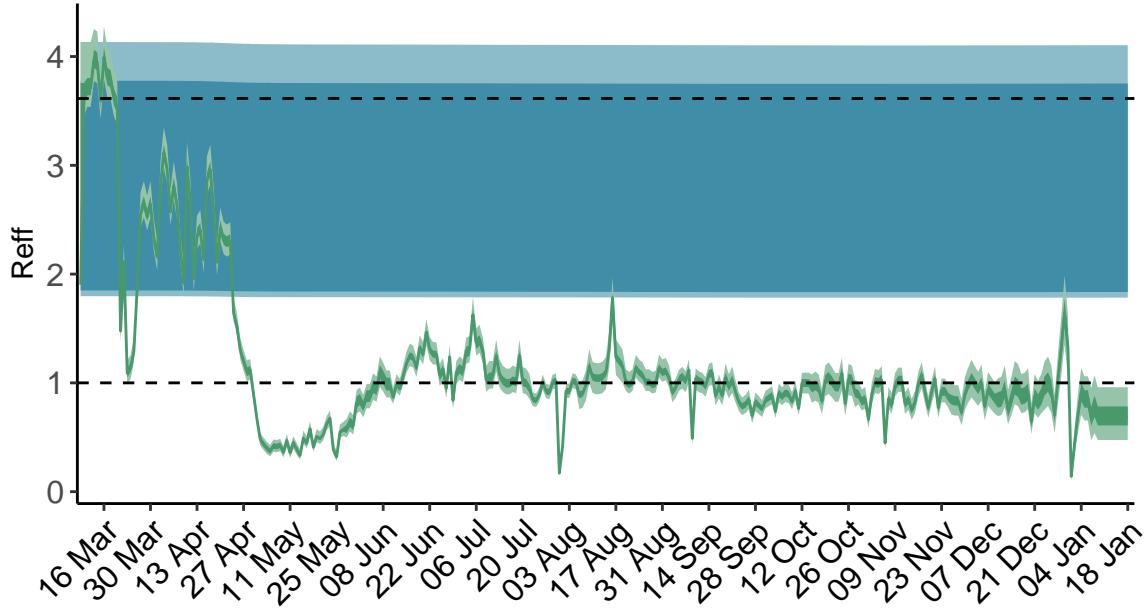


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

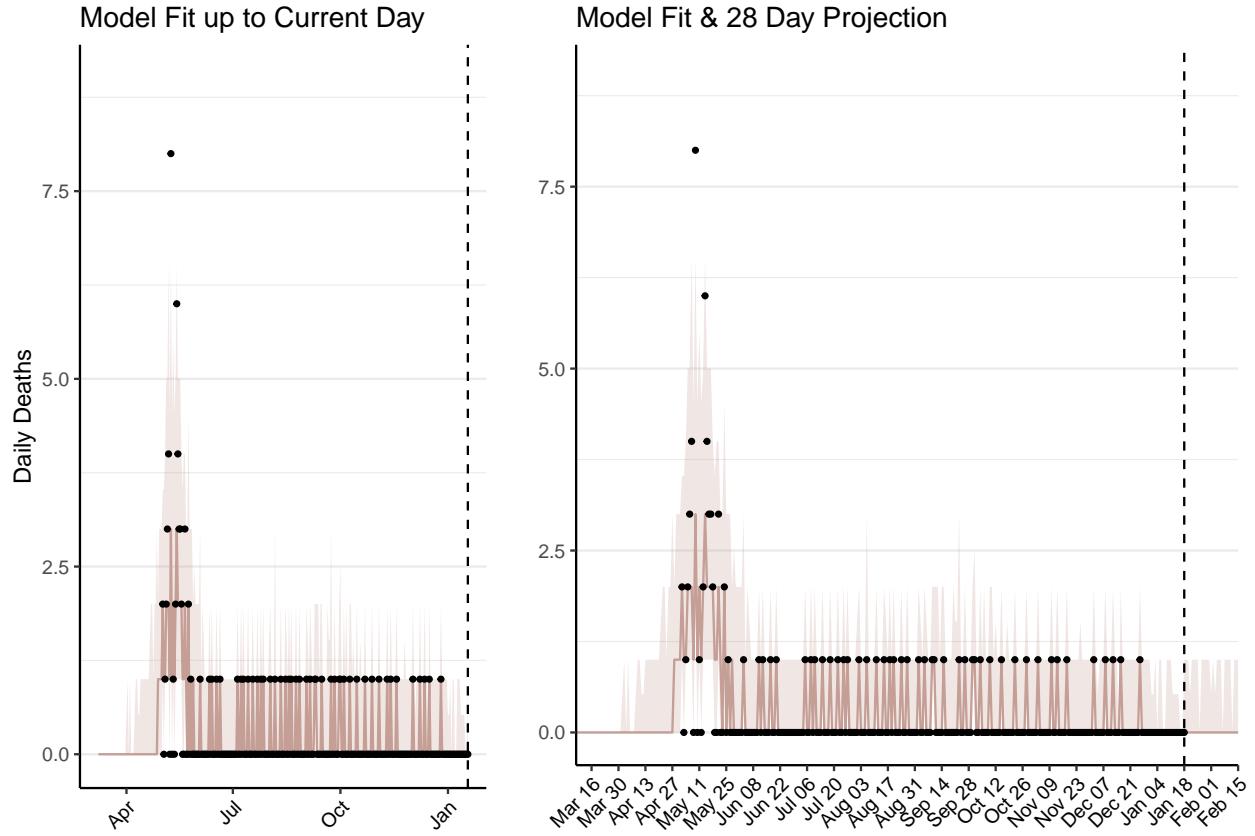


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 3 (95% CI: 3-4) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 1-2) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1 (95% CI: 1-2) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 0-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

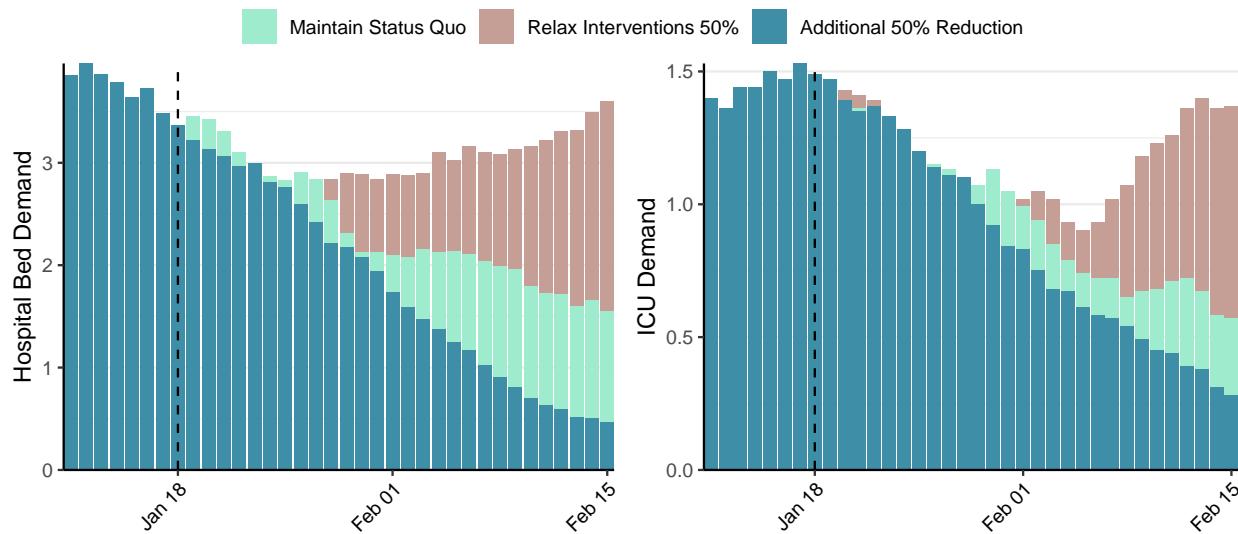


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 31 (95% CI: 25-36) at the current date to 1 (95% CI: 1-1) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 31 (95% CI: 25-36) at the current date to 72 (95% CI: 45-99) by 2021-02-15.

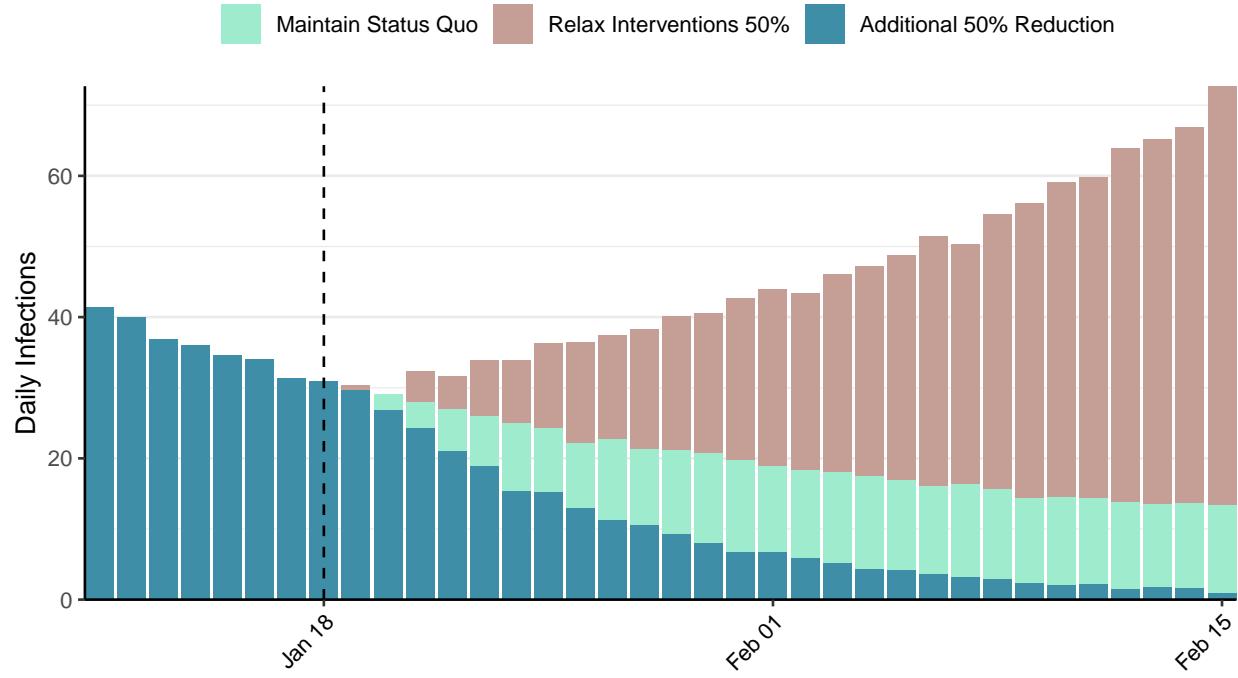


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Tunisia, 2021-01-18

[Download the report for Tunisia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.09 (95% CI: 0.96-1.23)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Tunisia is not shown in the following plot as only 0 deaths have been reported to date**

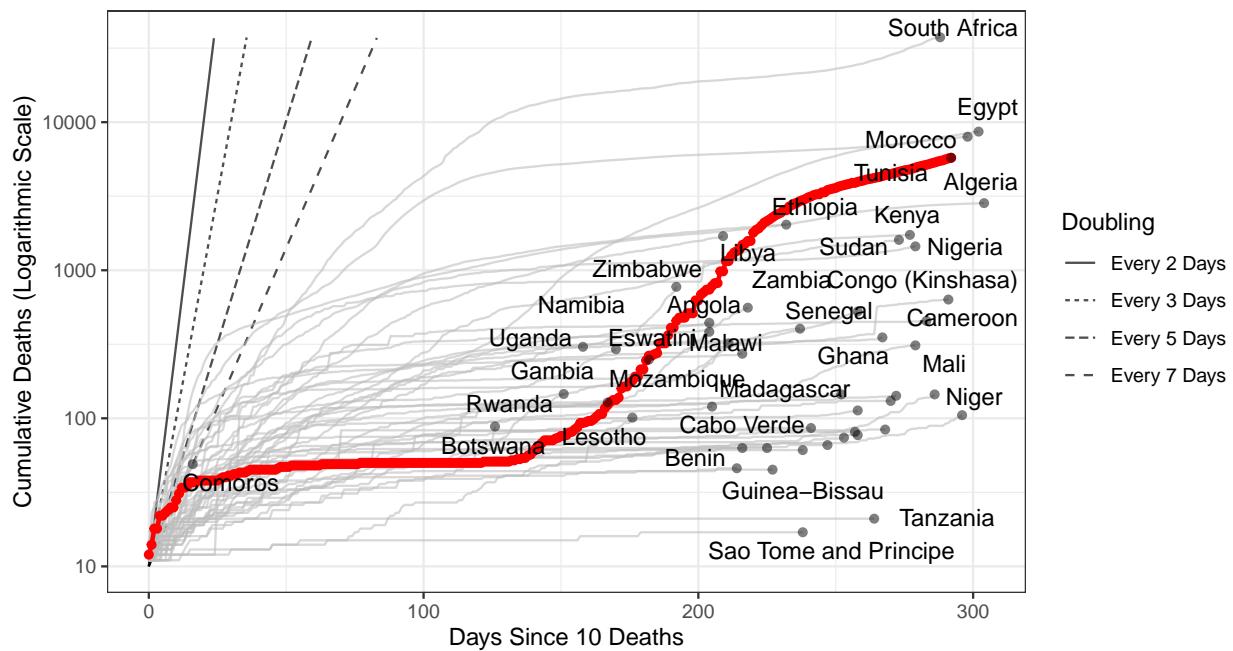


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 404,219 (95% CI: 392,904-415,535) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

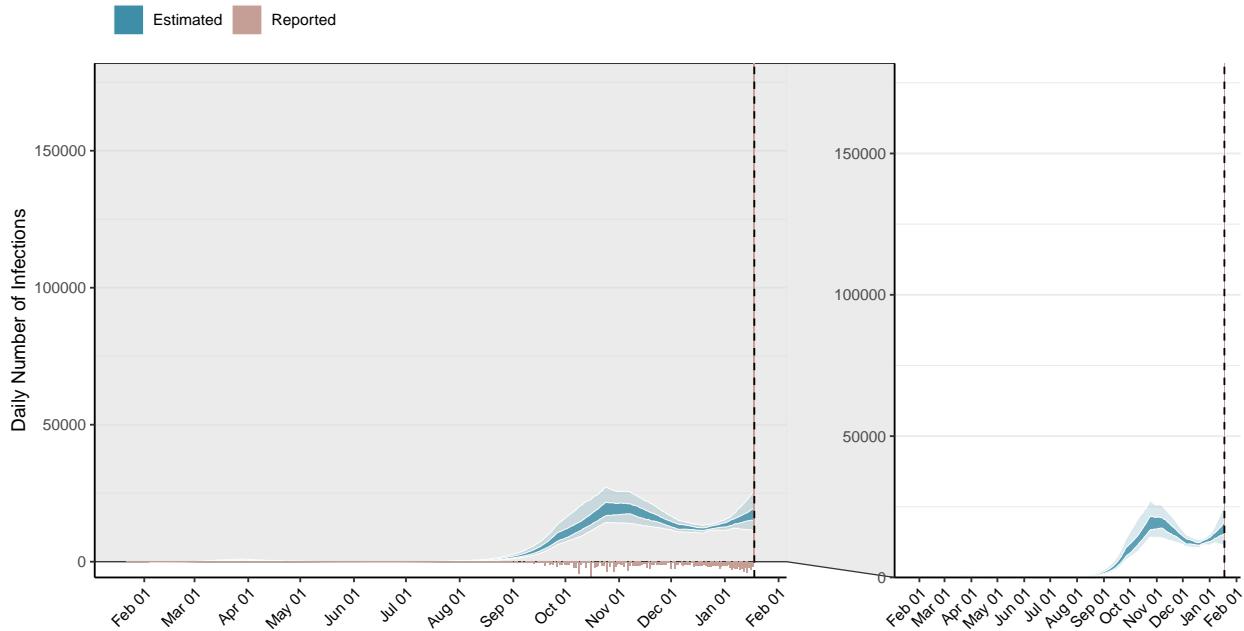
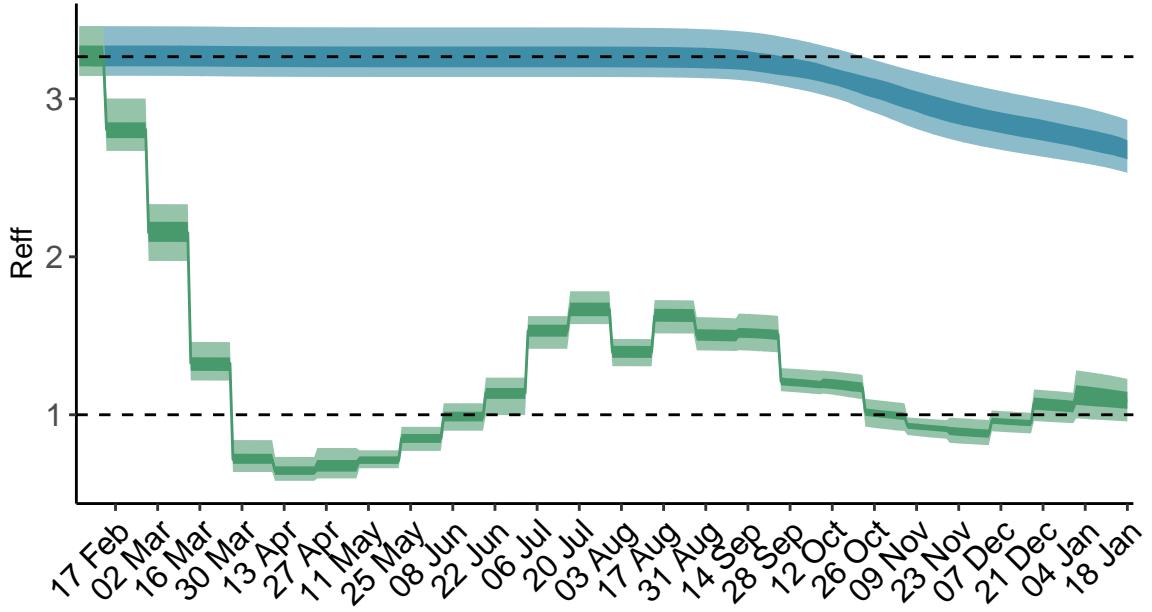


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Tunisia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

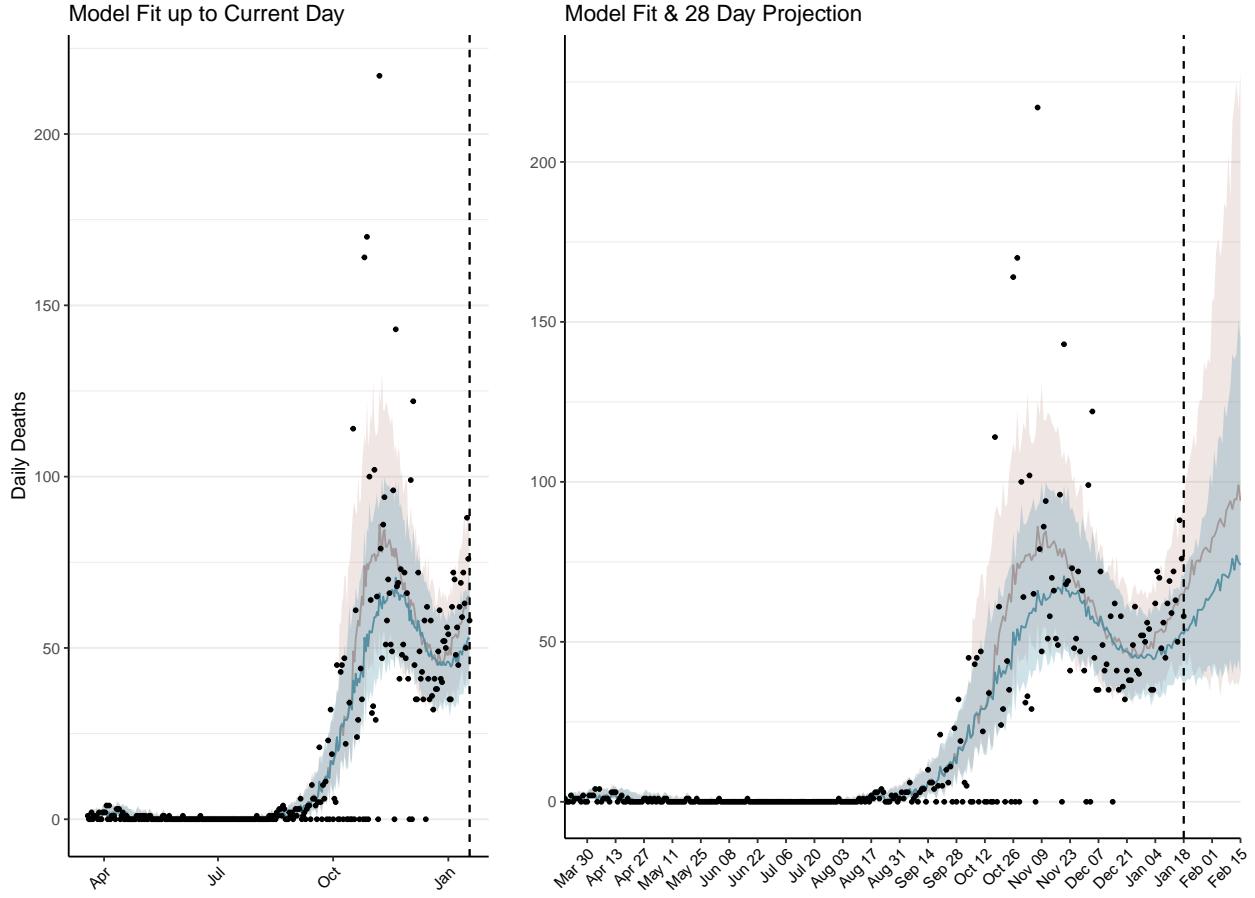


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,934 (95% CI: 1,877-1,991) patients requiring treatment with high-pressure oxygen at the current date to 2,884 (95% CI: 2,660-3,108) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 527 (95% CI: 516-538) patients requiring treatment with mechanical ventilation at the current date to 575 (95% CI: 558-592) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

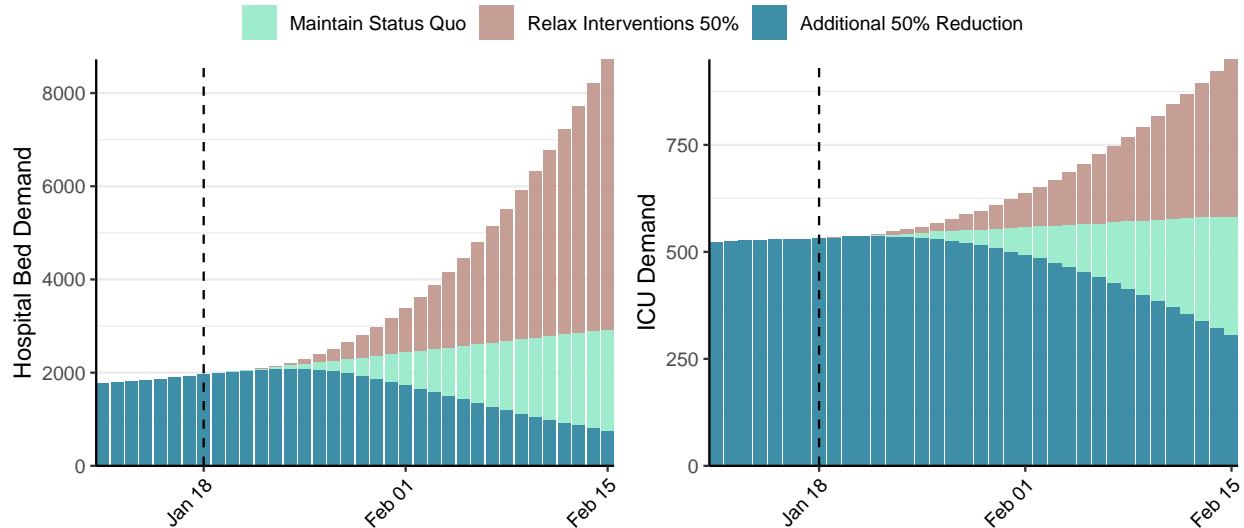


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 17,760 (95% CI: 16,937-18,584) at the current date to 2,090 (95% CI: 1,896-2,285) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 17,760 (95% CI: 16,937-18,584) at the current date to 111,457 (95% CI: 103,169-119,746) by 2021-02-15.

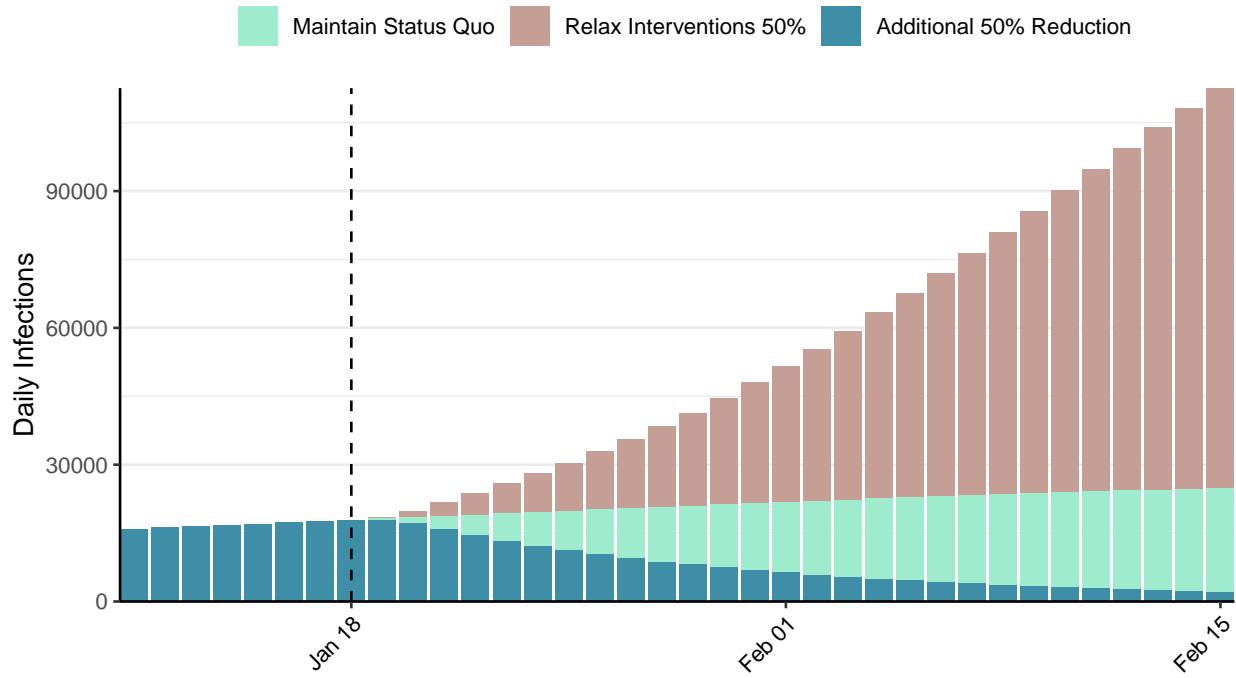


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Turkey, 2021-01-18

[Download the report for Turkey, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.63 (95% CI: 0.49-0.9)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Turkey is not shown in the following plot as only 0 deaths have been reported to date**

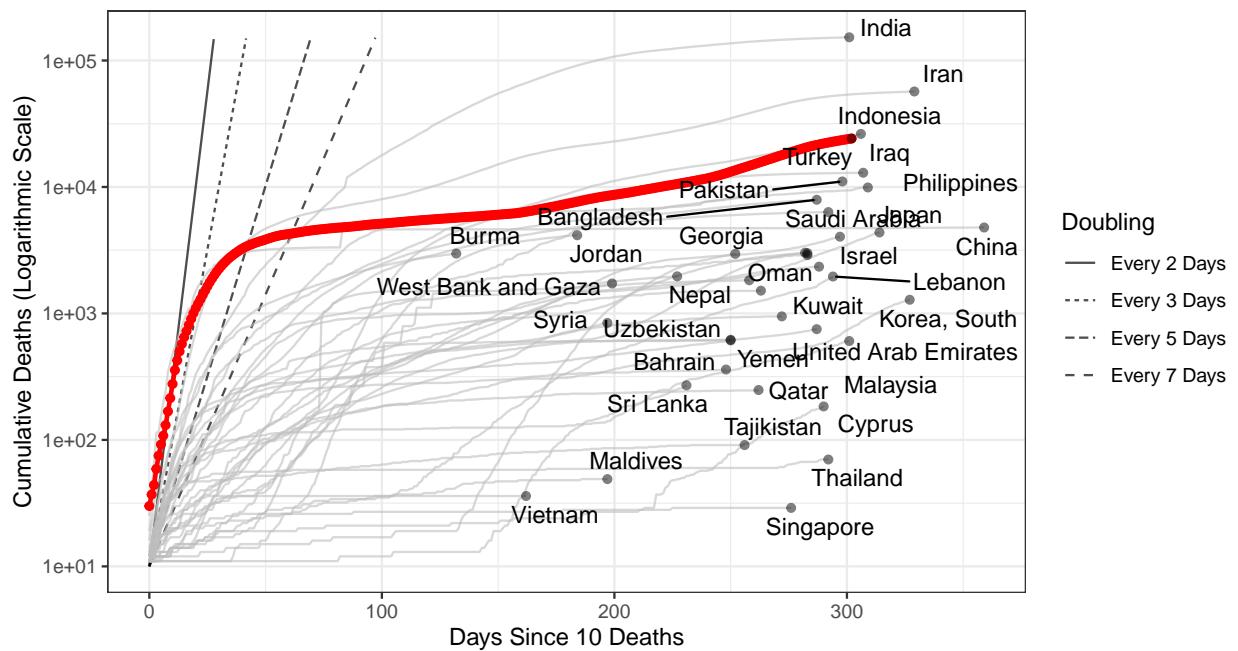


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 1,666,372 (95% CI: 1,601,201-1,731,542) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

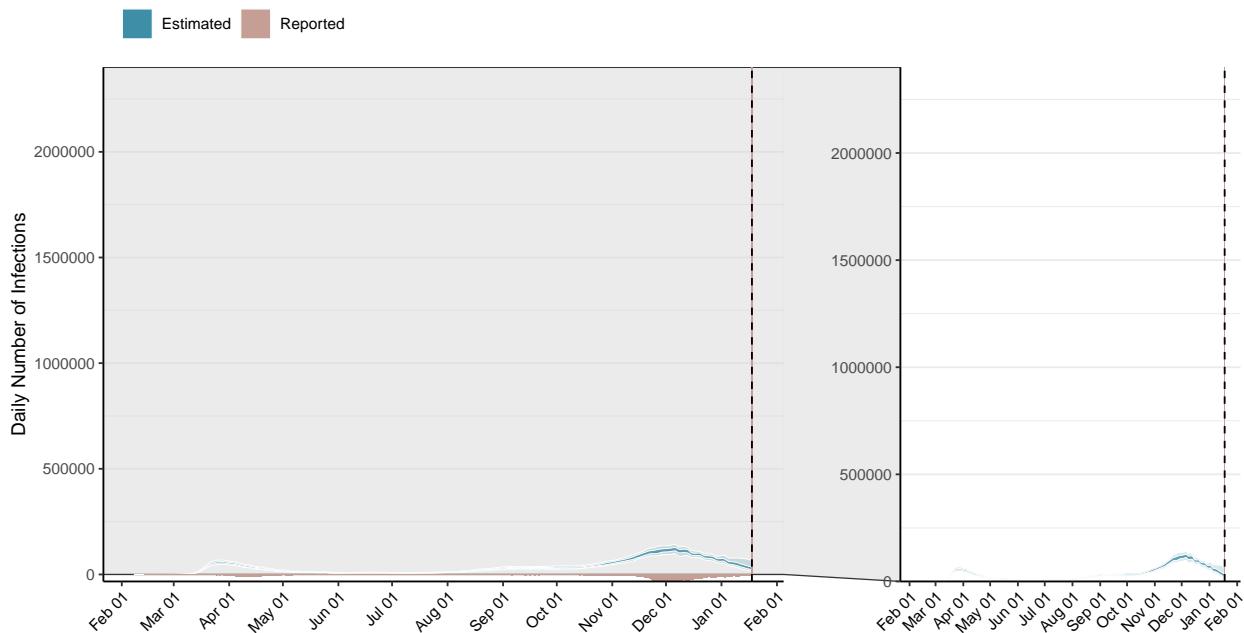
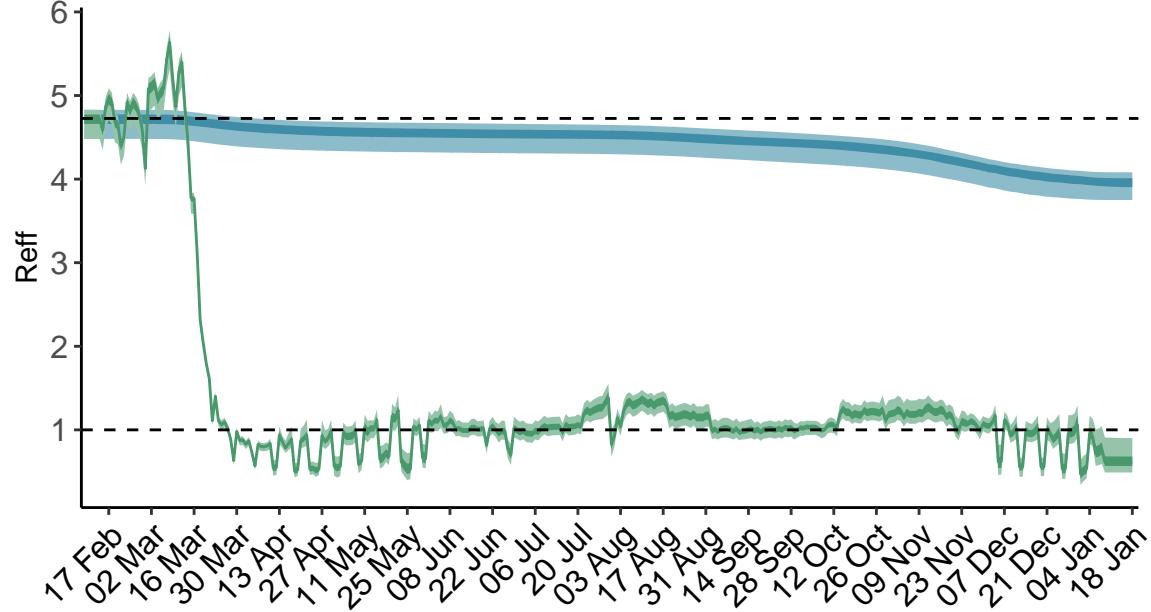


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

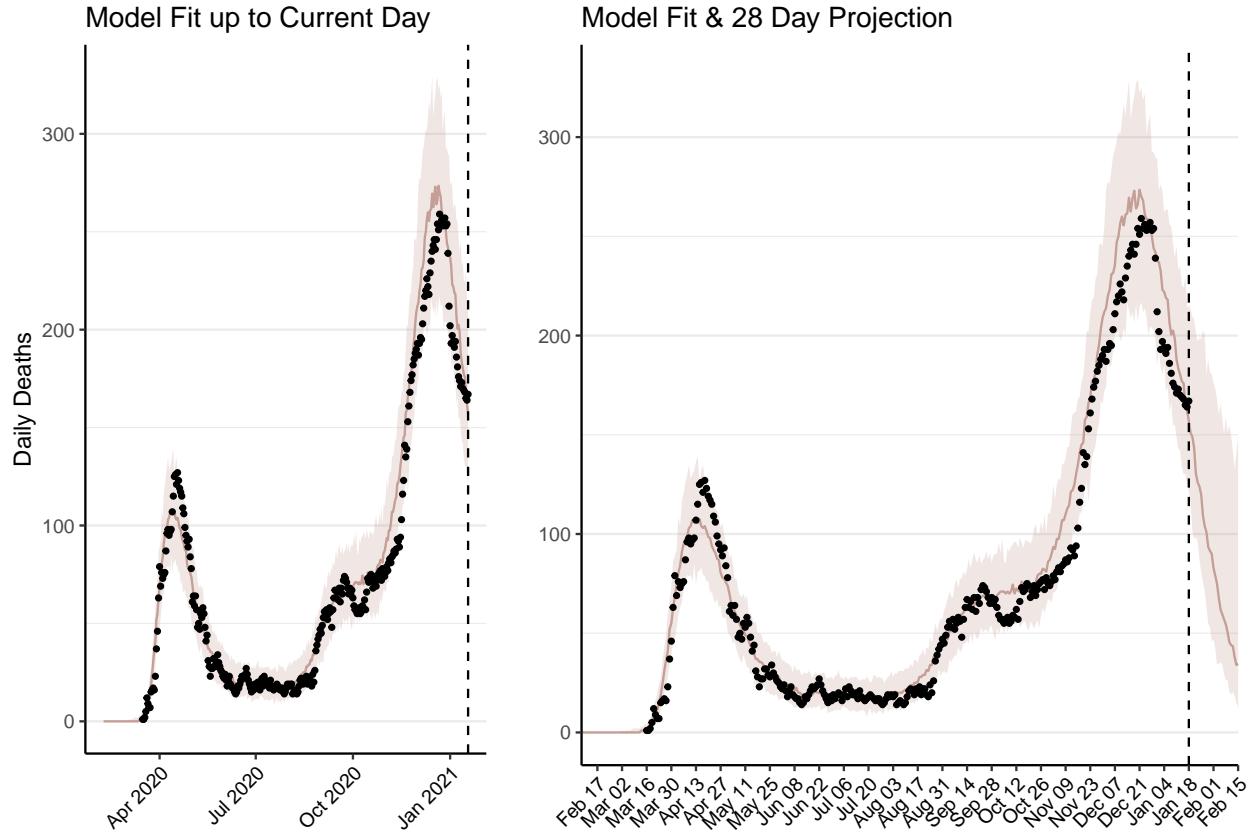


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 5,521 (95% CI: 5,271-5,772) patients requiring treatment with high-pressure oxygen at the current date to 1,450 (95% CI: 1,186-1,713) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 2,331 (95% CI: 2,241-2,422) patients requiring treatment with mechanical ventilation at the current date to 673 (95% CI: 572-775) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

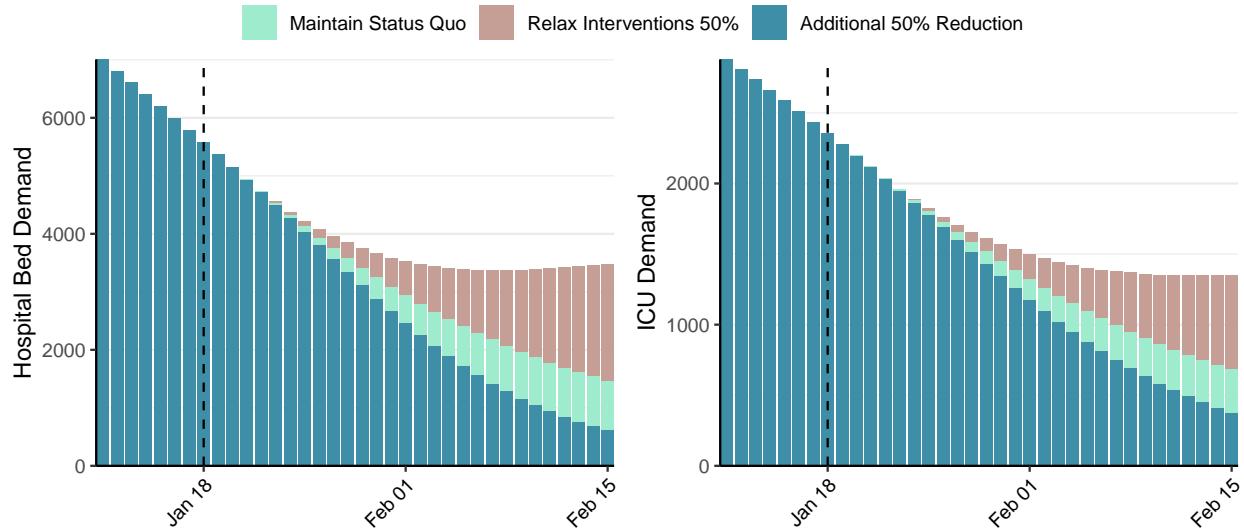
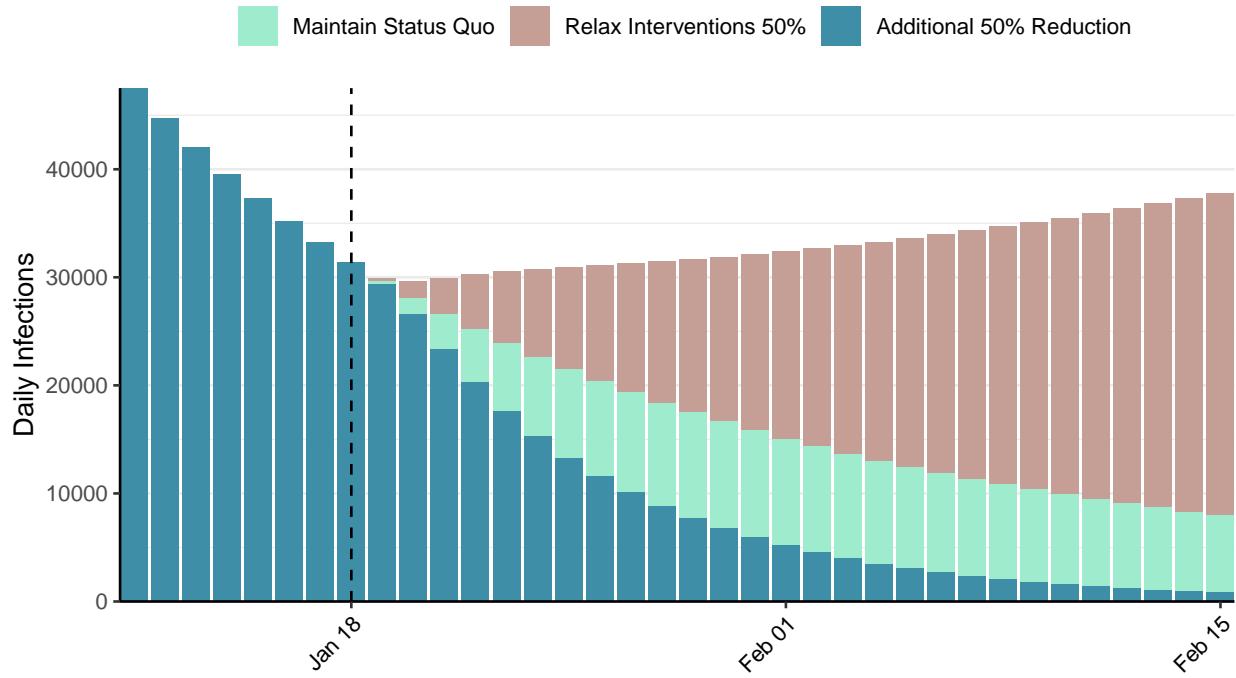


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 31,094 (95% CI: 28,182-34,007) at the current date to 854 (95% CI: 643-1,066) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 31,094 (95% CI: 28,182-34,007) at the current date to 37,458 (95% CI: 25,902-49,014) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Tanzania, 2021-01-18

[Download the report for Tanzania, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.68 (95% CI: 0.37-1.19)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Tanzania is not shown in the following plot as only 0 deaths have been reported to date**

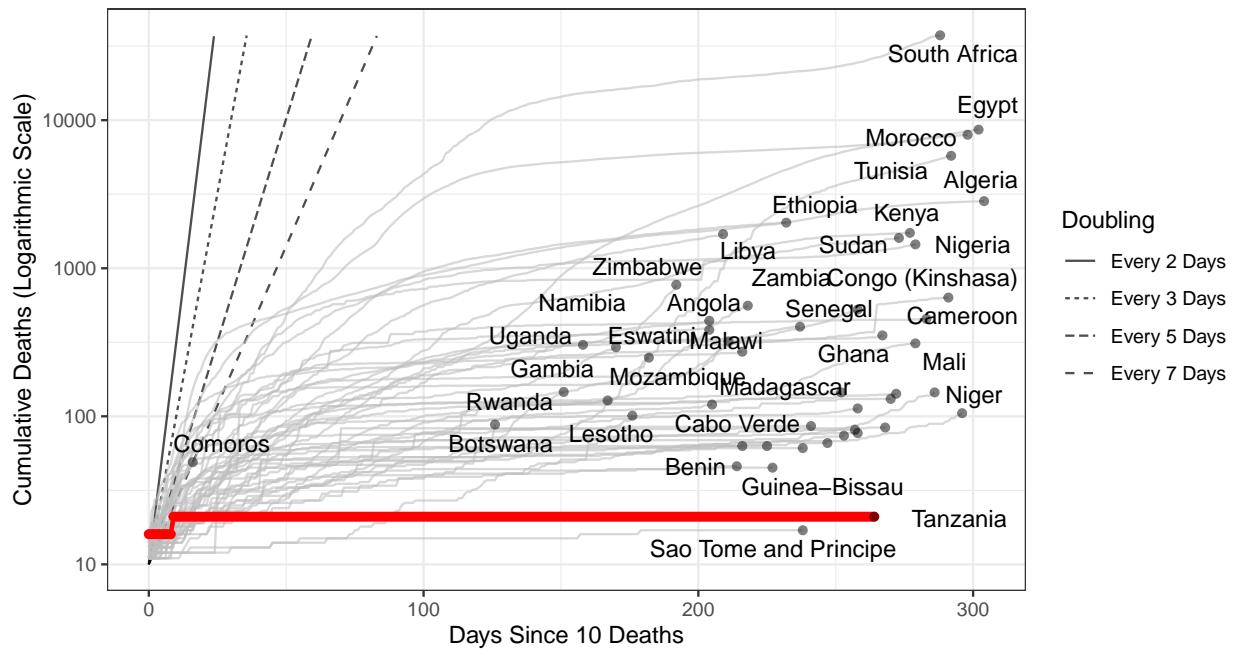


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 0 (95% CI: 0-1) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

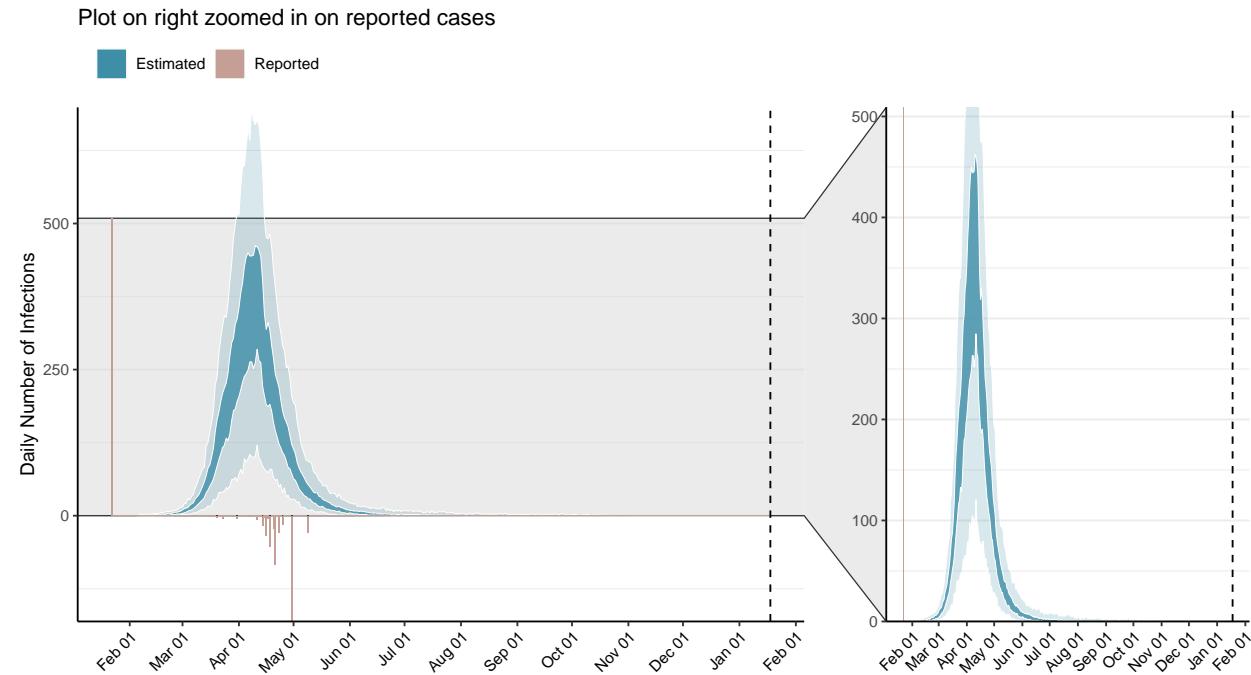
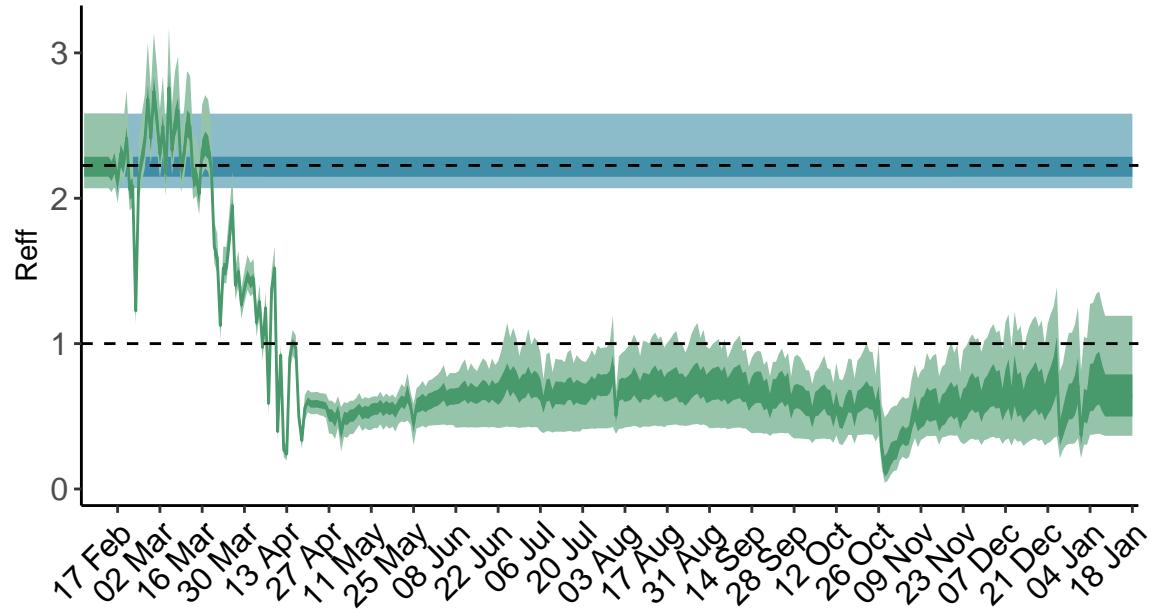


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

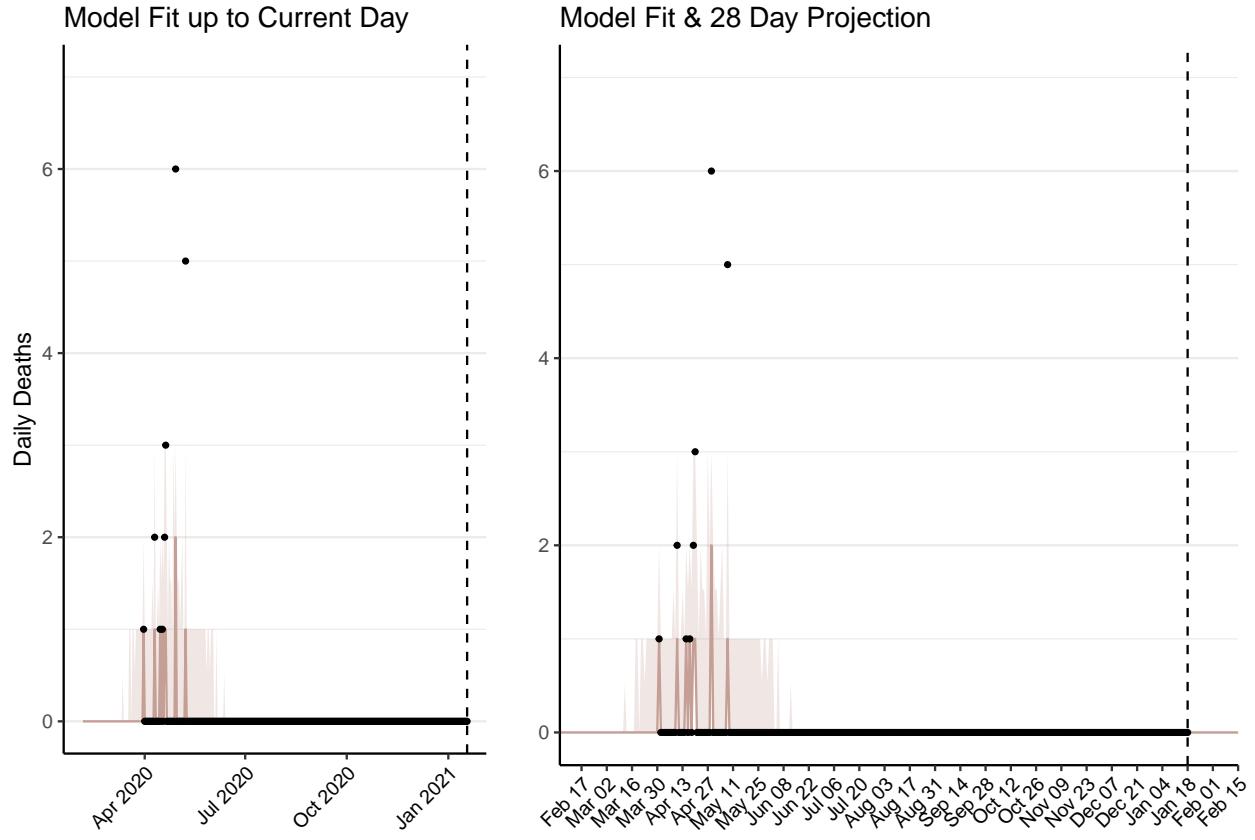


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: NaN-NaN) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

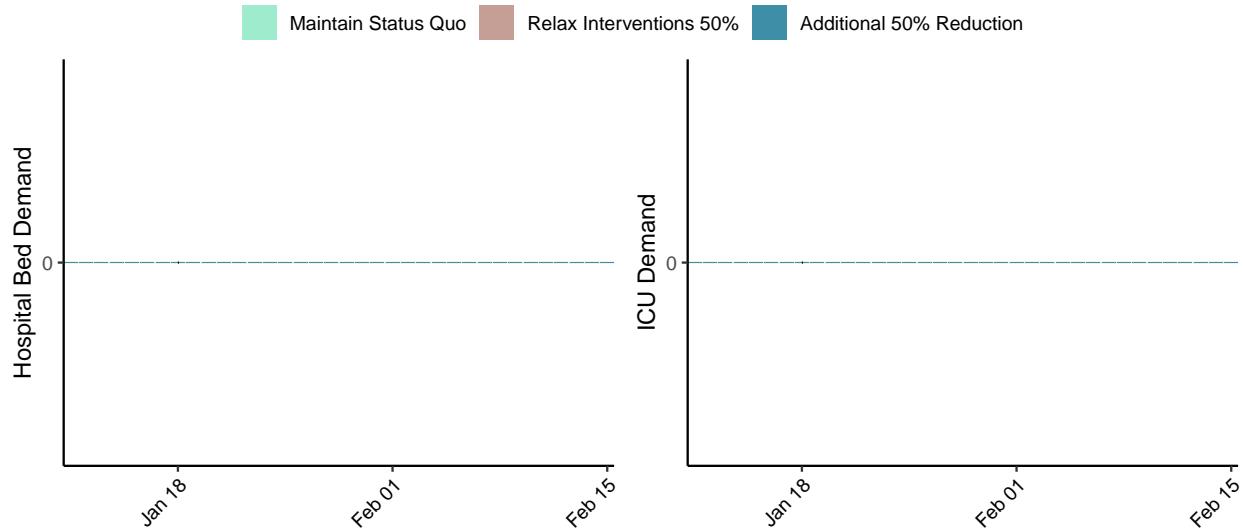


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15.

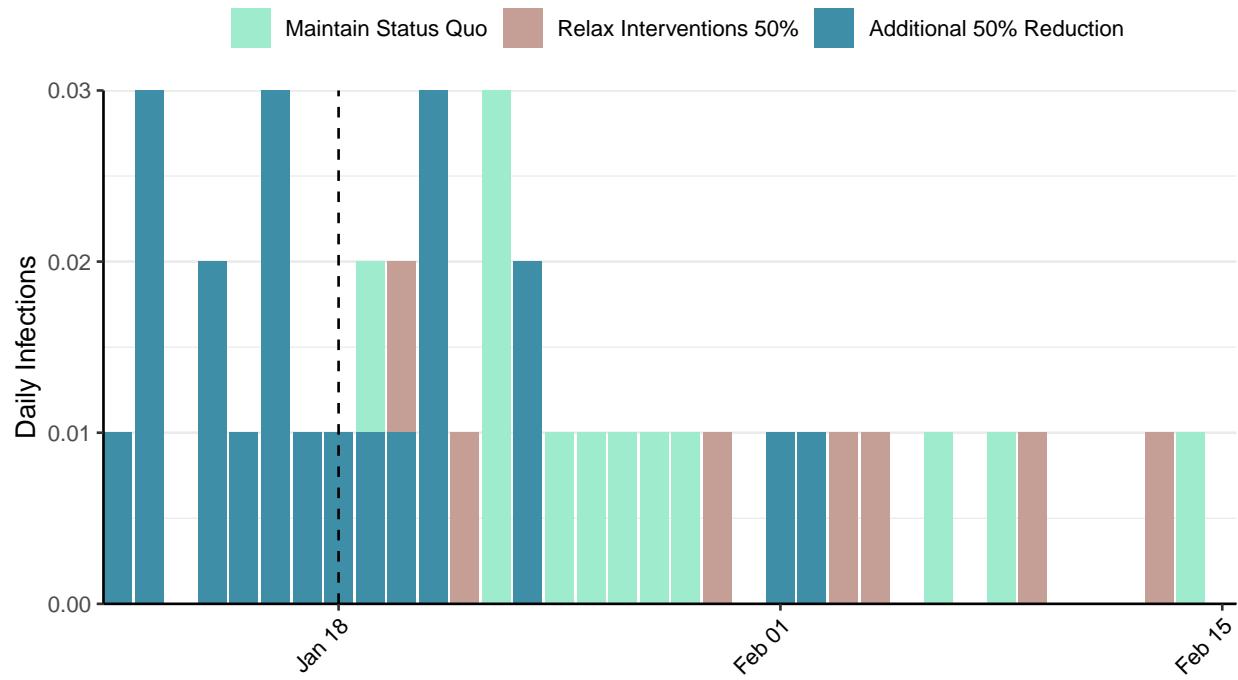


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Uganda, 2021-01-18

[Download the report for Uganda, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.62 (95% CI: 0.48-0.77)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Uganda is not shown in the following plot as only 0 deaths have been reported to date**

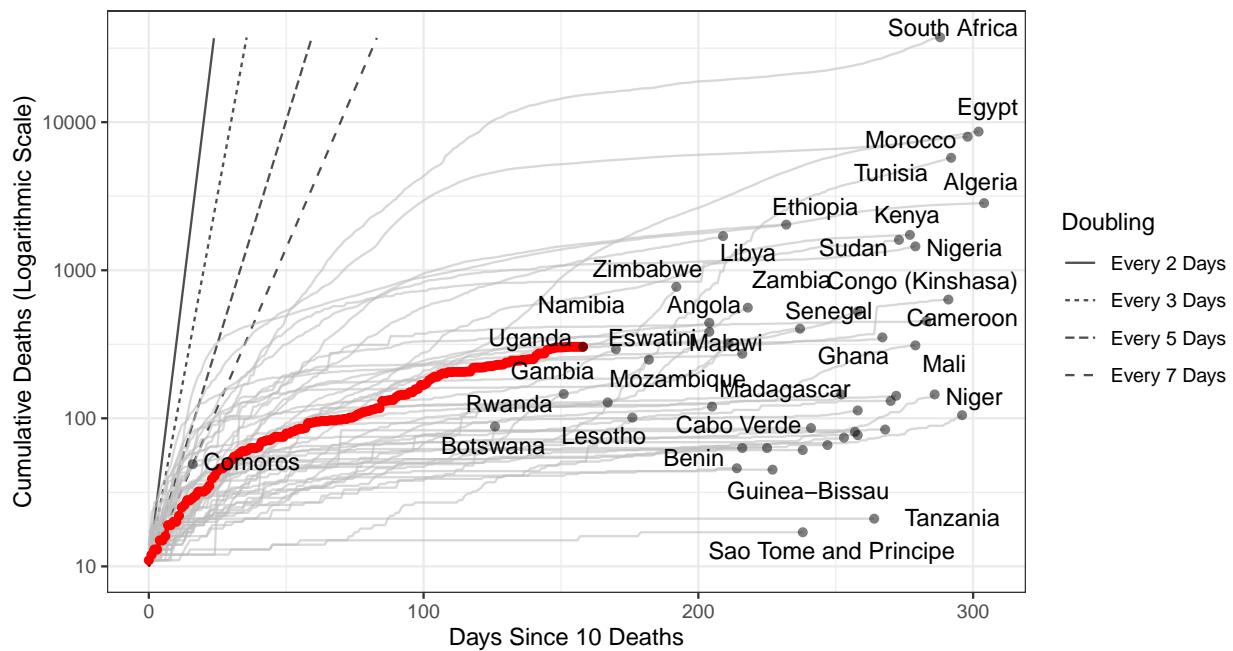


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 39,976 (95% CI: 37,016-42,936) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Uganda has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

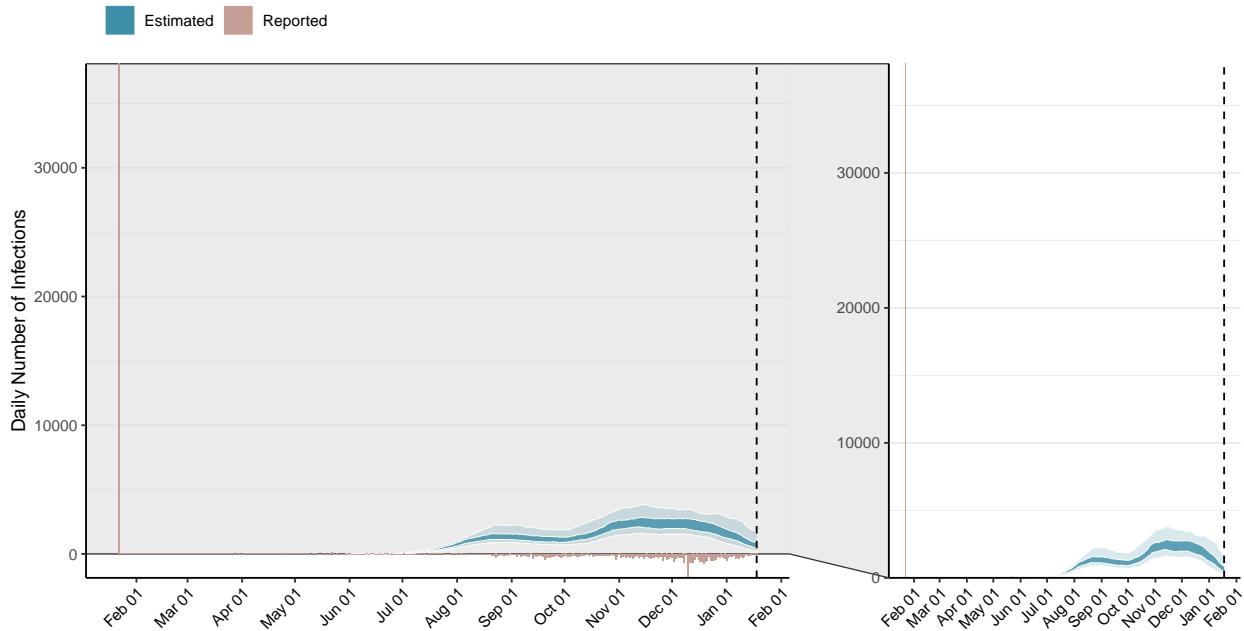
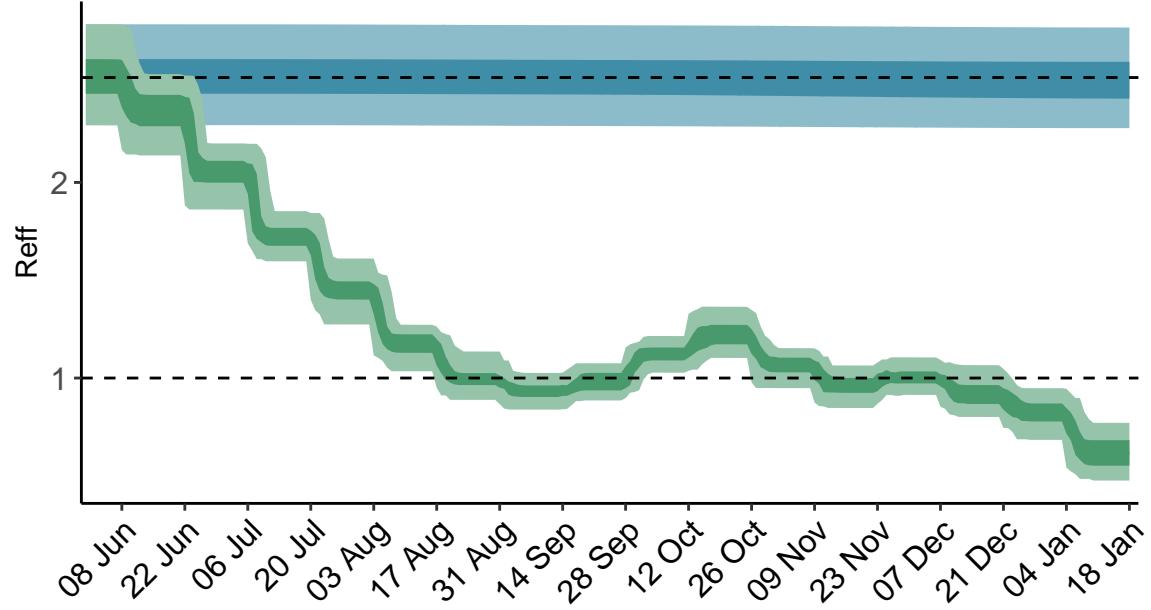


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

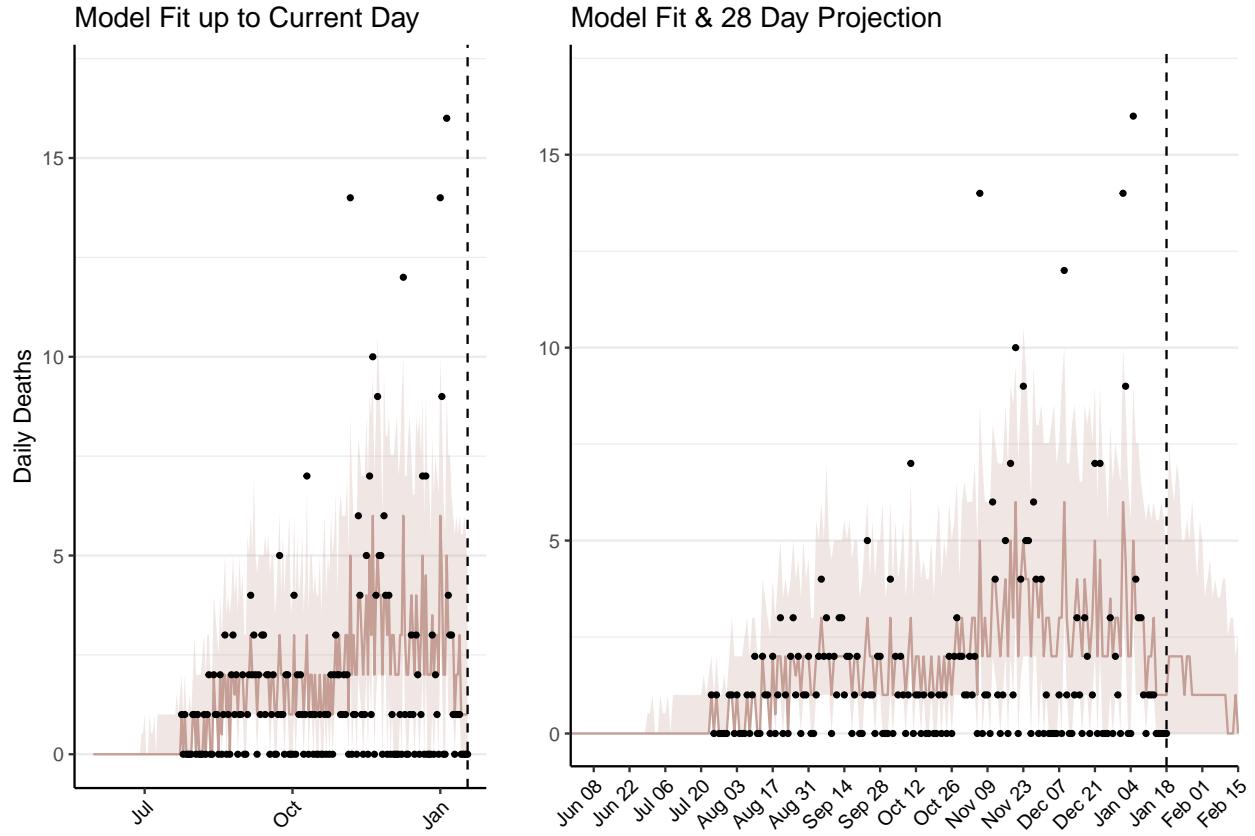


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 92 (95% CI: 84-100) patients requiring treatment with high-pressure oxygen at the current date to 22 (95% CI: 18-25) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 41 (95% CI: 37-44) patients requiring treatment with mechanical ventilation at the current date to 10 (95% CI: 9-12) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

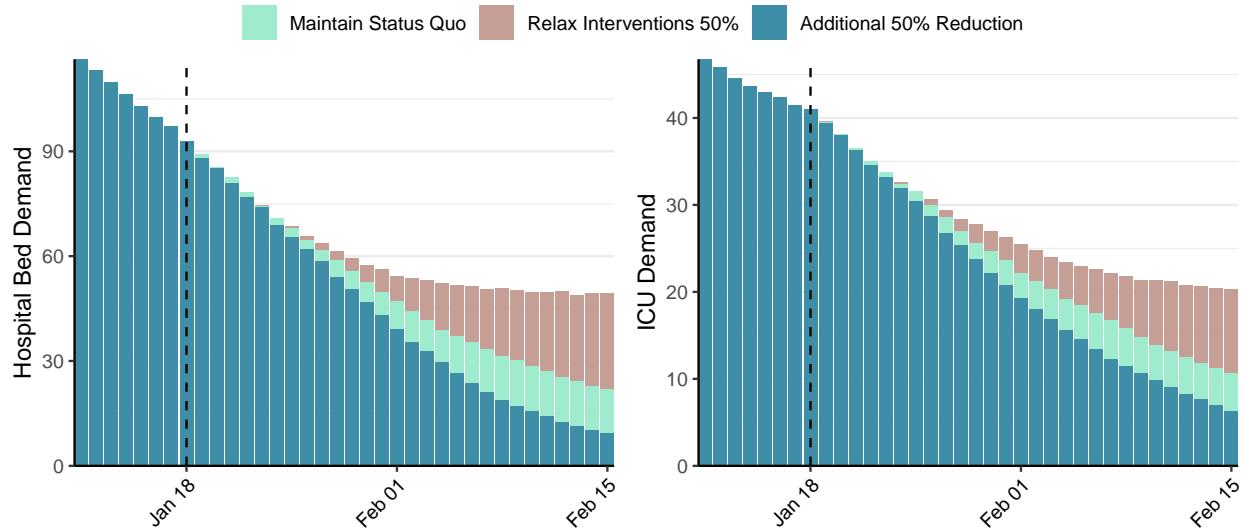


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 709 (95% CI: 633-786) at the current date to 17 (95% CI: 13-20) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 709 (95% CI: 633-786) at the current date to 725 (95% CI: 572-878) by 2021-02-15.

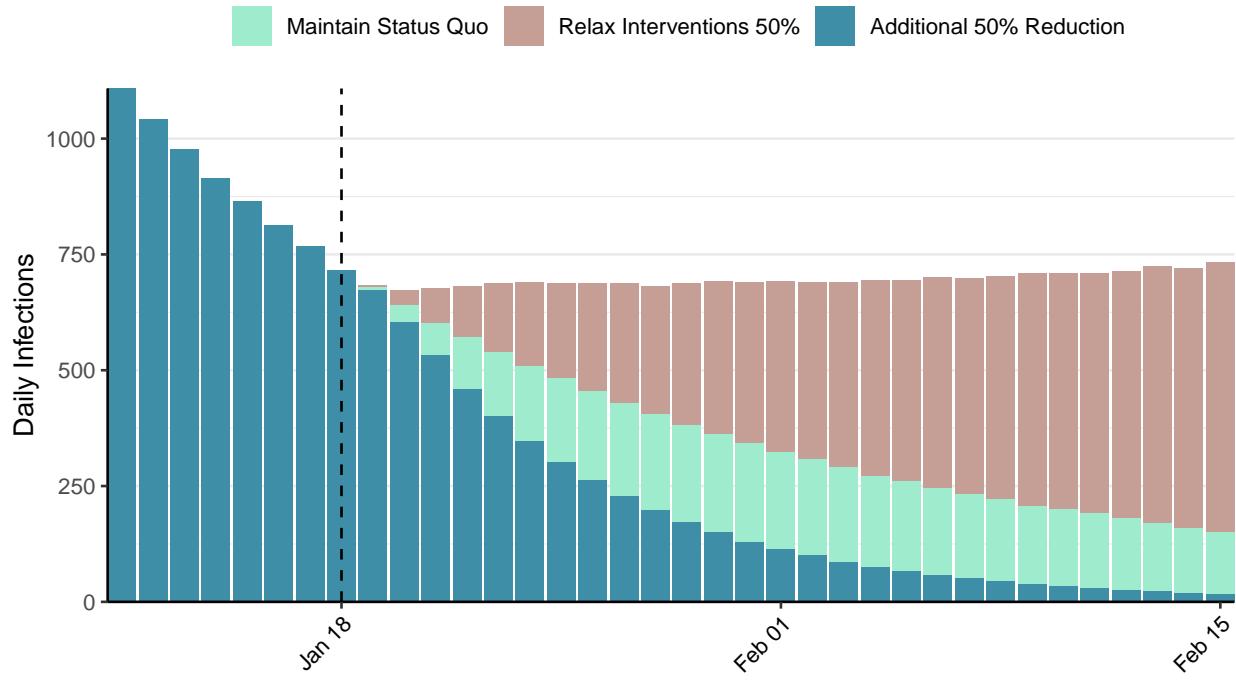


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Ukraine, 2021-01-18

[Download the report for Ukraine, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
3,382	3,382	80	80	1.03 (95% CI: 0.84-1.28)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

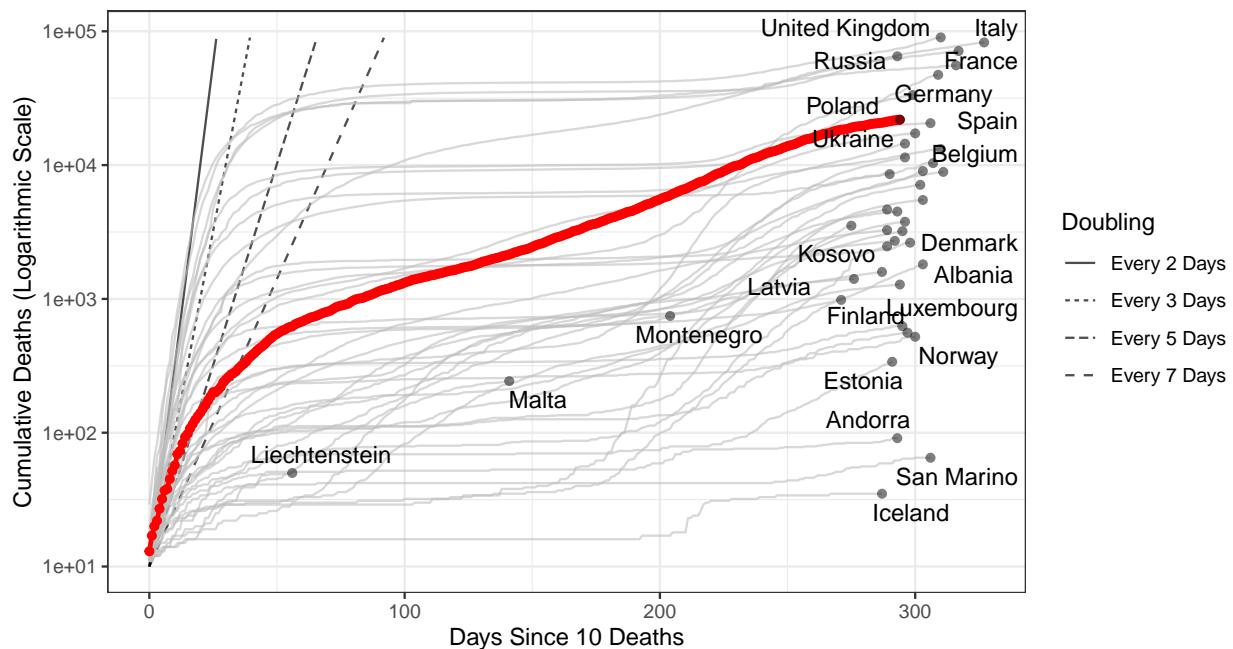


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 880,201 (95% CI: 842,269–918,134) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

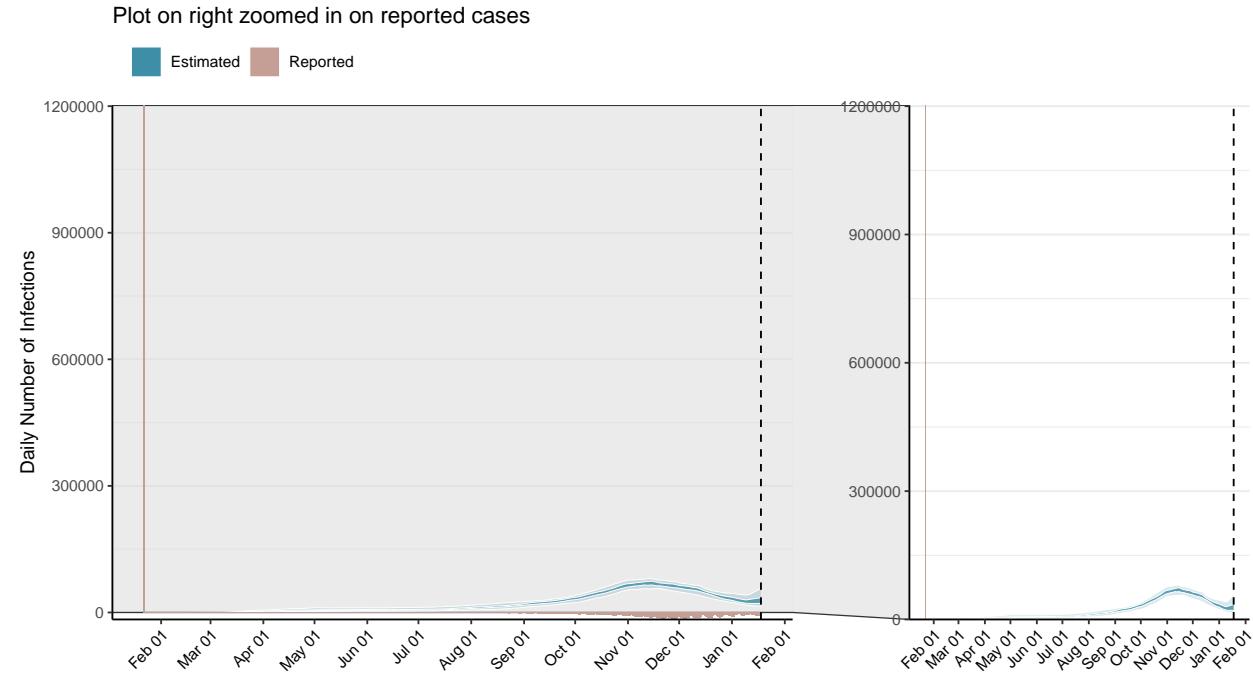
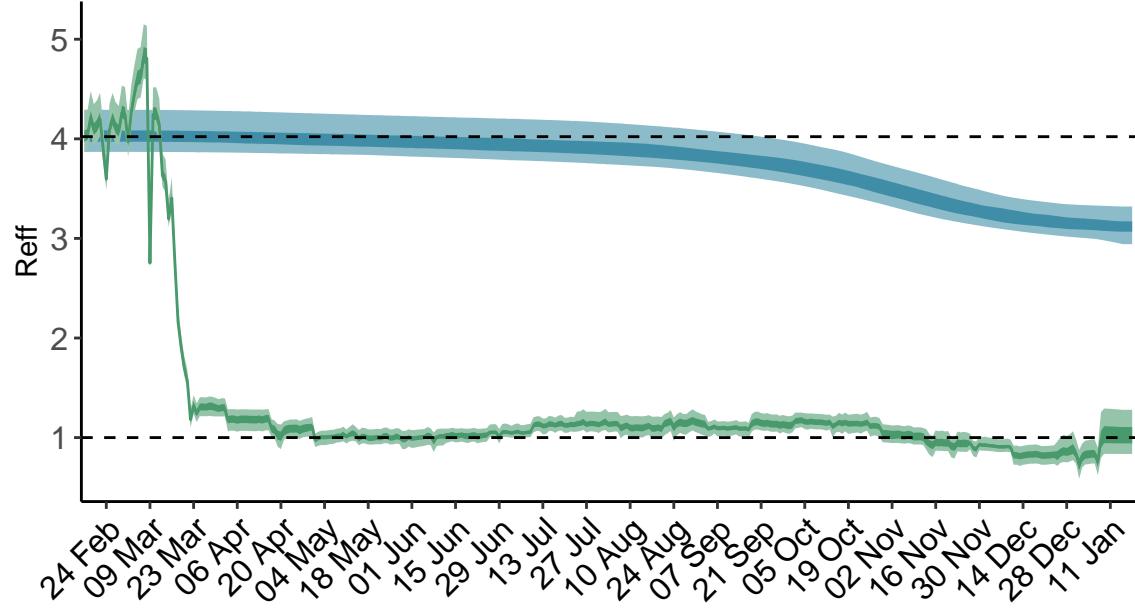


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

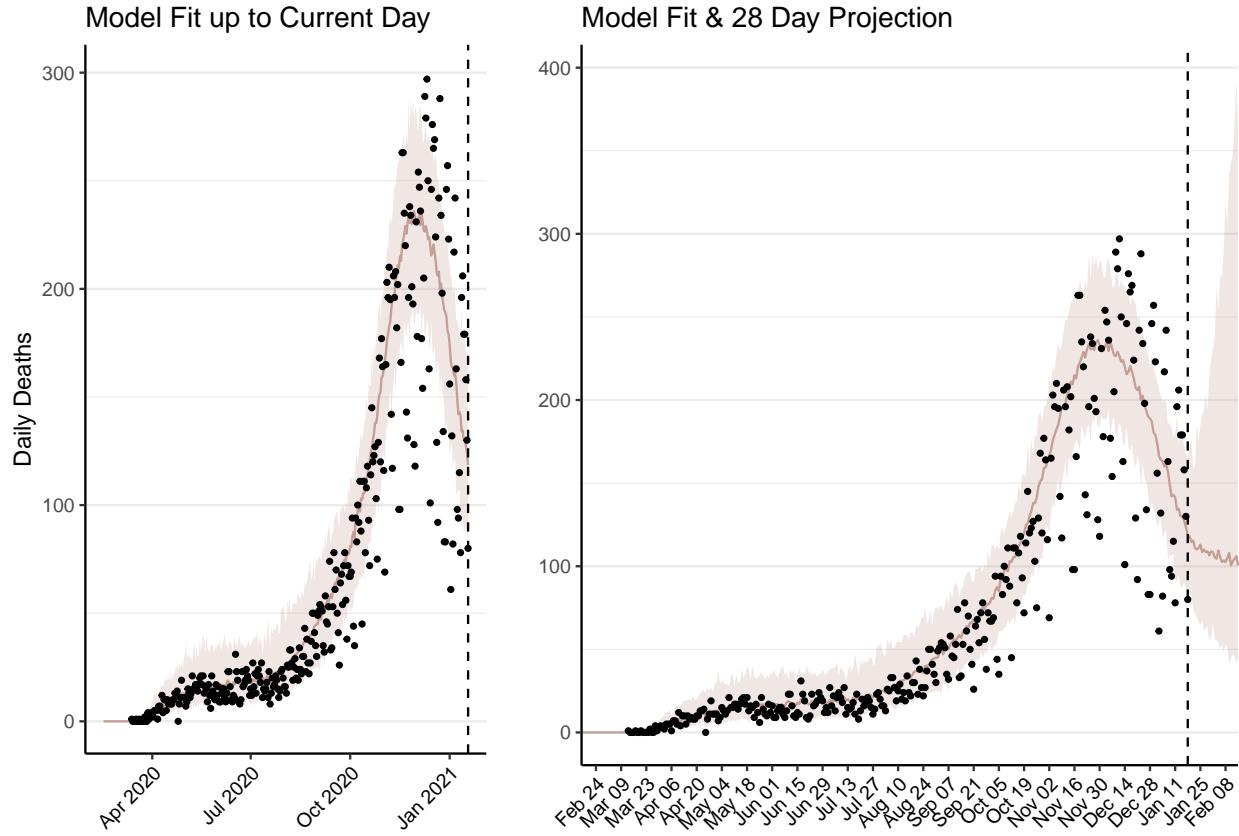


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 4,169 (95% CI: 3,976-4,361) patients requiring treatment with high-pressure oxygen at the current date to 5,095 (95% CI: 4,325-5,865) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 1,657 (95% CI: 1,588-1,725) patients requiring treatment with mechanical ventilation at the current date to 1,848 (95% CI: 1,588-2,107) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

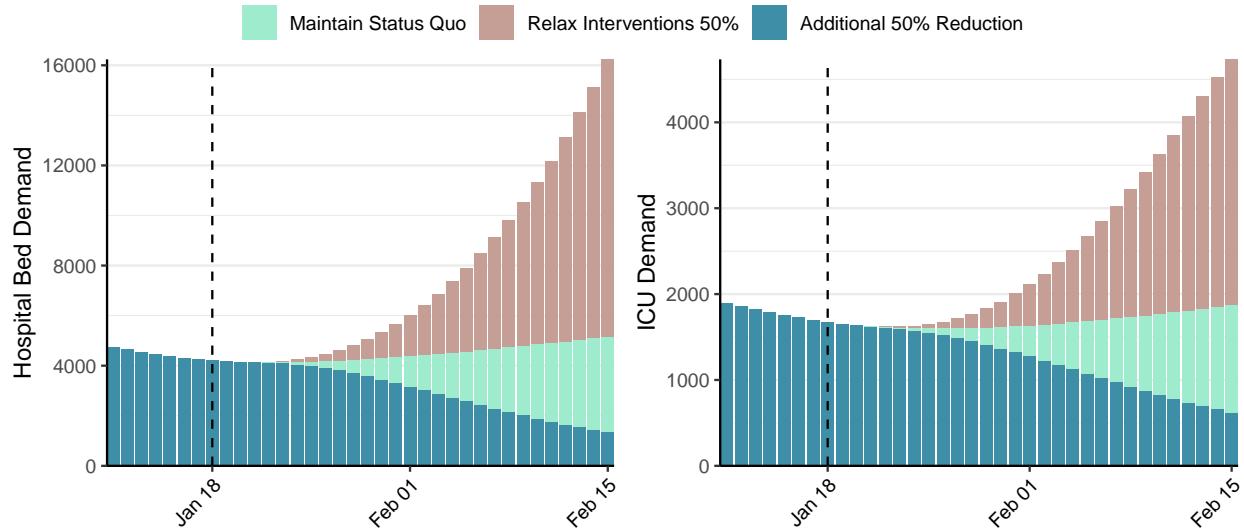
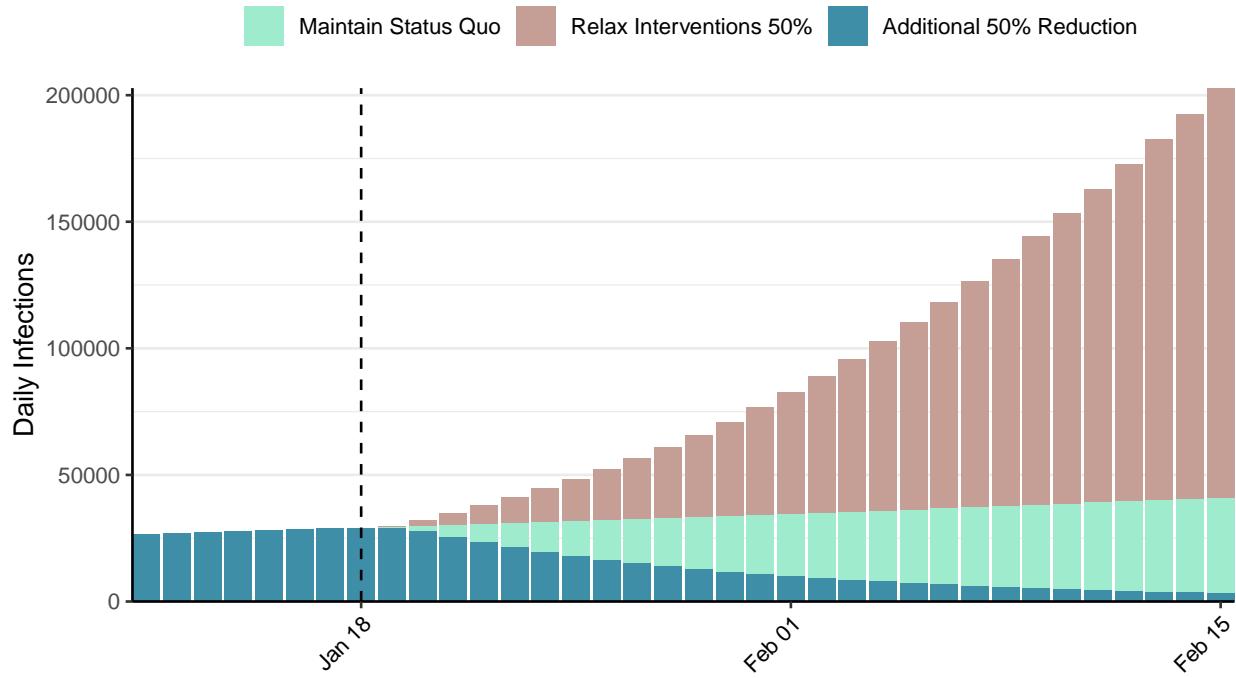


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 28,904 (95% CI: 26,608-31,200) at the current date to 3,316 (95% CI: 2,732-3,900) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 28,904 (95% CI: 26,608-31,200) at the current date to 200,779 (95% CI: 168,734-232,823) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Uruguay, 2021-01-18

[Download the report for Uruguay, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.01 (95% CI: 0.88-1.16)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Uruguay is not shown in the following plot as only 0 deaths have been reported to date**

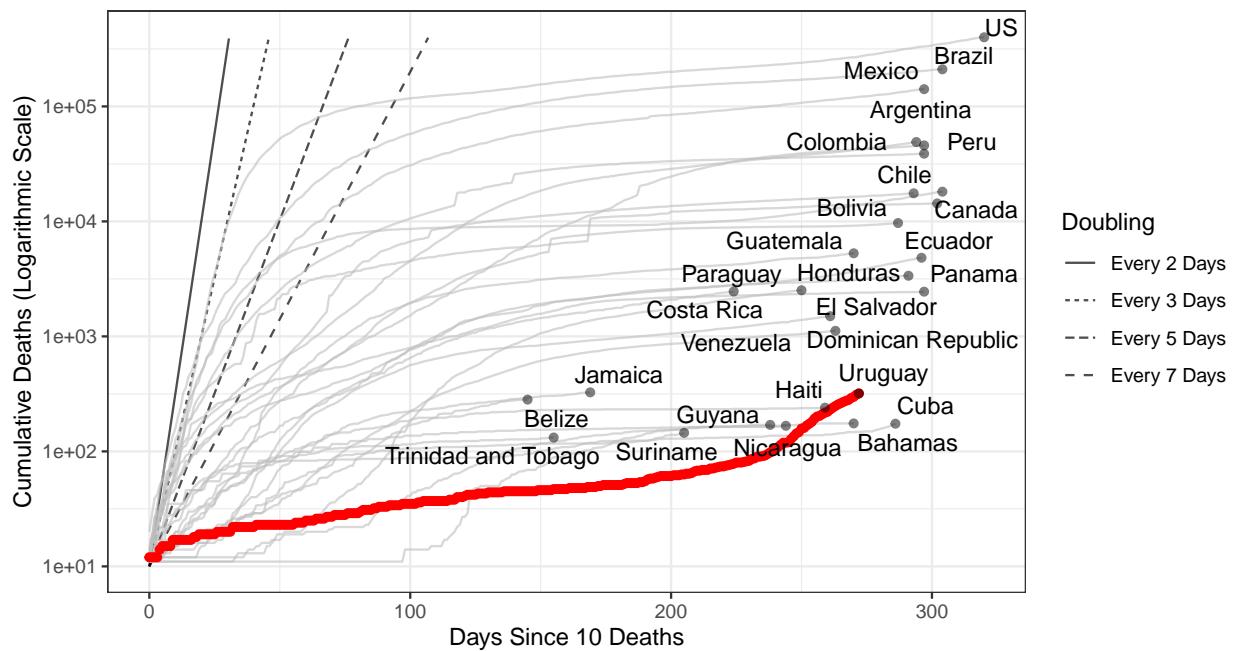


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 95,070 (95% CI: 90,483-99,657) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Uruguay has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

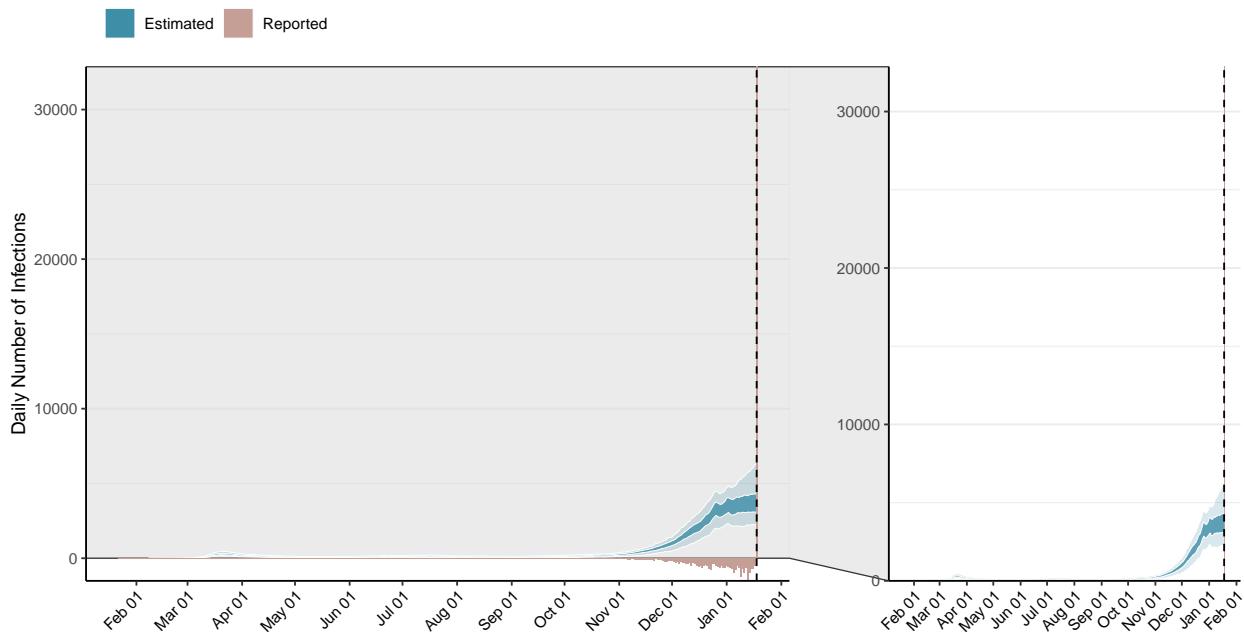
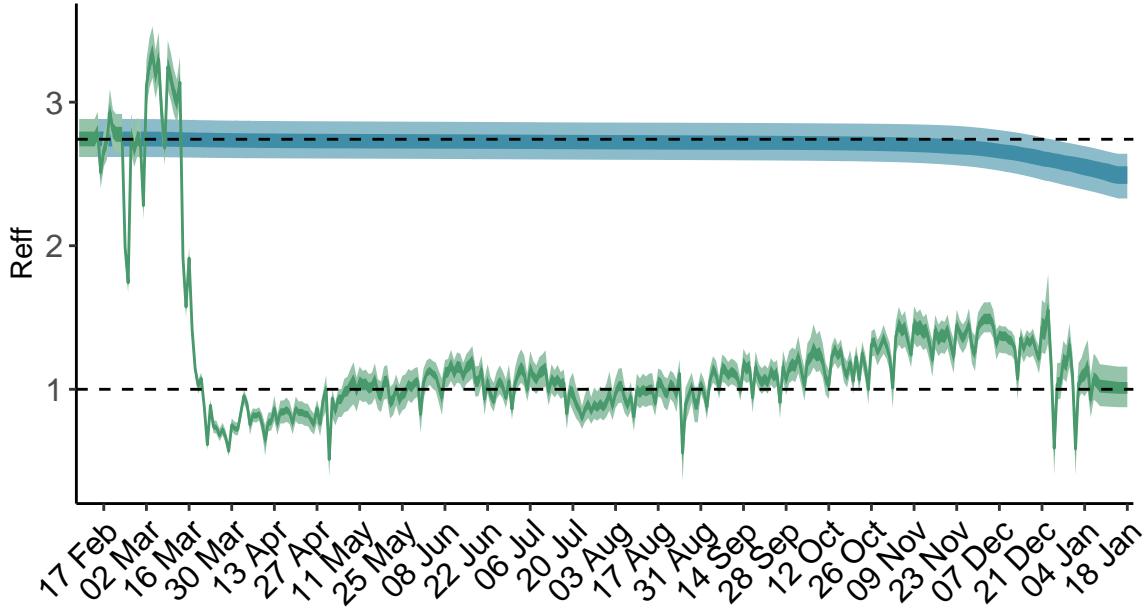


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

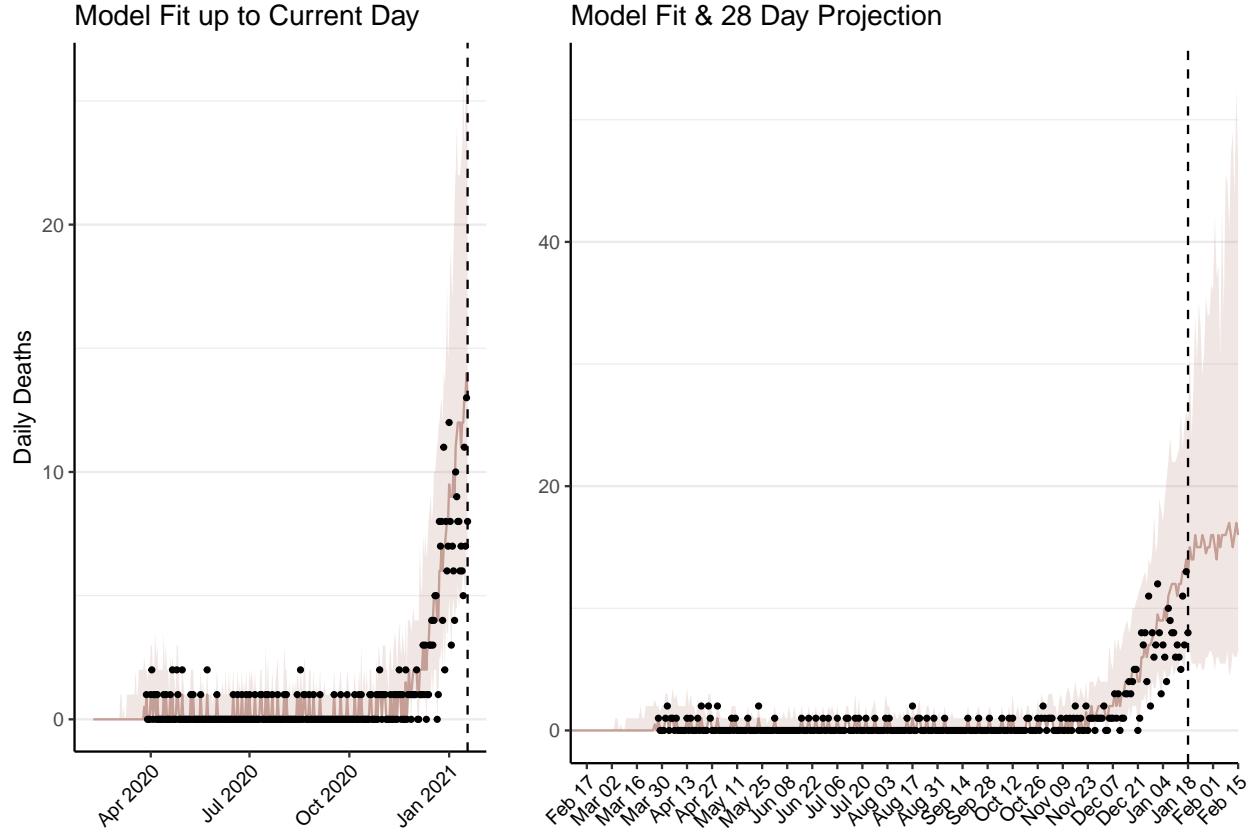


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 439 (95% CI: 417-462) patients requiring treatment with high-pressure oxygen at the current date to 510 (95% CI: 465-555) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 125 (95% CI: 120-130) patients requiring treatment with mechanical ventilation at the current date to 129 (95% CI: 124-135) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

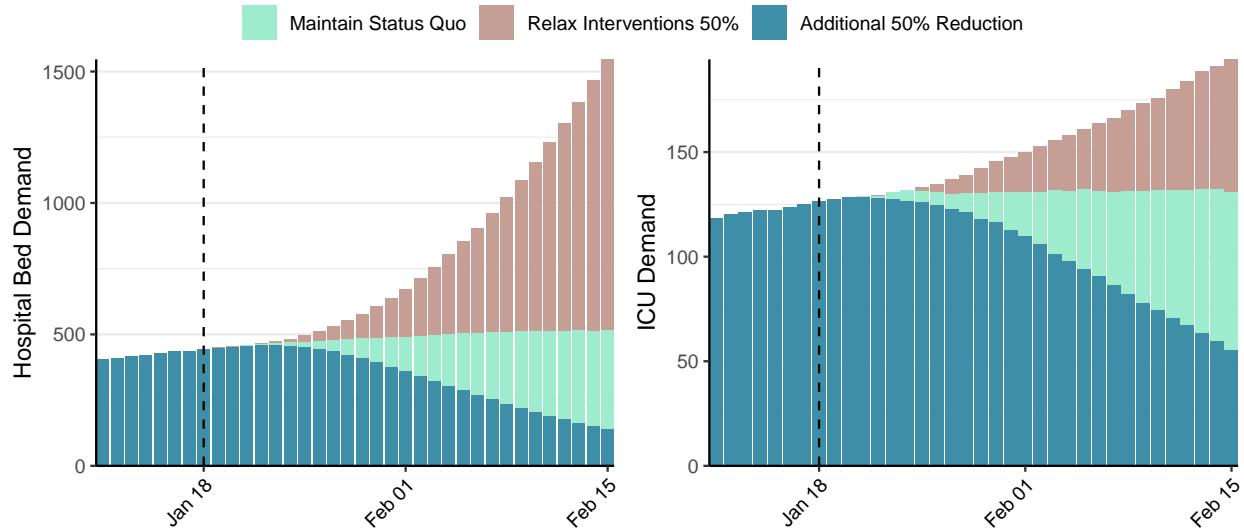


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,762 (95% CI: 3,538-3,986) at the current date to 345 (95% CI: 312-379) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,762 (95% CI: 3,538-3,986) at the current date to 18,621 (95% CI: 16,998-20,245) by 2021-02-15.

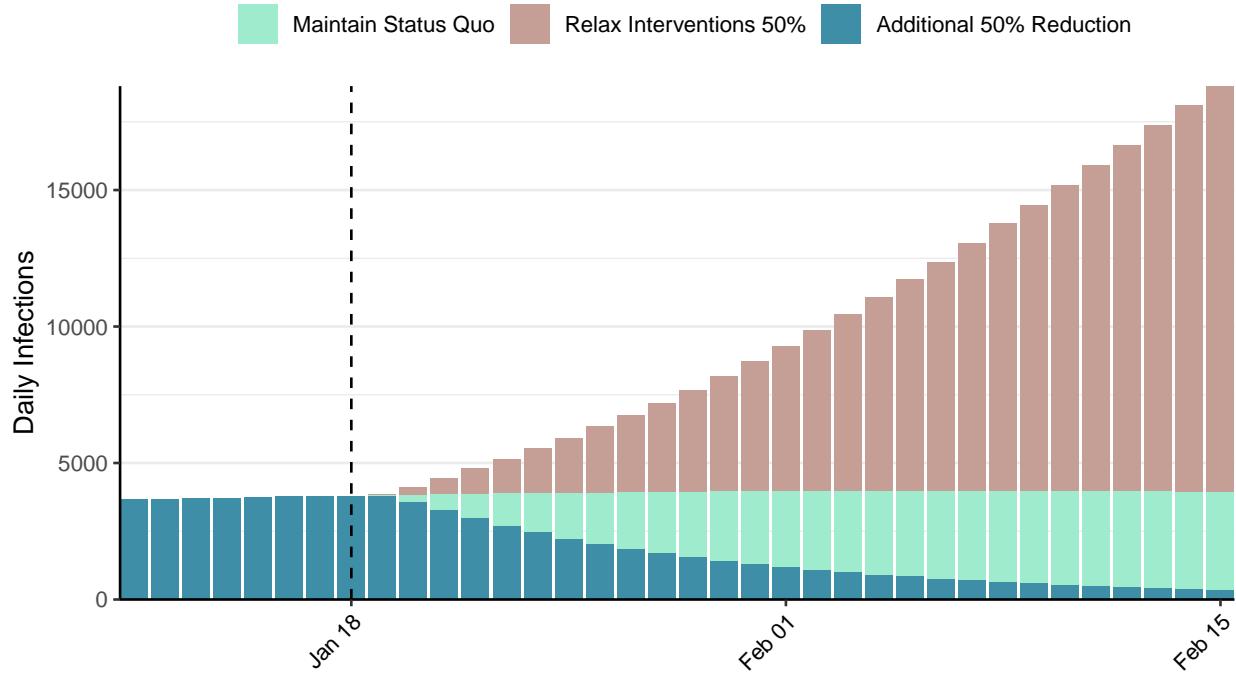


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Uzbekistan, 2021-01-18

[Download the report for Uzbekistan, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.71 (95% CI: 0.57-0.89)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Uzbekistan is not shown in the following plot as only 0 deaths have been reported to date**

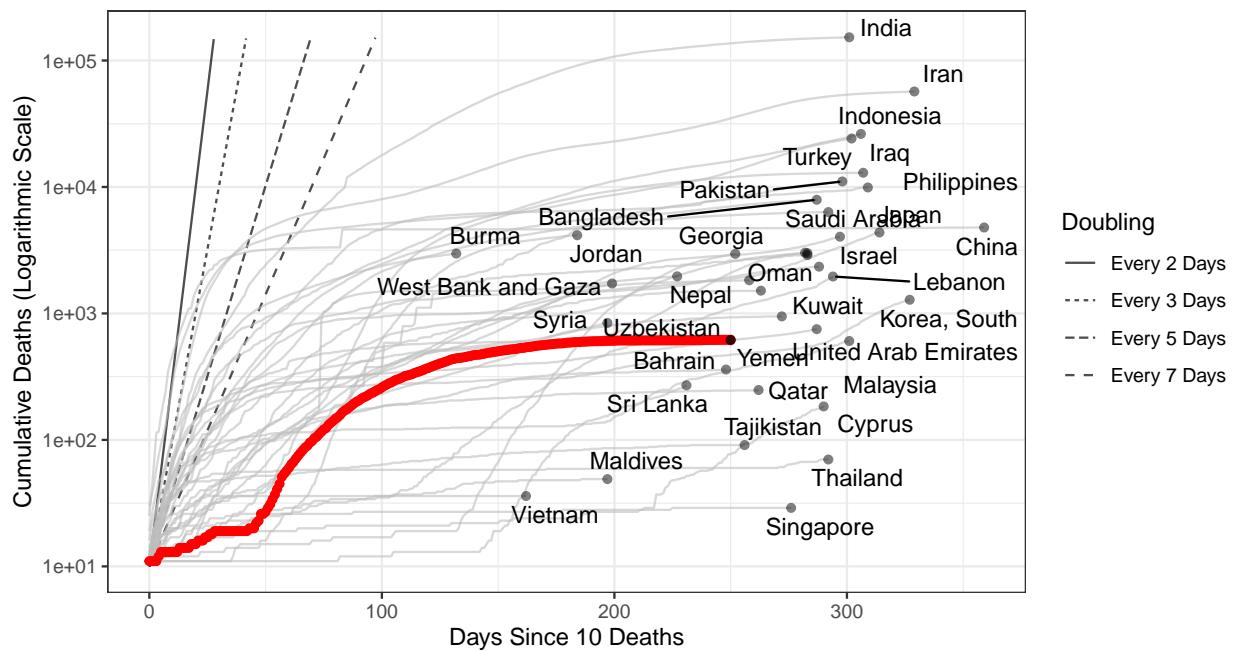


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,407 (95% CI: 2,202-2,612) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

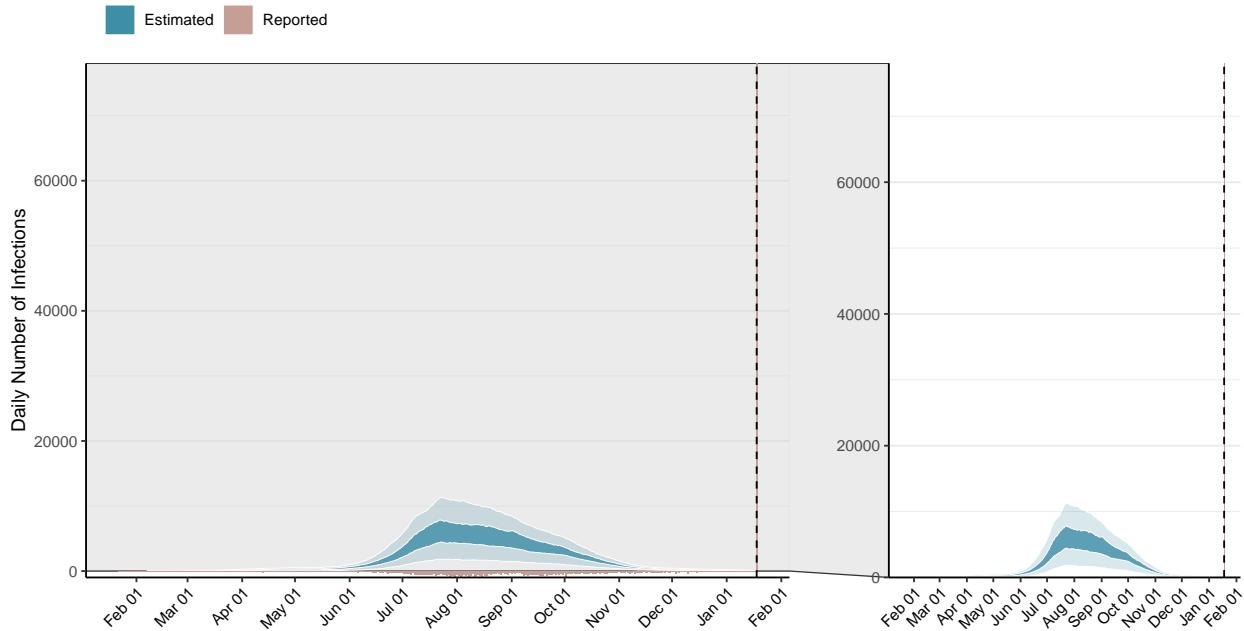
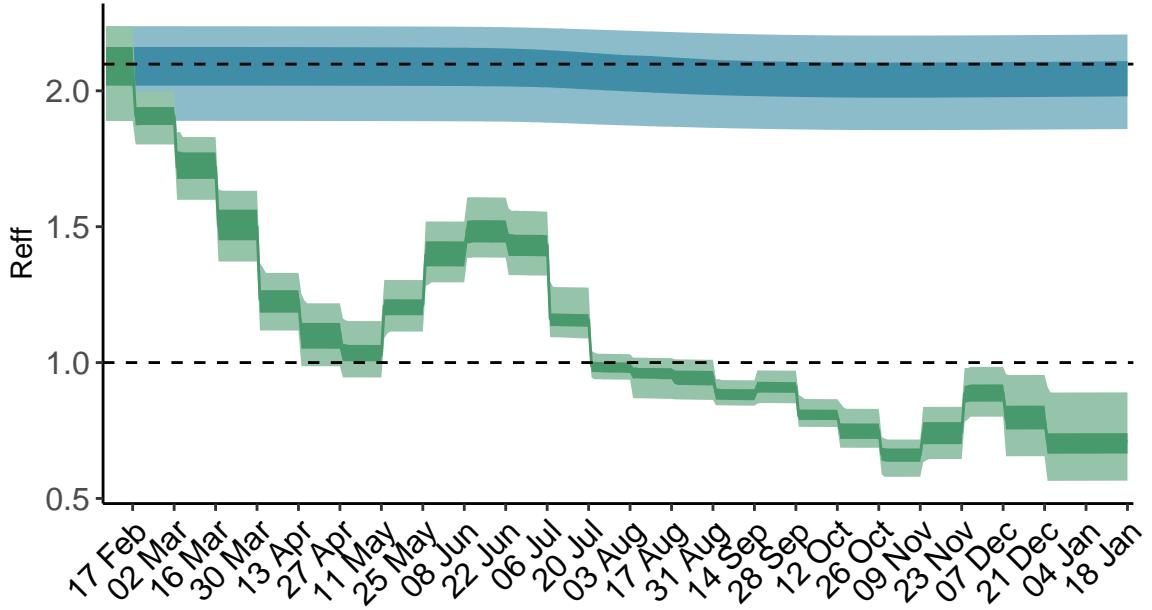


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

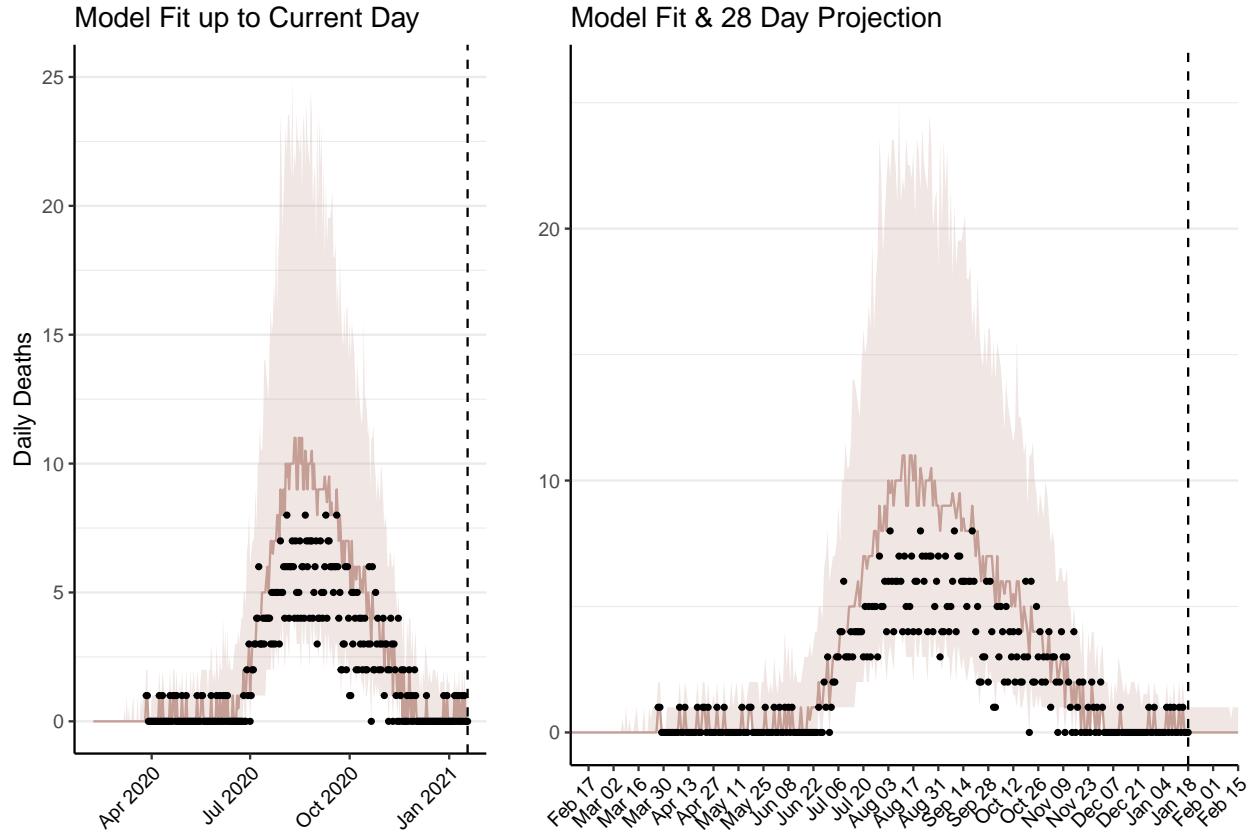


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 6 (95% CI: 5-7) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 1-2) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 3 (95% CI: 3-3) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

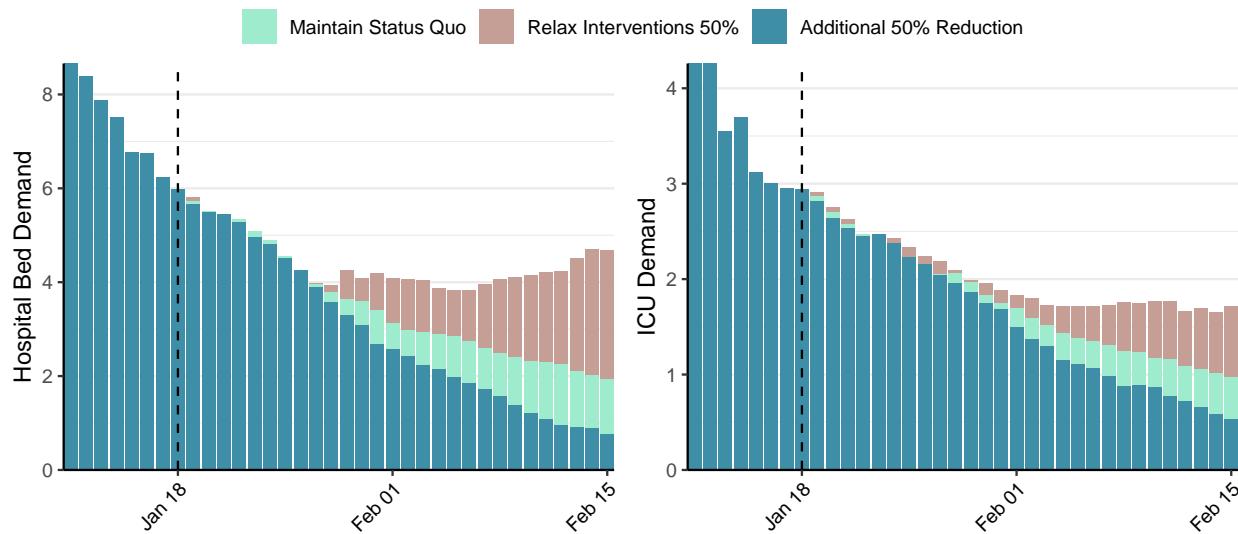
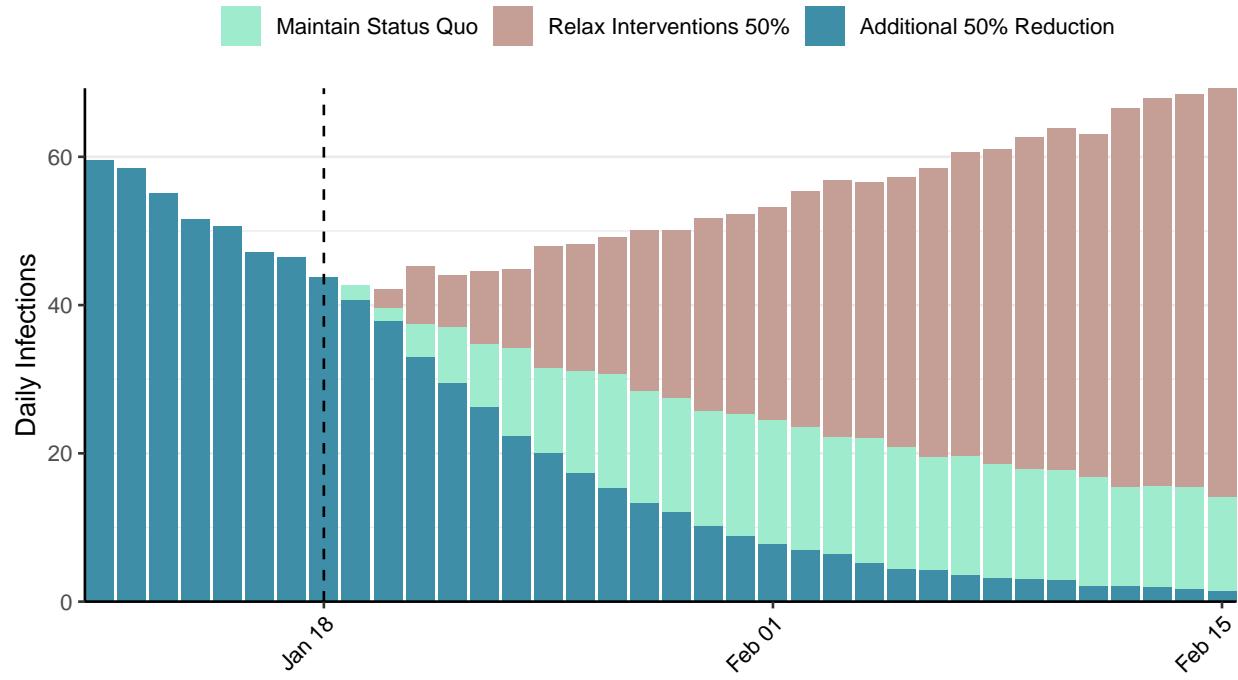


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 43 (95% CI: 38-49) at the current date to 1 (95% CI: 1-2) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 43 (95% CI: 38-49) at the current date to 69 (95% CI: 53-85) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: St. Vincent and the Grenadines, 2021-01-18

[Download the report for St. Vincent and the Grenadines, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
16	16	0	0	2.38 (95% CI: 1.7-3.17)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B.** St. Vincent and the Grenadines is not shown in the following plot as only 0 deaths have been reported to date

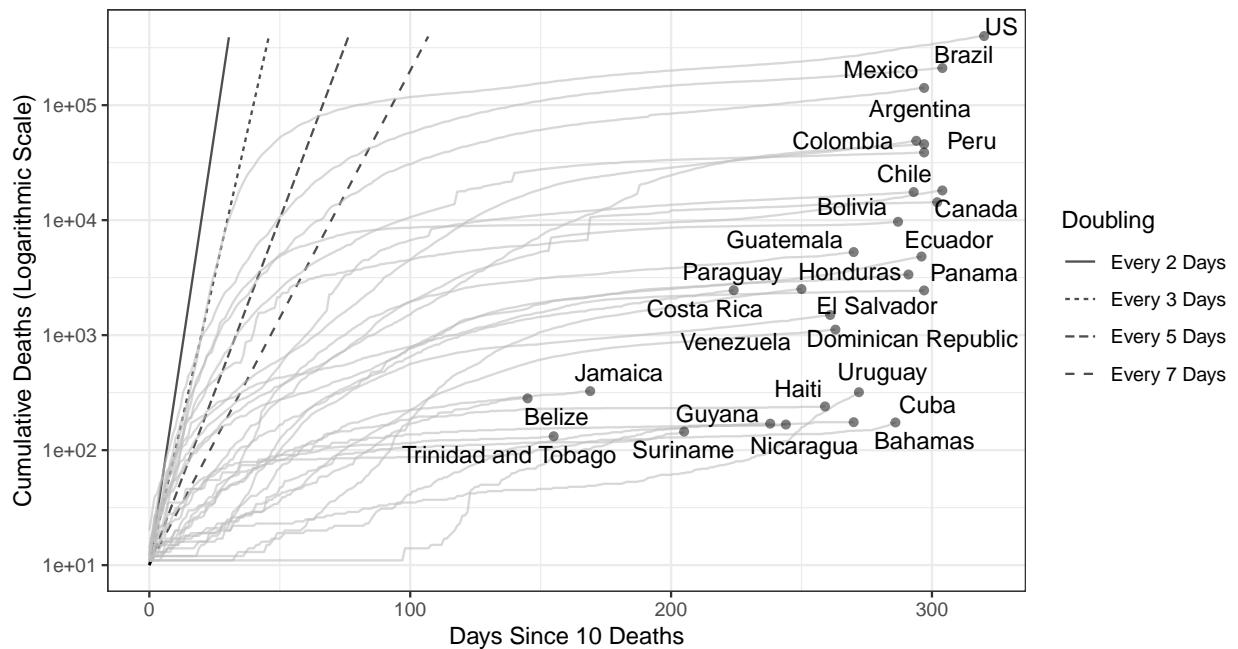


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,845 (95% CI: 2,293-3,398) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

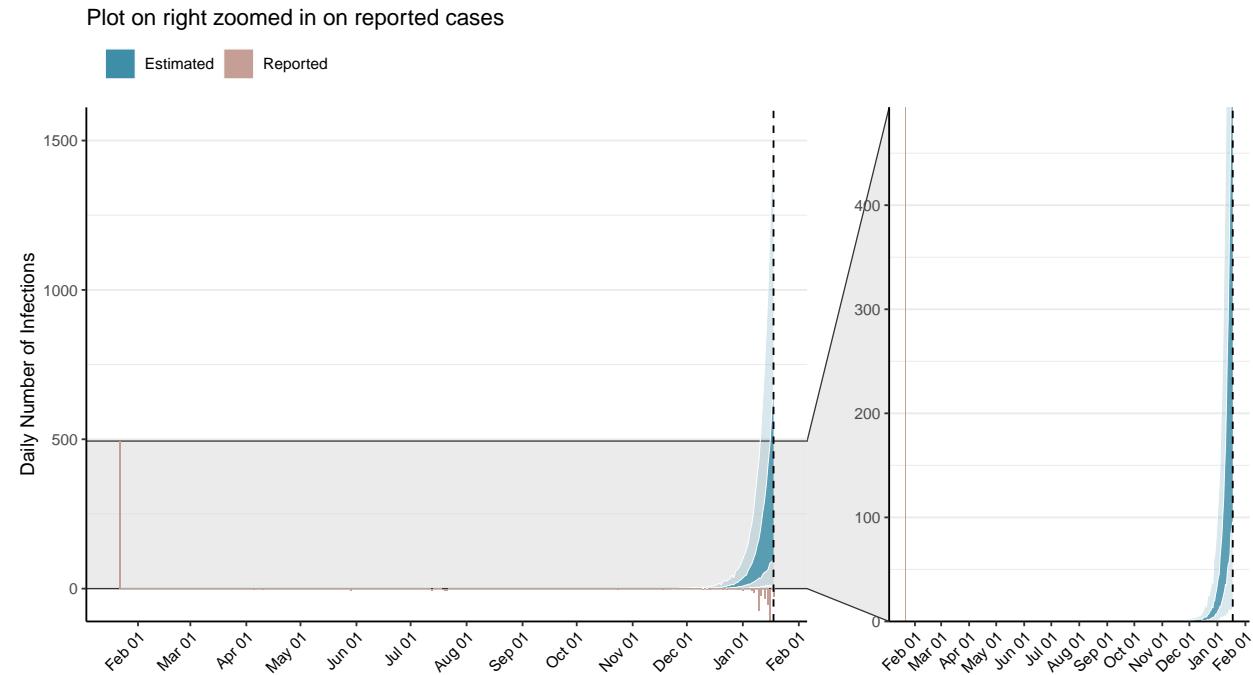
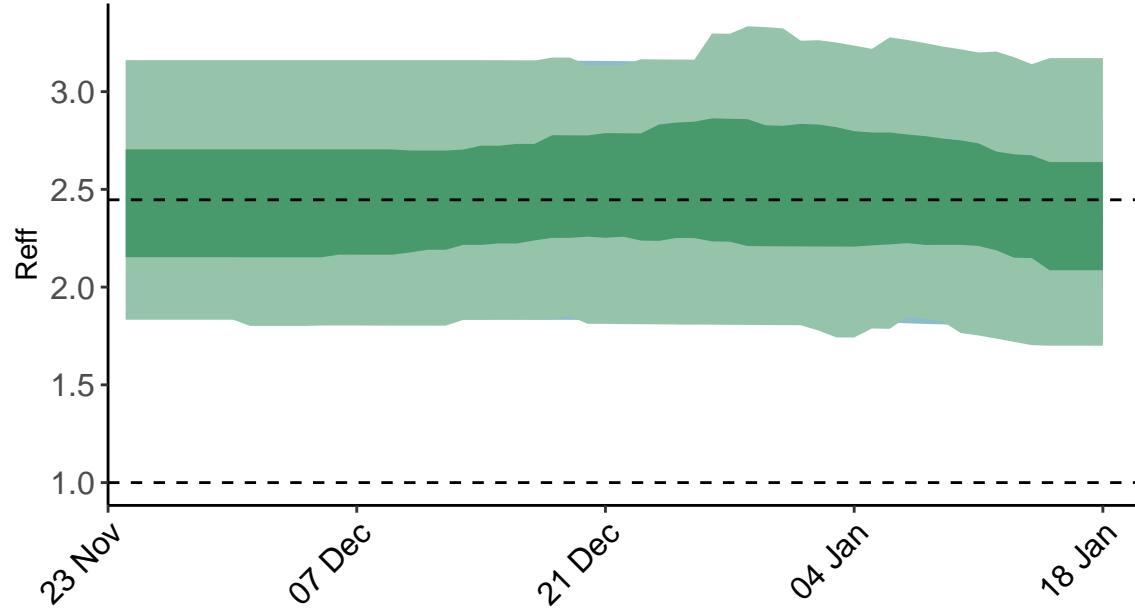


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. St. Vincent and the Grenadines is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

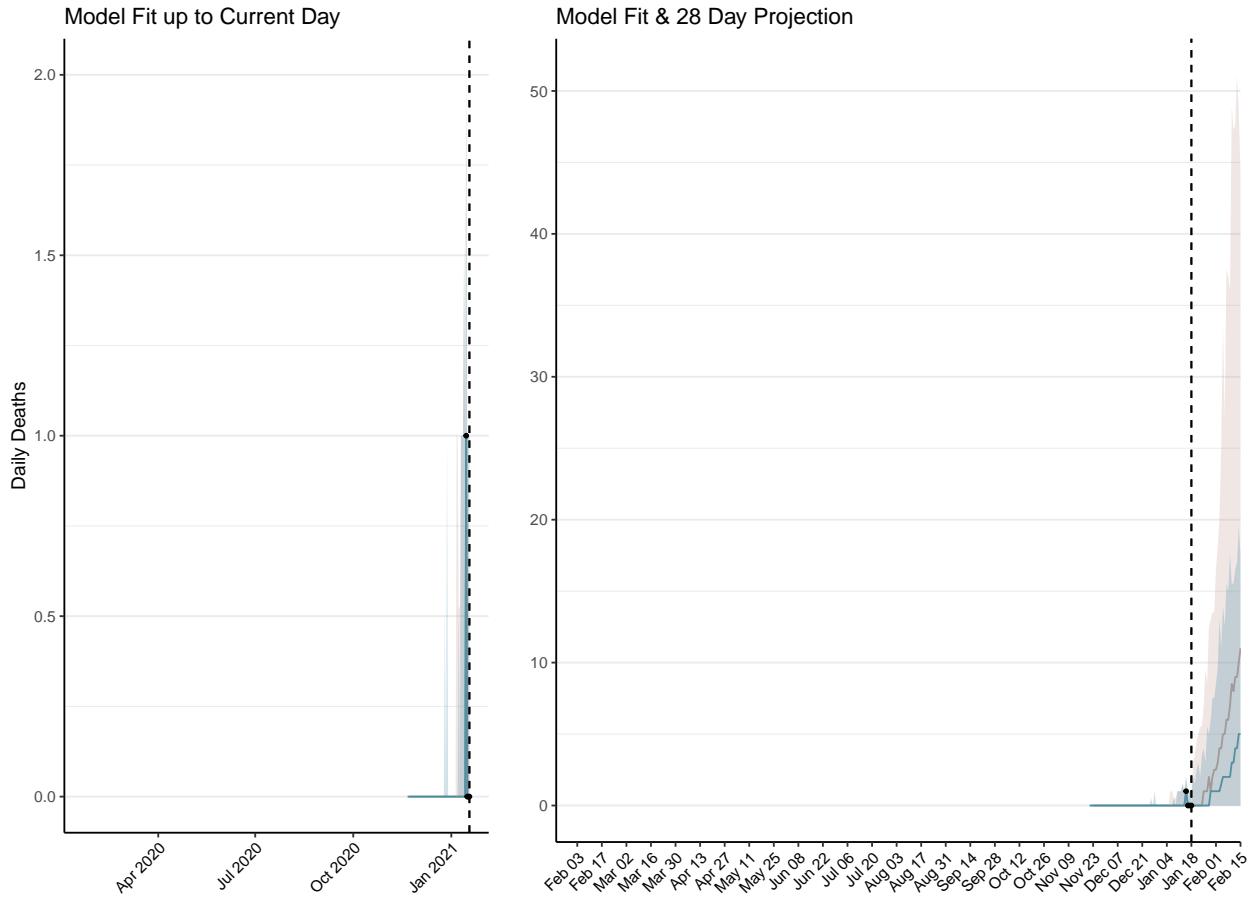


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 12 (95% CI: 9-14) patients requiring treatment with high-pressure oxygen at the current date to 232 (95% CI: 201-262) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 3 (95% CI: 3-4) patients requiring treatment with mechanical ventilation at the current date to 20 (95% CI: 17-22) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

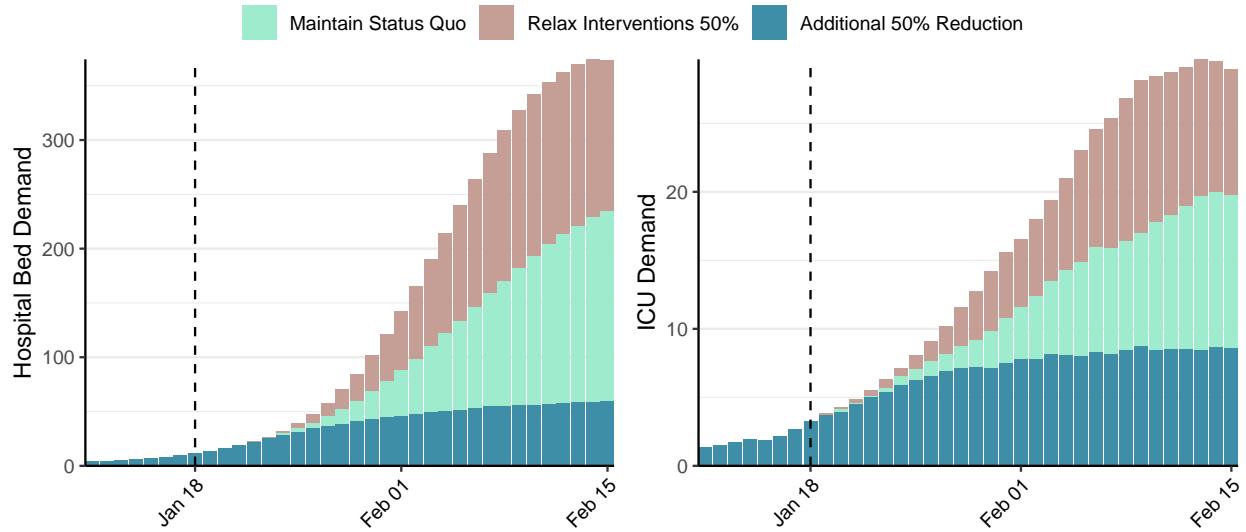
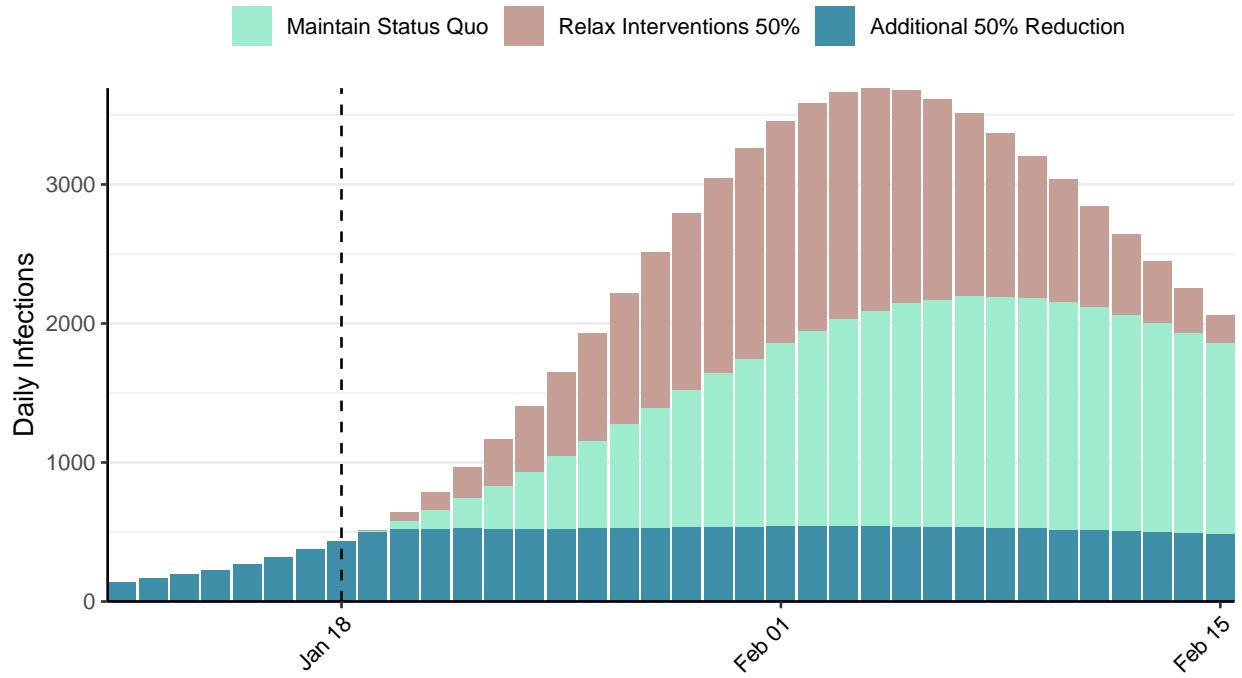


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 434 (95% CI: 347-521) at the current date to 482 (95% CI: 387-576) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 434 (95% CI: 347-521) at the current date to 2,044 (95% CI: 1,803-2,285) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Venezuela, 2021-01-18

[Download the report for Venezuela, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
641	641	6	6	1.04 (95% CI: 0.78-1.32)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Venezuela is not shown in the following plot as only 6 deaths have been reported to date**

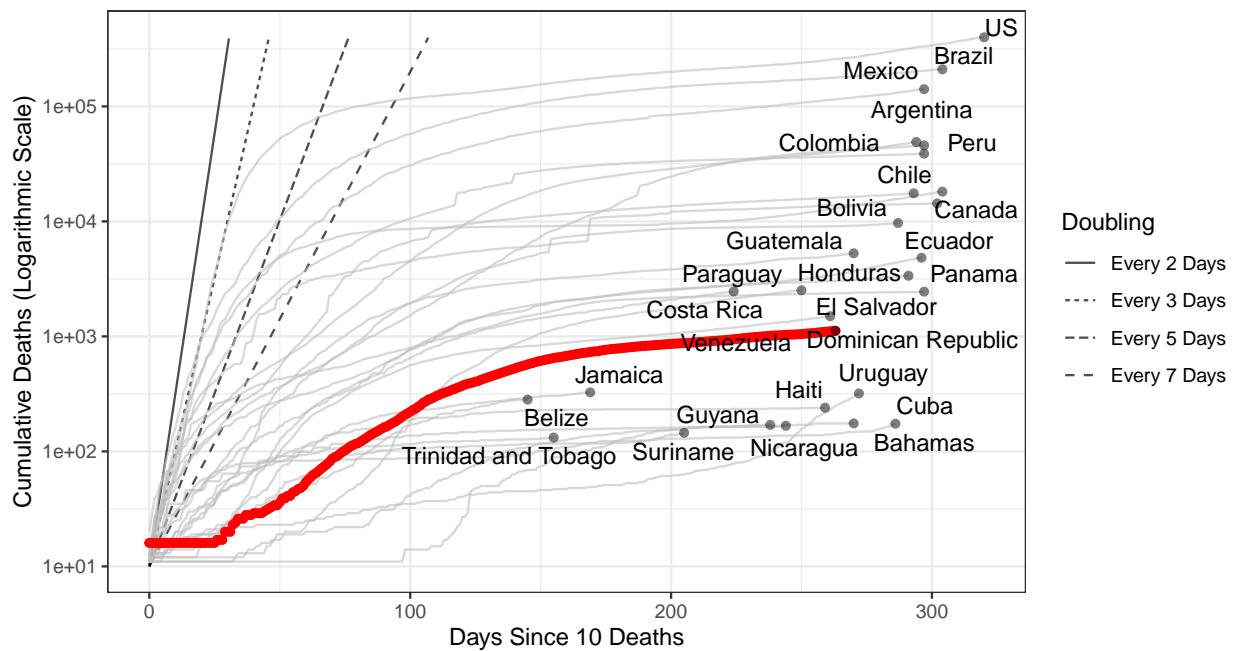


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 82,190 (95% CI: 78,153-86,228) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

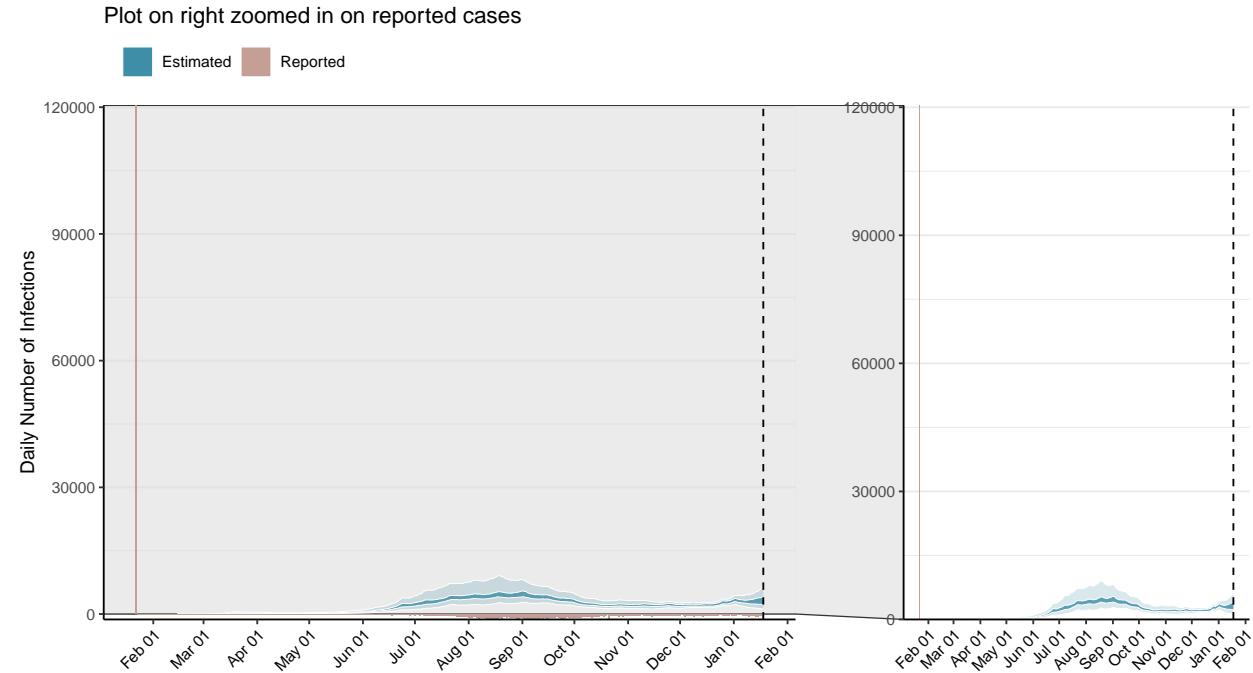
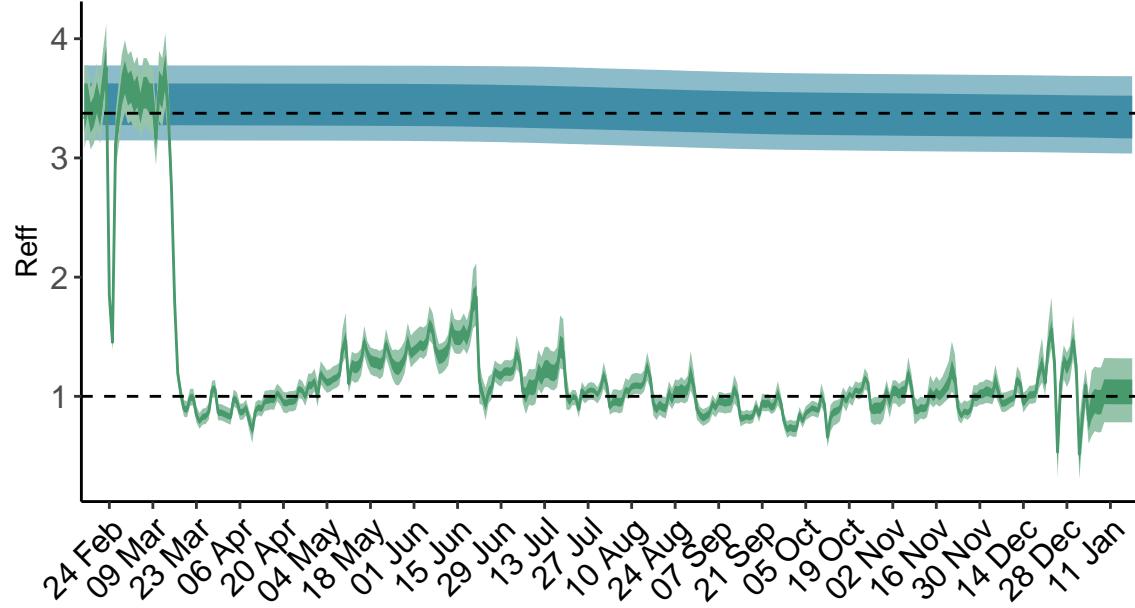


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

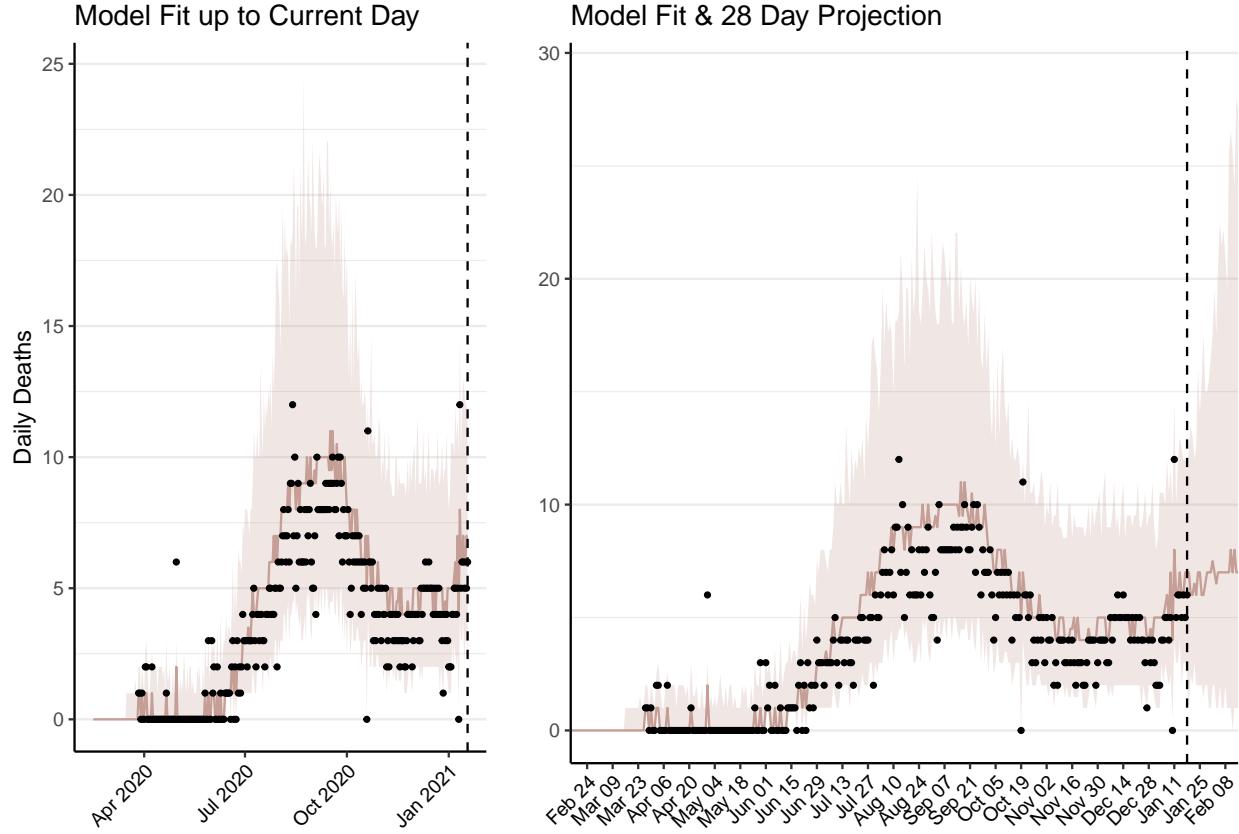


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 259 (95% CI: 244-273) patients requiring treatment with high-pressure oxygen at the current date to 396 (95% CI: 305-487) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 93 (95% CI: 88-98) patients requiring treatment with mechanical ventilation at the current date to 143 (95% CI: 112-175) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

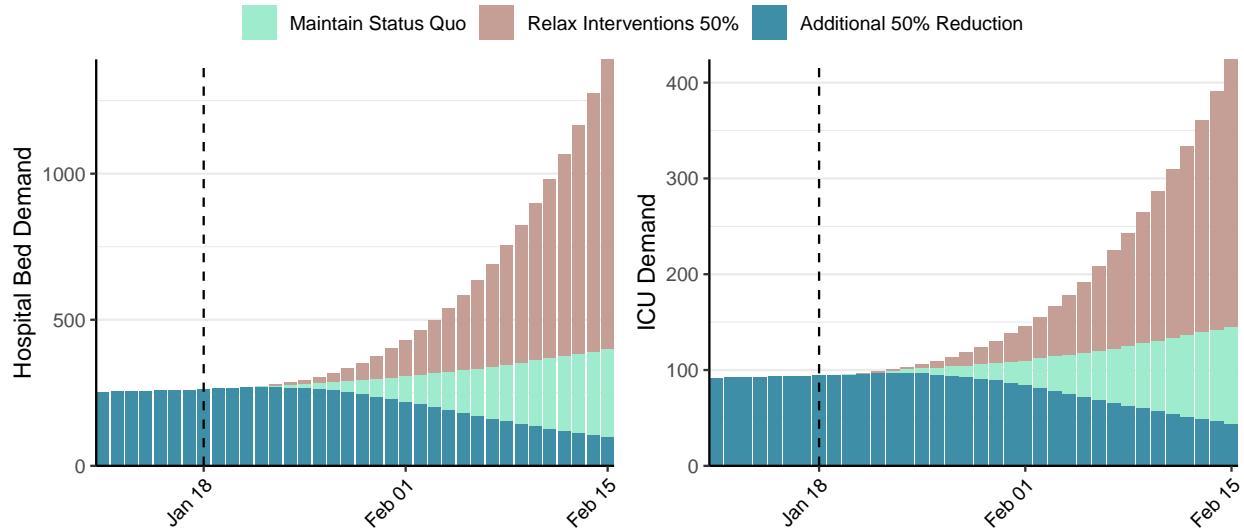


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 3,258 (95% CI: 2,944-3,571) at the current date to 423 (95% CI: 303-544) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,258 (95% CI: 2,944-3,571) at the current date to 35,333 (95% CI: 24,056-46,610) by 2021-02-15.

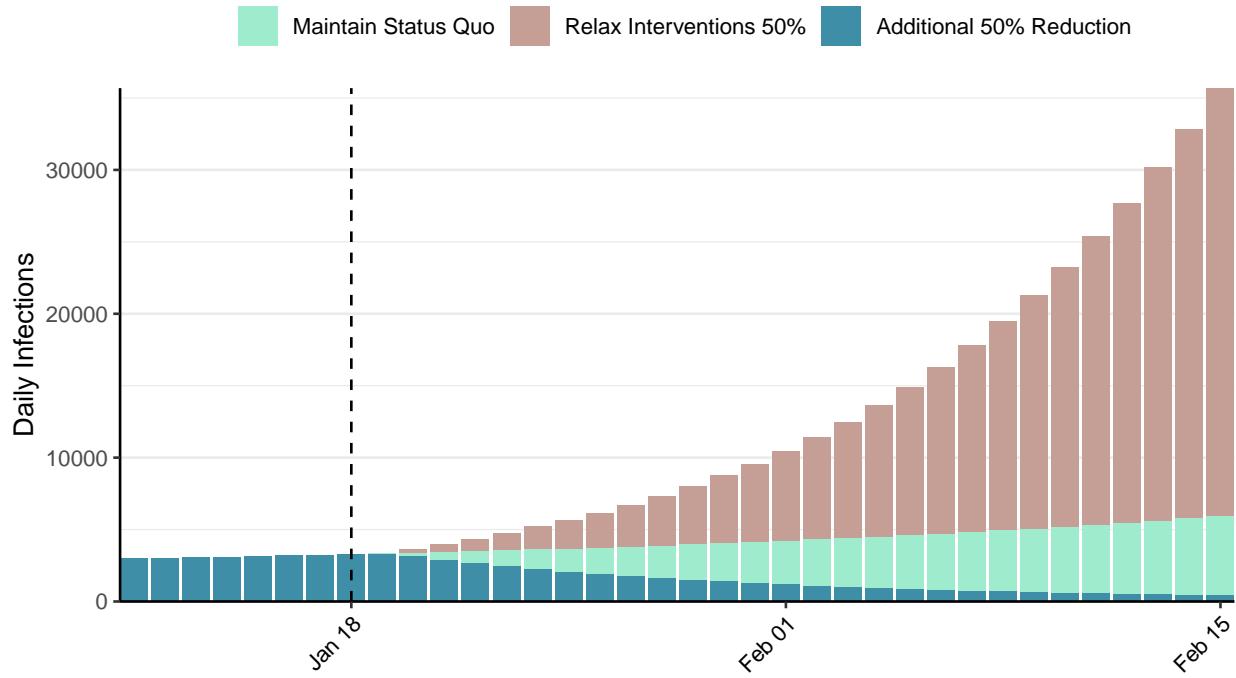


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Vietnam, 2021-01-18

[Download the report for Vietnam, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
2	2	0	0	0.59 (95% CI: 0.35-0.84)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Vietnam is not shown in the following plot as only 0 deaths have been reported to date**

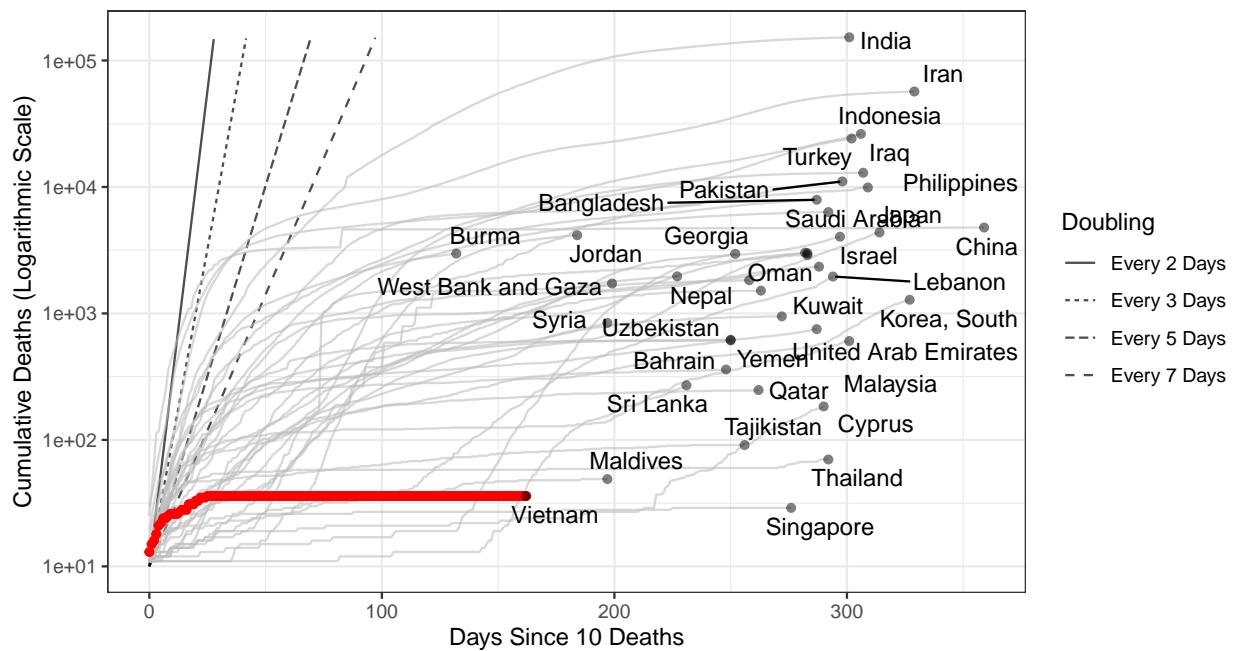


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2 (95% CI: 0-4) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

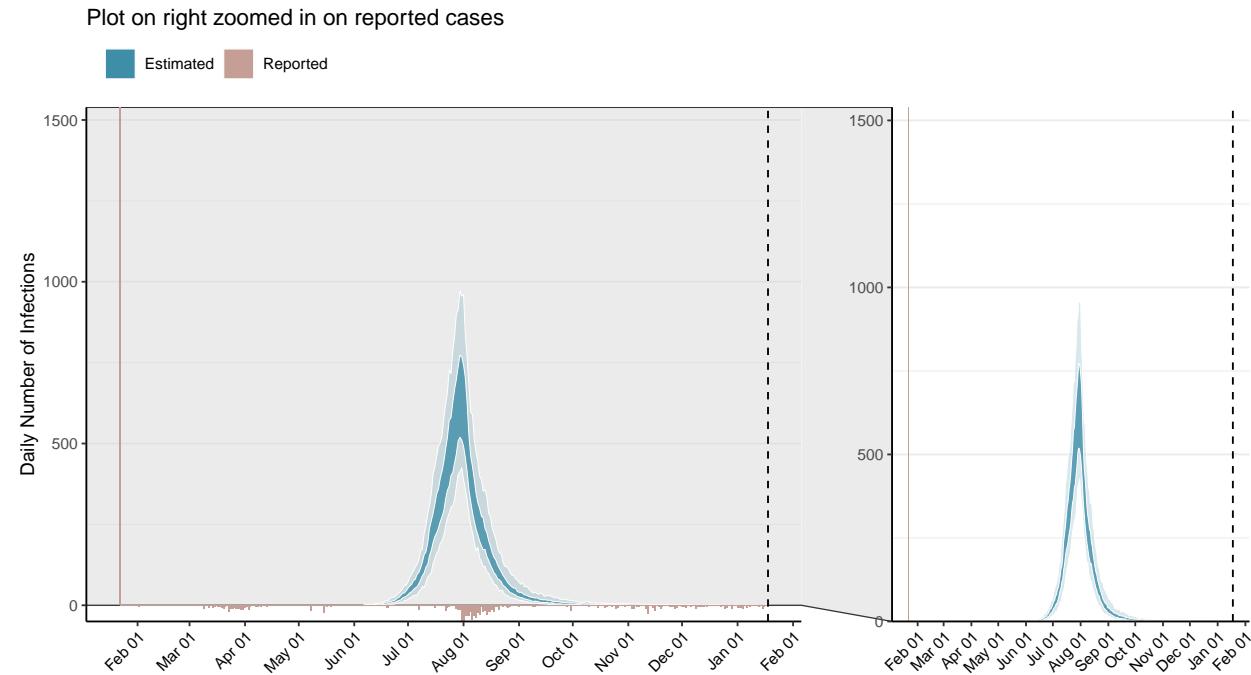
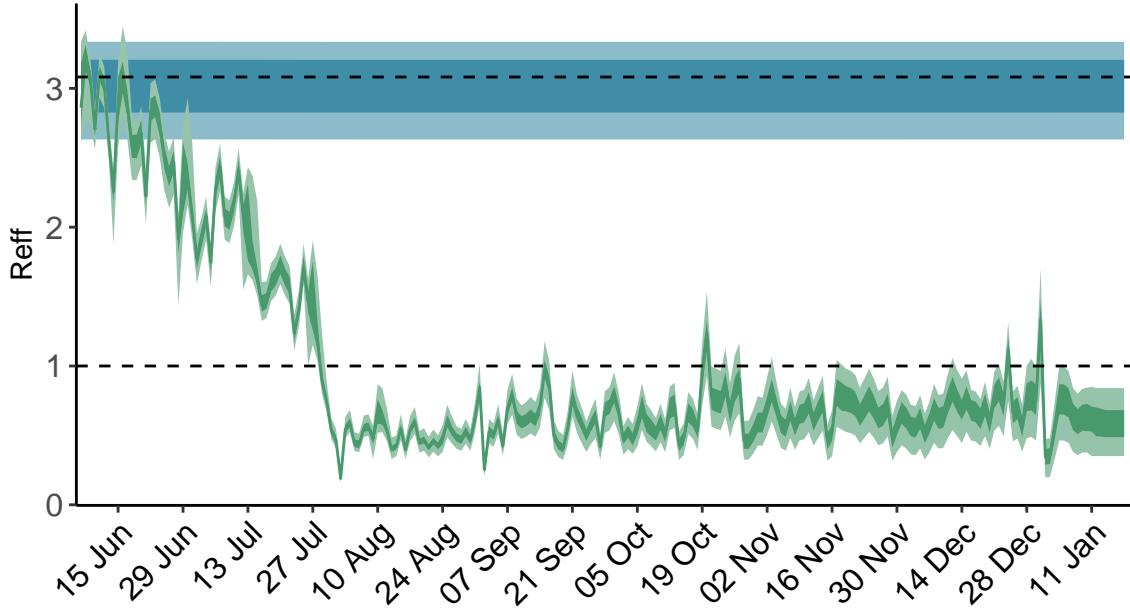


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in **blue** shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

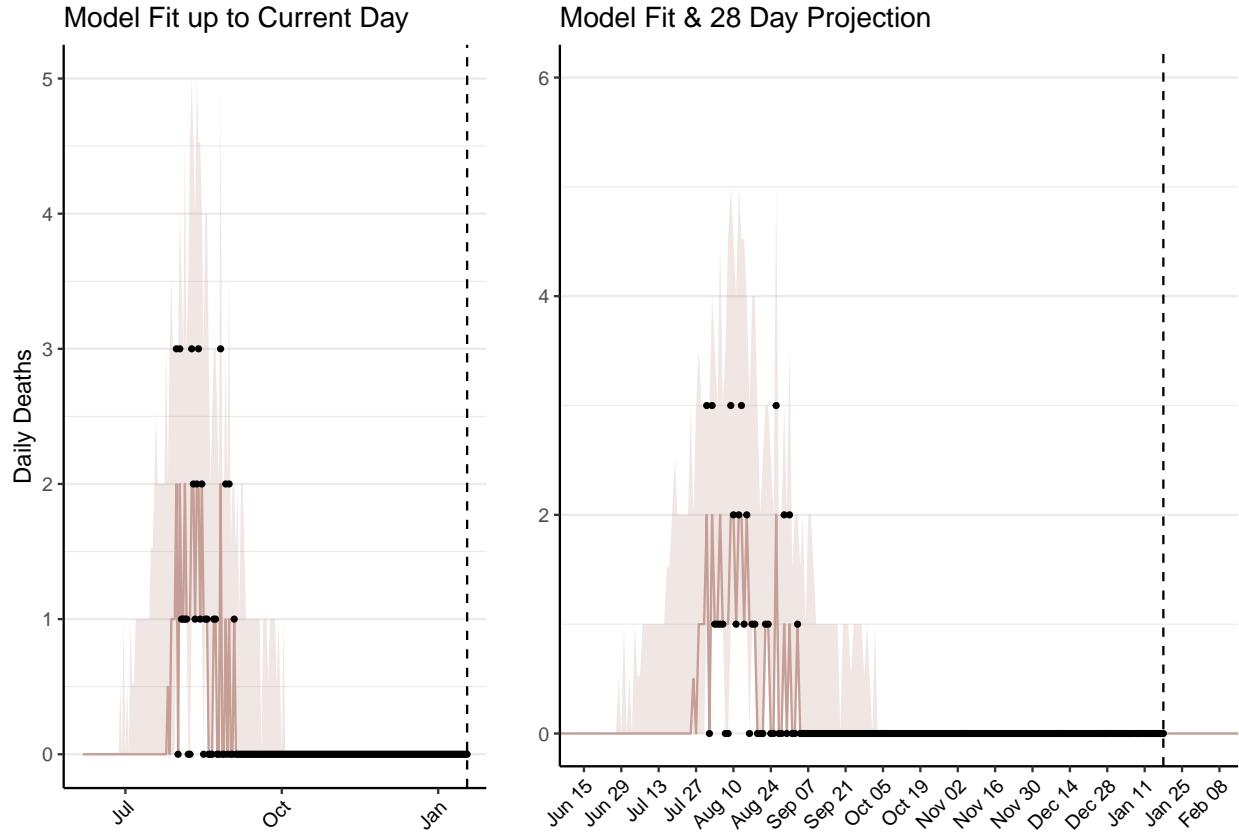


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 0 (95% CI: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: NaN-NaN) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 0 (95% CI: NaN-NaN) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

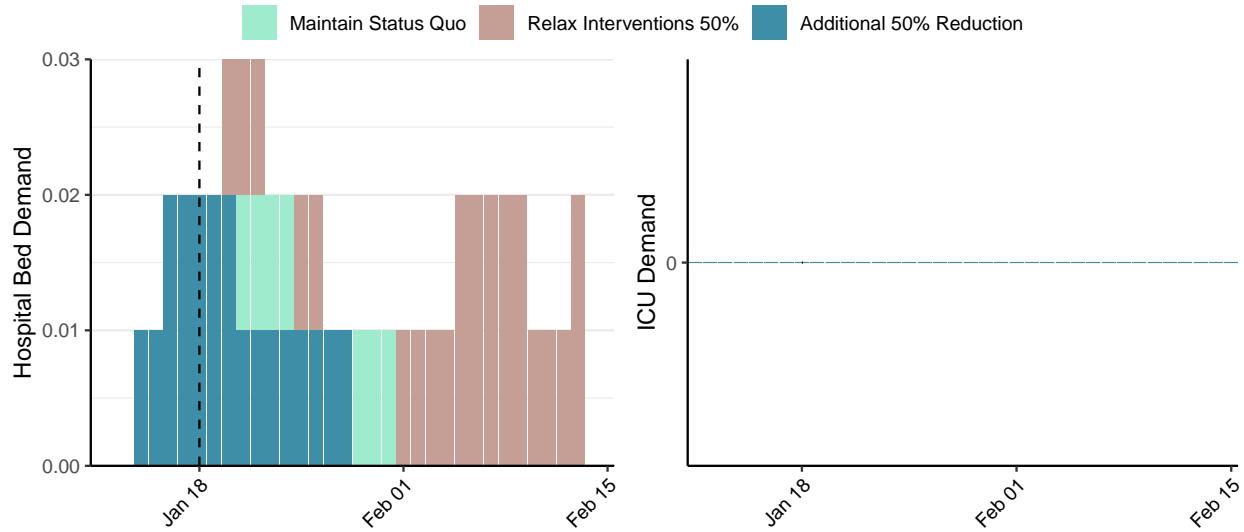


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: NaN-NaN) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 0 (95% CI: 0-0) at the current date to 0 (95% CI: 0-0) by 2021-02-15.

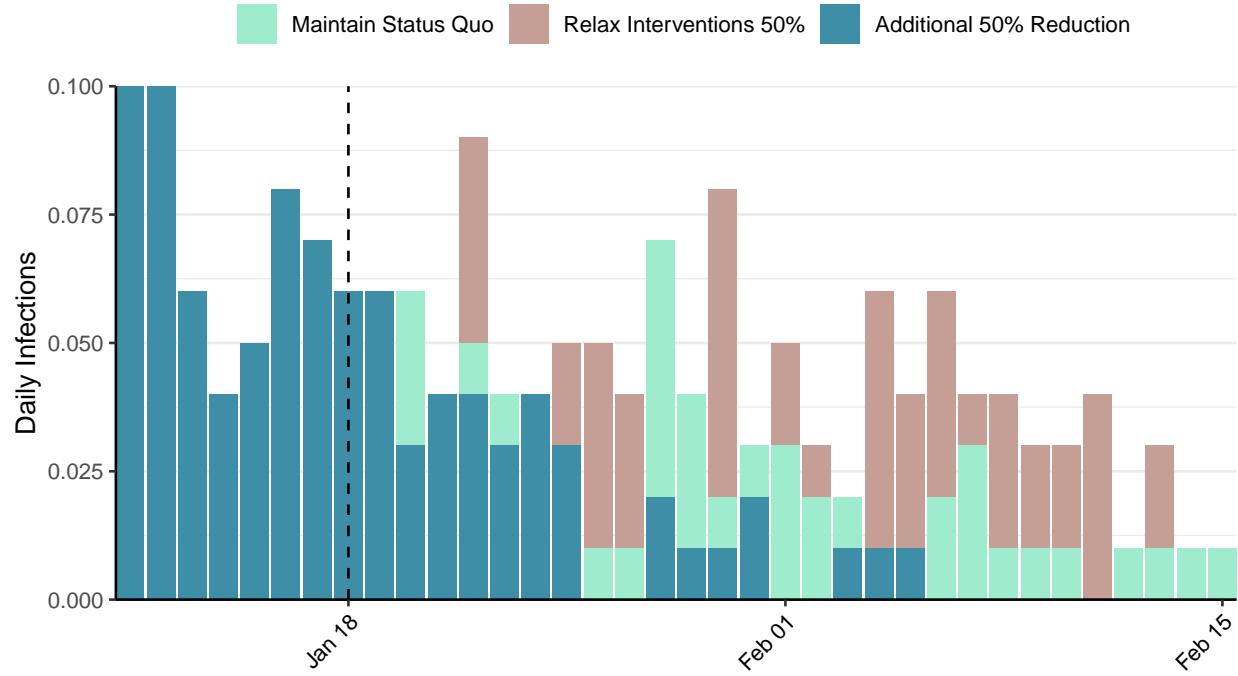


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](#) - <https://covidsim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

## Situation Report for COVID-19: Yemen, 2021-01-18

[Download the report for Yemen, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
1	1	0	0	1.08 (95% CI: 0.78-1.48)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Yemen is not shown in the following plot as only 0 deaths have been reported to date**

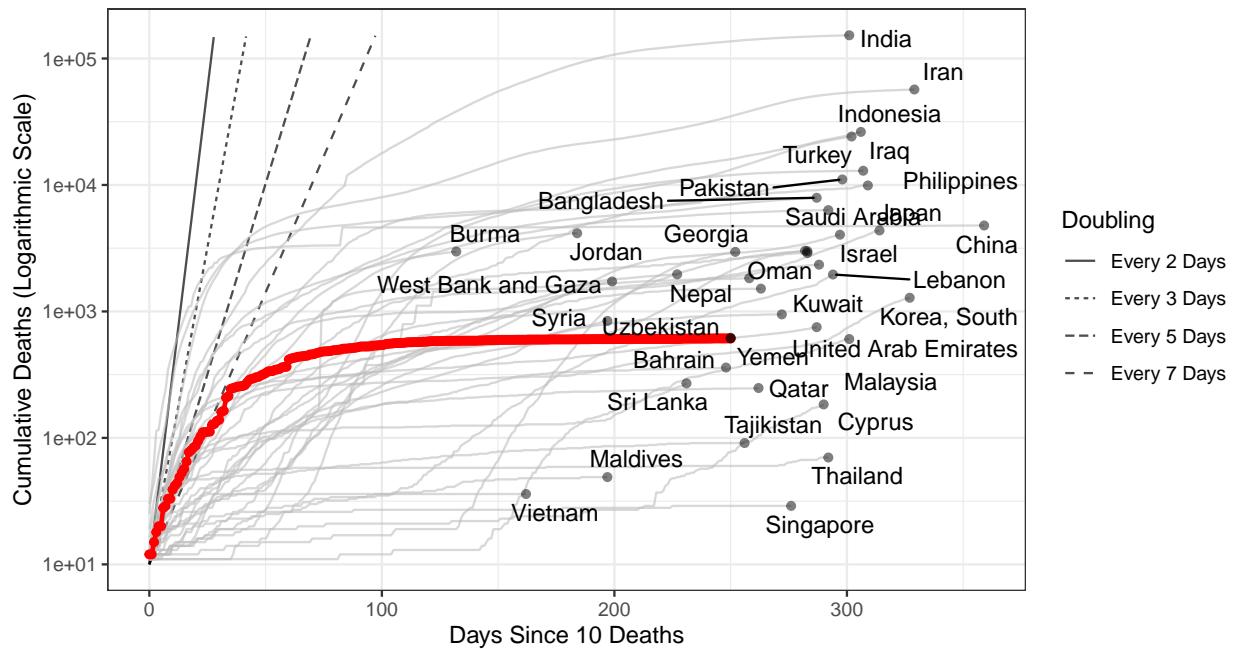


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 2,828 (95% CI: 2,544-3,113) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Yemen has revised their historic reported cases and thus have reported negative cases.**

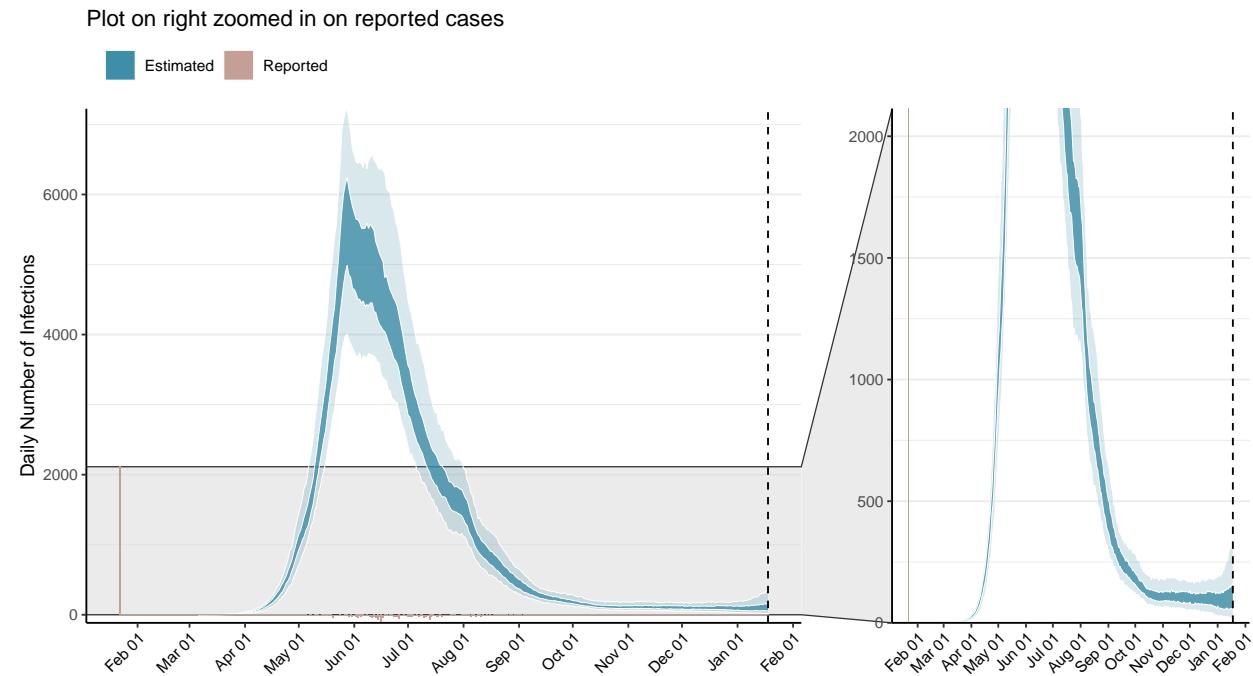
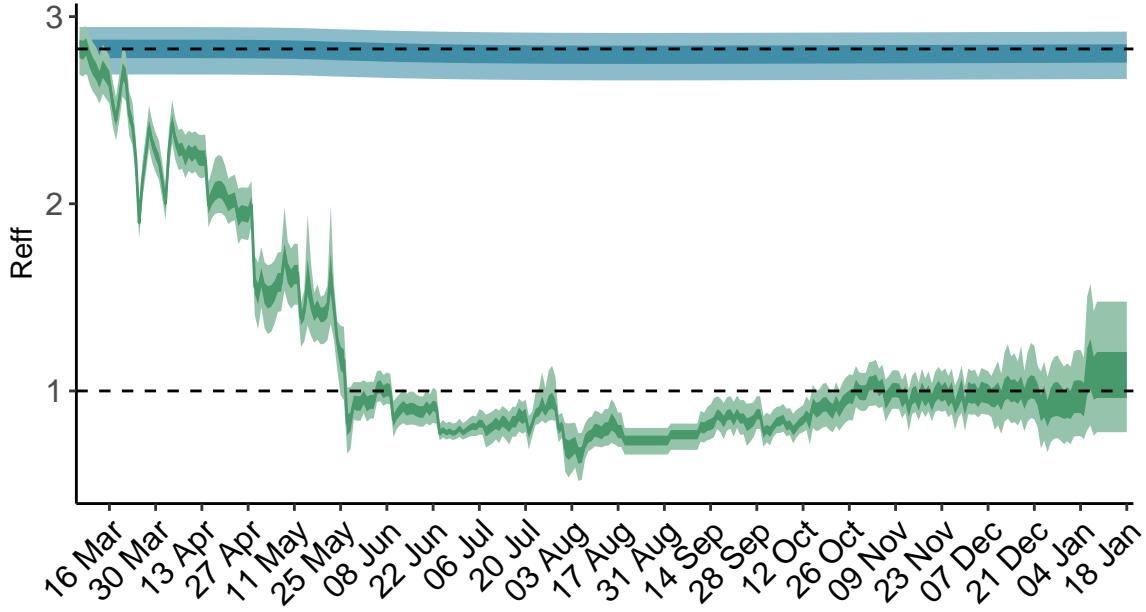


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

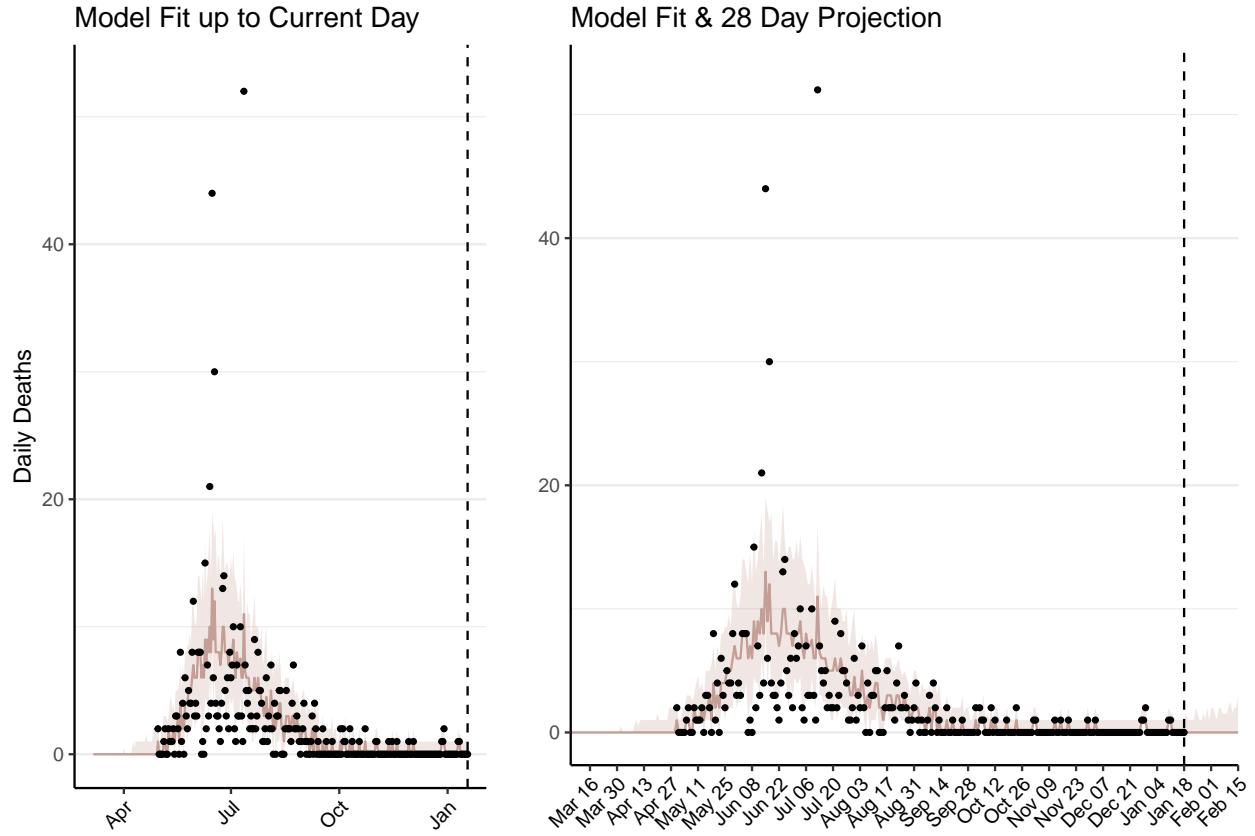


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 8 (95% CI: 7-9) patients requiring treatment with high-pressure oxygen at the current date to 16 (95% CI: 12-20) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 3 (95% CI: 3-4) patients requiring treatment with mechanical ventilation at the current date to 6 (95% CI: 5-7) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

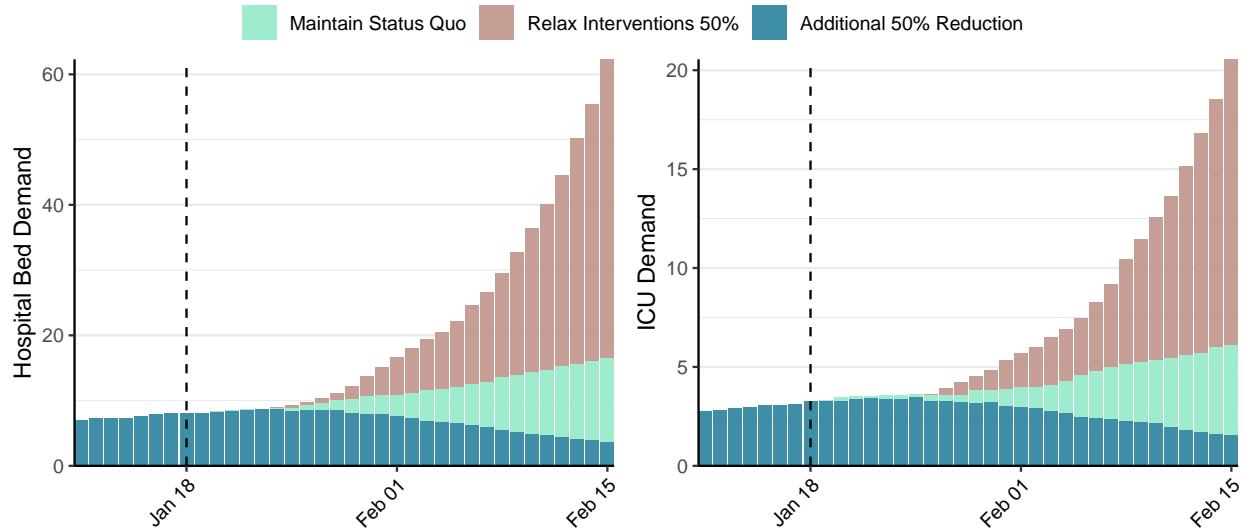


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 122 (95% CI: 105-140) at the current date to 20 (95% CI: 15-26) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 122 (95% CI: 105-140) at the current date to 2,107 (95% CI: 1,482-2,732) by 2021-02-15.

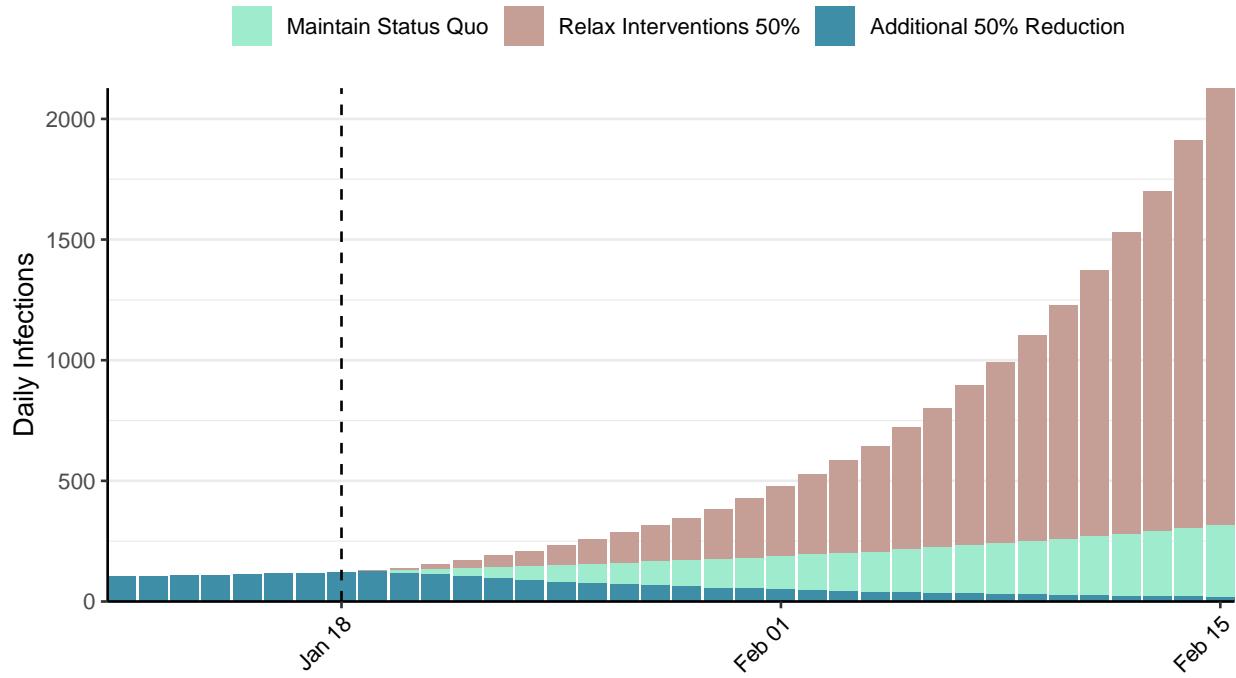


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: South Africa, 2021-01-18

[Download the report for South Africa, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
9,010	9,010	344	344	0.83 (95% CI: 0.73-0.96)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease.

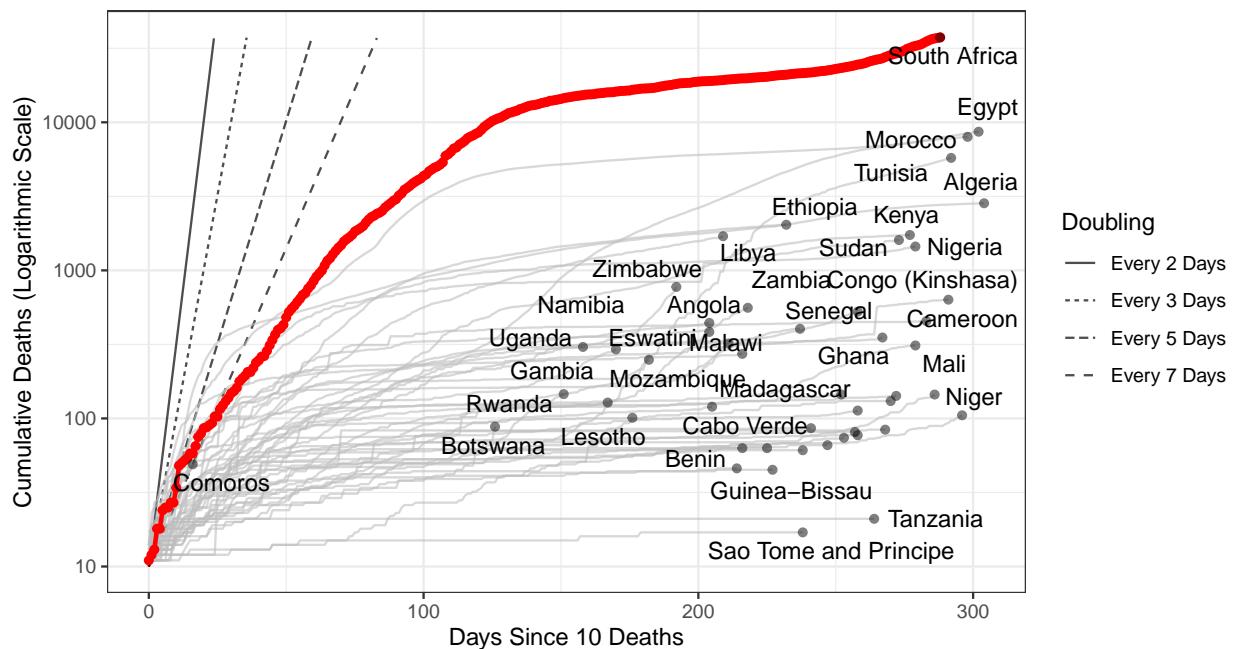


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 3,614,383 (95% CI: 3,500,665–3,728,101) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

Plot on right zoomed in on reported cases

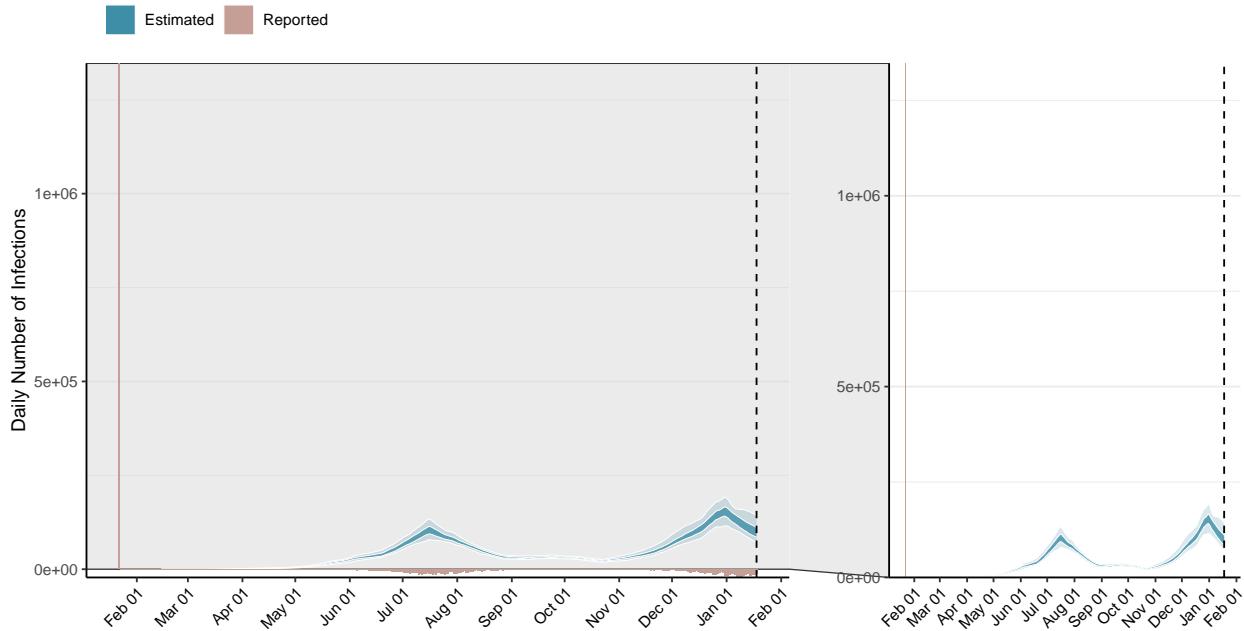
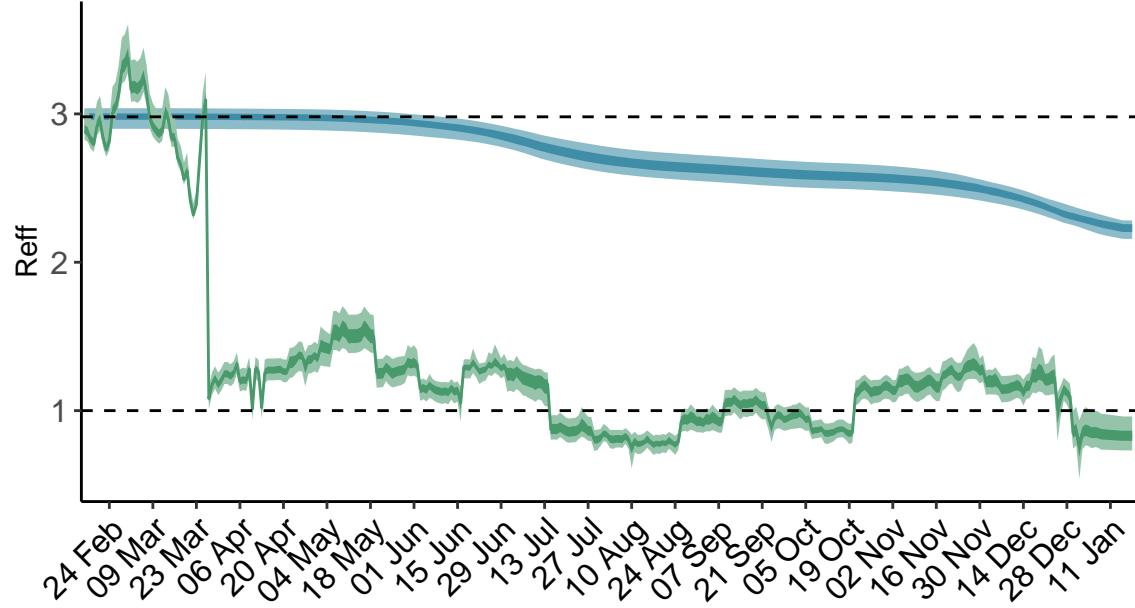


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. South Africa is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

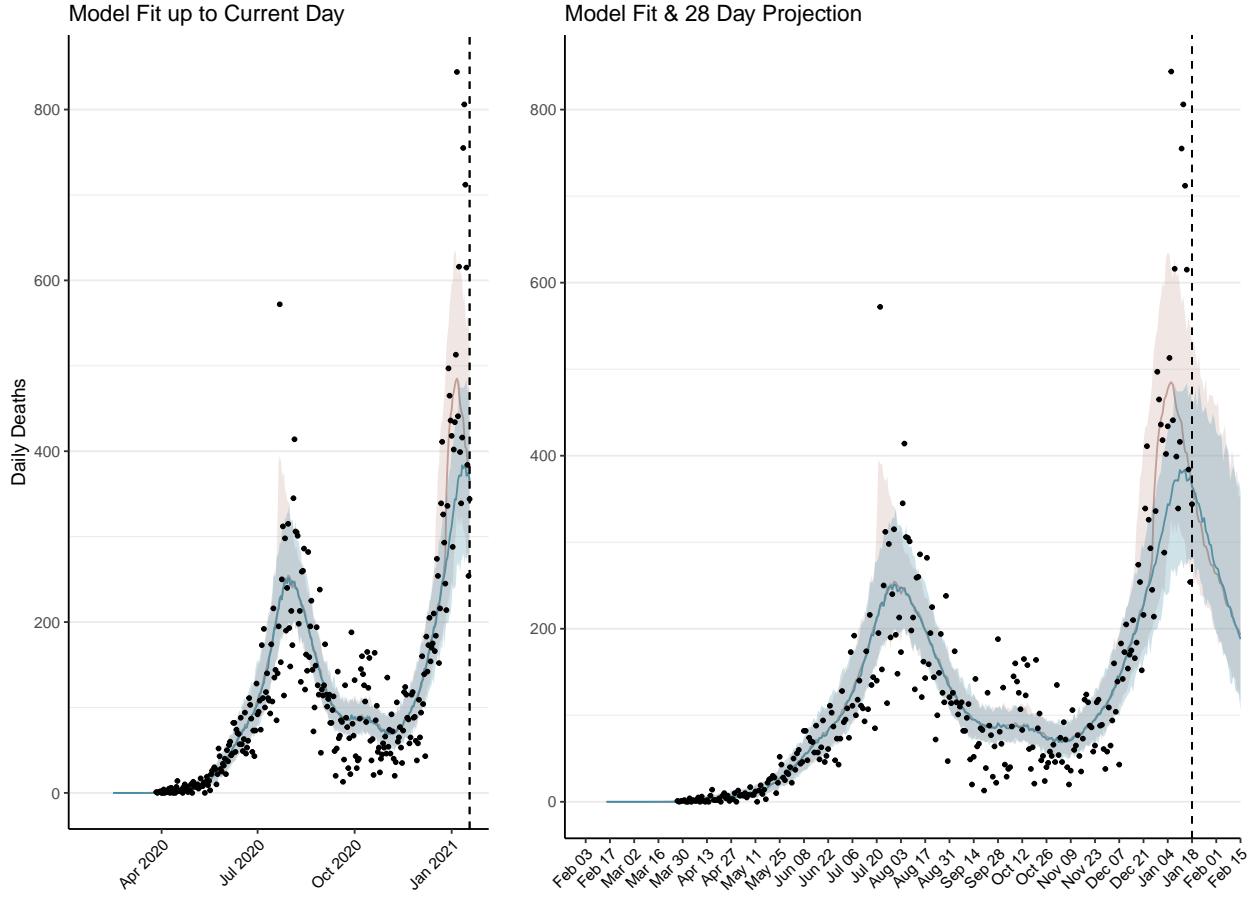


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 14,015 (95% CI: 13,568-14,462) patients requiring treatment with high-pressure oxygen at the current date to 7,409 (95% CI: 6,920-7,898) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 4,370 (95% CI: 4,280-4,460) patients requiring treatment with mechanical ventilation at the current date to 3,013 (95% CI: 2,861-3,166) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B.** These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.

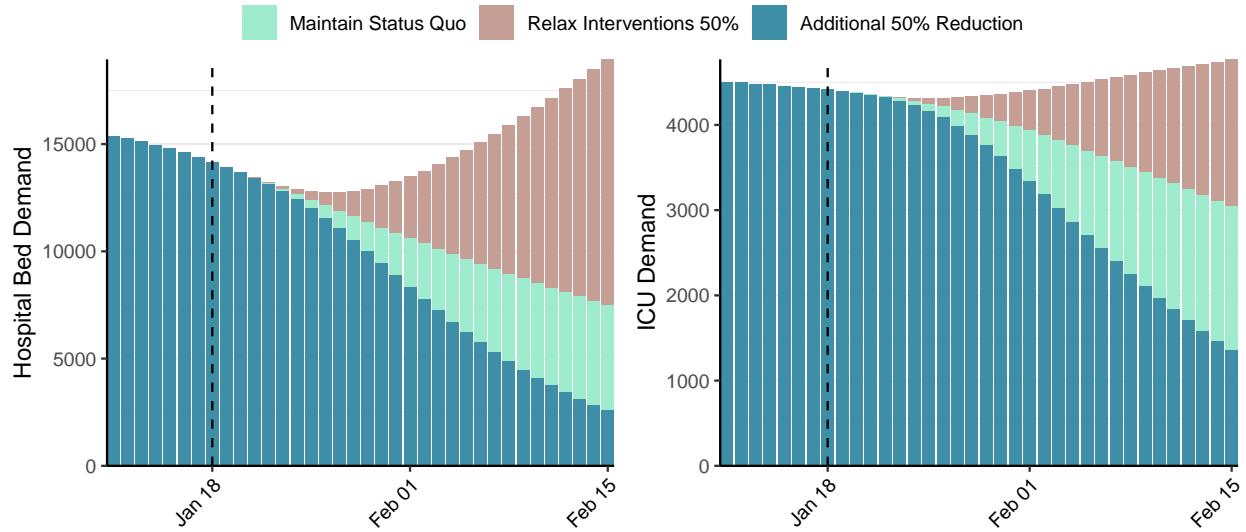
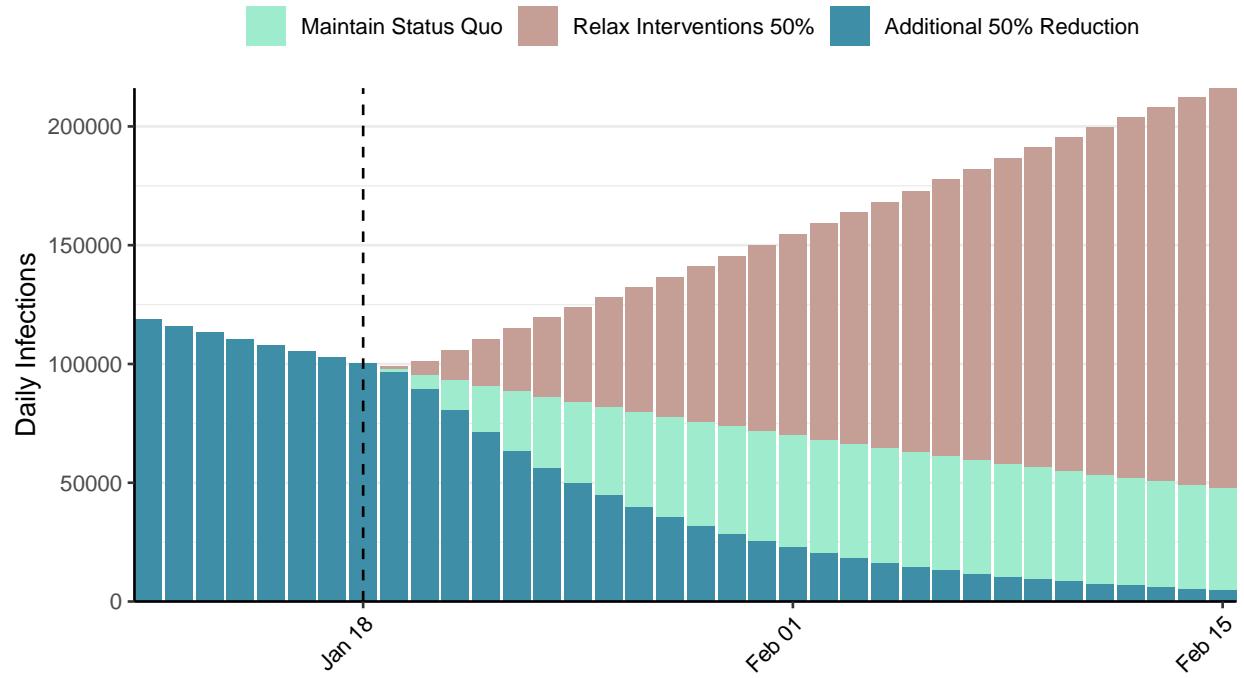


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 99,284 (95% CI: 94,912-103,656) at the current date to 4,824 (95% CI: 4,431-5,218) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 99,284 (95% CI: 94,912-103,656) at the current date to 213,992 (95% CI: 196,600-231,384) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Zambia, 2021-01-18

[Download the report for Zambia, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	1.57 (95% CI: 1.39-1.72)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Zambia is not shown in the following plot as only 0 deaths have been reported to date**

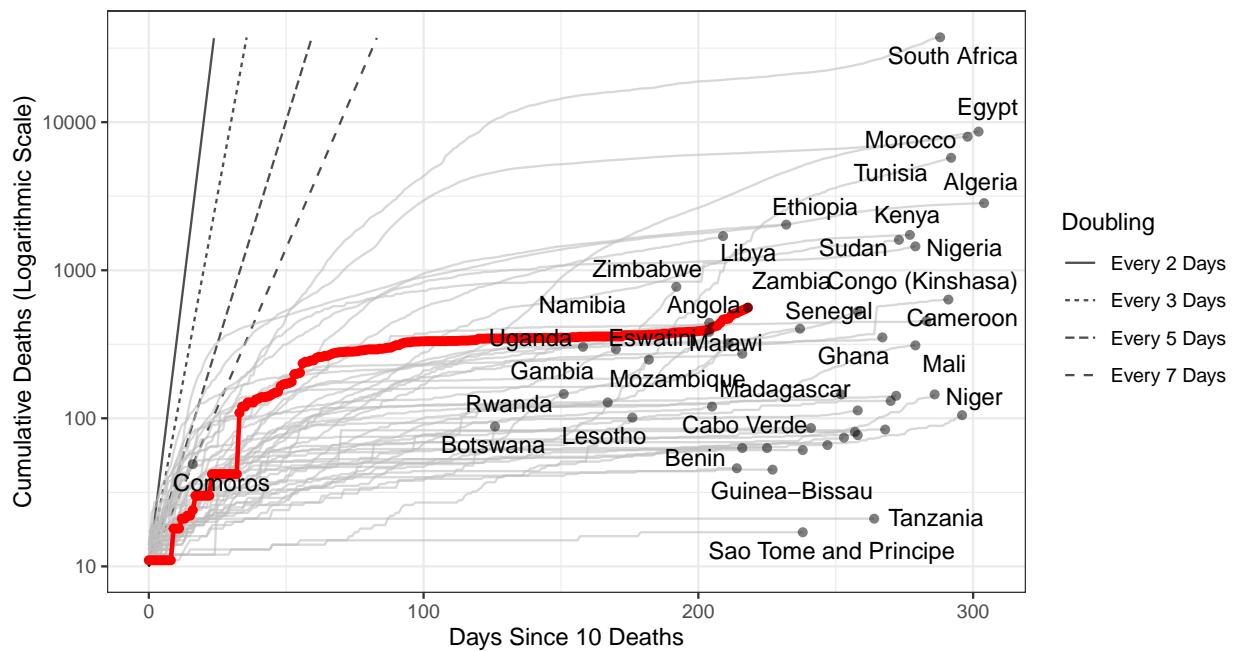


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 386,642 (95% CI: 364,287-408,997) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match).

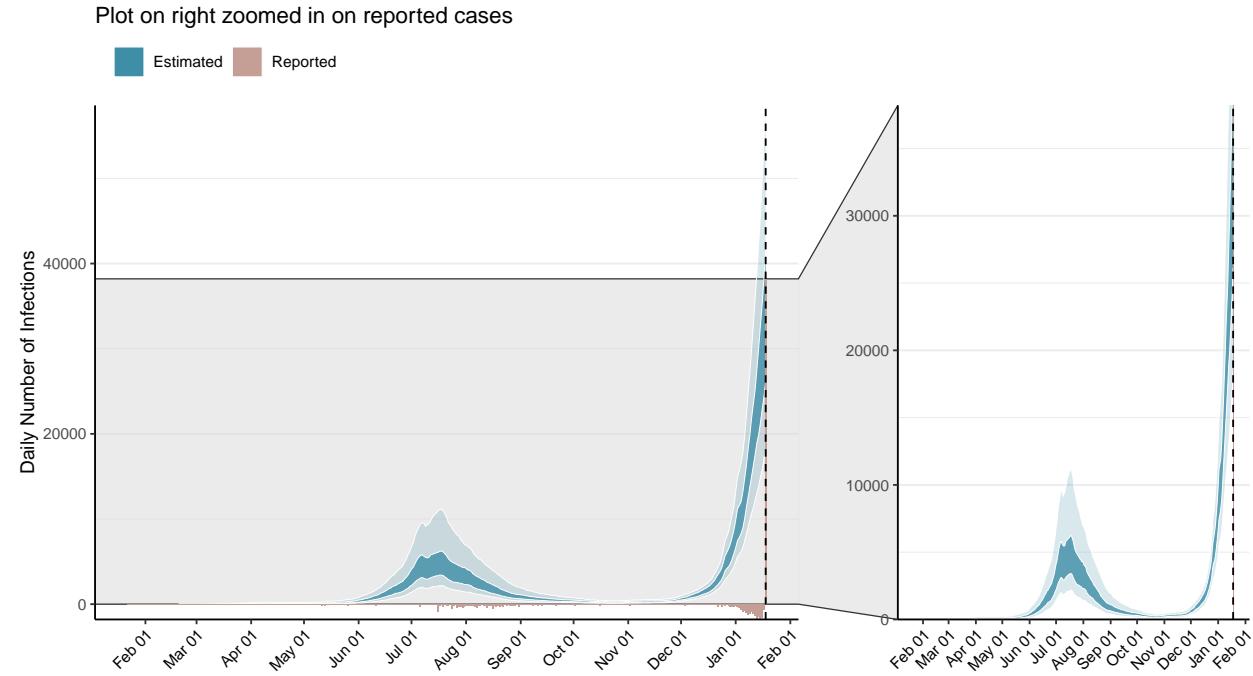
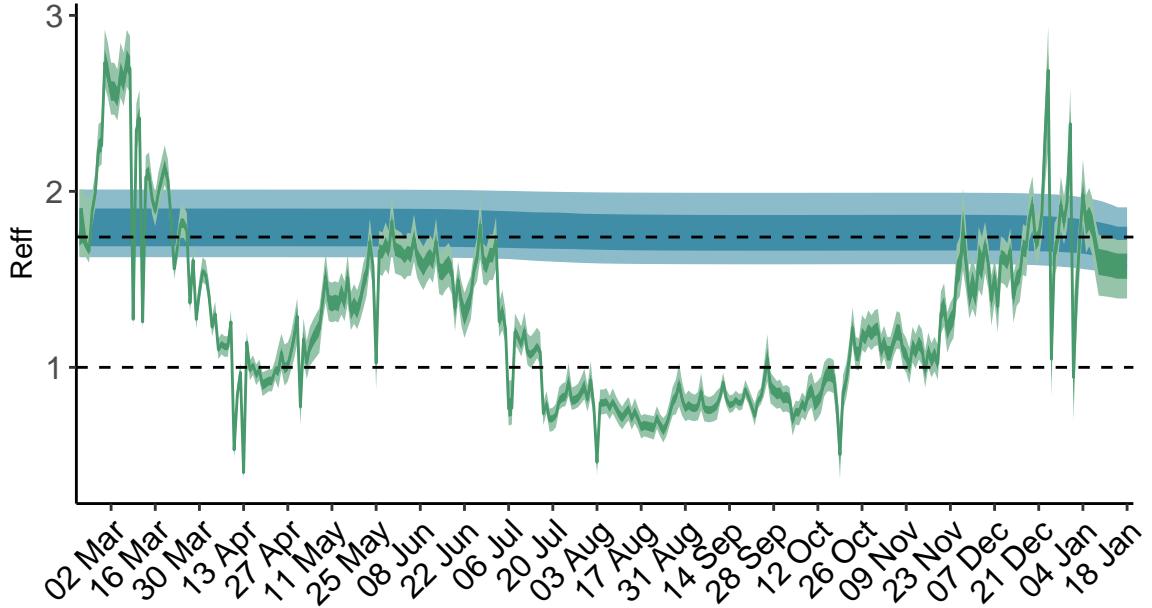


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days. **N.B. Zambia is forecast to be close to or surpassing our best estimates for healthcare capacity in the next 28 days.** Estimates of deaths in the next 28 days may be inaccurate due to our working assumptions for mortality in individuals who do not receive appropriate treatment. [See our methods for more information.](#)

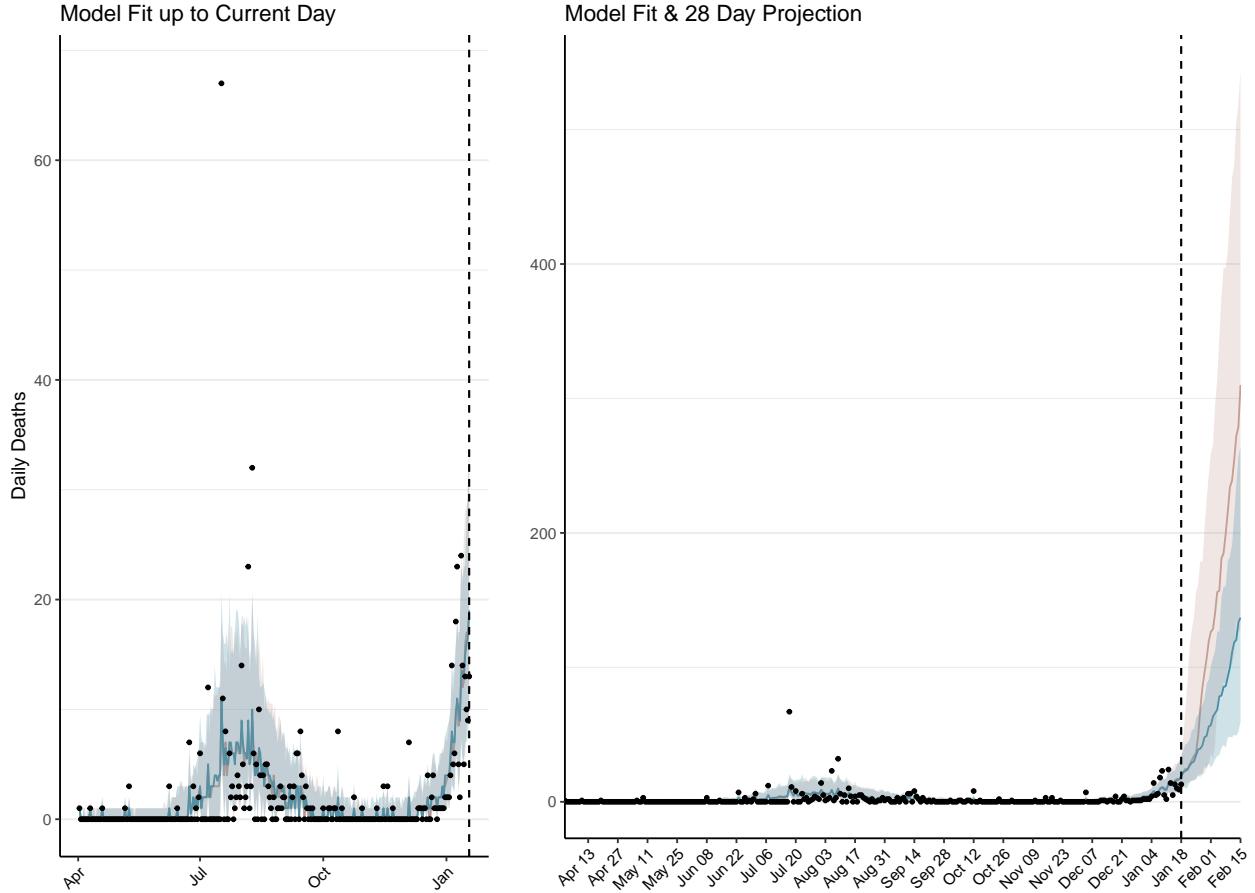


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days. The forecasted deaths in blue assumes healthcare capacity has been surged to ensure sufficient supply of ICU and hospital beds. The red curve assumes no surging in healthcare capacity and subsequently projects increased deaths.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,139 (95% CI: 1,074-1,204) patients requiring treatment with high-pressure oxygen at the current date to 7,595 (95% CI: 7,048-8,141) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 383 (95% CI: 359-406) patients requiring treatment with mechanical ventilation at the current date to 1,000 (95% CI: 965-1,035) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

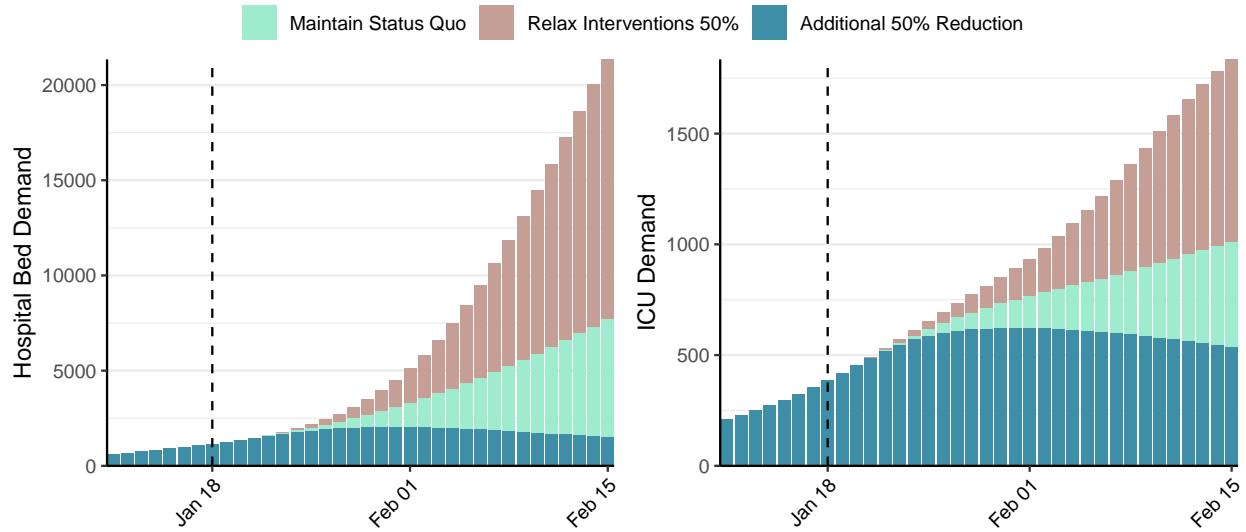
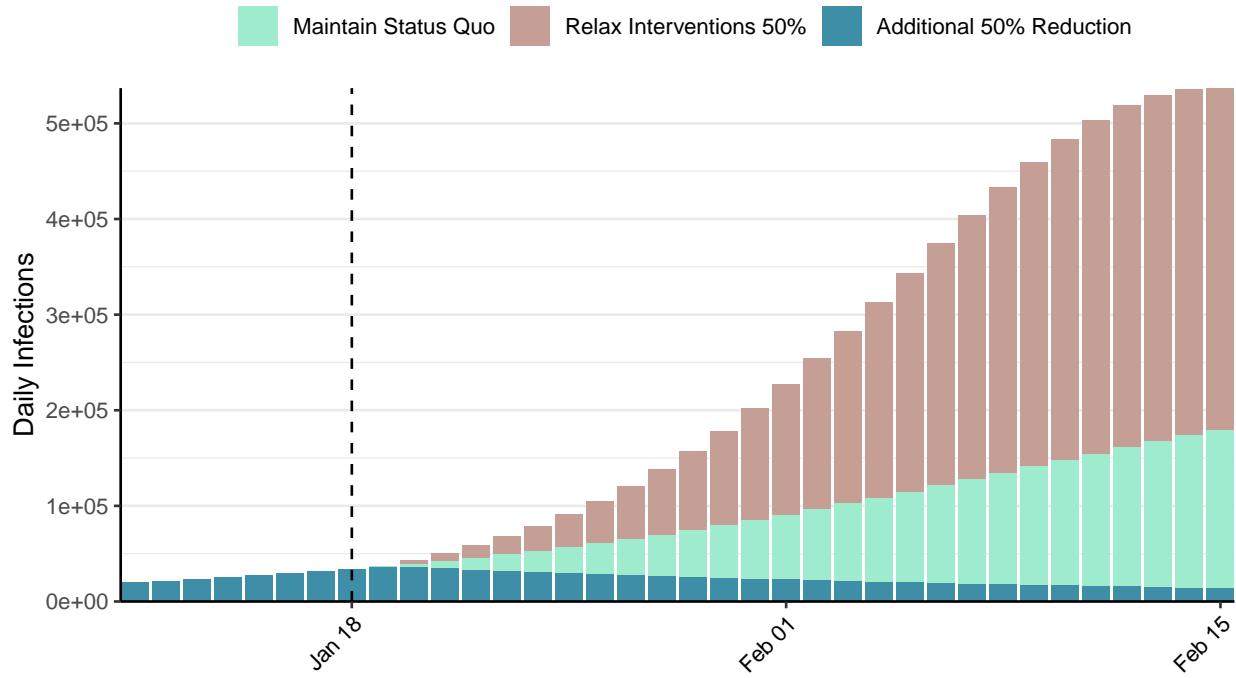


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 33,843 (95% CI: 31,641-36,045) at the current date to 13,933 (95% CI: 12,716-15,150) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 33,843 (95% CI: 31,641-36,045) at the current date to 531,560 (95% CI: 514,299-548,821) by 2021-02-15.



**Figure 6: Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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## Situation Report for COVID-19: Zimbabwe, 2021-01-18

[Download the report for Zimbabwe, 2021-01-18 here.](#) This report uses data from the European Centre for Disease Control. These data are updated daily and whilst there may be a short delay, they are generally consistent with Ministry reports. These data are then used to back-calculate an ‘inferred number of COVID-19 infections’ using mathematical modelling techniques (see [Report 12](#) for further details) to estimate the number of people that have been infected and to make short-term projections for future healthcare needs.

### Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated $R_{eff}$
0	0	0	0	0.89 (95% CI: 0.61-1.16)

The figure below shows the cumulative reported deaths as a function of the time since the 10th death was reported. Dashed lines show the expected trajectory for different doubling times of the epidemic. For example, with a doubling time of 3 days, if there are currently a total of 20 deaths reported, we would expect there to be 40 deaths in total reported in 3 days-time, 80 deaths in 6 days-time, 160 deaths in 9 days-time etc. For most epidemics, in the absence of interventions, we expect a doubling time of 3-4 days for this disease. **N.B. Zimbabwe is not shown in the following plot as only 0 deaths have been reported to date**

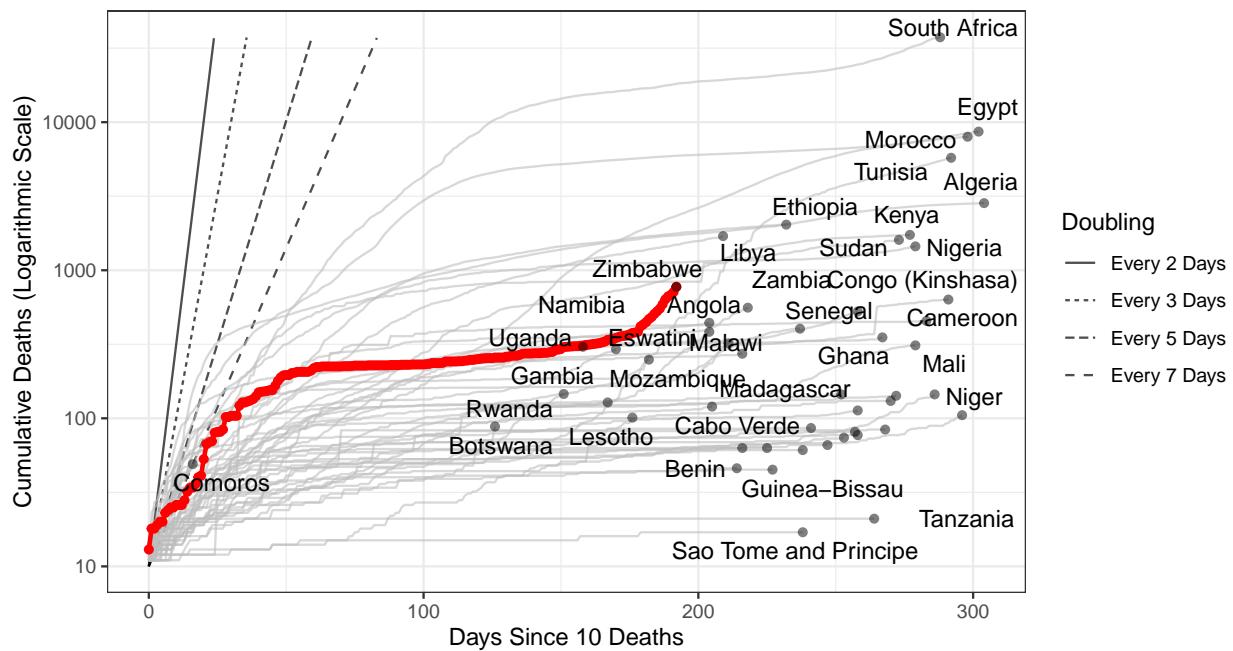


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

## COVID-19 Transmission Modelling

The figure below shows the estimated number of people infected over the past 4 weeks. The bar charts show, for comparison, the number of reported cases. We estimate that there has been a total of 531,408 (95% CI: 502,142–560,675) infections over the past 4 weeks. The right-hand plot shows these data on a different scale as the estimated infections are likely to be much larger than the reported cases. **Importantly**, the estimated infections includes both asymptomatic and mild cases that would not necessarily be identified through surveillance. Consequently, the estimated infections are likely to be significantly higher than the reported cases in all countries (see our [FAQ](#) for further explanation of these differences and why the reported cases and estimated infections are unlikely to match). **N.B. Zimbabwe has revised their historic reported cases and thus have reported negative cases.**

Plot on right zoomed in on reported cases

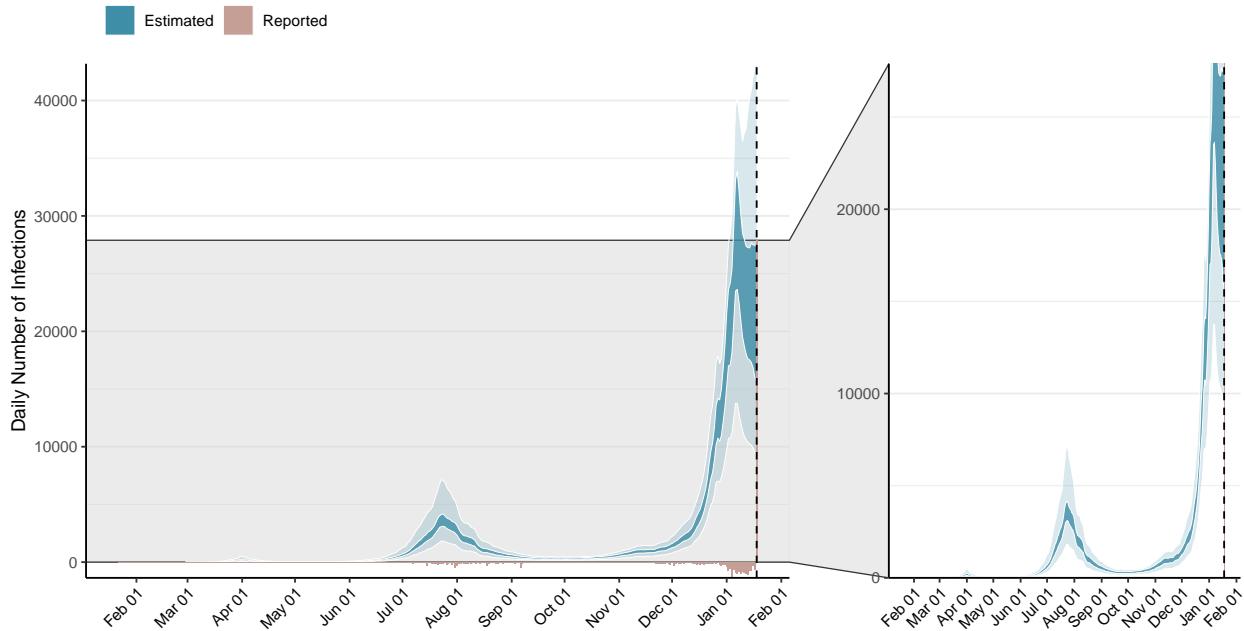
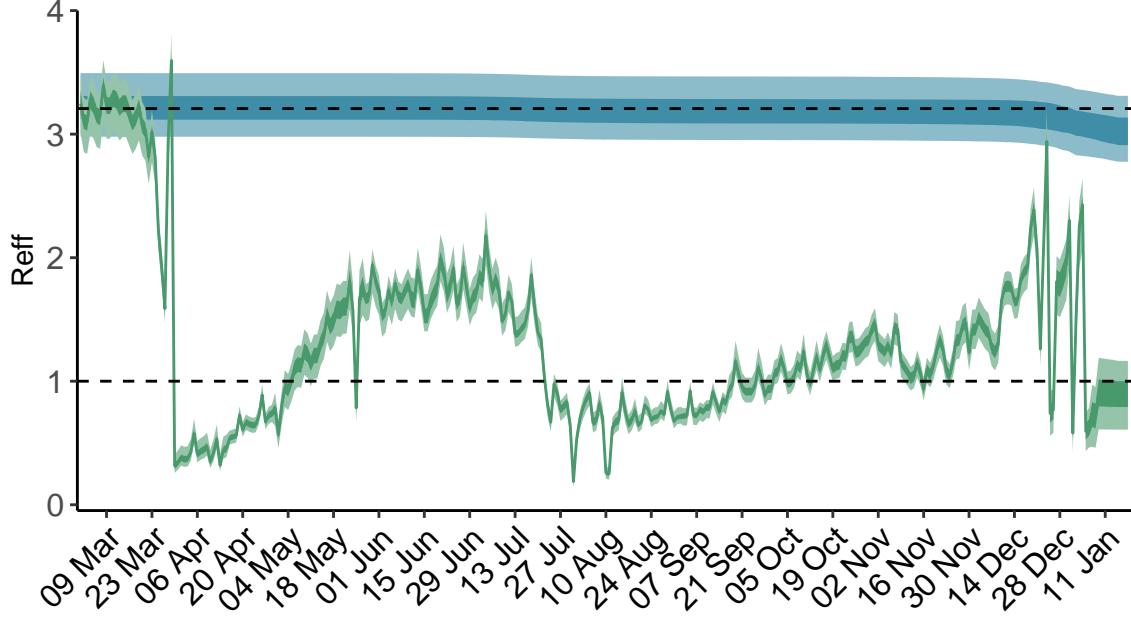


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

By fitting to the time series of deaths, we are able to estimate a time-varying reproduction number,  $R_{eff}$ .  $R_{eff}$  is the average number of secondary infections caused by a single infected person at a given time. If  $R_{eff}$  is above 1, the rate of transmission is increasing and the number of new infections is increasing.  $R_{eff}$  is assumed to change in relation to mobility fall in proportion. When fitting our model we assume that 100% of COVID-19 related deaths have been reported (please see our [FAQ](#) section for more information about this assumption). Additionally, we assume that infection with COVID-19 leads to protective immunity that does not wane within the time scales considered in these analyses.



**Figure 3: Time-varying effective reproduction number,  $R_{eff}$ .**  $R_{eff}$  (green) is the average number of secondary infections caused by a single infected person at time equal to  $t$ . A horizontal dashed line is shown at  $R_{eff} = 1$ .  $R_{eff} < 1$  indicates a slowing epidemic in which new infections are not increasing.  $R_{eff} > 1$  indicates a growing epidemic in which new infections are increasing over time. Dark green shows the 50% CI and light green shows the 95% CI. The curve in blue shows the predicted decrease in  $R_{eff}$  due to increasing immunity in the population resulting from people being infected by COVID-19. Dark blue shows the 50% CI and light blue shows the 95% CI. Individuals infected with COVID-19 are assumed to remain immune within our analysis. The upper horizontal dashed line shows the value of  $R_{eff}$  at the beginning of the epidemic, highlighting the impact of immunity on transmission.

Using the model fit, we can forecast the expected trajectory for cumulative deaths assuming the transmission level, represented by the final Rt value stays the same over the next 28 days.

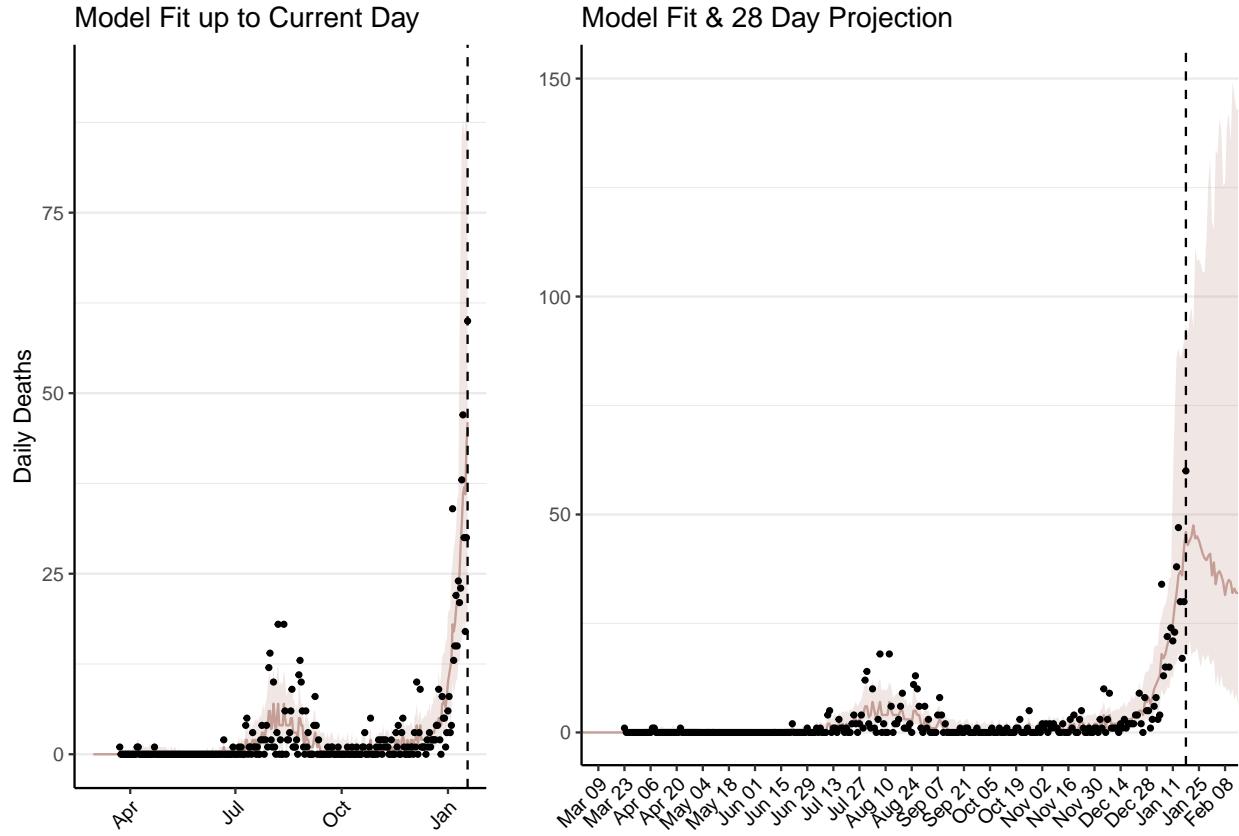


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 28 days.

## Short-term Epidemic Scenarios

We make the following short-term projections of healthcare demand and new infections under the following three scenarios:

- **Scenario 1.** The epidemic continues to grow at the current rate.
- **Scenario 2.** Countries will further scale up interventions (either increasing current strategies or implementing new interventions) leading to a further 50% reduction in transmission.
- **Scenario 3.** Countries will relax current interventions by 50%

**N.B.** These scenarios currently assume that the impact of mobility on transmission will remain the same in the future as it has in the past. We are working to extend methods to estimate the impact of increases in mobility on transmission as lockdown and interventions are reversed. Consequently, projection are likely to represent an upper estimate of the healthcare demand and case load for each scenario

We estimate that over the next 4 weeks demand for hospital beds will change from 1,701 (95% CI: 1,604-1,797) patients requiring treatment with high-pressure oxygen at the current date to 1,443 (95% CI: 1,242-1,644) hospital beds being required on 2021-02-15 if no further interventions are introduced (Scenario 1). Similarly, we estimate that over the next 4 weeks demand for critical care (ICU) beds will change from 541 (95% CI: 520-561) patients requiring treatment with mechanical ventilation at the current date to 449 (95% CI: 413-484) by 2021-02-15. These projections assume that approximately 5% of all infections will require treatment with high-pressure oxygen and that approximately 30% of hospitalised cases will require treatment with mechanical ventilation (based on analysis of ongoing epidemics in Europe). **N.B. These scenarios are unlikely to show significant differences for the first week since there is a delay of approximately 10 days between infection and hospital admission. Consequently, the effectiveness of a change in policy is likely to be better captured by hospital admission data approximately 2 weeks after the policy change is implemented.**

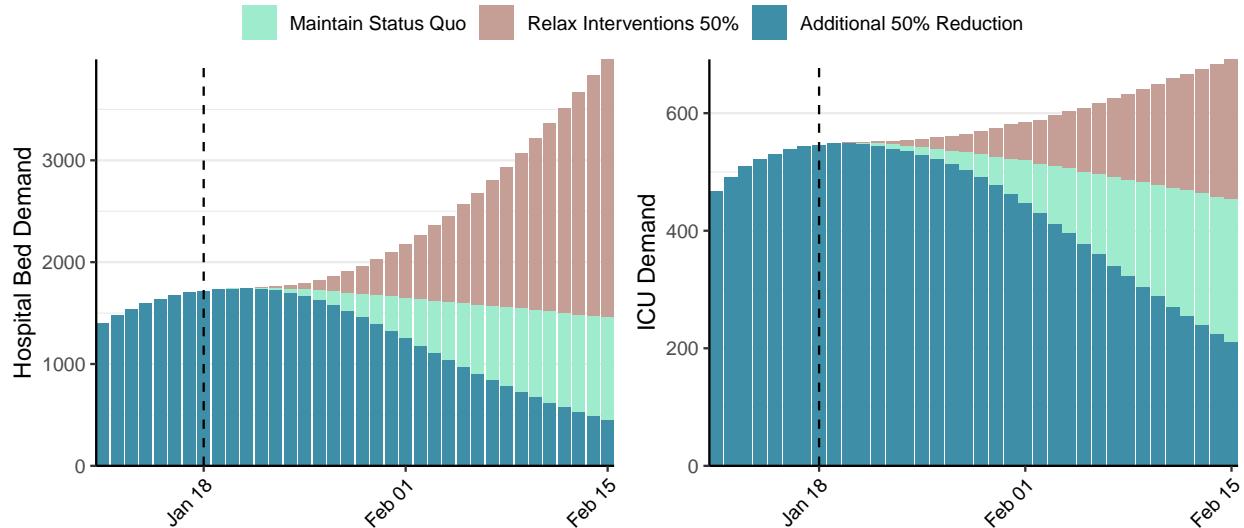


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

The impact of each scenario has a more immediate effect on the daily number of infections. The figure below shows the impact of each scenario on the estimated daily incidence of new infections. If interventions are scaled up (Scenario 2), the daily number of infections will change from 21,690 (95% CI: 19,868-23,511) at the current date to 1,554 (95% CI: 1,291-1,817) by 2021-02-15. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 21,690 (95% CI: 19,868-23,511) at the current date to 77,322 (95% CI: 64,788-89,856) by 2021-02-15.

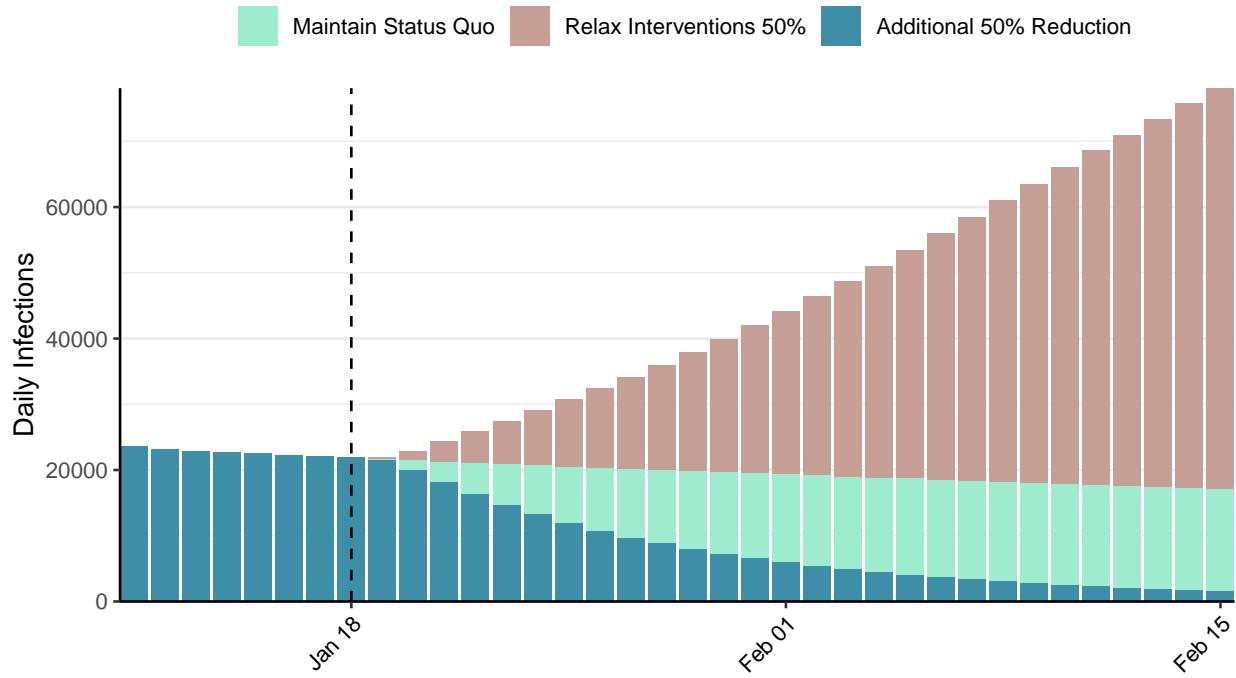


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for Scenario 3 (relaxing interventions by 50%) are shown in red. Current date shown with dashed line.

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To explore different scenarios, we recommend using our [COVID-19 Scenario Analysis Tool](https://covid19sim.org/) - <https://covid19sim.org/>, which can be used to simulate different intervention scenarios and explore the long term impact on healthcare demand.

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