

Situation Report for COVID-19: Afghanistan, 2021-03-19

[Download the report for Afghanistan, 2021-03-19 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}
56,069	25	2,462	0	1.06 (95% CI: 0.89-1.28)

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.

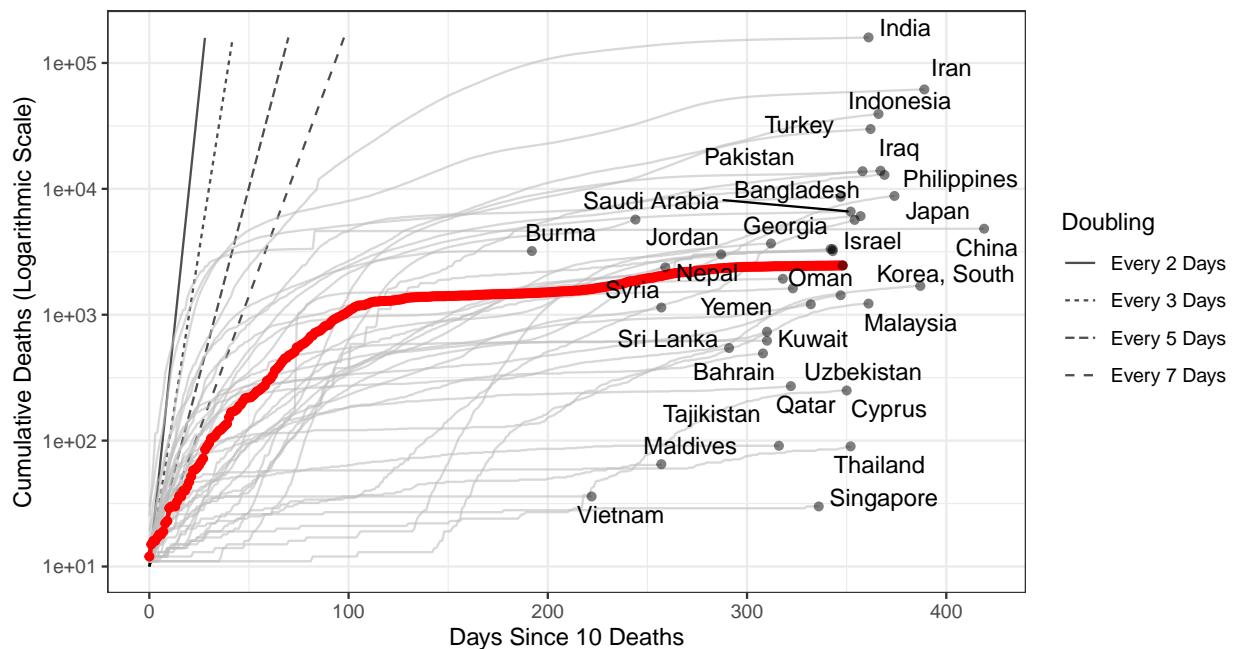


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 12,089 (95% CI: 11,307-12,872) 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).

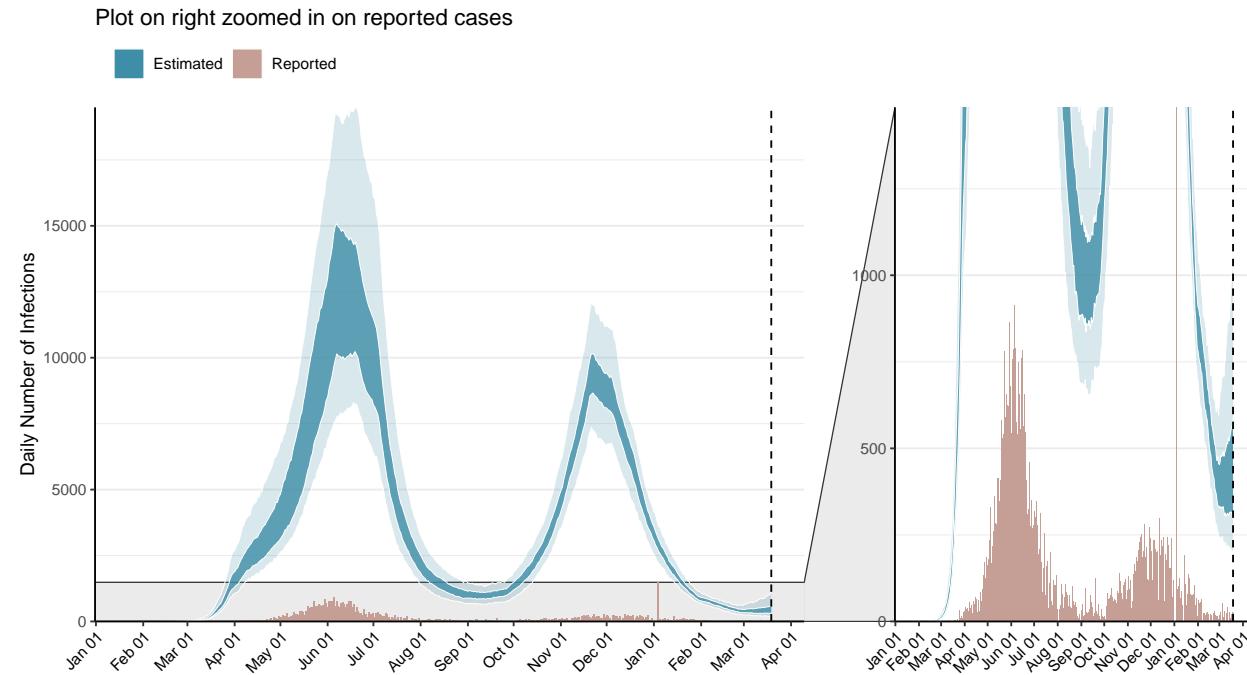


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

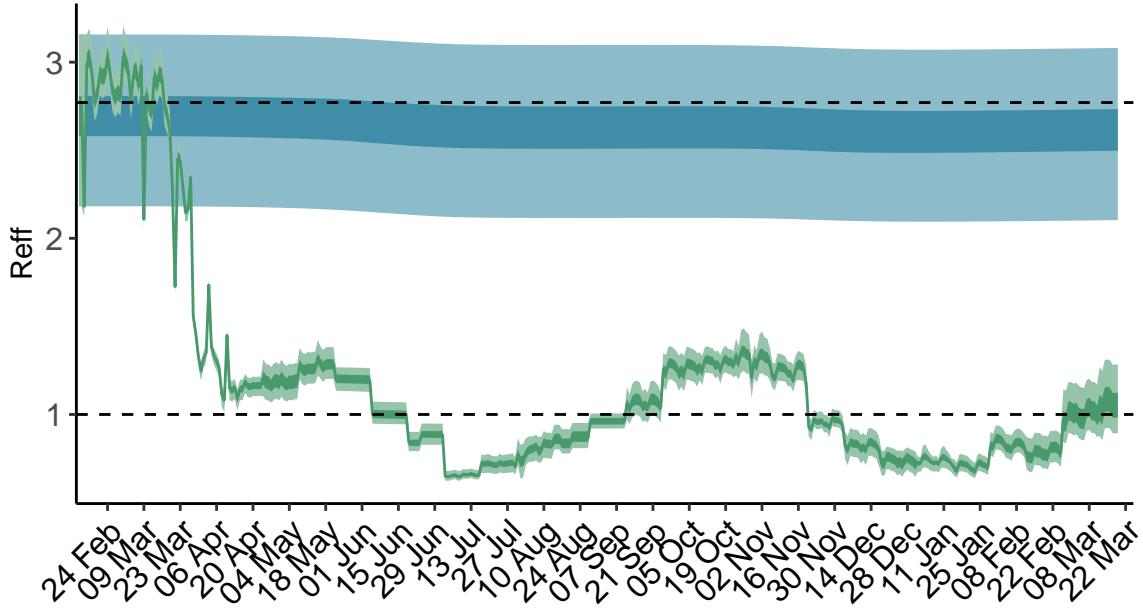


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

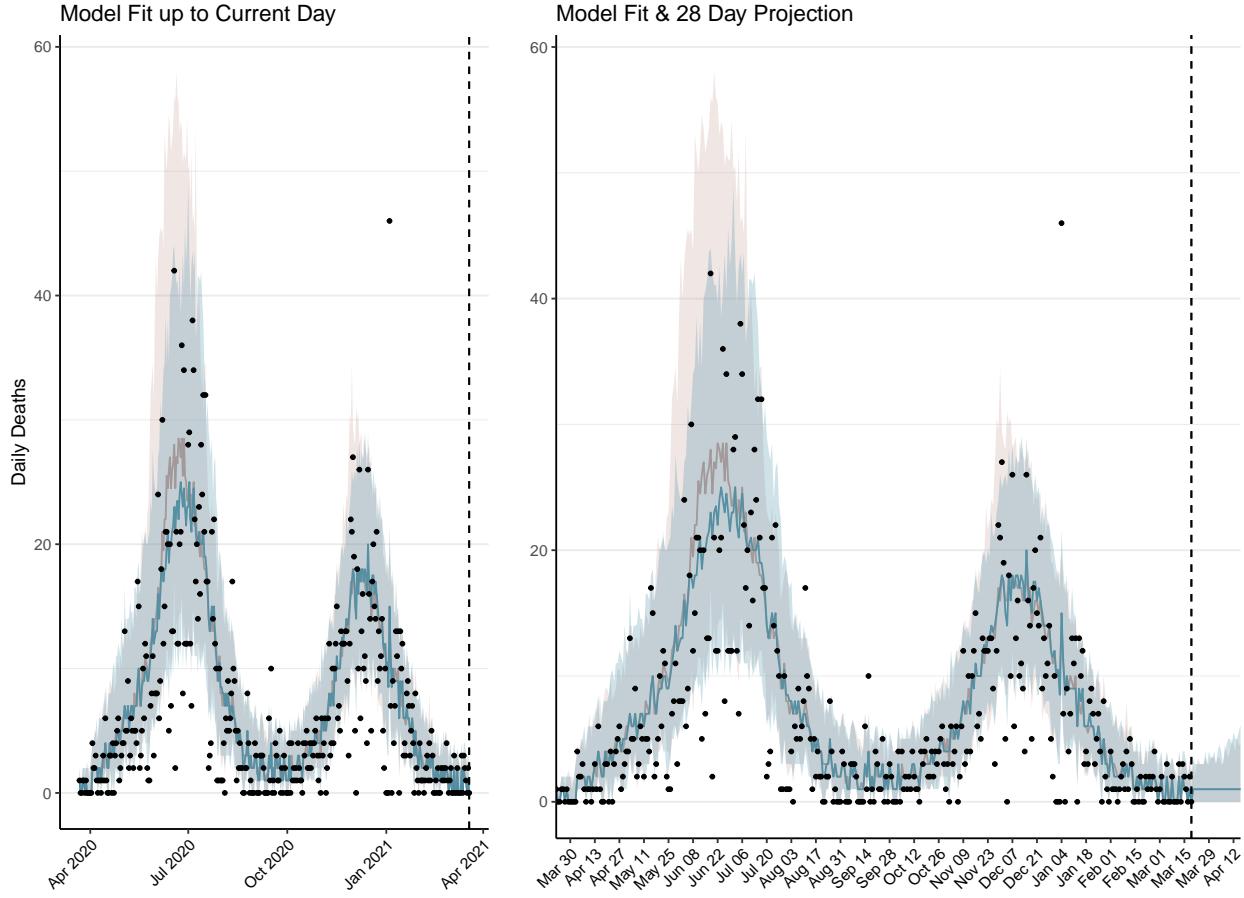


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 36 (95% CI: 33-38) patients requiring treatment with high-pressure oxygen at the current date to 55 (95% CI: 46-65) hospital beds being required on 2021-04-16 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: 13-16) patients requiring treatment with mechanical ventilation at the current date to 21 (95% CI: 17-24) by 2021-04-16. 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.**

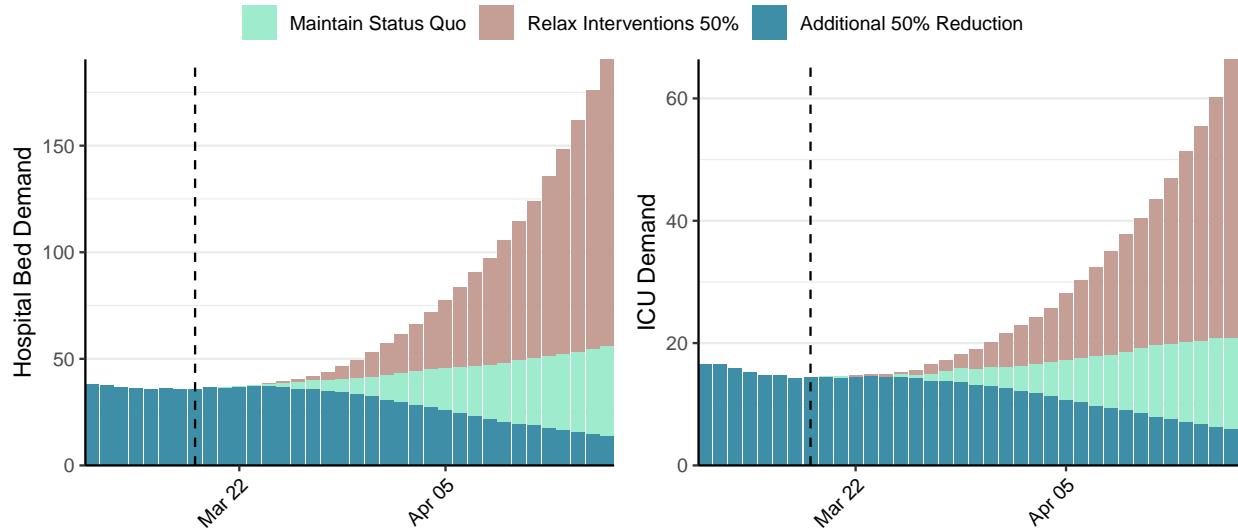


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 483 (95% CI: 435-531) at the current date to 60 (95% CI: 48-72) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 483 (95% CI: 435-531) at the current date to 5,251 (95% CI: 4,046-6,455) by 2021-04-16.

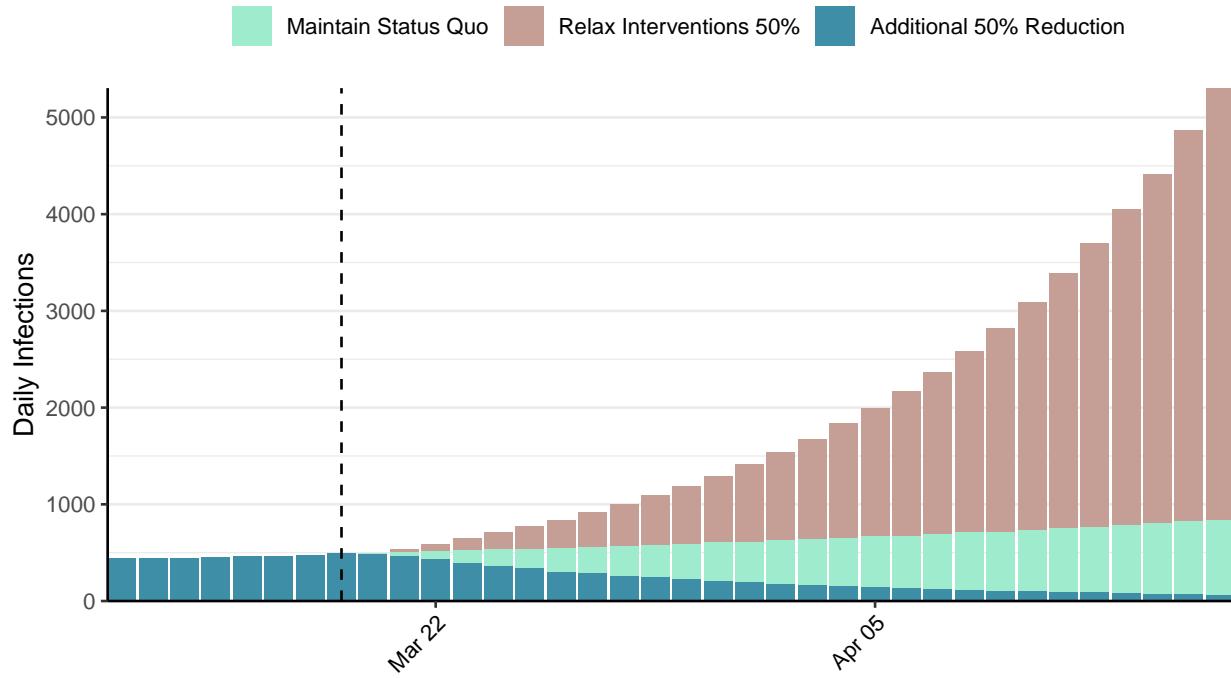


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Angola, 2021-03-19

[Download the report for Angola, 2021-03-19 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}
21,642	84	527	2	1.07 (95% CI: 0.87-1.29)

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.

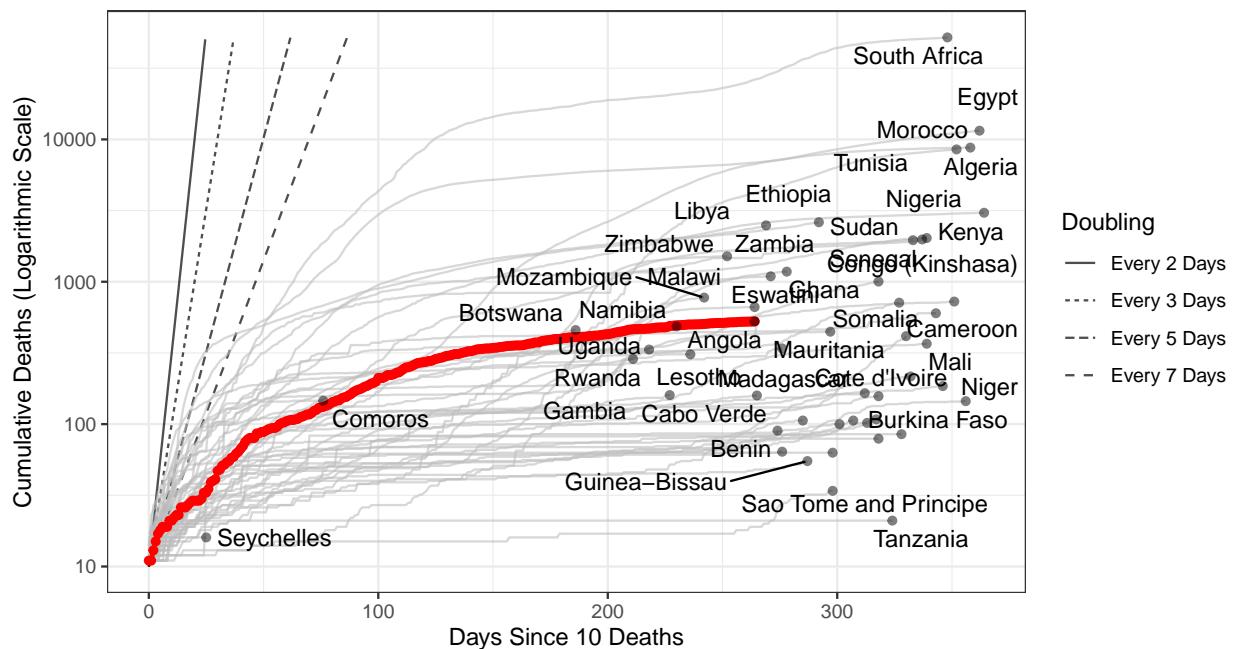


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 15,548 (95% CI: 14,287-16,810) 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).

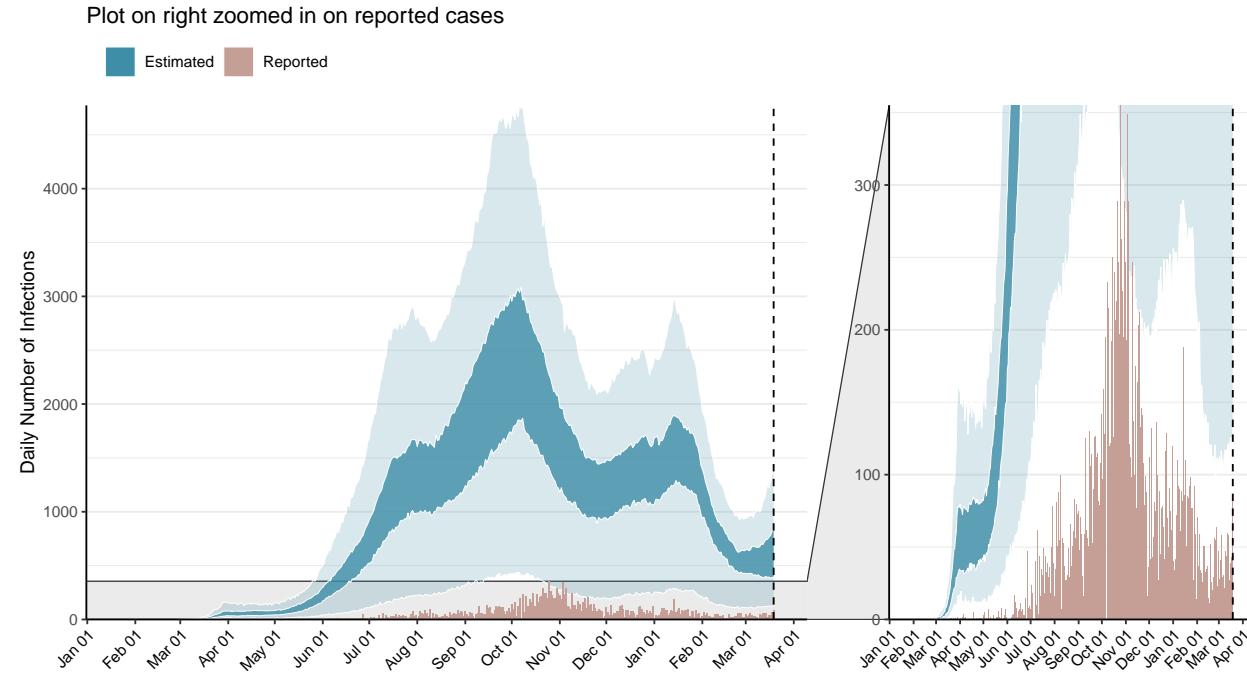


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

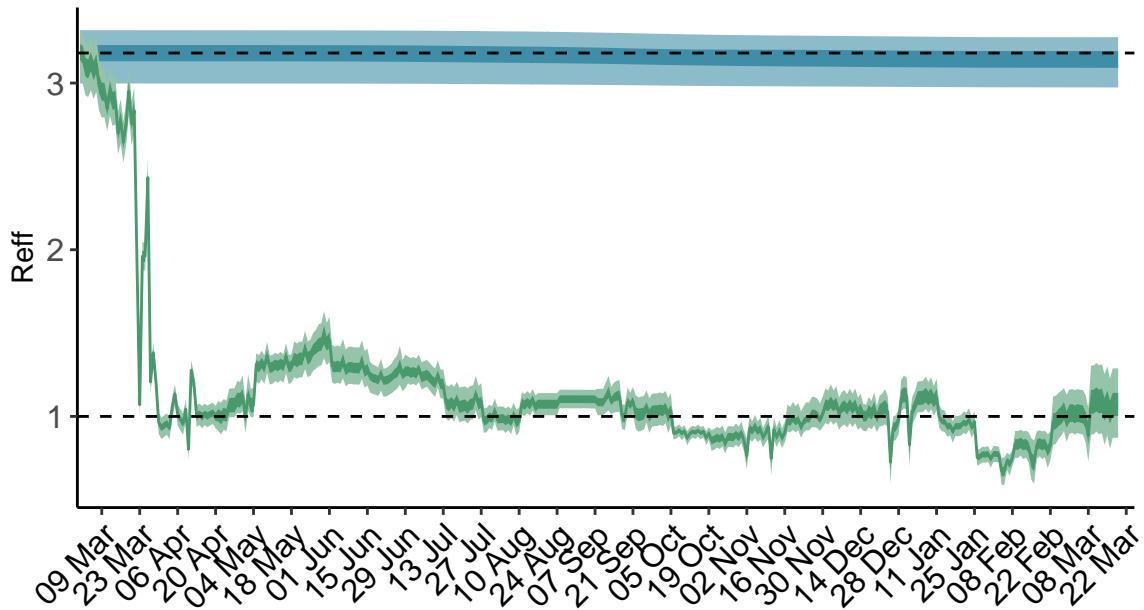


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

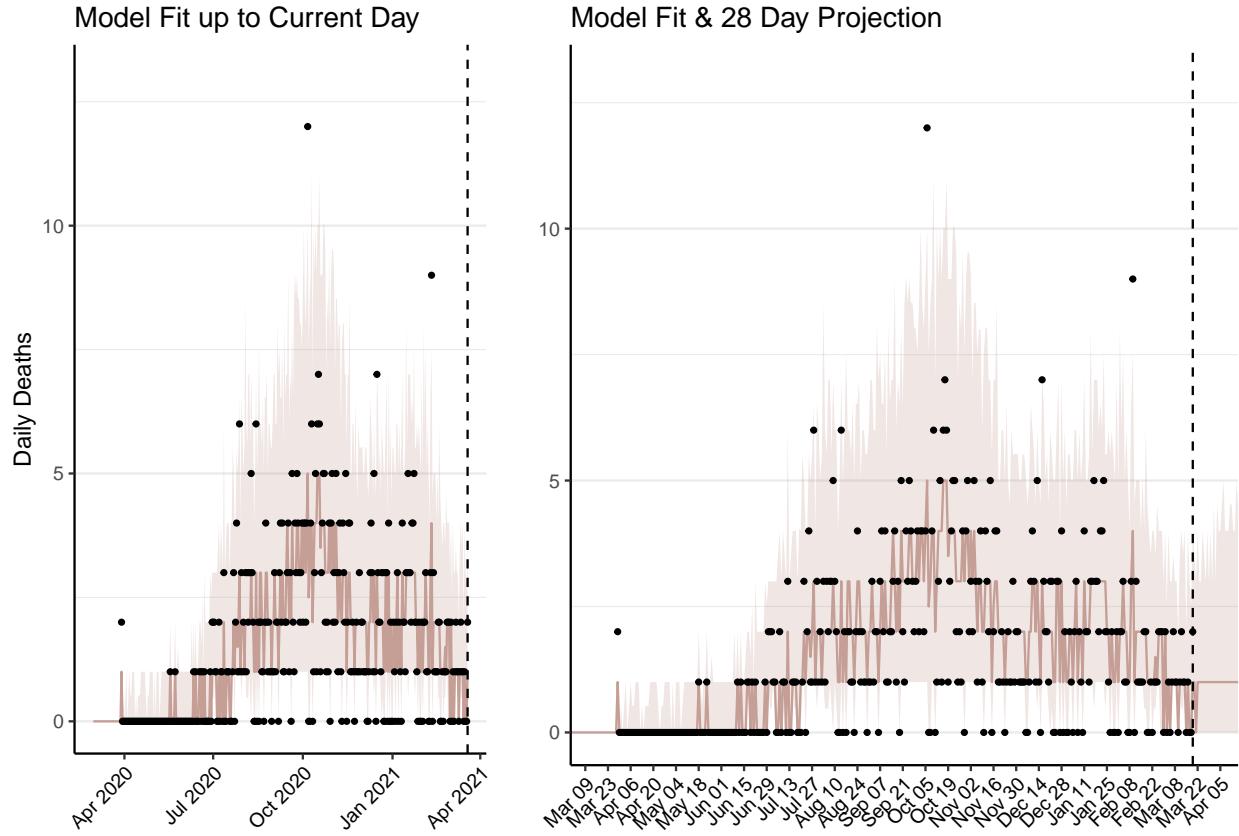


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 41 (95% CI: 37-45) patients requiring treatment with high-pressure oxygen at the current date to 59 (95% CI: 51-68) hospital beds being required on 2021-04-16 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 16 (95% CI: 15-18) patients requiring treatment with mechanical ventilation at the current date to 23 (95% CI: 20-26) by 2021-04-16. 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.**

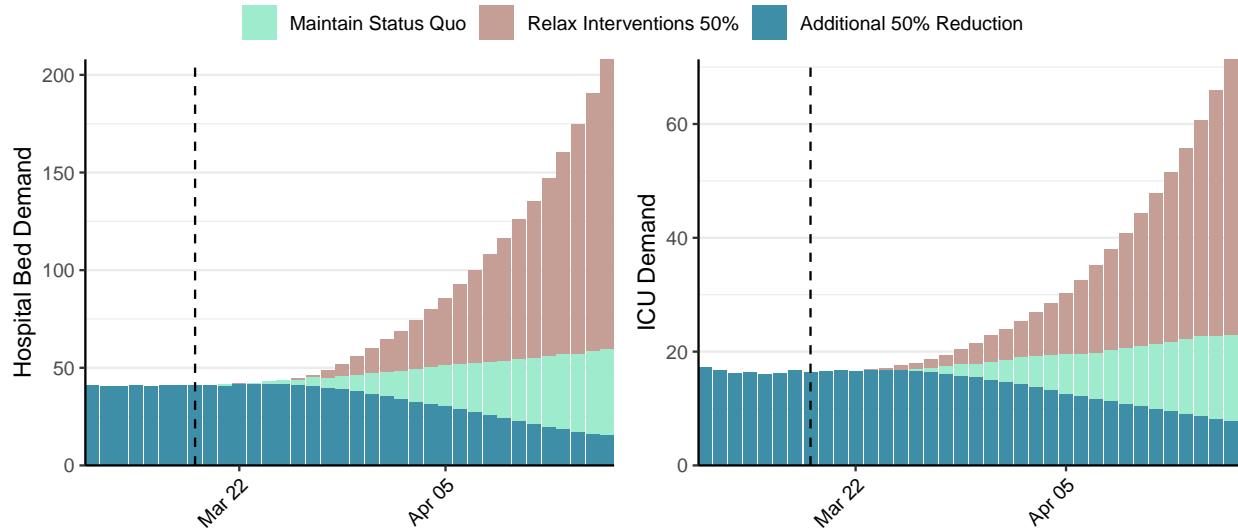


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 615 (95% CI: 552-678) at the current date to 76 (95% CI: 64-88) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 615 (95% CI: 552-678) at the current date to 6,367 (95% CI: 5,189-7,545) by 2021-04-16.

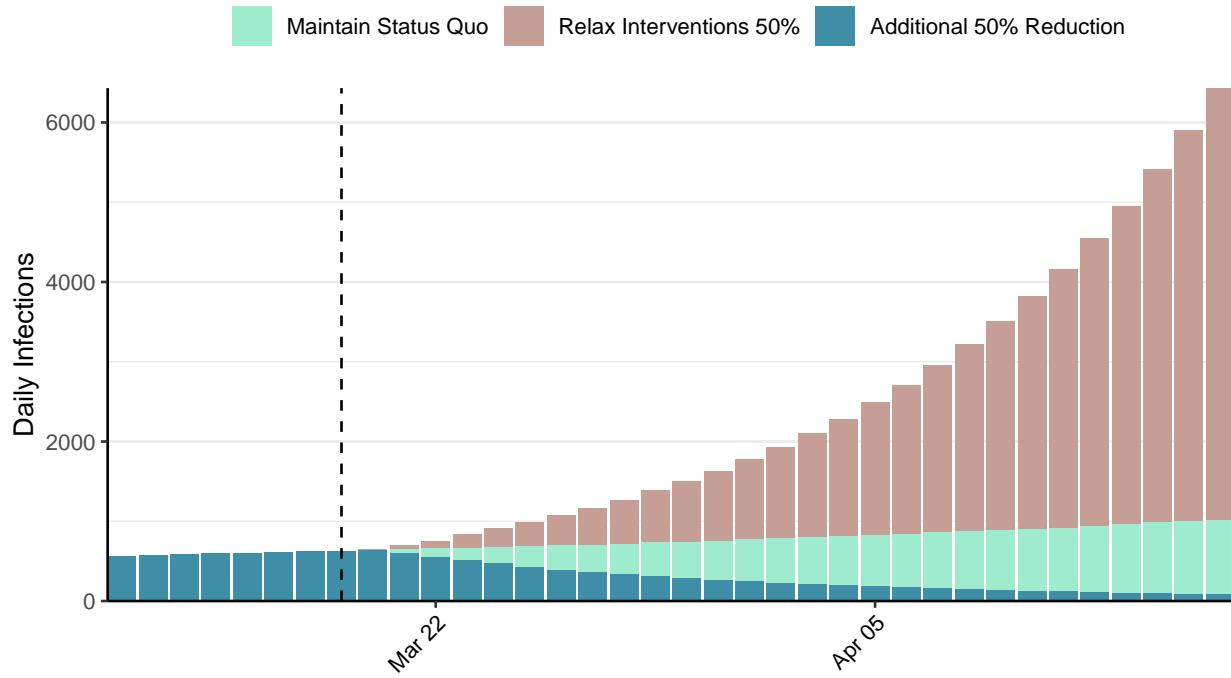


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Albania, 2021-03-19

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Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated R_{eff}
120,022	494	2,122	16	0.83 (95% CI: 0.69-0.95)

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.

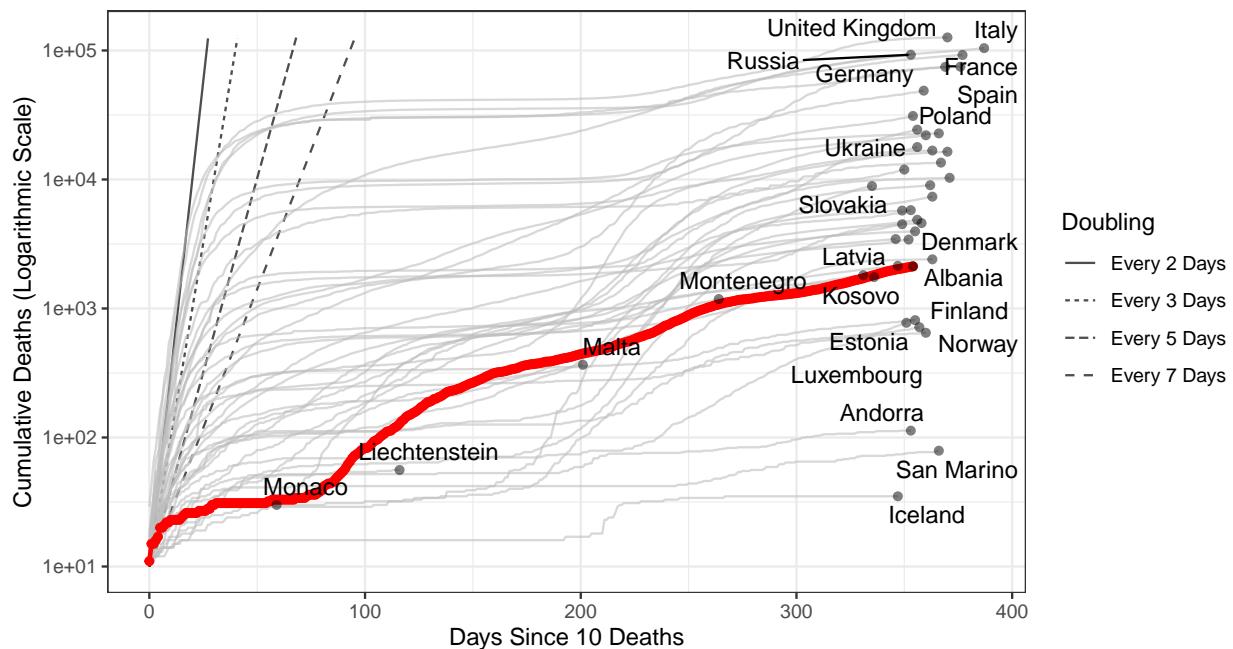


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 115,391 (95% CI: 111,229-119,554) 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).

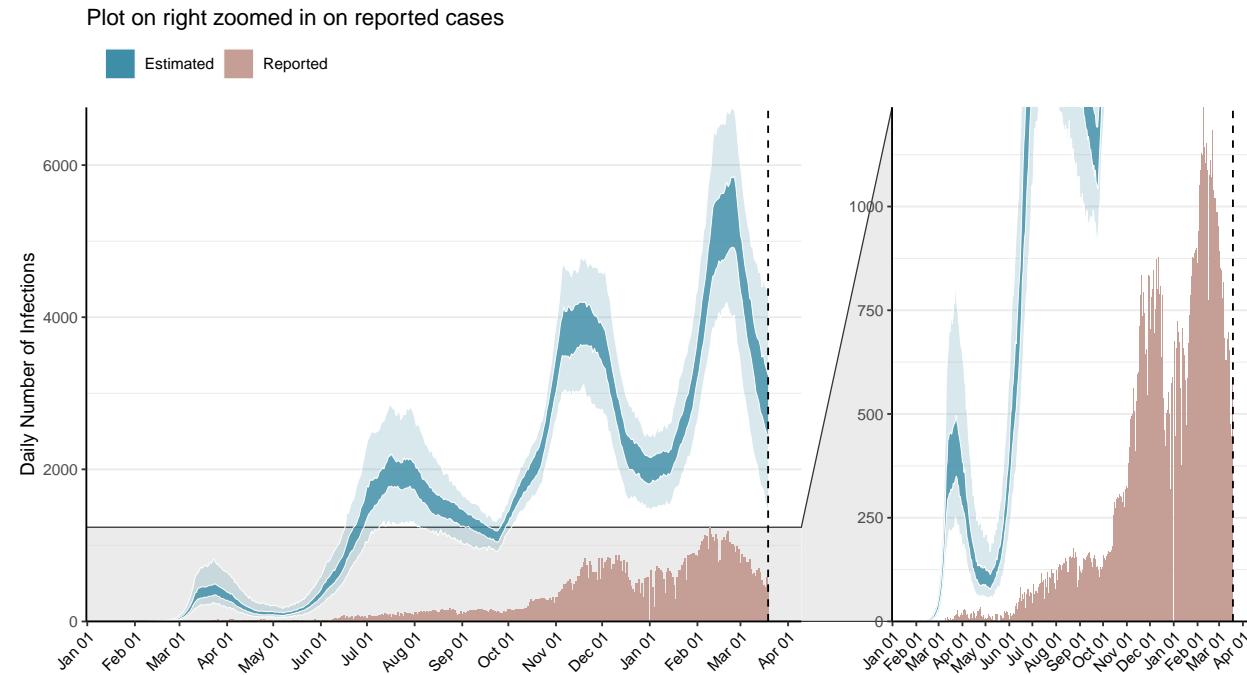


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

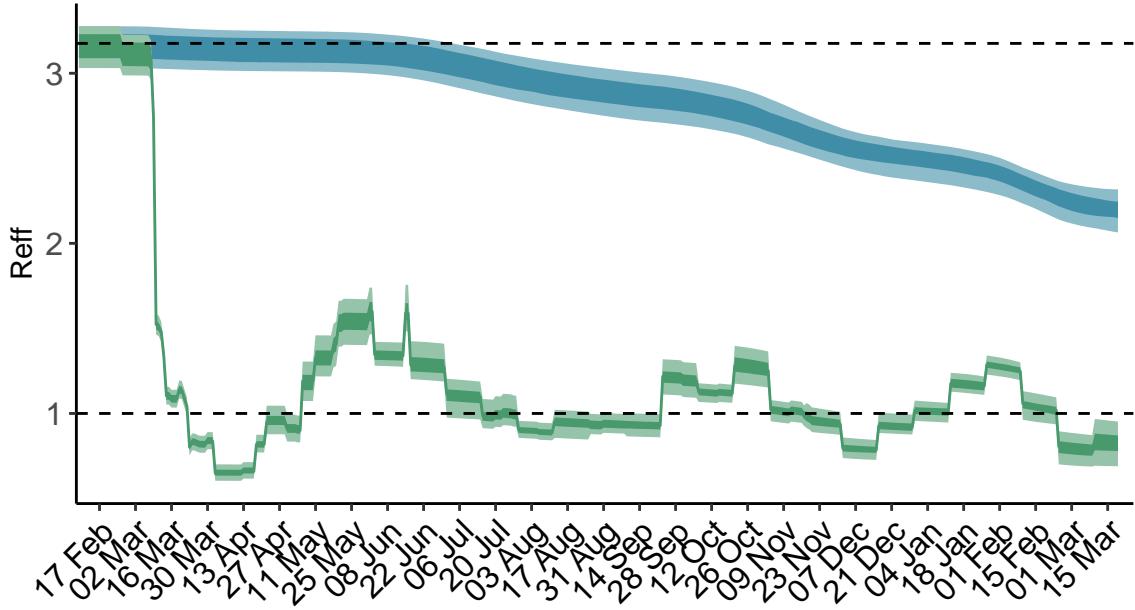


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

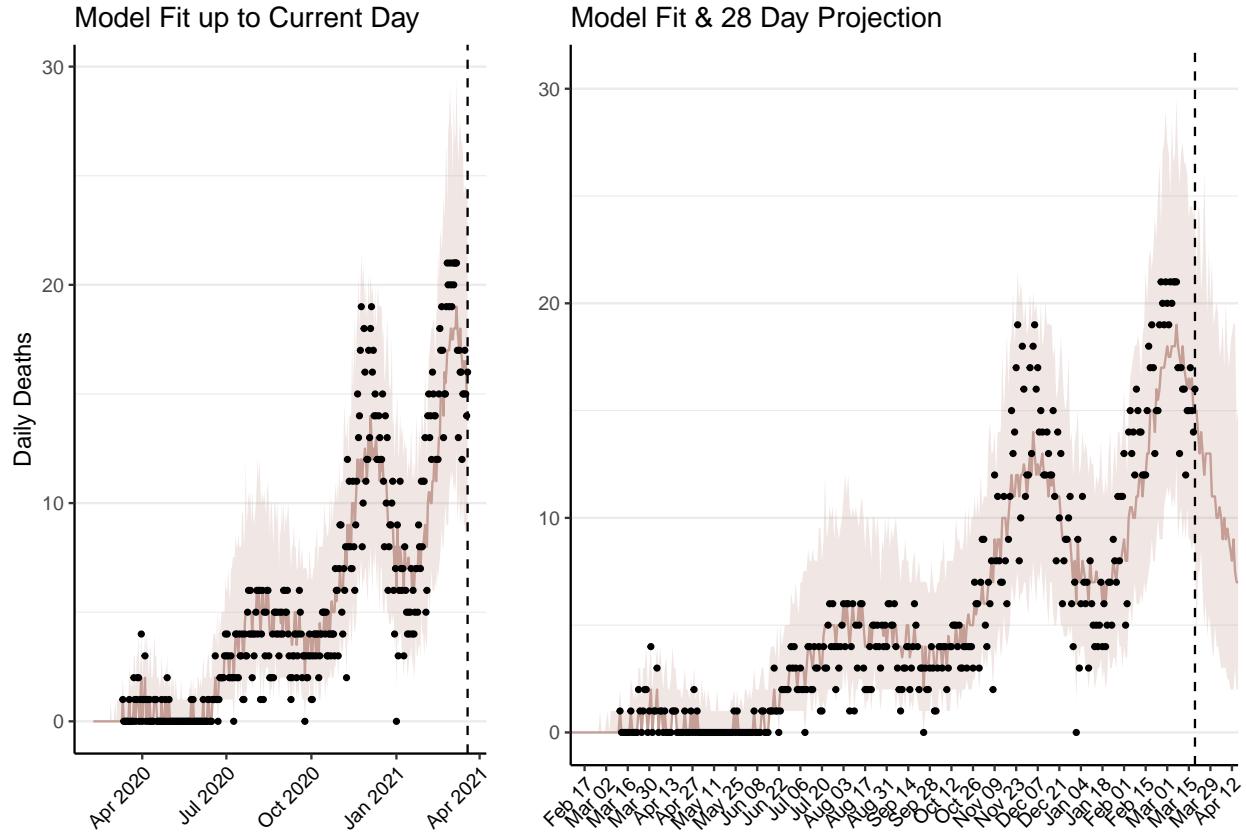


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 517 (95% CI: 496-538) patients requiring treatment with high-pressure oxygen at the current date to 265 (95% CI: 242-287) hospital beds being required on 2021-04-16 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 209 (95% CI: 200-217) patients requiring treatment with mechanical ventilation at the current date to 108 (95% CI: 100-117) by 2021-04-16. 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.**

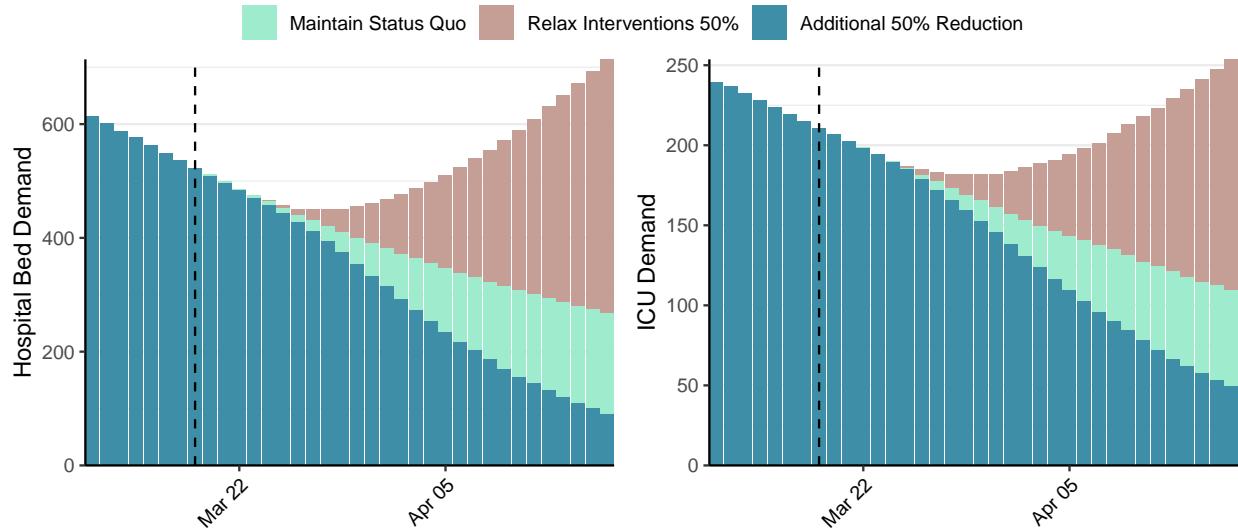


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,810 (95% CI: 2,654-2,966) at the current date to 142 (95% CI: 128-157) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,810 (95% CI: 2,654-2,966) at the current date to 6,768 (95% CI: 6,068-7,468) by 2021-04-16.

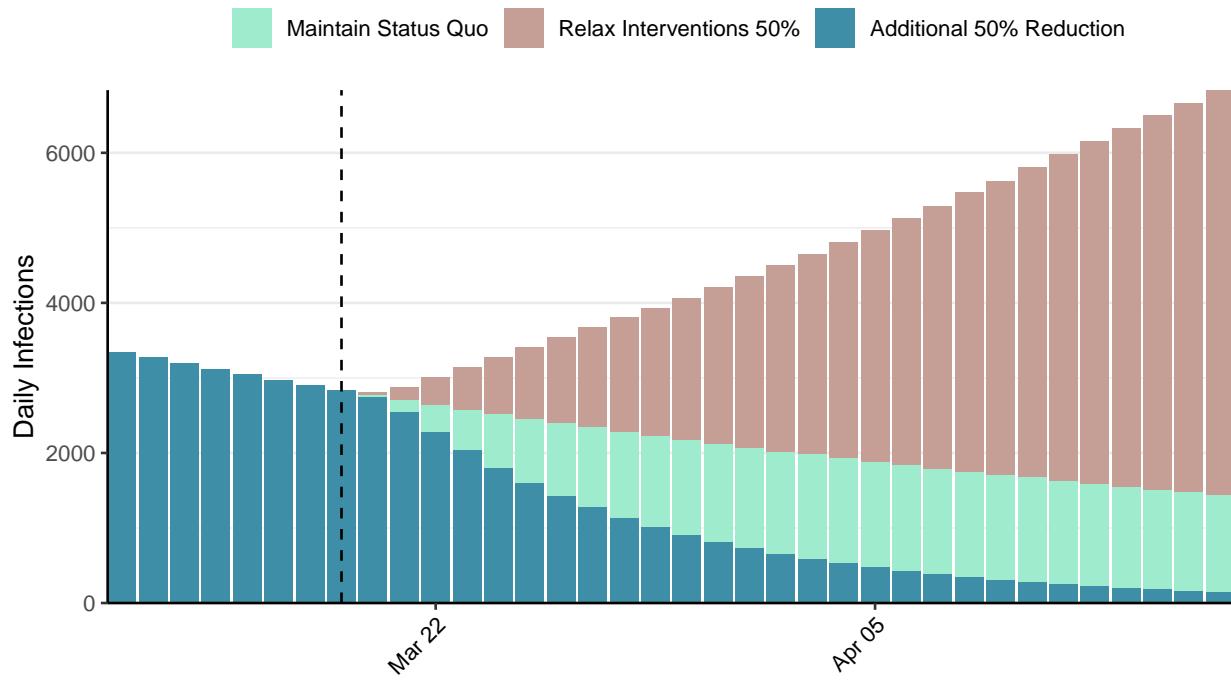


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Argentina, 2021-03-19

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Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated R_{eff}
2,234,913	8,160	54,476	90	1.05 (95% CI: 0.91-1.21)

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.

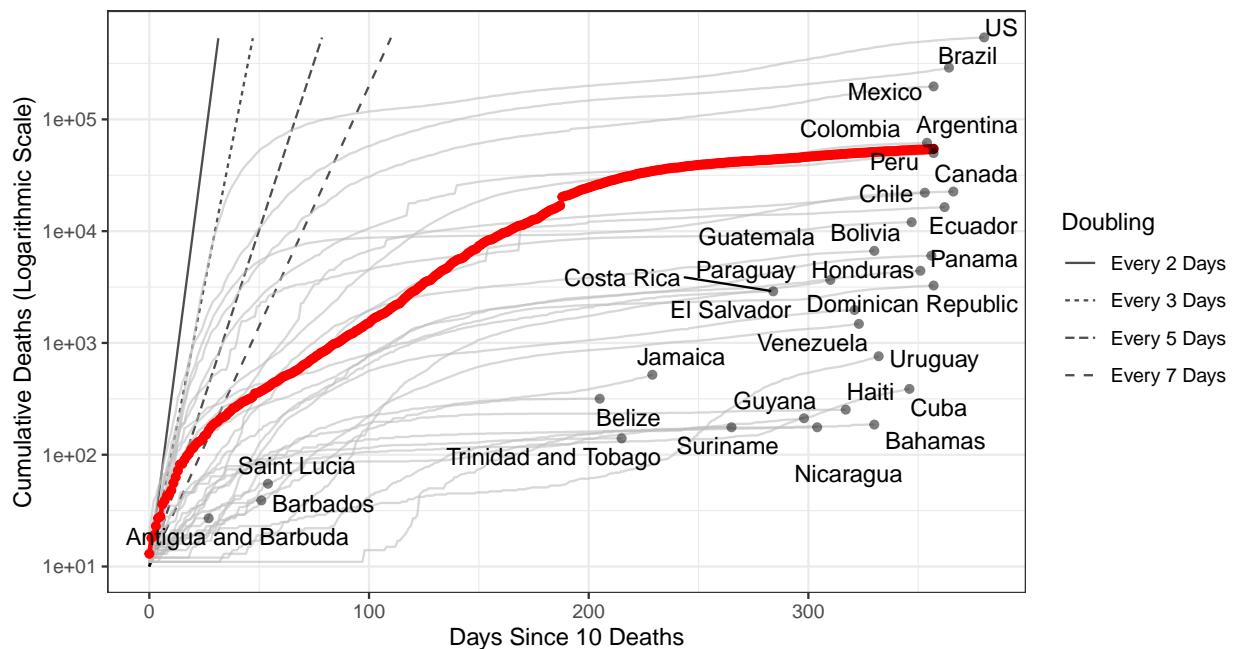


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 896,642 (95% CI: 860,612–932,672) 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).

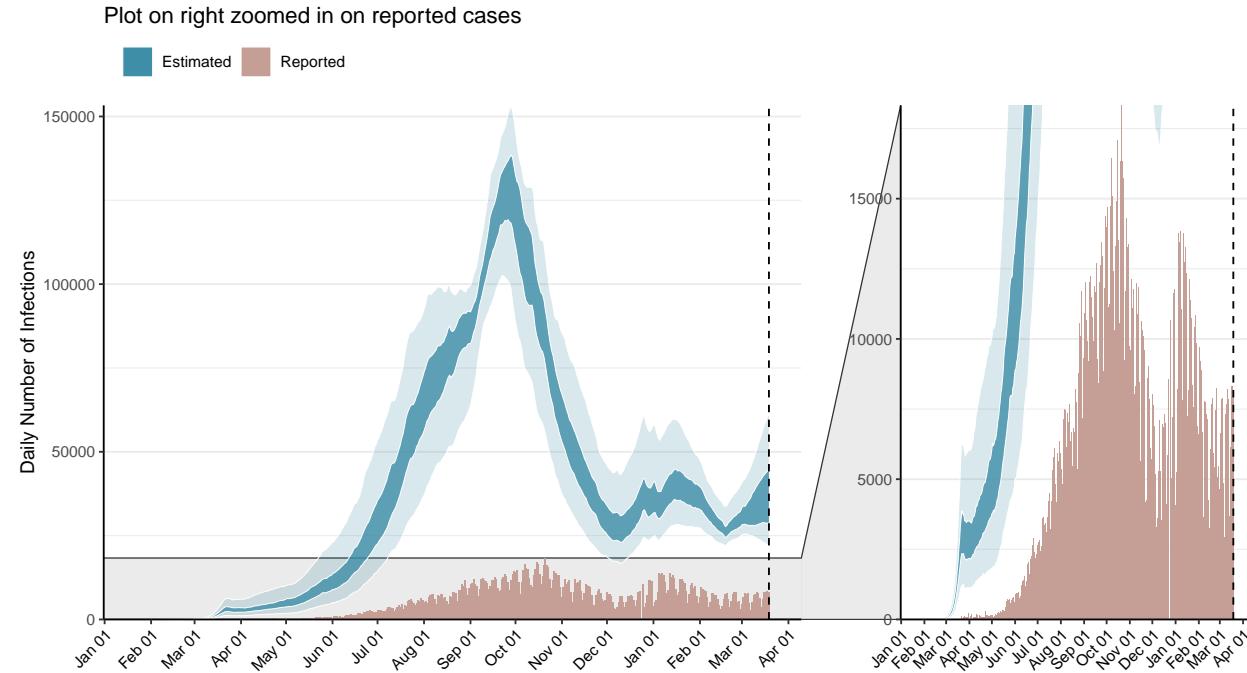


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

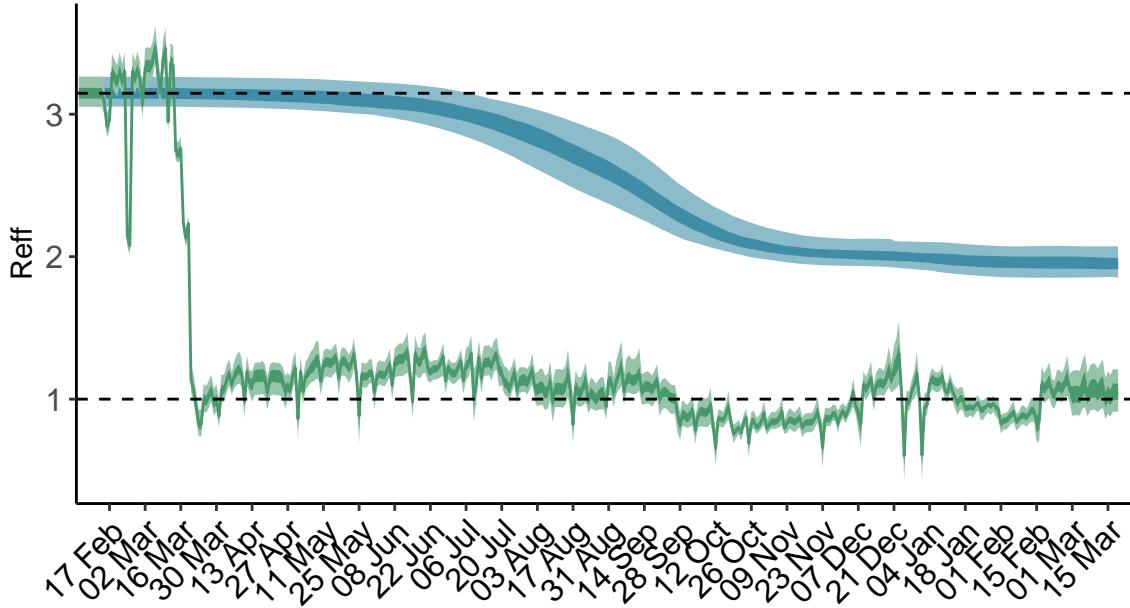


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

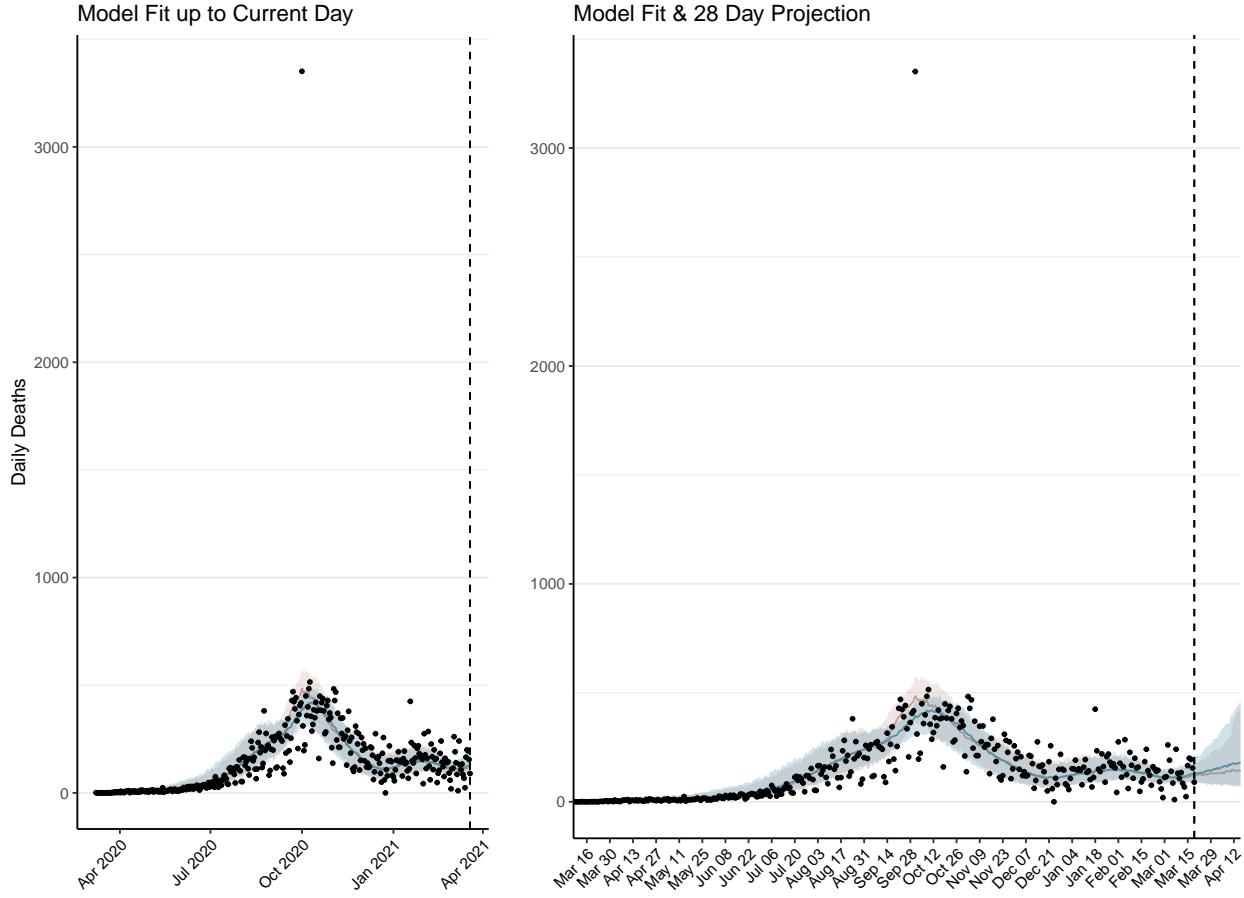


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 4,297 (95% CI: 4,113-4,481) patients requiring treatment with high-pressure oxygen at the current date to 5,854 (95% CI: 5,268-6,439) hospital beds being required on 2021-04-16 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 1,488 (95% CI: 1,429-1,547) patients requiring treatment with mechanical ventilation at the current date to 1,964 (95% CI: 1,790-2,138) by 2021-04-16. 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.**

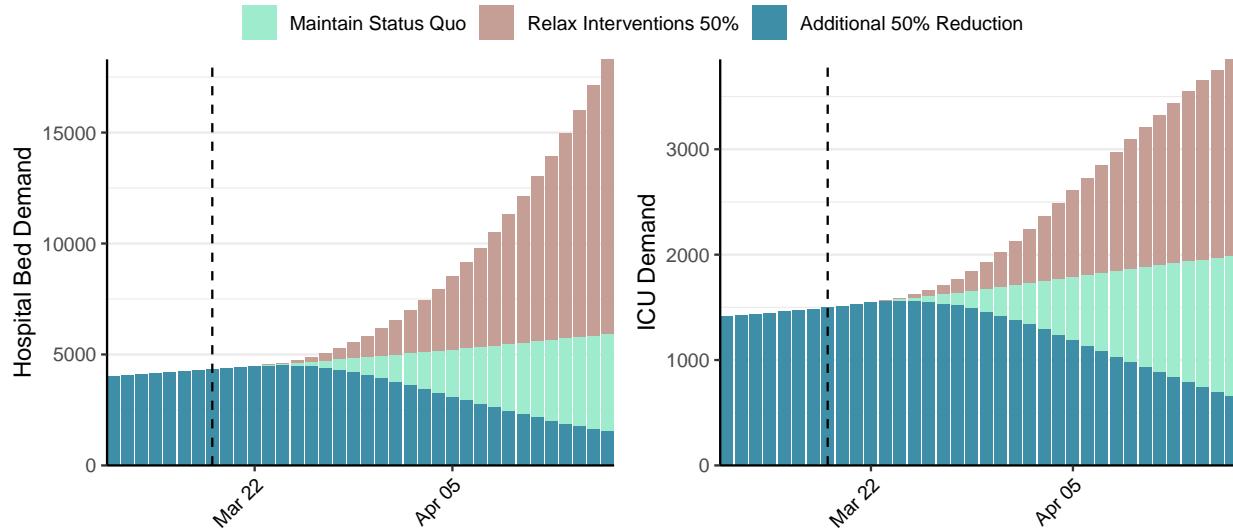


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 36,860 (95% CI: 34,476-39,245) at the current date to 4,195 (95% CI: 3,719-4,671) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 36,860 (95% CI: 34,476-39,245) at the current date to 245,760 (95% CI: 220,610-270,911) by 2021-04-16.

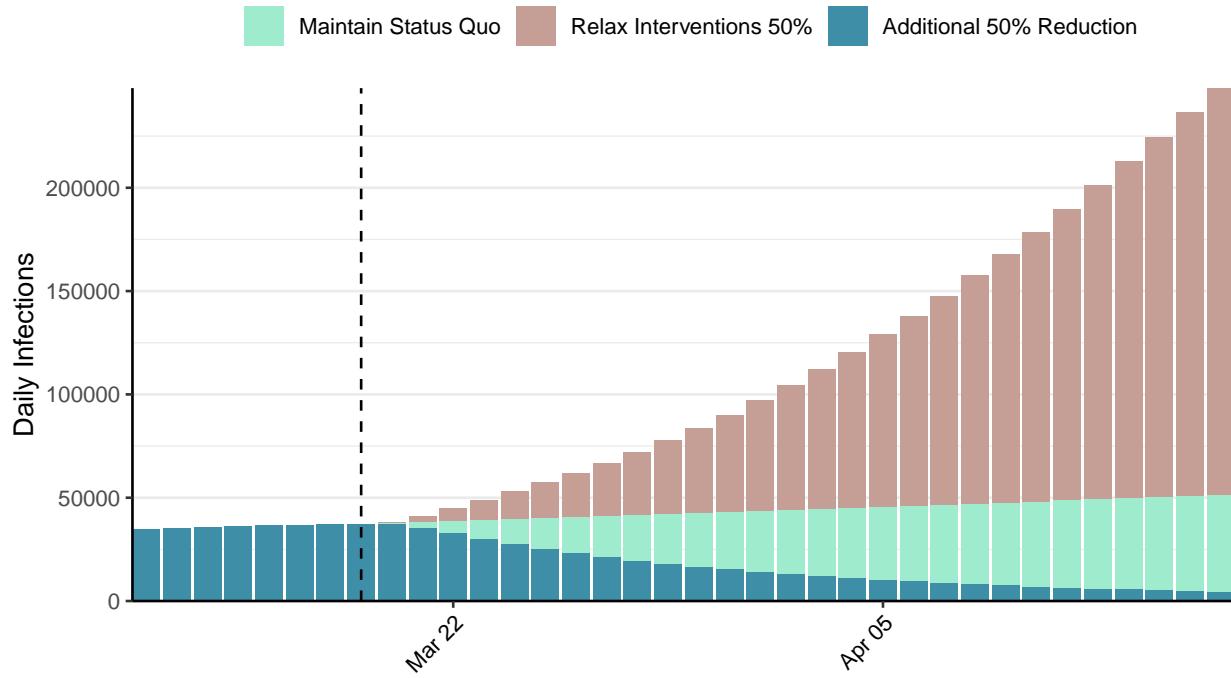


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

Situation Report for COVID-19: Armenia, 2021-03-19

[Download the report for Armenia, 2021-03-19 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}
182,056	891	3,320	19	1.45 (95% CI: 1.34-1.58)

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.

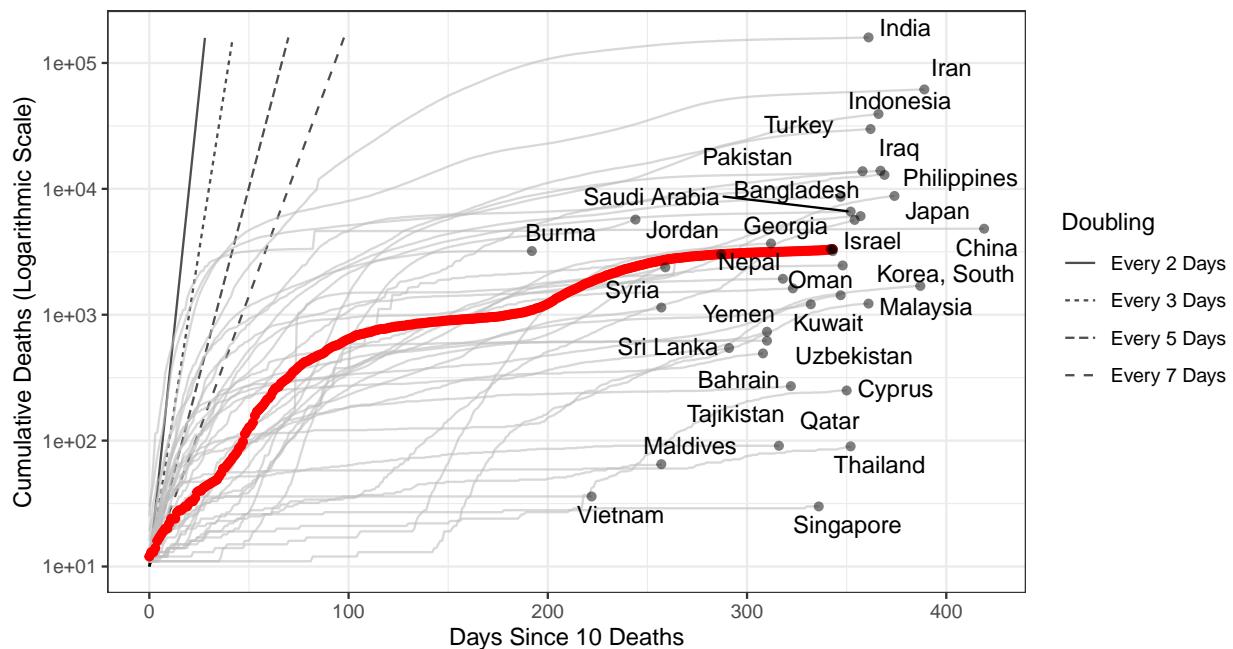


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 101,273 (95% CI: 94,047-108,500) 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).

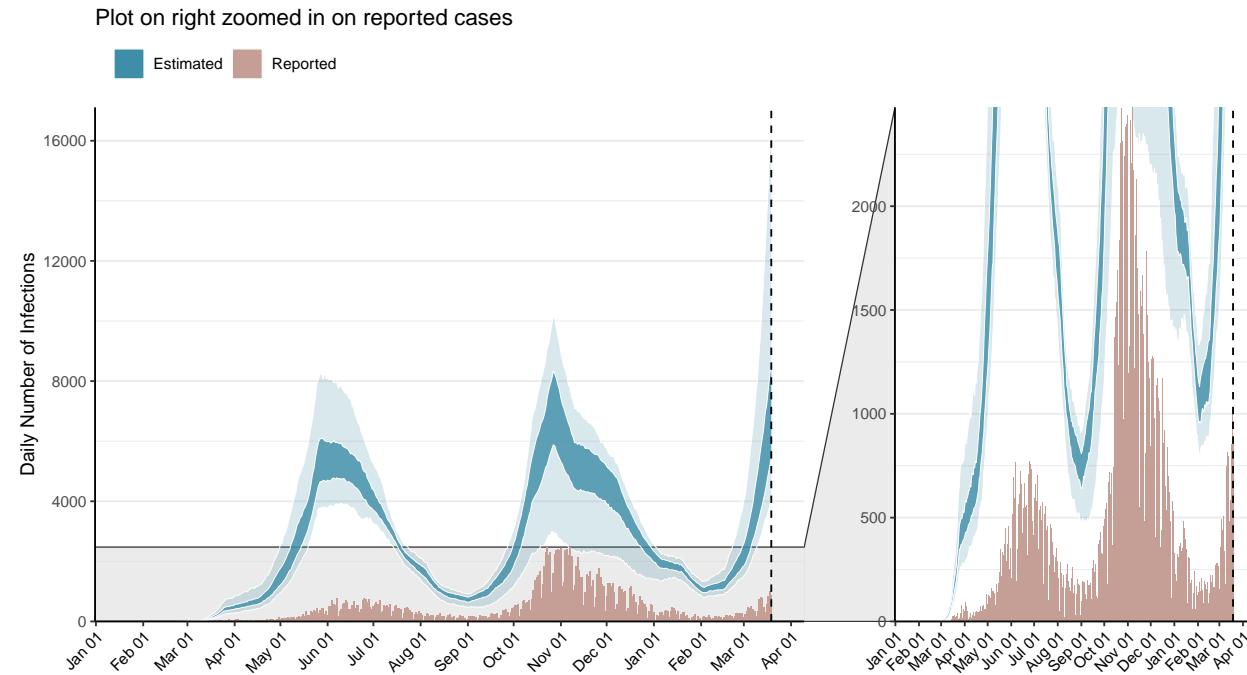


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

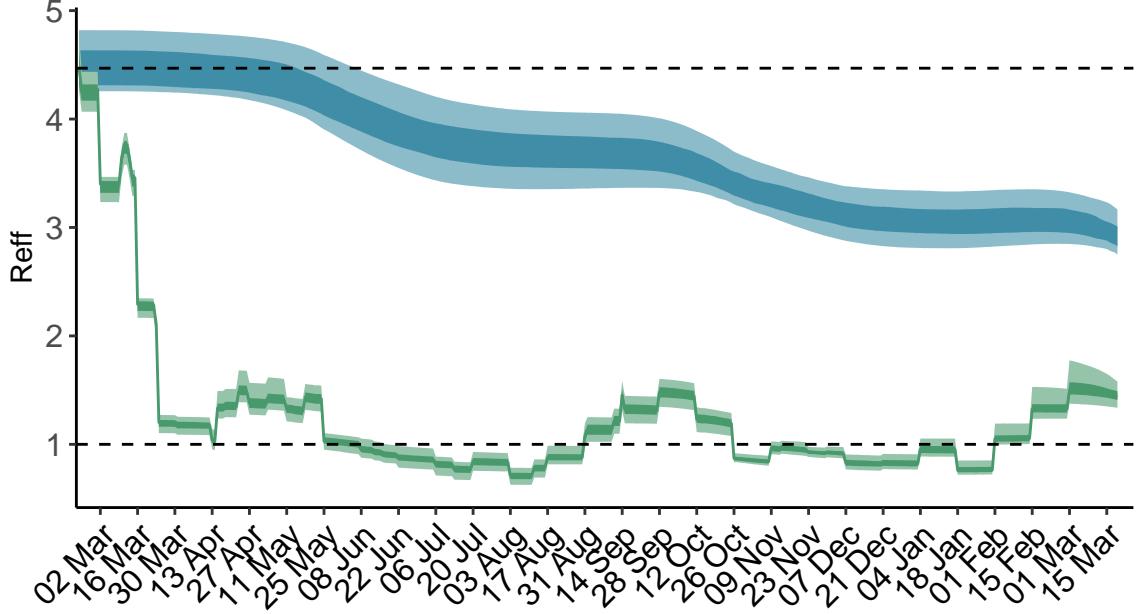


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

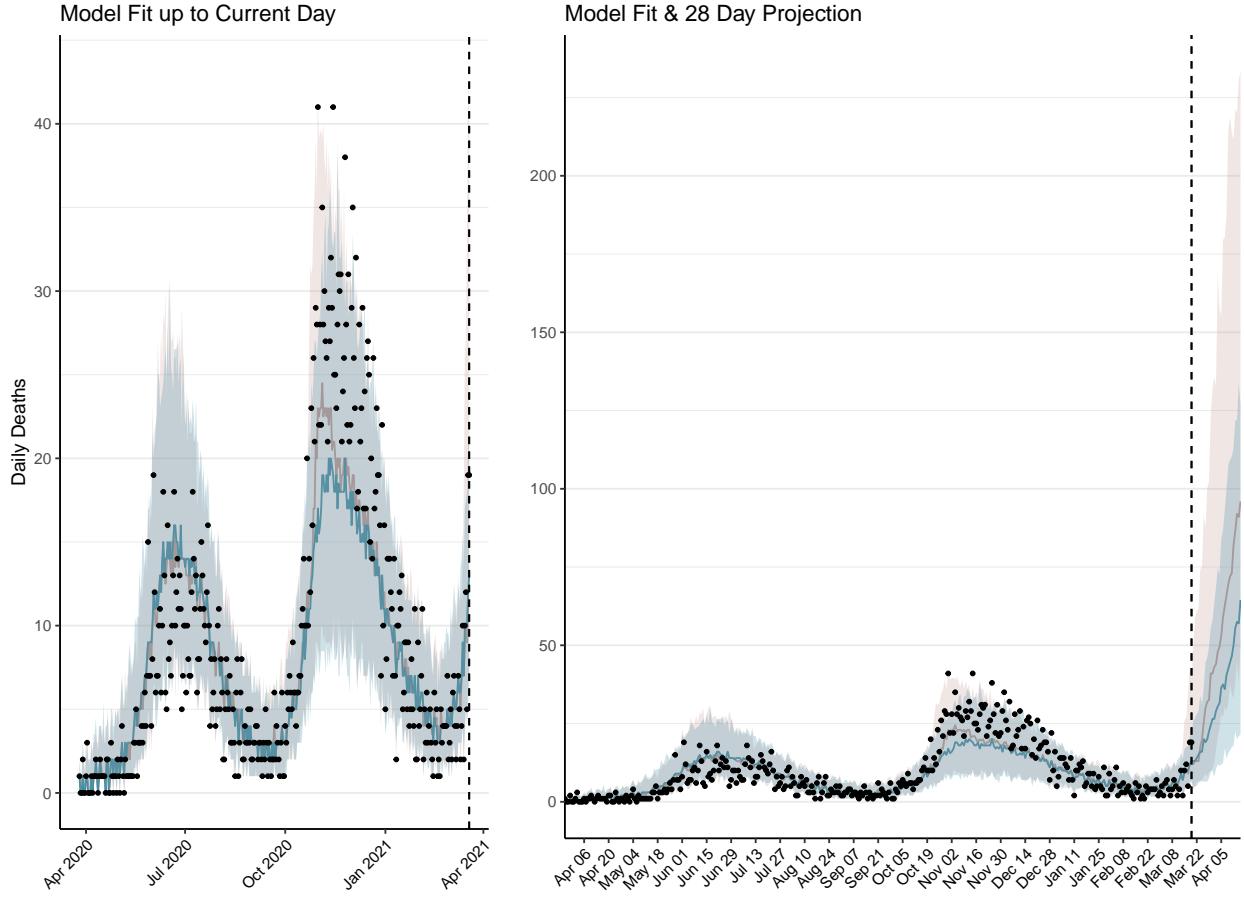


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 522 (95% CI: 485-559) patients requiring treatment with high-pressure oxygen at the current date to 2,449 (95% CI: 2,237-2,661) hospital beds being required on 2021-04-16 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 171 (95% CI: 162-180) patients requiring treatment with mechanical ventilation at the current date to 313 (95% CI: 302-325) by 2021-04-16. 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.**

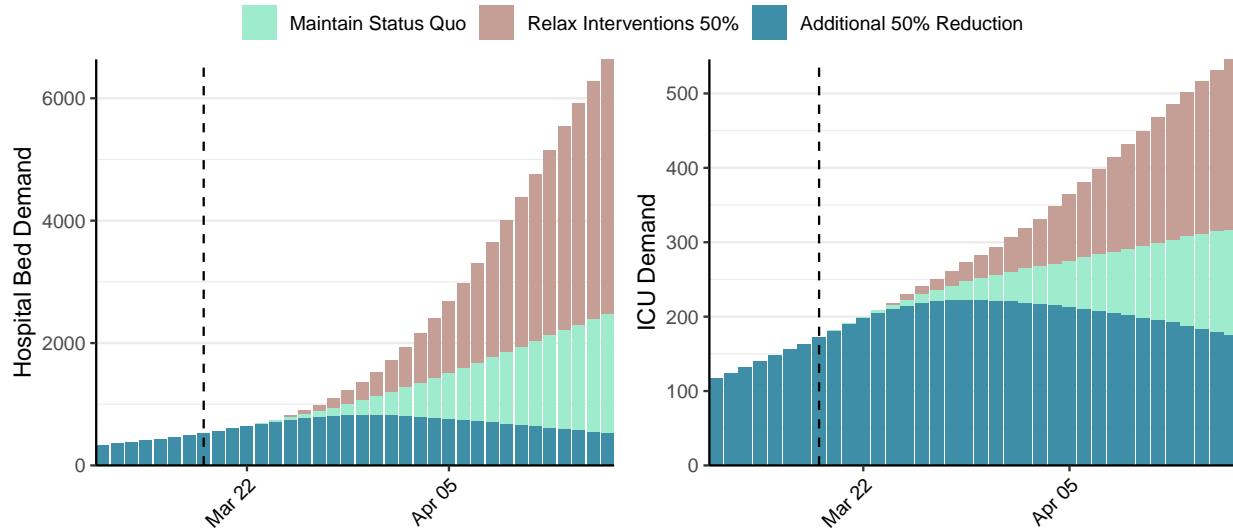


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 7,576 (95% CI: 6,905-8,248) at the current date to 2,260 (95% CI: 2,039-2,482) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,576 (95% CI: 6,905-8,248) at the current date to 56,337 (95% CI: 54,805-57,869) by 2021-04-16.

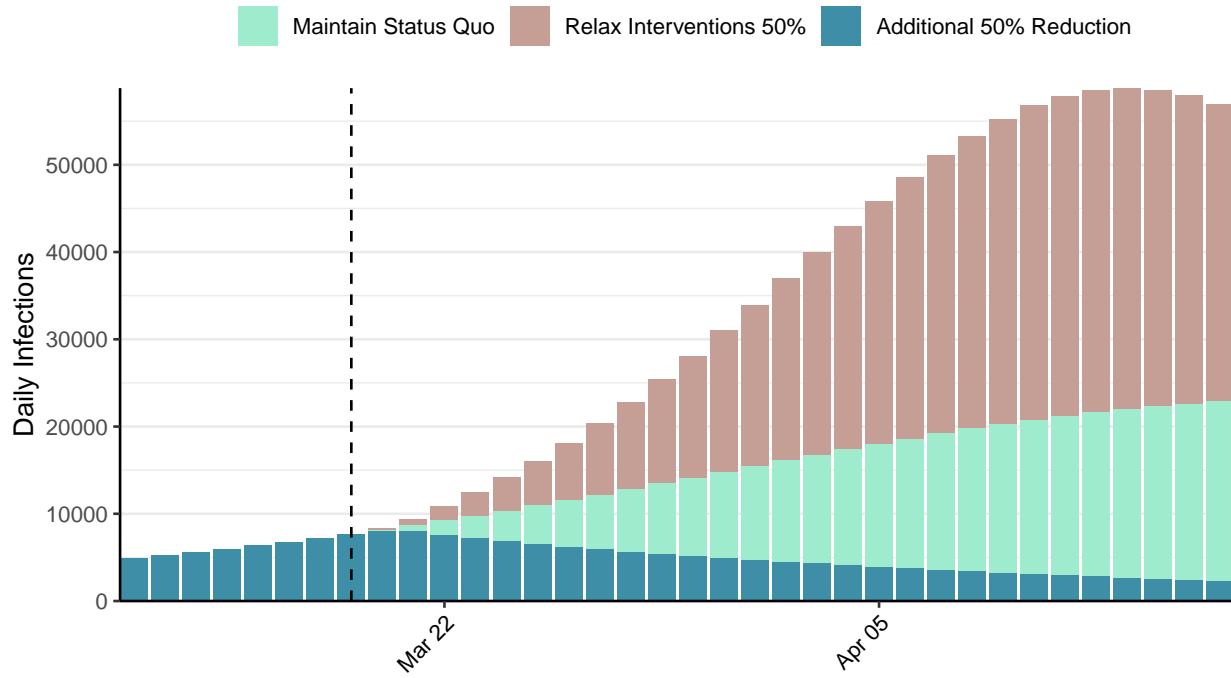


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Azerbaijan, 2021-03-19

[Download the report for Azerbaijan, 2021-03-19 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}
244,303	879	3,325	11	1.58 (95% CI: 1.38-1.79)

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.

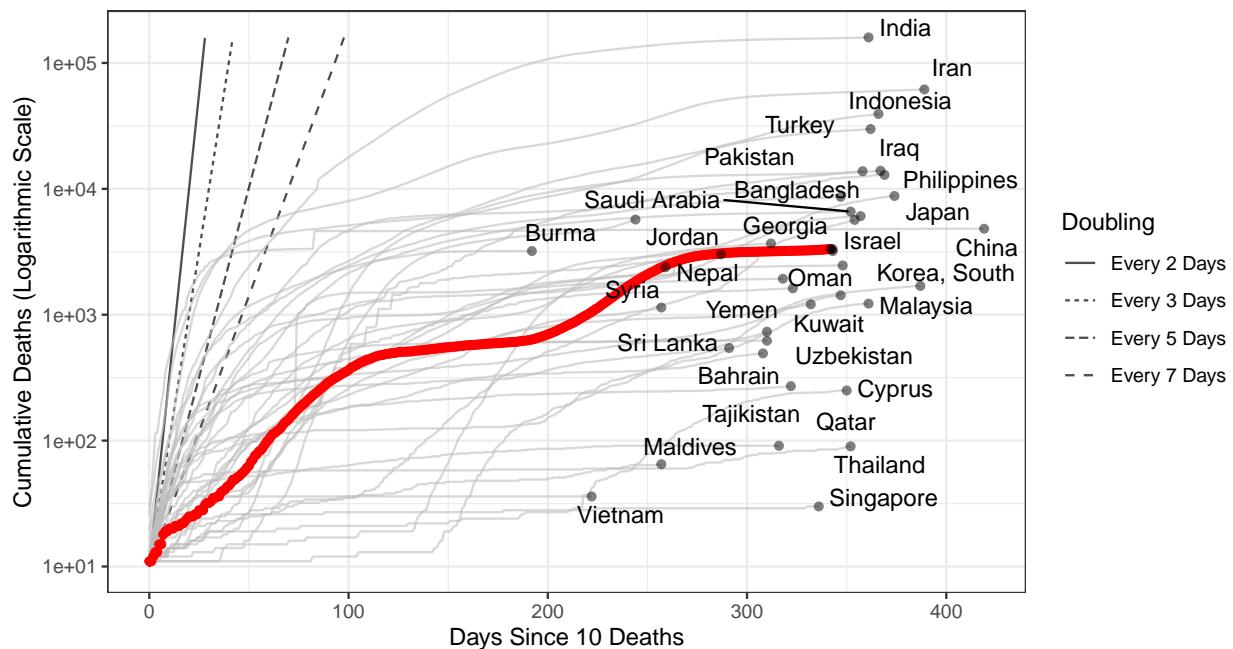


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 97,657 (95% CI: 90,443-104,871) 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).

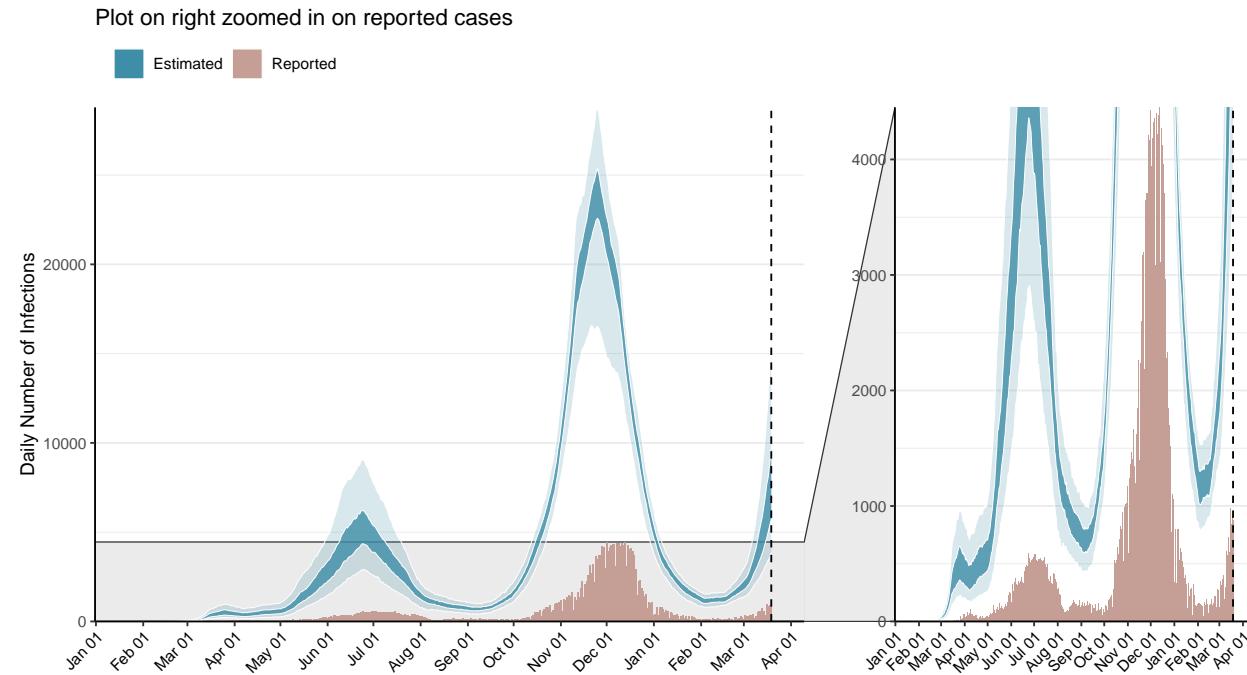


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

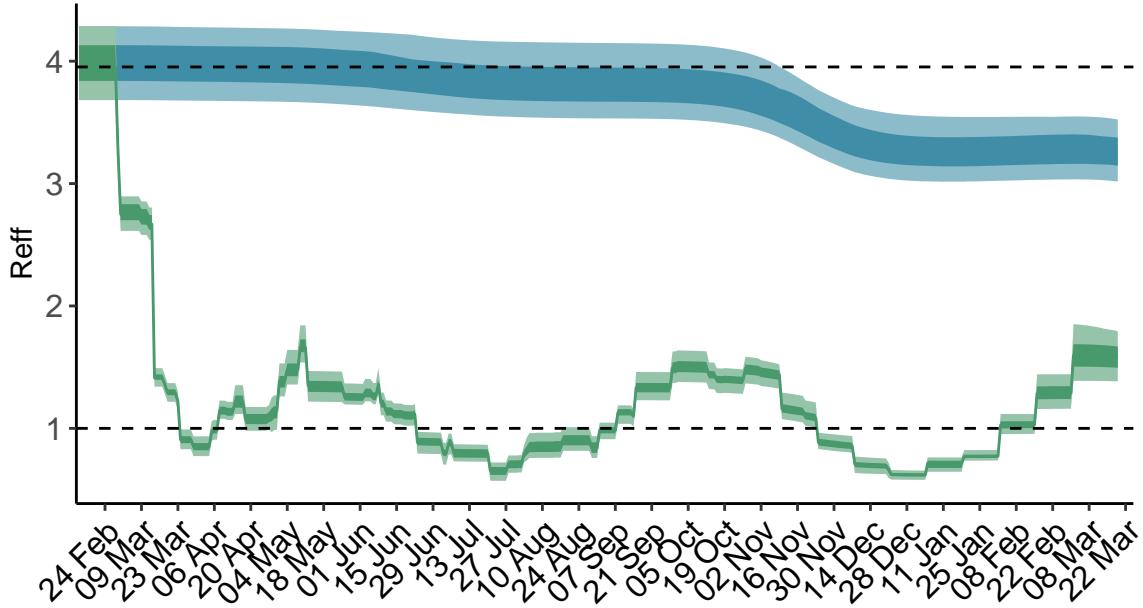


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Azerbaijan 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.](#)

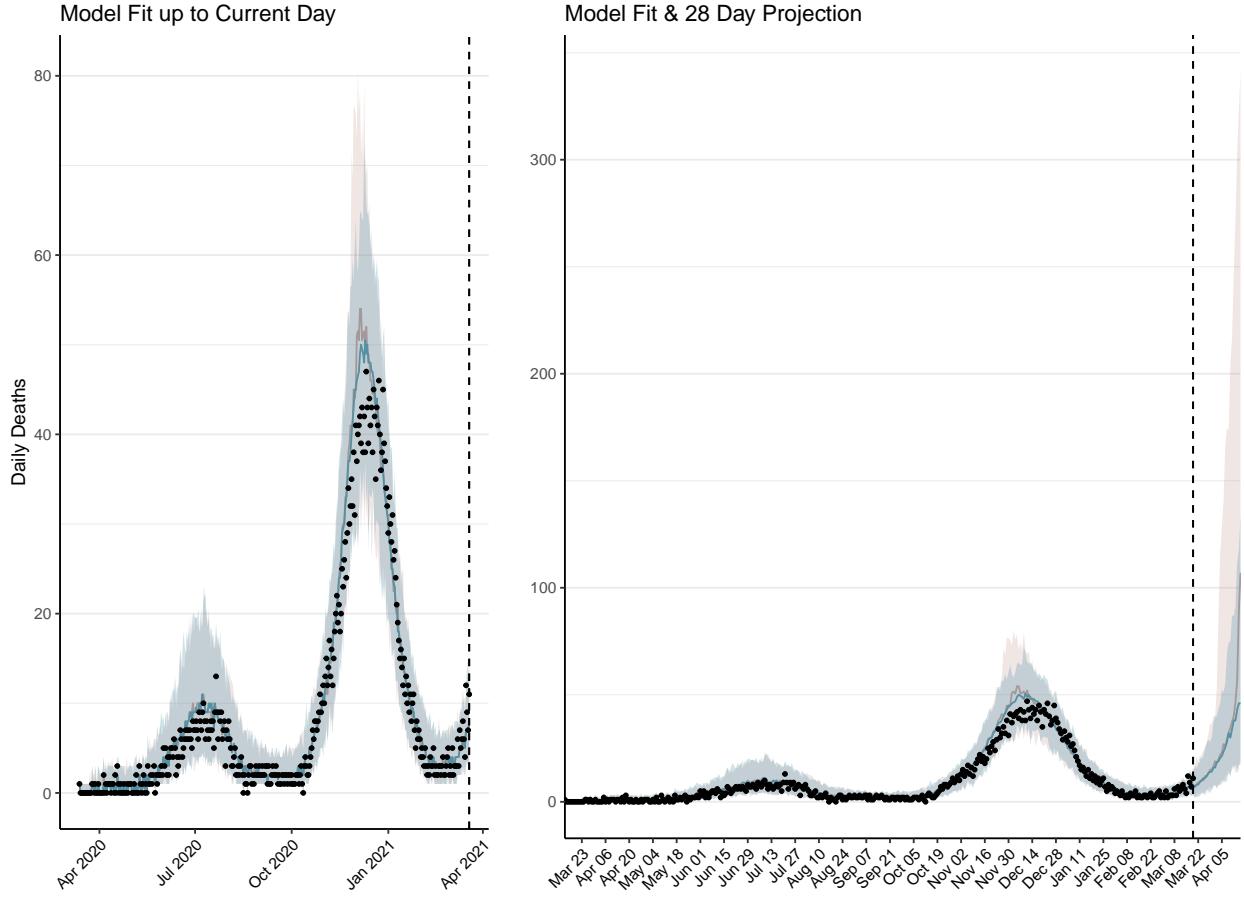


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 384 (95% CI: 355-412) patients requiring treatment with high-pressure oxygen at the current date to 3,138 (95% CI: 2,759-3,518) hospital beds being required on 2021-04-16 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: 126-147) patients requiring treatment with mechanical ventilation at the current date to 778 (95% CI: 735-822) by 2021-04-16. 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.**

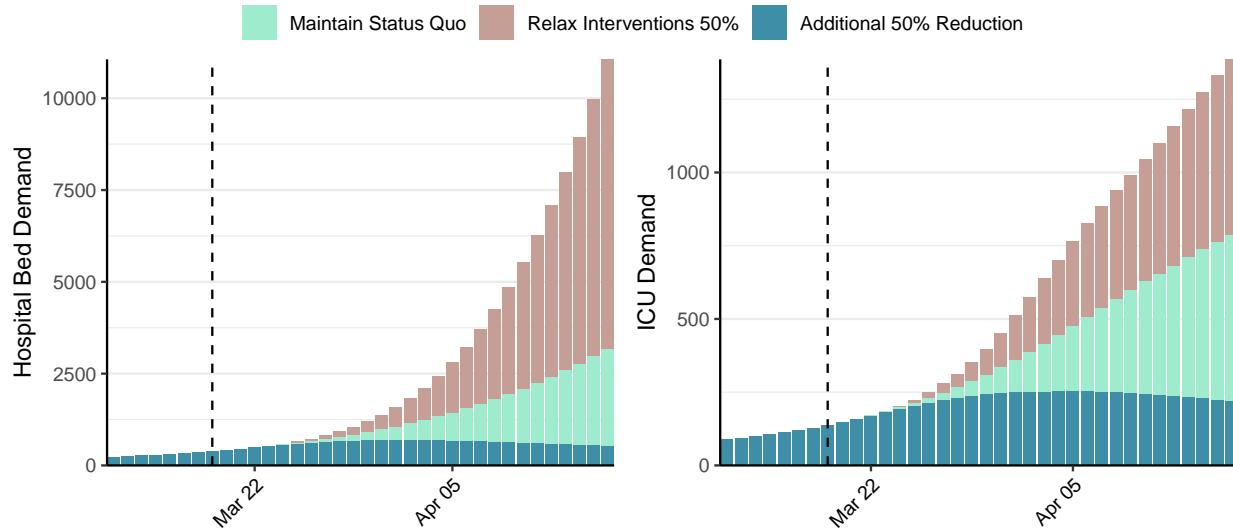


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 8,006 (95% CI: 7,238-8,773) at the current date to 3,786 (95% CI: 3,257-4,316) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 8,006 (95% CI: 7,238-8,773) at the current date to 218,652 (95% CI: 204,896-232,408) by 2021-04-16.

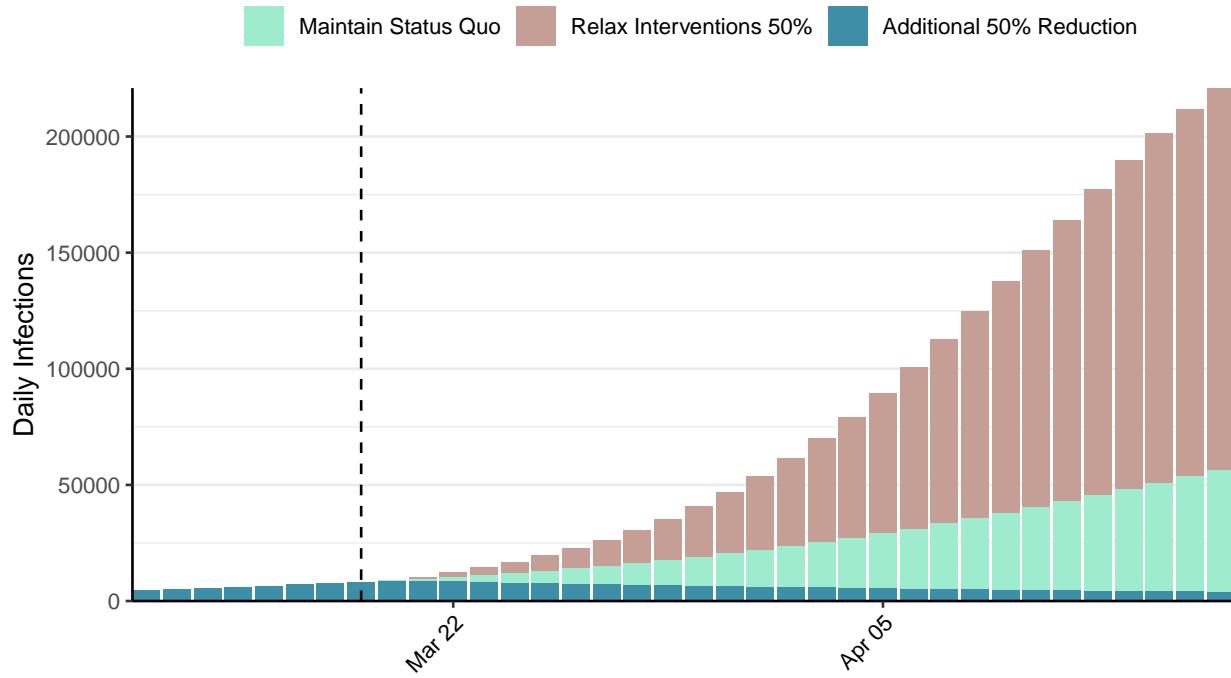


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Burundi, 2021-03-19

[Download the report for Burundi, 2021-03-19 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}
2,563	21	3	0	0.87 (95% CI: 0.61-1.17)

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. Burundi is not shown in the following plot as only 3 deaths have been reported to date**

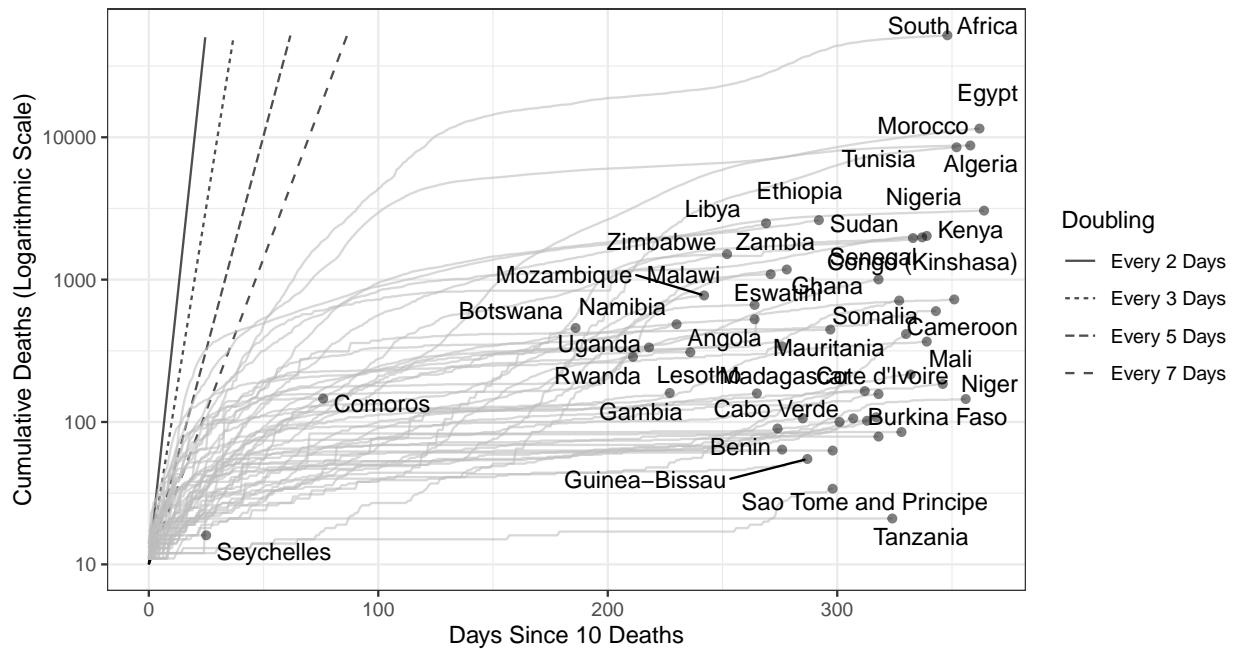


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 7 (95% CI: 1-12) 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

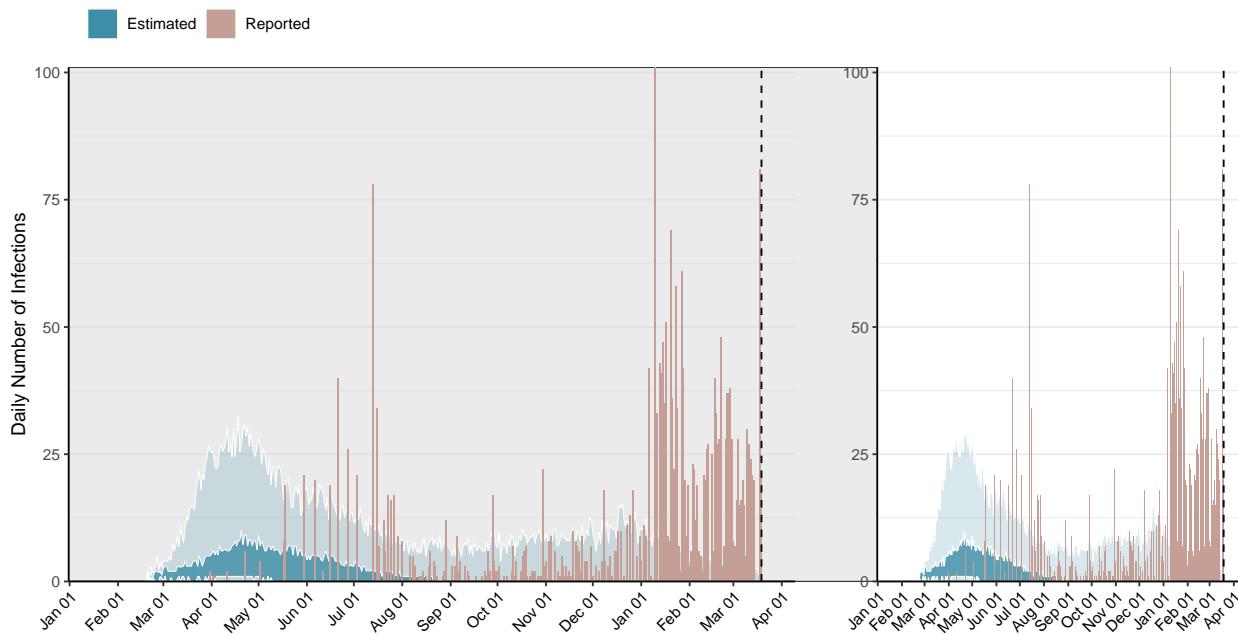


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

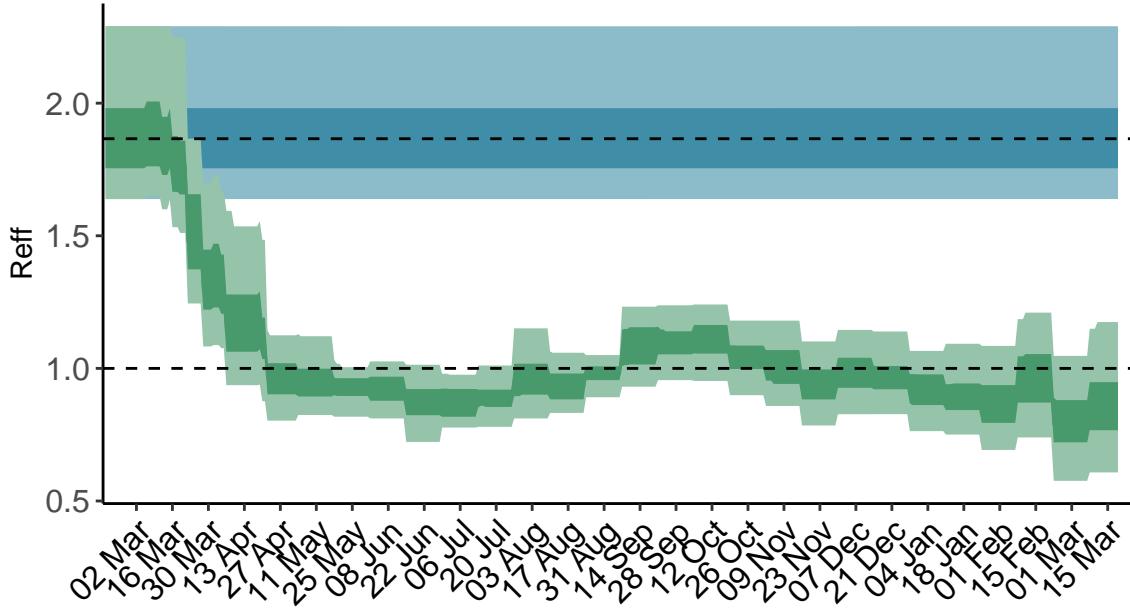


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

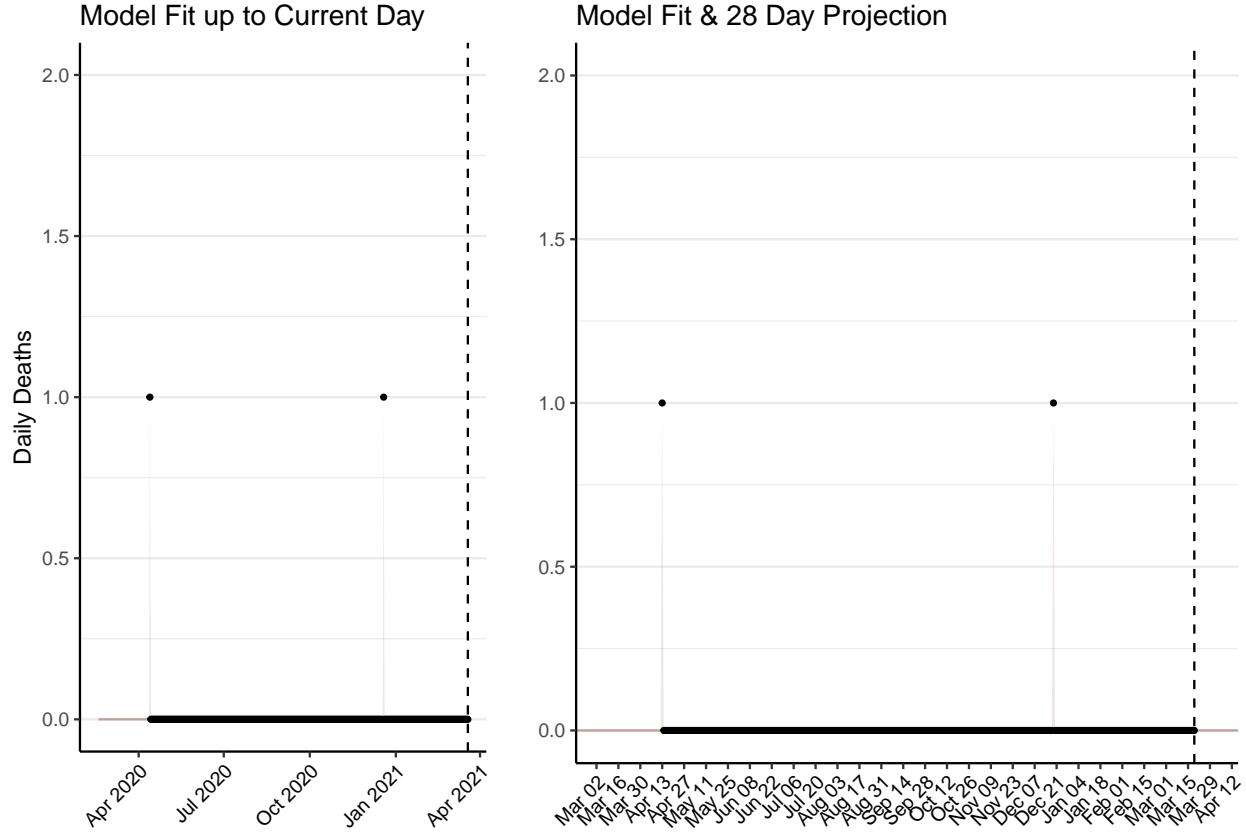


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 0-0) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

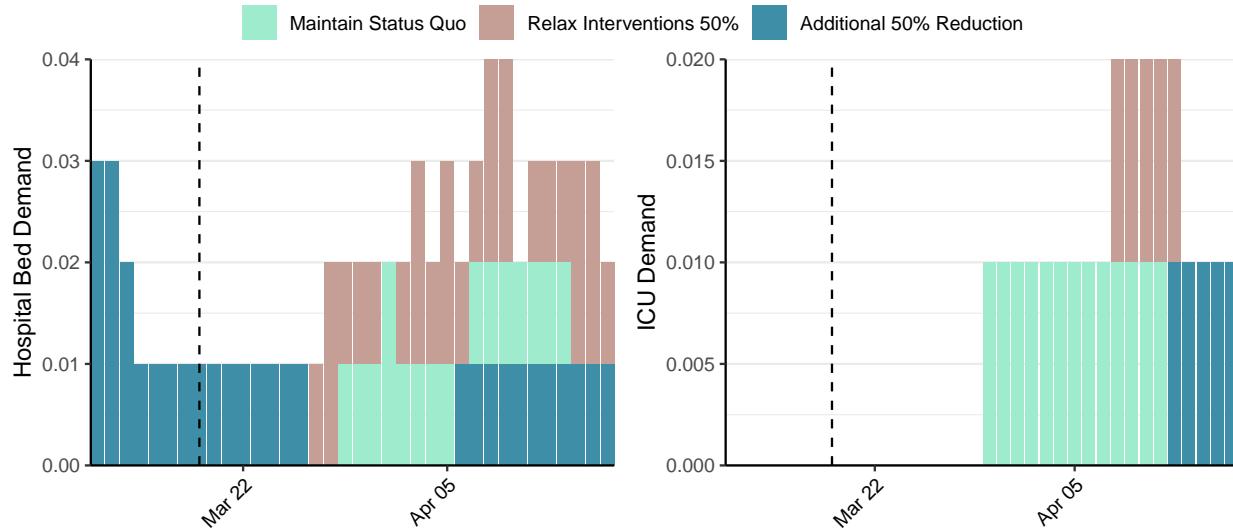


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2021-04-16. 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 1 (95% CI: 0-2) by 2021-04-16.

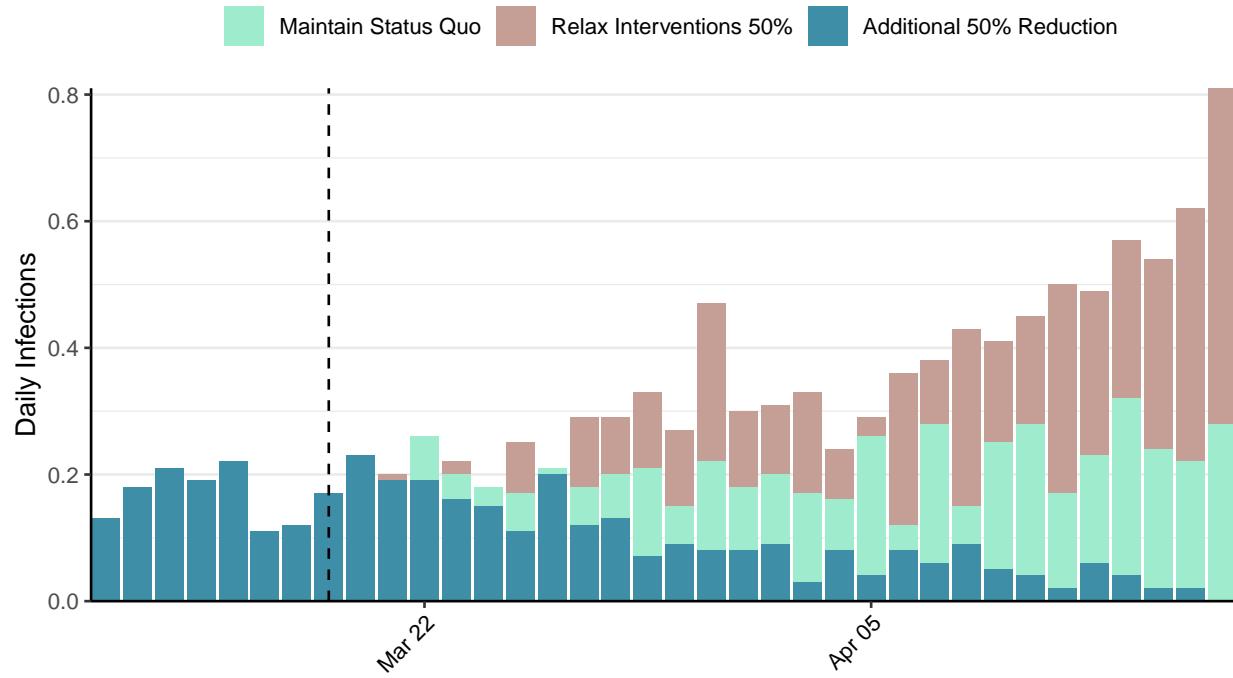


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Benin, 2021-03-19

[Download the report for Benin, 2021-03-19 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}
6,818	317	90	9	1.07 (95% CI: 0.93-1.21)

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.

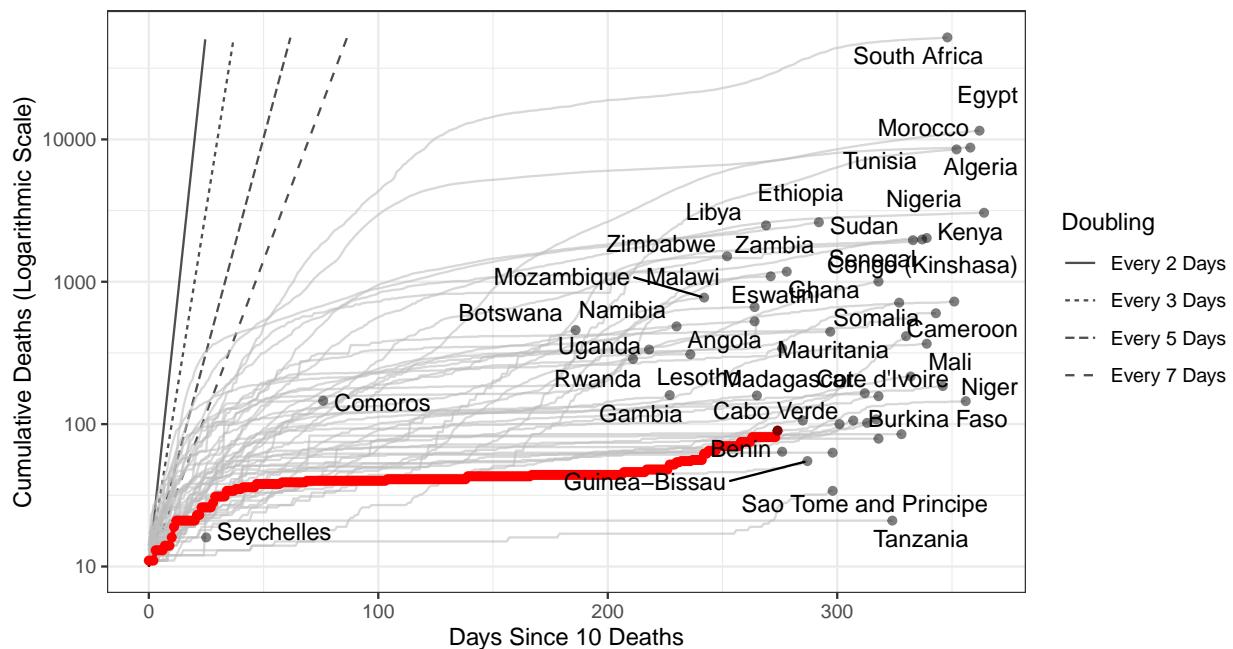


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 22,371 (95% CI: 19,703-25,039) 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.**

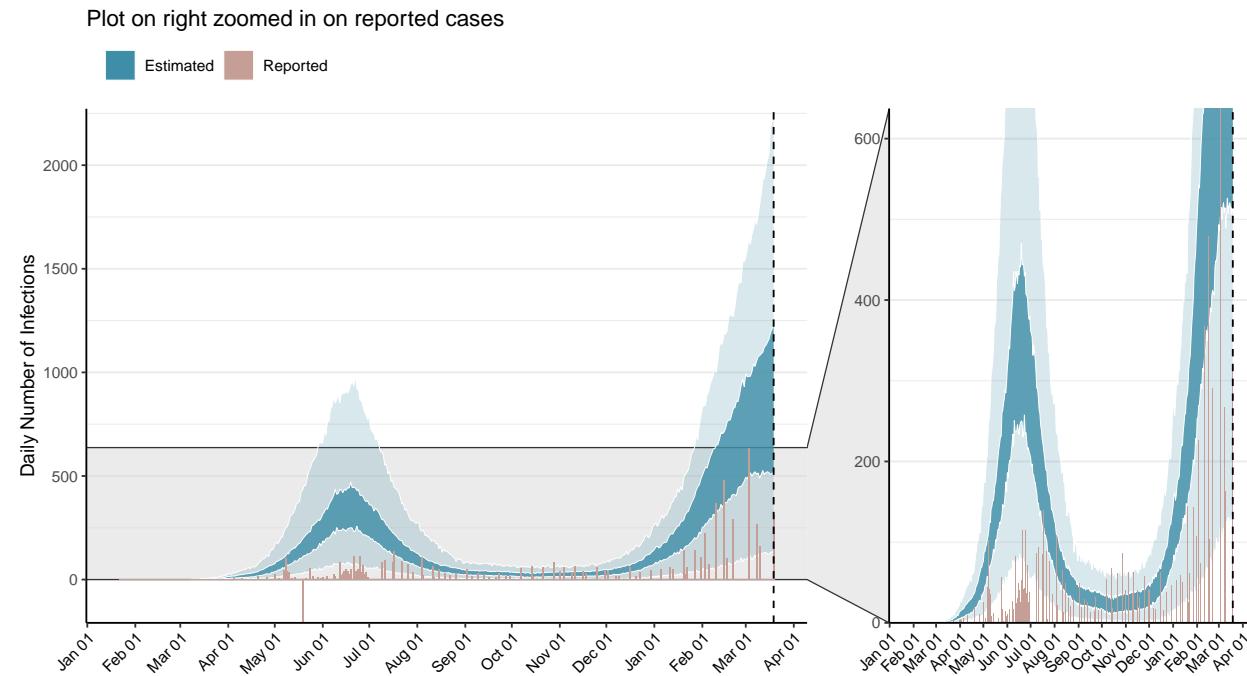


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

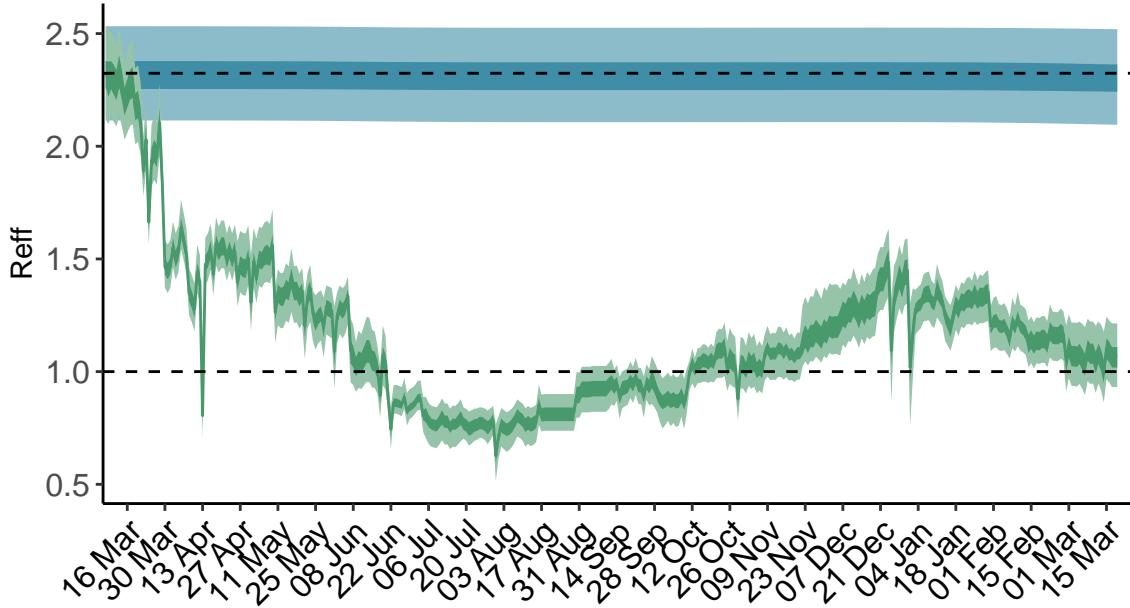


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

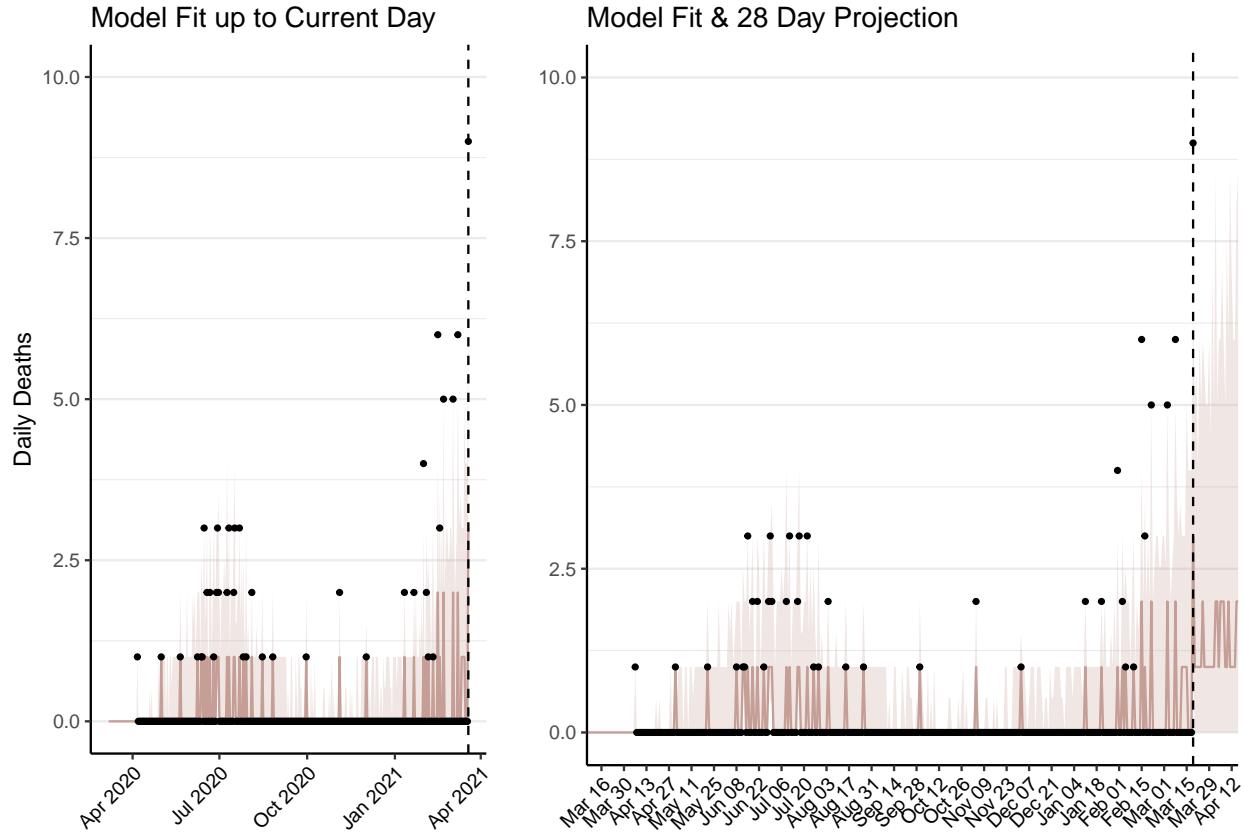


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 67 (95% CI: 59-75) patients requiring treatment with high-pressure oxygen at the current date to 95 (95% CI: 80-110) hospital beds being required on 2021-04-16 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 26 (95% CI: 23-29) patients requiring treatment with mechanical ventilation at the current date to 36 (95% CI: 30-41) by 2021-04-16. 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.**

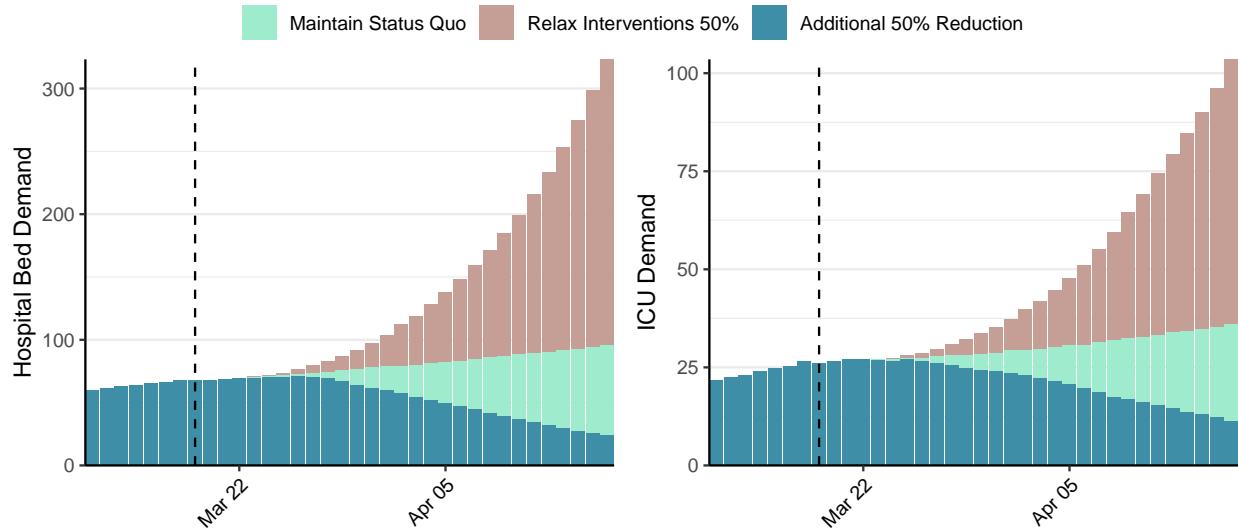


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 945 (95% CI: 823-1,068) at the current date to 109 (95% CI: 90-127) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 945 (95% CI: 823-1,068) at the current date to 8,433 (95% CI: 6,920-9,946) by 2021-04-16.

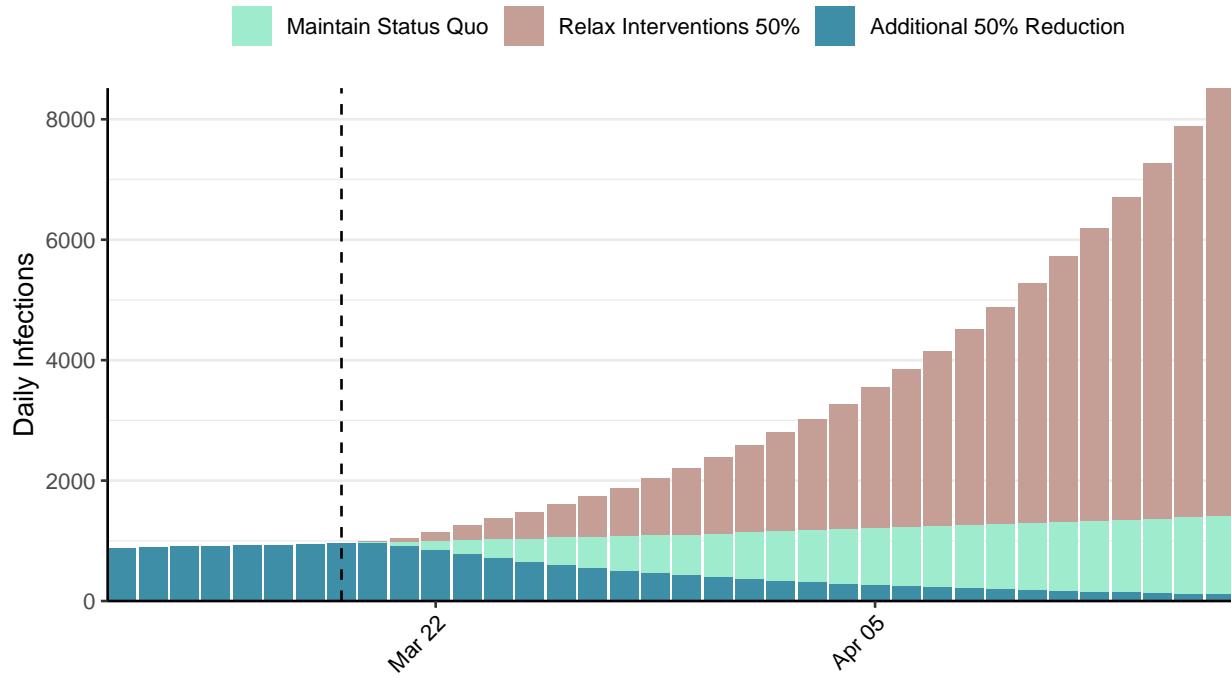


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Burkina Faso, 2021-03-19

[Download the report for Burkina Faso, 2021-03-19 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}
12,450	0	145	0	0.73 (95% CI: 0.58-0.91)

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.

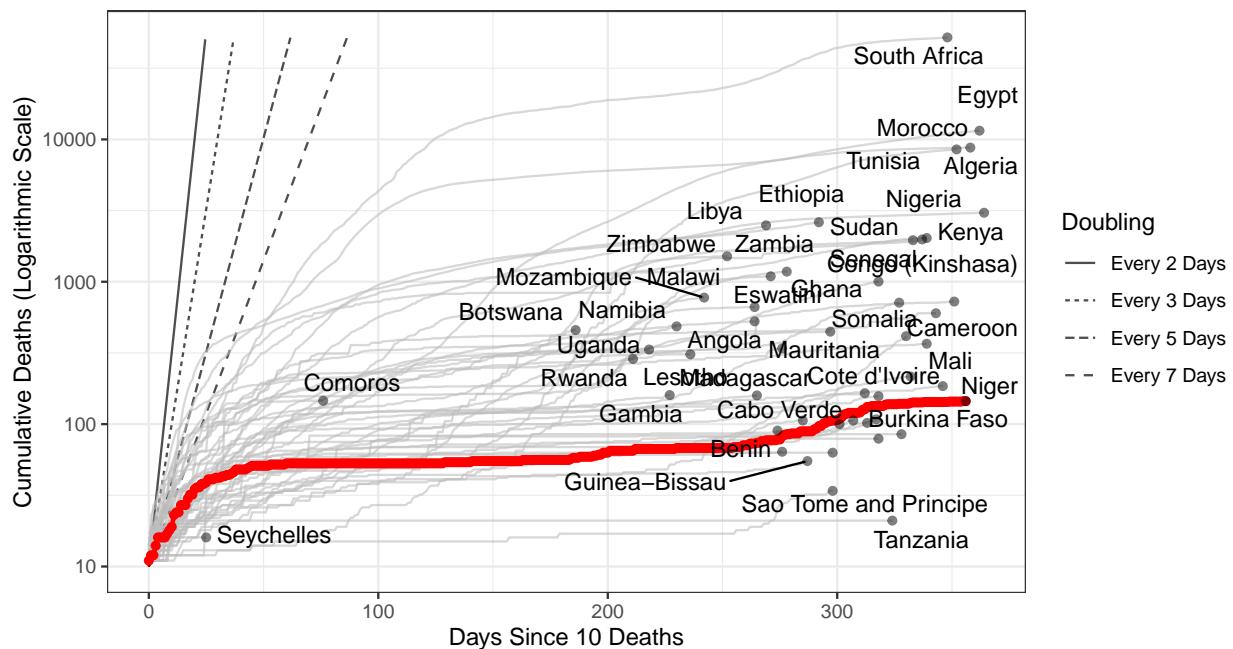


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 2,680 (95% CI: 2,426-2,934) 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).

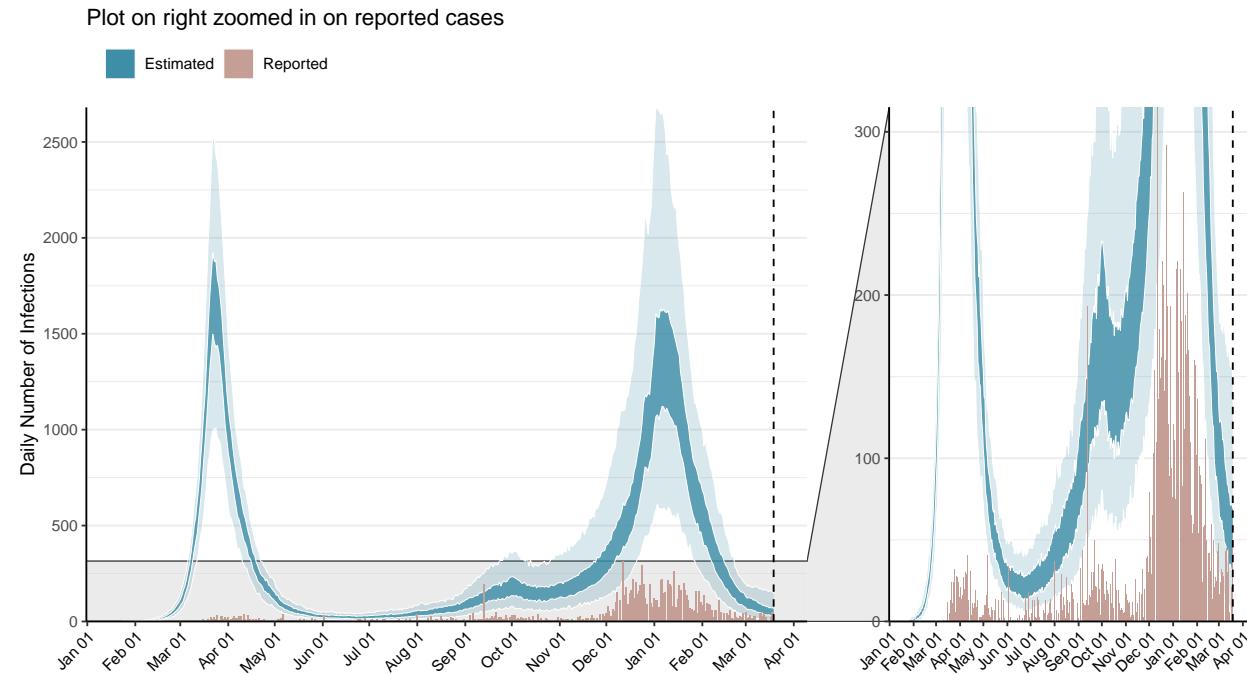


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

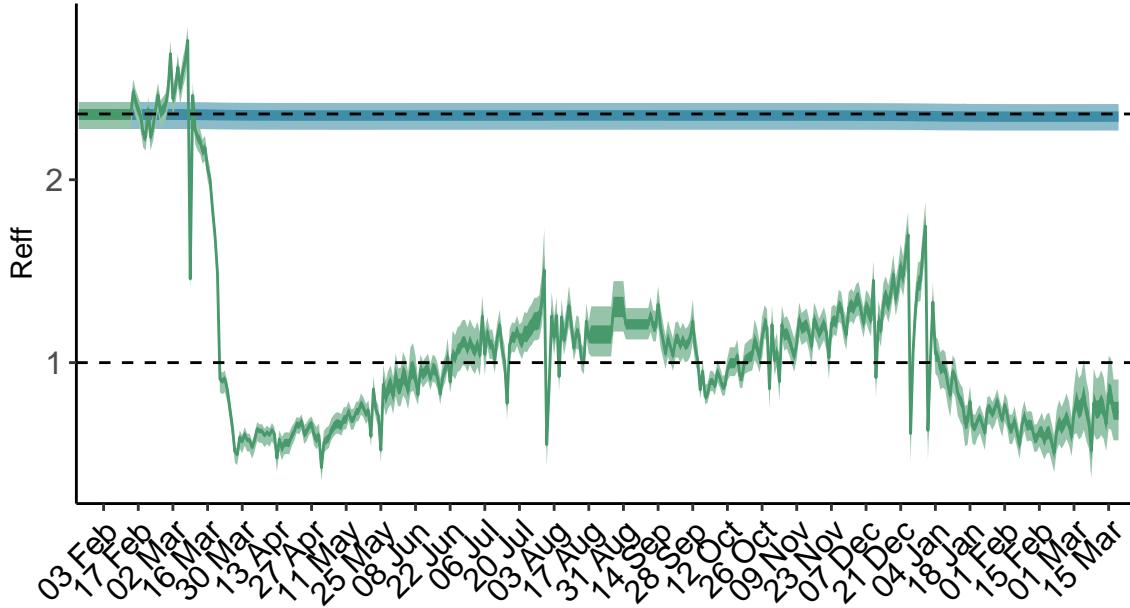


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

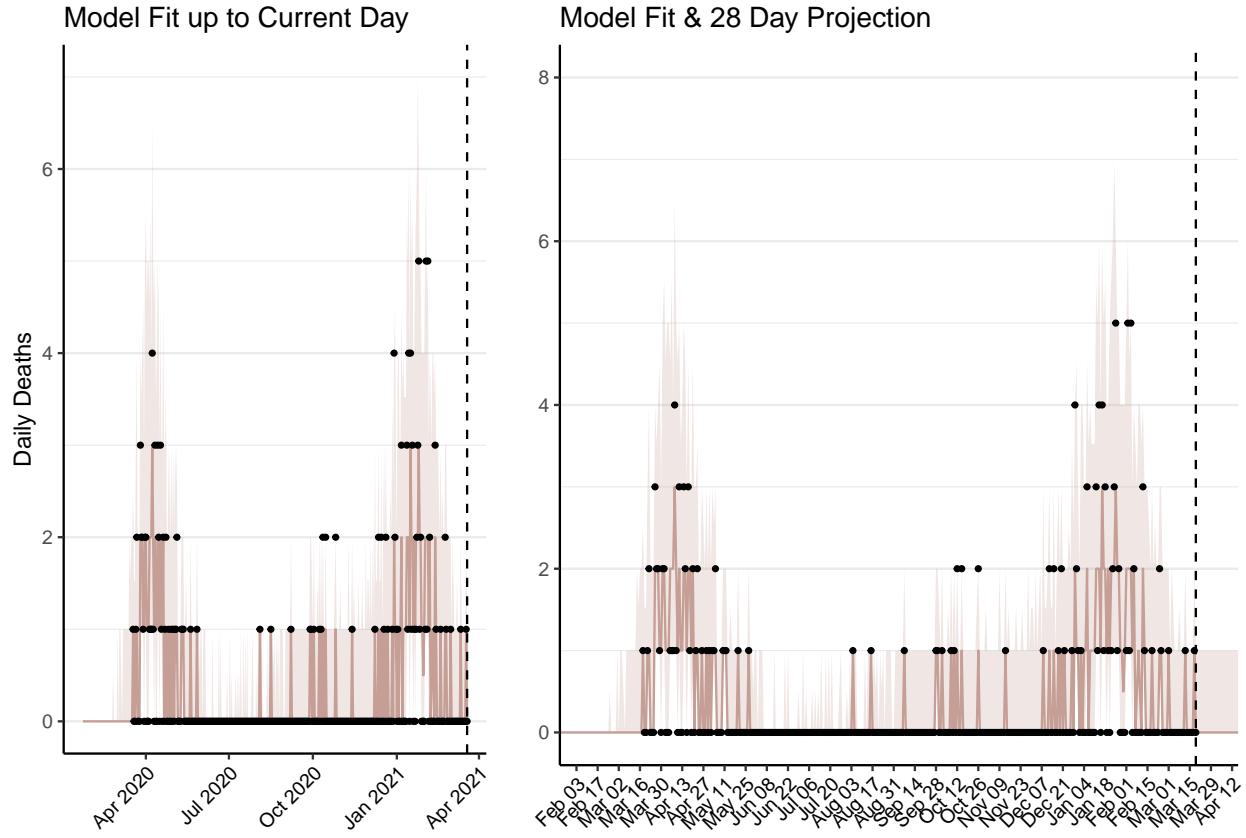


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 7 (95% CI: 6-8) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 2-3) hospital beds being required on 2021-04-16 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: 3-4) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-04-16. 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.**

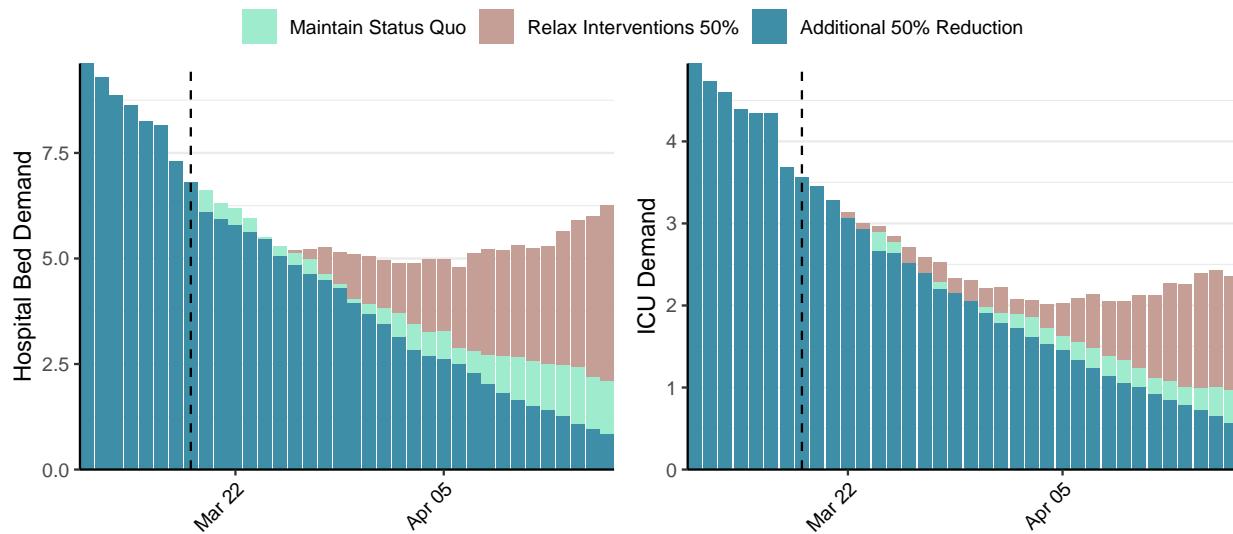


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 46-60) at the current date to 2 (95% CI: 1-3) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 53 (95% CI: 46-60) at the current date to 107 (95% CI: 80-134) by 2021-04-16.

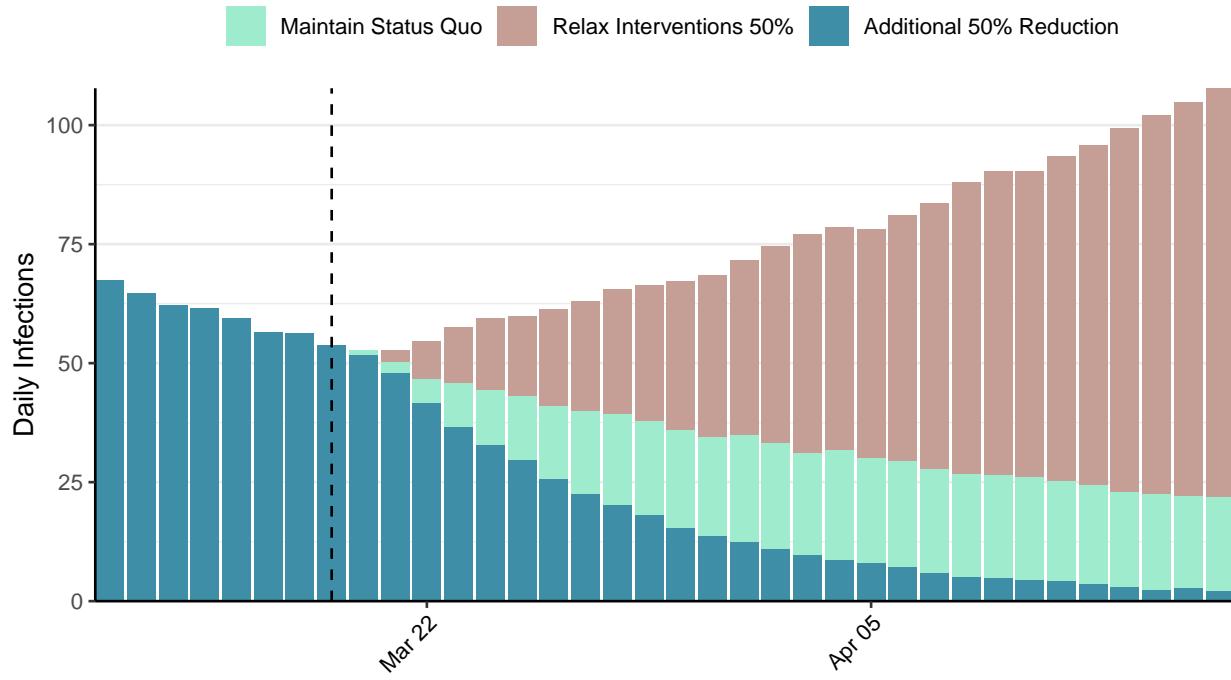


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

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Situation Report for COVID-19: Bangladesh, 2021-03-19

[Download the report for Bangladesh, 2021-03-19 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}
566,838	1,899	8,642	18	1.49 (95% CI: 1.29-1.67)

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.

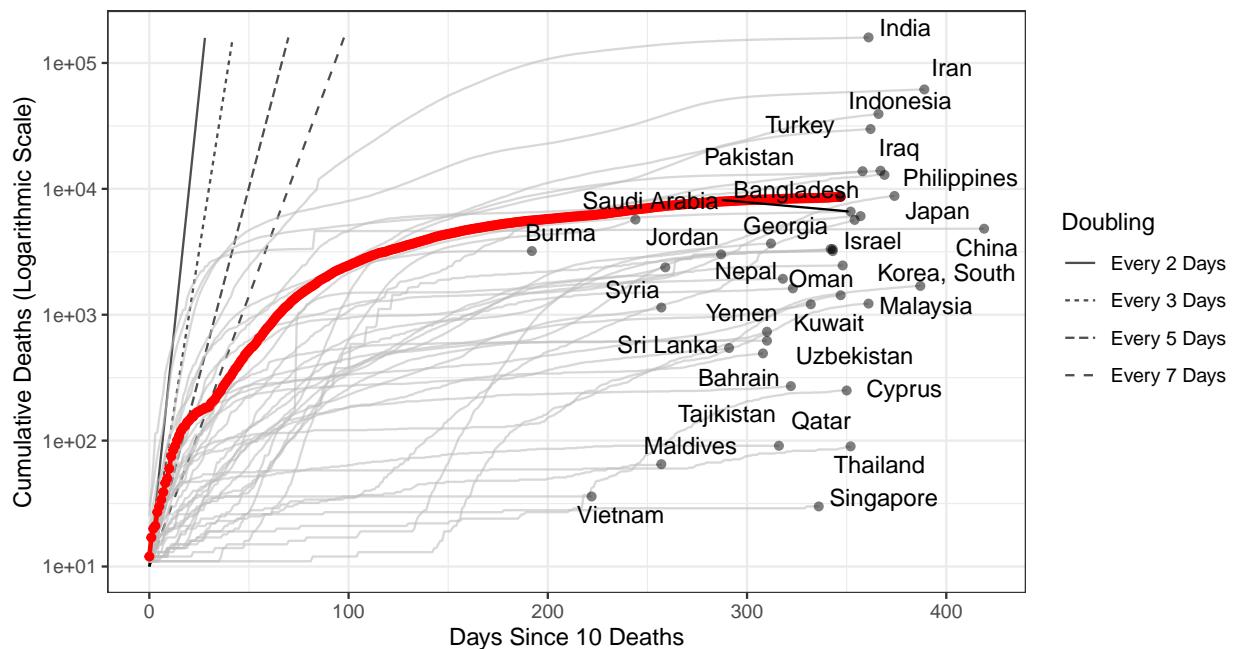


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 203,681 (95% CI: 194,072–213,290) 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).

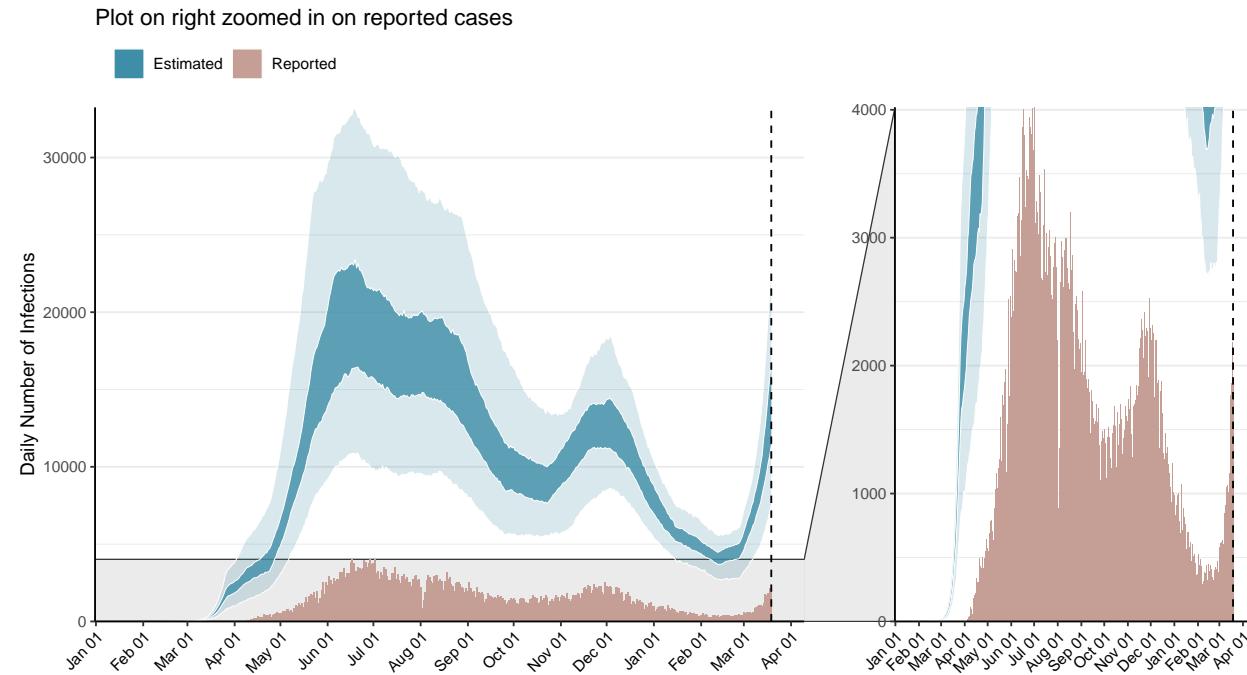


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

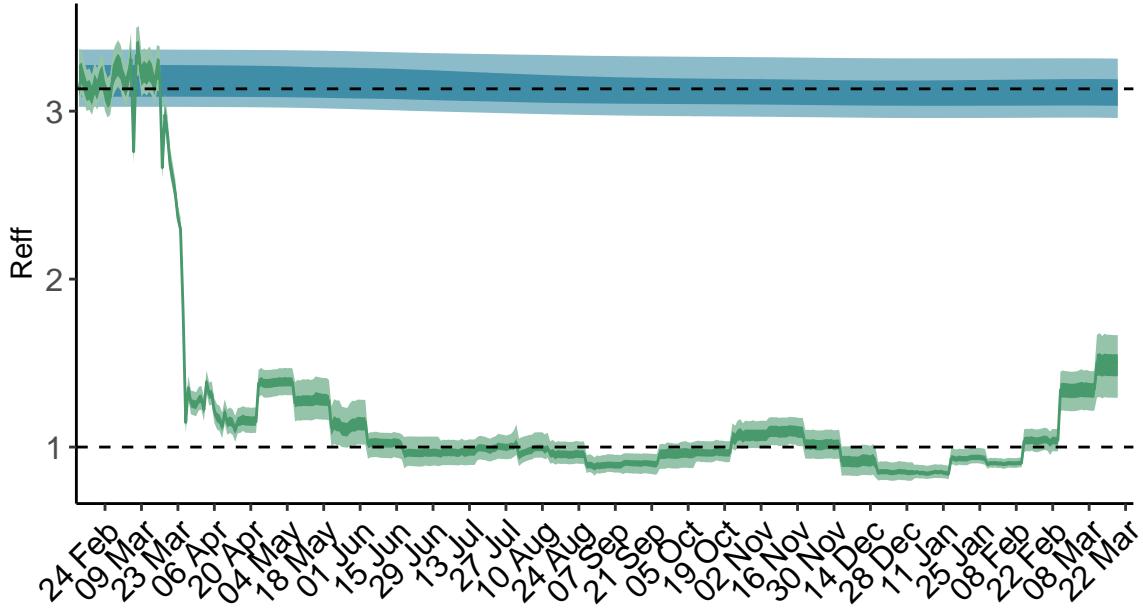


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Bangladesh 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.](#)

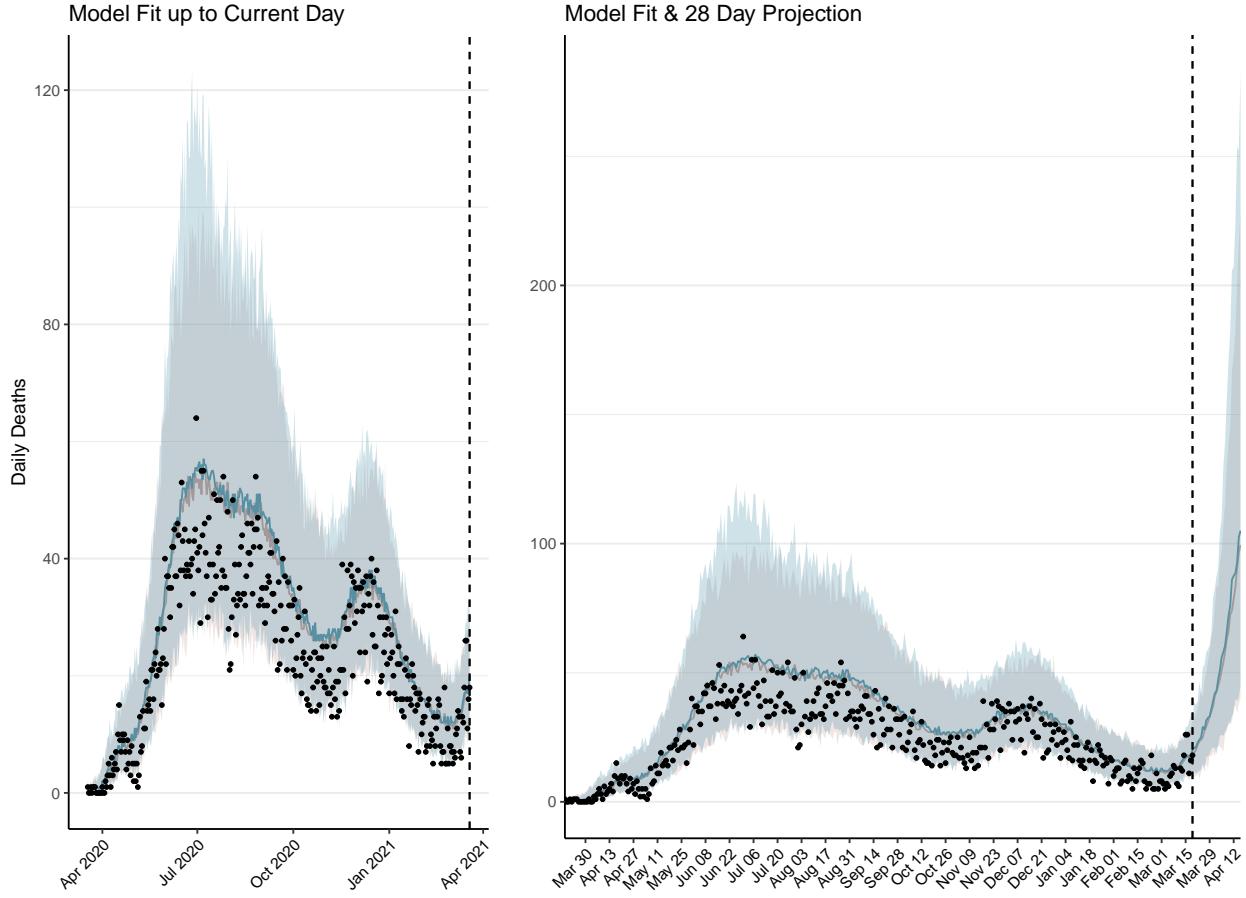


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 850 (95% CI: 809-891) patients requiring treatment with high-pressure oxygen at the current date to 5,109 (95% CI: 4,618-5,600) hospital beds being required on 2021-04-16 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 298 (95% CI: 283-312) patients requiring treatment with mechanical ventilation at the current date to 1,721 (95% CI: 1,559-1,883) by 2021-04-16. 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.**

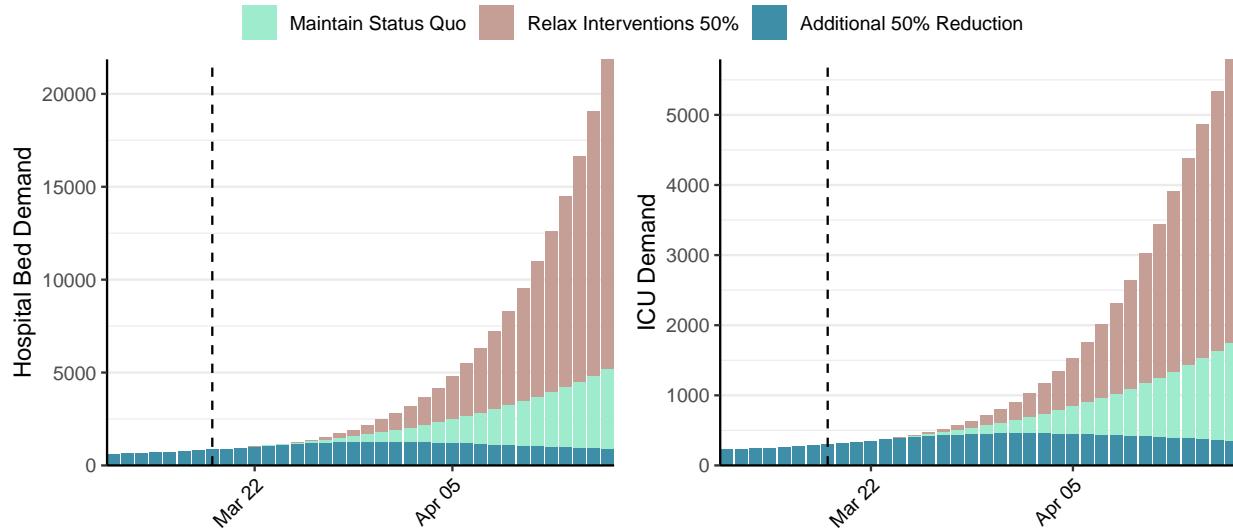


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 14,006 (95% CI: 13,150-14,863) at the current date to 5,212 (95% CI: 4,677-5,747) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14,006 (95% CI: 13,150-14,863) at the current date to 648,521 (95% CI: 575,254-721,787) by 2021-04-16.

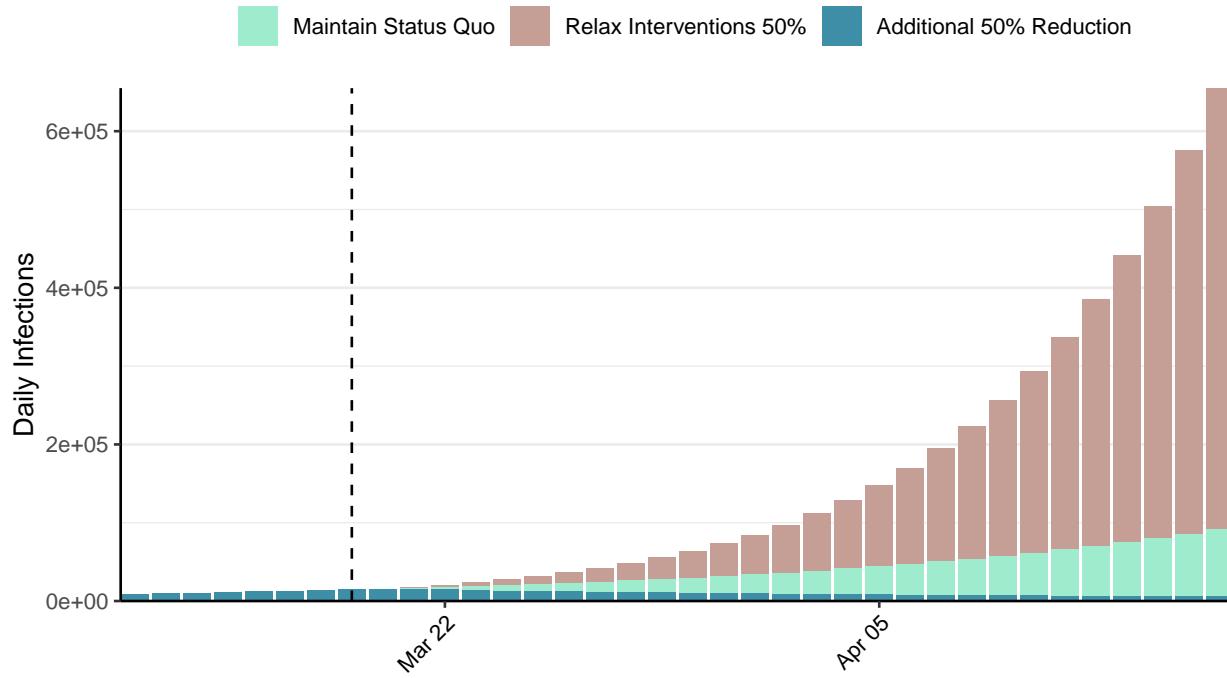


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Bulgaria, 2021-03-19

[Download the report for Bulgaria, 2021-03-19 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}
299,939	4,162	11,932	115	1.2 (95% CI: 1.05-1.28)

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.

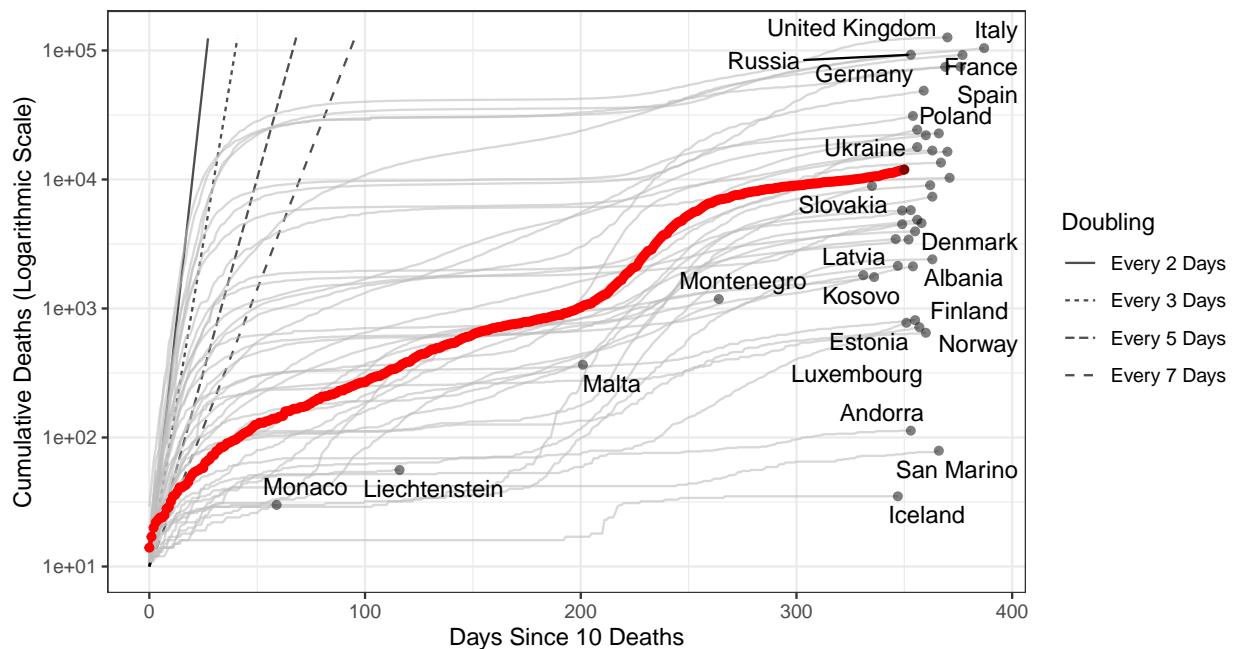


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 600,164 (95% CI: 577,568–622,760) 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).

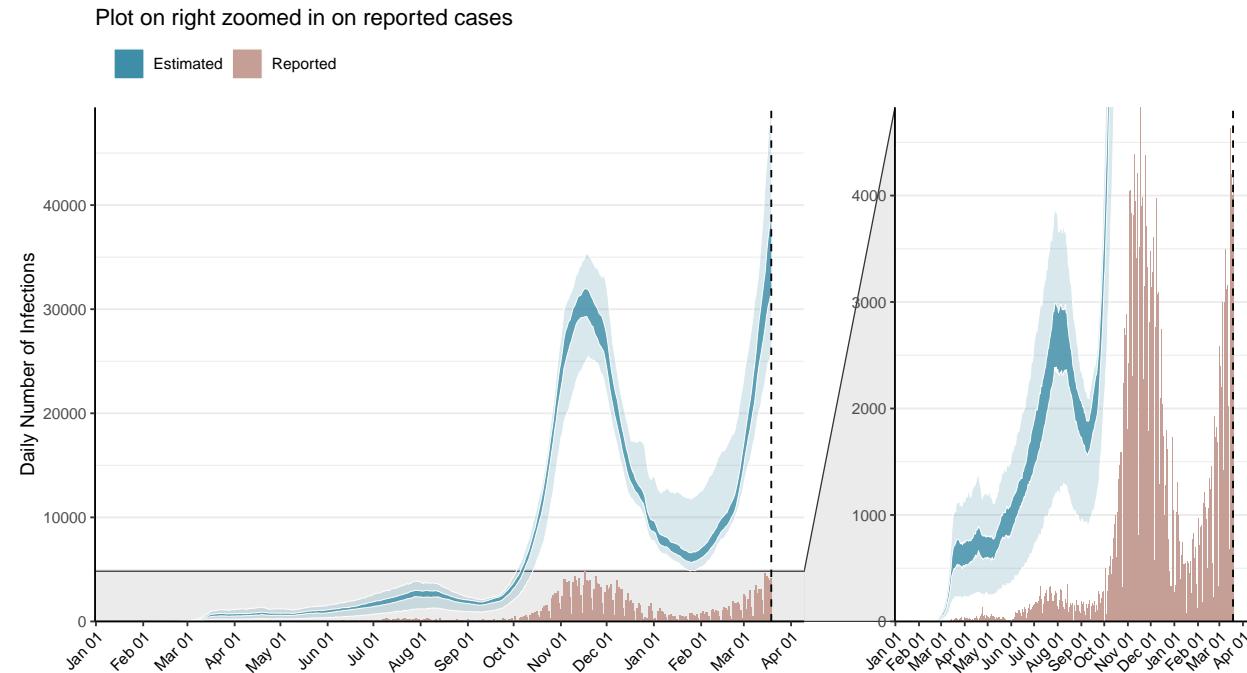


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

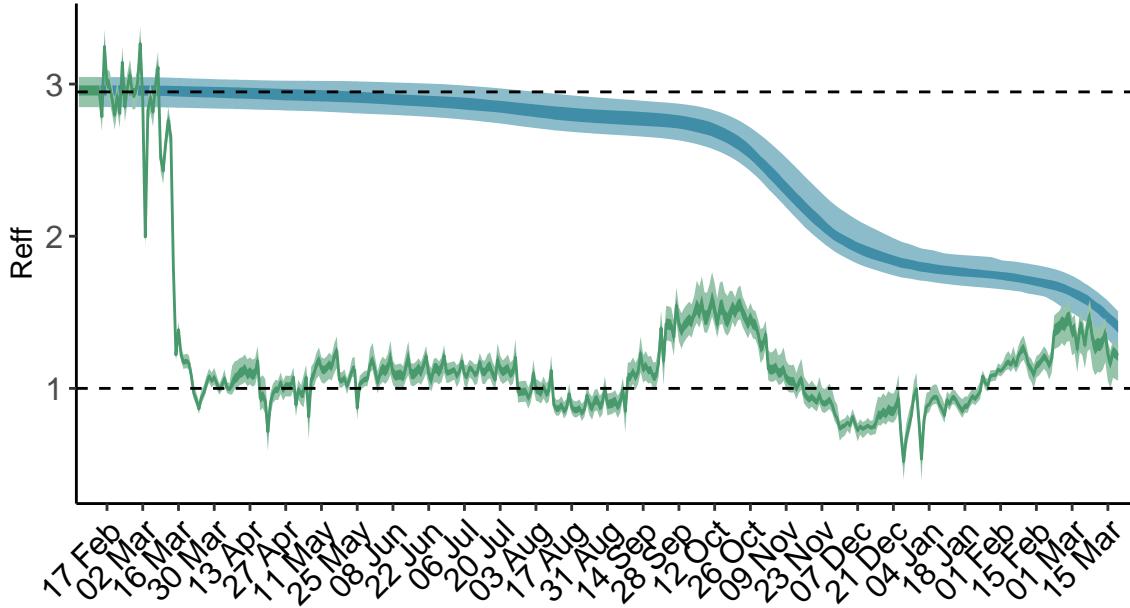


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

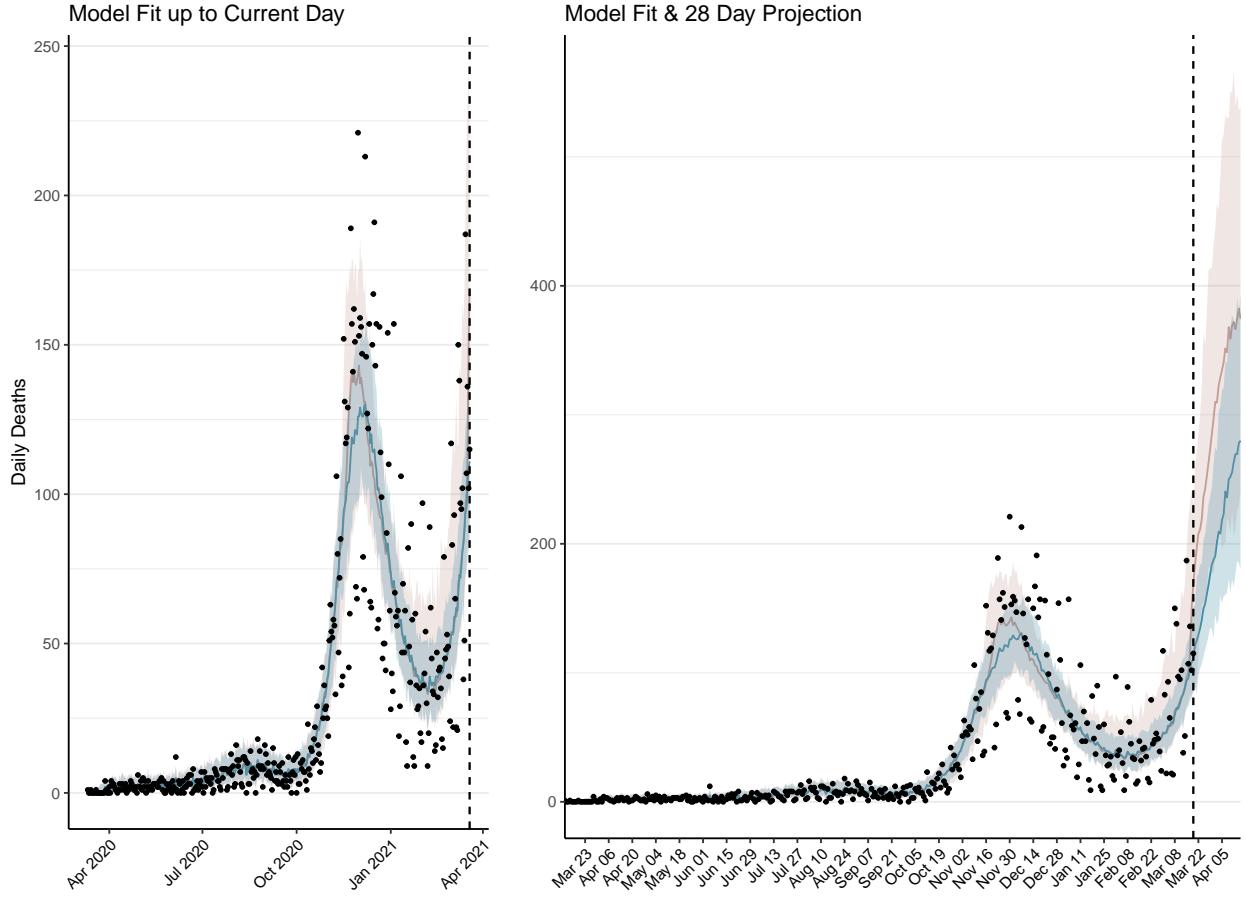


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 4,607 (95% CI: 4,424-4,790) patients requiring treatment with high-pressure oxygen at the current date to 9,678 (95% CI: 9,256-10,100) hospital beds being required on 2021-04-16 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 1,376 (95% CI: 1,346-1,407) patients requiring treatment with mechanical ventilation at the current date to 1,550 (95% CI: 1,516-1,585) by 2021-04-16. 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.**

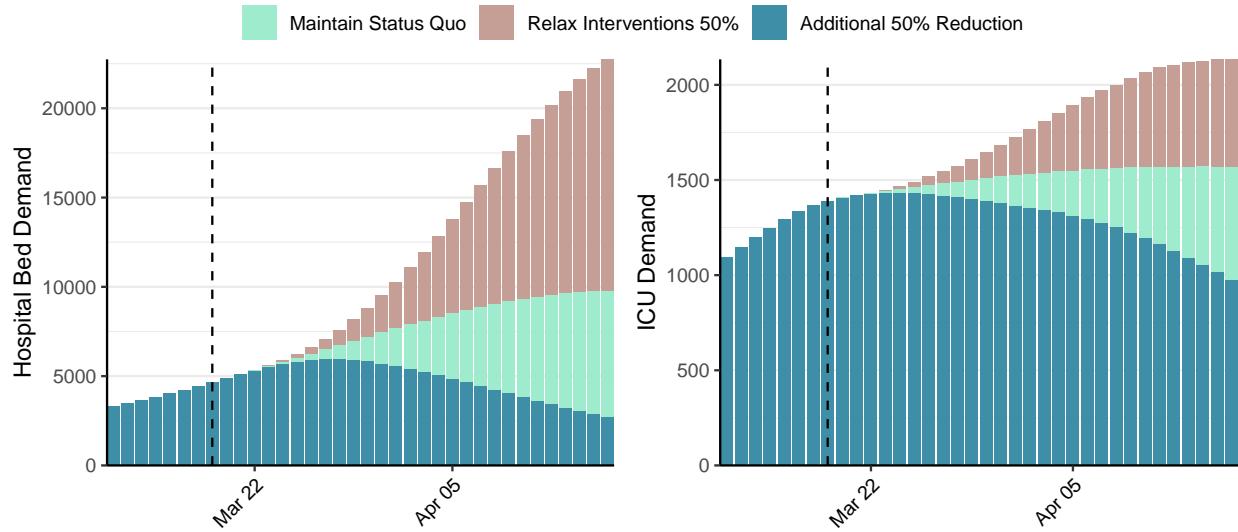


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 35,591 (95% CI: 34,195-36,987) at the current date to 5,058 (95% CI: 4,805-5,310) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 35,591 (95% CI: 34,195-36,987) at the current date to 78,342 (95% CI: 76,230-80,453) by 2021-04-16.

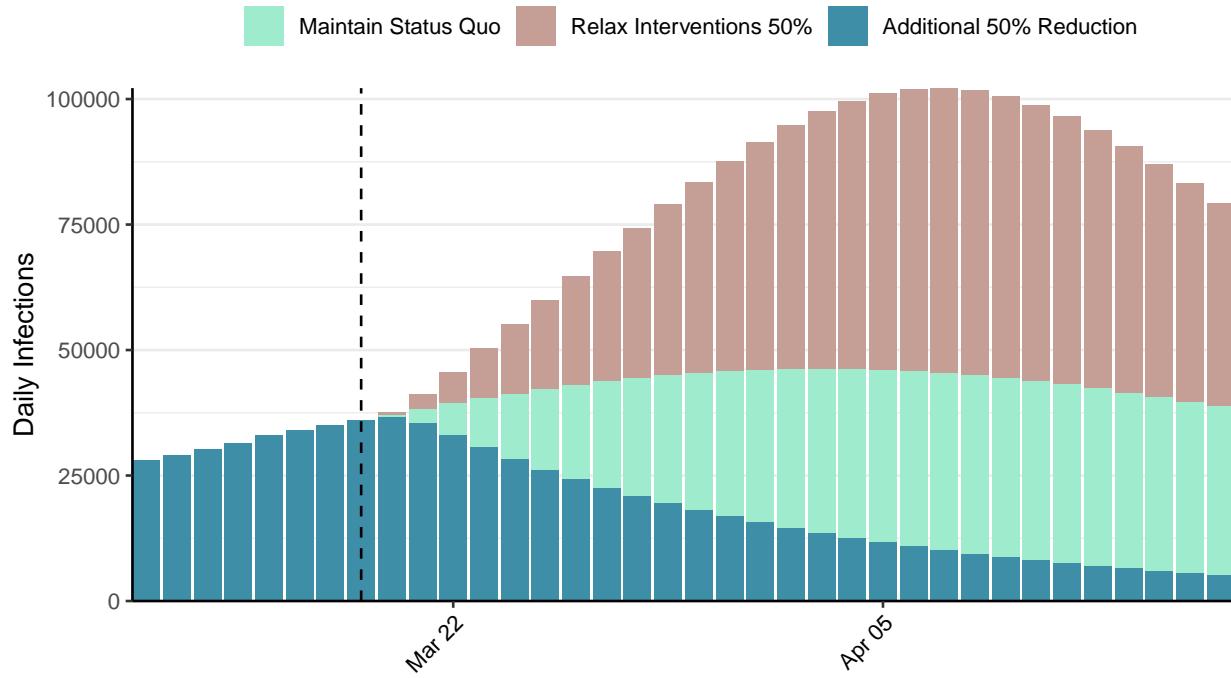


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Bosnia and Herzegovina, 2021-03-19

[Download the report for Bosnia and Herzegovina, 2021-03-19 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}
151,337	1,446	5,784	44	1.26 (95% CI: 1.18-1.35)

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.

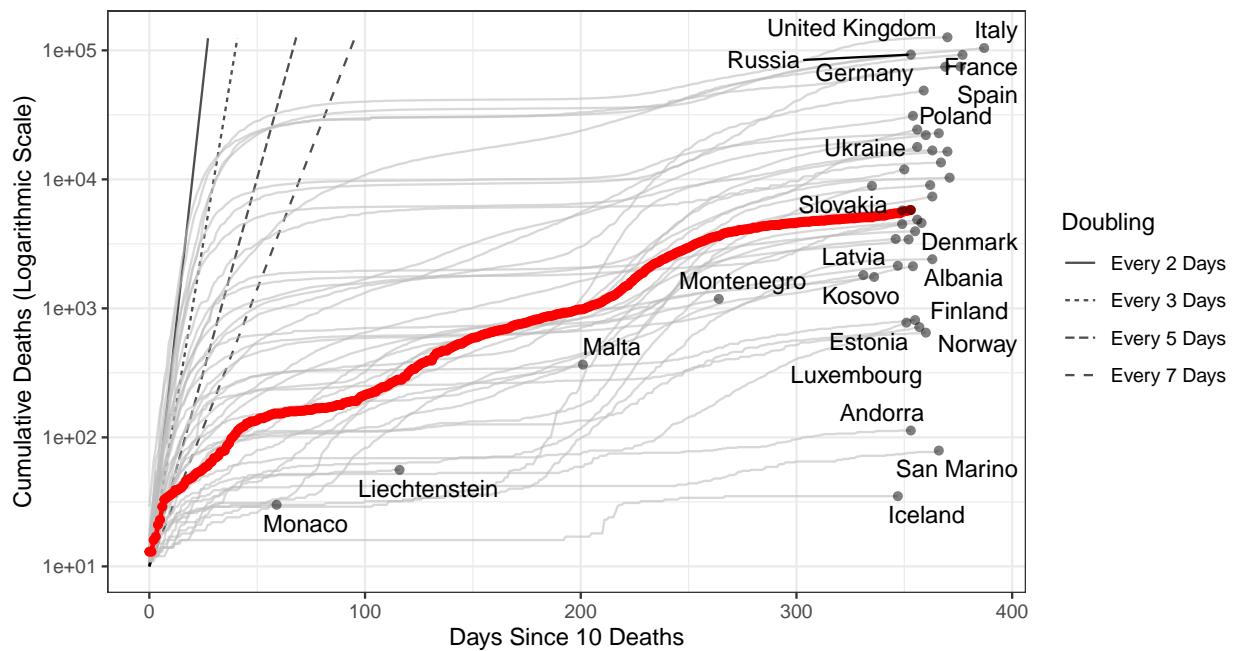


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 203,349 (95% CI: 197,313-209,385) 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

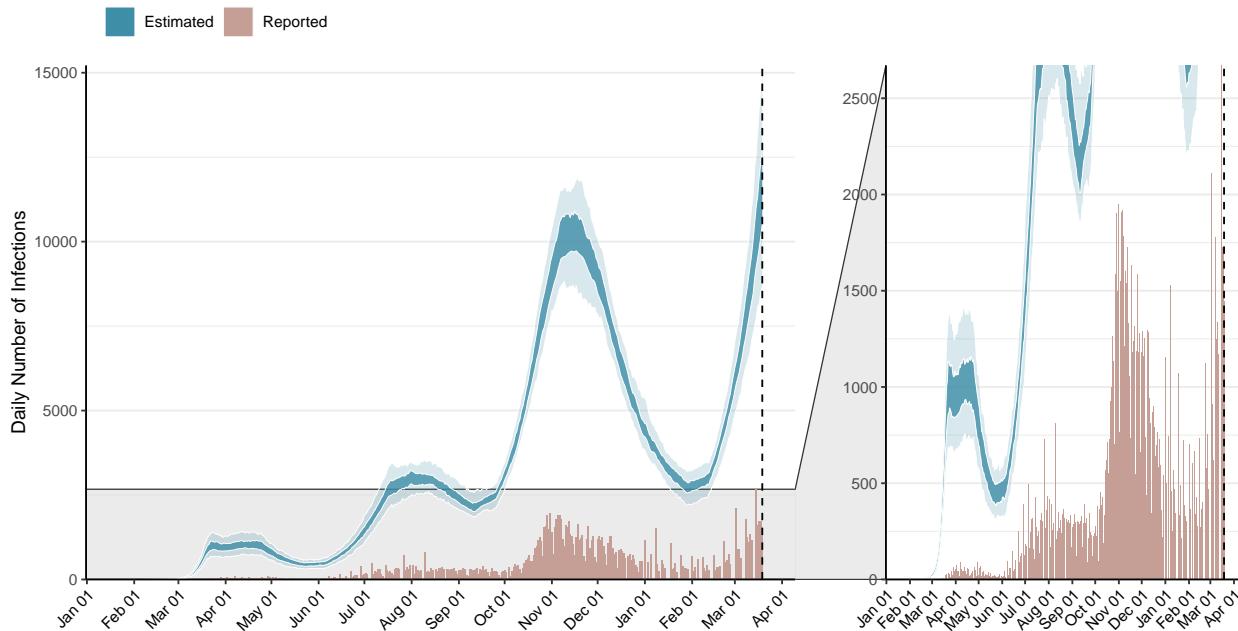


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

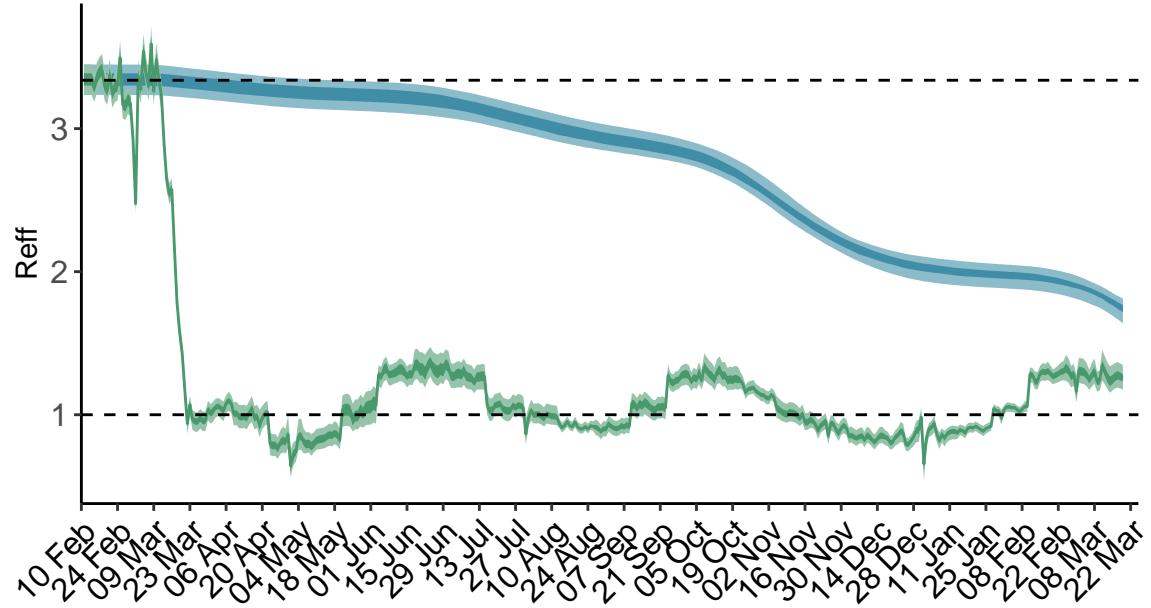


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

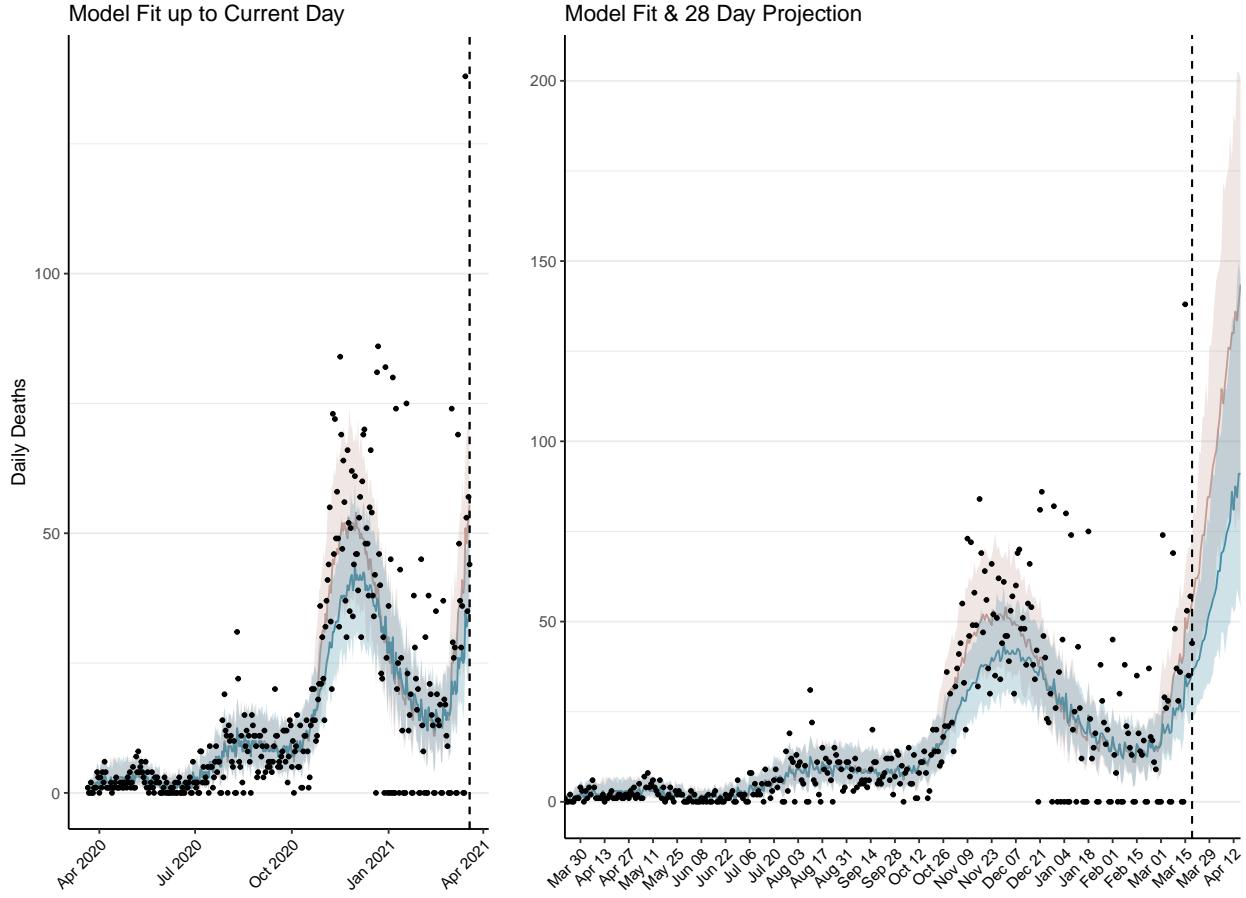


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,354 (95% CI: 1,312-1,397) patients requiring treatment with high-pressure oxygen at the current date to 3,275 (95% CI: 3,135-3,415) hospital beds being required on 2021-04-16 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 286 (95% CI: 280-292) patients requiring treatment with mechanical ventilation at the current date to 363 (95% CI: 354-372) by 2021-04-16. 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.**

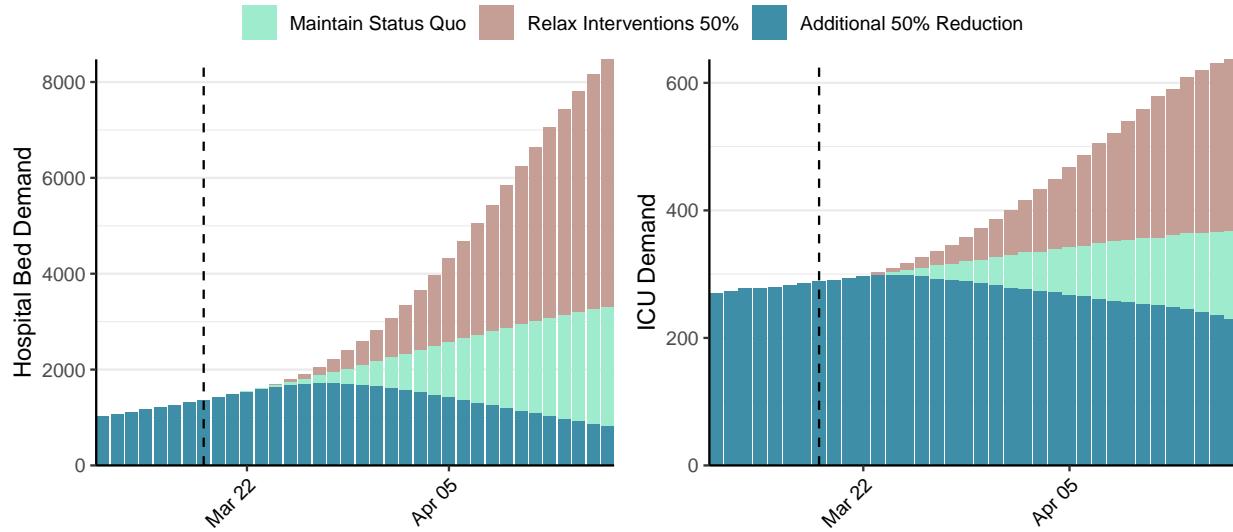


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 11,598 (95% CI: 11,173-12,024) at the current date to 2,020 (95% CI: 1,925-2,114) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 11,598 (95% CI: 11,173-12,024) at the current date to 44,745 (95% CI: 43,766-45,725) by 2021-04-16.

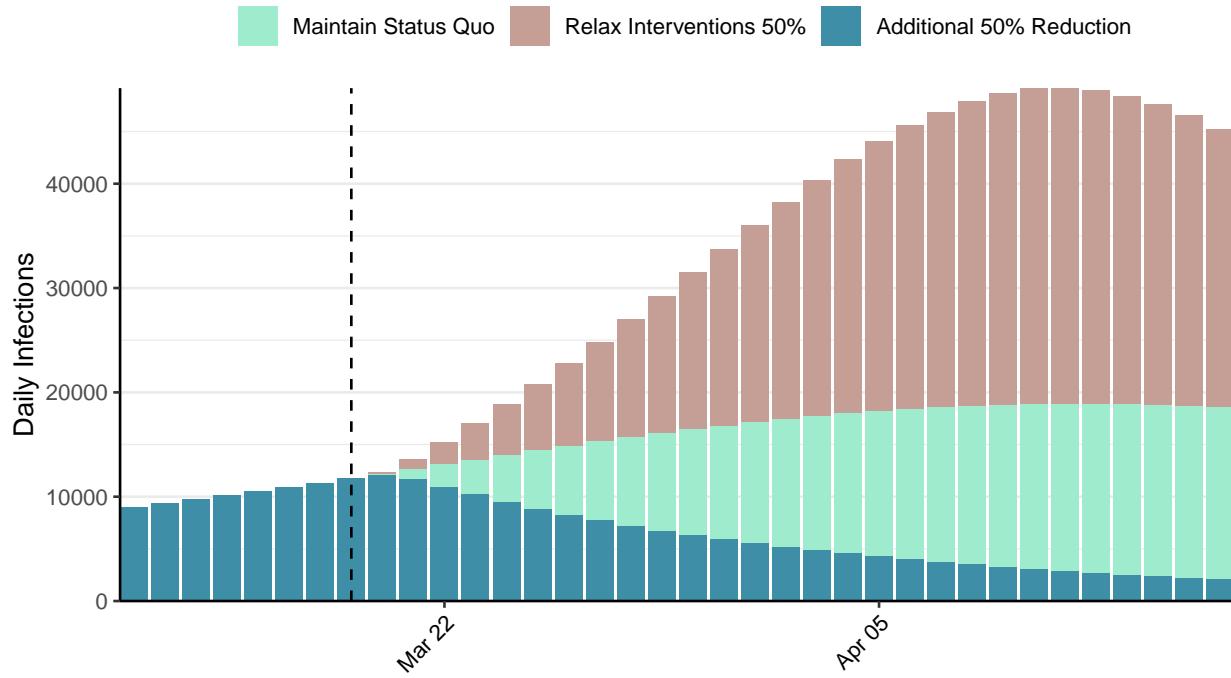


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Belarus, 2021-03-19

[Download the report for Belarus, 2021-03-19 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}
307,938	1,414	2,139	9	0.9 (95% CI: 0.8-1.01)

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.

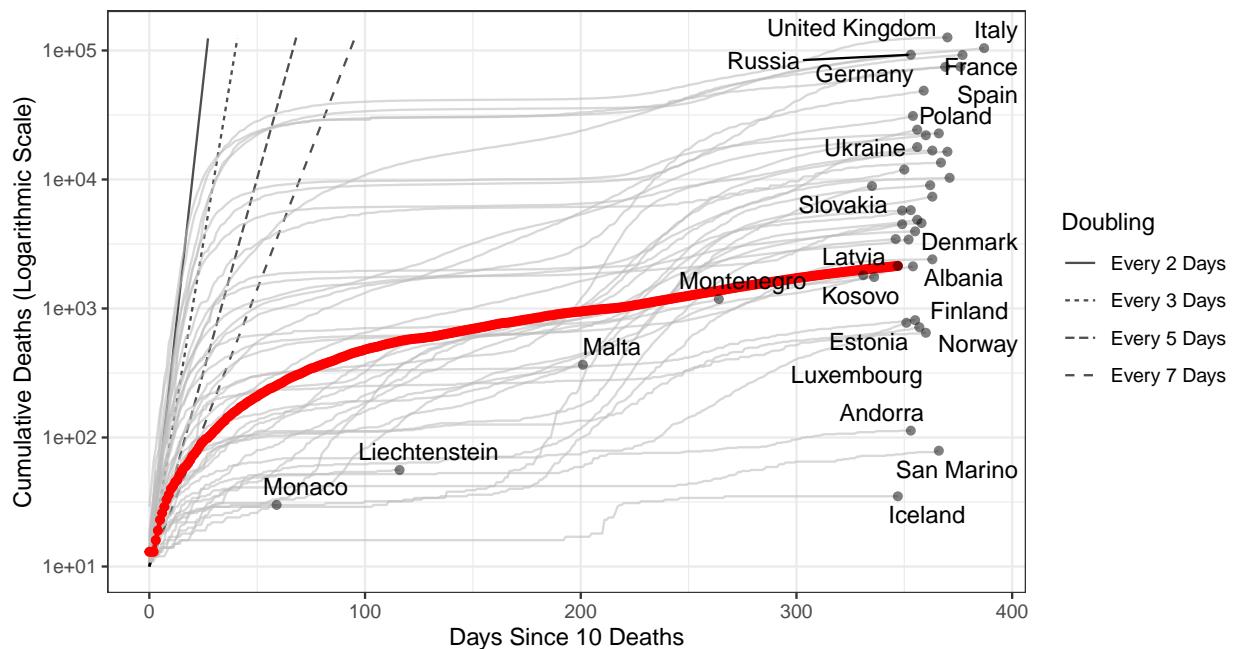


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 71,196 (95% CI: 68,569-73,823) 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).

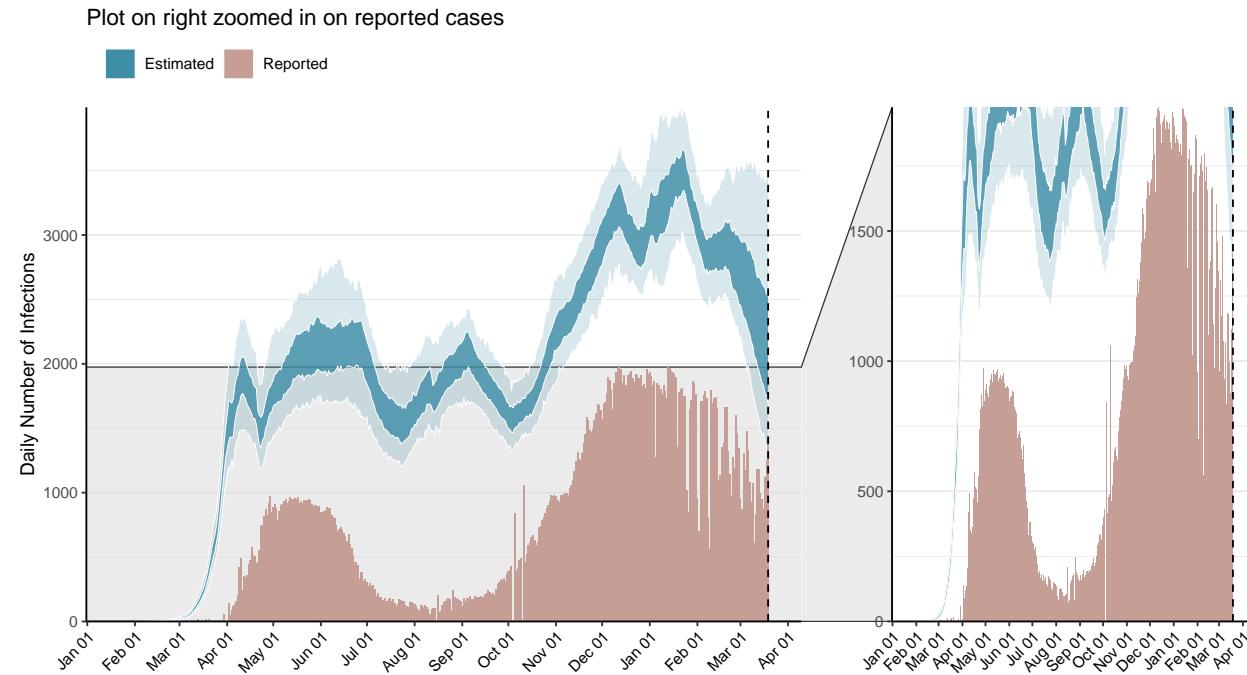


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

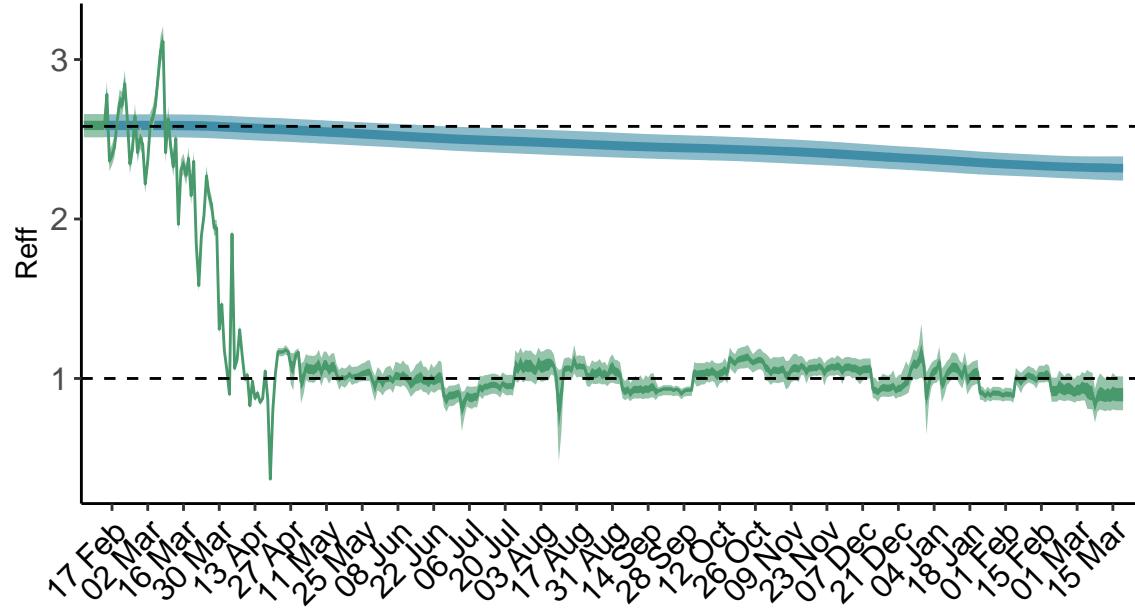


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

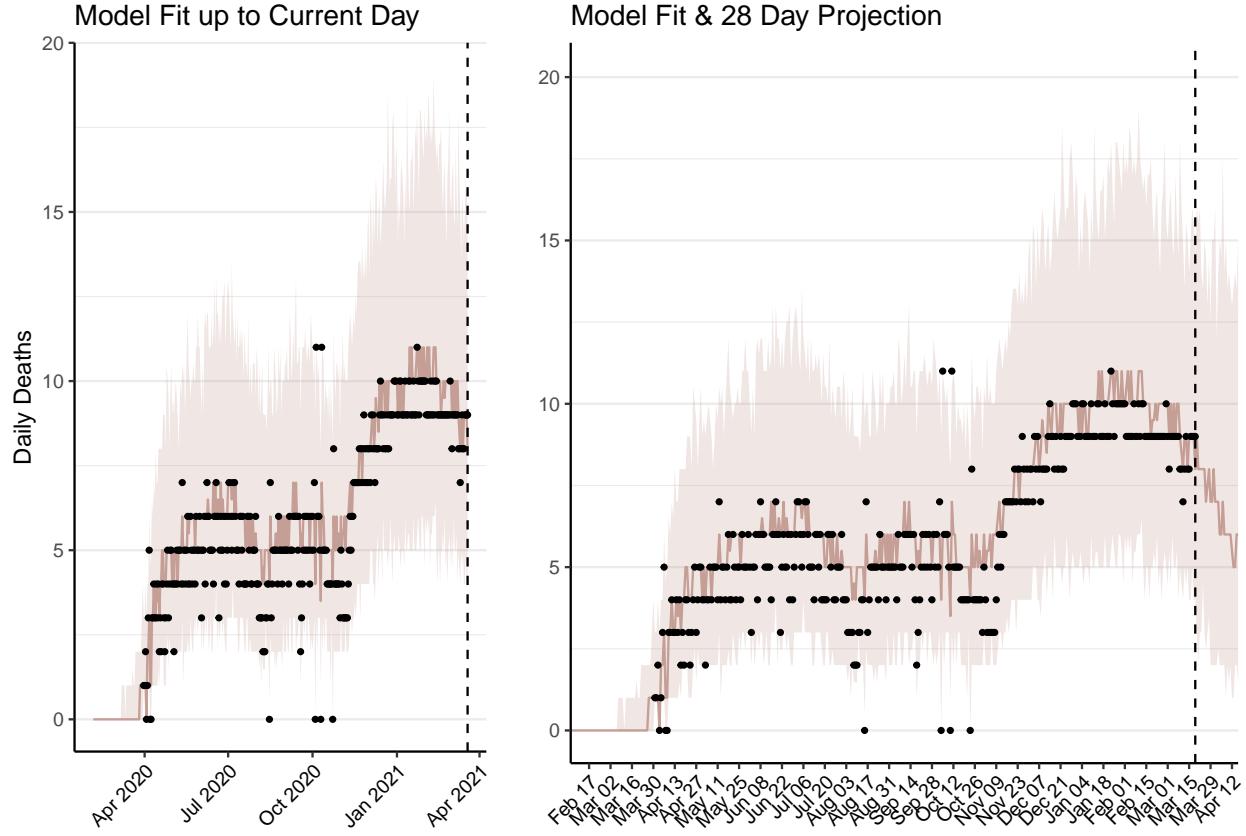


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 307 (95% CI: 295-319) patients requiring treatment with high-pressure oxygen at the current date to 217 (95% CI: 198-235) hospital beds being required on 2021-04-16 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 119 (95% CI: 114-124) patients requiring treatment with mechanical ventilation at the current date to 86 (95% CI: 79-93) by 2021-04-16. 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.**

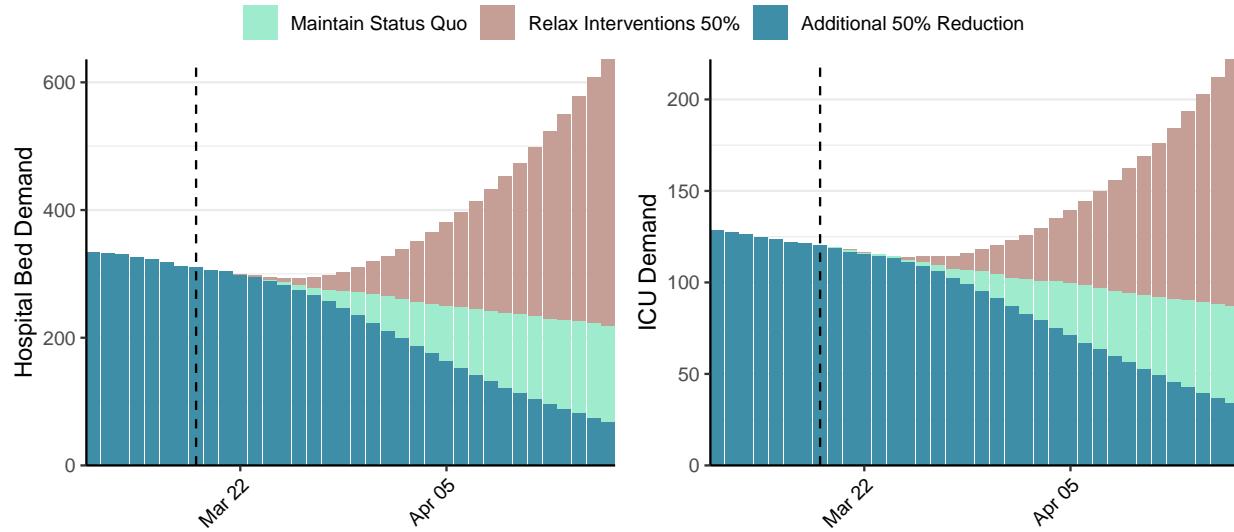


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,149 (95% CI: 2,025-2,272) at the current date to 136 (95% CI: 123-149) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,149 (95% CI: 2,025-2,272) at the current date to 8,296 (95% CI: 7,384-9,208) by 2021-04-16.

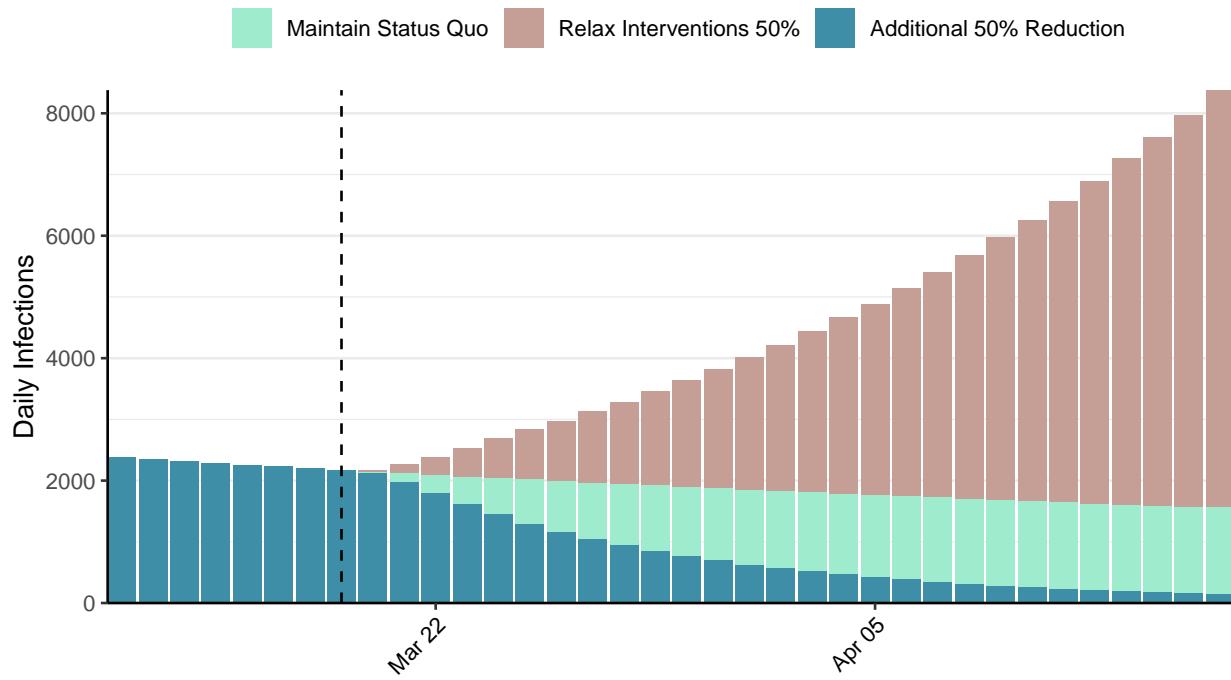


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Belize, 2021-03-19

[Download the report for Belize, 2021-03-19 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}
12,400	1	317	0	0.74 (95% CI: 0.57-1.04)

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.

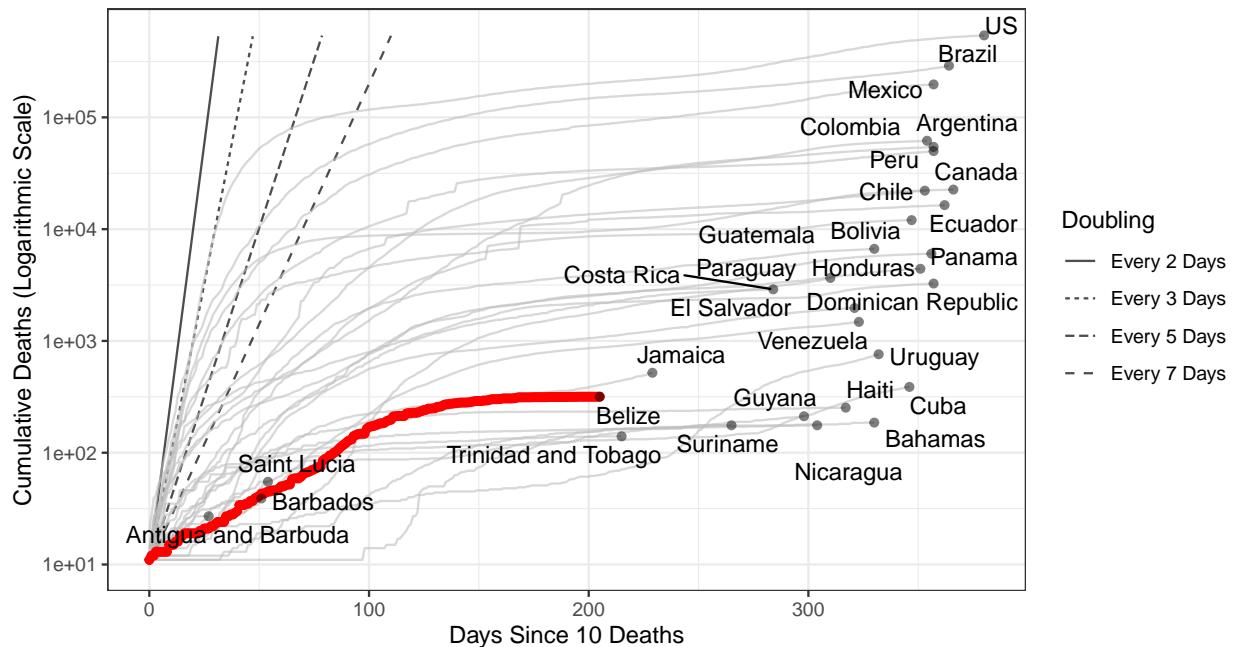


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 462 (95% CI: 408-515) 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).

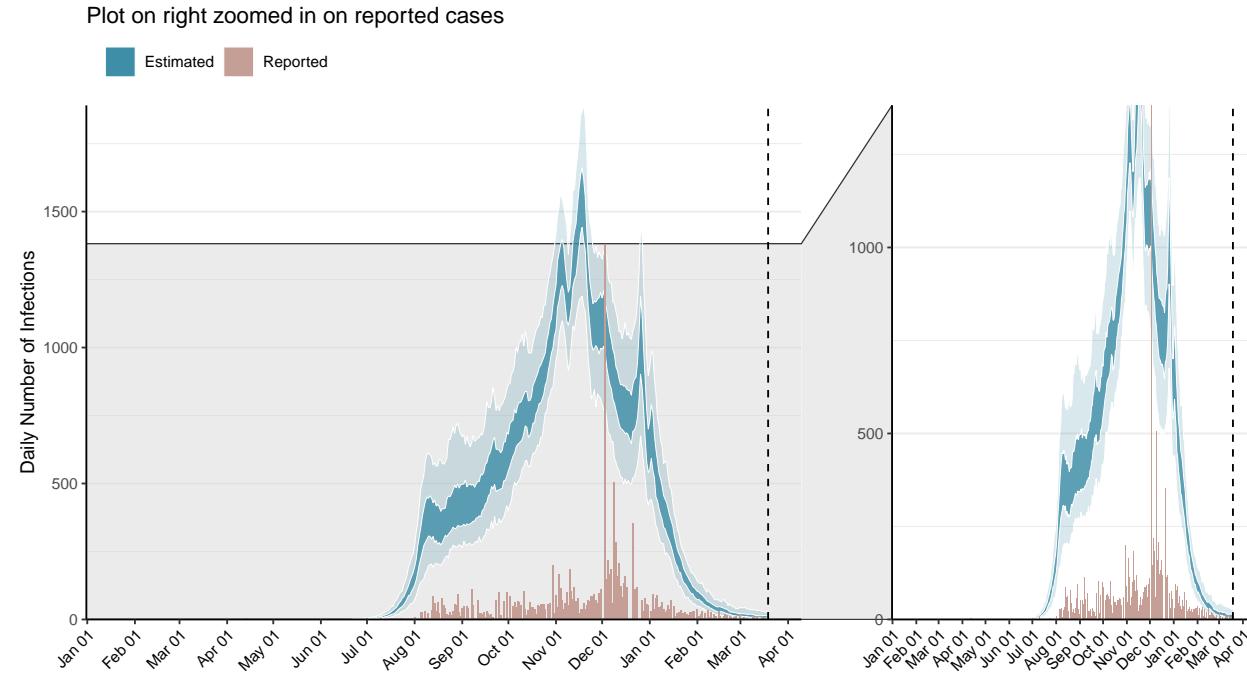


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

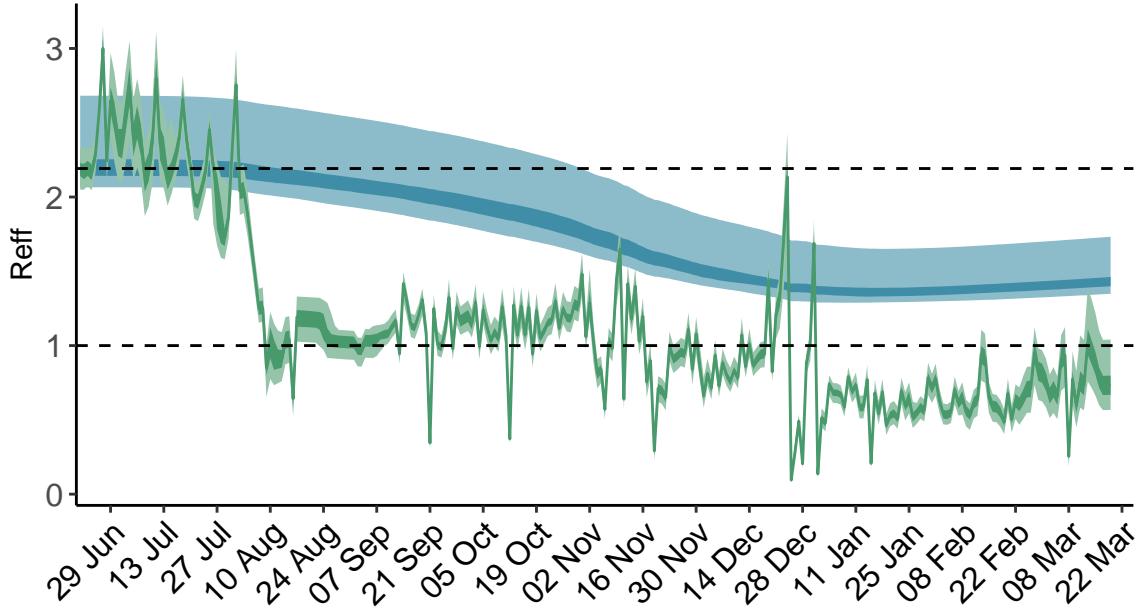


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

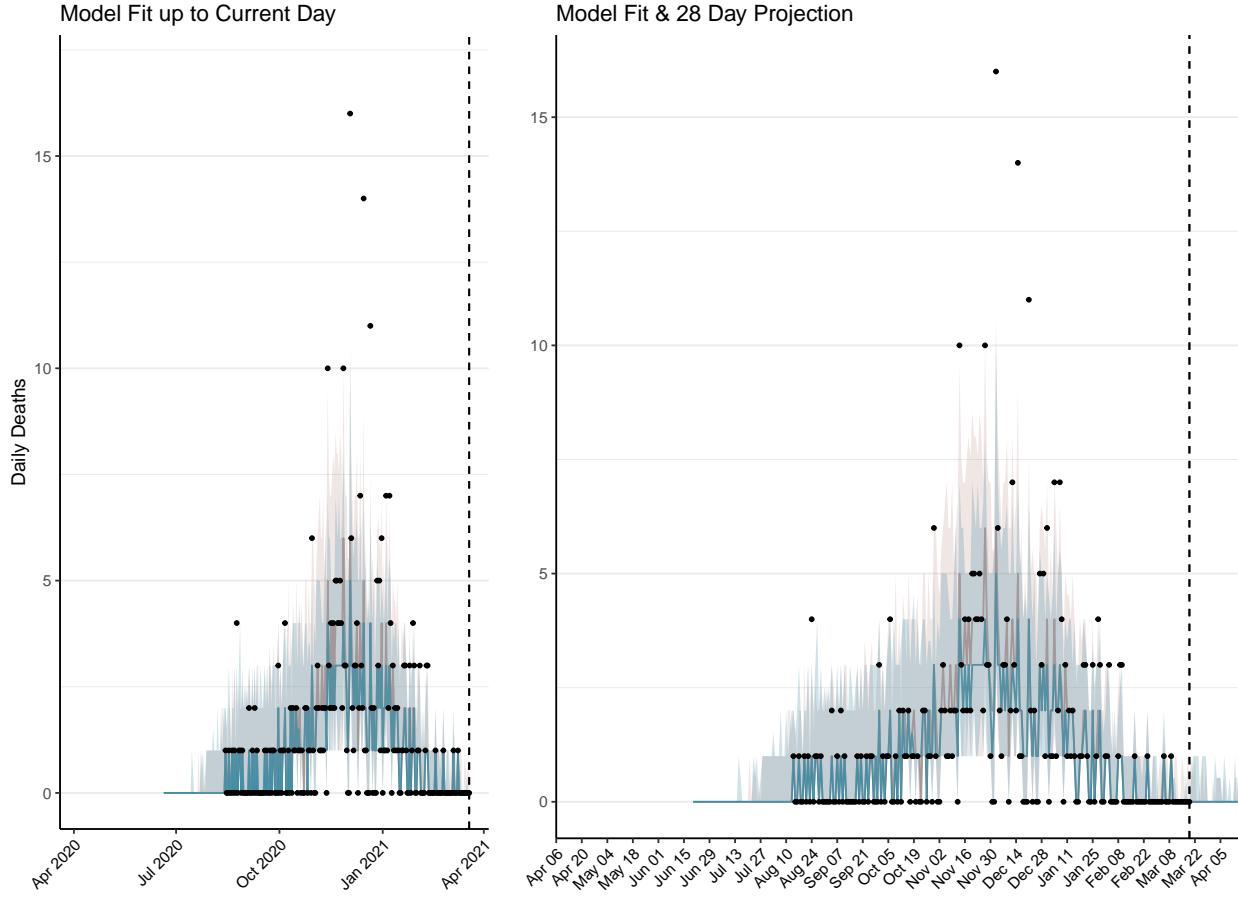


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2 (95% CI: 1-2) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 0-1) hospital beds being required on 2021-04-16 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: 0-1) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-0) by 2021-04-16. 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.**

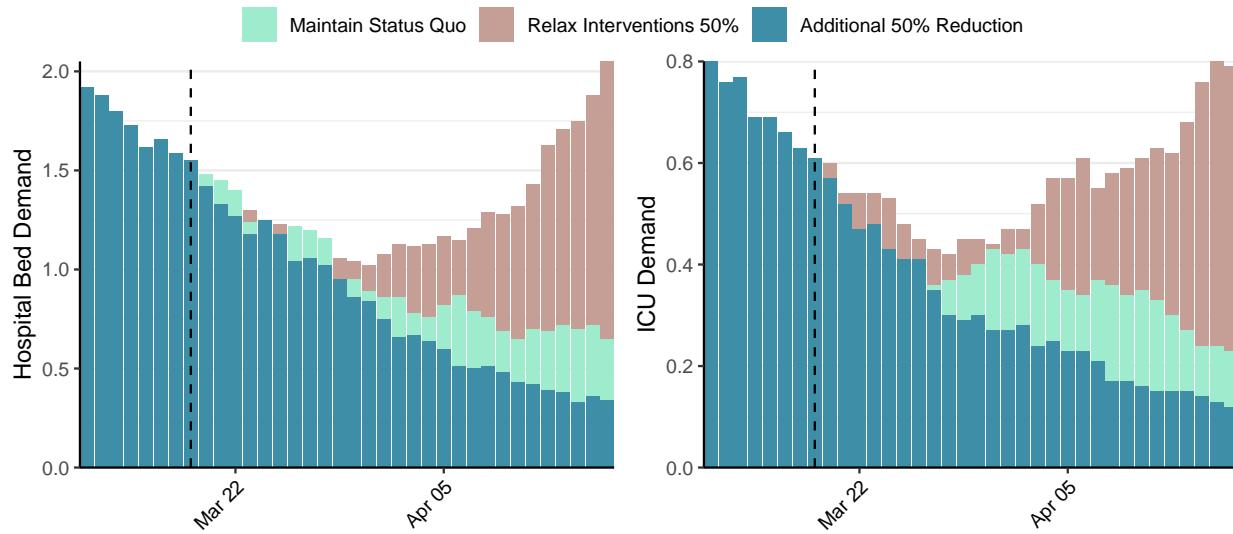


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 8-12) at the current date to 1 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10 (95% CI: 8-12) at the current date to 49 (95% CI: 19-79) by 2021-04-16.

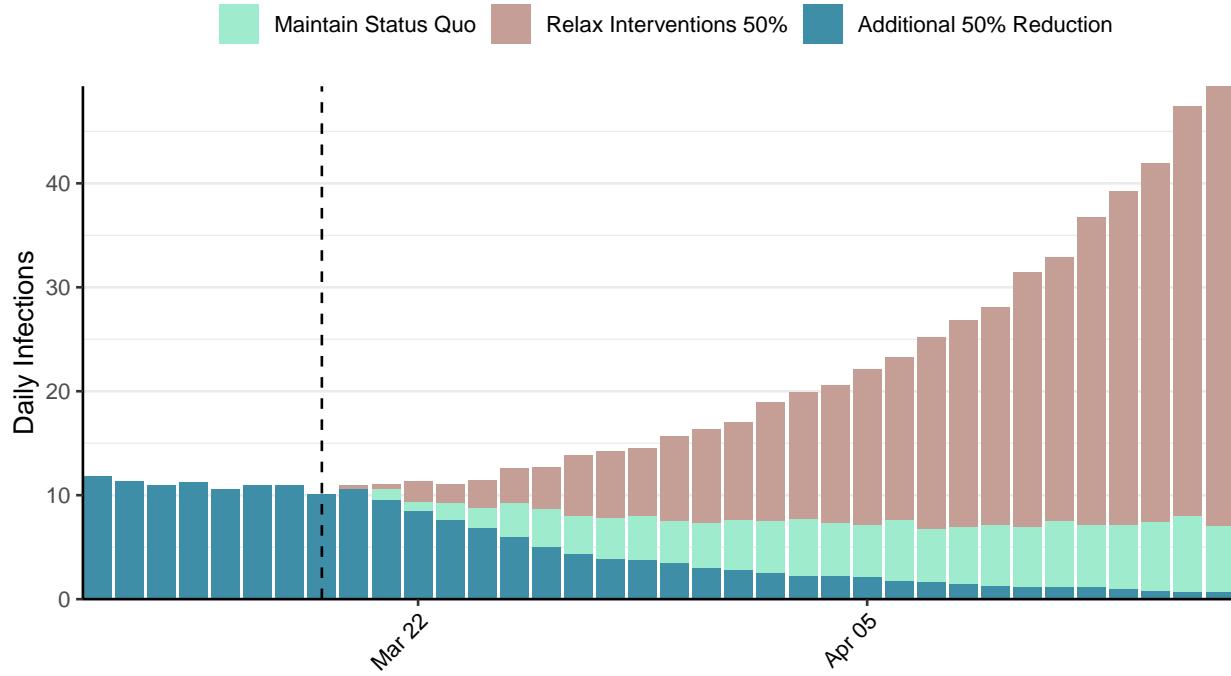


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Bolivia, 2021-03-19

[Download the report for Bolivia, 2021-03-19 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}
263,806	867	12,041	13	0.97 (95% CI: 0.84-1.08)

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.

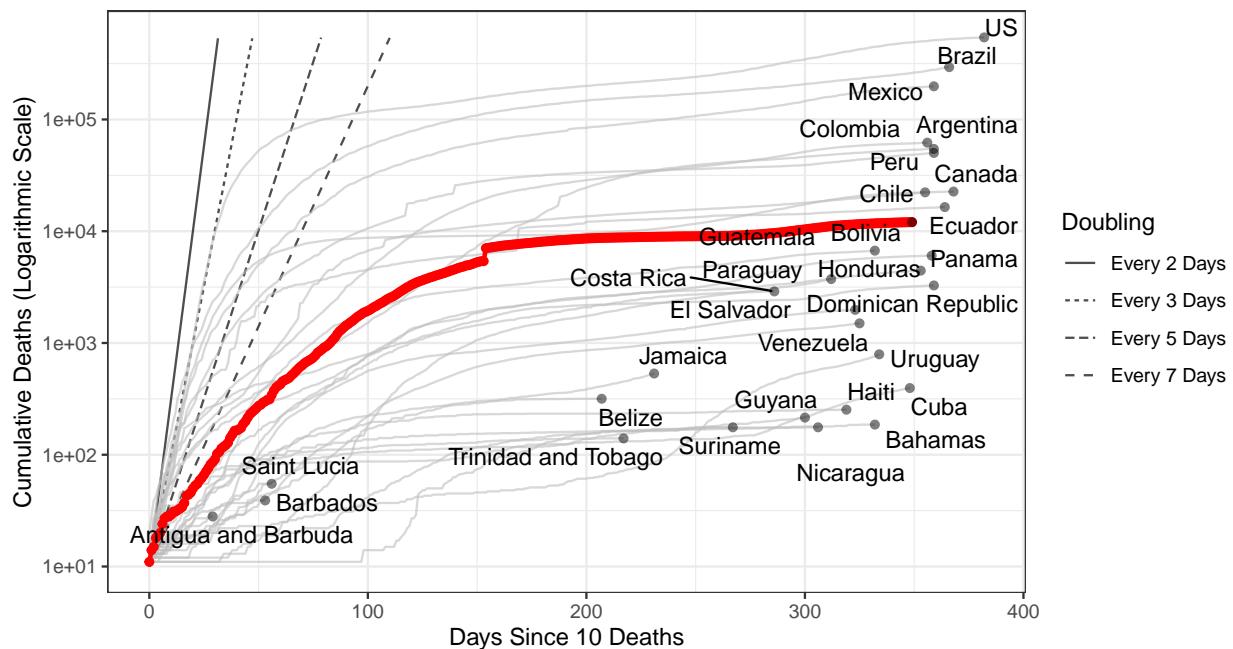


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 161,957 (95% CI: 155,253–168,660) 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).

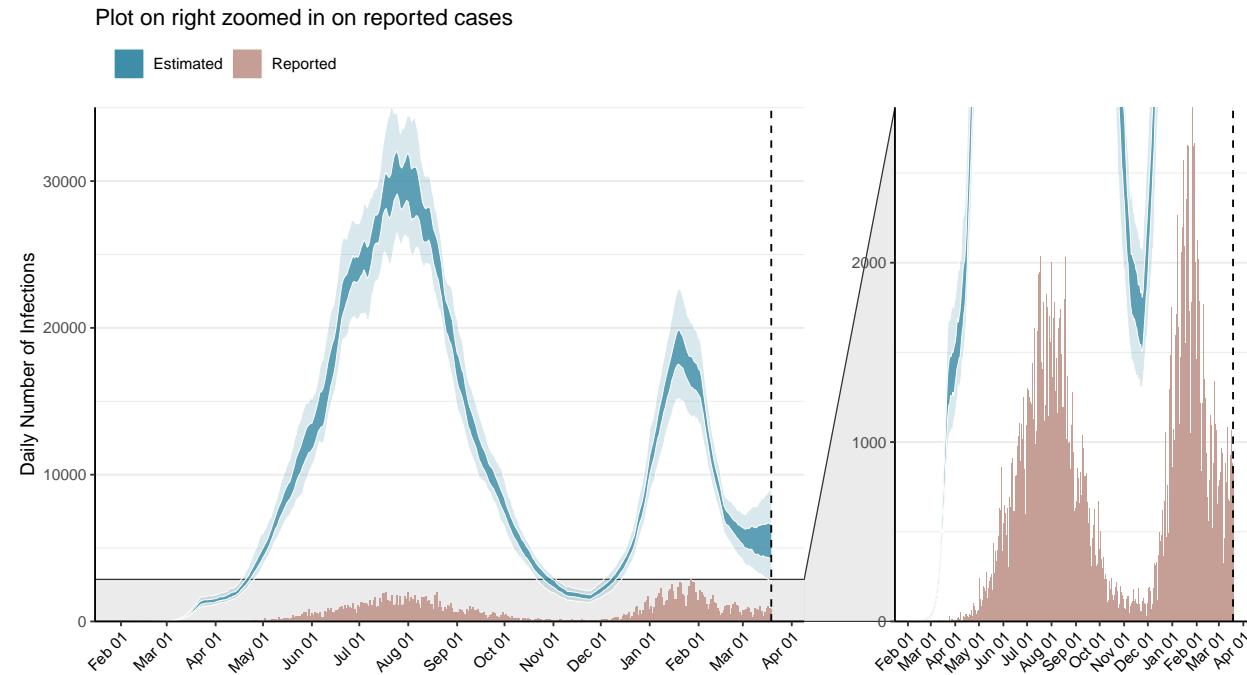


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

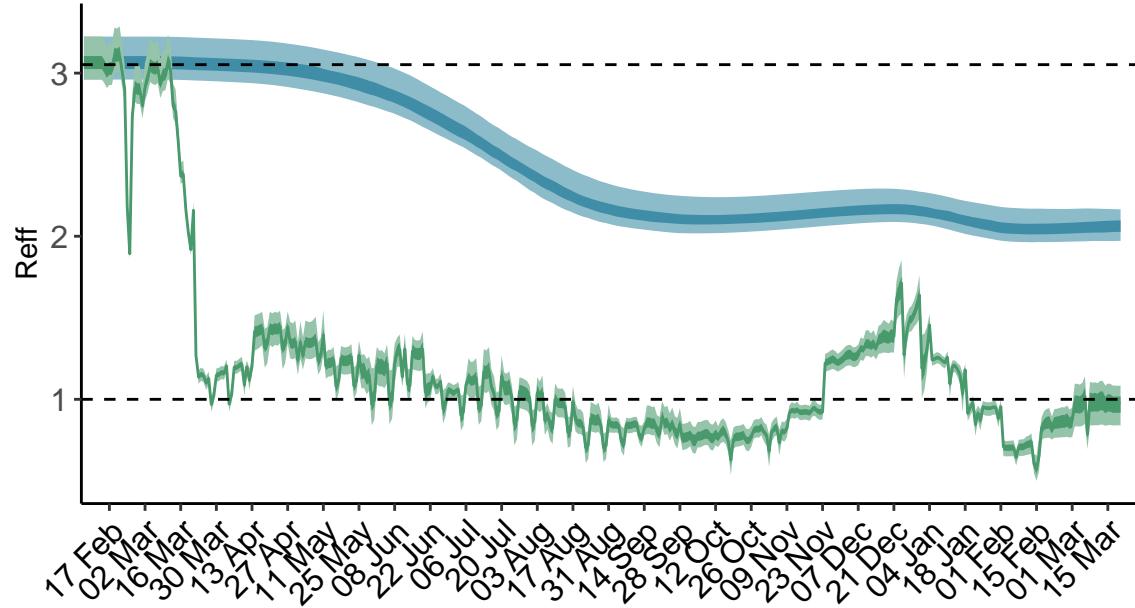


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

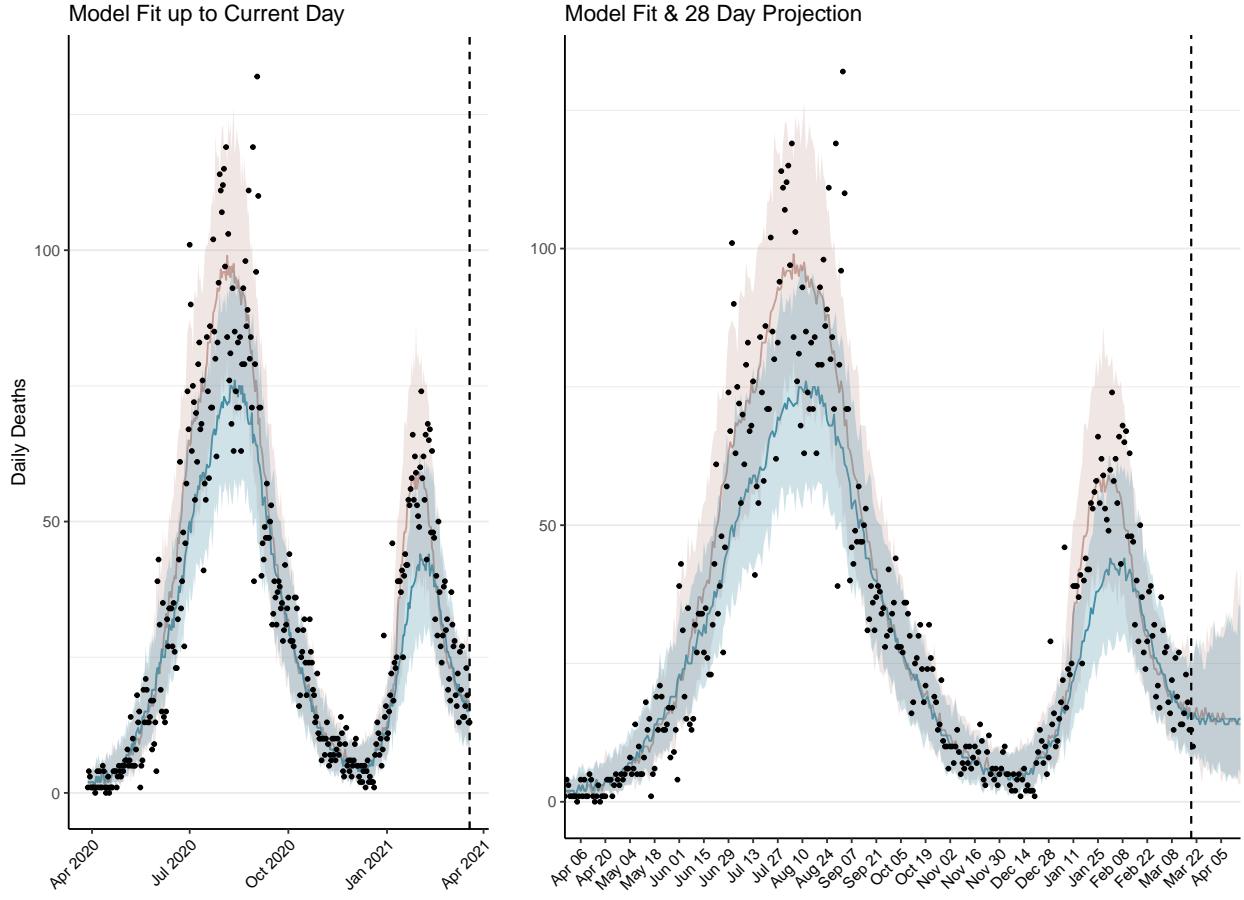


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 568 (95% CI: 542-593) patients requiring treatment with high-pressure oxygen at the current date to 544 (95% CI: 493-595) hospital beds being required on 2021-04-16 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 204 (95% CI: 195-212) patients requiring treatment with mechanical ventilation at the current date to 184 (95% CI: 170-199) by 2021-04-16. 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.**

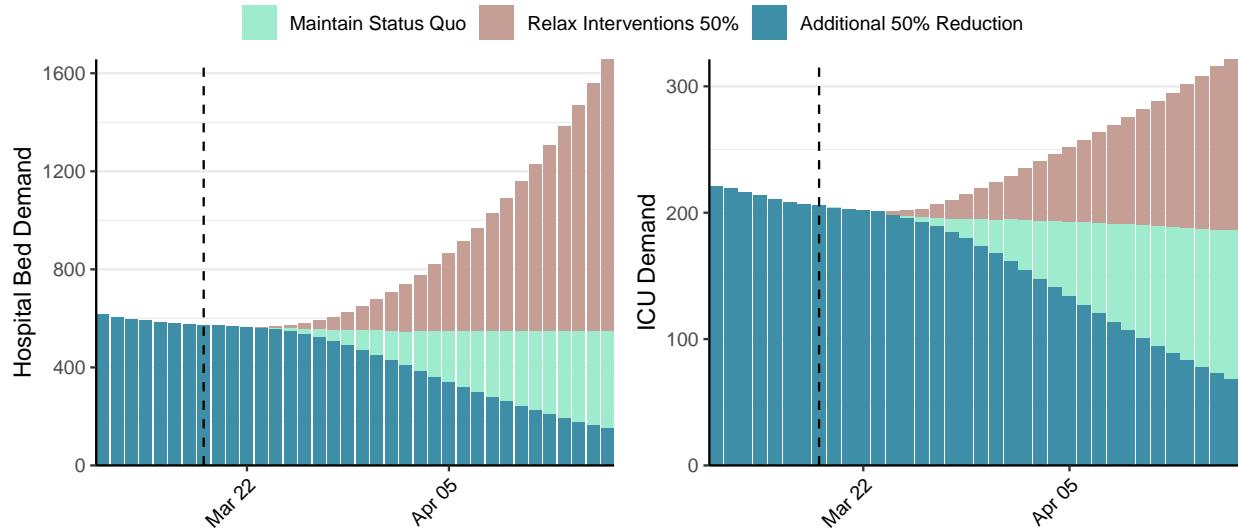


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 5,464 (95% CI: 5,107-5,821) at the current date to 469 (95% CI: 419-518) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 5,464 (95% CI: 5,107-5,821) at the current date to 29,558 (95% CI: 26,332-32,784) by 2021-04-16.

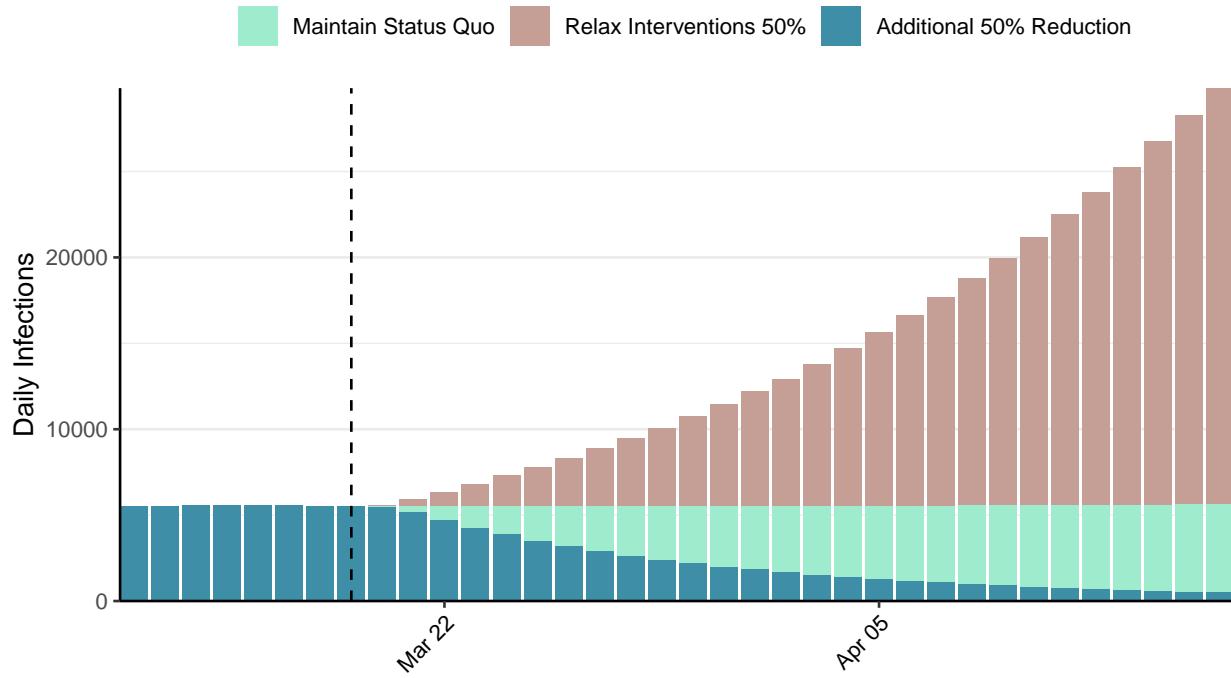


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Brazil, 2021-03-19

[Download the report for Brazil, 2021-03-19 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}
11,871,390	90,570	290,314	2,815	1.01 (95% CI: 0.94-1.08)

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.

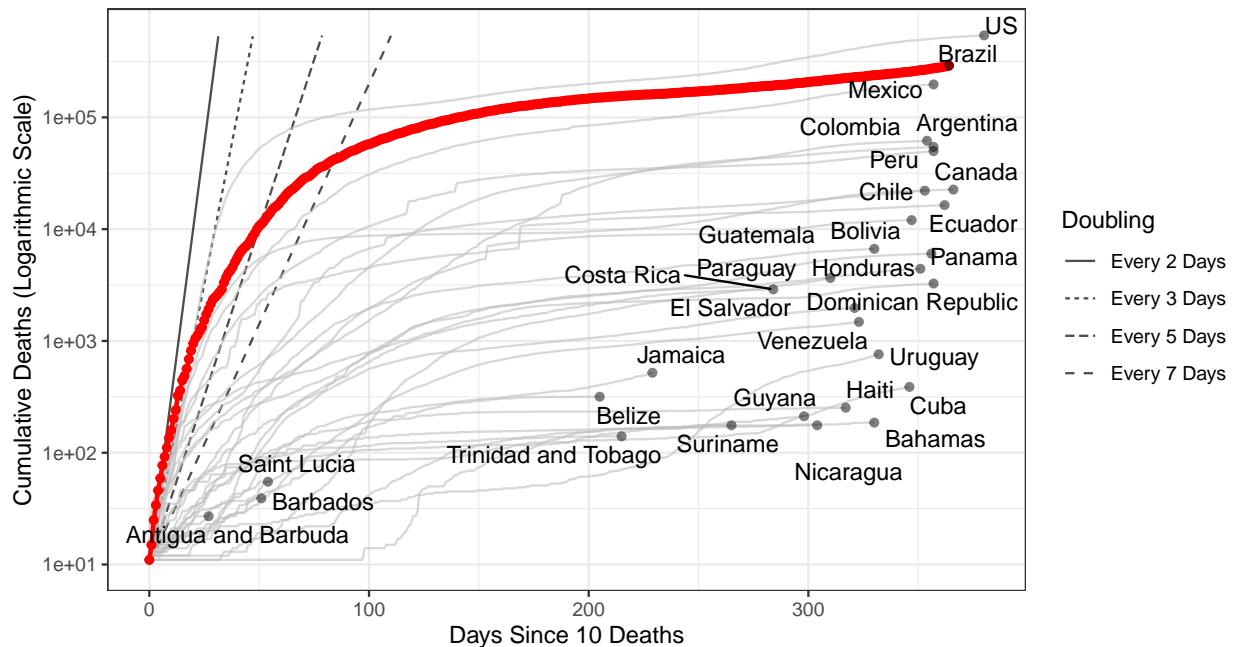


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 13,452,183 (95% CI: 13,075,736-13,828,629) 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).

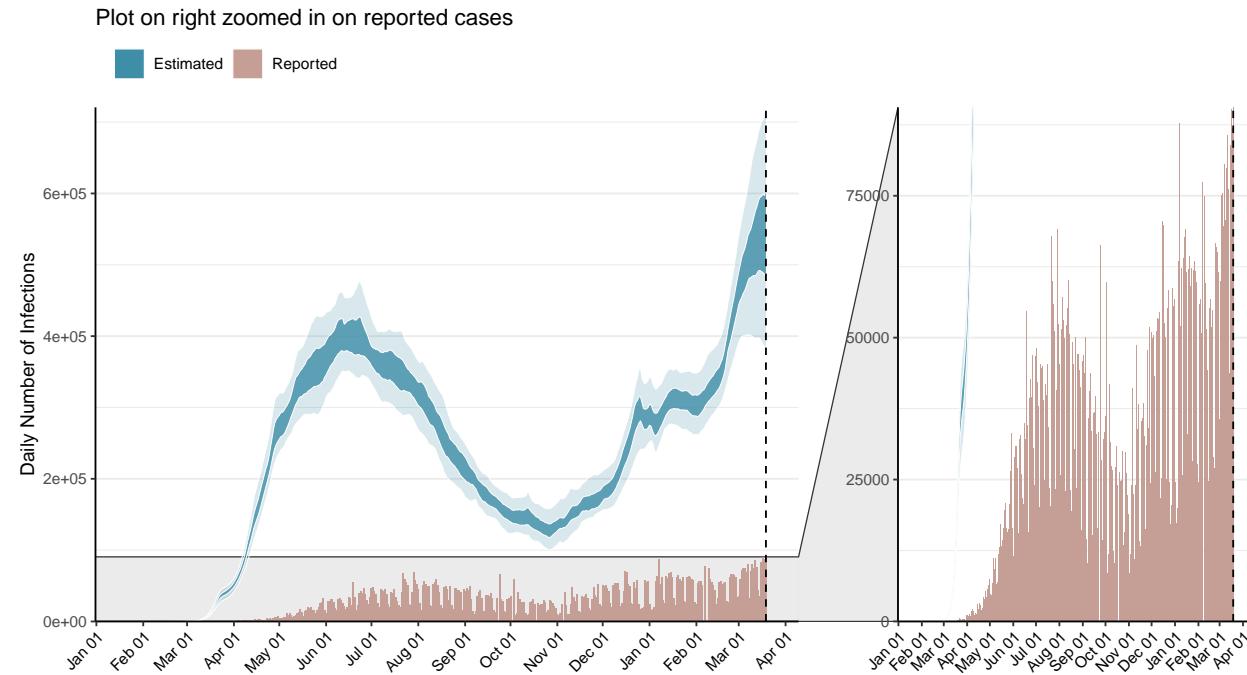


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

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

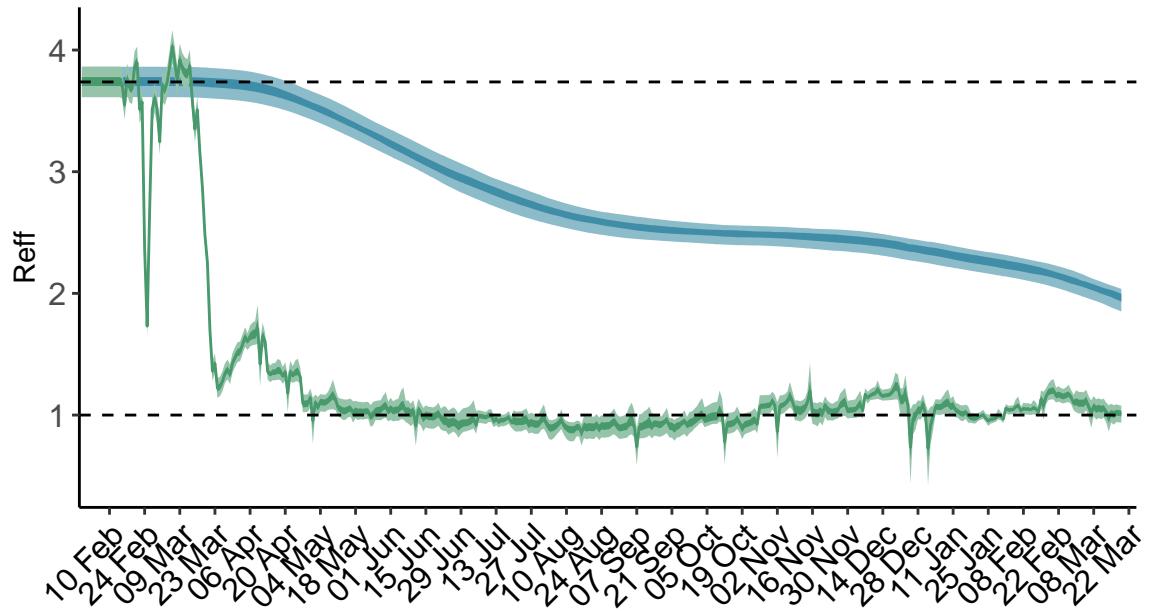


Figure 3: **Time-varying effective reproduction number, R_{eff} .** R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

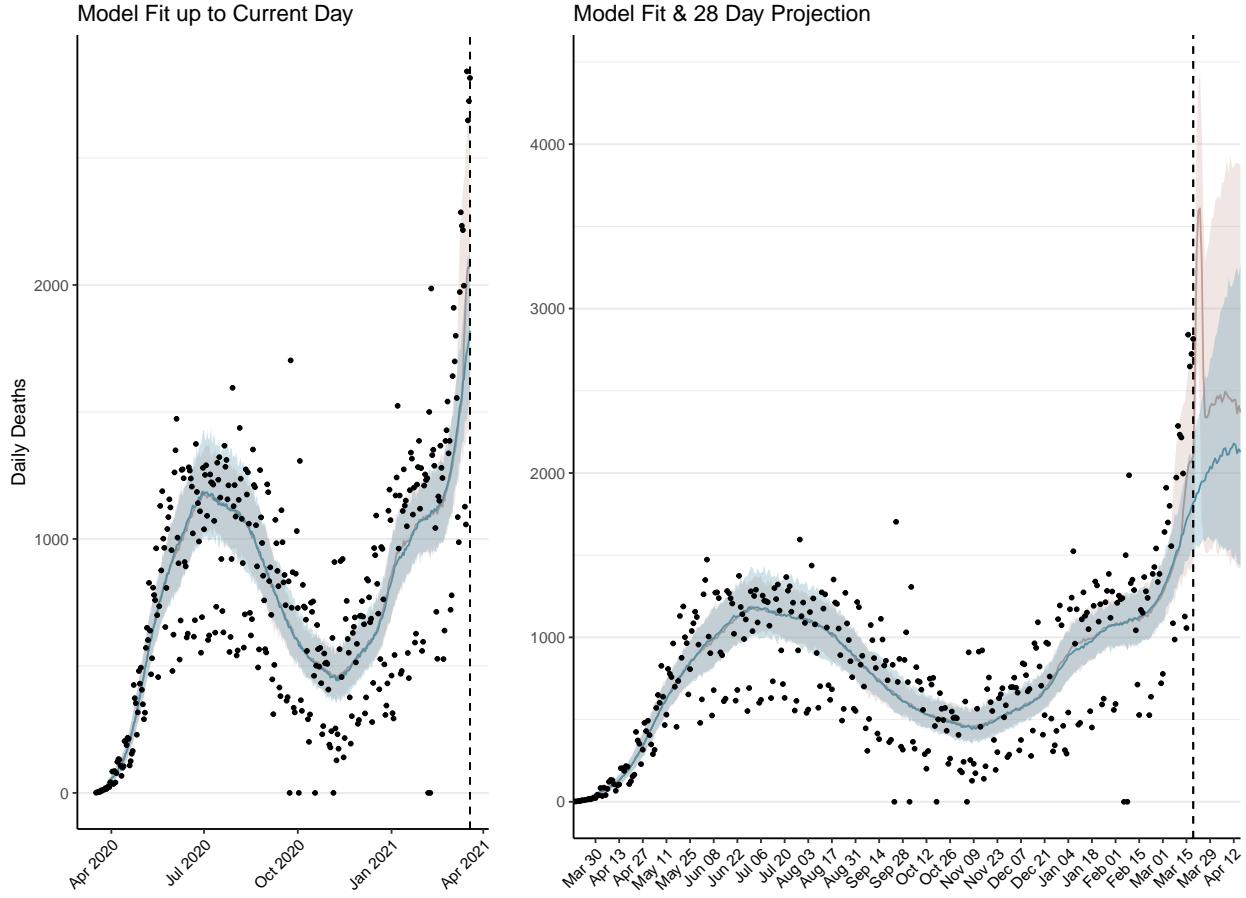


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 65,602 (95% CI: 63,693-67,510) patients requiring treatment with high-pressure oxygen at the current date to 71,170 (95% CI: 67,826-74,514) hospital beds being required on 2021-04-16 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 21,323 (95% CI: 20,869-21,777) patients requiring treatment with mechanical ventilation at the current date to 15,922 (95% CI: 15,581-16,264) by 2021-04-16. 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.

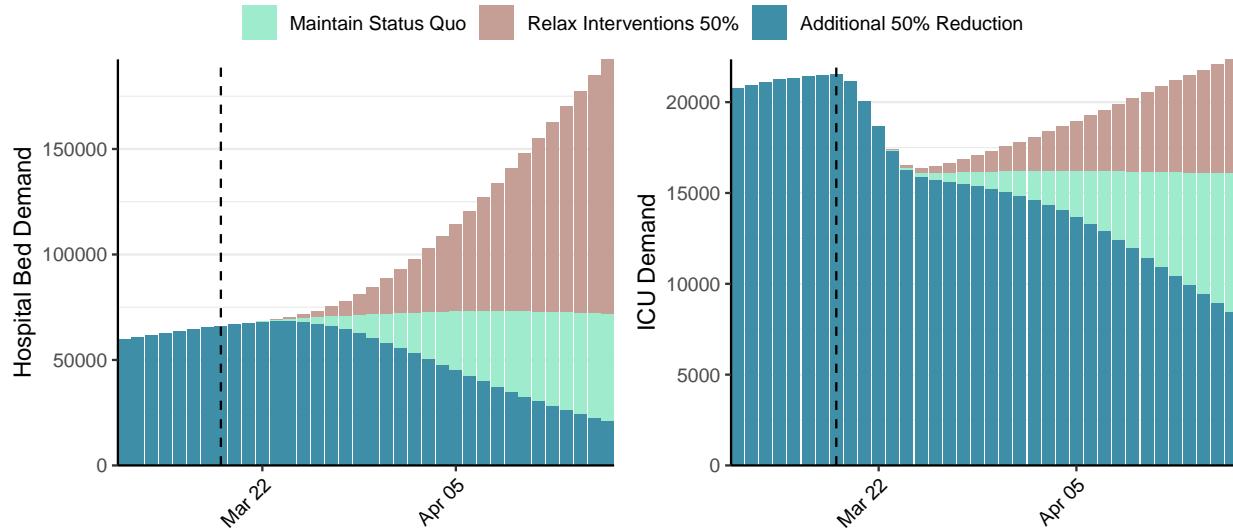


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 544,111 (95% CI: 524,029-564,194) at the current date to 48,638 (95% CI: 46,060-51,216) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 544,111 (95% CI: 524,029-564,194) at the current date to 1,815,663 (95% CI: 1,750,698-1,880,629) by 2021-04-16.

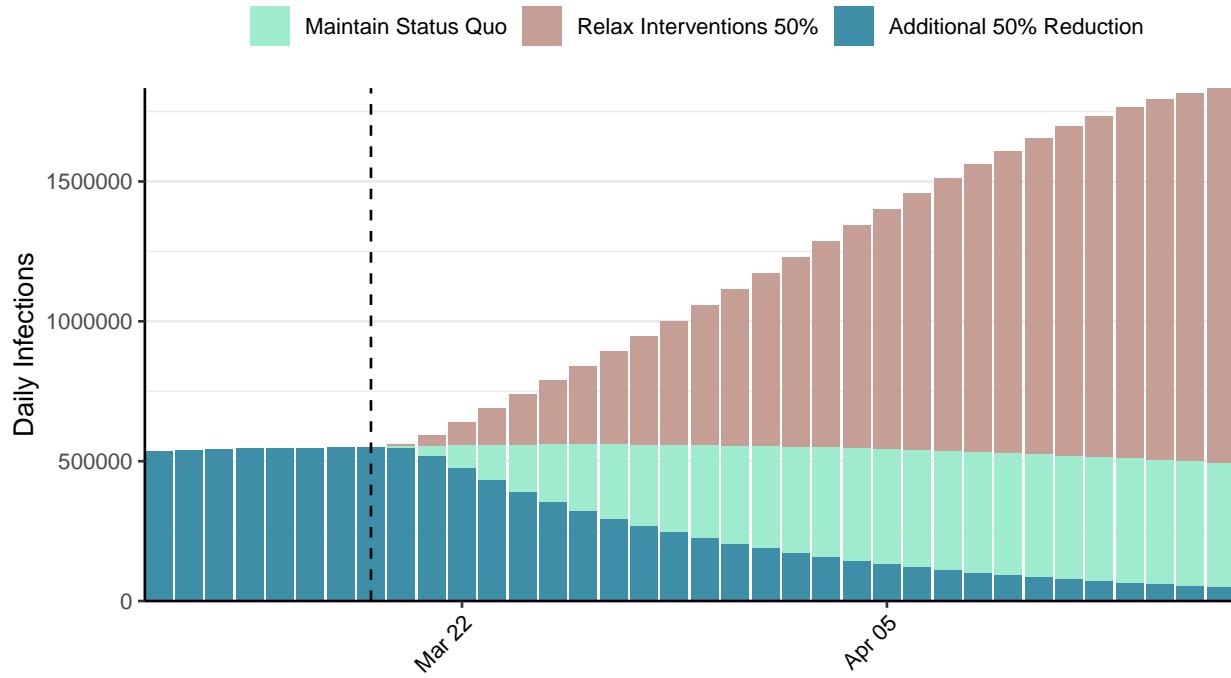


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Bhutan, 2021-03-19

[Download the report for Bhutan, 2021-03-19 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}
868	0	1	0	1.04 (95% CI: 0.81-1.32)

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. Bhutan is not shown in the following plot as only 1 deaths have been reported to date**

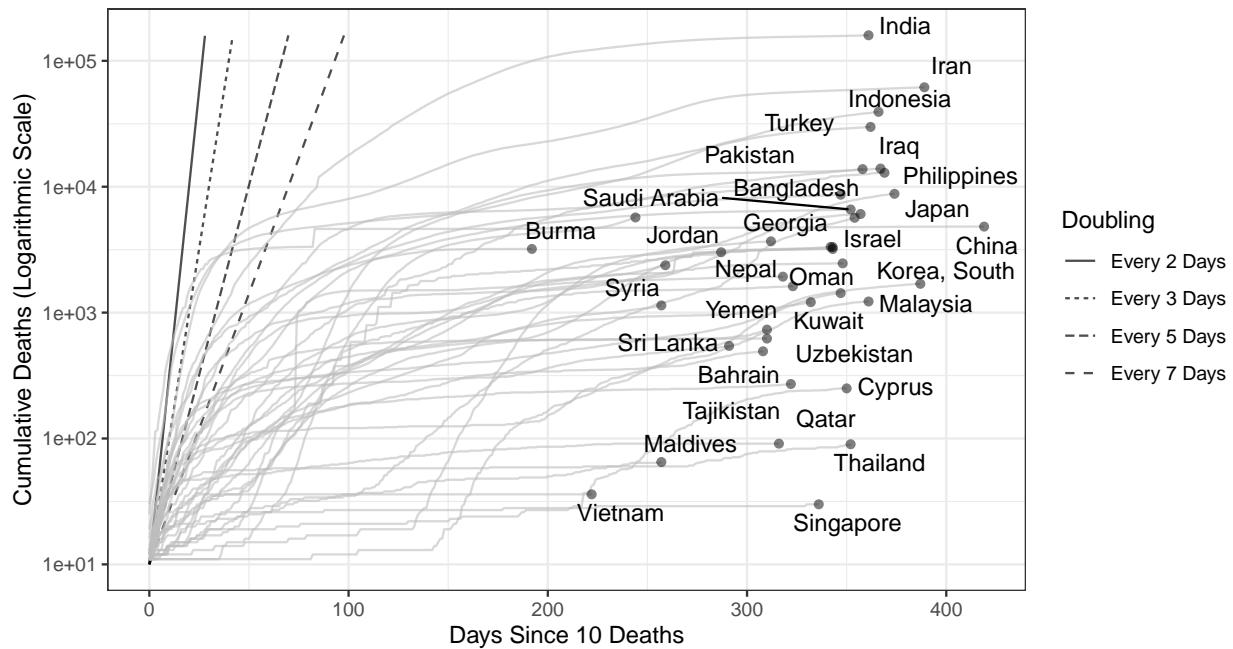


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 198 (95% CI: 60-335) 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).

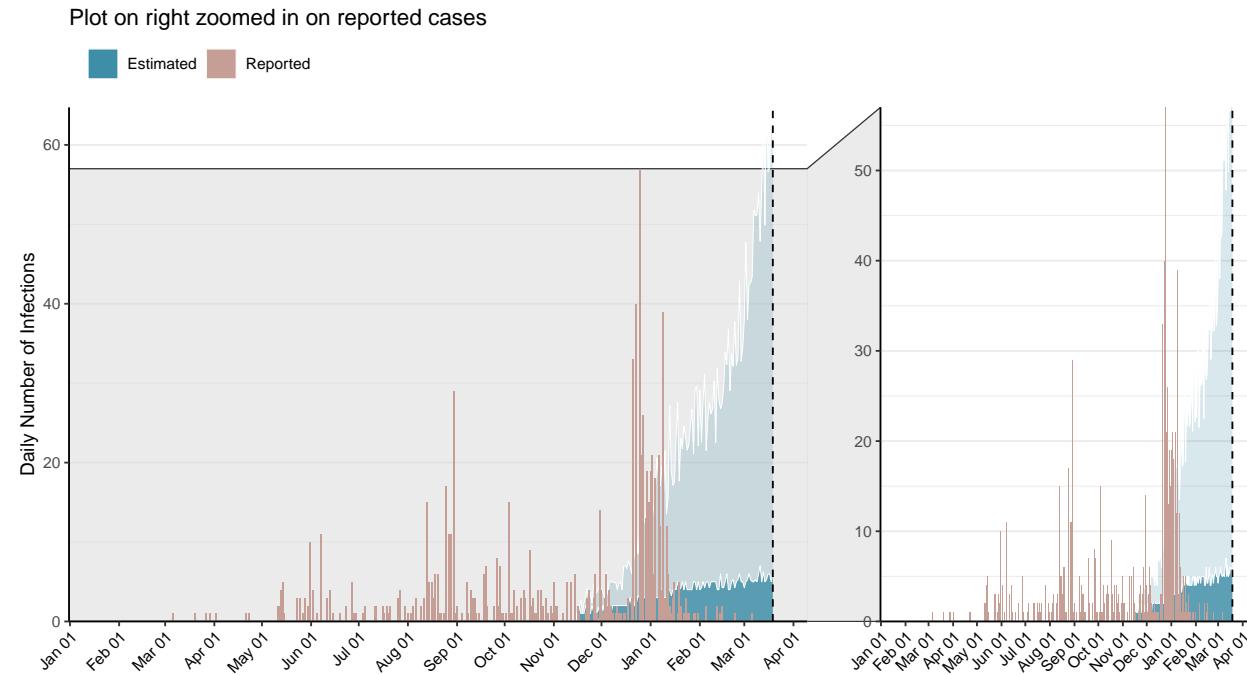


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

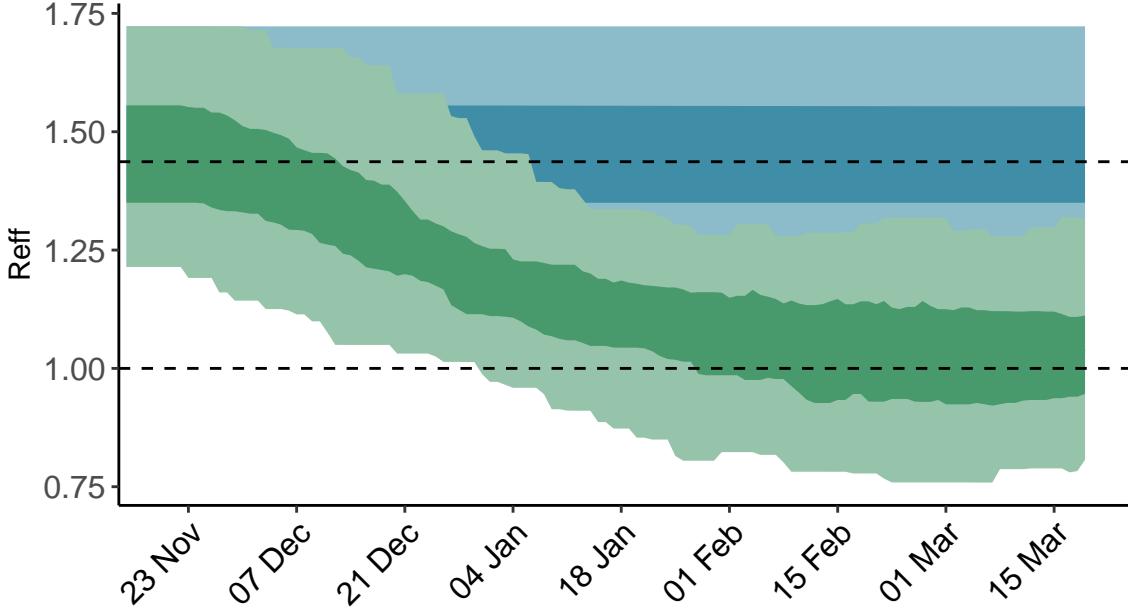


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

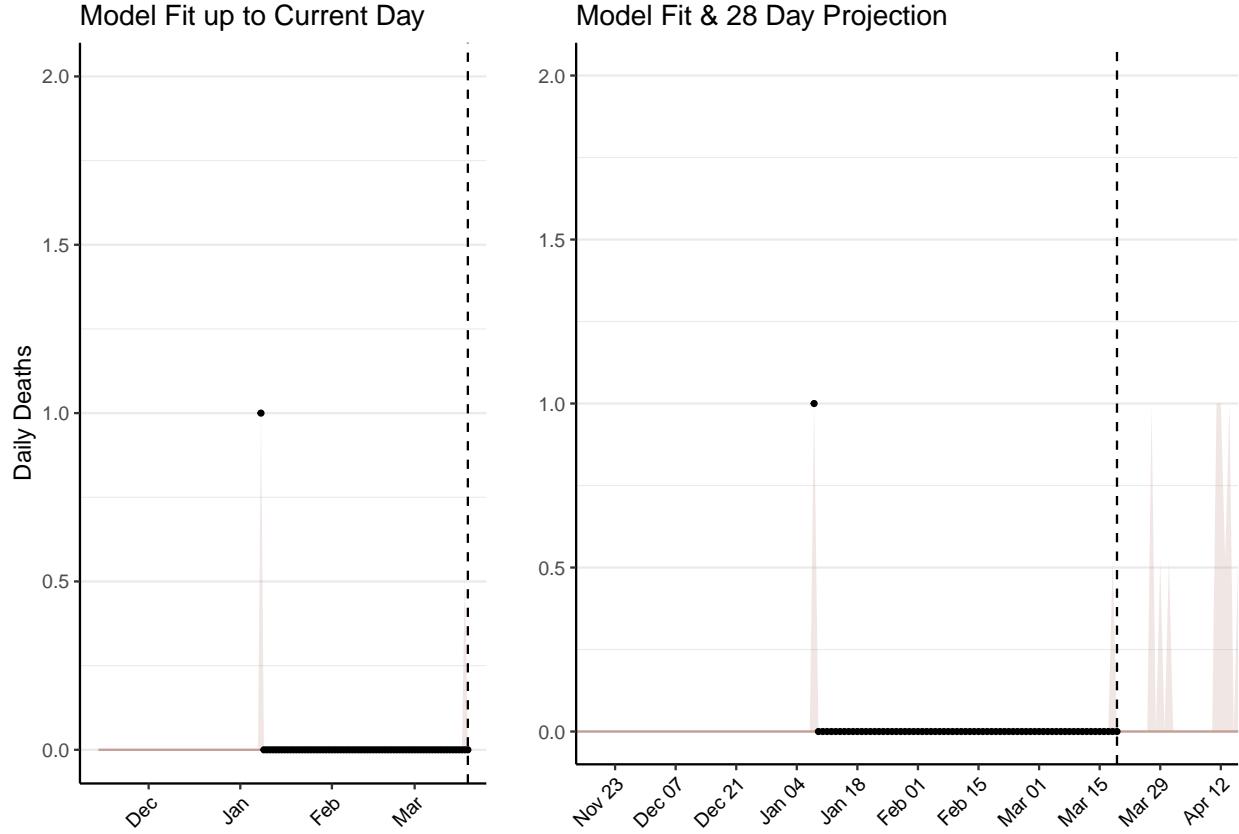


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1 (95% CI: 0-2) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 0-3) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

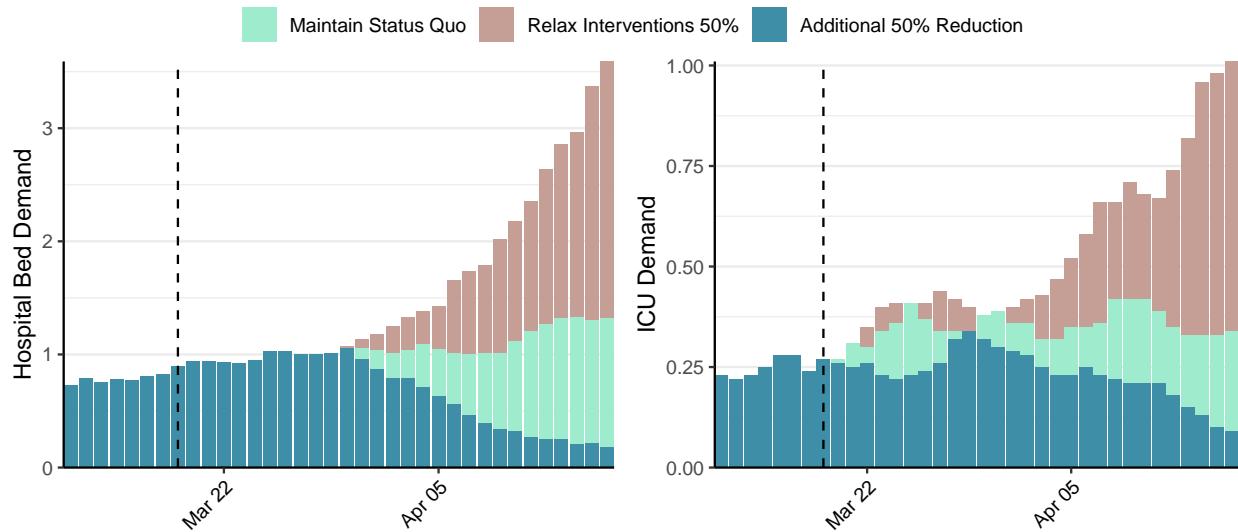


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 3-15) at the current date to 1 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 9 (95% CI: 3-15) at the current date to 69 (95% CI: -12-151) by 2021-04-16.

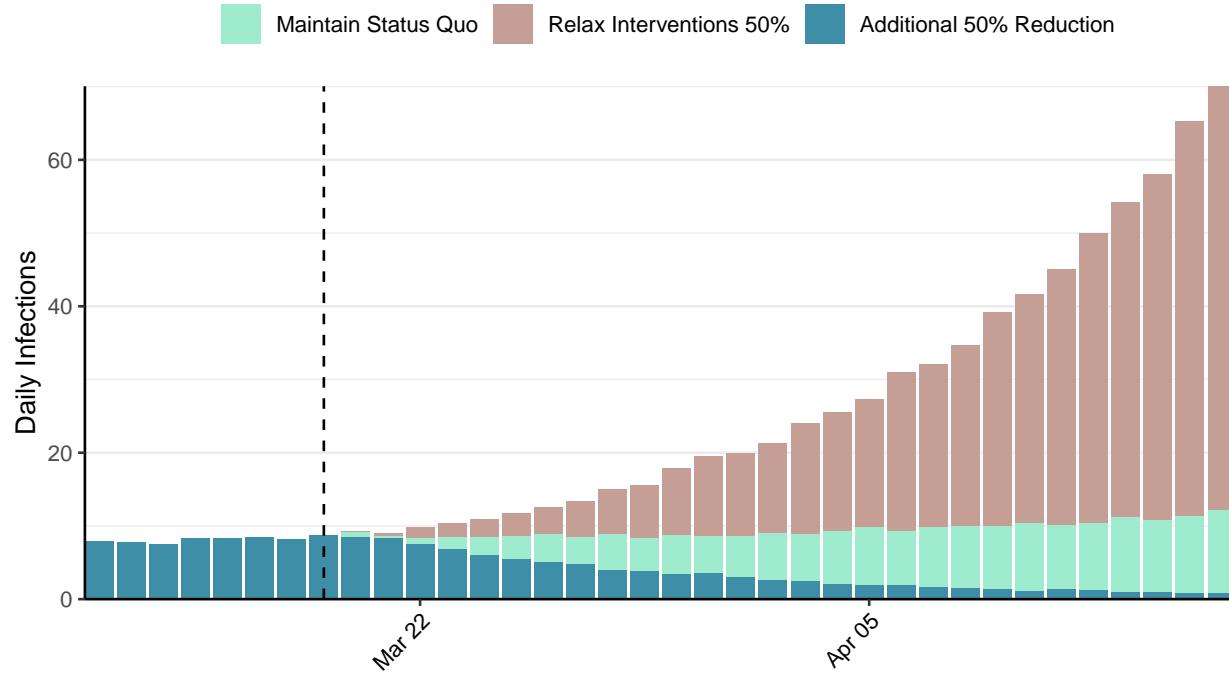


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Botswana, 2021-03-19

[Download the report for Botswana, 2021-03-19 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}
35,493	0	458	0	0.93 (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.

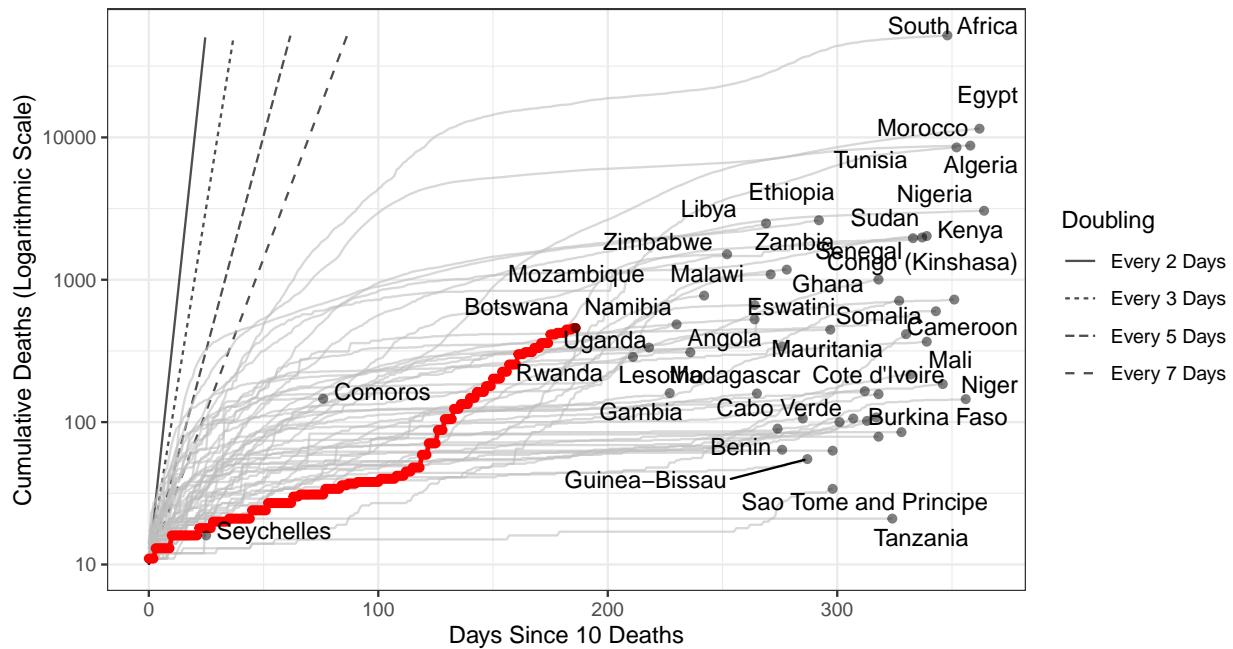


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 85,058 (95% CI: 78,234-91,882) 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).

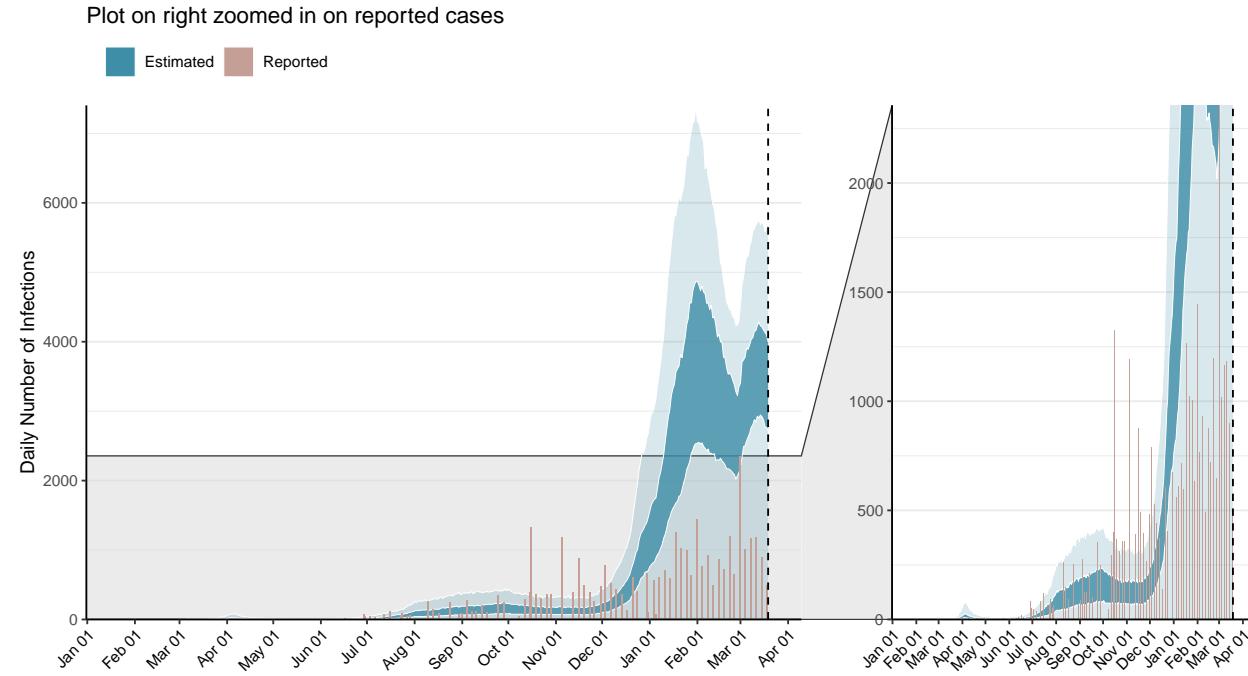


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

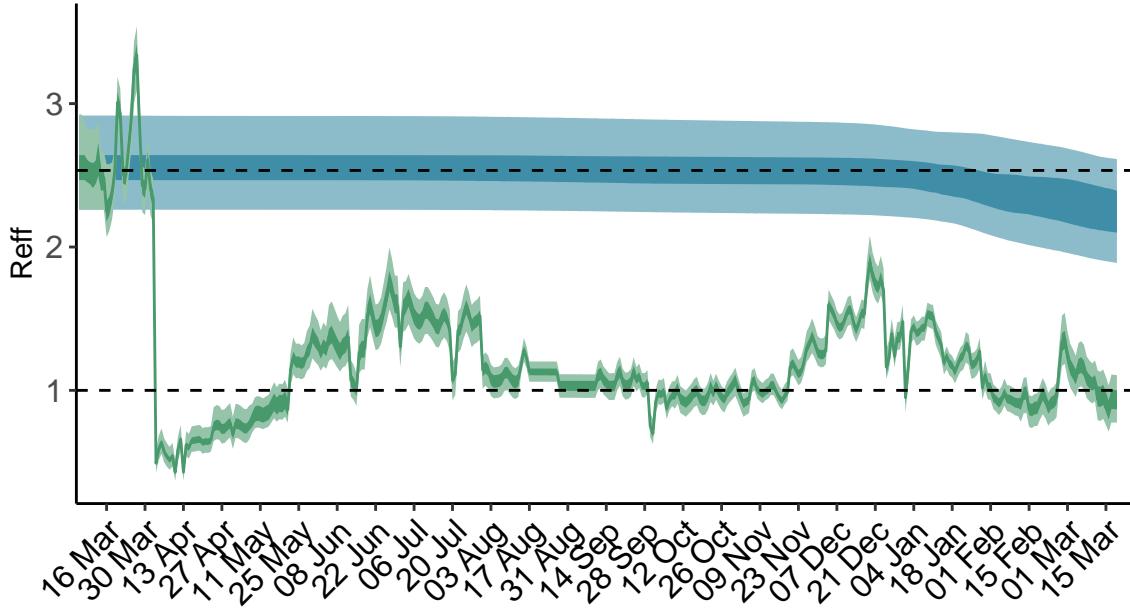


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

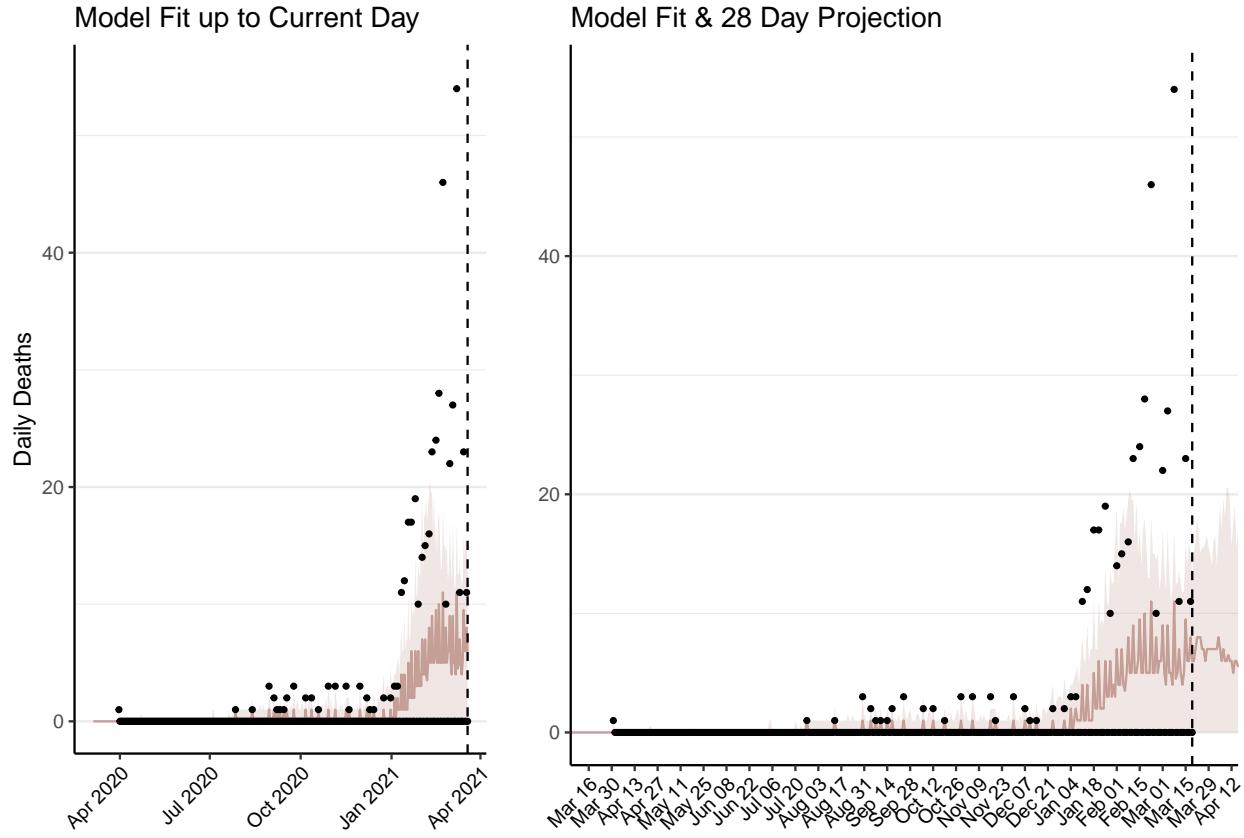


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 290 (95% CI: 267-314) patients requiring treatment with high-pressure oxygen at the current date to 246 (95% CI: 220-272) hospital beds being required on 2021-04-16 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 110 (95% CI: 102-119) patients requiring treatment with mechanical ventilation at the current date to 95 (95% CI: 86-104) by 2021-04-16. 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.**

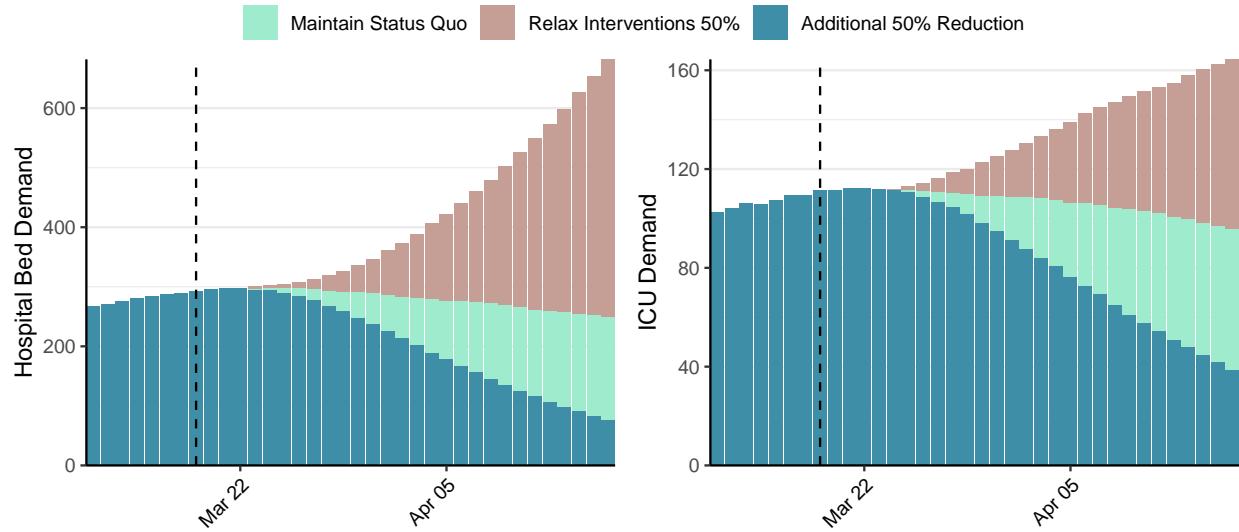


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 3,208 (95% CI: 2,938-3,479) at the current date to 220 (95% CI: 193-248) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,208 (95% CI: 2,938-3,479) at the current date to 11,296 (95% CI: 9,942-12,651) by 2021-04-16.

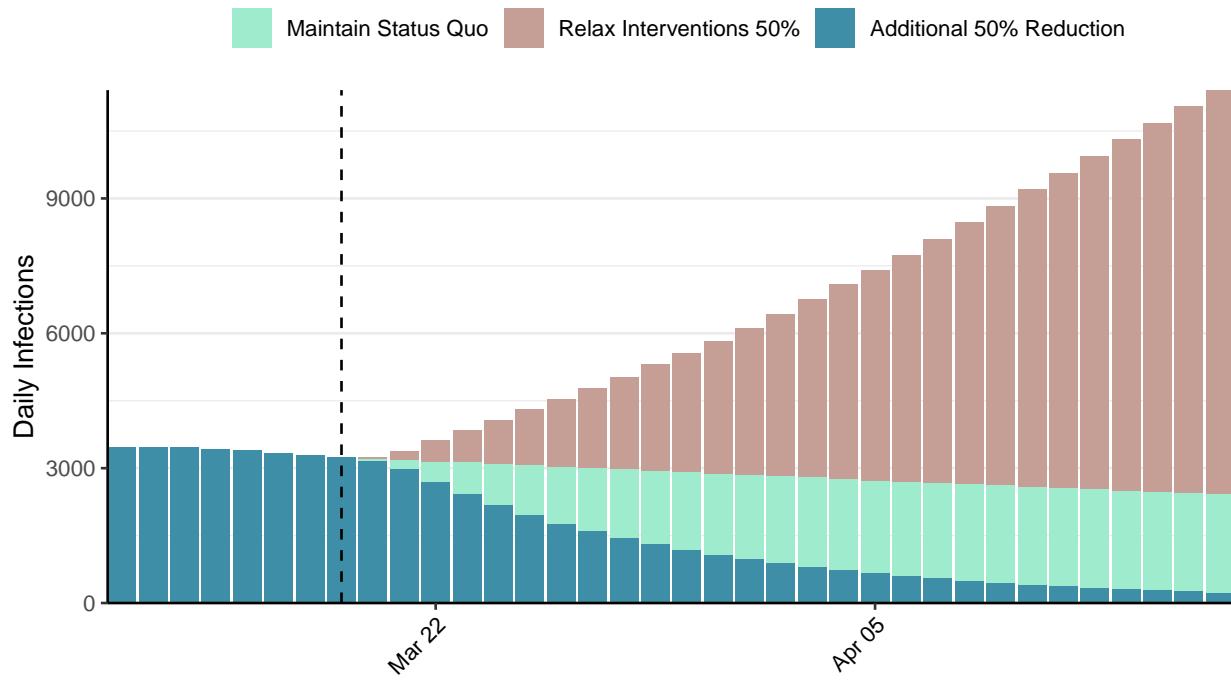


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Central African Republic, 2021-03-19

[Download the report for Central African Republic, 2021-03-19 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}
5,075	0	64	0	0.54 (95% CI: 0.33-0.83)

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.

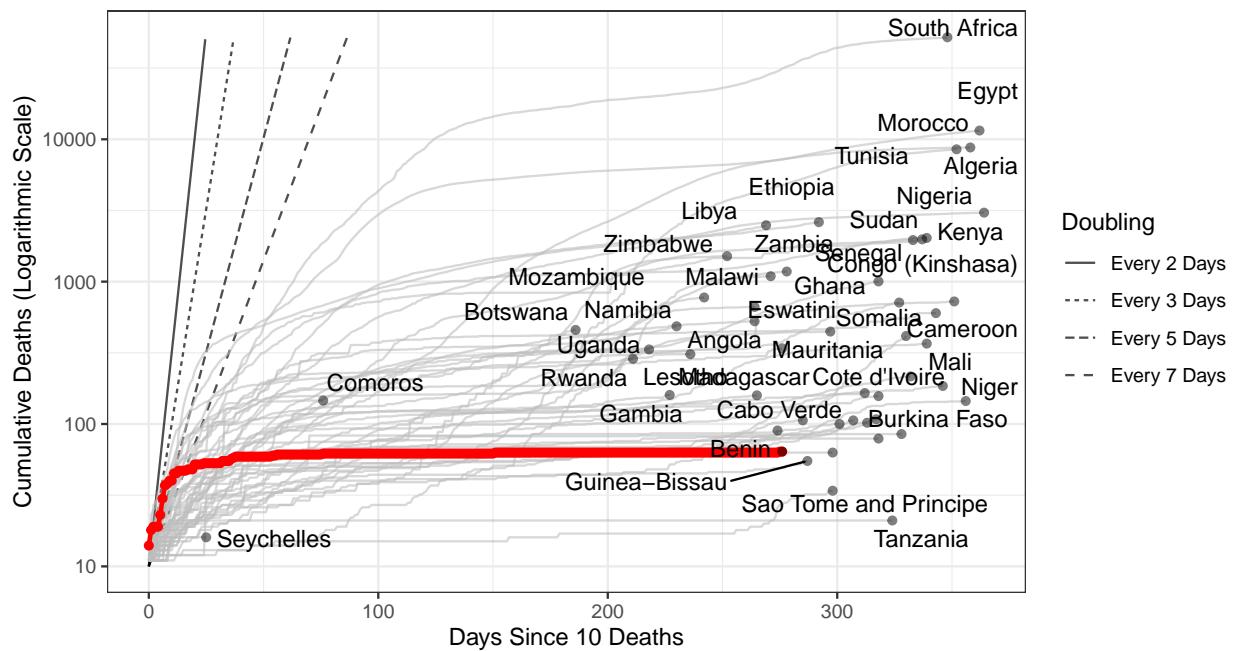


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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: 0-0) 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).

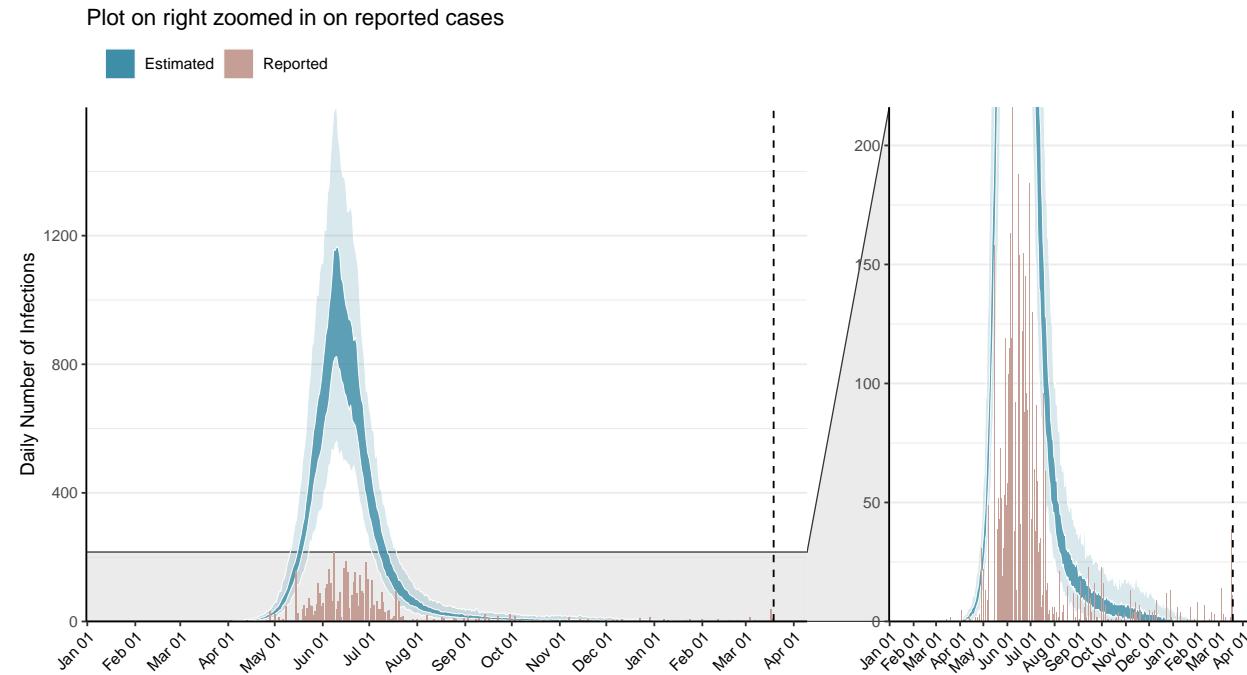


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

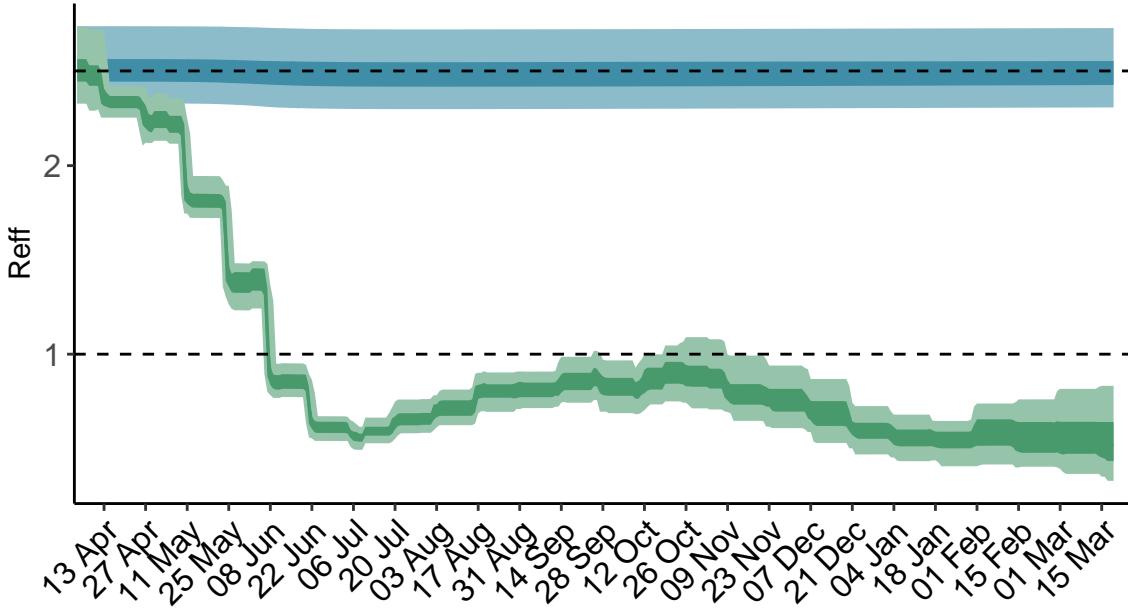


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

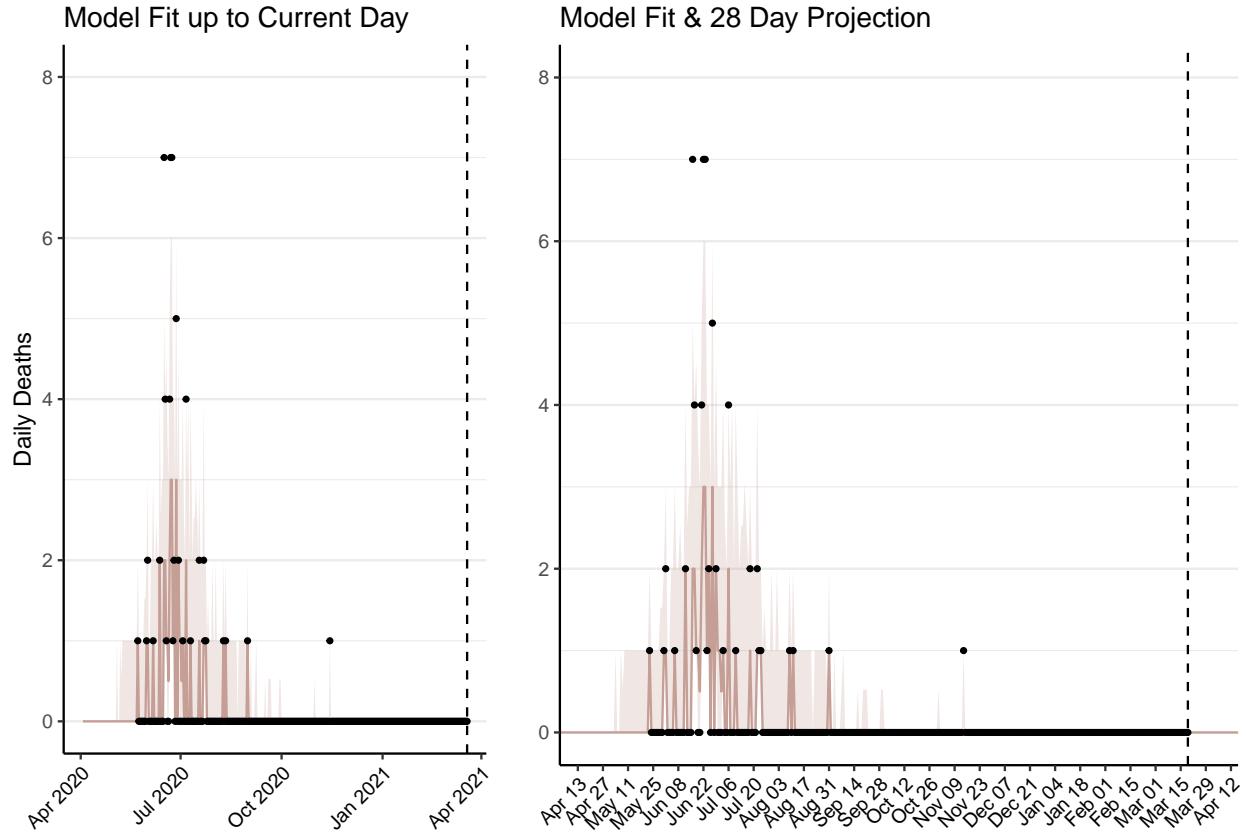


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

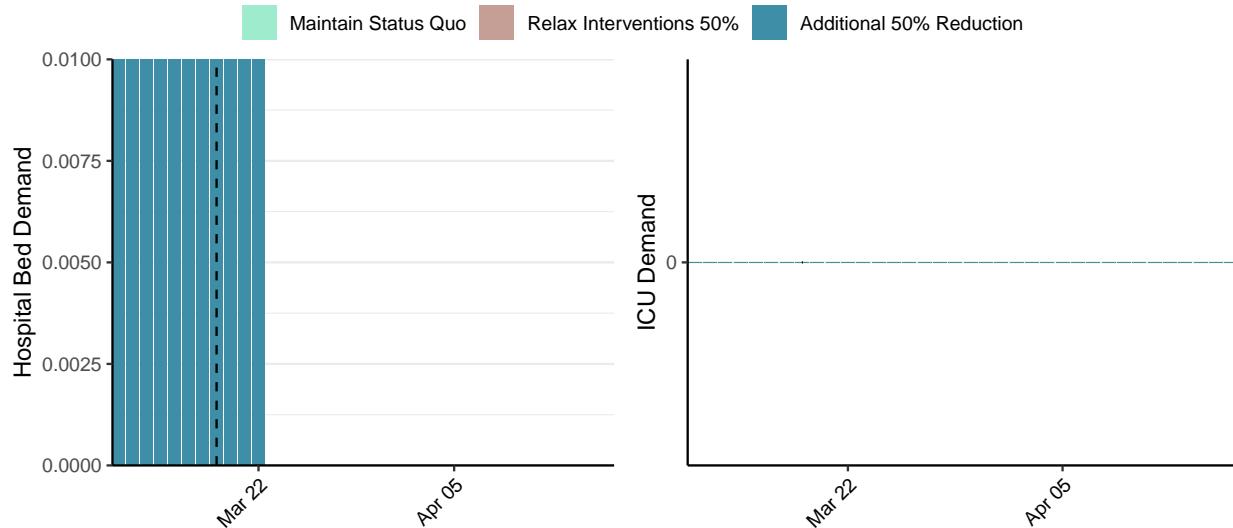


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2021-04-16. 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 2021-04-16.

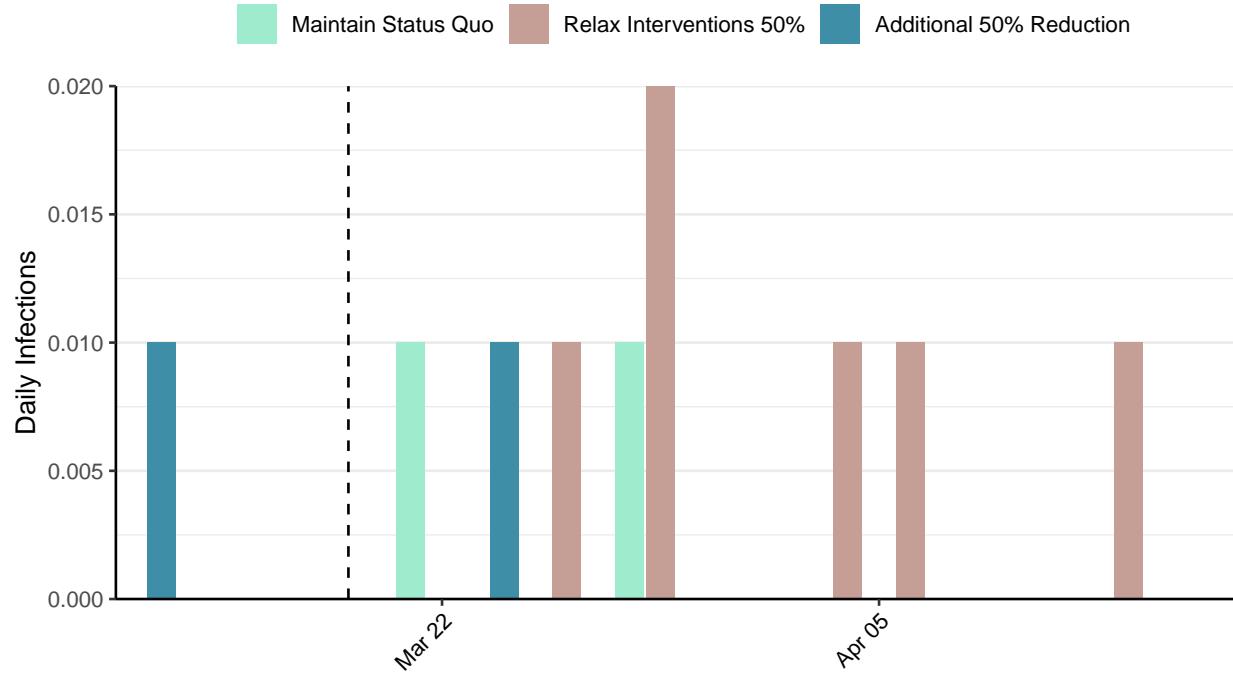


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Chile, 2021-03-19

[Download the report for Chile, 2021-03-19 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}
925,088	7,036	22,180	93	1.15 (95% CI: 1.03-1.26)

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.

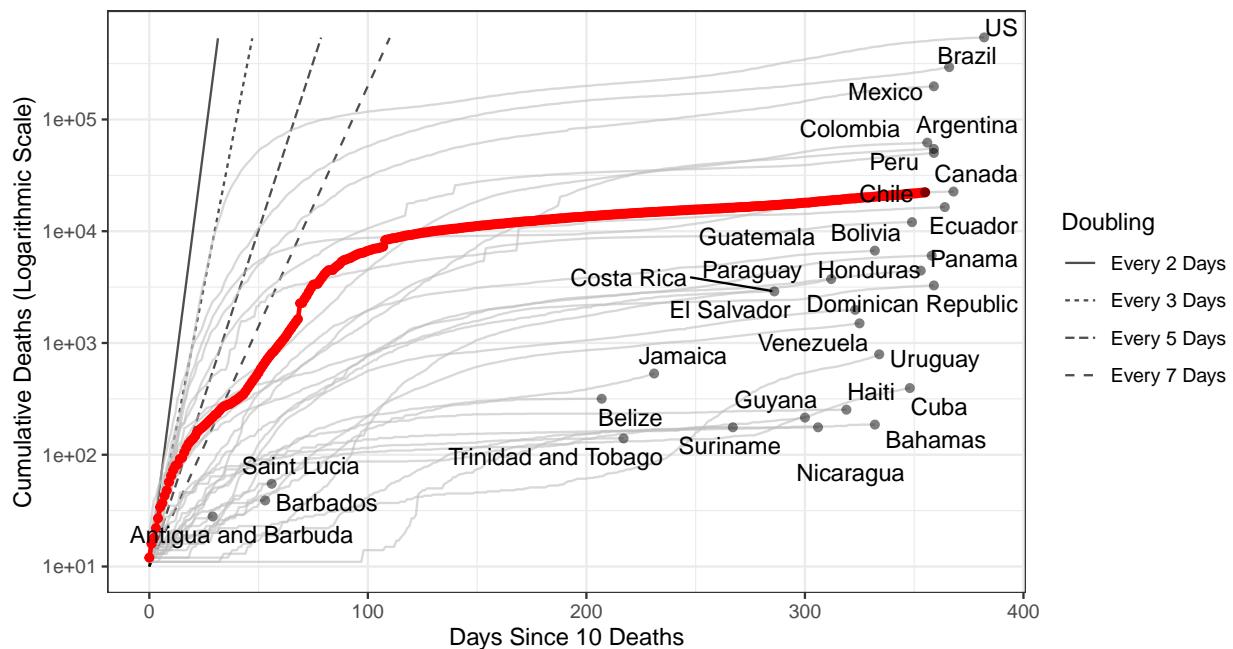


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 684,372 (95% CI: 658,506-710,238) 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

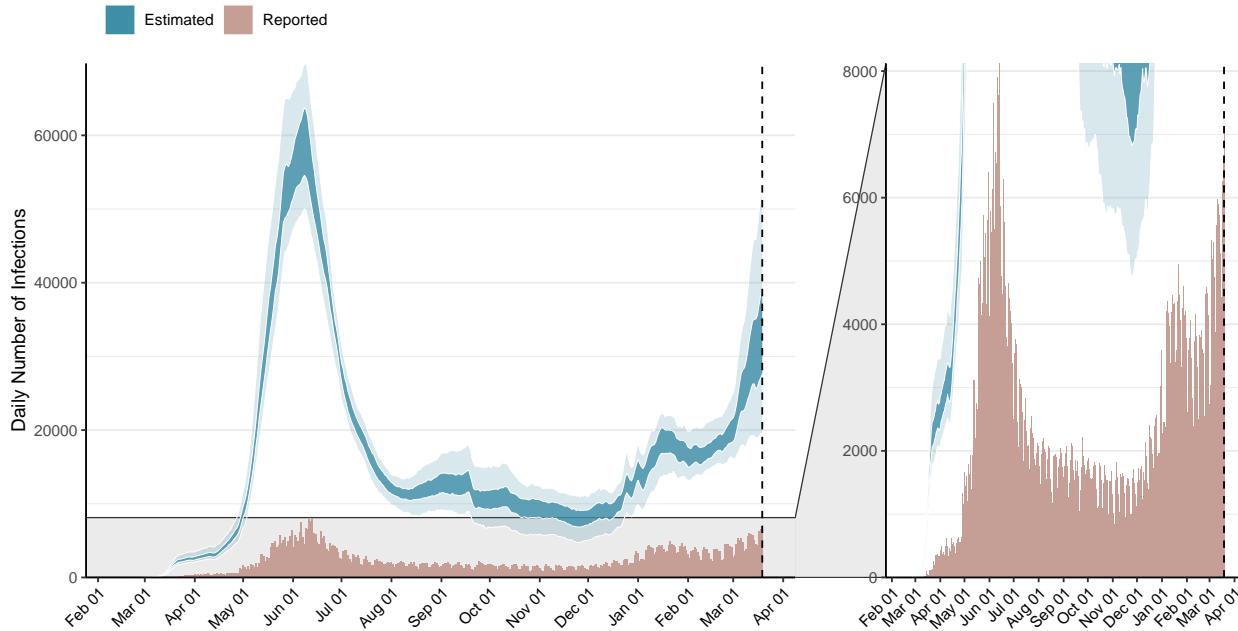


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

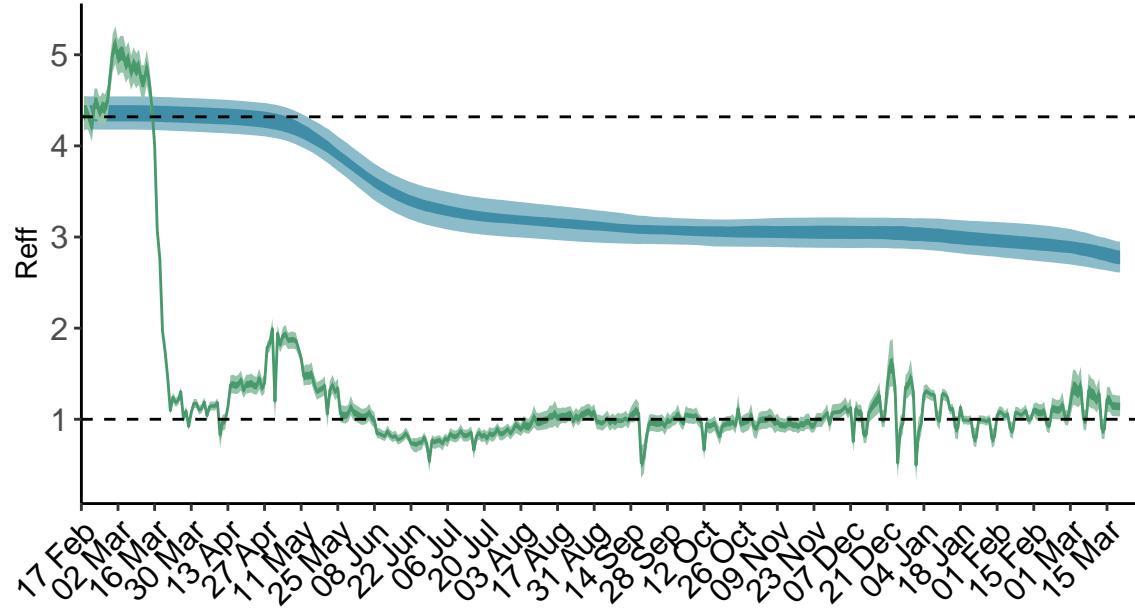


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

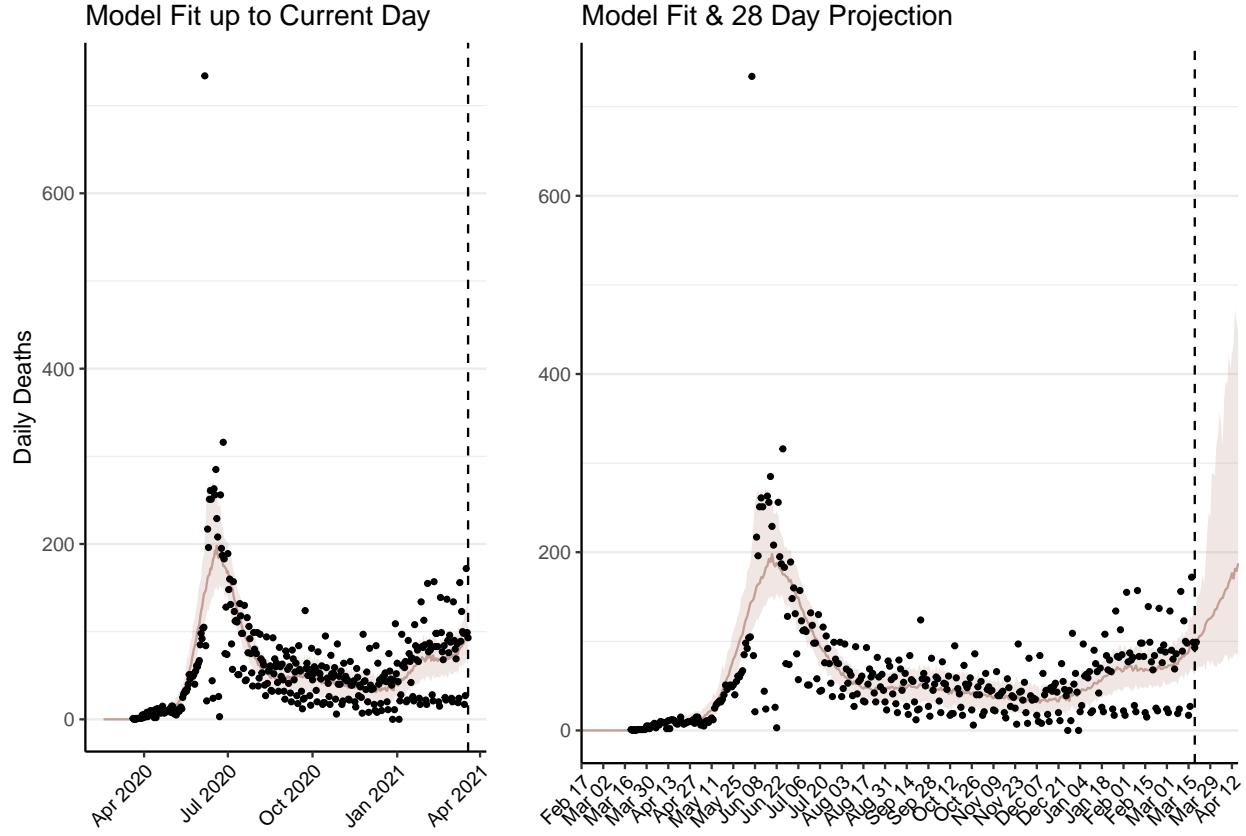


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 3,616 (95% CI: 3,466-3,765) patients requiring treatment with high-pressure oxygen at the current date to 6,683 (95% CI: 6,178-7,187) hospital beds being required on 2021-04-16 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 1,233 (95% CI: 1,185-1,281) patients requiring treatment with mechanical ventilation at the current date to 1,974 (95% CI: 1,881-2,067) by 2021-04-16. 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.**

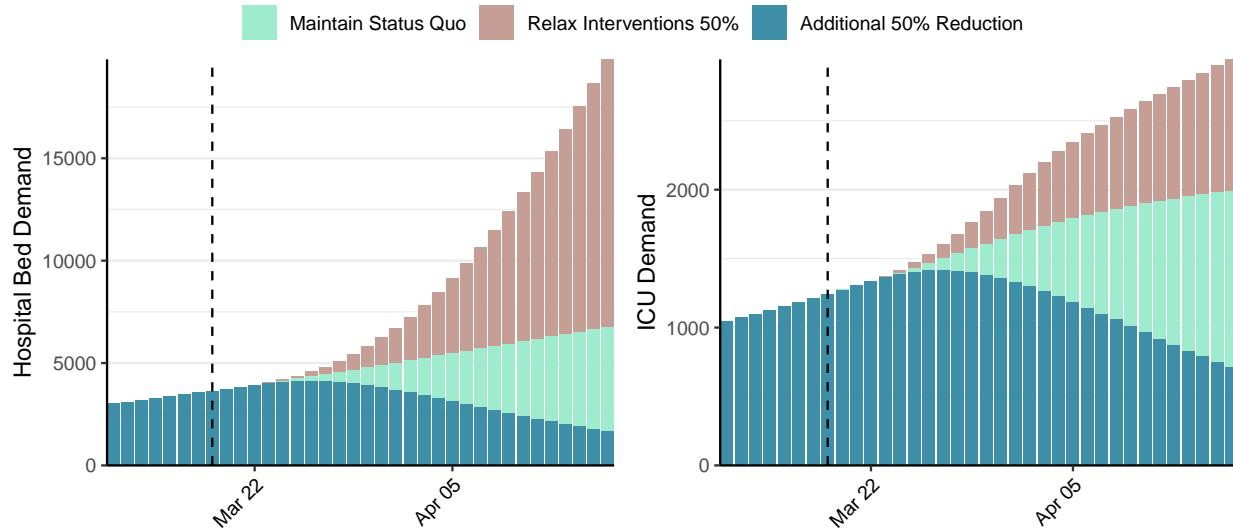


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 33,465 (95% CI: 31,616-35,314) at the current date to 4,685 (95% CI: 4,291-5,078) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 33,465 (95% CI: 31,616-35,314) at the current date to 205,681 (95% CI: 194,342-217,019) by 2021-04-16.

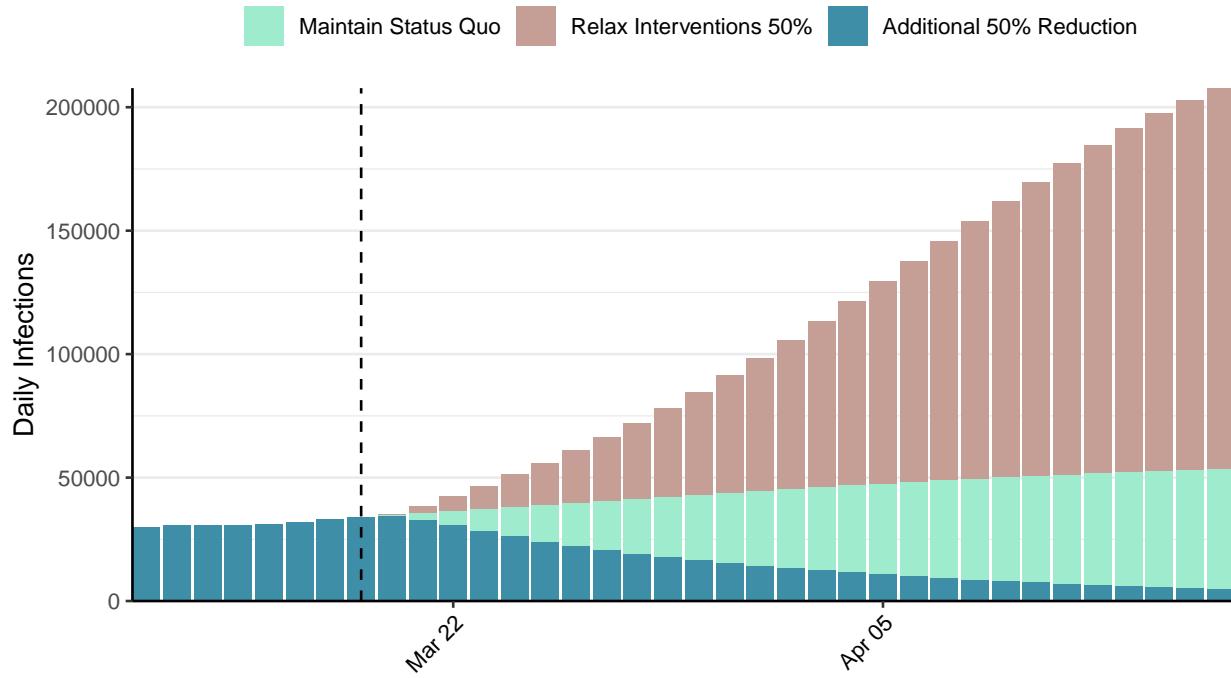


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: China, 2021-03-19

[Download the report for China, 2021-03-19 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}
100,950	17	4,822	0	0.75 (95% CI: 0.53-0.98)

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.

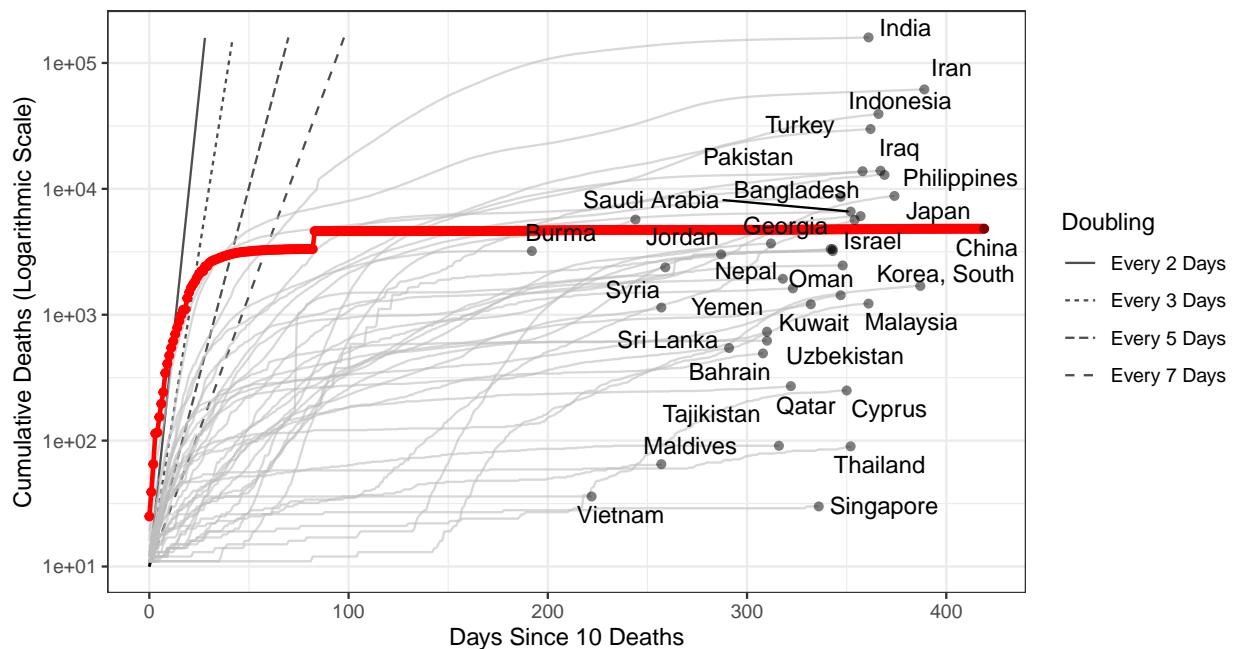


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,330 (95% CI: 1,195-1,465) 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). **N.B. China has revised their historic reported cases and thus have reported negative cases.**

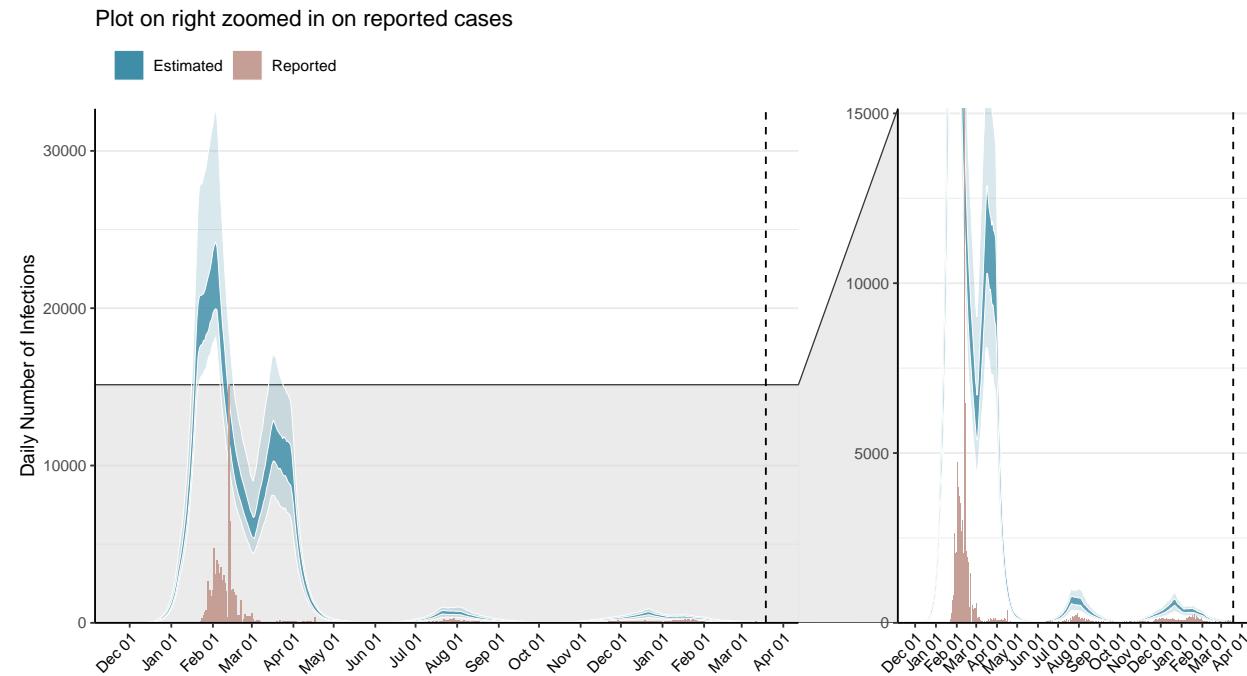


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

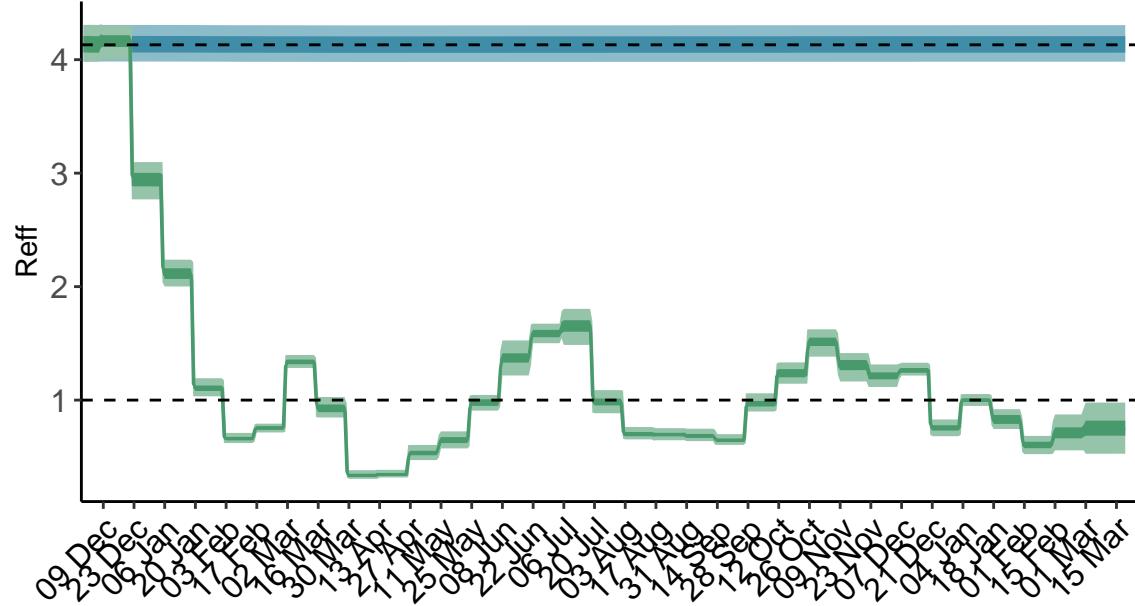


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

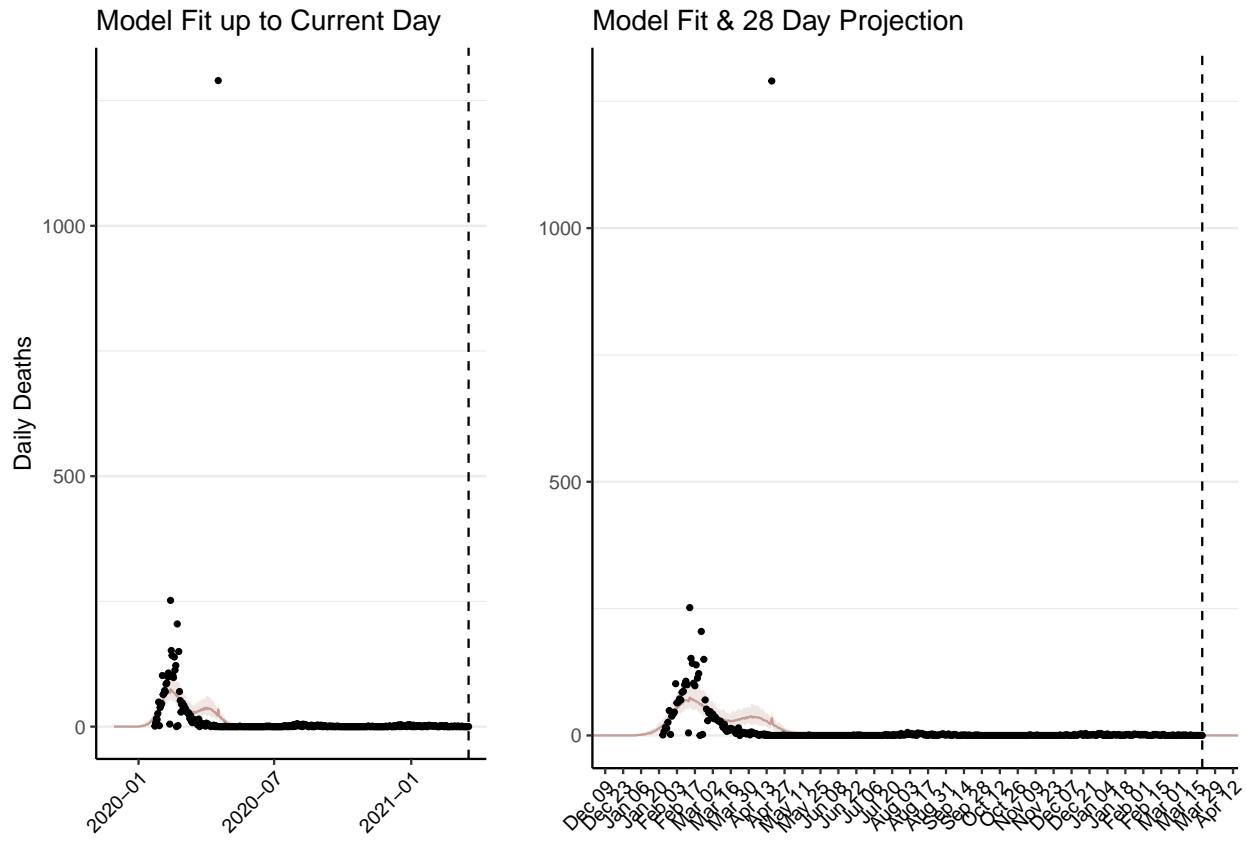


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 6 (95% CI: 5-7) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 2-3) hospital beds being required on 2021-04-16 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 1 (95% CI: 1-2) by 2021-04-16. 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.**

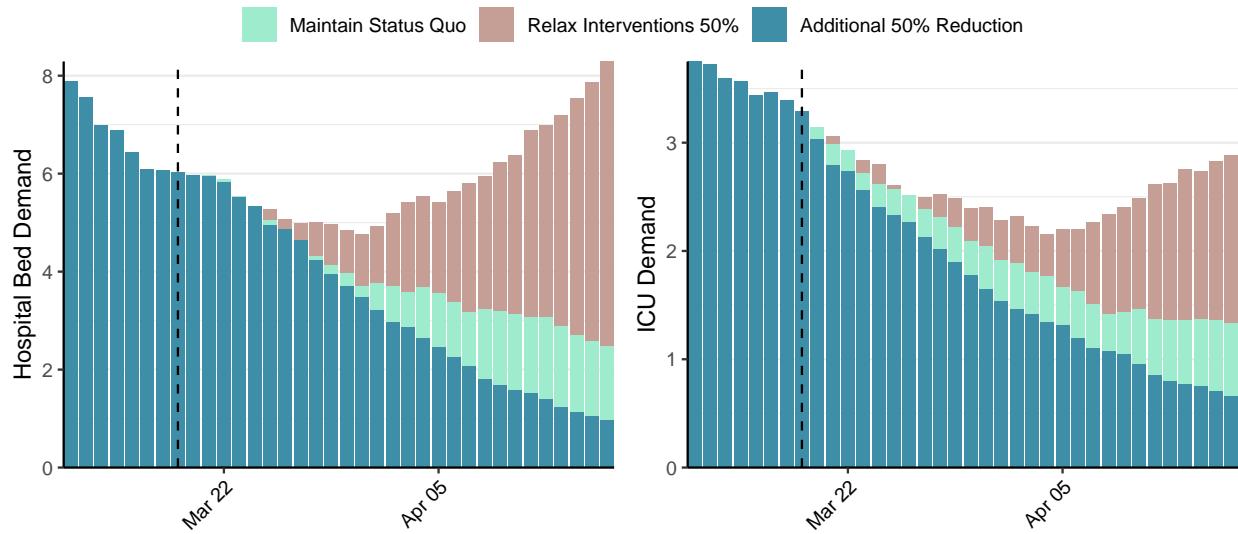


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 24-33) at the current date to 2 (95% CI: 1-2) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 29 (95% CI: 24-33) at the current date to 85 (95% CI: 54-115) by 2021-04-16.

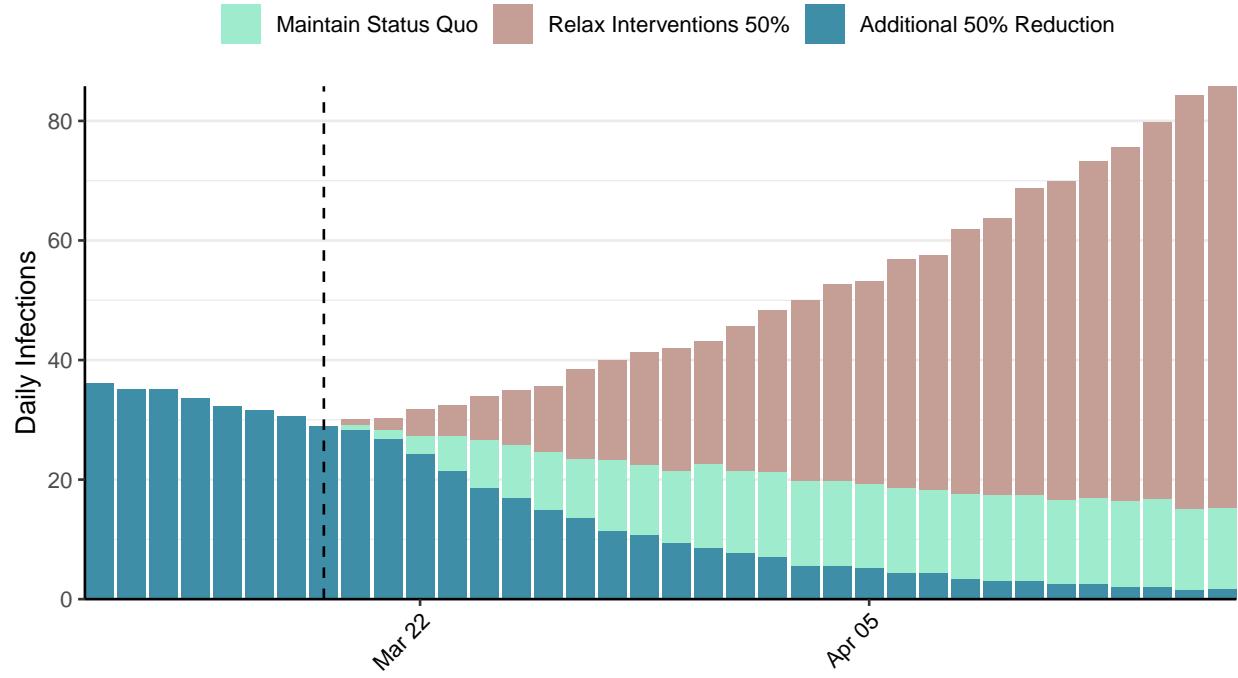


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

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Situation Report for COVID-19: Cote d'Ivoire, 2021-03-19

[Download the report for Cote d'Ivoire, 2021-03-19 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}
39,434	511	216	1	1.04 (95% CI: 0.87-1.19)

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.

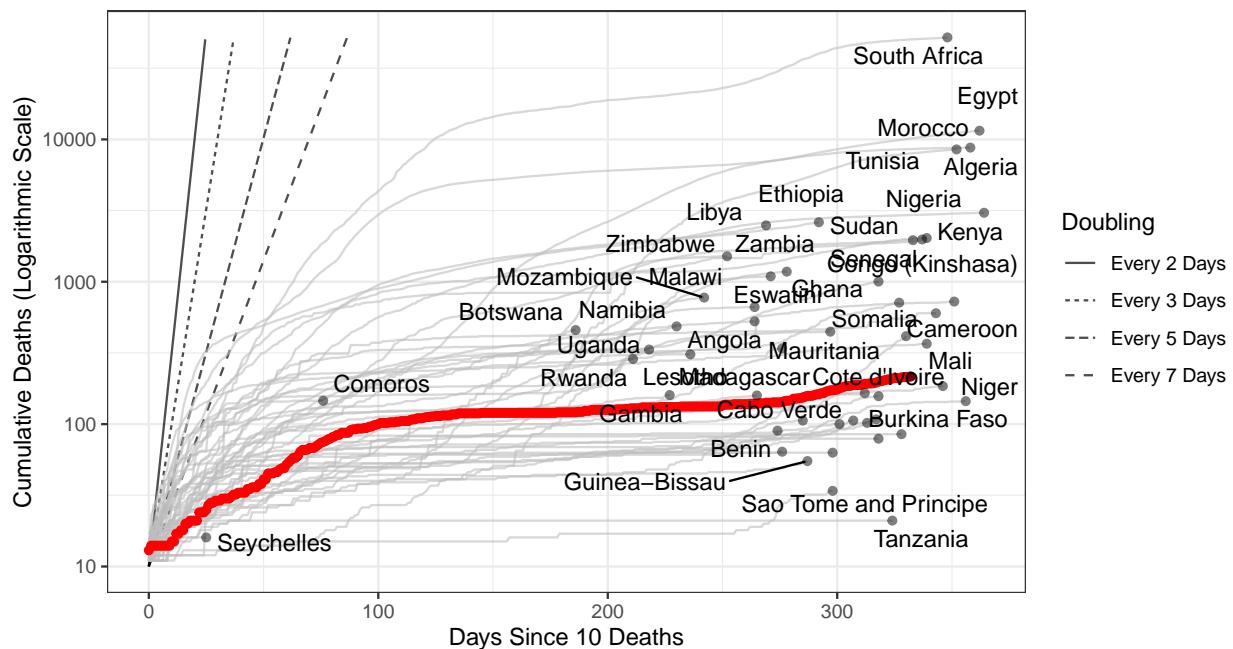


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 25,126 (95% CI: 23,667-26,584) 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.**

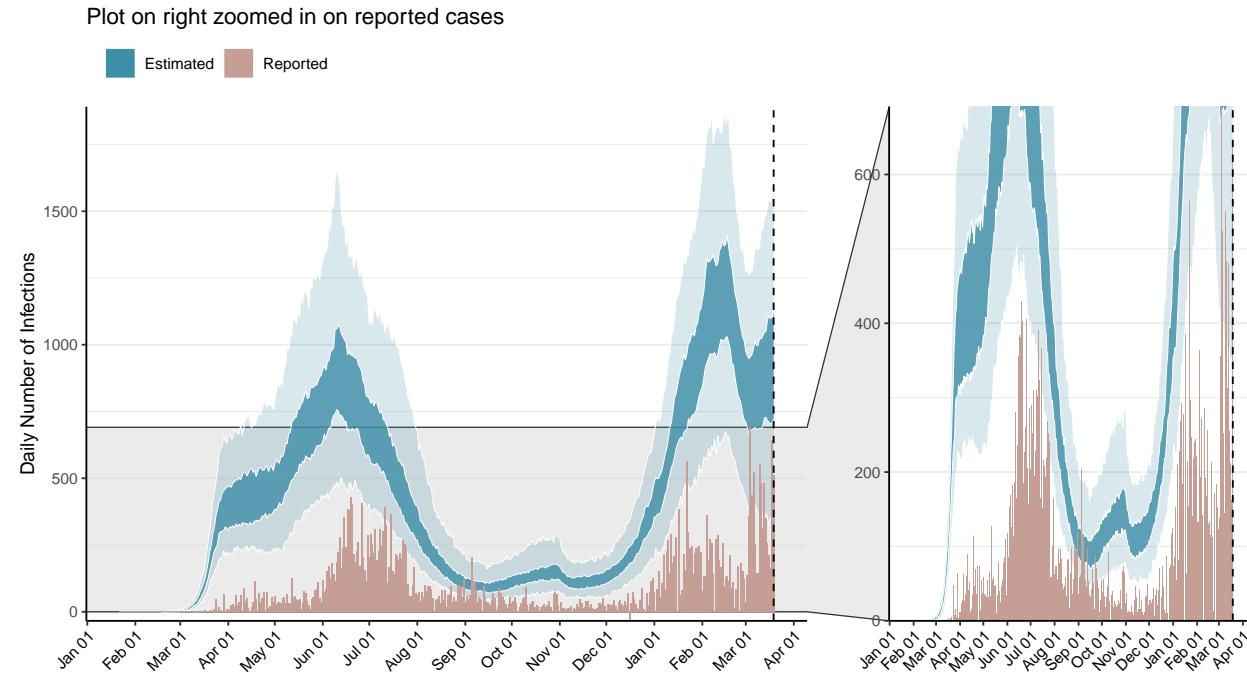


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

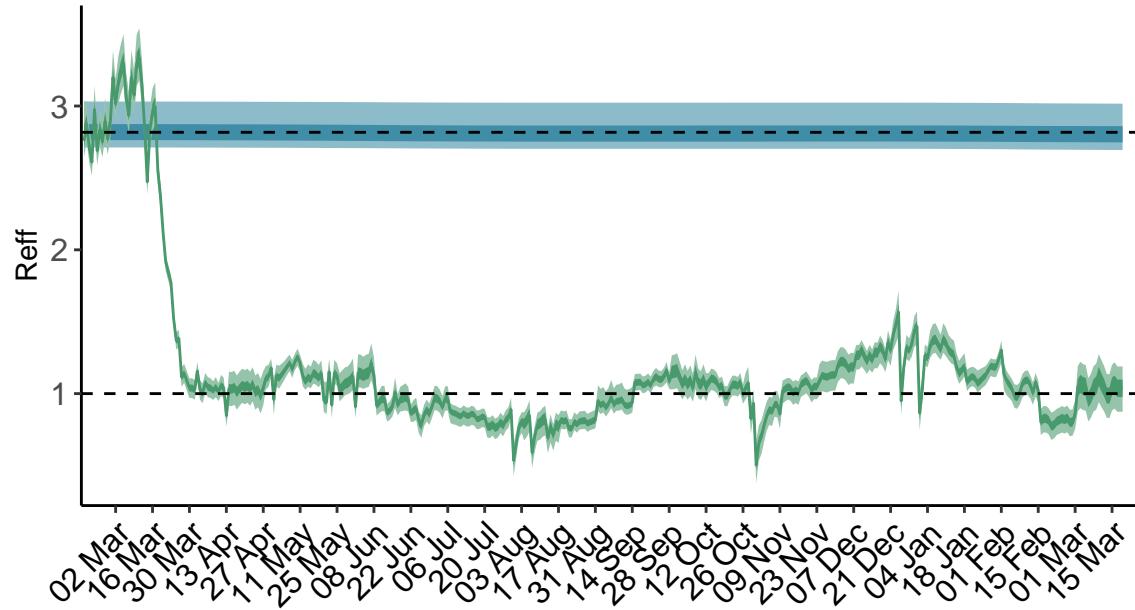


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

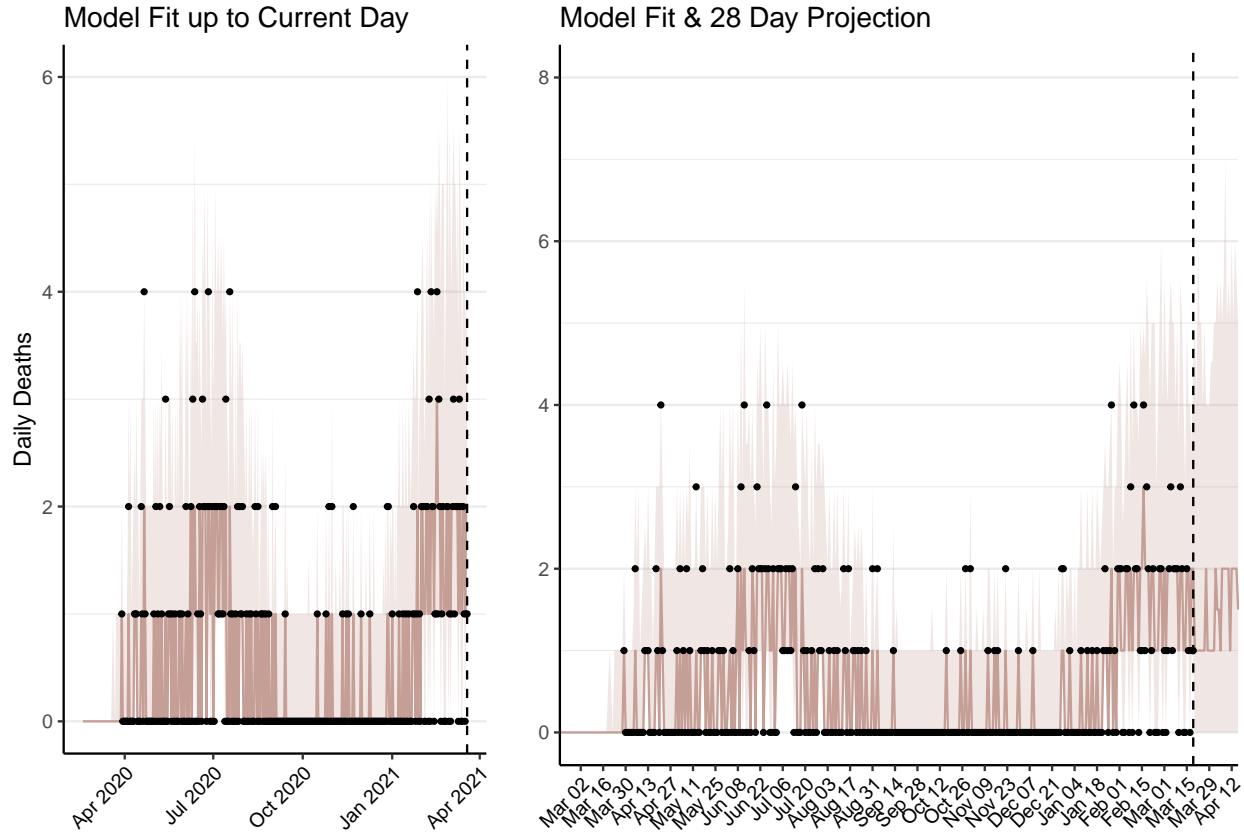


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 68 (95% CI: 63-72) patients requiring treatment with high-pressure oxygen at the current date to 86 (95% CI: 77-95) hospital beds being required on 2021-04-16 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 31 (95% CI: 27-34) by 2021-04-16. 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.**

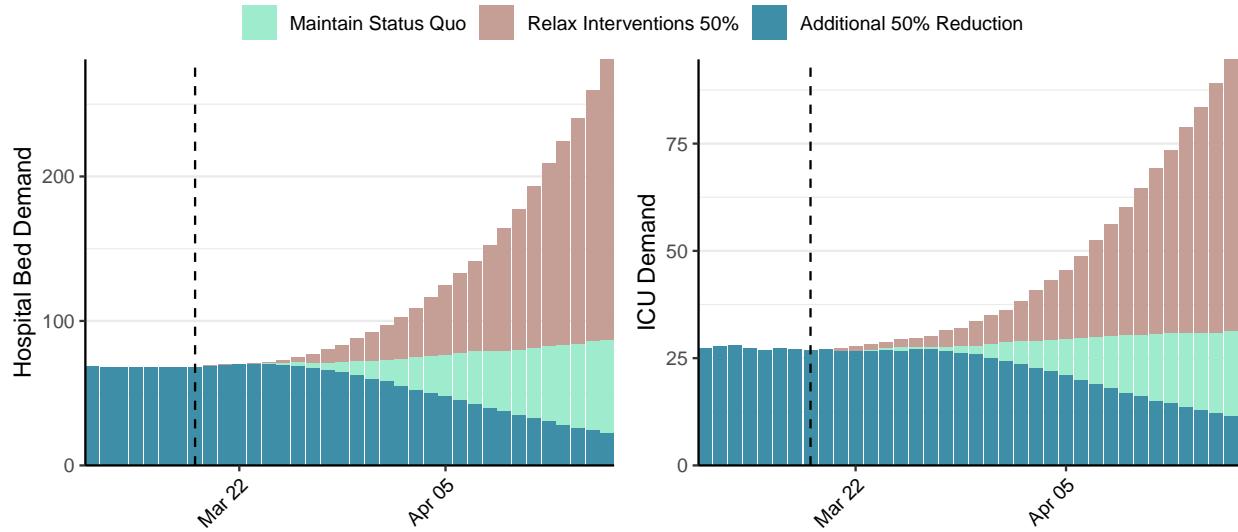


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 922 (95% CI: 853-991) at the current date to 98 (95% CI: 86-111) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 922 (95% CI: 853-991) at the current date to 7,546 (95% CI: 6,505-8,588) by 2021-04-16.

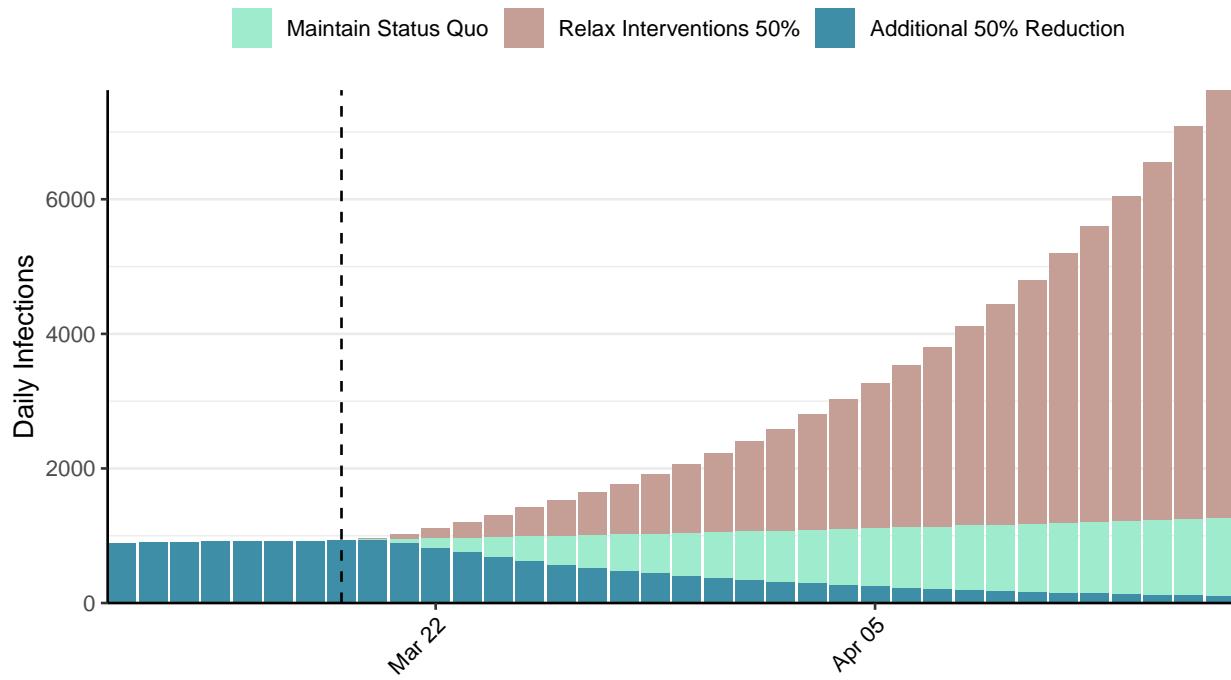


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Cameroon, 2021-03-19

[Download the report for Cameroon, 2021-03-19 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}
40,622	0	601	0	0.86 (95% CI: 0.71-1.04)

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.

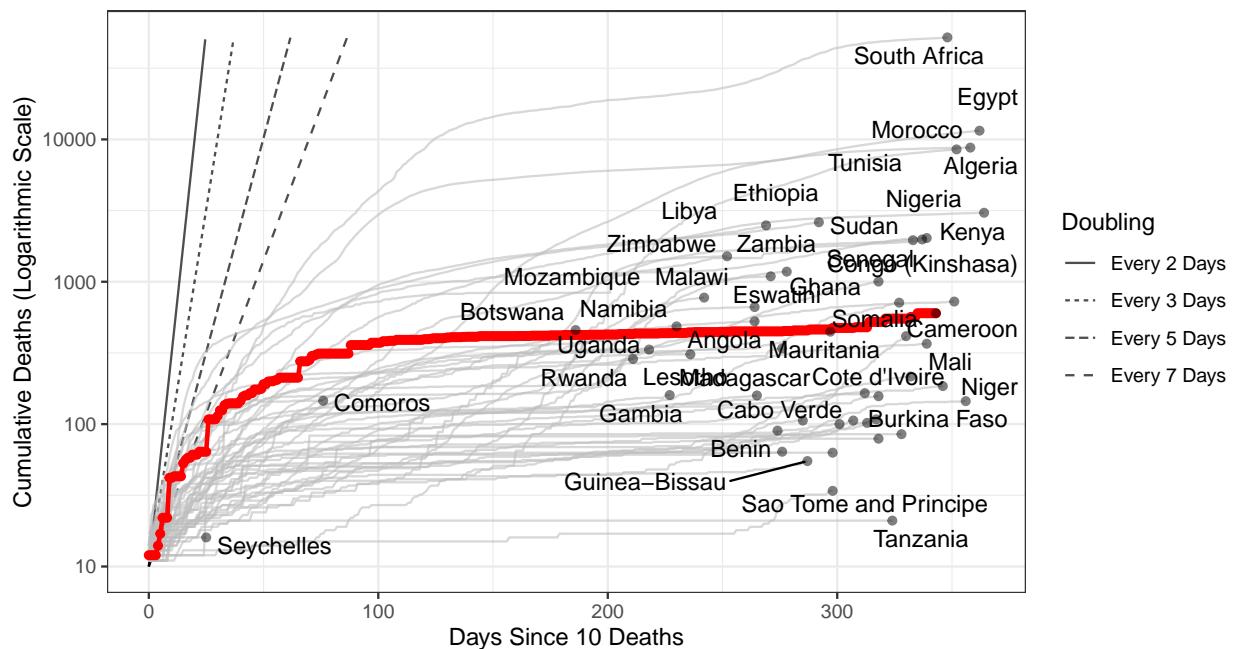


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 48,642 (95% CI: 45,898–51,387) 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).

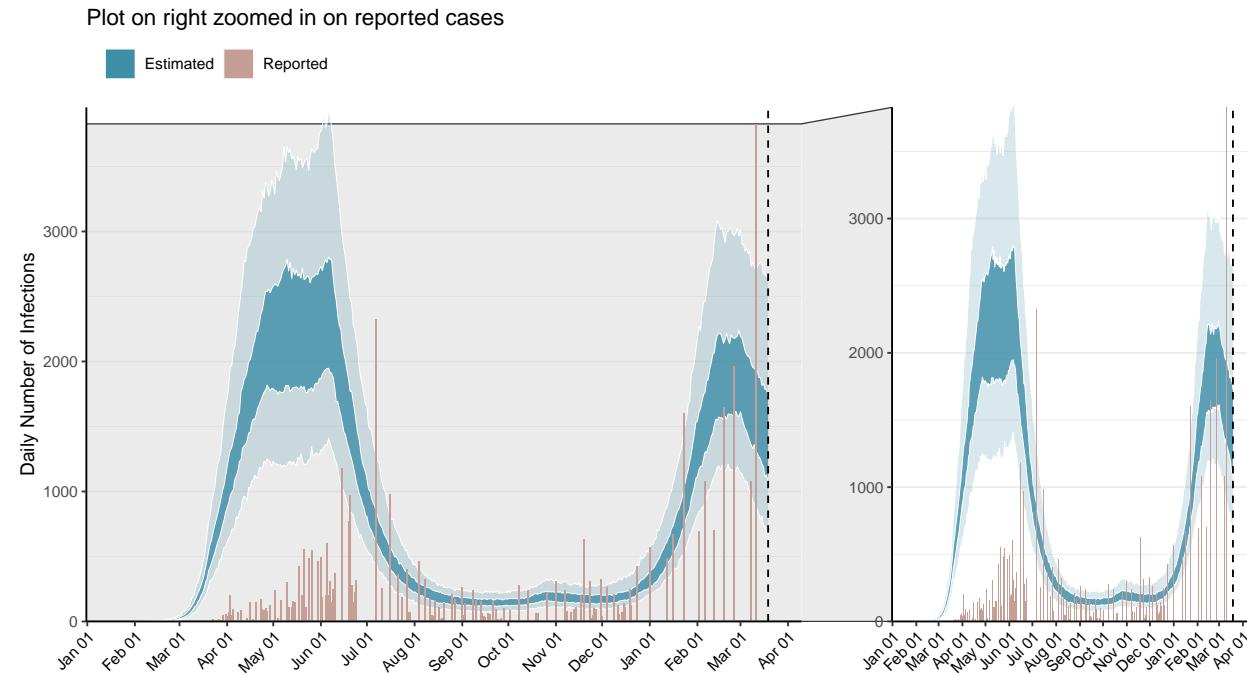


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

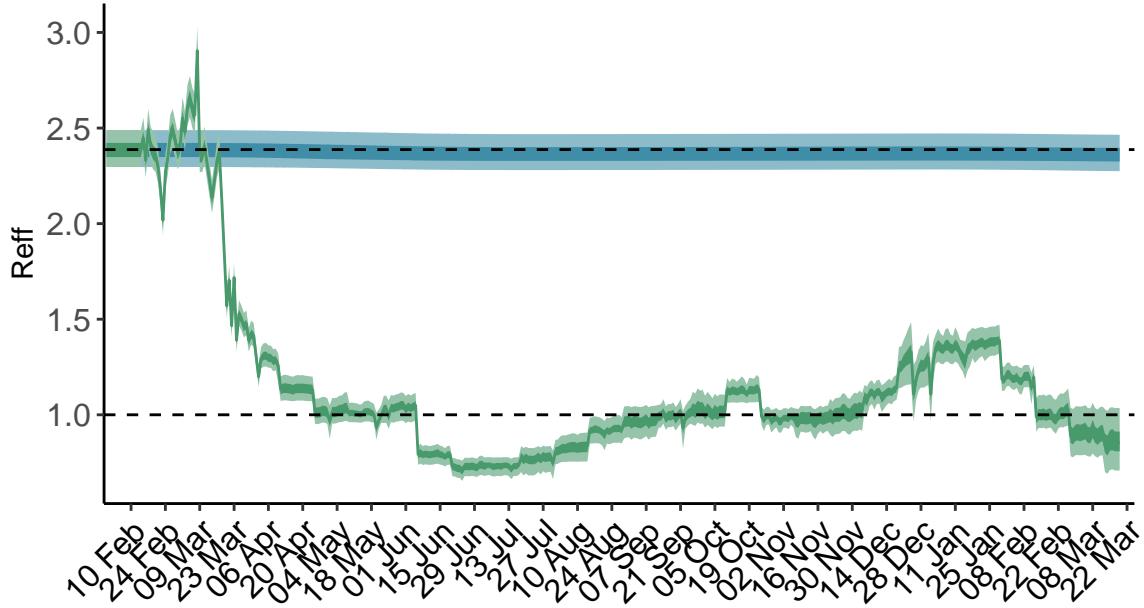


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

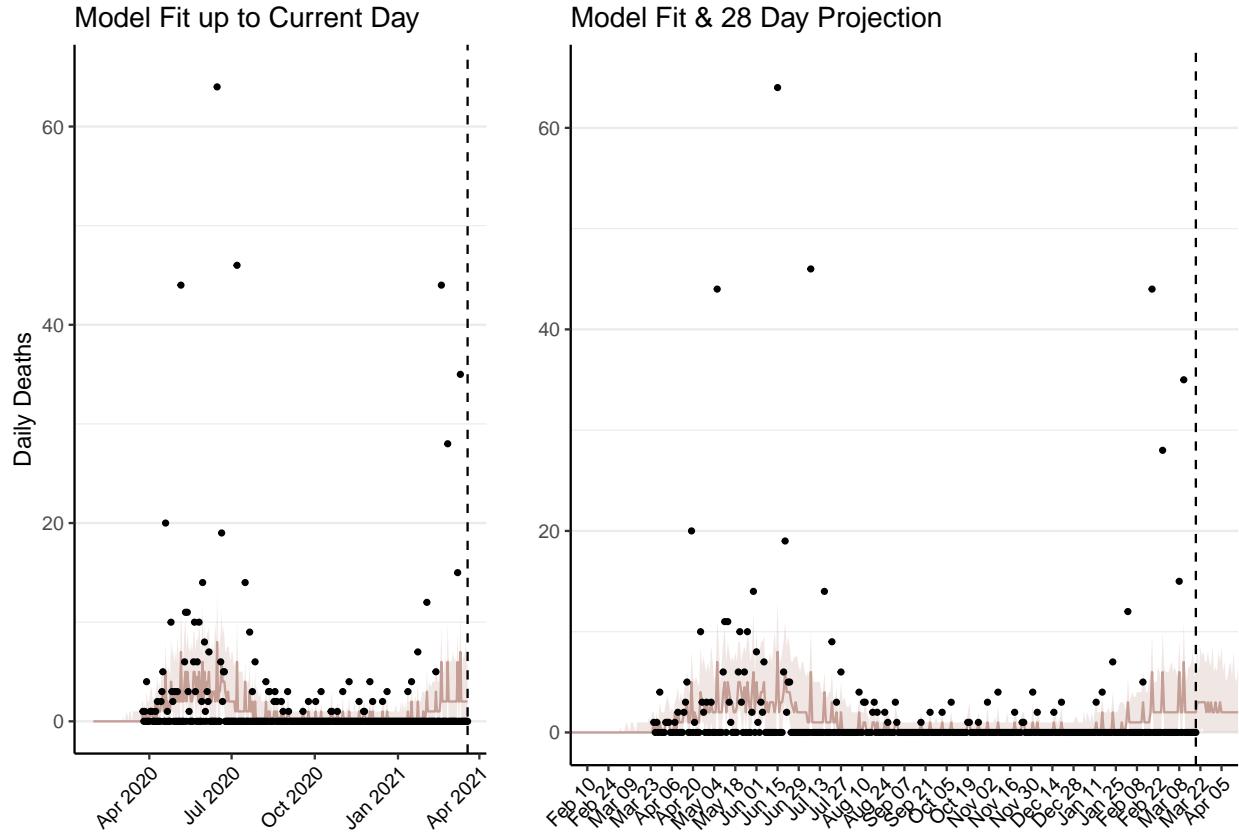


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 131 (95% CI: 123-139) patients requiring treatment with high-pressure oxygen at the current date to 82 (95% CI: 74-91) hospital beds being required on 2021-04-16 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 54 (95% CI: 51-58) patients requiring treatment with mechanical ventilation at the current date to 35 (95% CI: 31-39) by 2021-04-16. 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.**

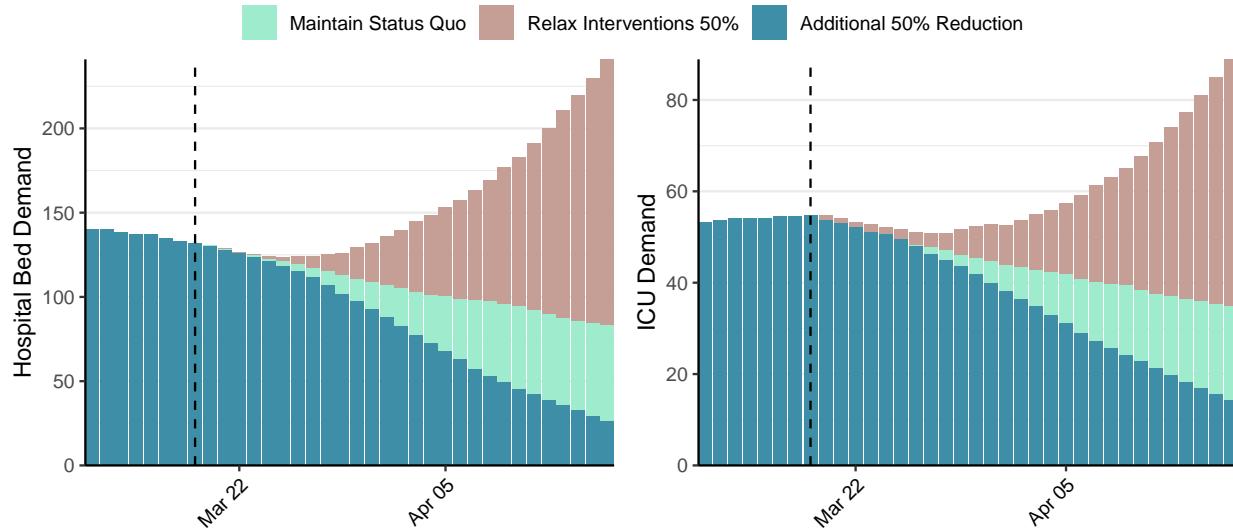


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,421 (95% CI: 1,319-1,523) at the current date to 82 (95% CI: 72-93) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,421 (95% CI: 1,319-1,523) at the current date to 5,019 (95% CI: 4,265-5,773) by 2021-04-16.

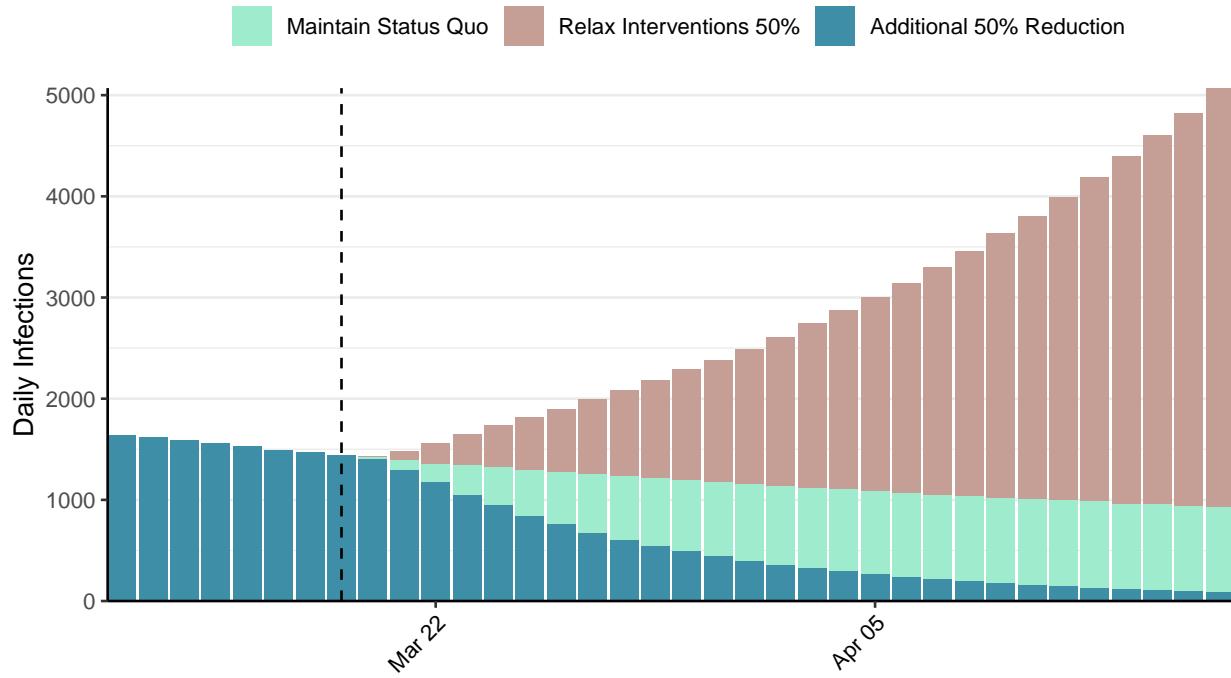


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Democratic Republic of Congo, 2021-03-19

[Download the report for Democratic Republic of Congo, 2021-03-19 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}
27,467	112	726	0	0.94 (95% CI: 0.8-1.18)

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.

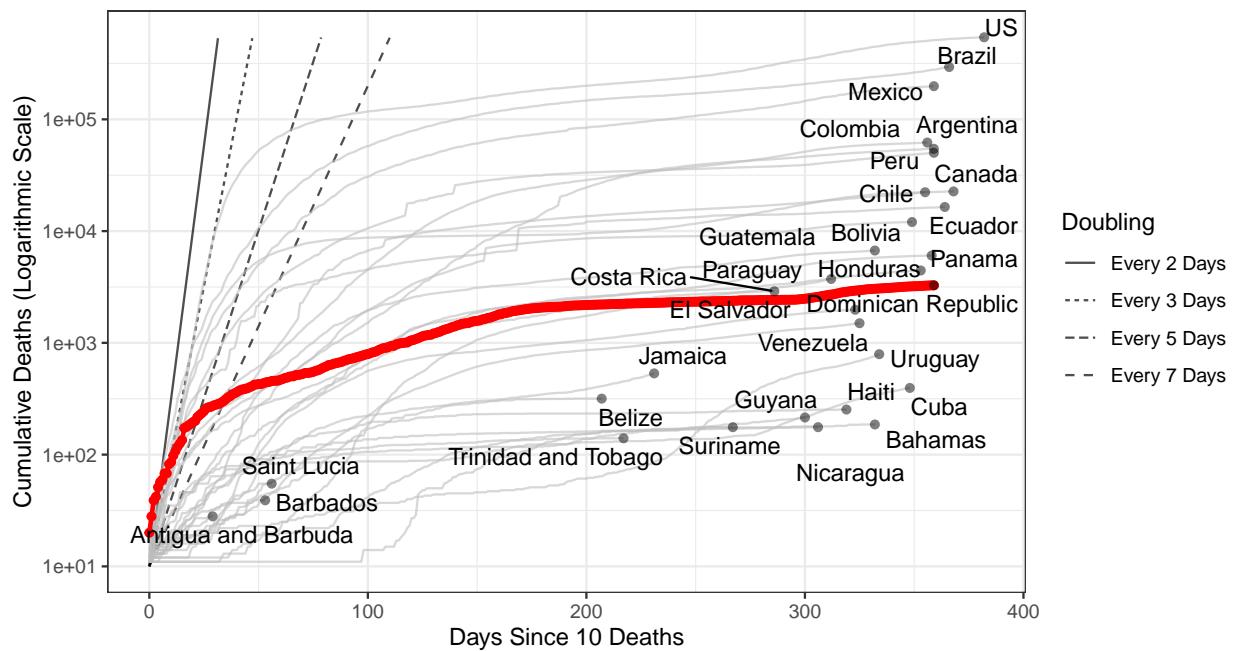


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 20,681 (95% CI: 19,183-22,179) 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

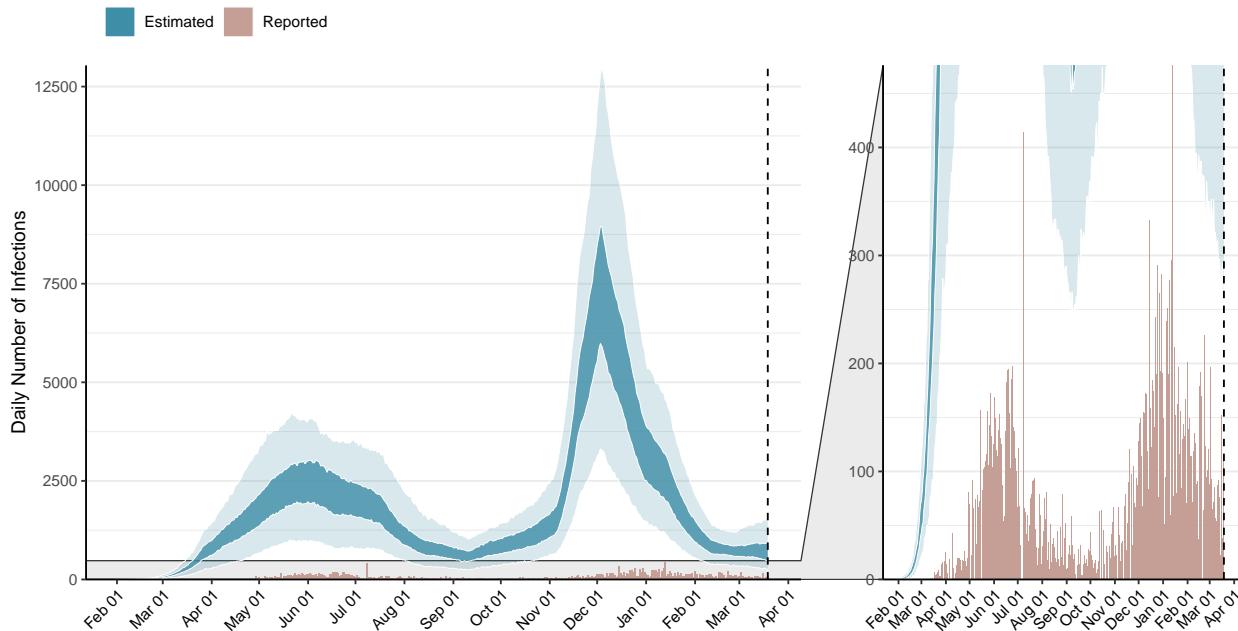


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

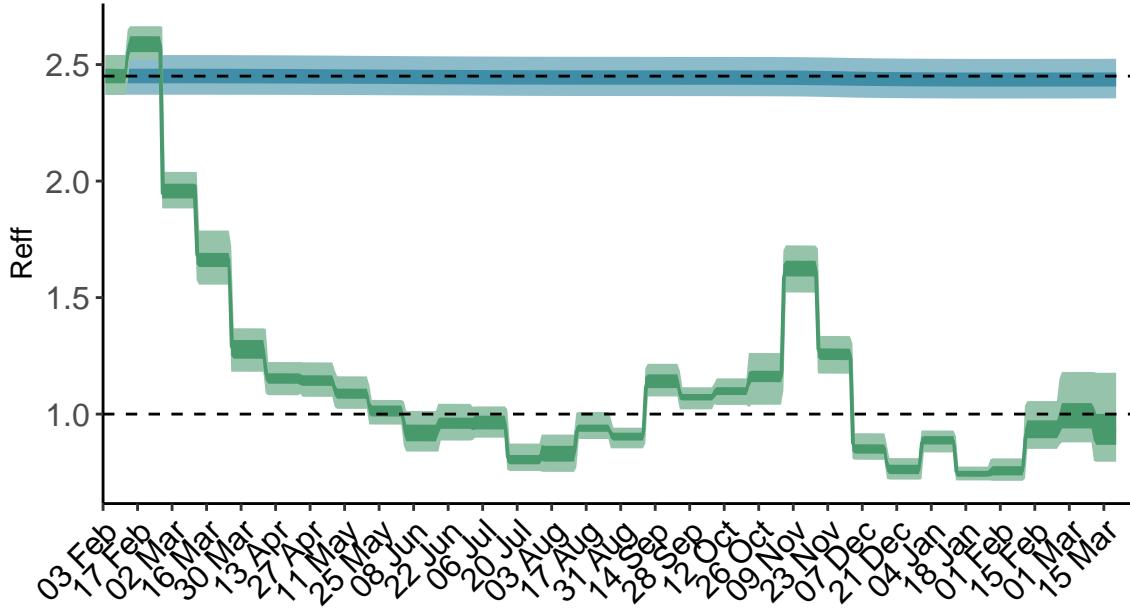


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

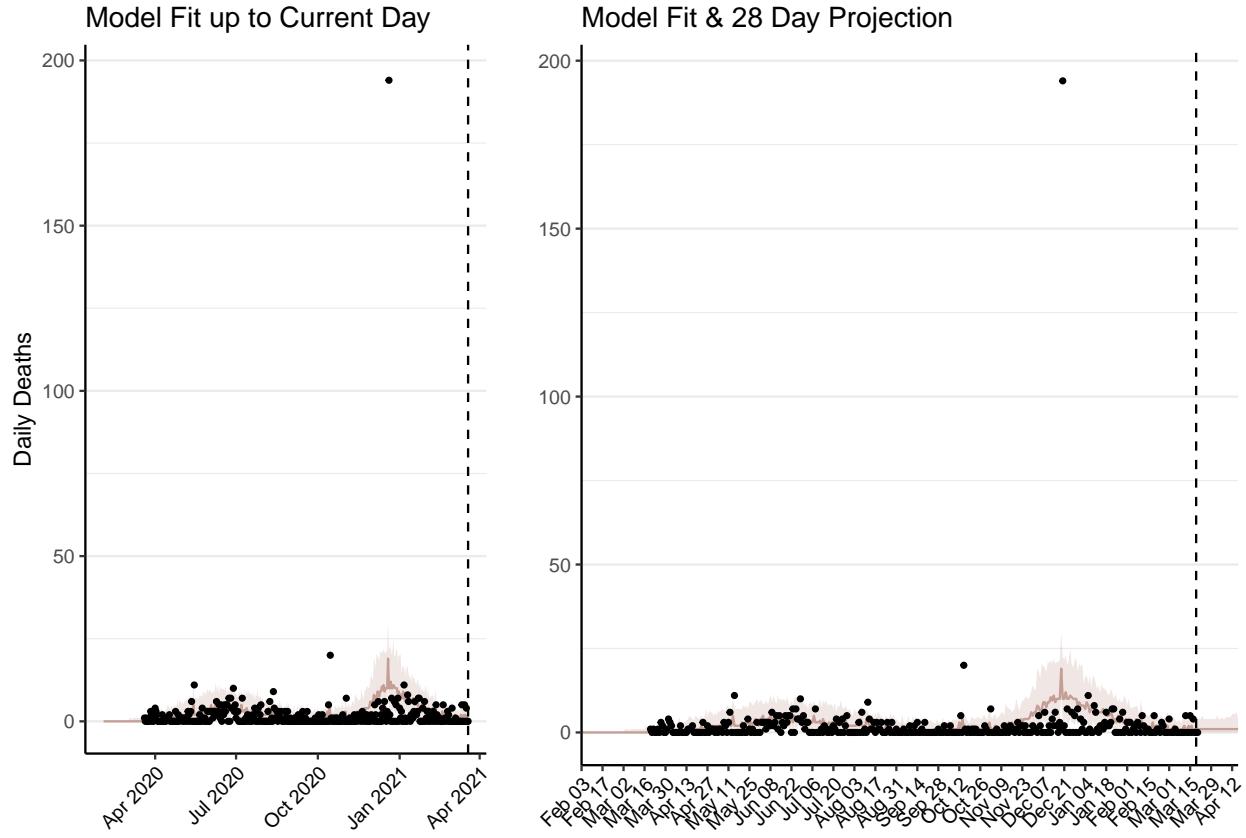


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 58 (95% CI: 54-63) patients requiring treatment with high-pressure oxygen at the current date to 56 (95% CI: 48-65) hospital beds being required on 2021-04-16 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 24 (95% CI: 22-25) patients requiring treatment with mechanical ventilation at the current date to 22 (95% CI: 18-25) by 2021-04-16. 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.**

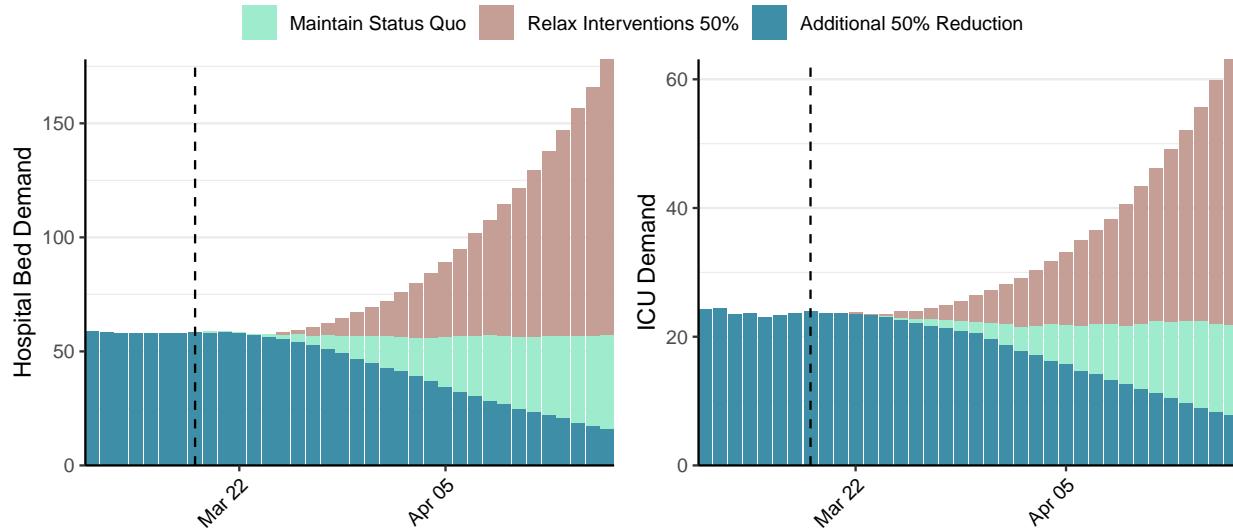


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 725 (95% CI: 655-796) at the current date to 58 (95% CI: 48-68) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 725 (95% CI: 655-796) at the current date to 4,359 (95% CI: 3,483-5,234) by 2021-04-16.

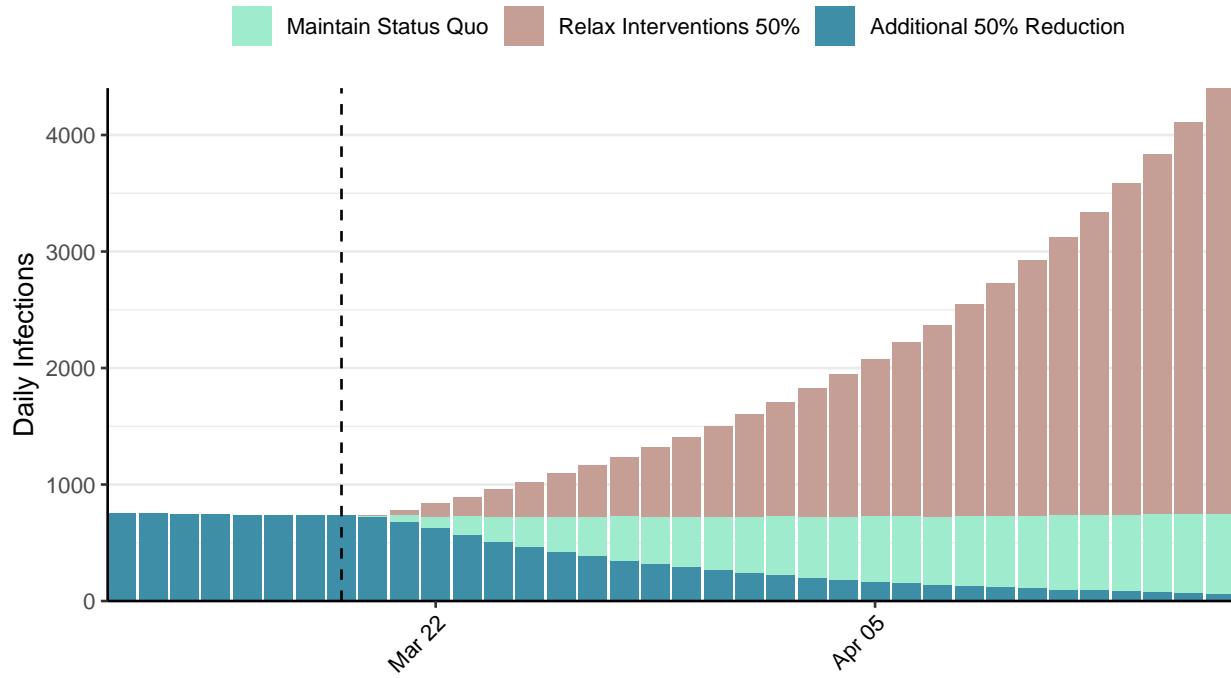


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Republic of the Congo, 2021-03-19

[Download the report for Republic of the Congo, 2021-03-19 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}
9,564	0	165	0	0.92 (95% CI: 0.64-1.12)

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.

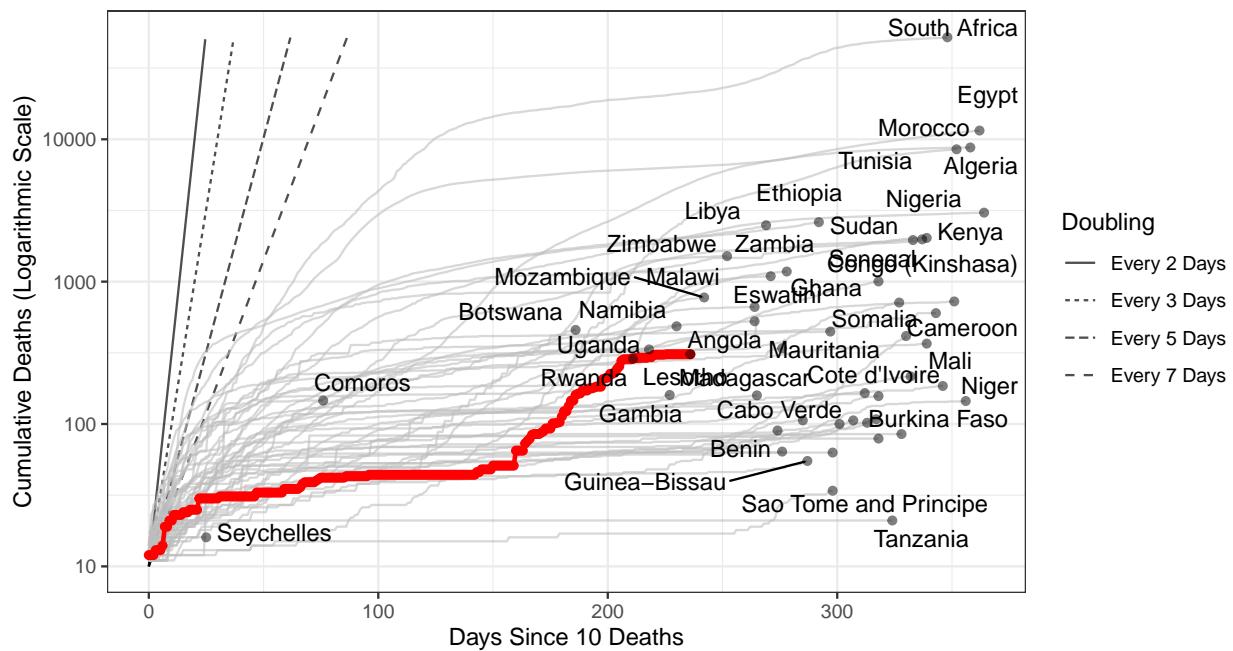


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 4,260 (95% CI: 3,878-4,643) 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).

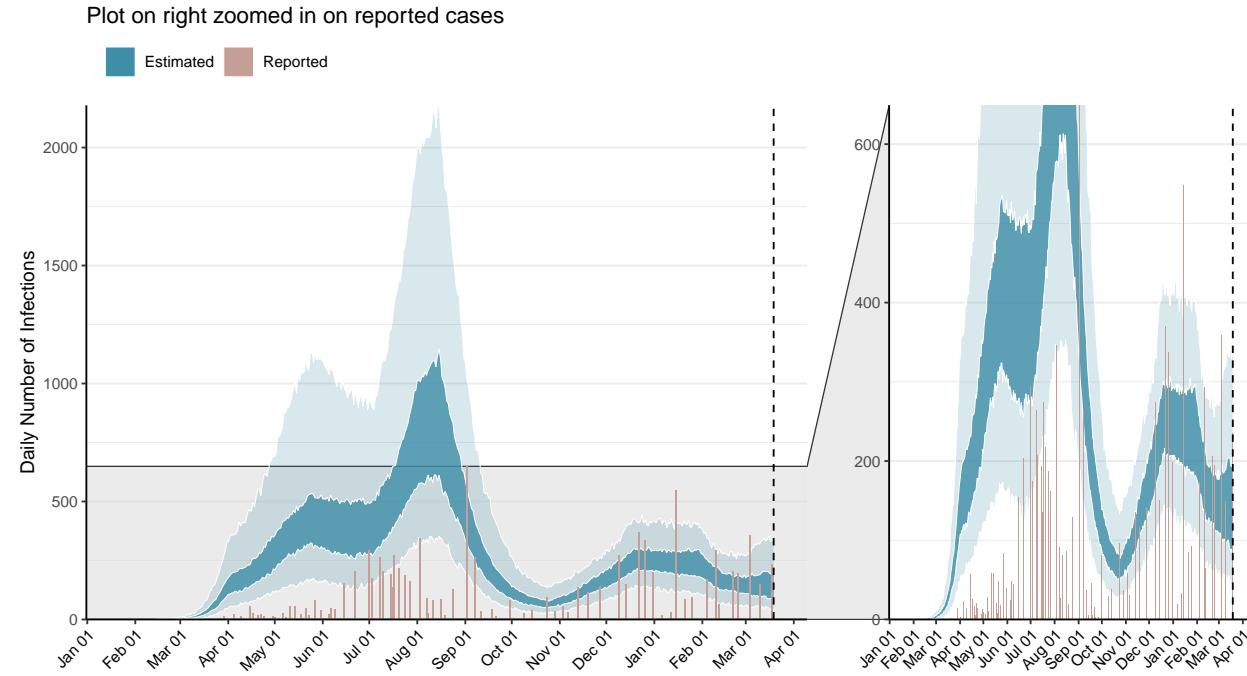


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

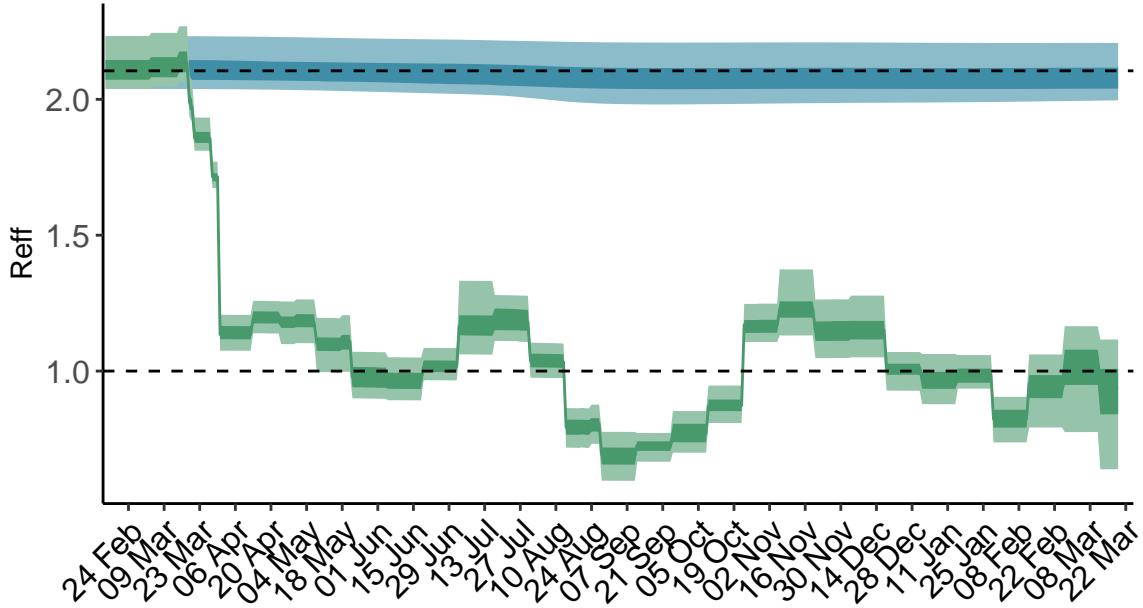


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

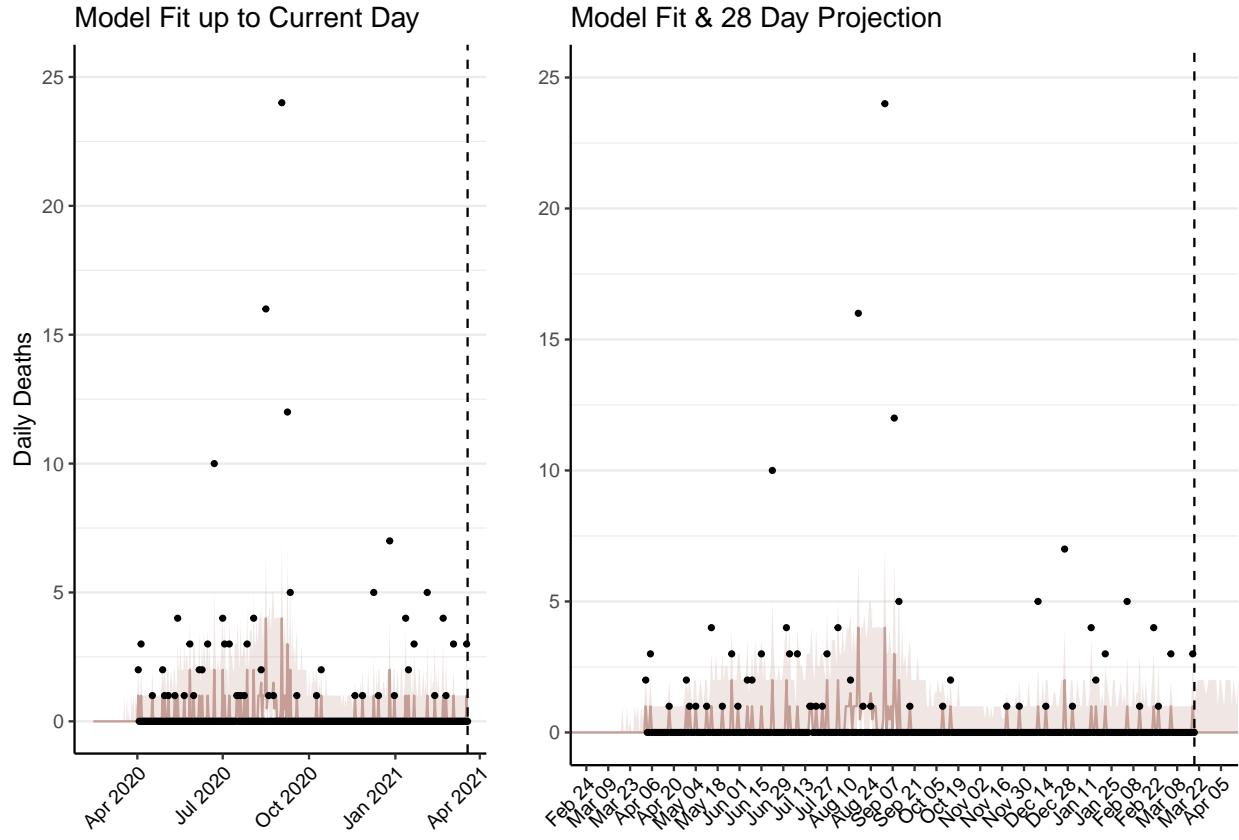


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 12 (95% CI: 11-14) patients requiring treatment with high-pressure oxygen at the current date to 12 (95% CI: 10-14) hospital beds being required on 2021-04-16 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: 5-6) patients requiring treatment with mechanical ventilation at the current date to 5 (95% CI: 4-6) by 2021-04-16. 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.**

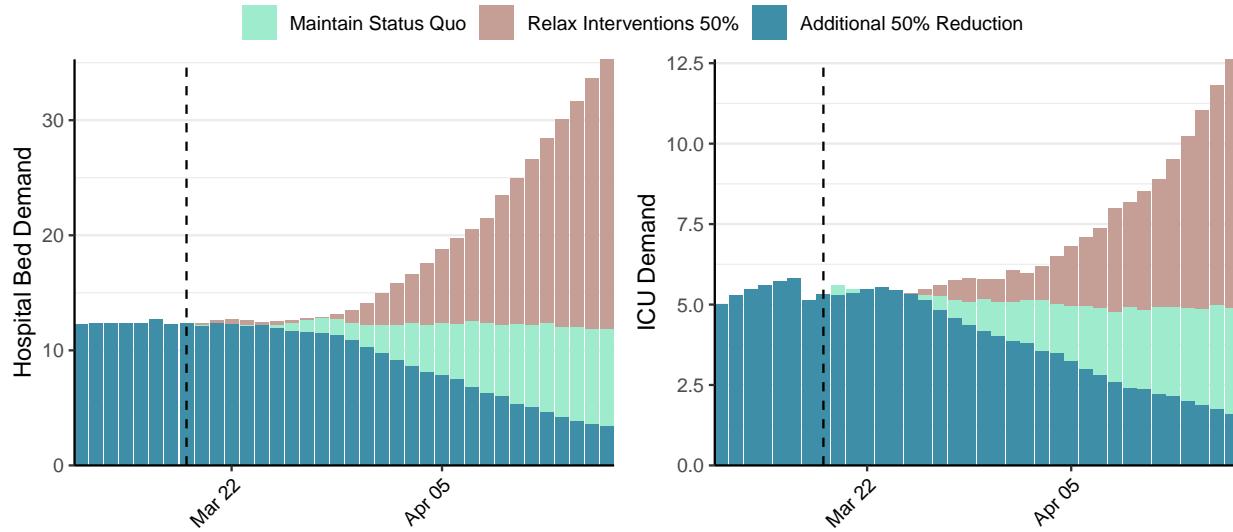


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 153 (95% CI: 135-171) at the current date to 12 (95% CI: 9-14) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 153 (95% CI: 135-171) at the current date to 835 (95% CI: 666-1,004) by 2021-04-16.

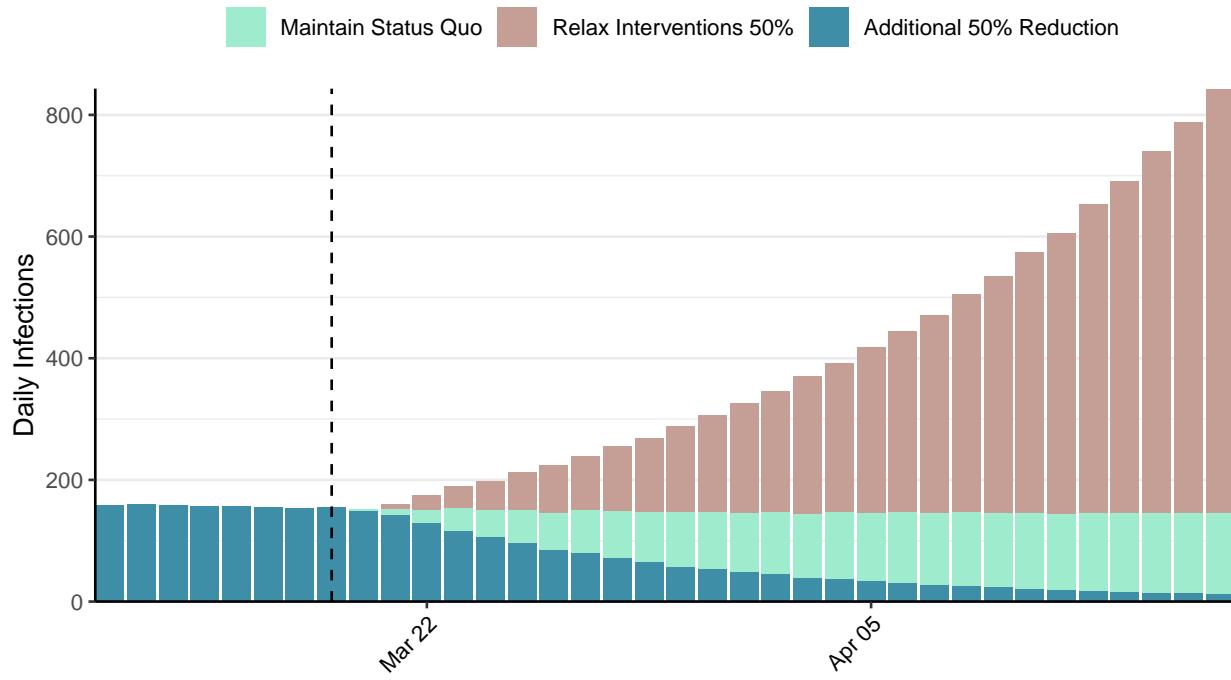


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Colombia, 2021-03-19

[Download the report for Colombia, 2021-03-19 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}
2,324,426	5,133	61,771	135	1.04 (95% CI: 0.91-1.15)

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.

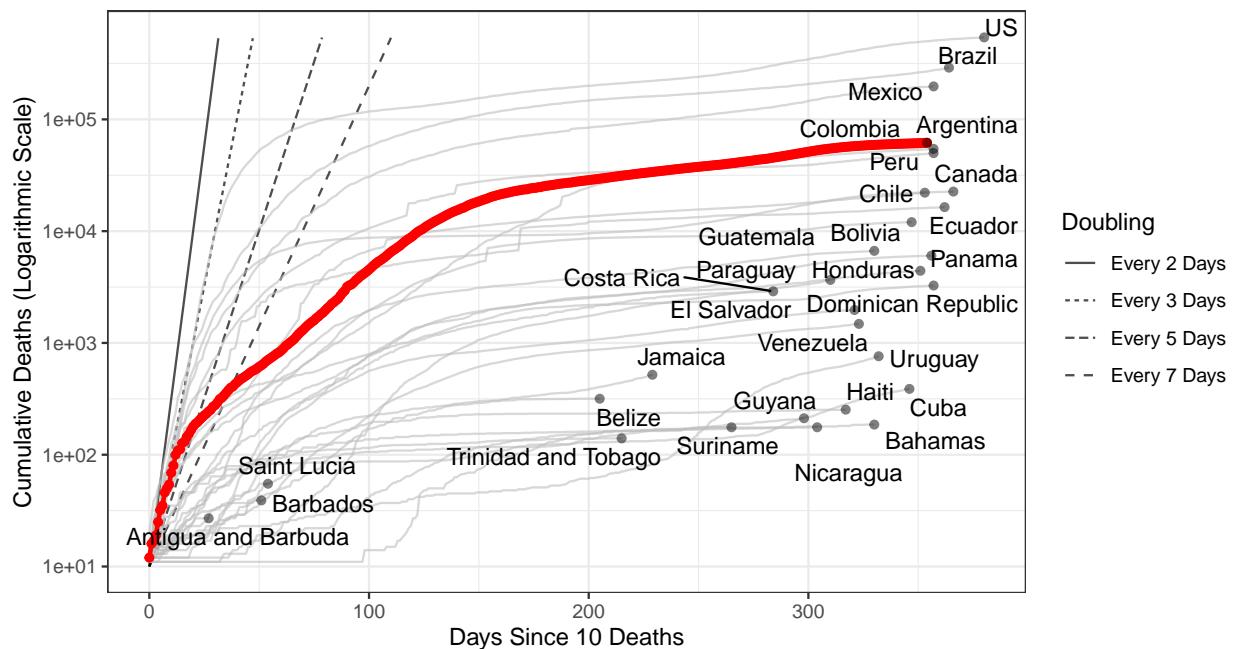


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 806,520 (95% CI: 772,466-840,574) 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).

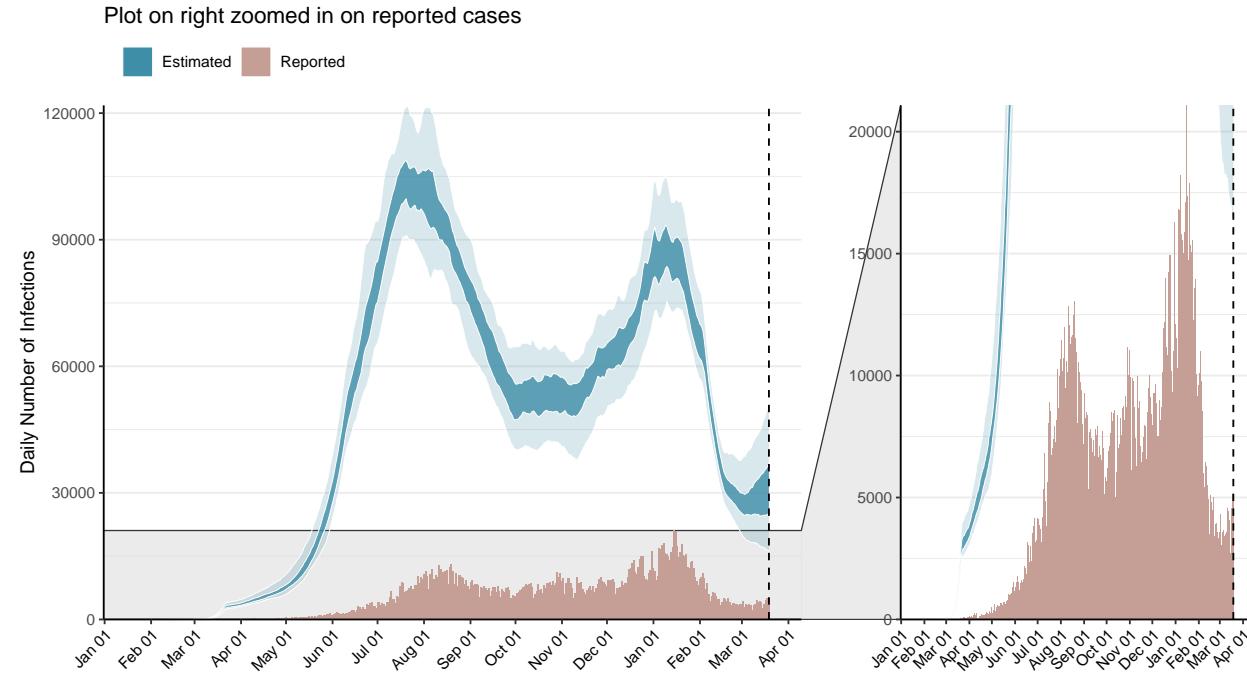


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

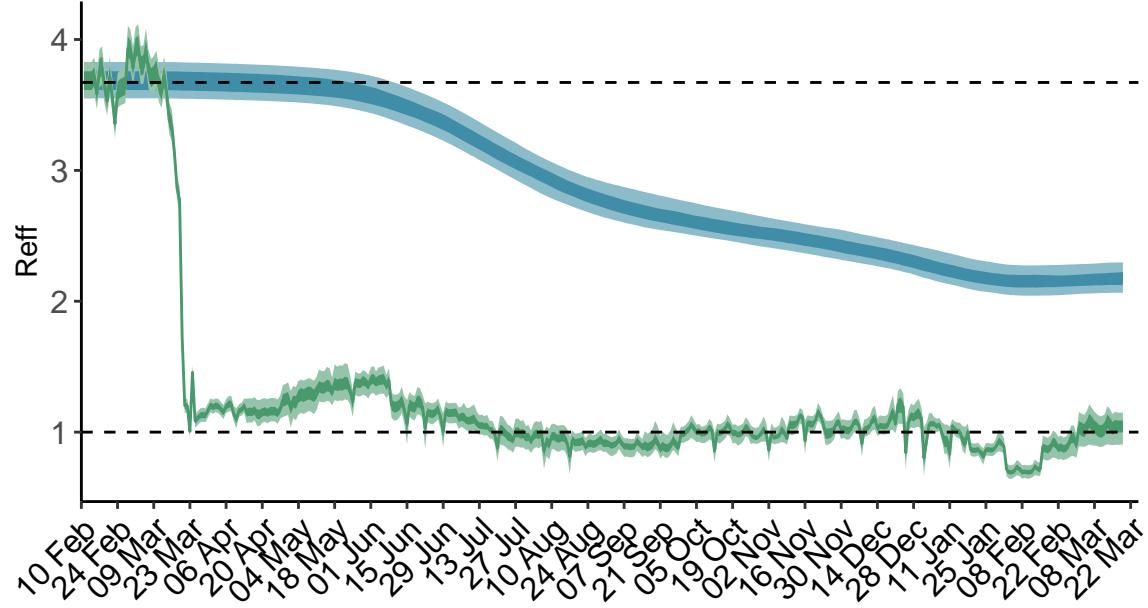


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

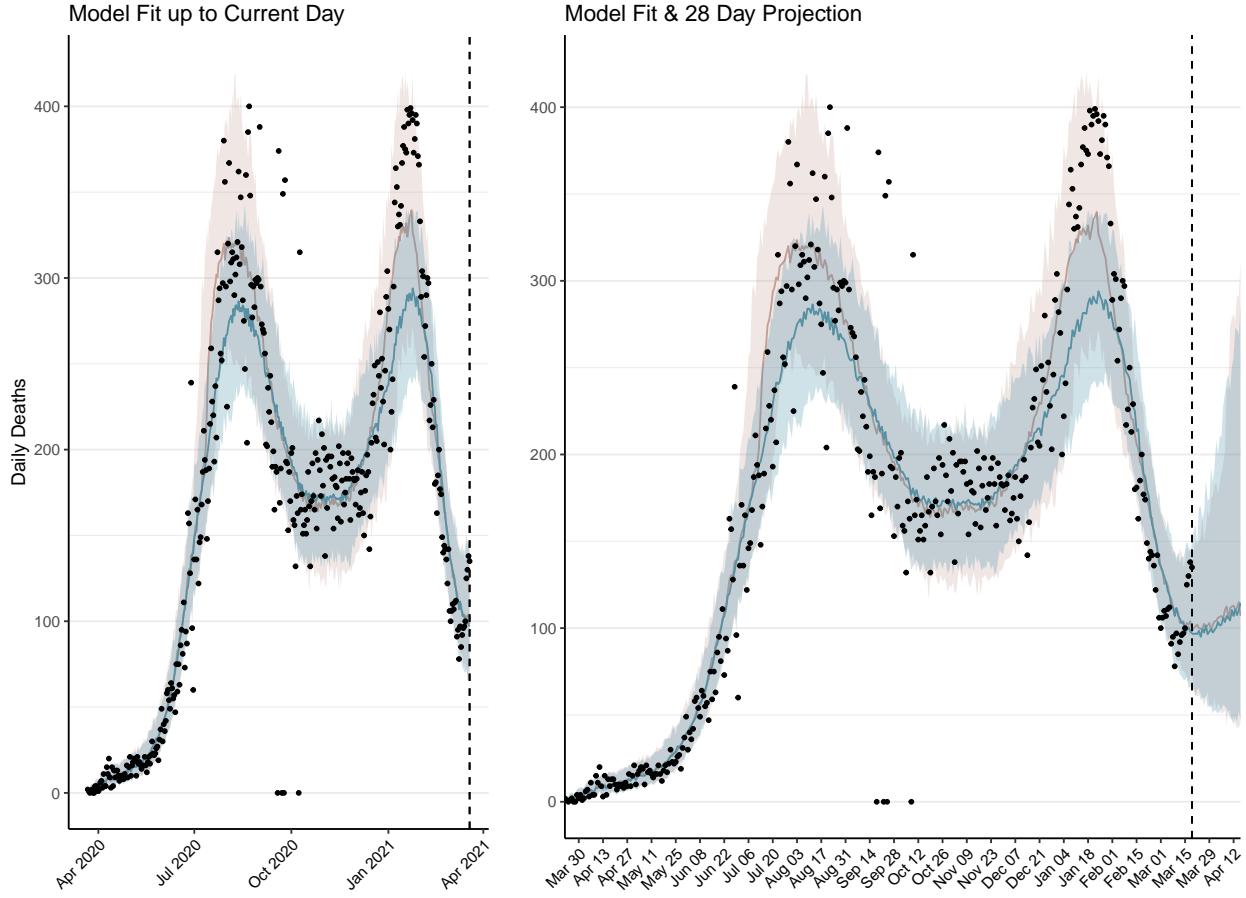


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 3,553 (95% CI: 3,394-3,712) patients requiring treatment with high-pressure oxygen at the current date to 4,378 (95% CI: 3,994-4,762) hospital beds being required on 2021-04-16 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 1,346 (95% CI: 1,291-1,401) patients requiring treatment with mechanical ventilation at the current date to 1,555 (95% CI: 1,434-1,676) by 2021-04-16. 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.**

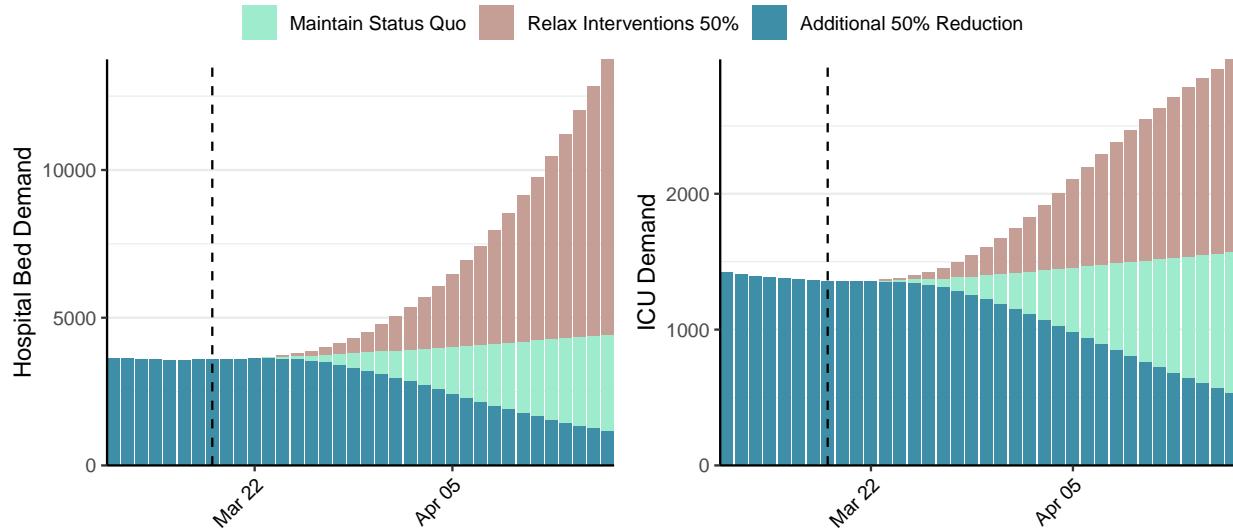


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 30,629 (95% CI: 28,730-32,528) at the current date to 3,258 (95% CI: 2,946-3,569) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 30,629 (95% CI: 28,730-32,528) at the current date to 206,335 (95% CI: 187,119-225,552) by 2021-04-16.

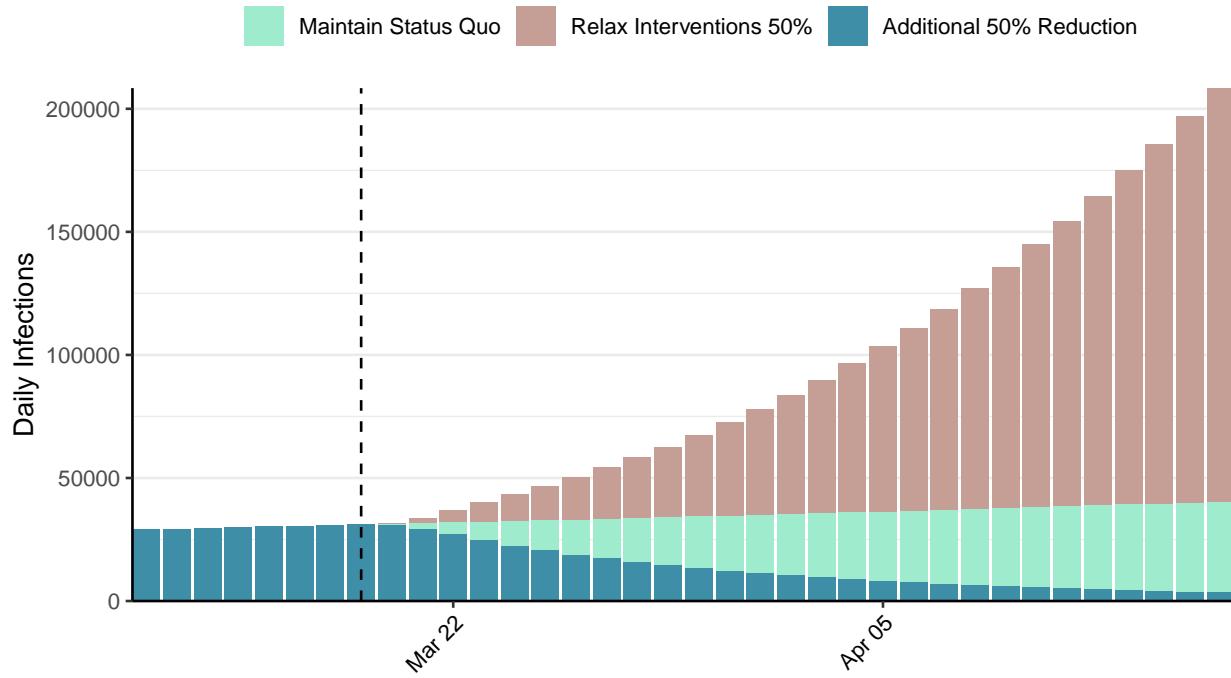


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Comoros, 2021-03-19

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Epidemiological Situation

Total Reported Cases	New Reported Cases	Total Reported Deaths	New Reported Deaths	Estimated R_{eff}
3,665	8	146	0	0.54 (95% CI: 0.37-0.76)

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.

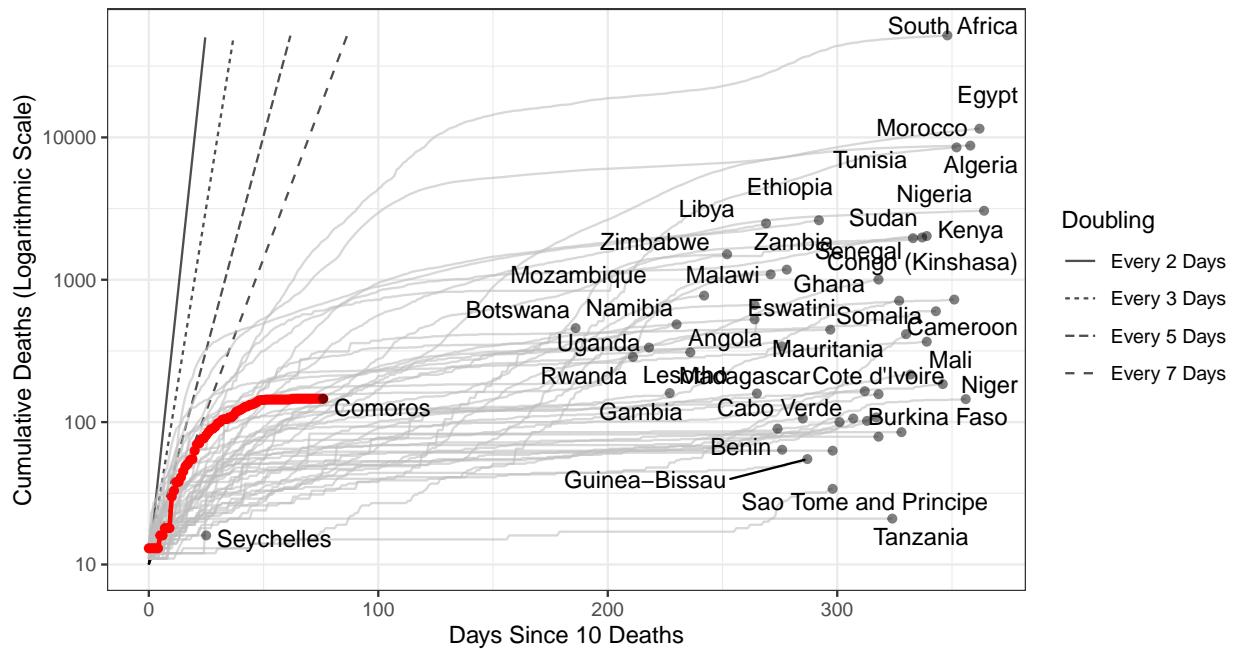


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 1,065 (95% CI: 780-1,350) 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).

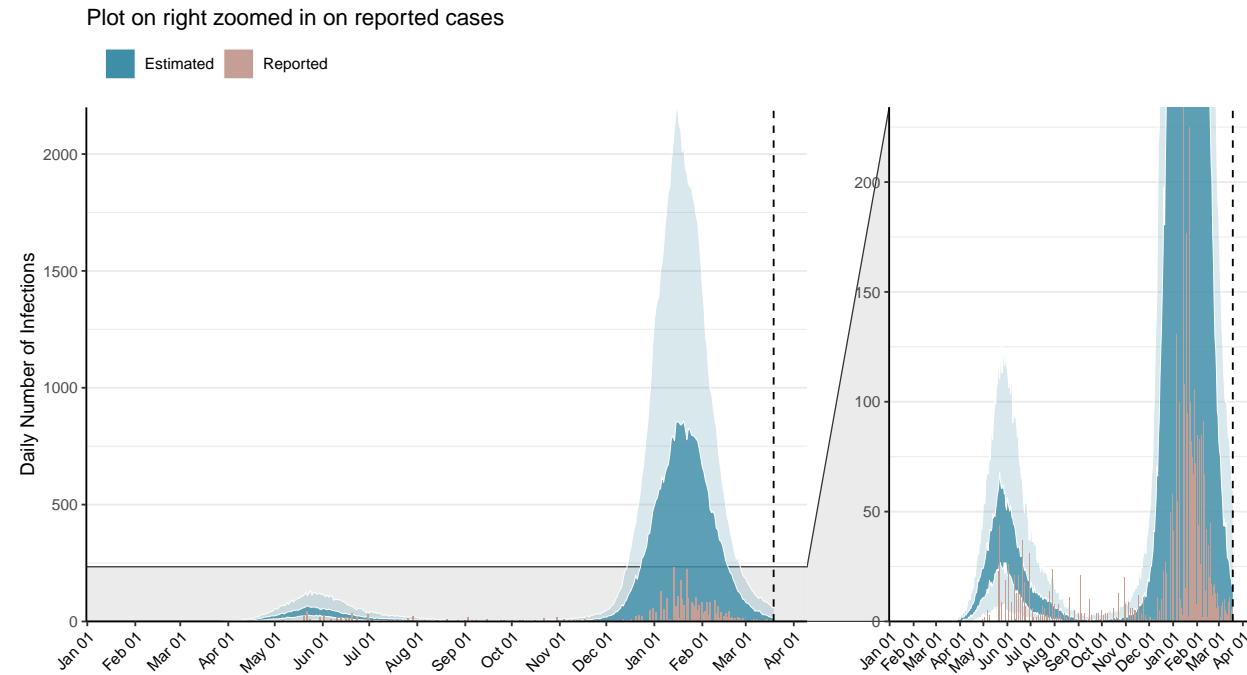


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

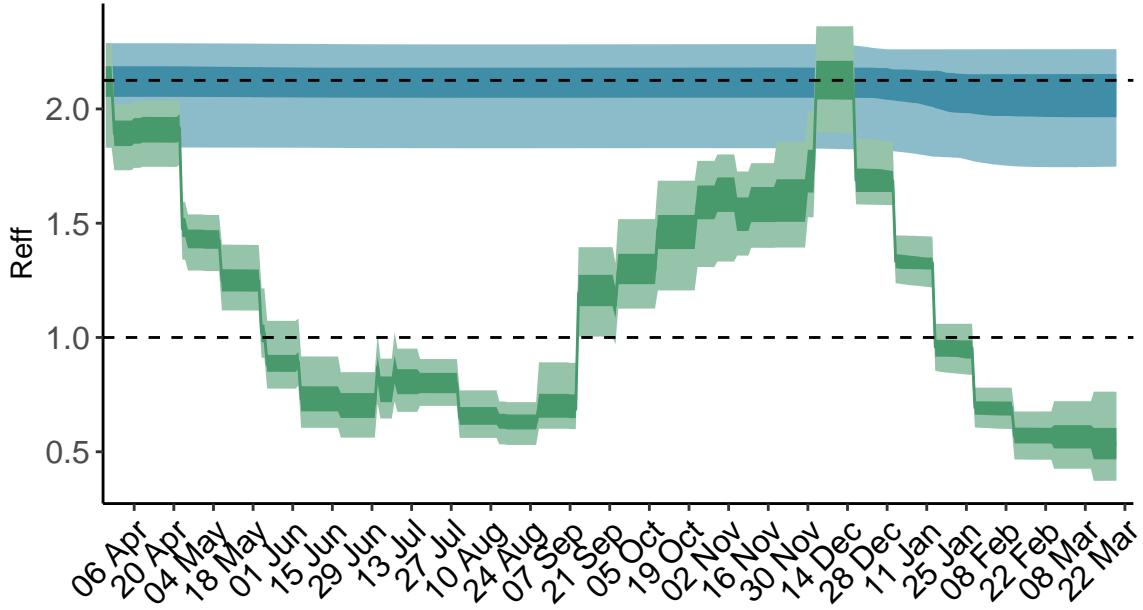


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

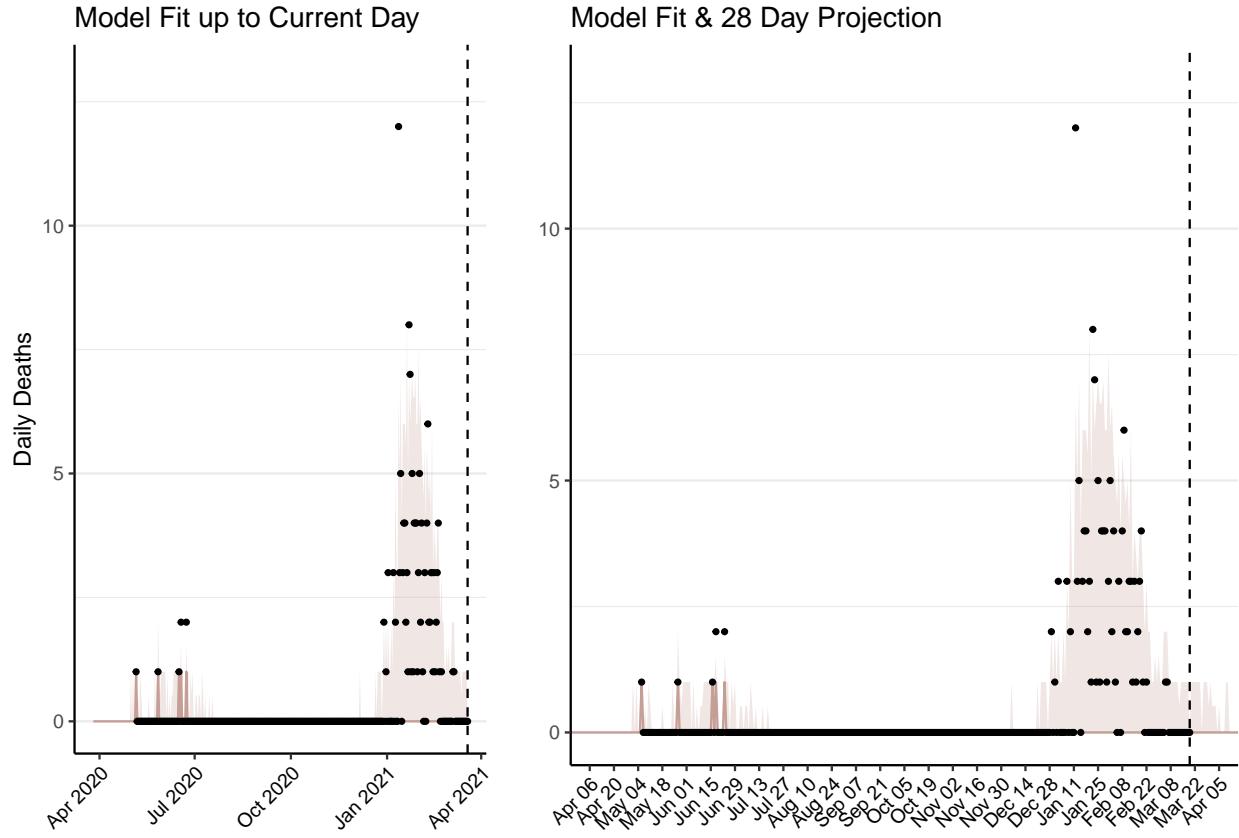


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 2-3) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-04-16 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 0 (95% CI: 0-0) by 2021-04-16. 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.**

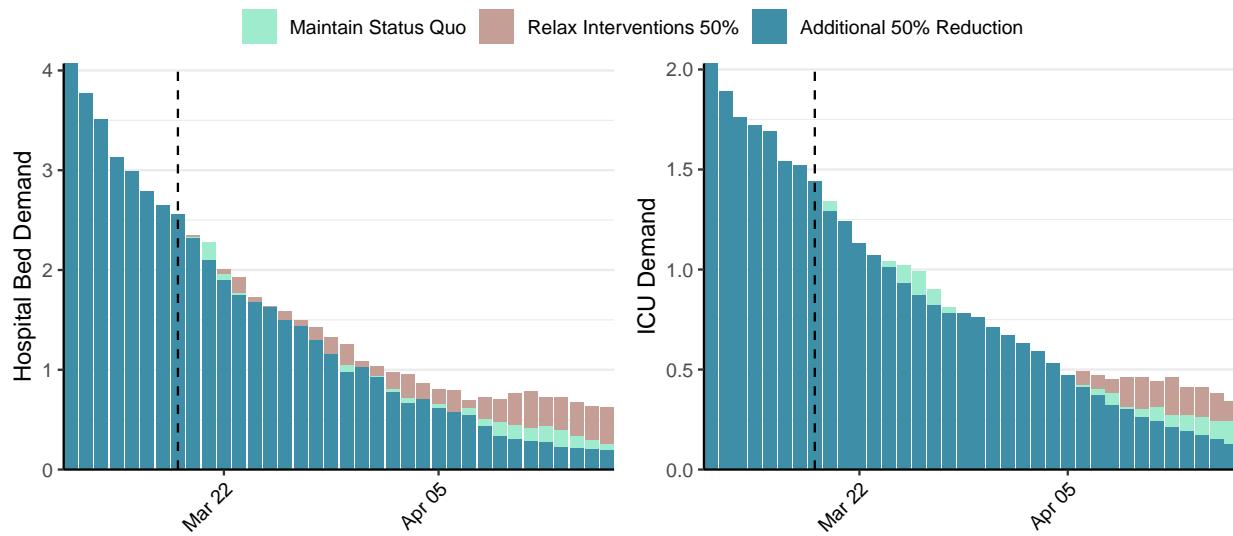


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 7-14) at the current date to 0 (95% CI: 0-0) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10 (95% CI: 7-14) at the current date to 7 (95% CI: 3-11) by 2021-04-16.

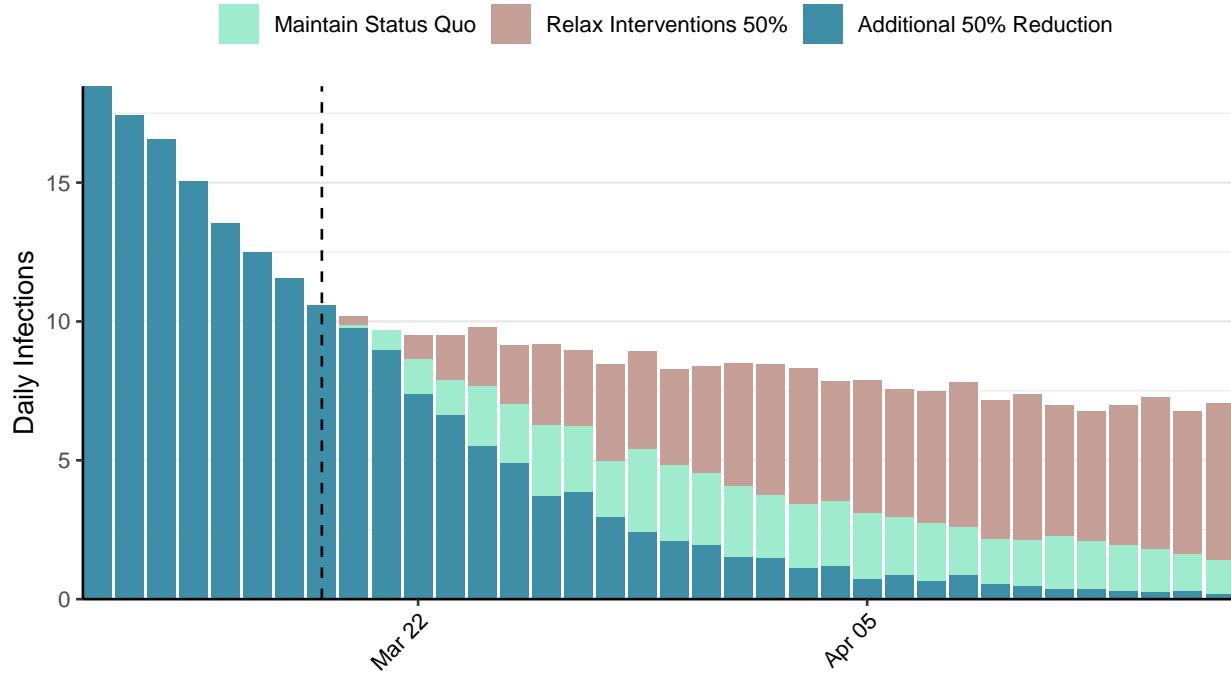


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Cabo Verde, 2021-03-19

[Download the report for Cabo Verde, 2021-03-19 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}
16,374	76	159	1	0.95 (95% CI: 0.74-1.15)

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.

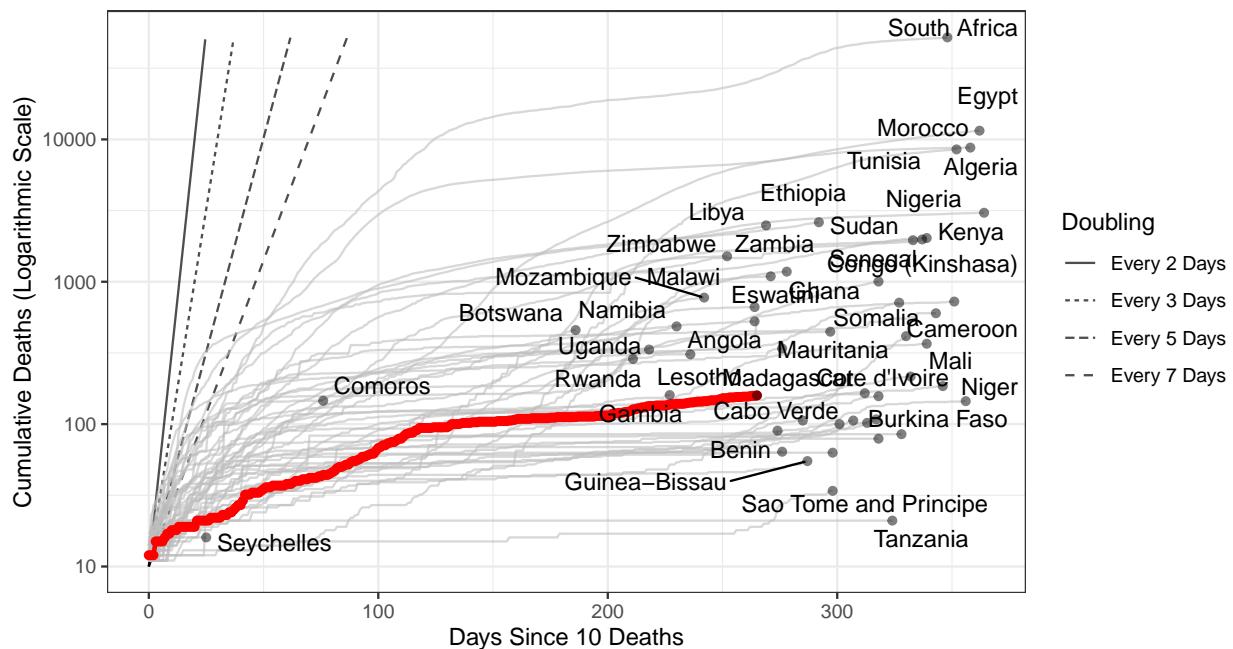


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 5,726 (95% CI: 5,231-6,221) 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

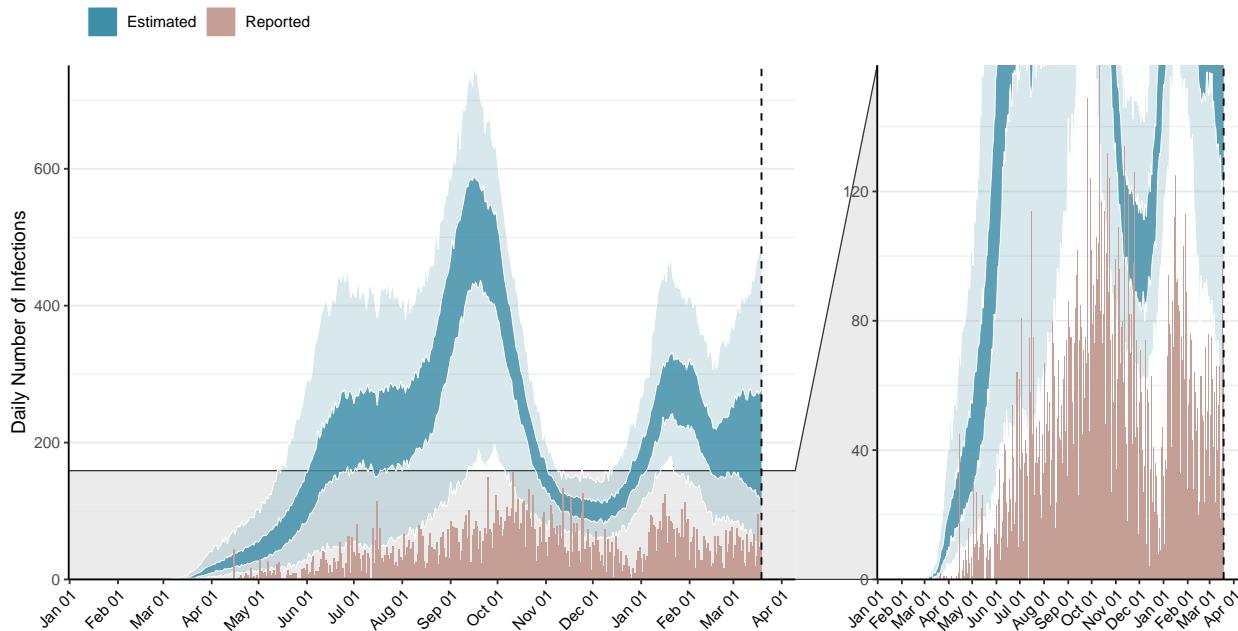


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

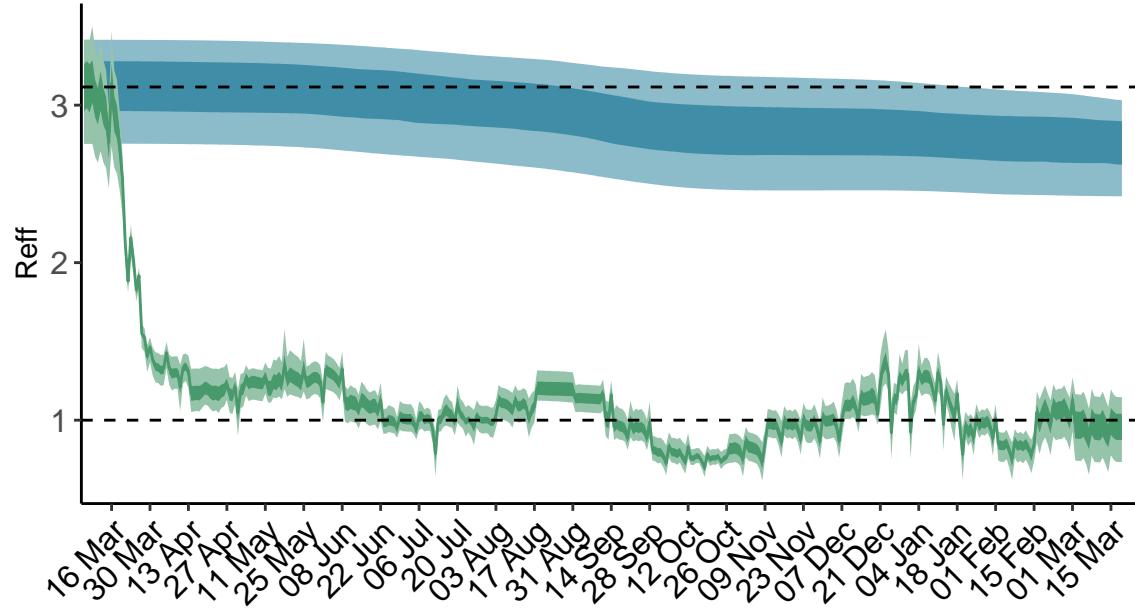


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

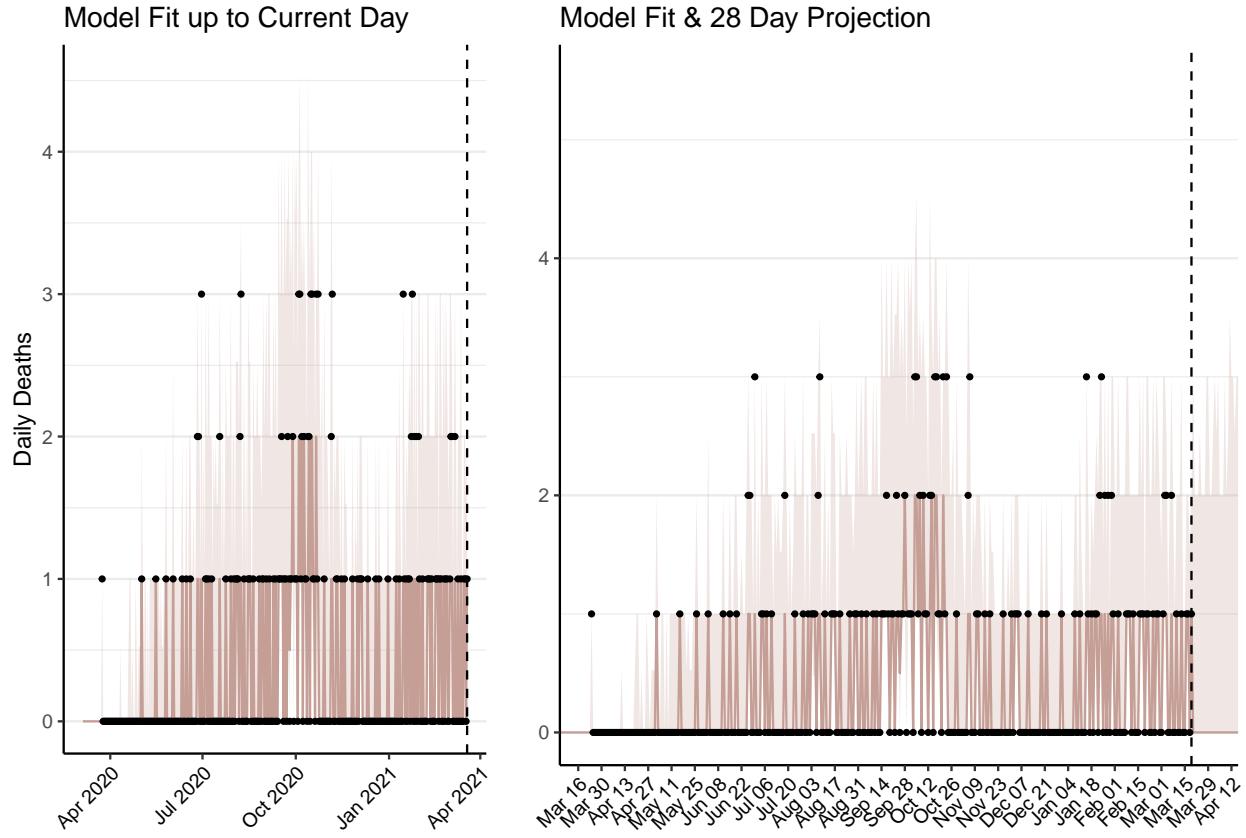


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 21 (95% CI: 19-24) patients requiring treatment with high-pressure oxygen at the current date to 22 (95% CI: 18-26) hospital beds being required on 2021-04-16 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: 7-8) patients requiring treatment with mechanical ventilation at the current date to 8 (95% CI: 7-9) by 2021-04-16. 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.**

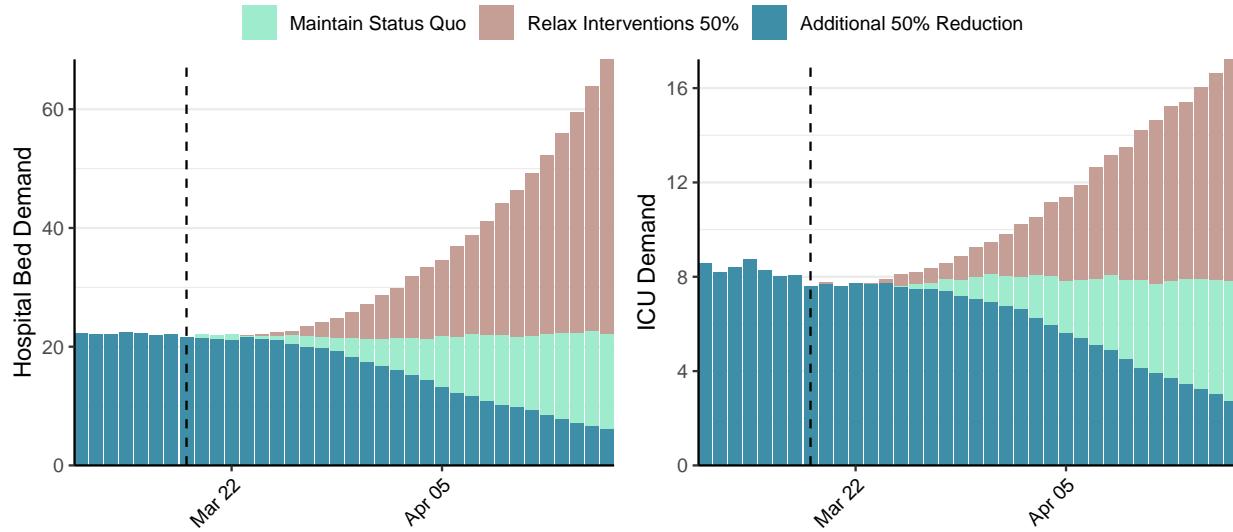


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 212 (95% CI: 187-238) at the current date to 17 (95% CI: 14-20) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 212 (95% CI: 187-238) at the current date to 1,208 (95% CI: 971-1,444) by 2021-04-16.

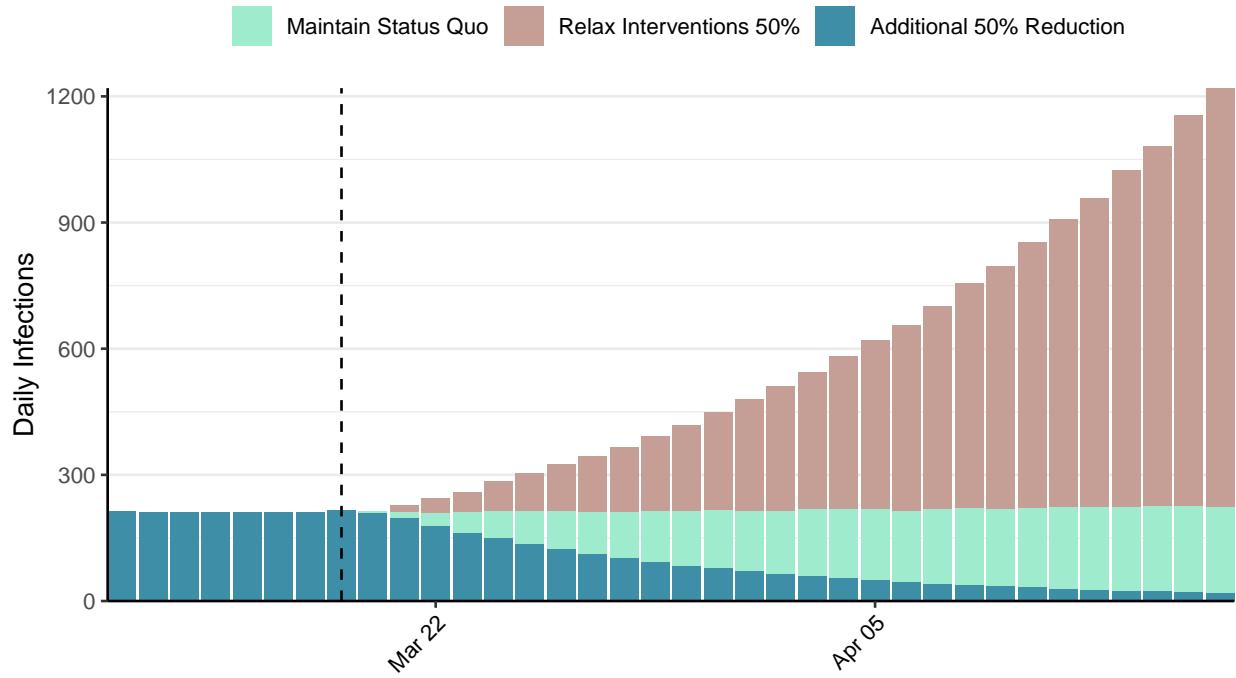


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Costa Rica, 2021-03-19

[Download the report for Costa Rica, 2021-03-19 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}
211,903	1,456	2,896	10	0.89 (95% CI: 0.75-1.08)

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.

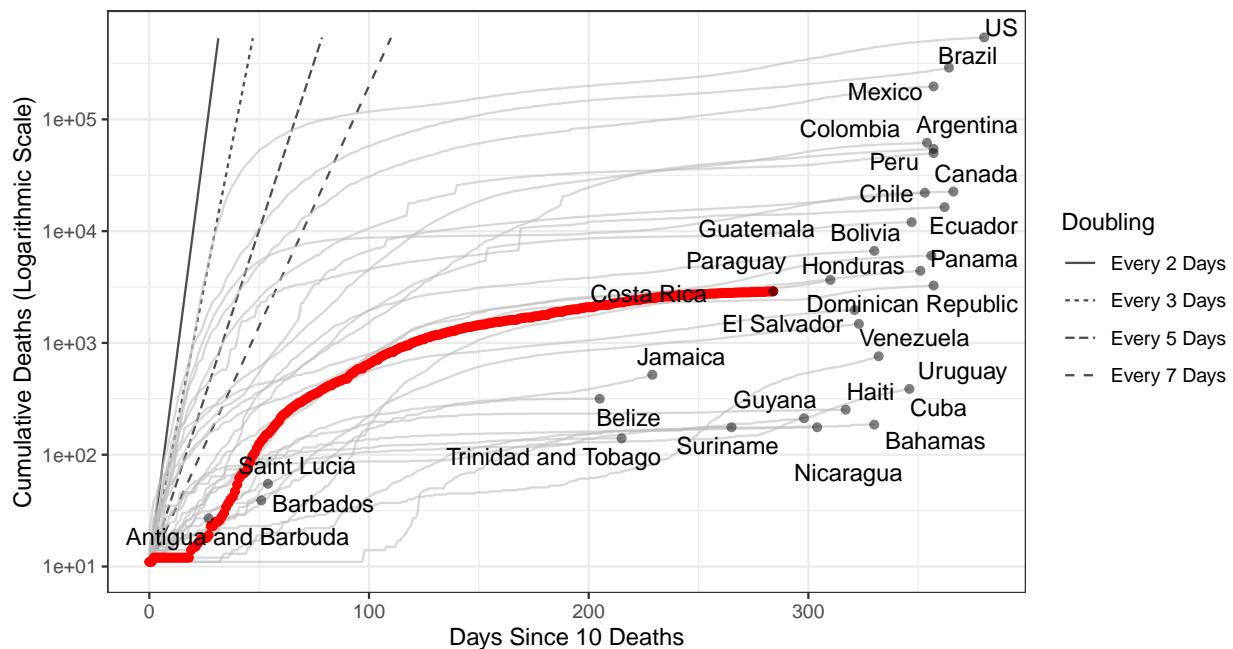


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 32,012 (95% CI: 29,267-34,757) 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).

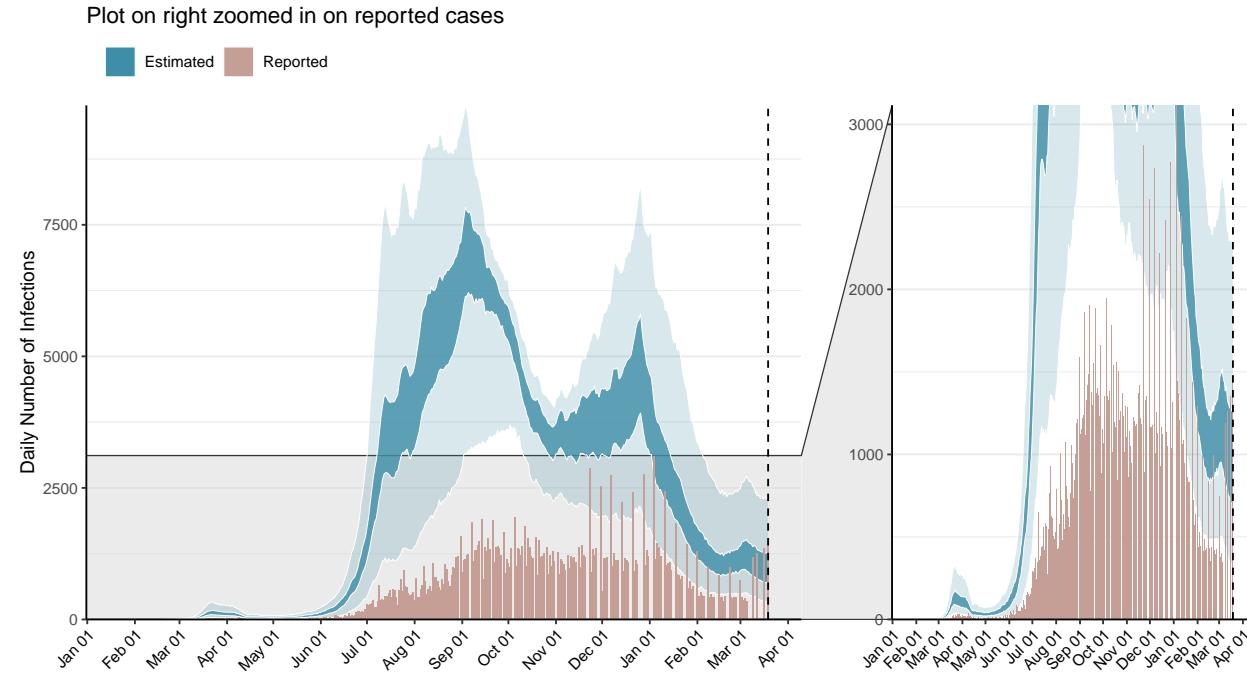


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

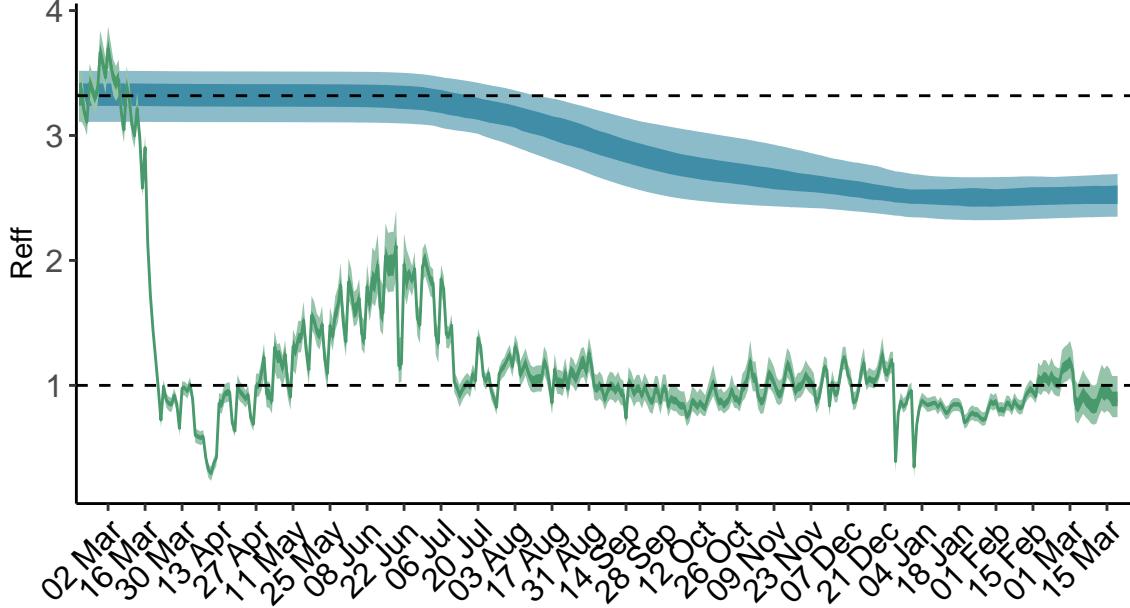


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

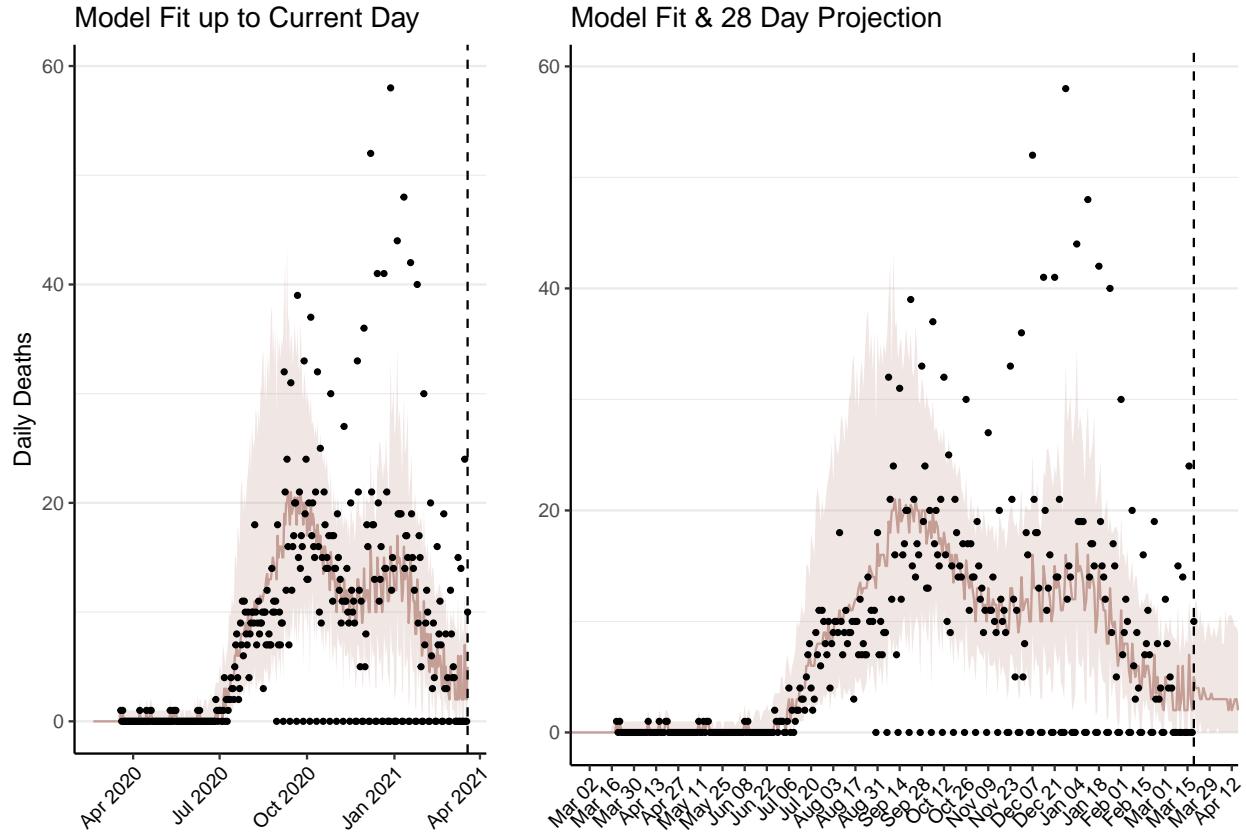


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 137 (95% CI: 125-149) patients requiring treatment with high-pressure oxygen at the current date to 102 (95% CI: 89-115) hospital beds being required on 2021-04-16 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: 46-55) patients requiring treatment with mechanical ventilation at the current date to 38 (95% CI: 33-43) by 2021-04-16. 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.**

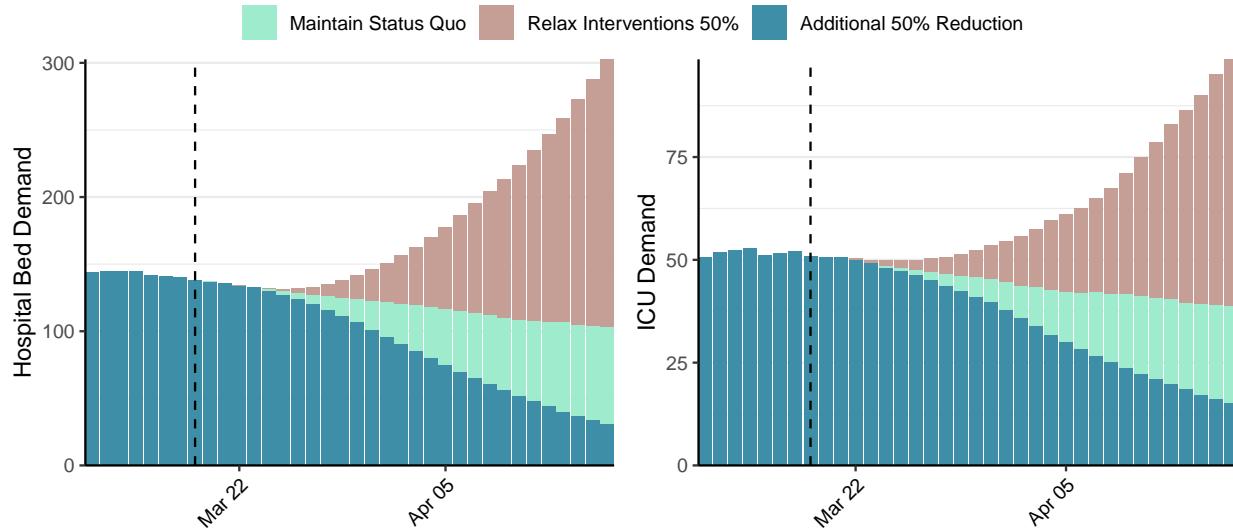


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,037 (95% CI: 936-1,138) at the current date to 69 (95% CI: 60-79) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,037 (95% CI: 936-1,138) at the current date to 4,298 (95% CI: 3,630-4,967) by 2021-04-16.

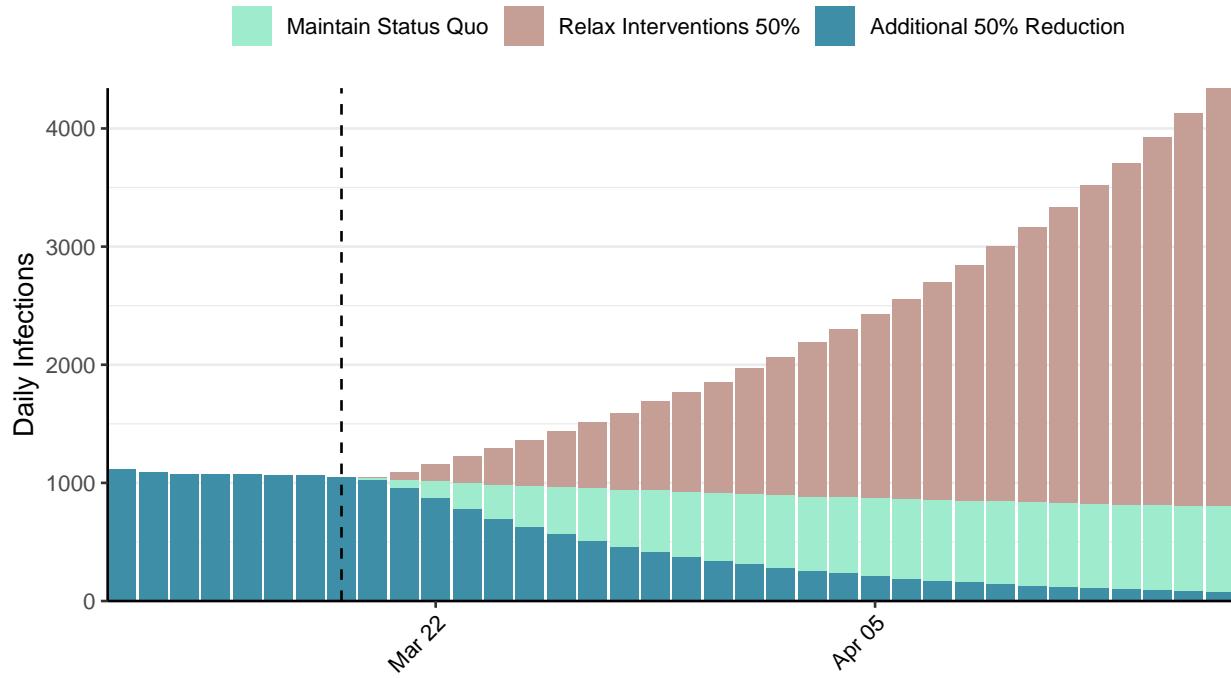


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Cuba, 2021-03-19

[Download the report for Cuba, 2021-03-19 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}
65,149	735	388	3	0.88 (95% CI: 0.71-1.06)

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.

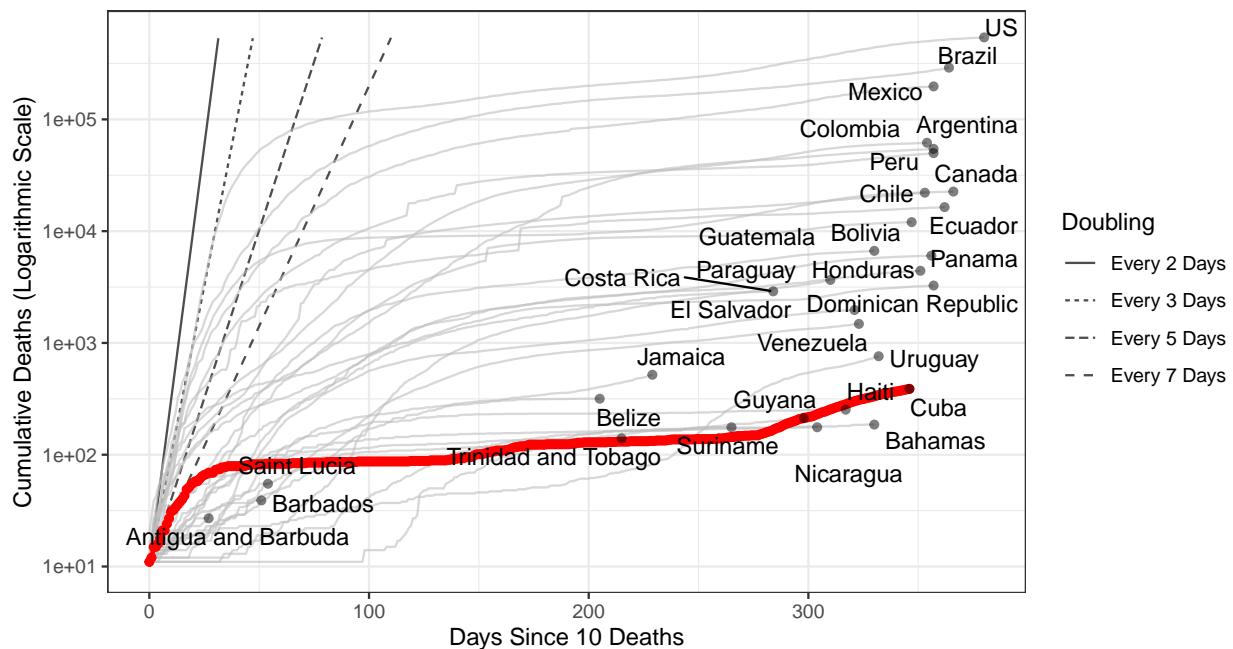


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 31,562 (95% CI: 29,640-33,483) 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).

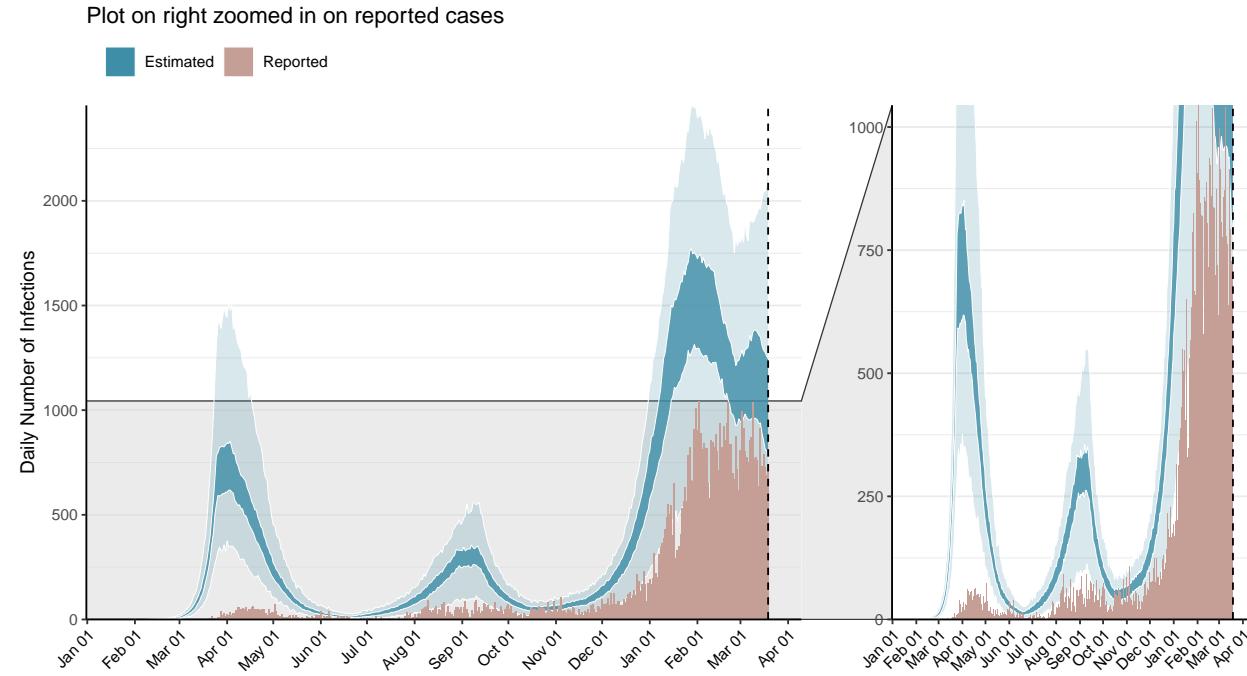


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

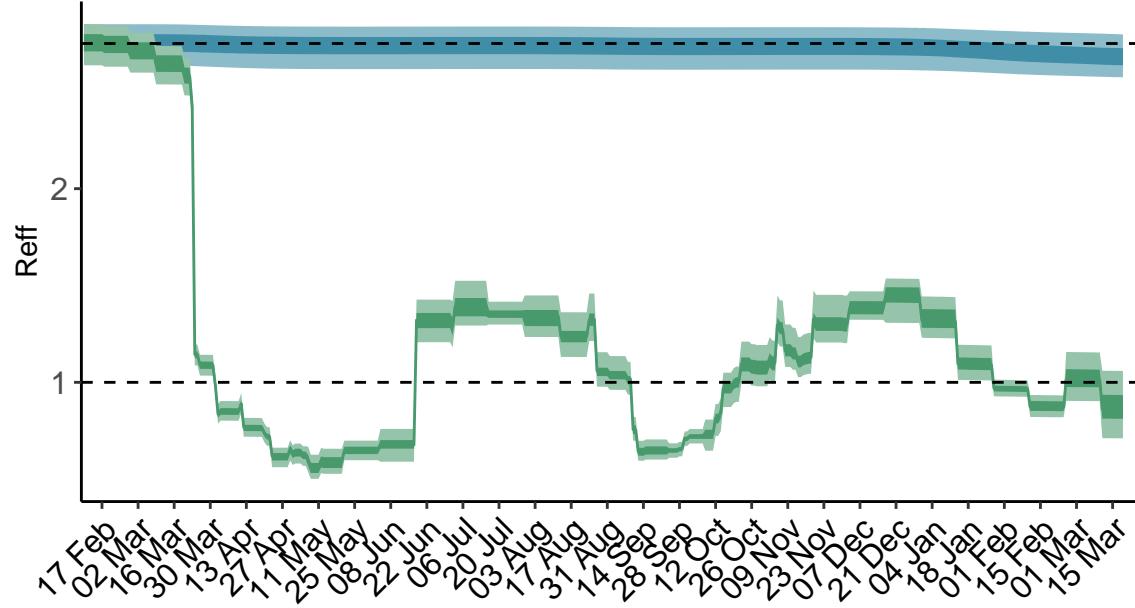


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

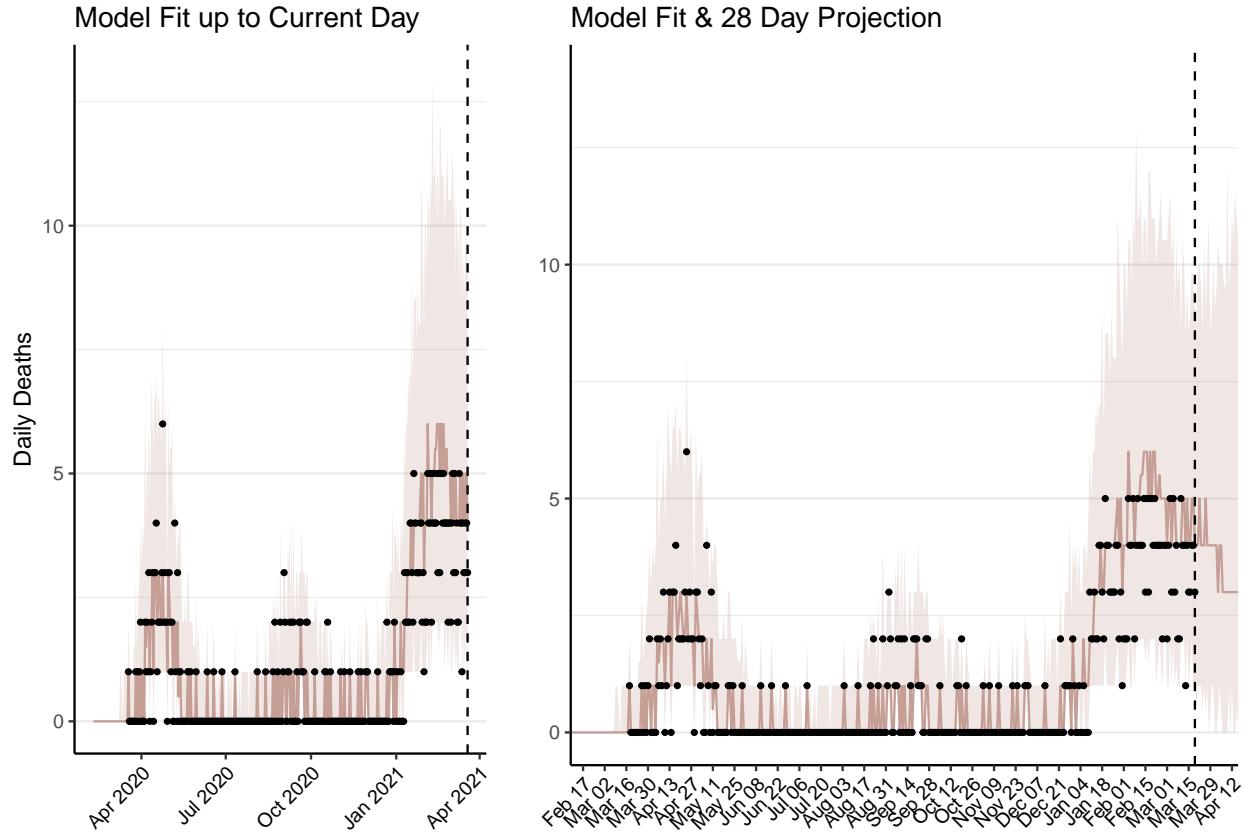


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 156 (95% CI: 146-167) patients requiring treatment with high-pressure oxygen at the current date to 115 (95% CI: 100-131) hospital beds being required on 2021-04-16 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: 51-58) patients requiring treatment with mechanical ventilation at the current date to 42 (95% CI: 37-47) by 2021-04-16. 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.**

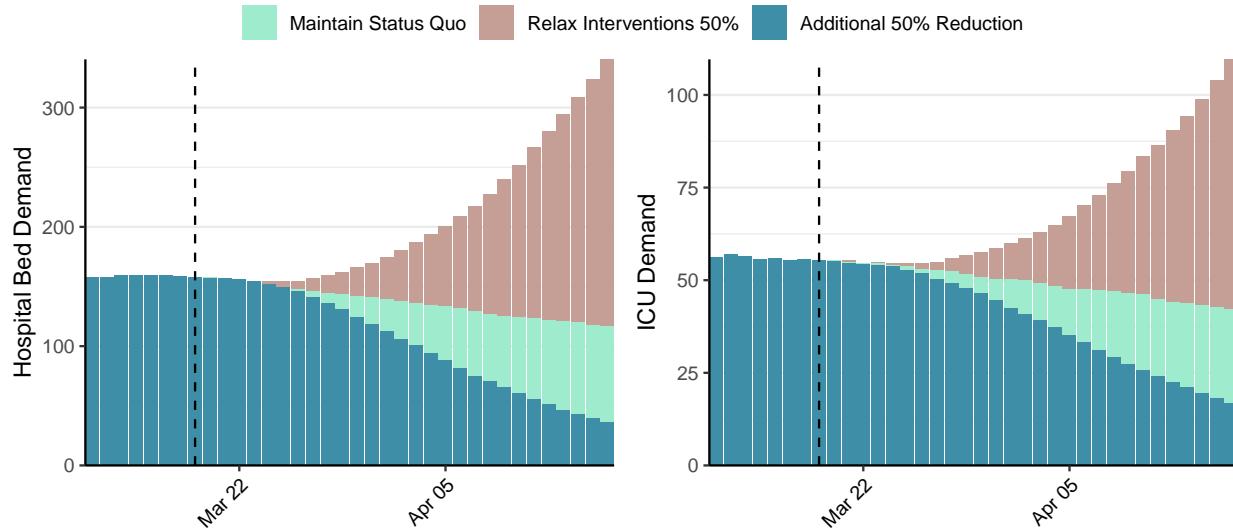


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,047 (95% CI: 960-1,134) at the current date to 65 (95% CI: 56-75) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,047 (95% CI: 960-1,134) at the current date to 4,166 (95% CI: 3,403-4,929) by 2021-04-16.

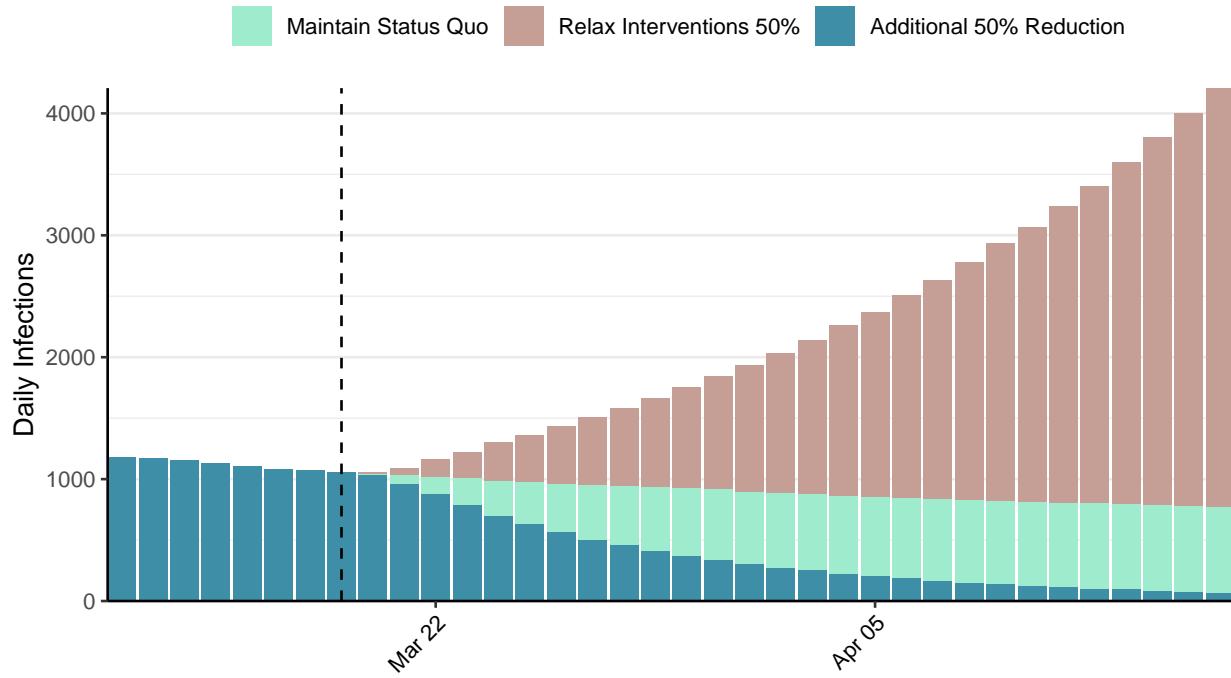


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Djibouti, 2021-03-19

[Download the report for Djibouti, 2021-03-19 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}
6,501	49	63	0	1.11 (95% CI: 0.83-1.53)

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.

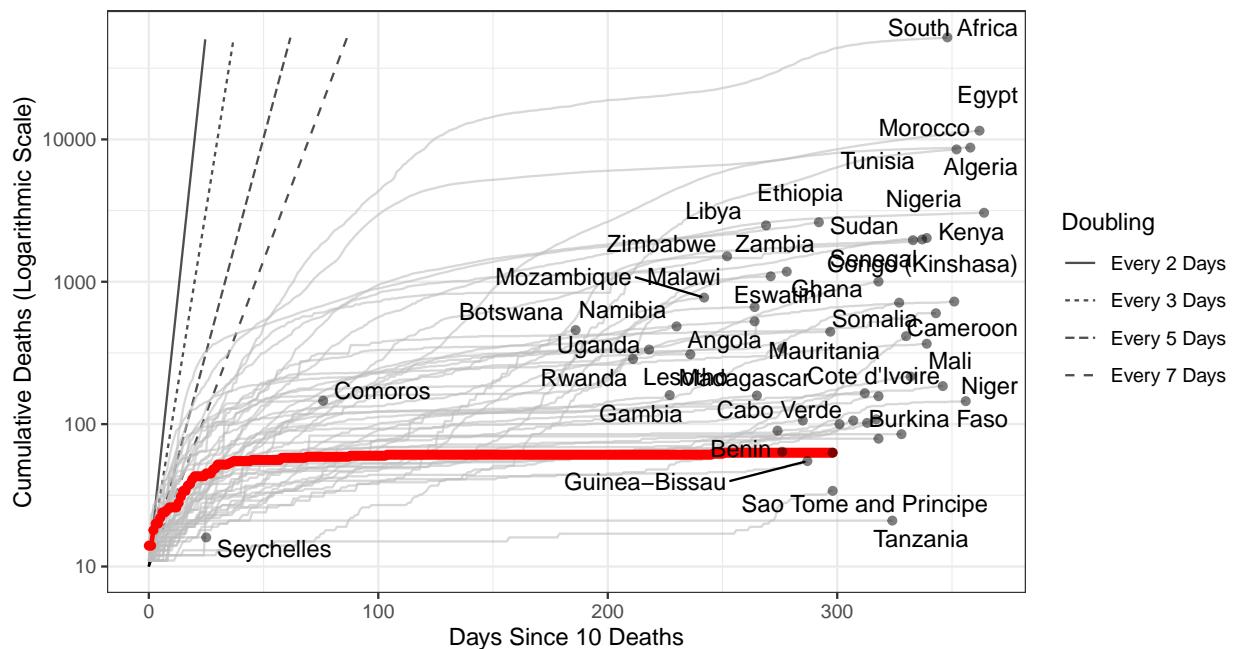


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 514 (95% CI: 329-699) 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).

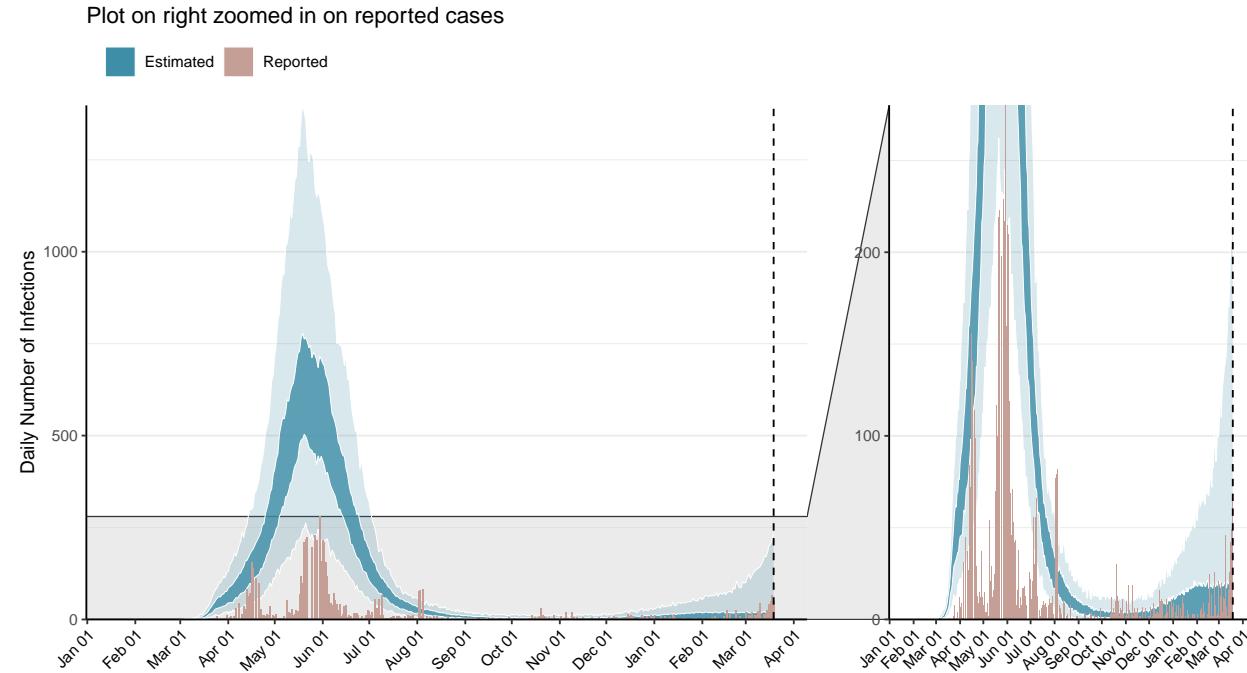


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

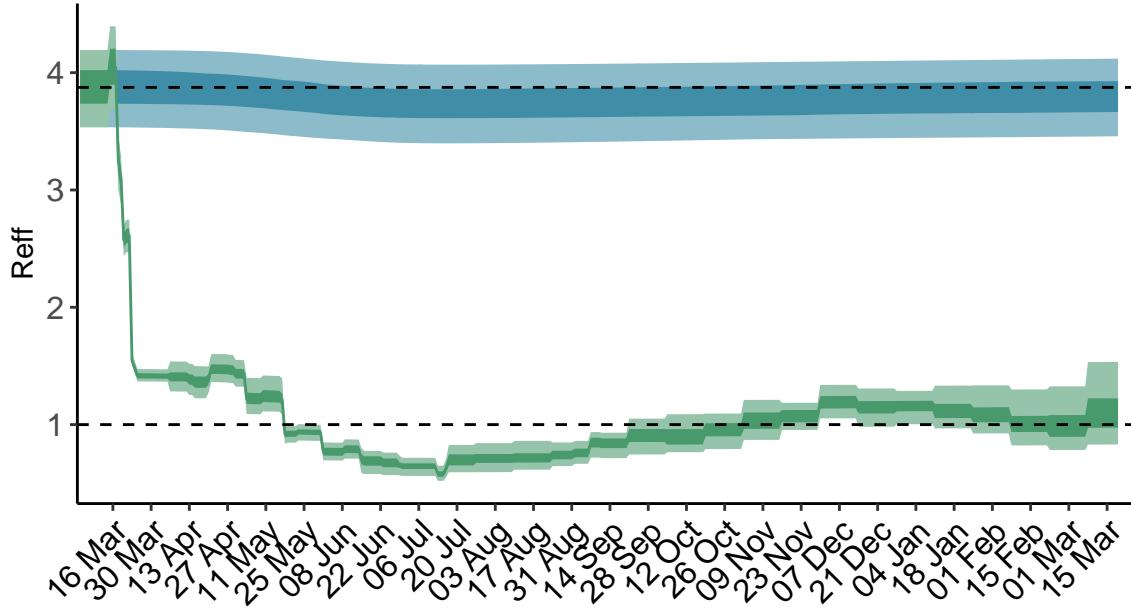


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

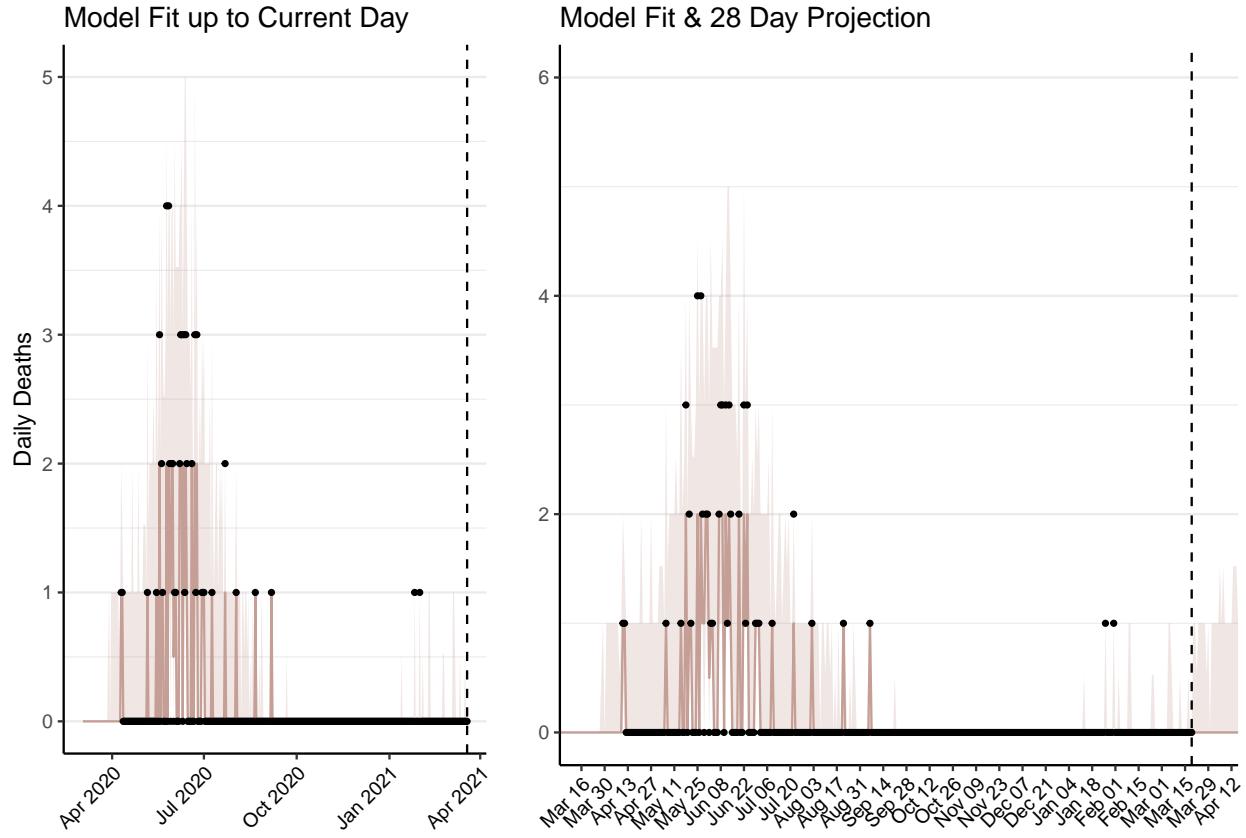


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 (95% CI: 1-3) patients requiring treatment with high-pressure oxygen at the current date to 6 (95% CI: 3-9) hospital beds being required on 2021-04-16 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: 0-1) patients requiring treatment with mechanical ventilation at the current date to 2 (95% CI: 1-3) by 2021-04-16. 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.**

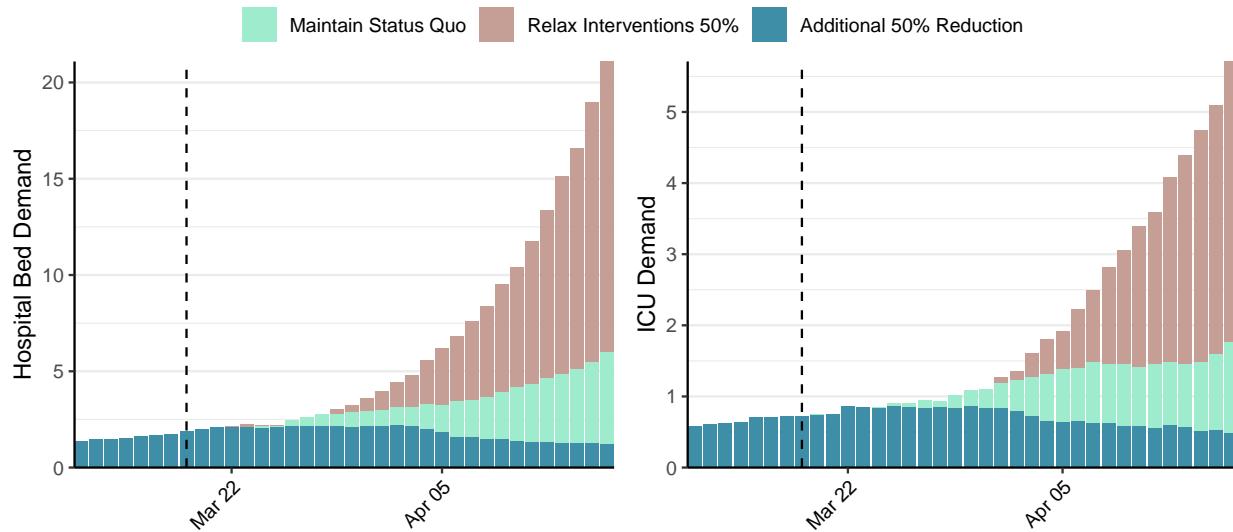


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 26 (95% CI: 15-37) at the current date to 6 (95% CI: 2-9) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 26 (95% CI: 15-37) at the current date to 628 (95% CI: 243-1,012) by 2021-04-16.

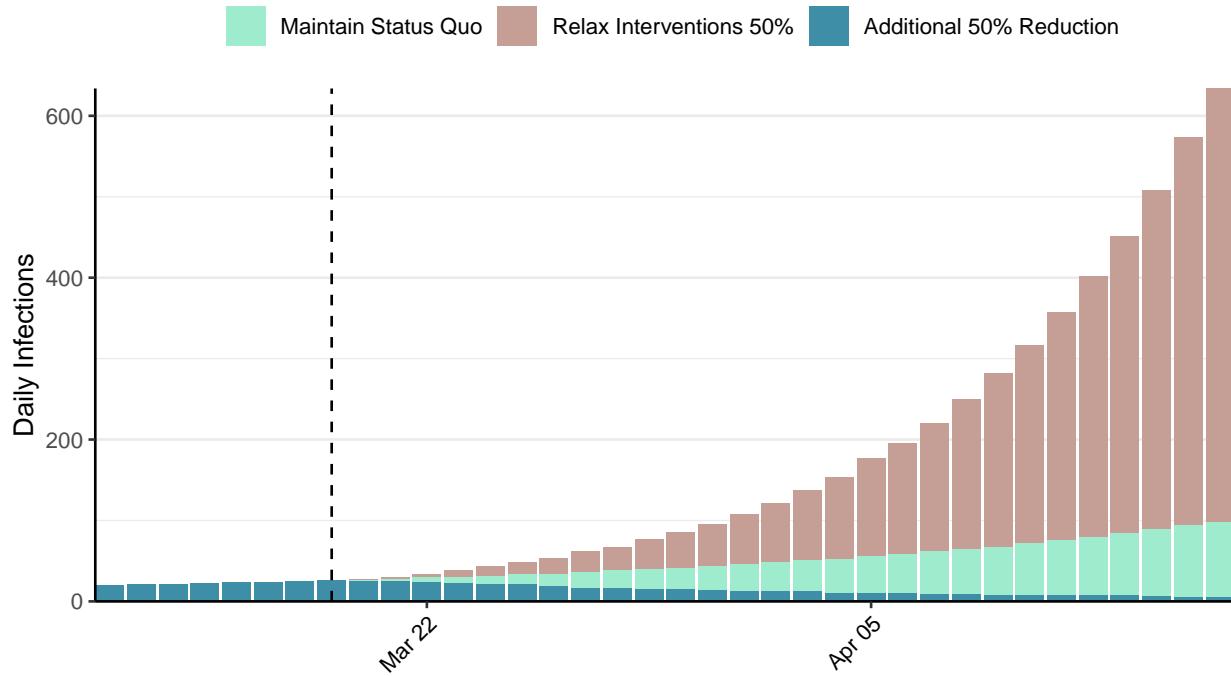


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Dominican Republic, 2021-03-19

[Download the report for Dominican Republic, 2021-03-19 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}
248,502	523	3,262	5	0.82 (95% CI: 0.68-0.98)

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.

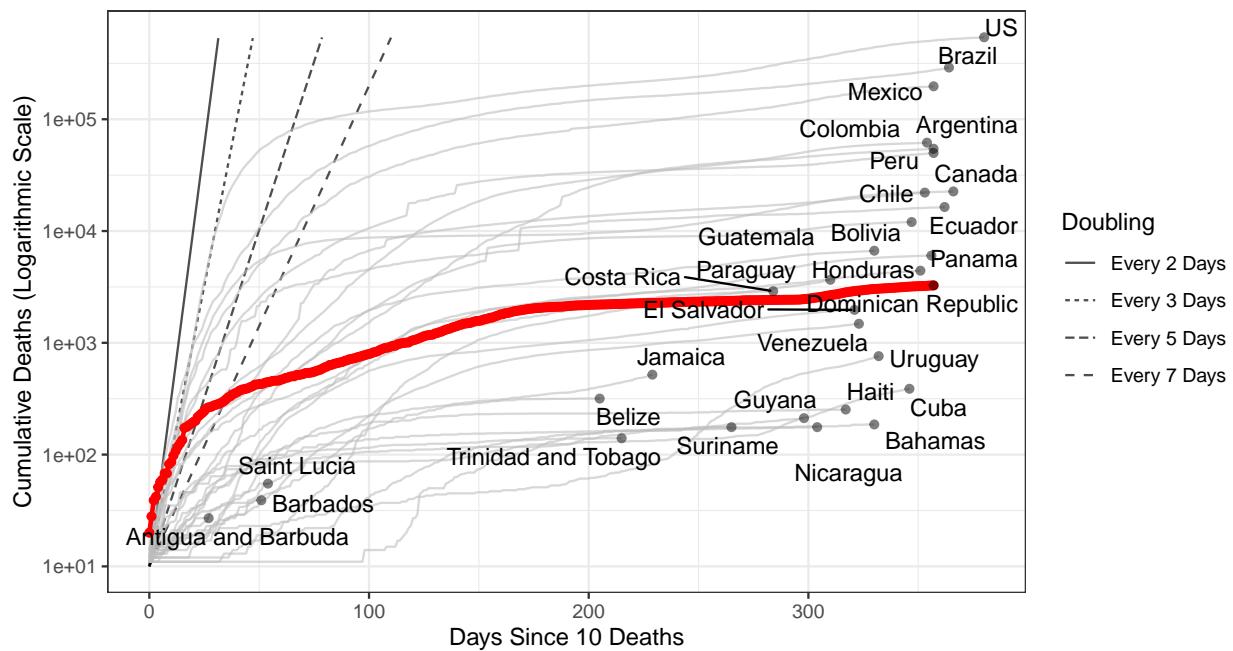


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 66,702 (95% CI: 63,134-70,269) 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).

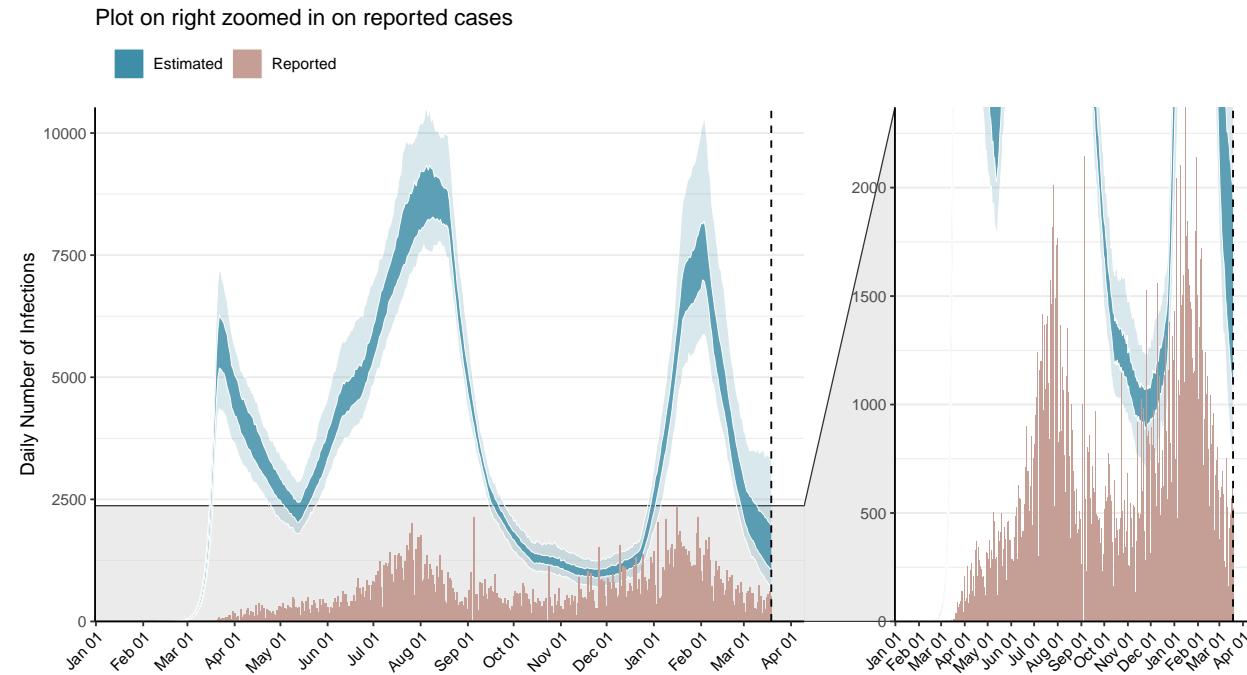


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

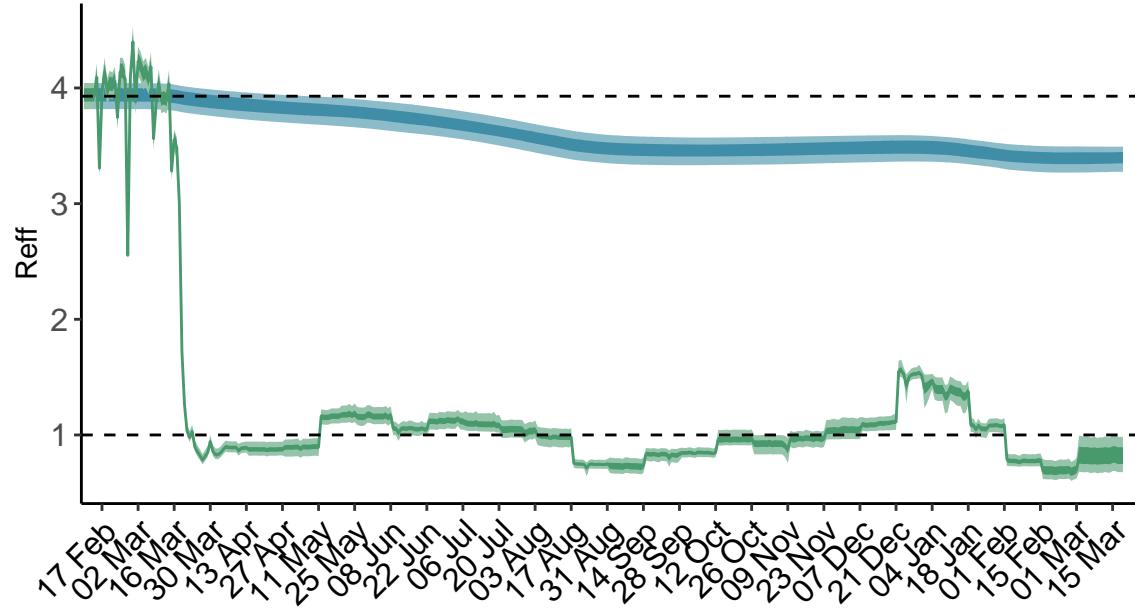


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

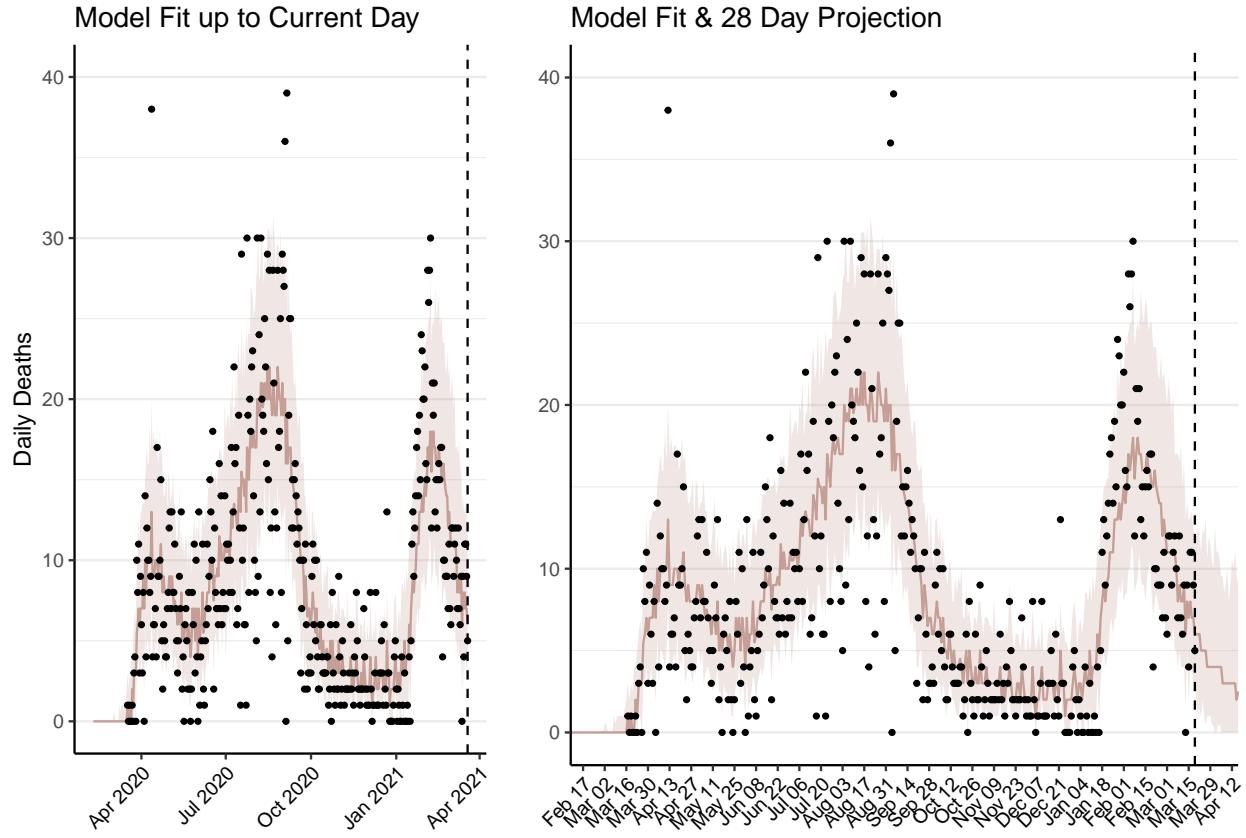


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 202 (95% CI: 189-215) patients requiring treatment with high-pressure oxygen at the current date to 105 (95% CI: 90-120) hospital beds being required on 2021-04-16 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: 79-89) patients requiring treatment with mechanical ventilation at the current date to 41 (95% CI: 35-47) by 2021-04-16. 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.**

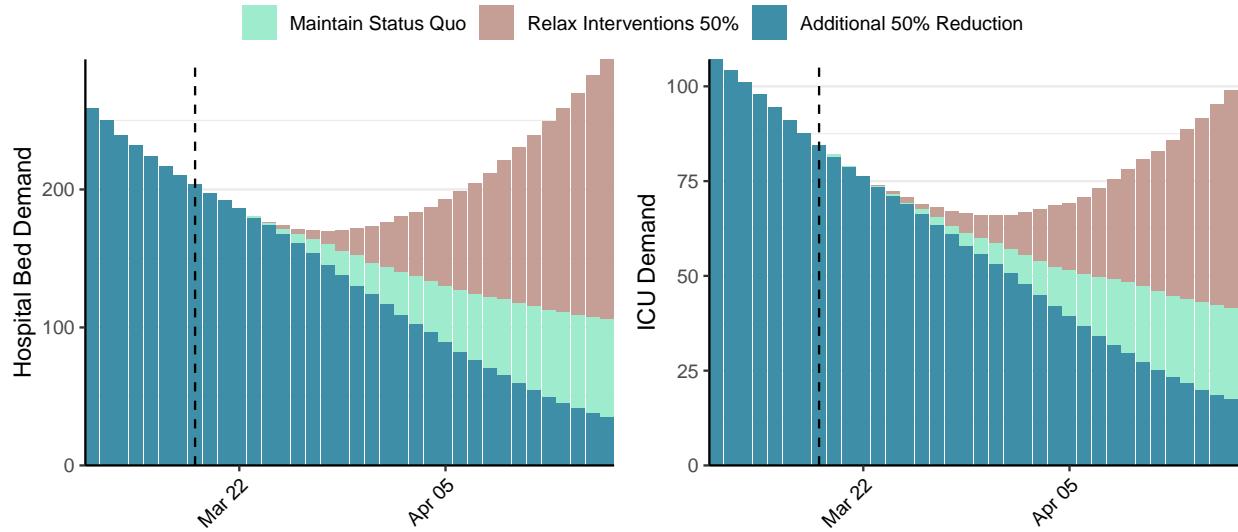


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,564 (95% CI: 1,418-1,711) at the current date to 84 (95% CI: 70-98) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,564 (95% CI: 1,418-1,711) at the current date to 4,876 (95% CI: 3,932-5,820) by 2021-04-16.

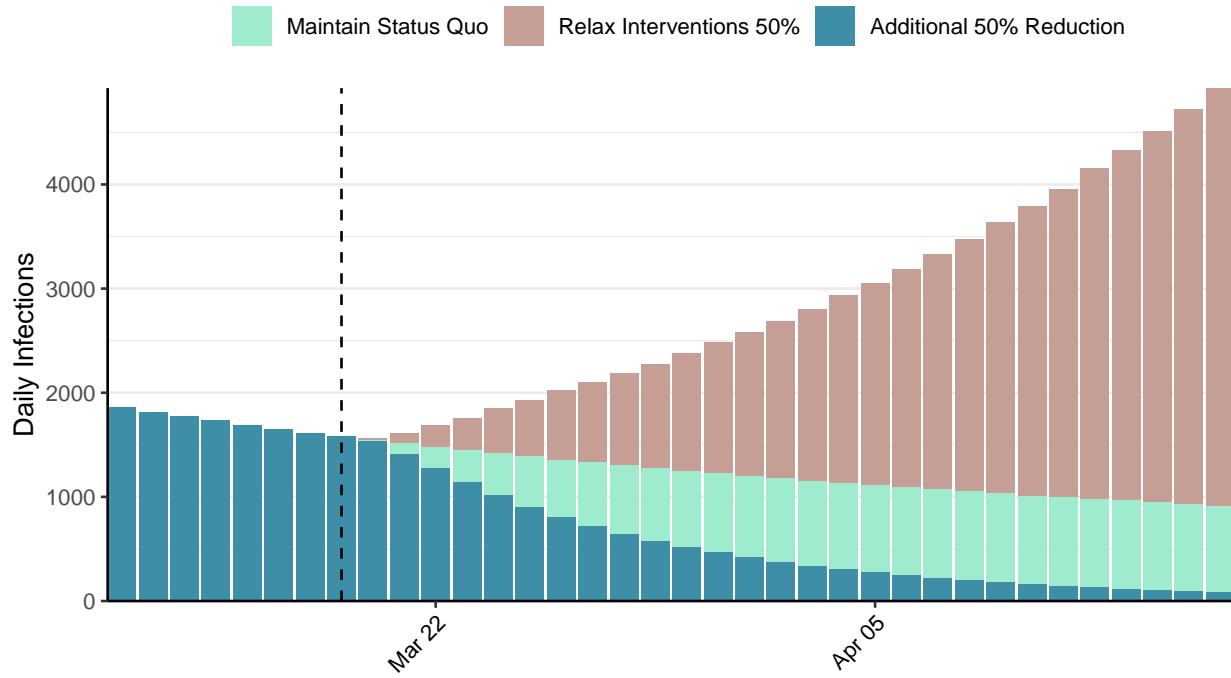


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Algeria, 2021-03-19

[Download the report for Algeria, 2021-03-19 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}
115,970	128	3,053	2	0.92 (95% CI: 0.78-1.08)

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.

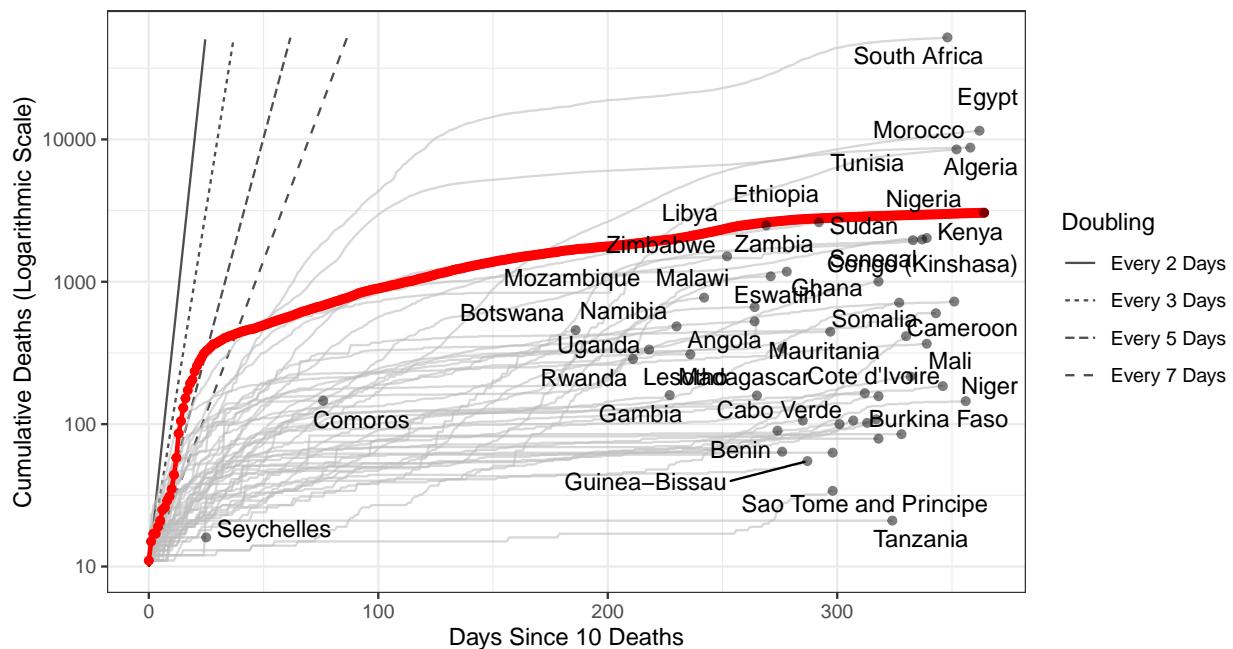


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 30,446 (95% CI: 29,114-31,778) 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).

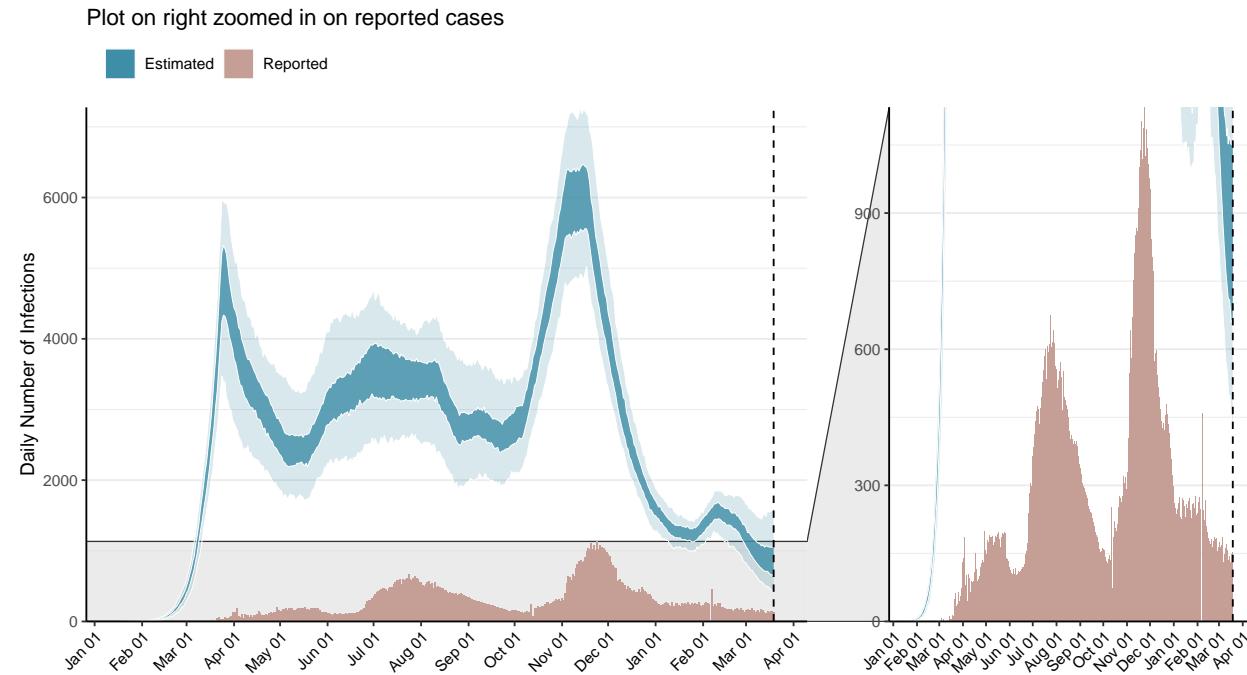


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

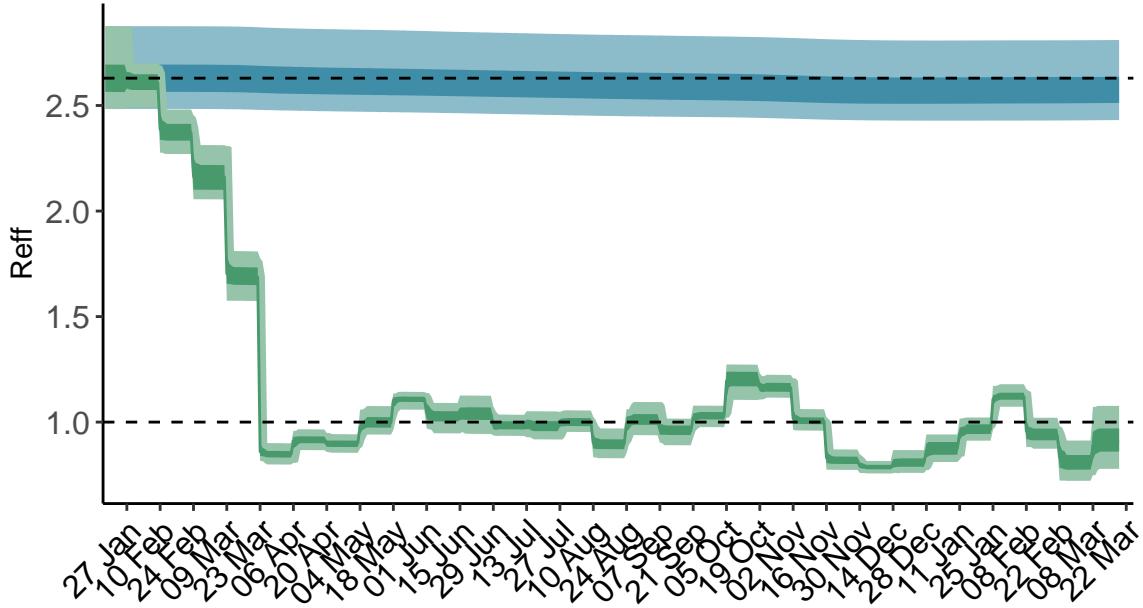


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

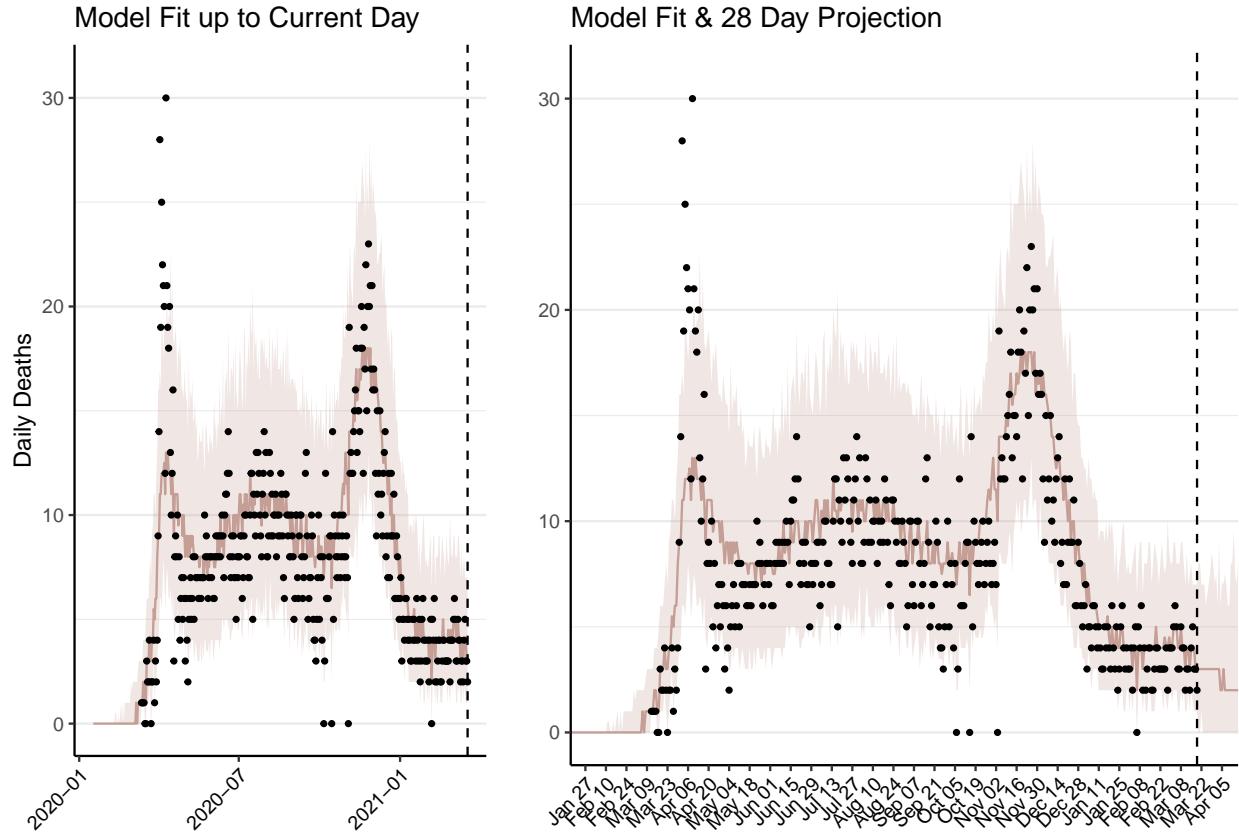


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 122 (95% CI: 116-128) patients requiring treatment with high-pressure oxygen at the current date to 92 (95% CI: 81-103) hospital beds being required on 2021-04-16 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 51 (95% CI: 48-53) patients requiring treatment with mechanical ventilation at the current date to 36 (95% CI: 32-40) by 2021-04-16. 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.**

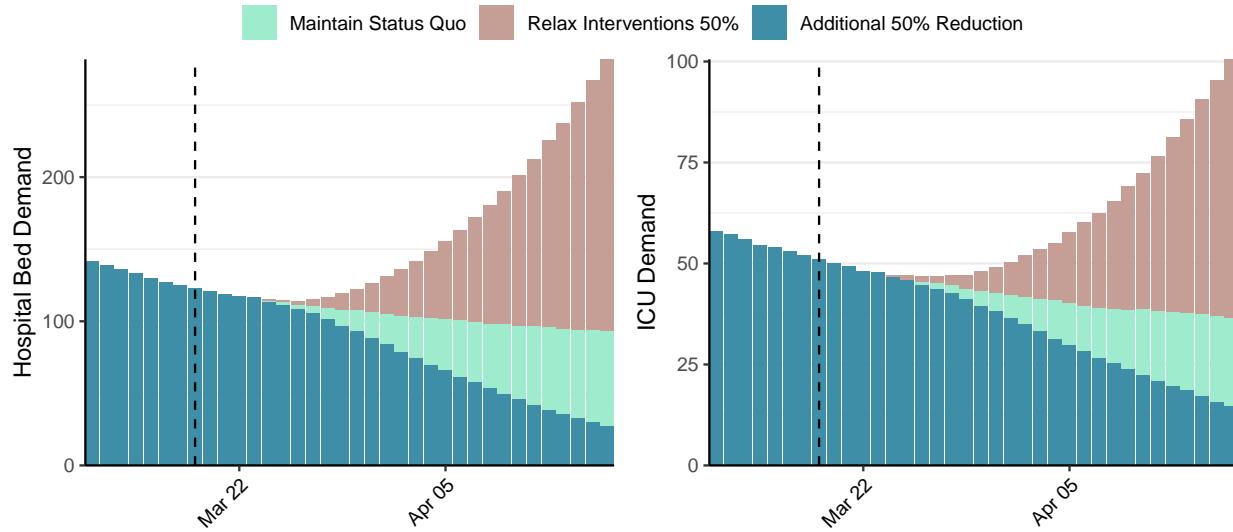


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 860 (95% CI: 798-921) at the current date to 63 (95% CI: 54-71) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 860 (95% CI: 798-921) at the current date to 4,137 (95% CI: 3,491-4,784) by 2021-04-16.

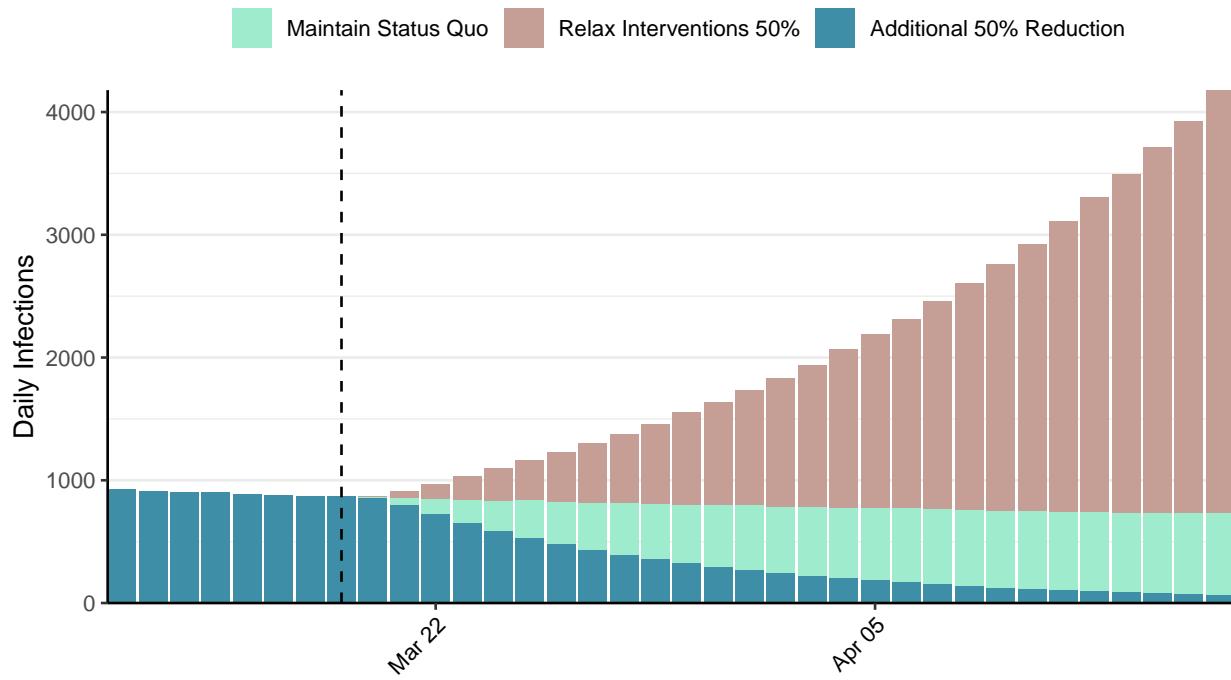


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Ecuador, 2021-03-19

[Download the report for Ecuador, 2021-03-19 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}
310,867	1,225	16,435	23	0.91 (95% CI: 0.77-1.06)

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.

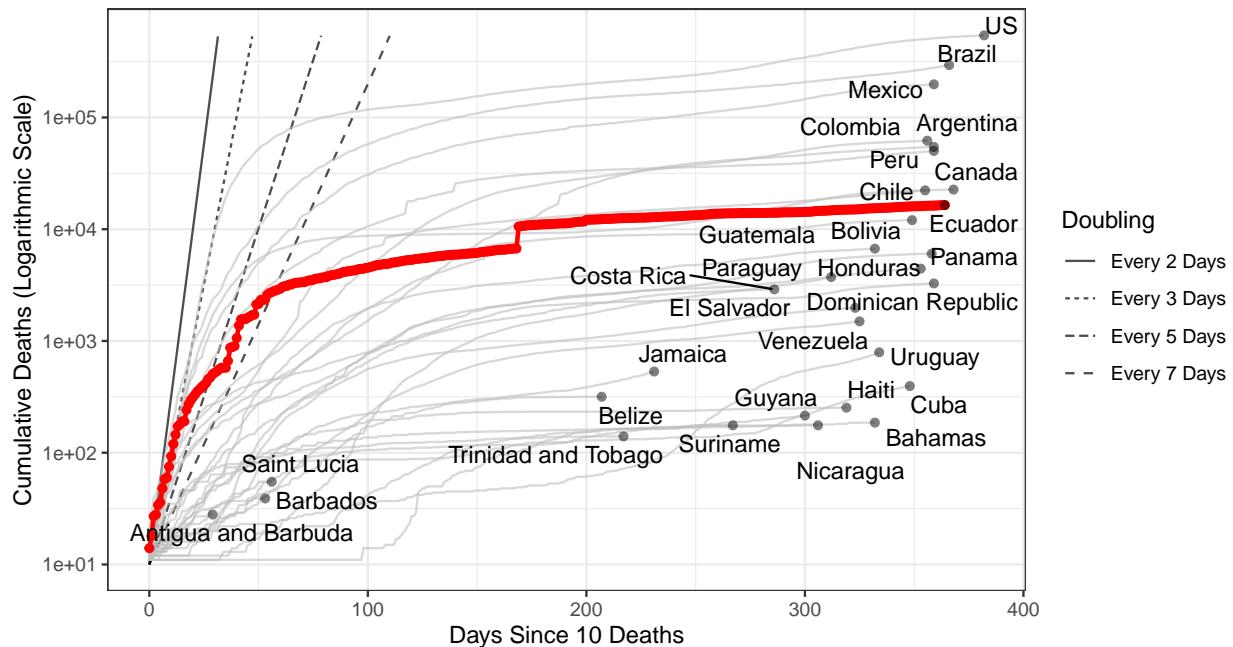


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 313,523 (95% CI: 299,388–327,657) 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).

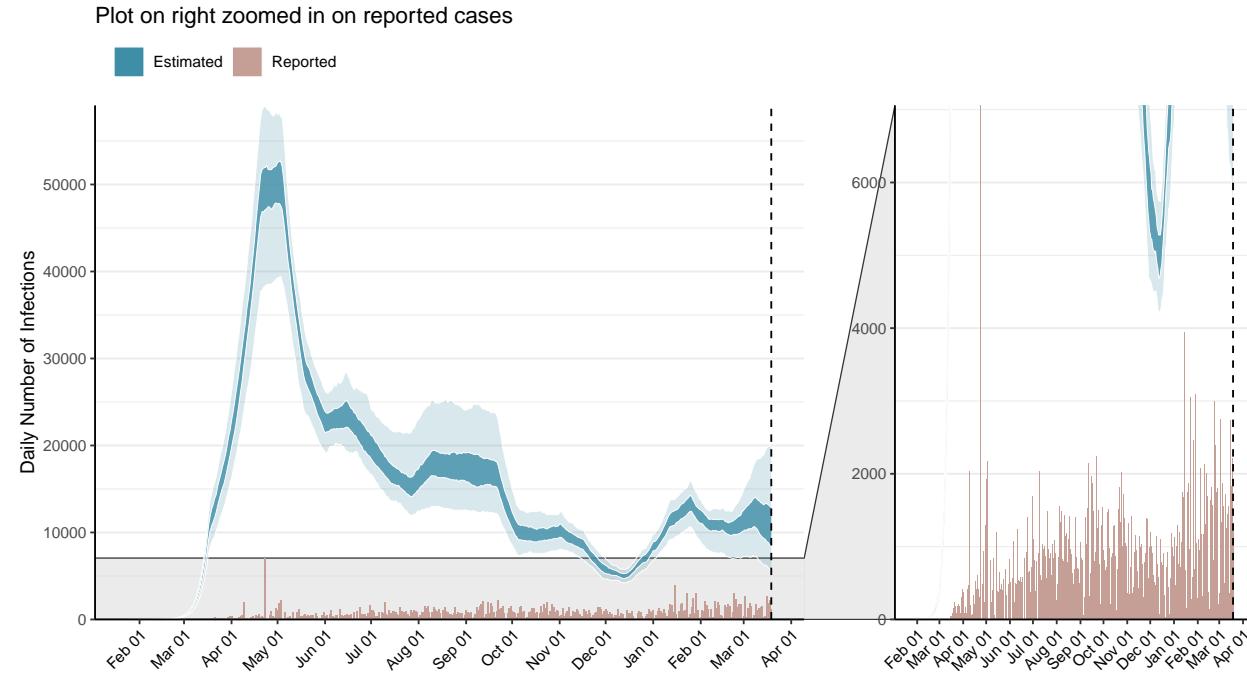


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

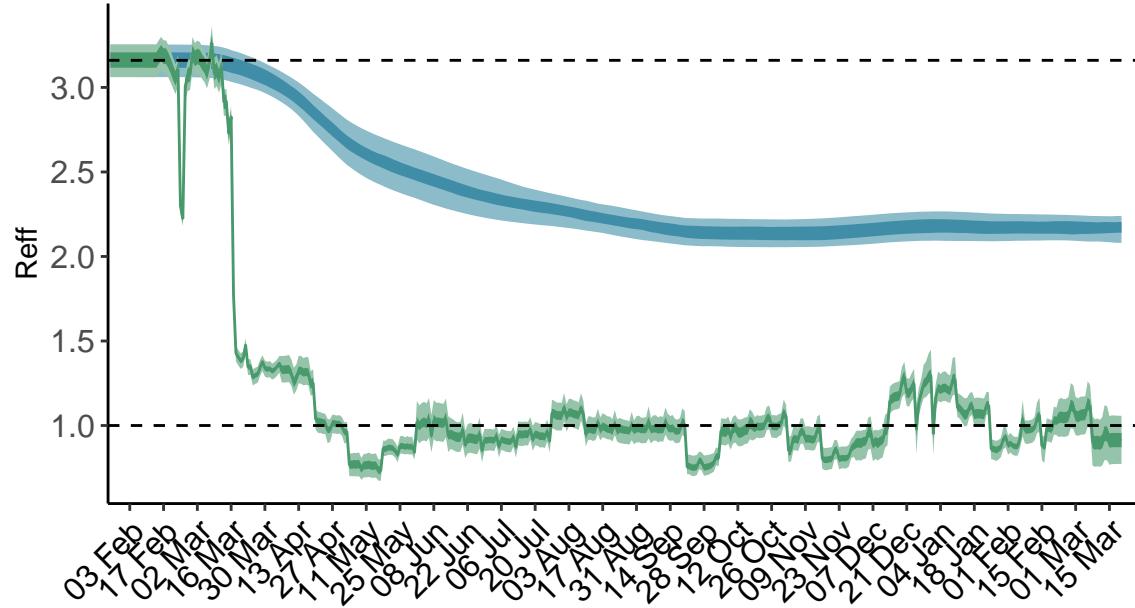


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

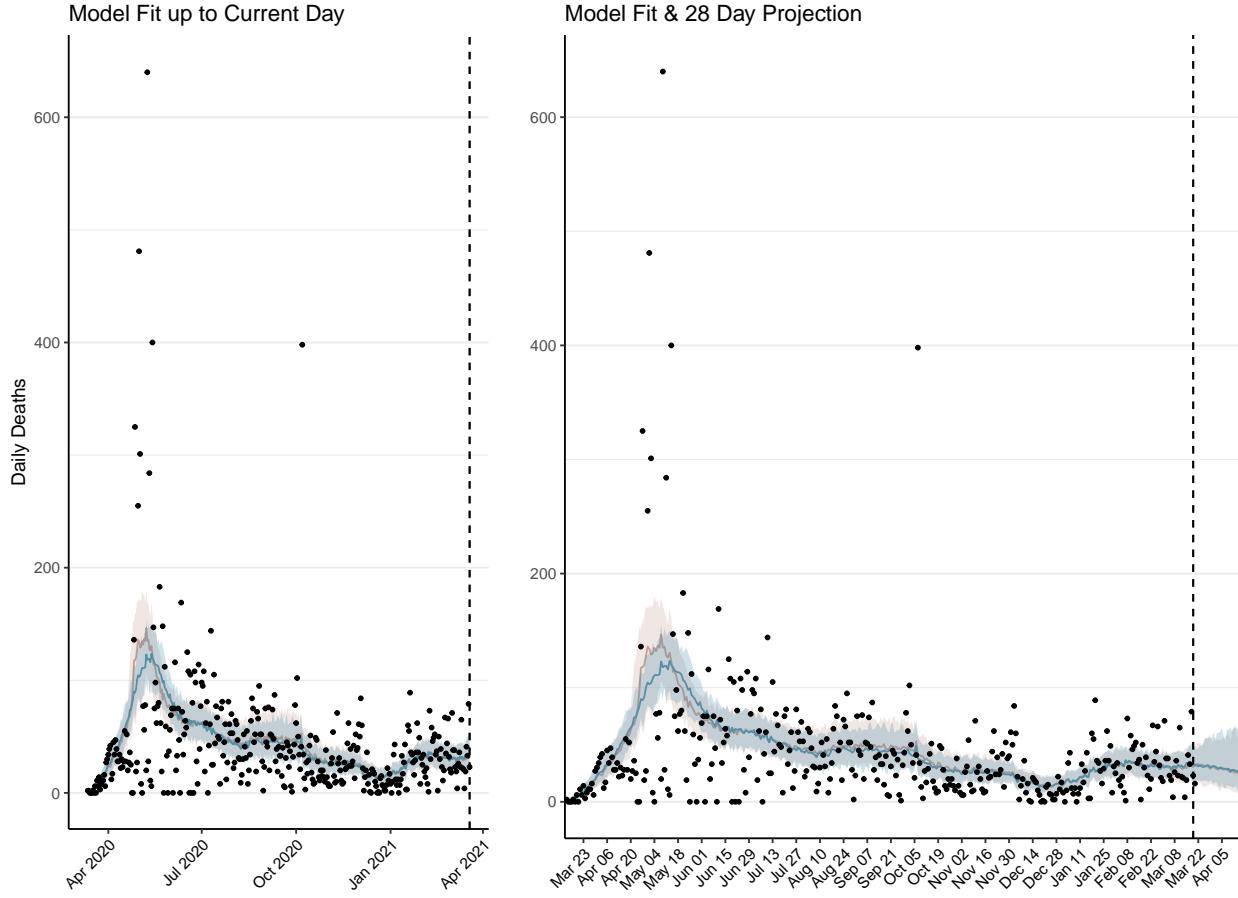


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,164 (95% CI: 1,109-1,219) patients requiring treatment with high-pressure oxygen at the current date to 957 (95% CI: 860-1,055) hospital beds being required on 2021-04-16 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 421 (95% CI: 401-441) patients requiring treatment with mechanical ventilation at the current date to 350 (95% CI: 317-384) by 2021-04-16. 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.**

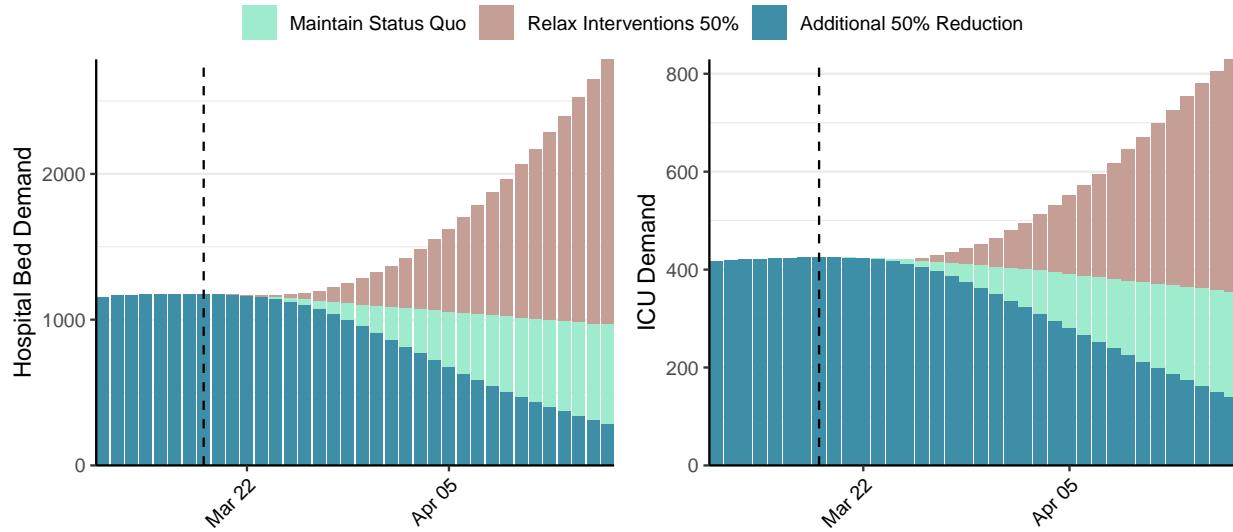


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 10,835 (95% CI: 10,105-11,564) at the current date to 769 (95% CI: 680-858) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 10,835 (95% CI: 10,105-11,564) at the current date to 43,794 (95% CI: 38,613-48,976) by 2021-04-16.

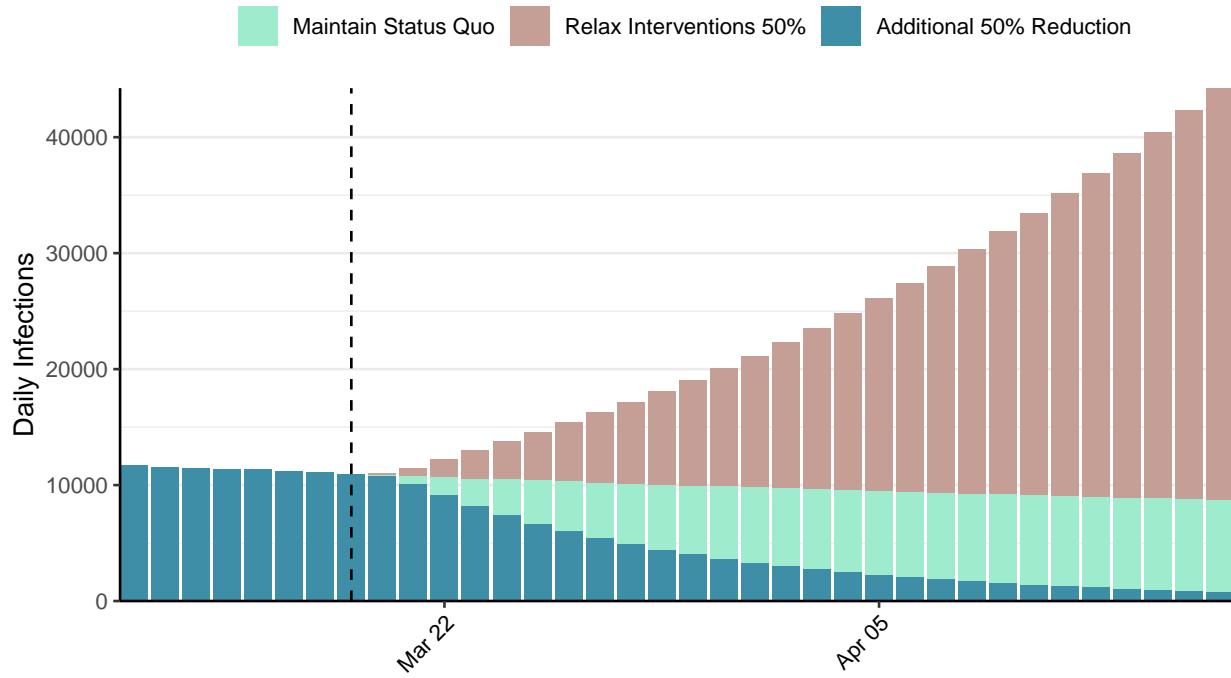


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Egypt, 2021-03-19

[Download the report for Egypt, 2021-03-19 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}
194,127	645	11,512	40	1.05 (95% CI: 0.93-1.18)

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.

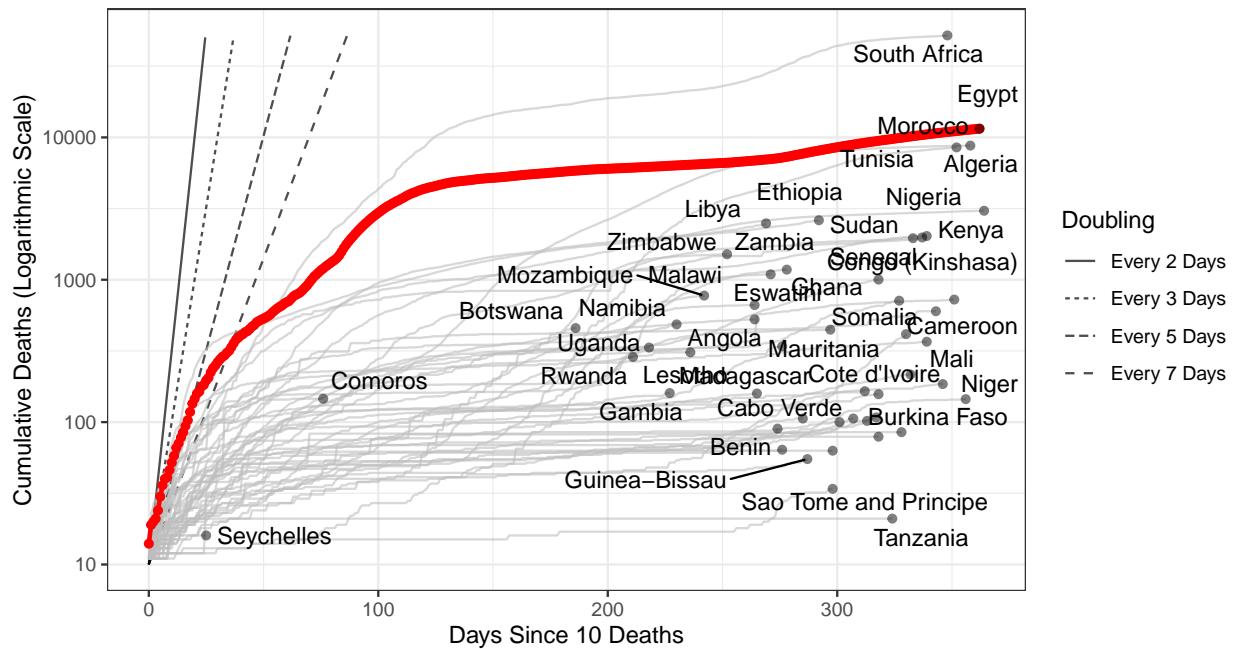


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 585,138 (95% CI: 561,797-608,480) 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).

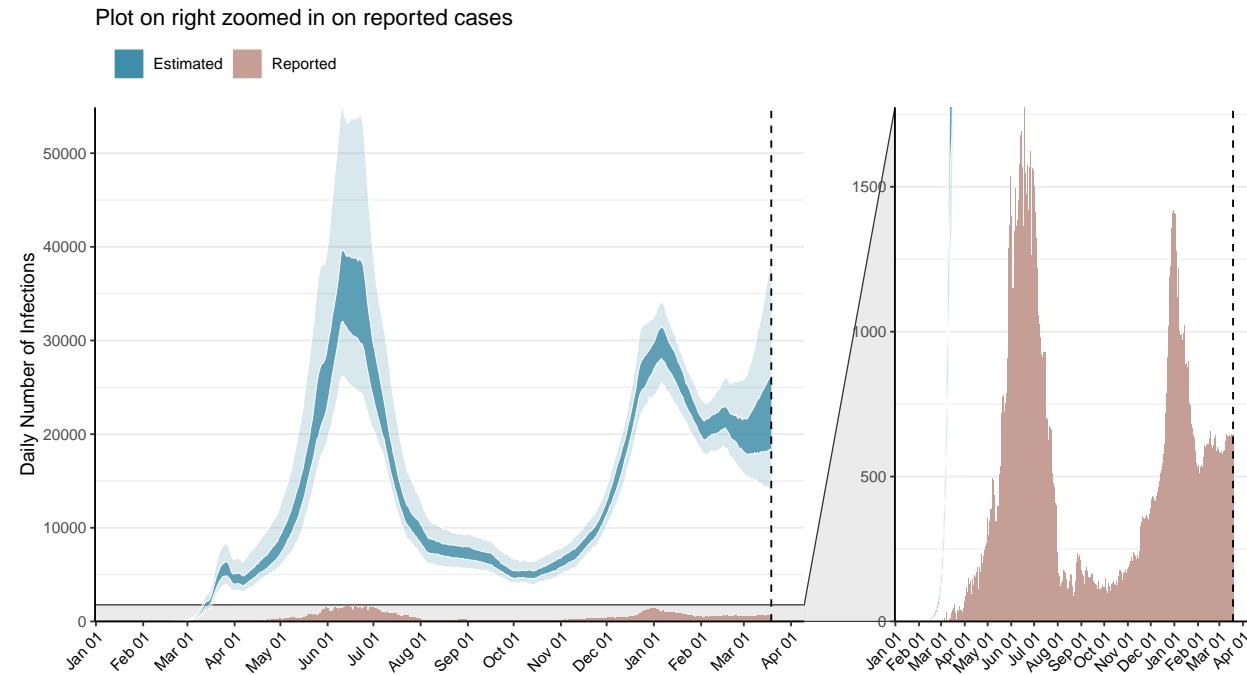


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

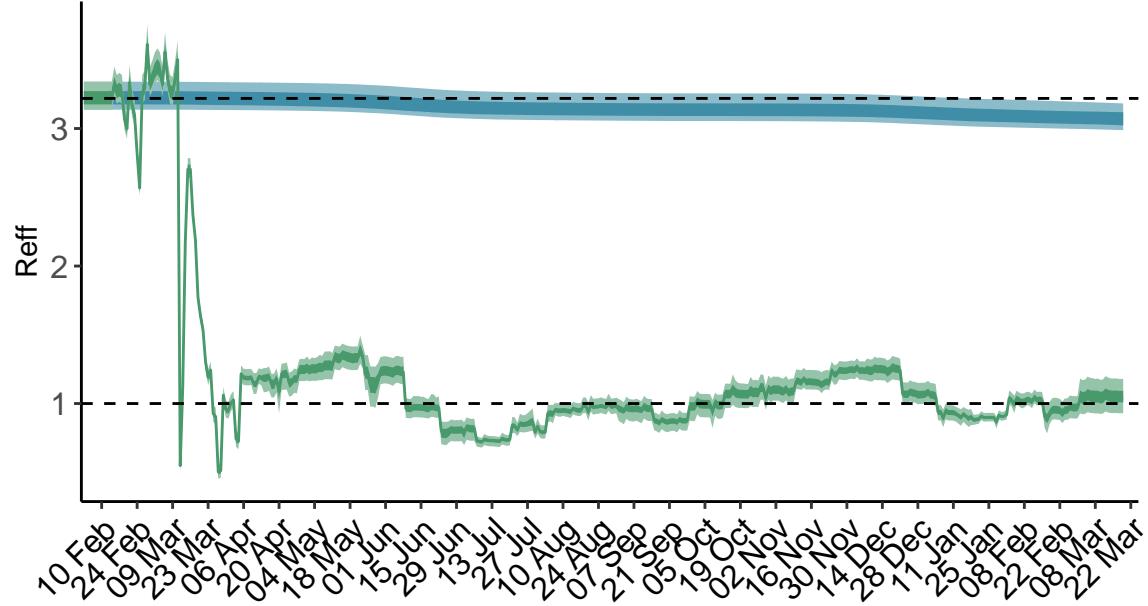


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

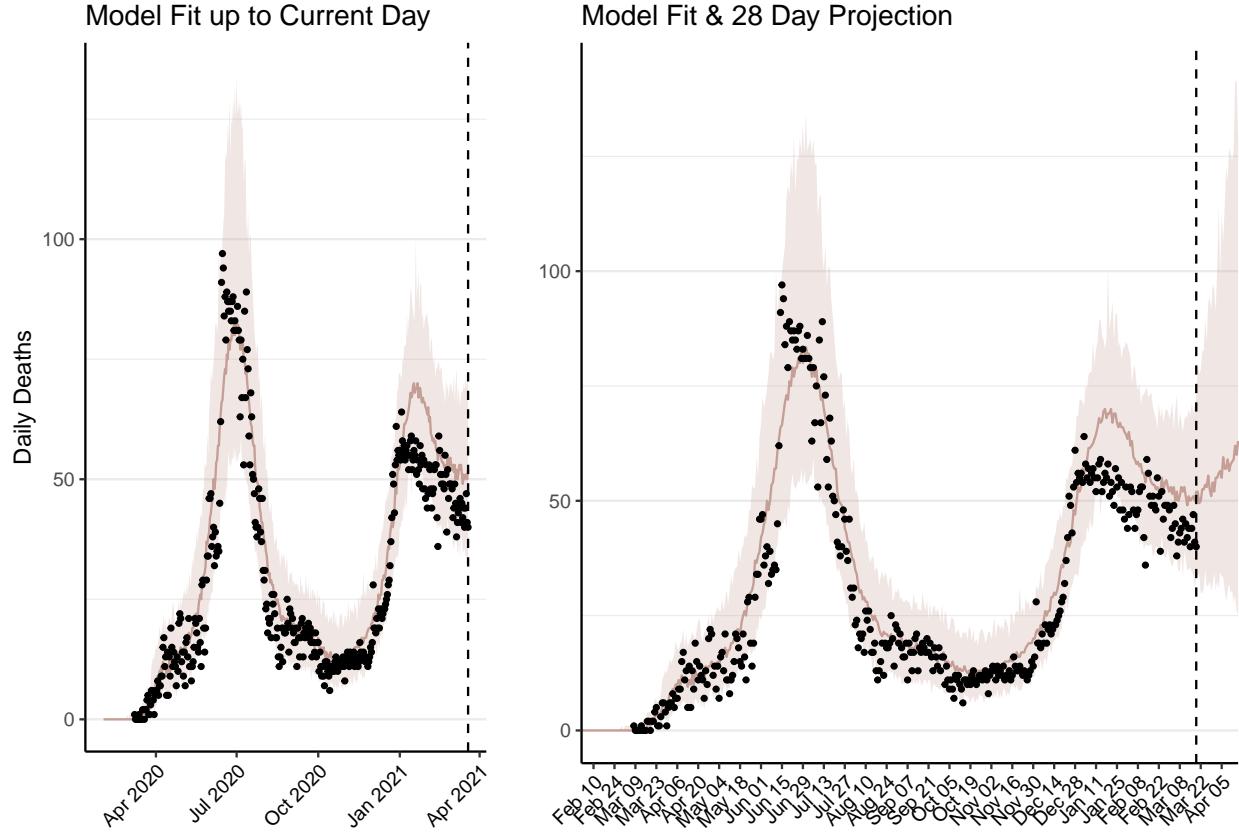


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2,041 (95% CI: 1,954-2,128) patients requiring treatment with high-pressure oxygen at the current date to 2,734 (95% CI: 2,447-3,021) hospital beds being required on 2021-04-16 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 801 (95% CI: 768-834) patients requiring treatment with mechanical ventilation at the current date to 1,044 (95% CI: 941-1,147) by 2021-04-16. 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.**

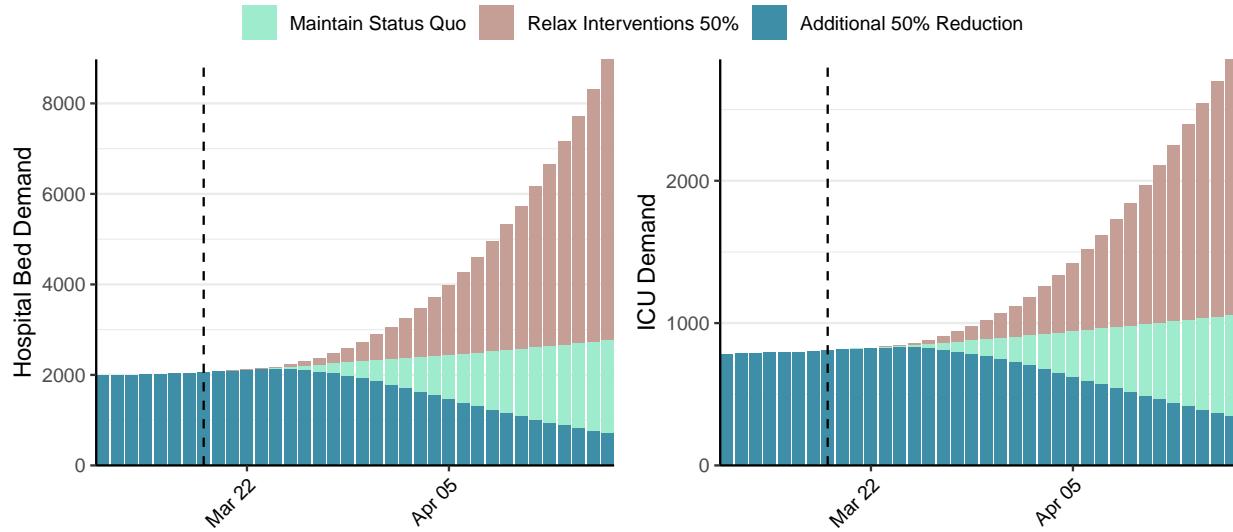


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 23,184 (95% CI: 21,745-24,623) at the current date to 2,504 (95% CI: 2,203-2,805) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 23,184 (95% CI: 21,745-24,623) at the current date to 186,702 (95% CI: 160,895-212,508) by 2021-04-16.

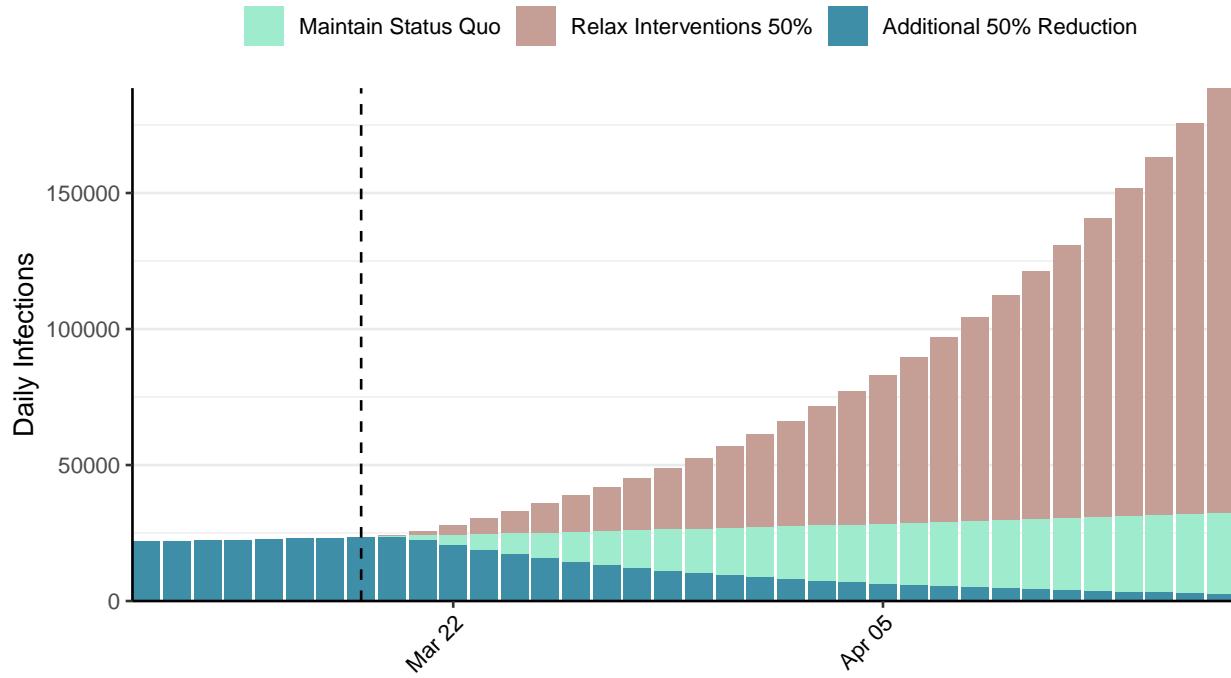


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Eritrea, 2021-03-19

[Download the report for Eritrea, 2021-03-19 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}
3,118	23	7	0	0.9 (95% CI: 0.68-1.15)

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. Eritrea is not shown in the following plot as only 7 deaths have been reported to date**

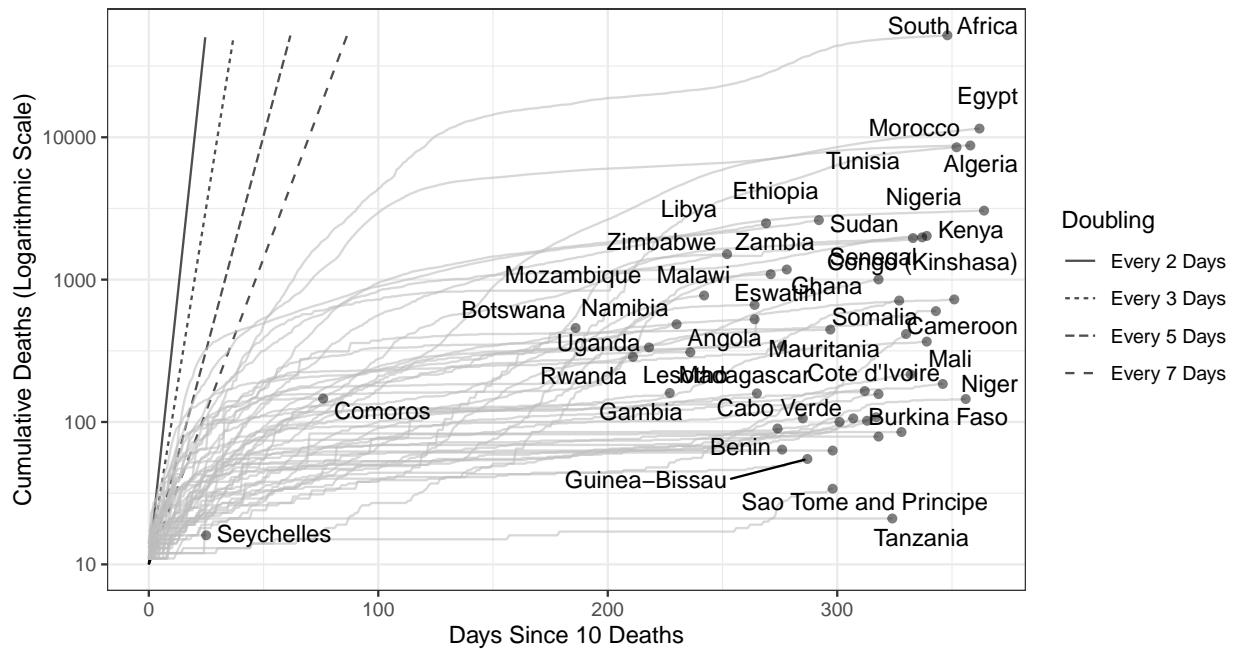


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 452 (95% CI: 371-534) 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

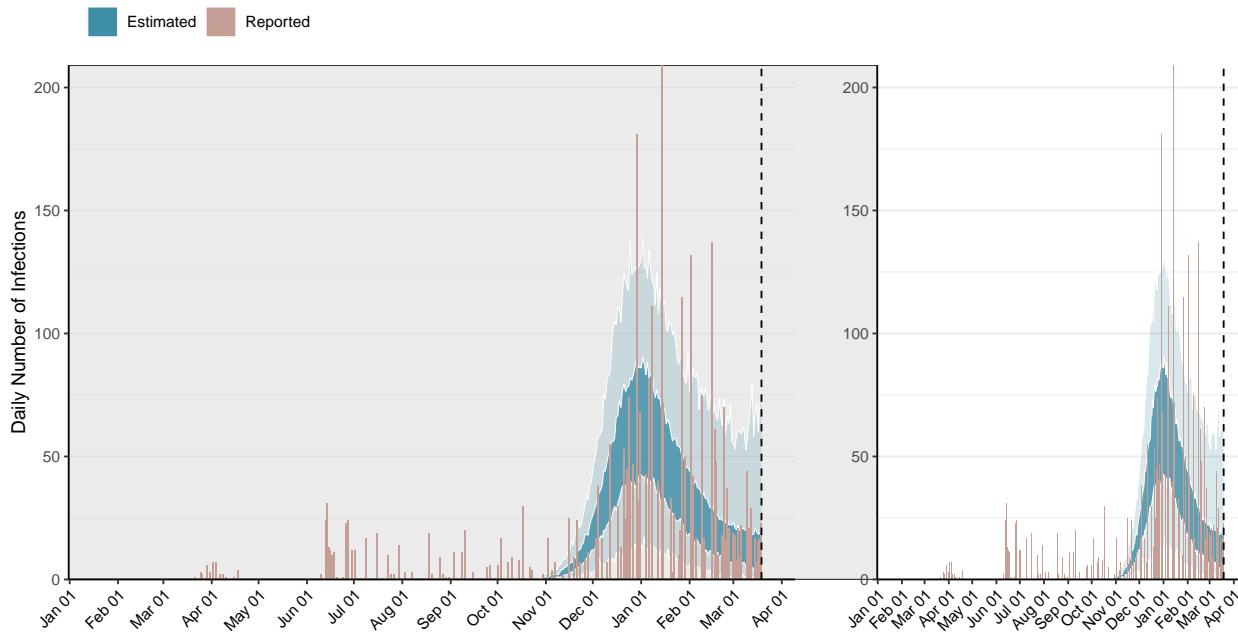


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

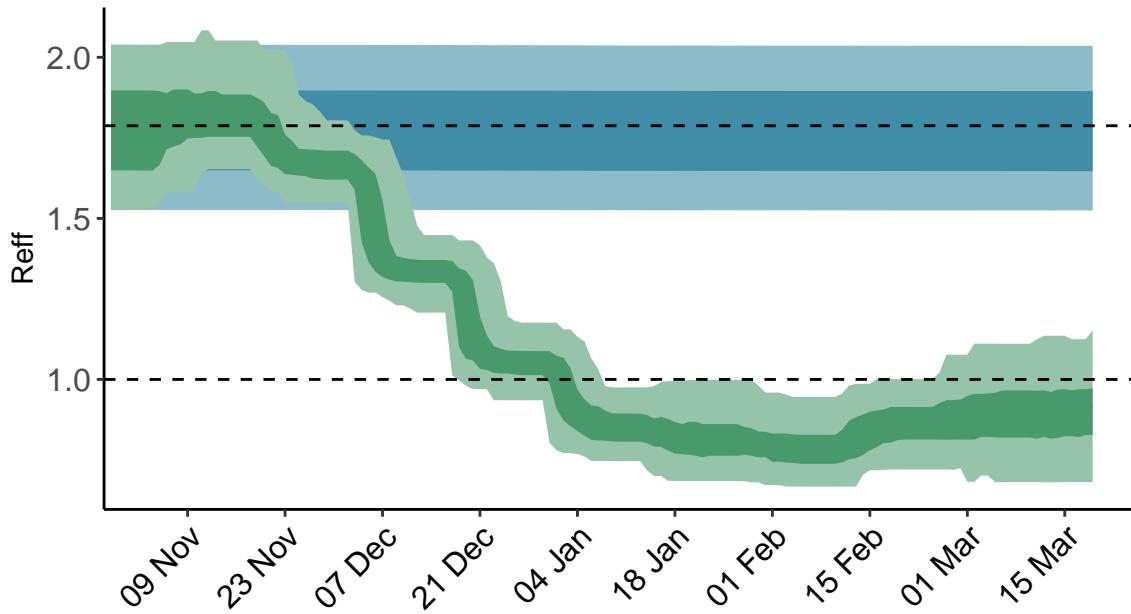


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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](#).

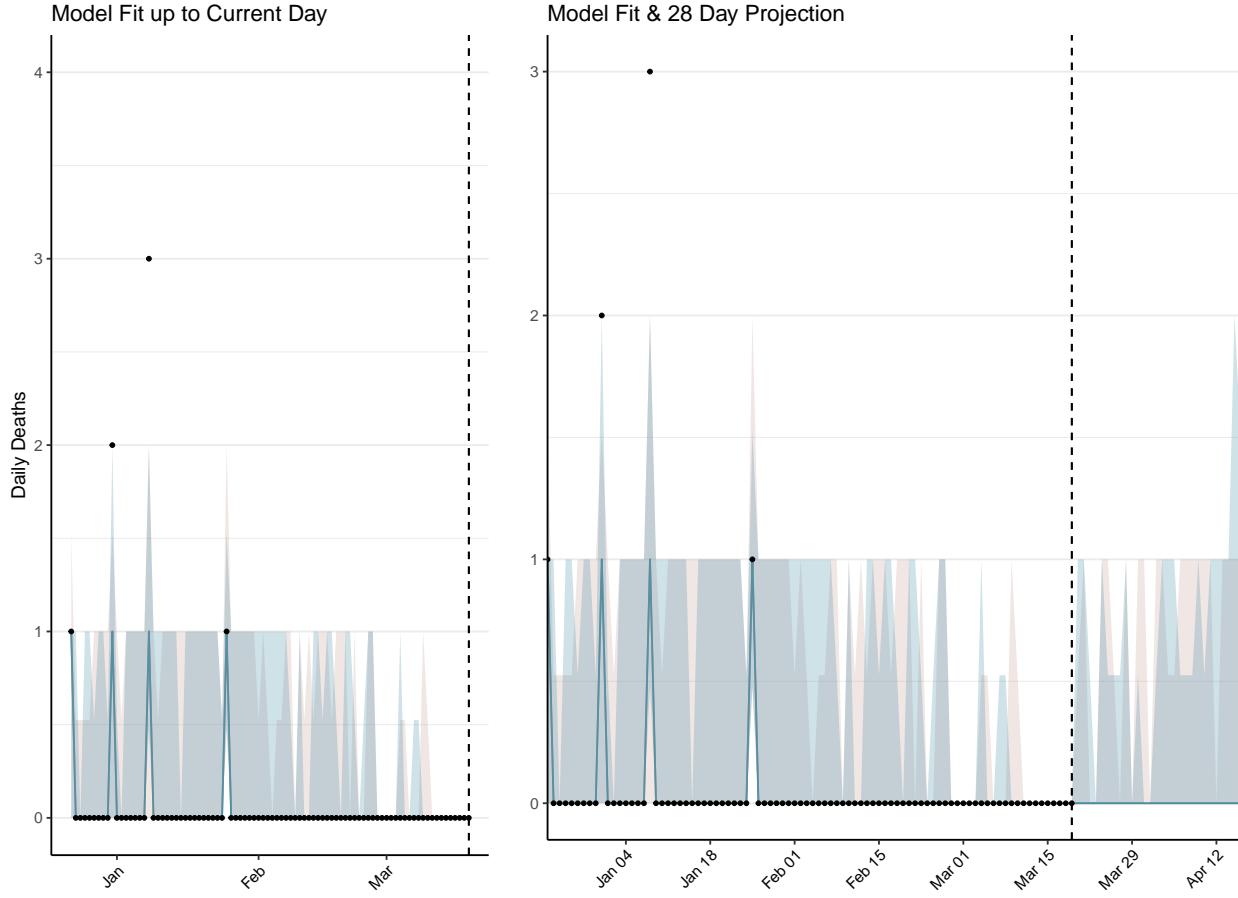


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1 (95% CI: 1-2) patients requiring treatment with high-pressure oxygen at the current date to 4 (95% CI: 3-6) hospital beds being required on 2021-04-16 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: 0-1) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-2) by 2021-04-16. 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.**

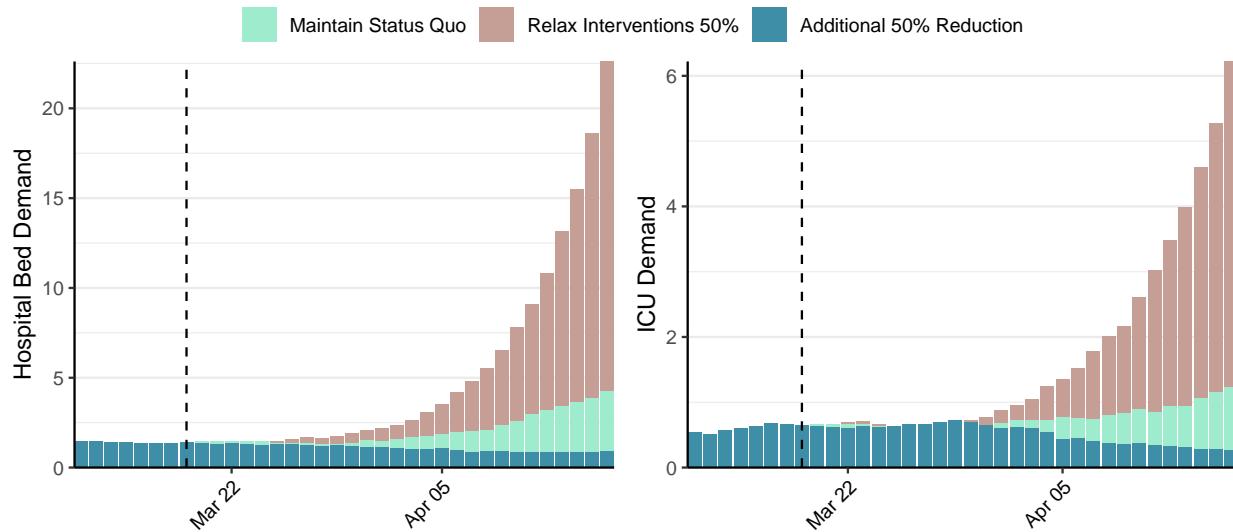


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 11-17) at the current date to 6 (95% CI: 3-9) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14 (95% CI: 11-17) at the current date to 1,323 (95% CI: 313-2,332) by 2021-04-16.

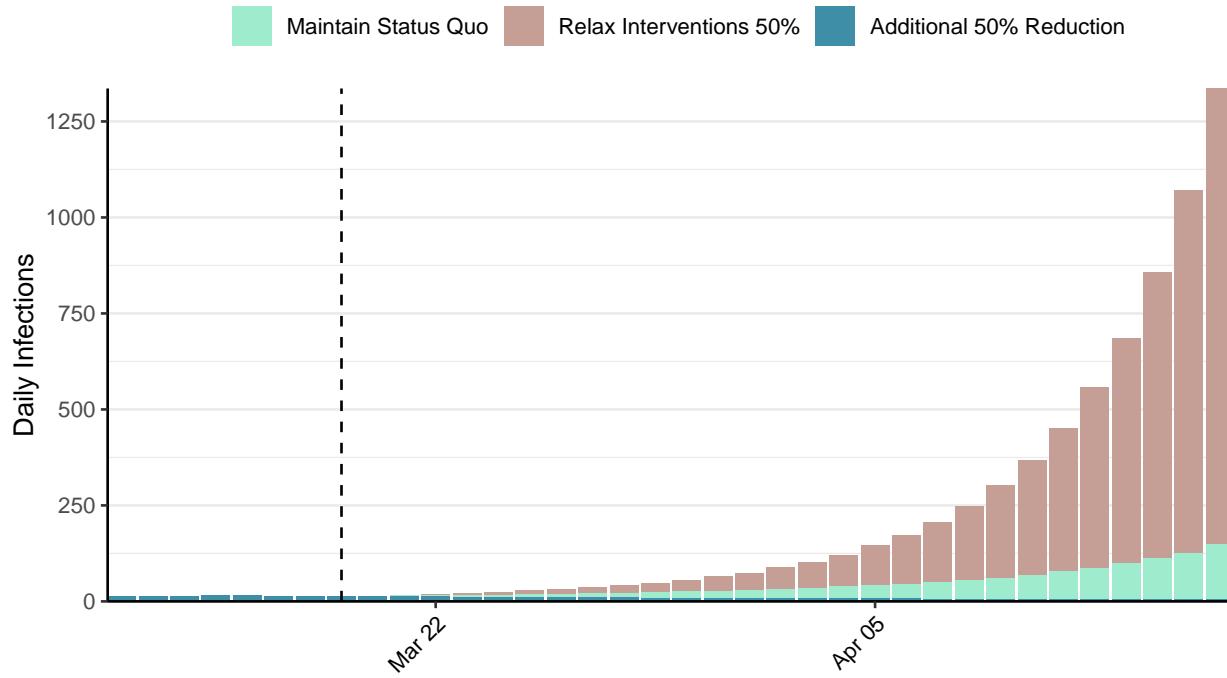


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Ethiopia, 2021-03-19

[Download the report for Ethiopia, 2021-03-19 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}
183,863	1,994	2,618	16	1.22 (95% CI: 1.06-1.39)

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.

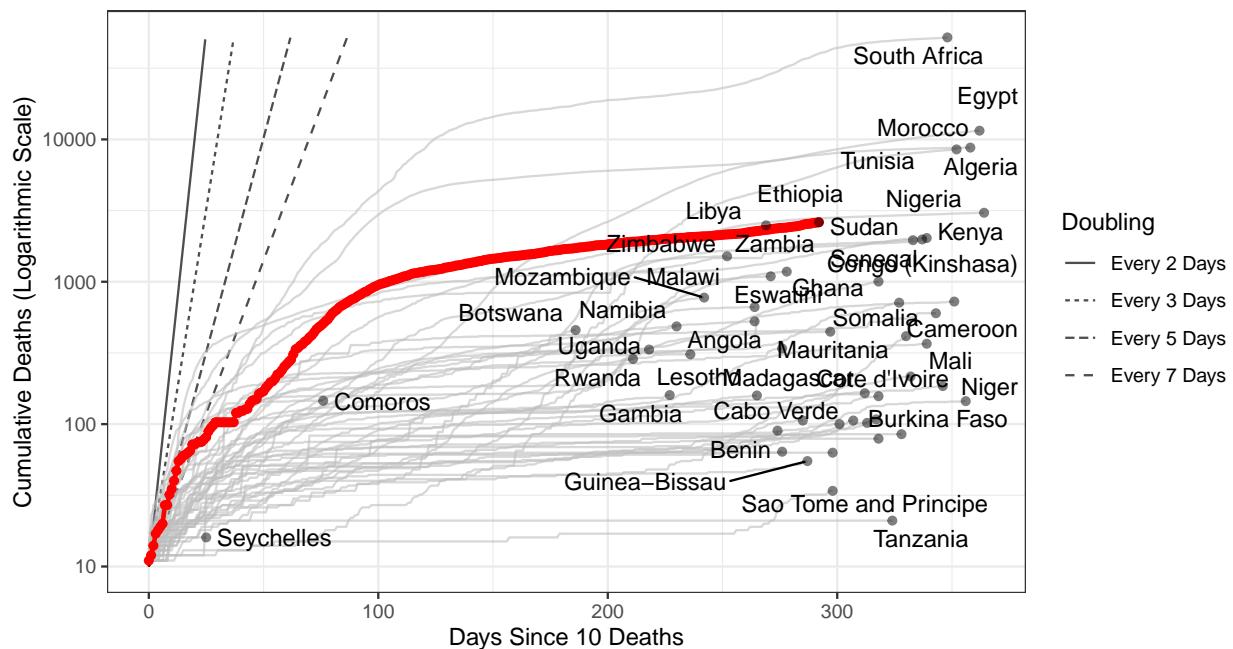


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 339,232 (95% CI: 314,156-364,308) 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).

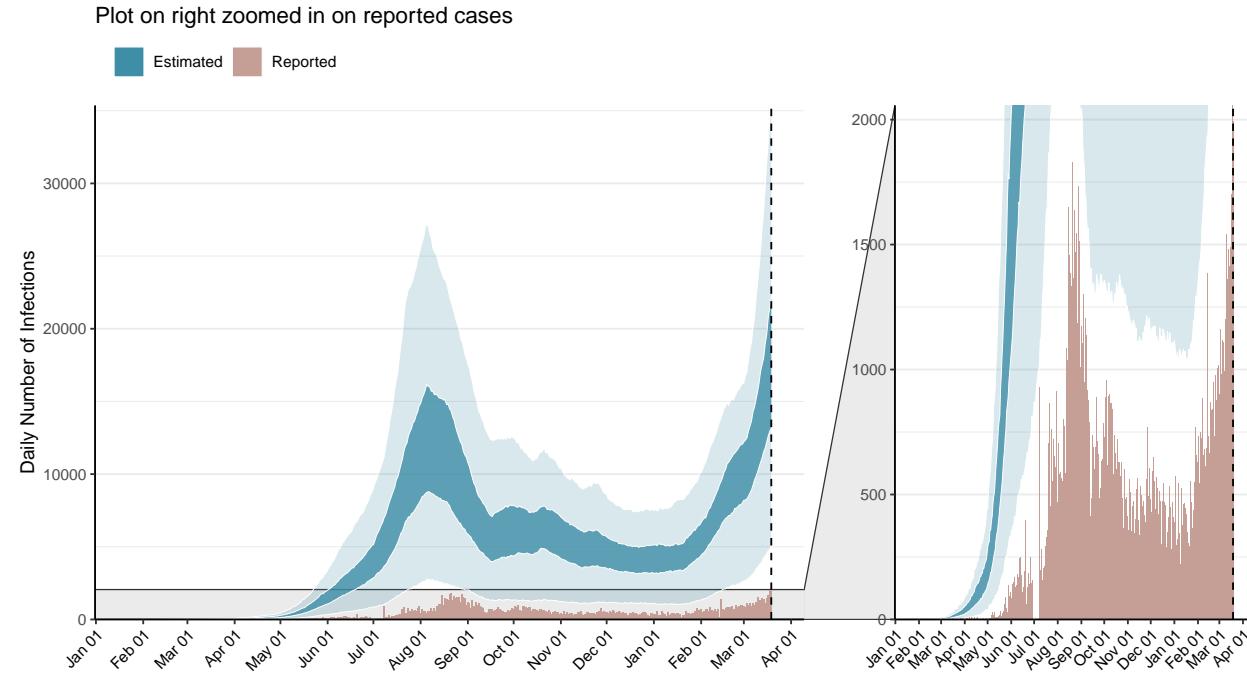


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

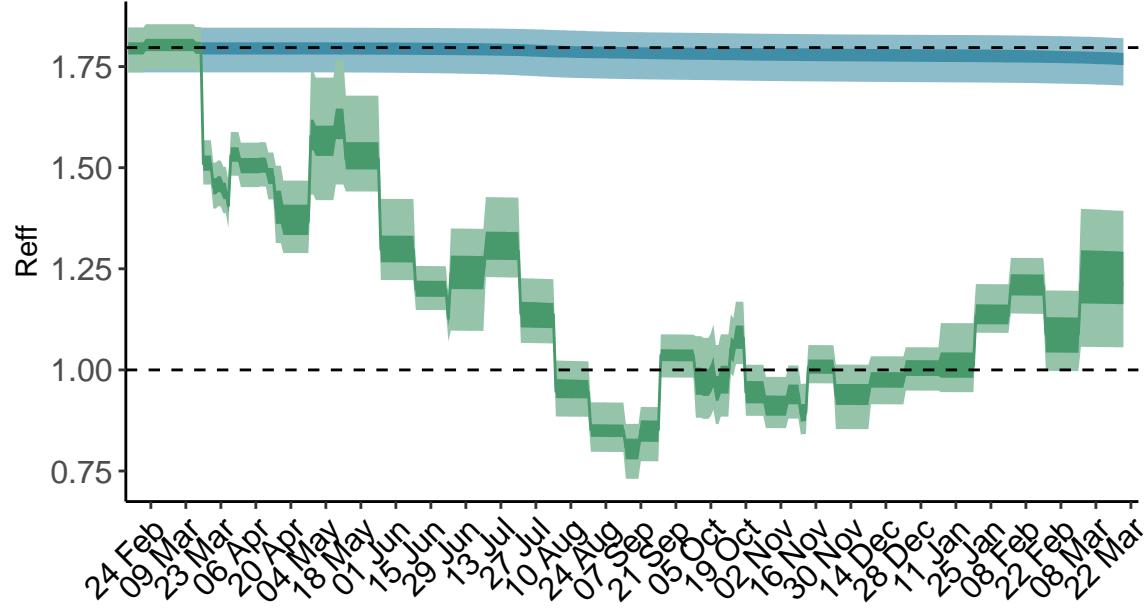


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

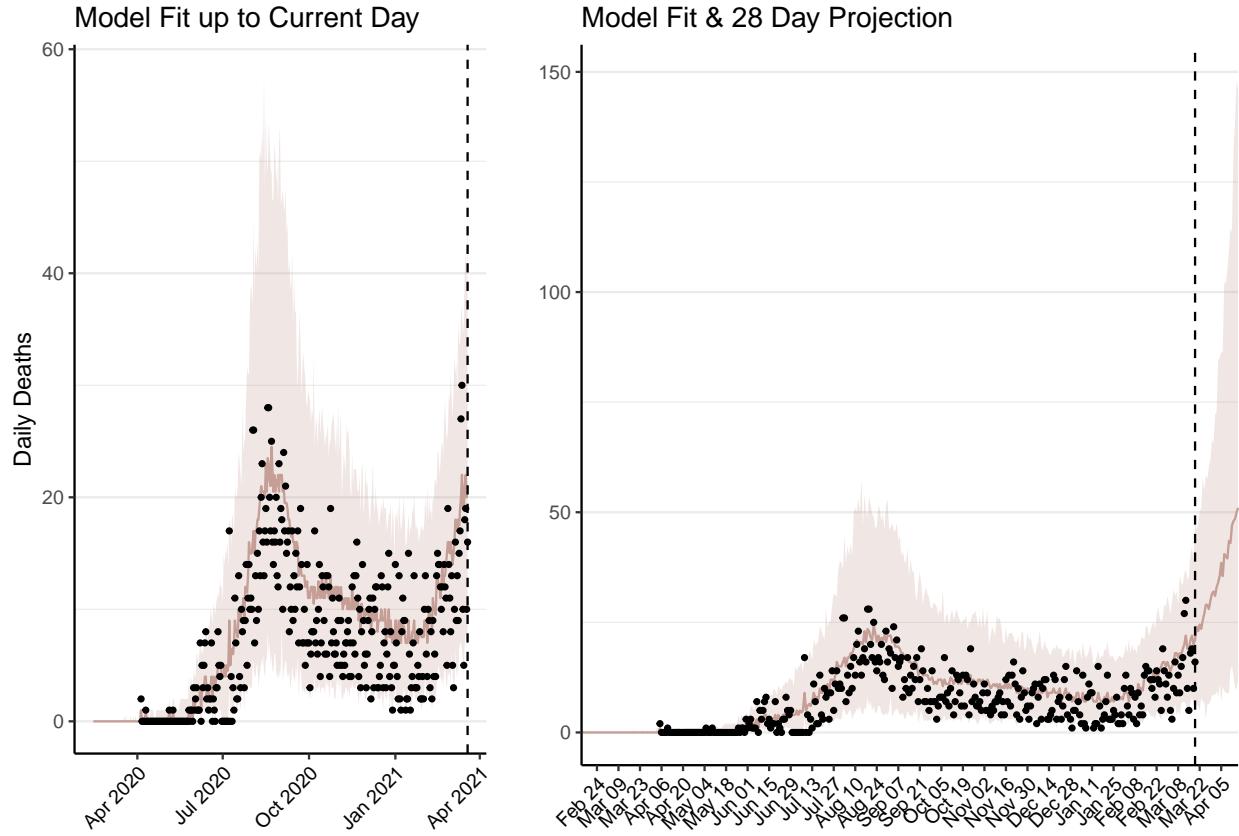


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,039 (95% CI: 960-1,118) patients requiring treatment with high-pressure oxygen at the current date to 2,674 (95% CI: 2,355-2,992) hospital beds being required on 2021-04-16 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 379 (95% CI: 351-407) patients requiring treatment with mechanical ventilation at the current date to 955 (95% CI: 843-1,066) by 2021-04-16. 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.**

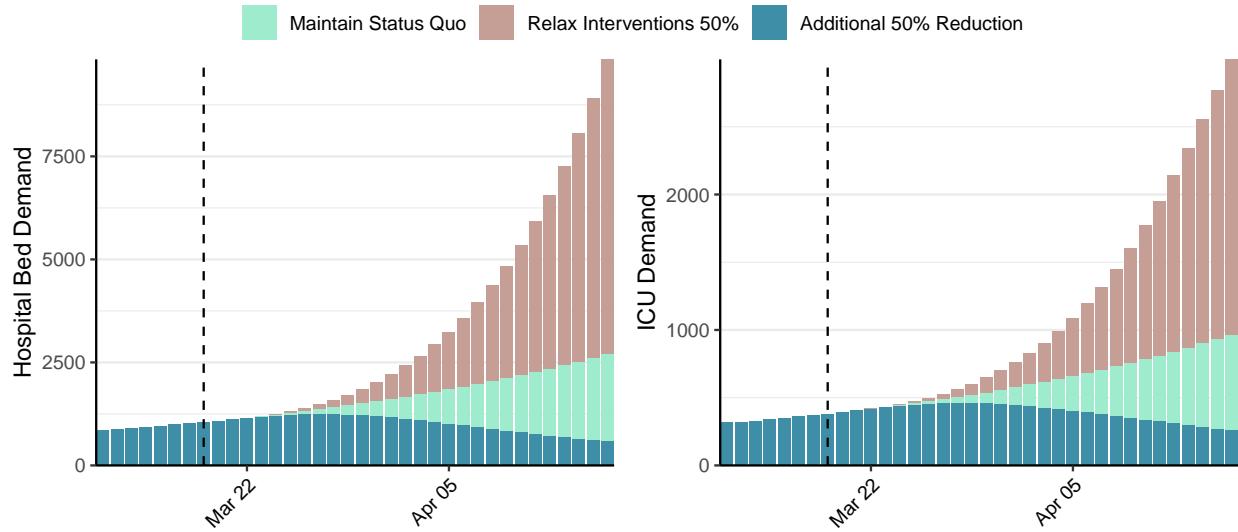


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 17,733 (95% CI: 16,188-19,277) at the current date to 3,226 (95% CI: 2,812-3,640) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 17,733 (95% CI: 16,188-19,277) at the current date to 299,393 (95% CI: 257,906-340,879) by 2021-04-16.

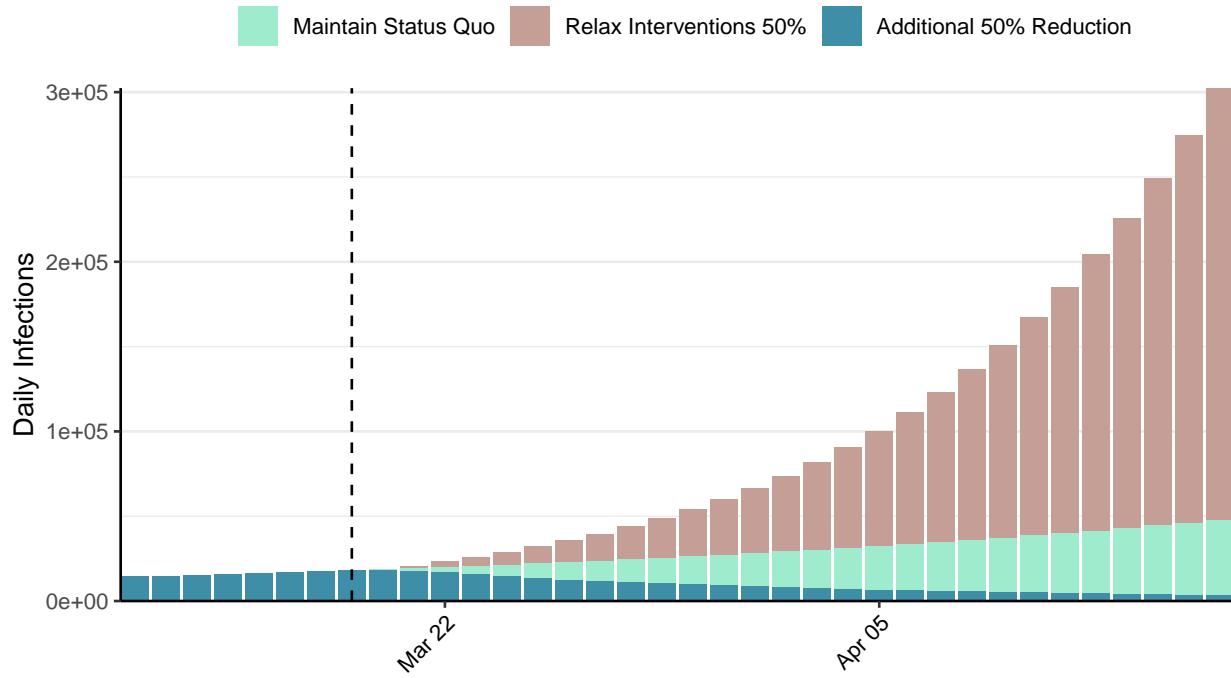


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Fiji, 2021-03-19

[Download the report for Fiji, 2021-03-19 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}
67	0	2	0	0.92 (95% CI: 0.51-1.34)

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. Fiji is not shown in the following plot as only 2 deaths have been reported to date**

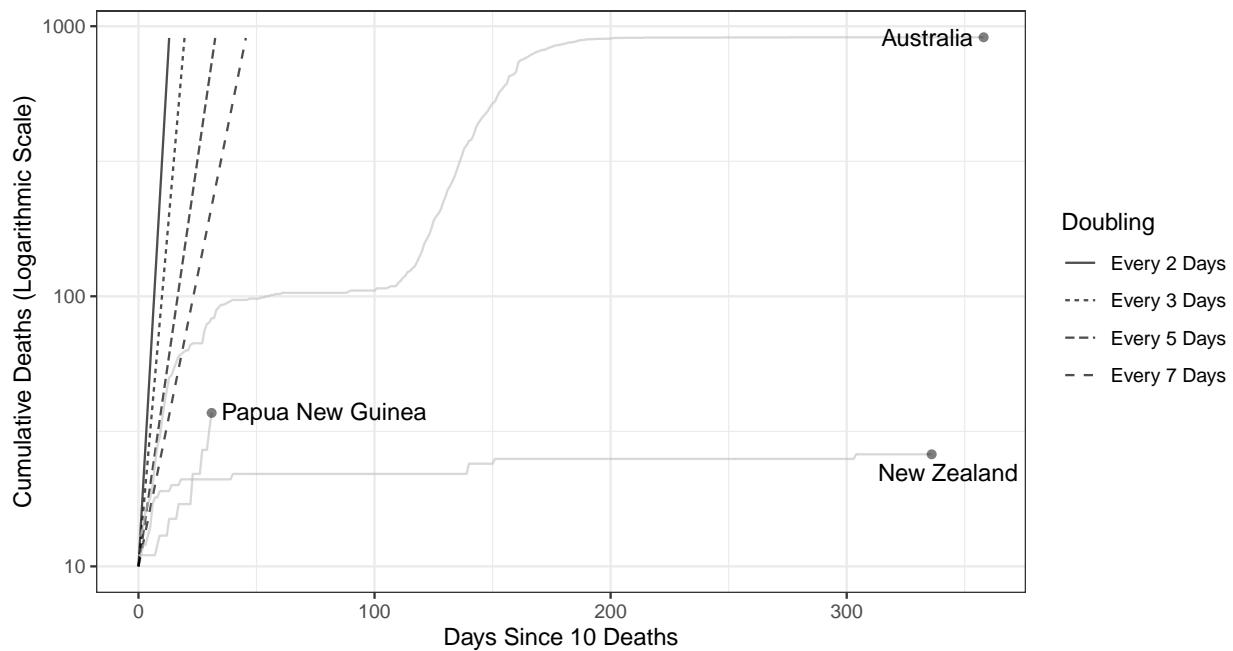


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 9 (95% CI: -2-21) 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).

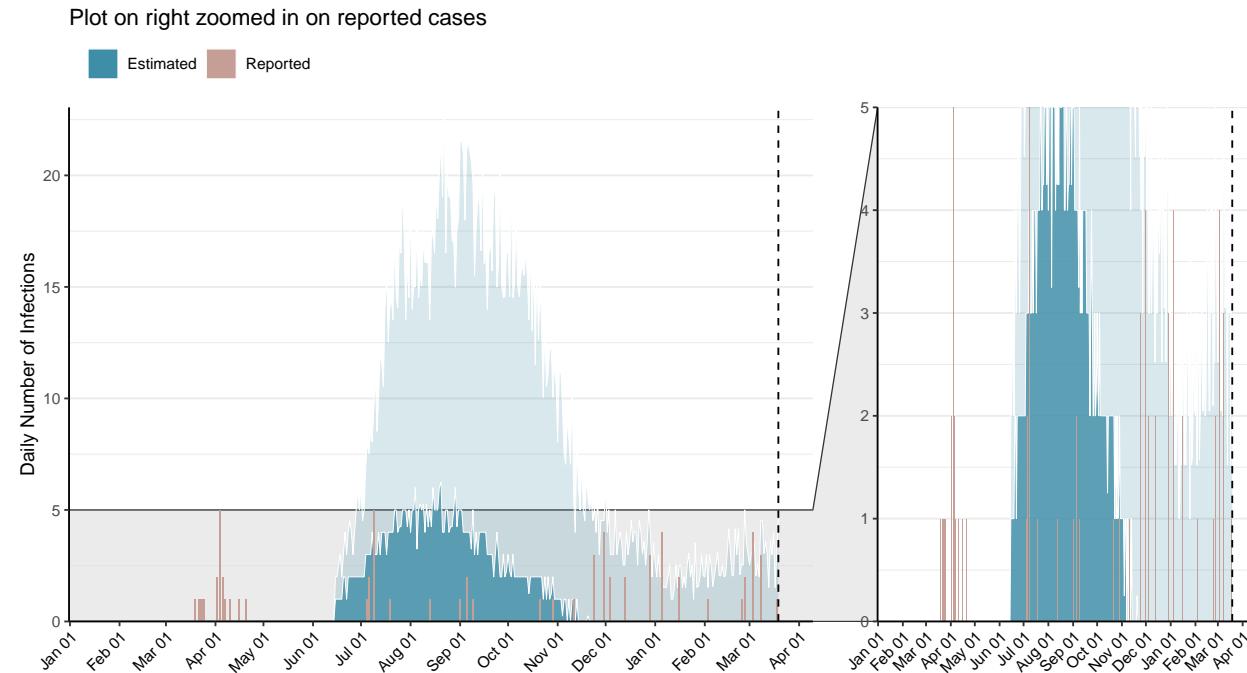


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

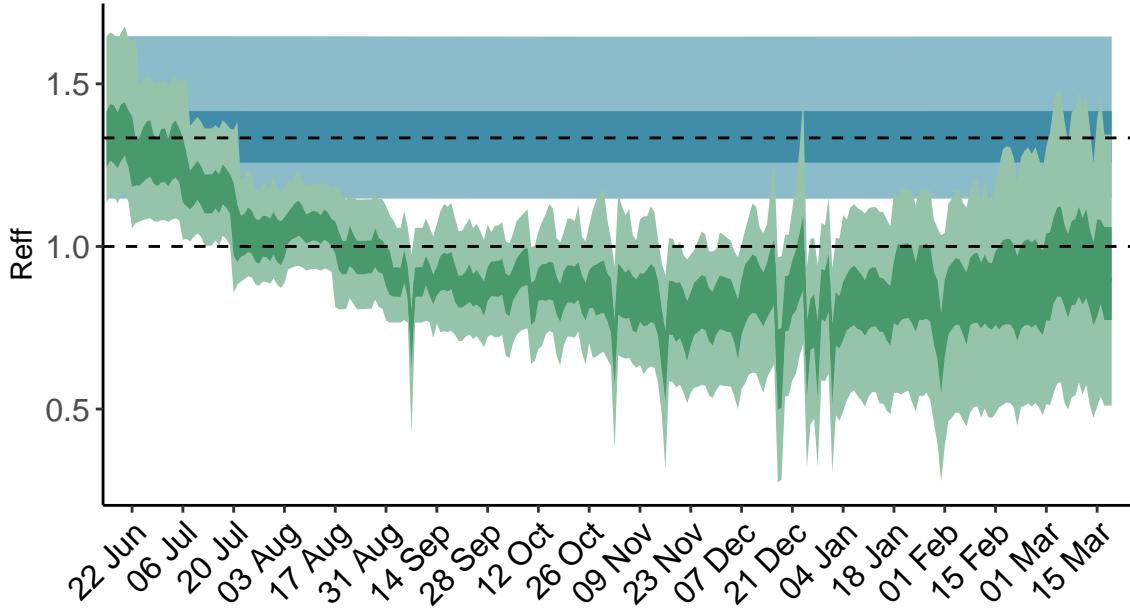


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

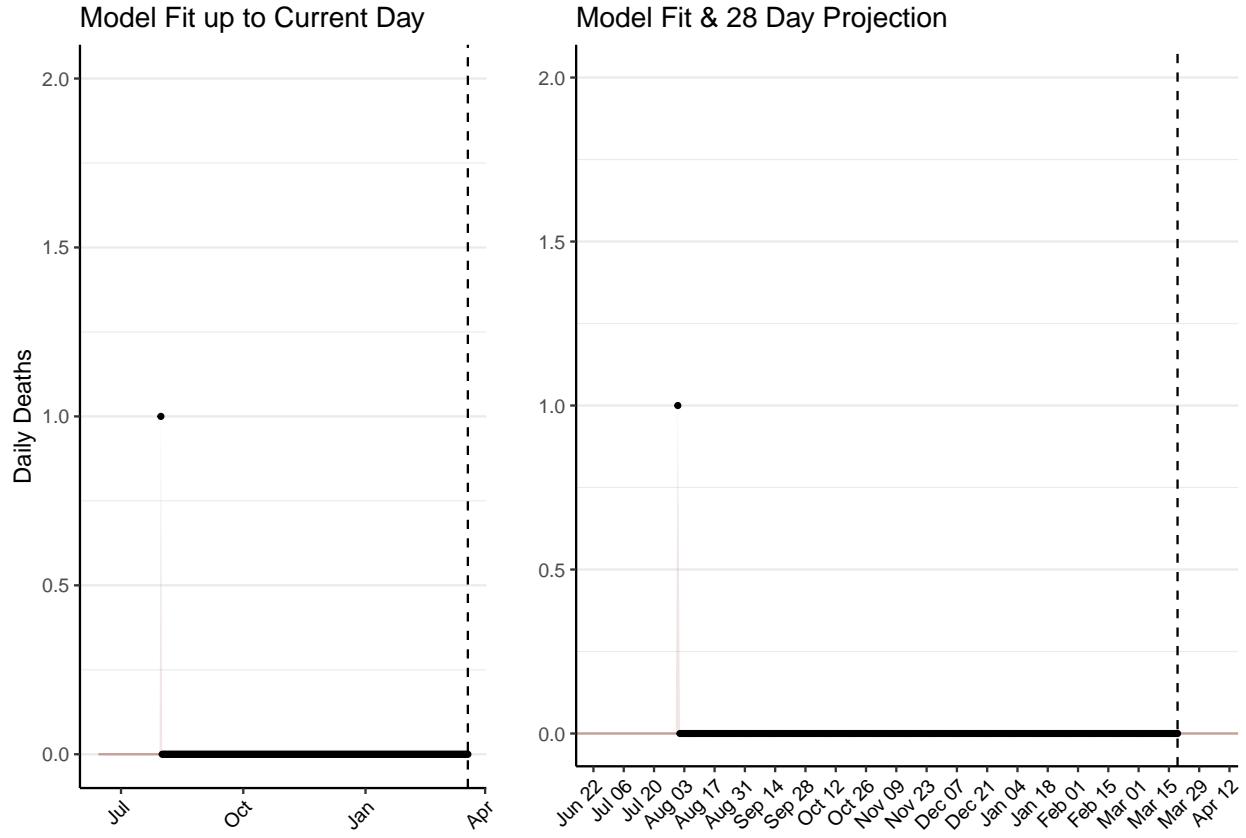


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

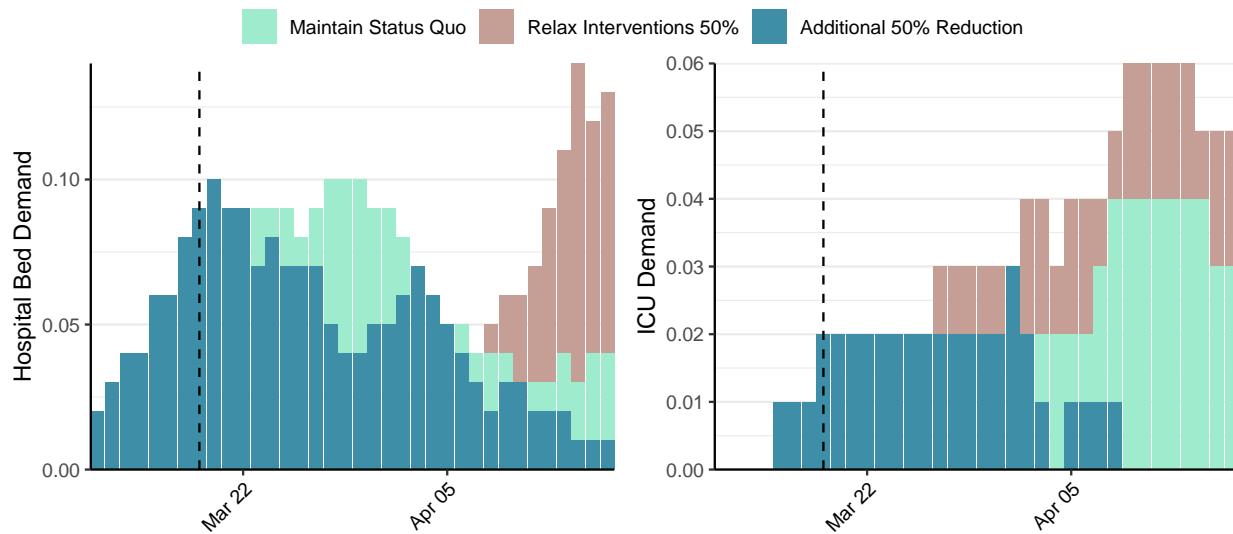


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 0-1) at the current date to 0 (95% CI: 0-0) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 0-1) at the current date to 2 (95% CI: -2-6) by 2021-04-16.

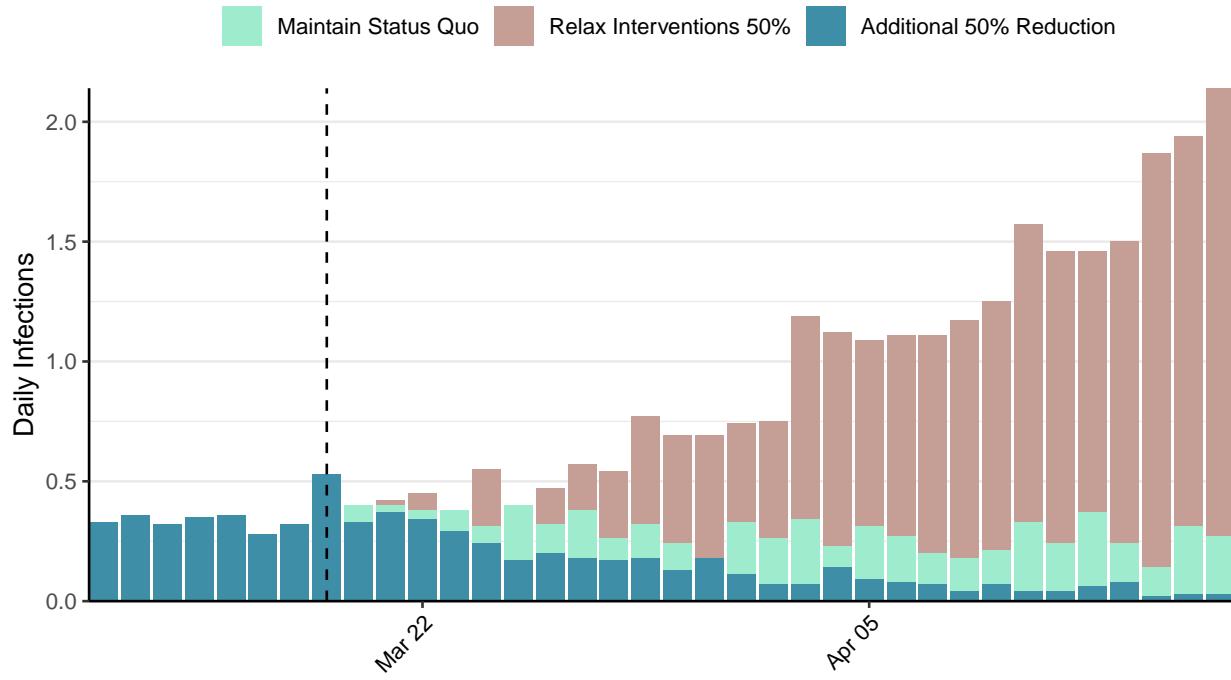


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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, 2021-03-19

[Download the report for Gabon, 2021-03-19 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}
17,711	414	106	1	0.97 (95% CI: 0.82-1.12)

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.

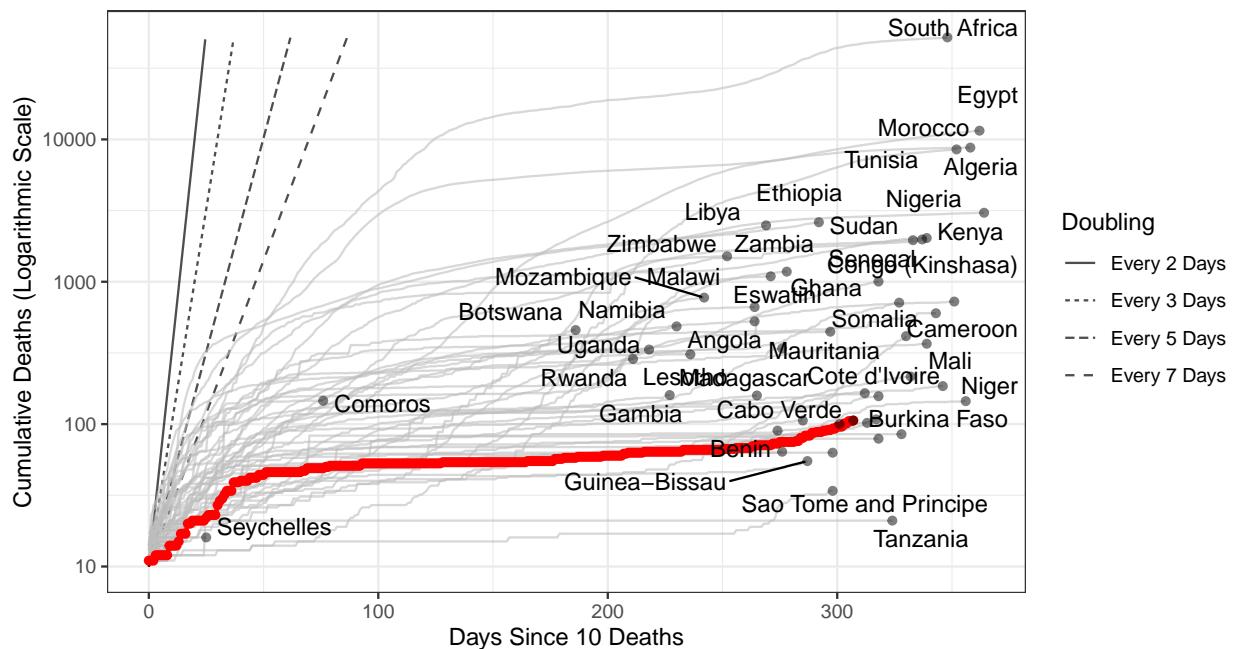


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 24,827 (95% CI: 22,857-26,798) 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).

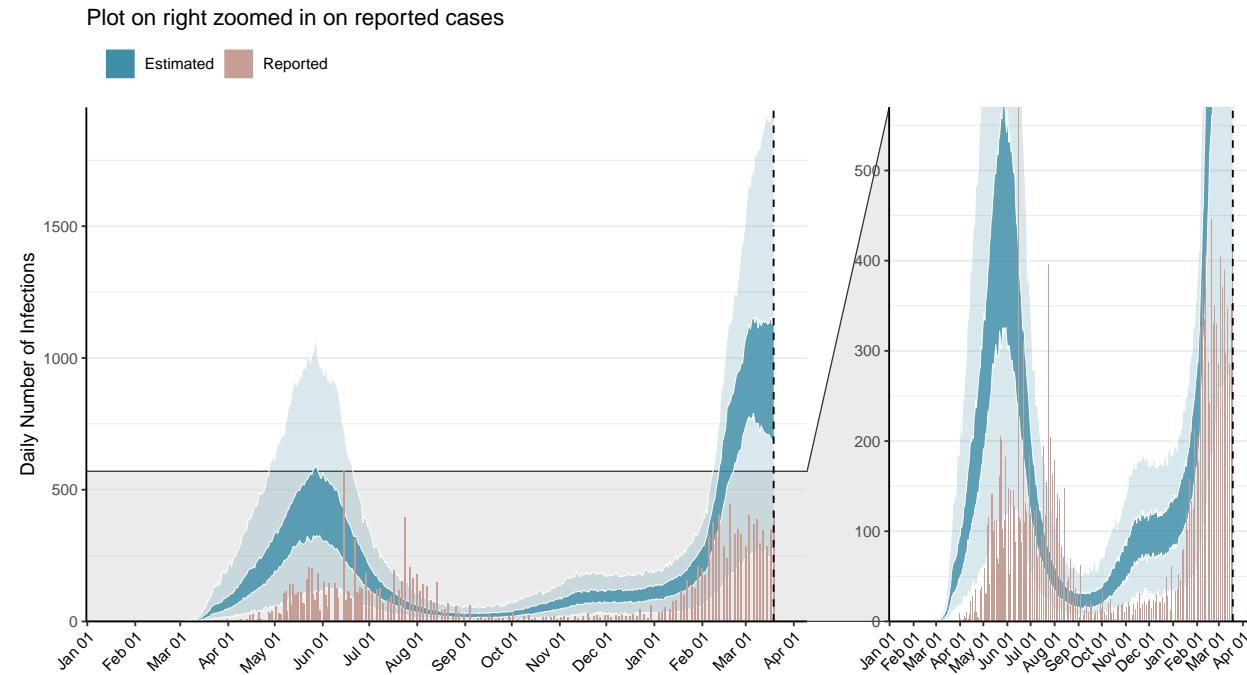


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

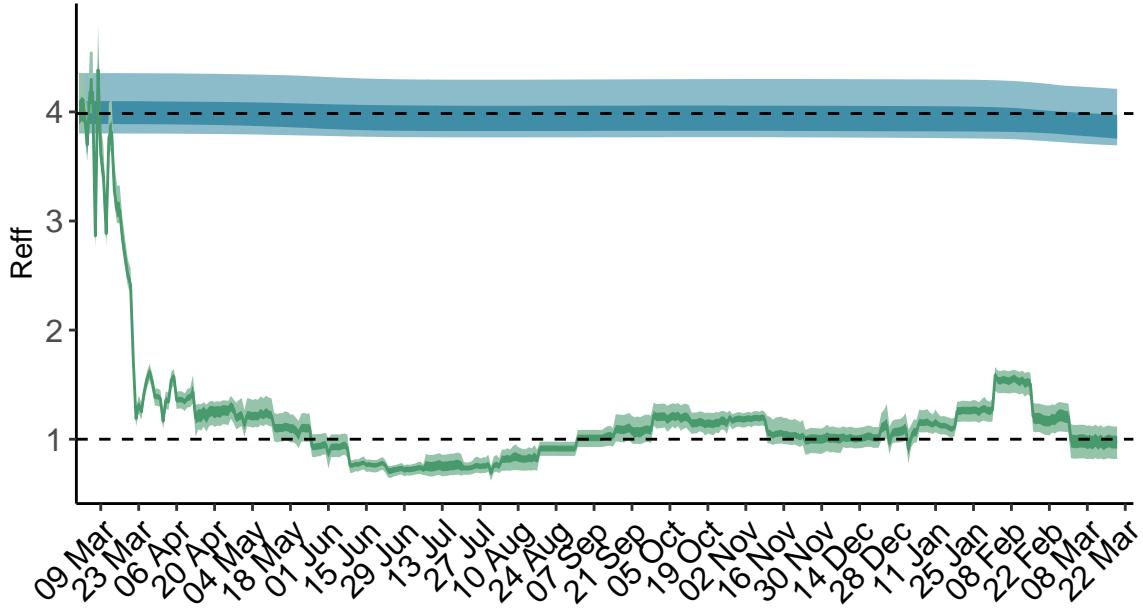


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

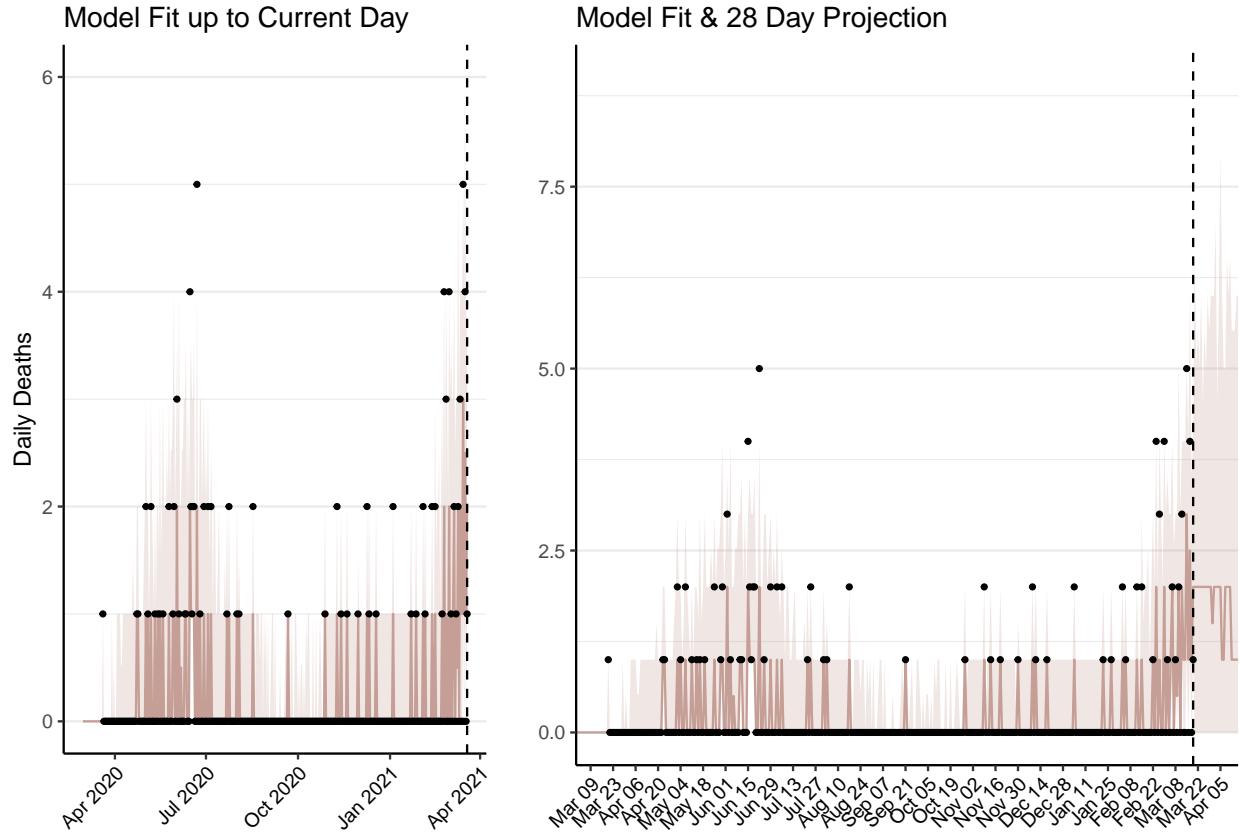


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 79 (95% CI: 72-85) patients requiring treatment with high-pressure oxygen at the current date to 82 (95% CI: 71-93) hospital beds being required on 2021-04-16 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 32 (95% CI: 28-36) by 2021-04-16. 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.**

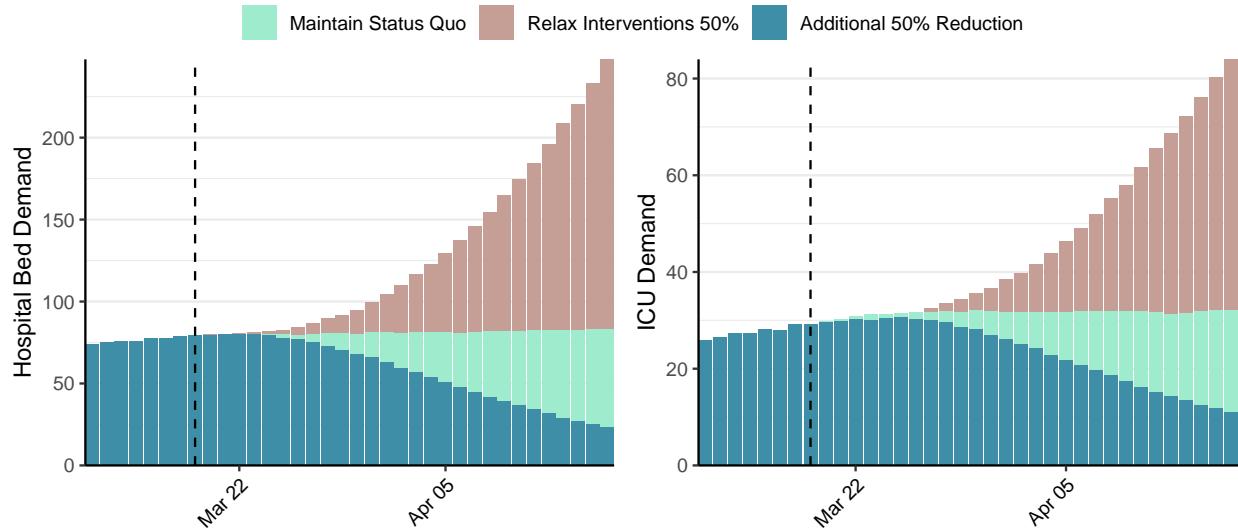


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 937 (95% CI: 845-1,028) at the current date to 81 (95% CI: 69-93) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 937 (95% CI: 845-1,028) at the current date to 5,234 (95% CI: 4,479-5,989) by 2021-04-16.

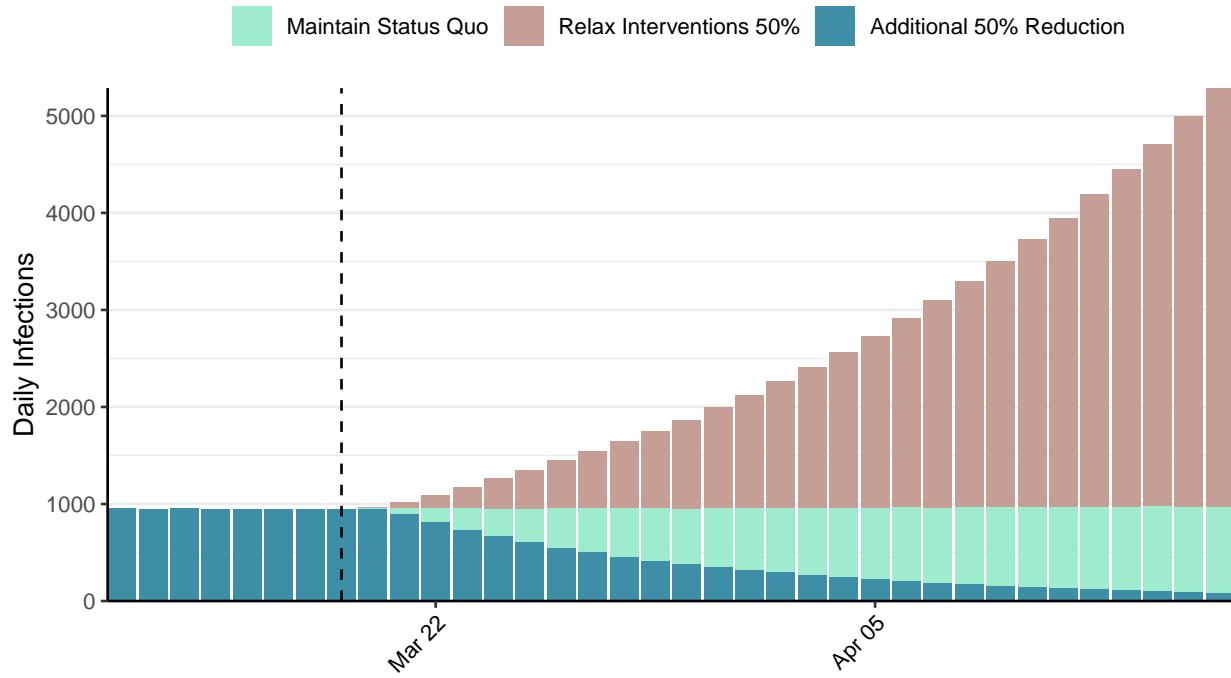


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Georgia, 2021-03-19

[Download the report for Georgia, 2021-03-19 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}
276,796	360	3,683	9	0.95 (95% CI: 0.85-1.05)

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.

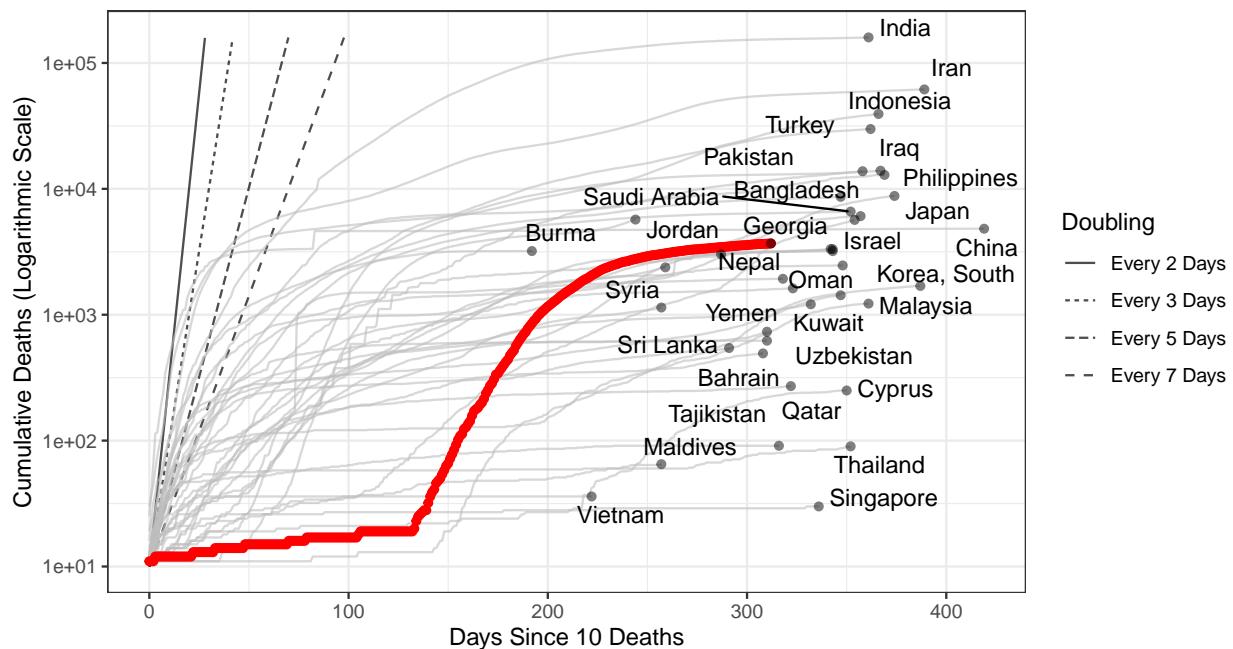


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 41,561 (95% CI: 34,651-48,472) 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).

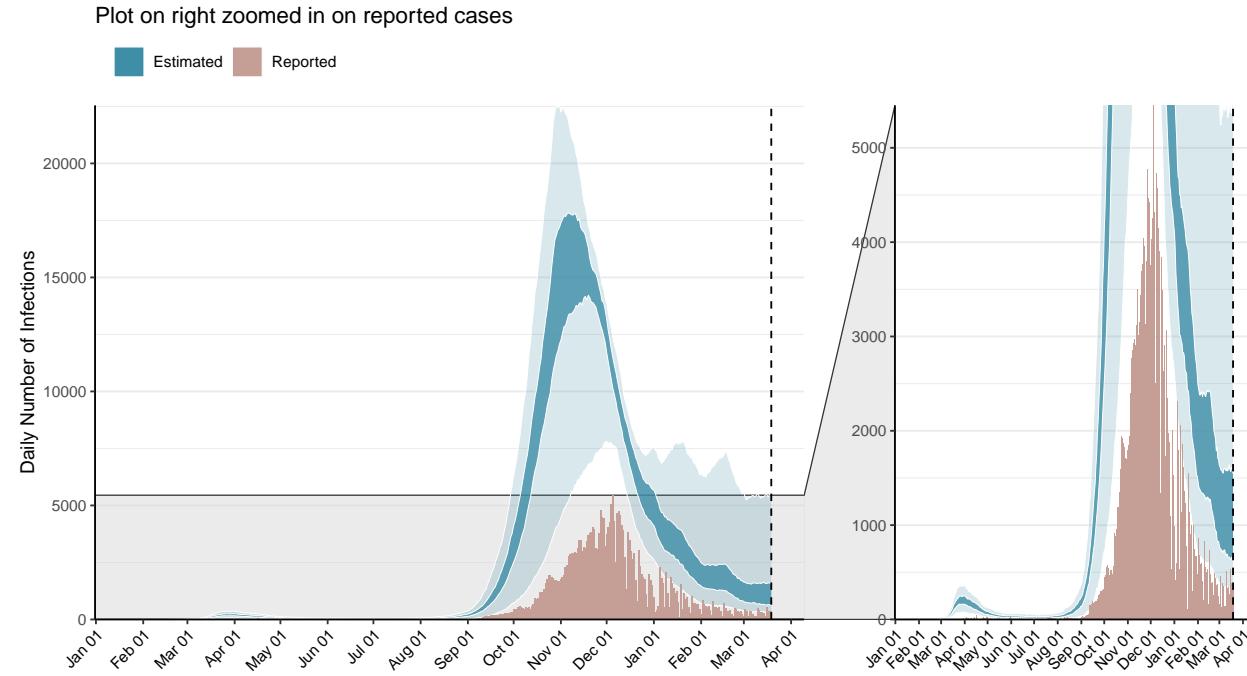


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

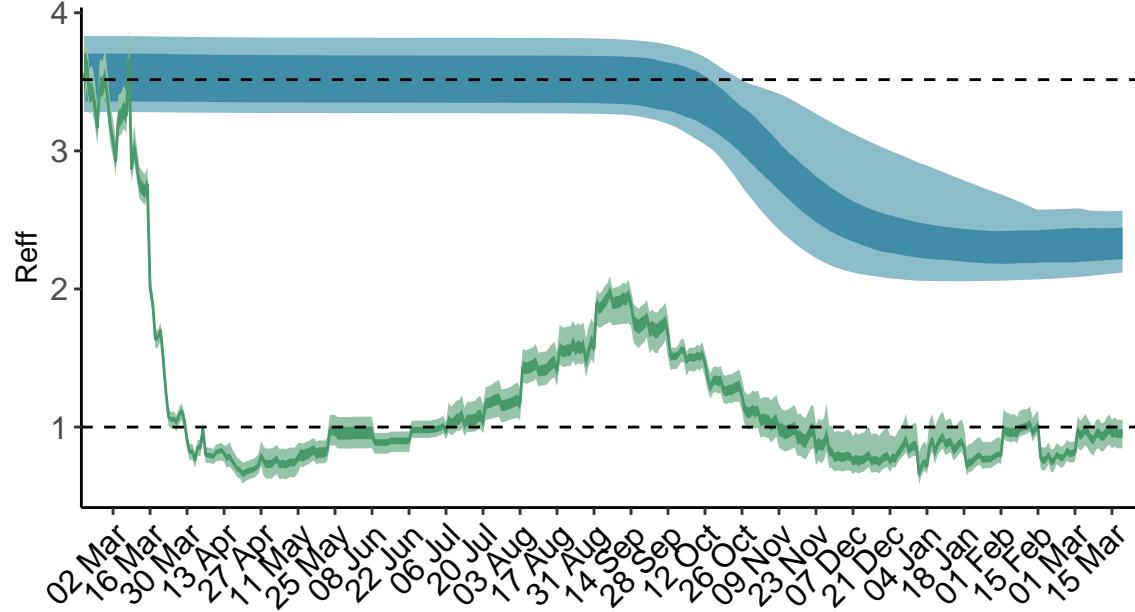


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

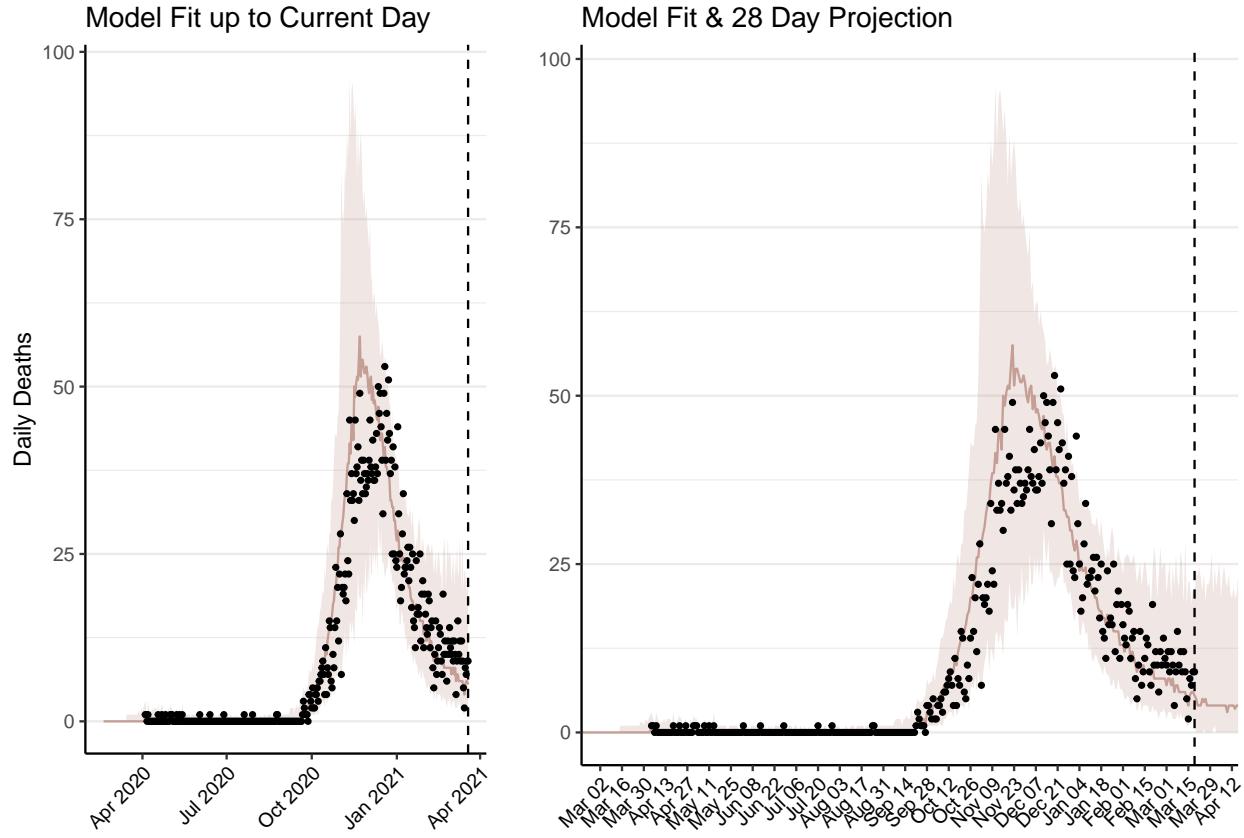


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 209 (95% CI: 174-244) patients requiring treatment with high-pressure oxygen at the current date to 182 (95% CI: 148-217) hospital beds being required on 2021-04-16 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 82 (95% CI: 68-95) patients requiring treatment with mechanical ventilation at the current date to 70 (95% CI: 57-82) by 2021-04-16. 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.**

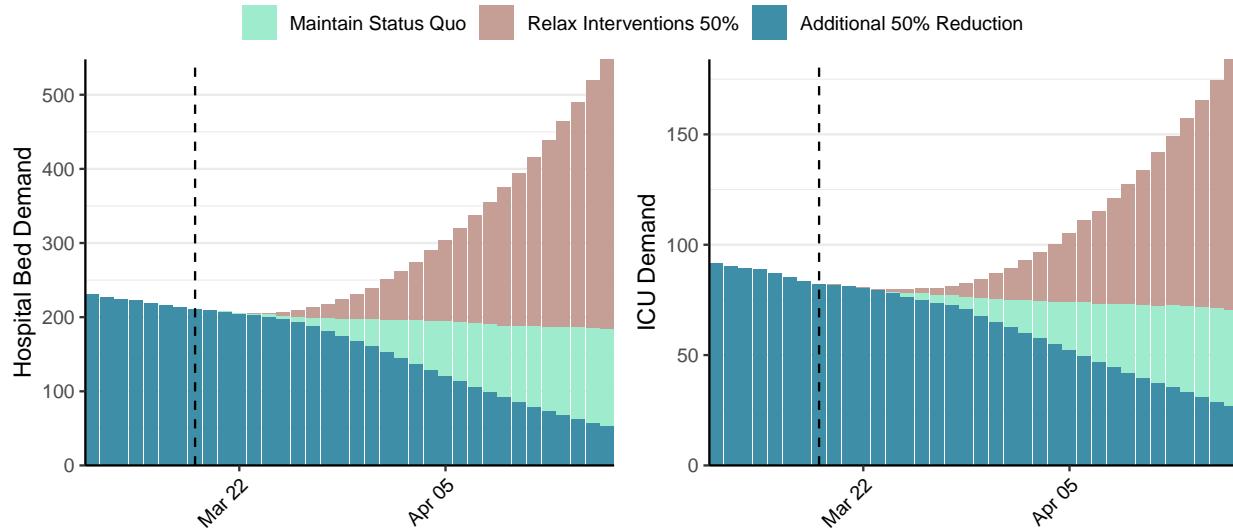


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,320 (95% CI: 1,080-1,561) at the current date to 105 (95% CI: 84-126) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,320 (95% CI: 1,080-1,561) at the current date to 6,294 (95% CI: 5,200-7,388) by 2021-04-16.

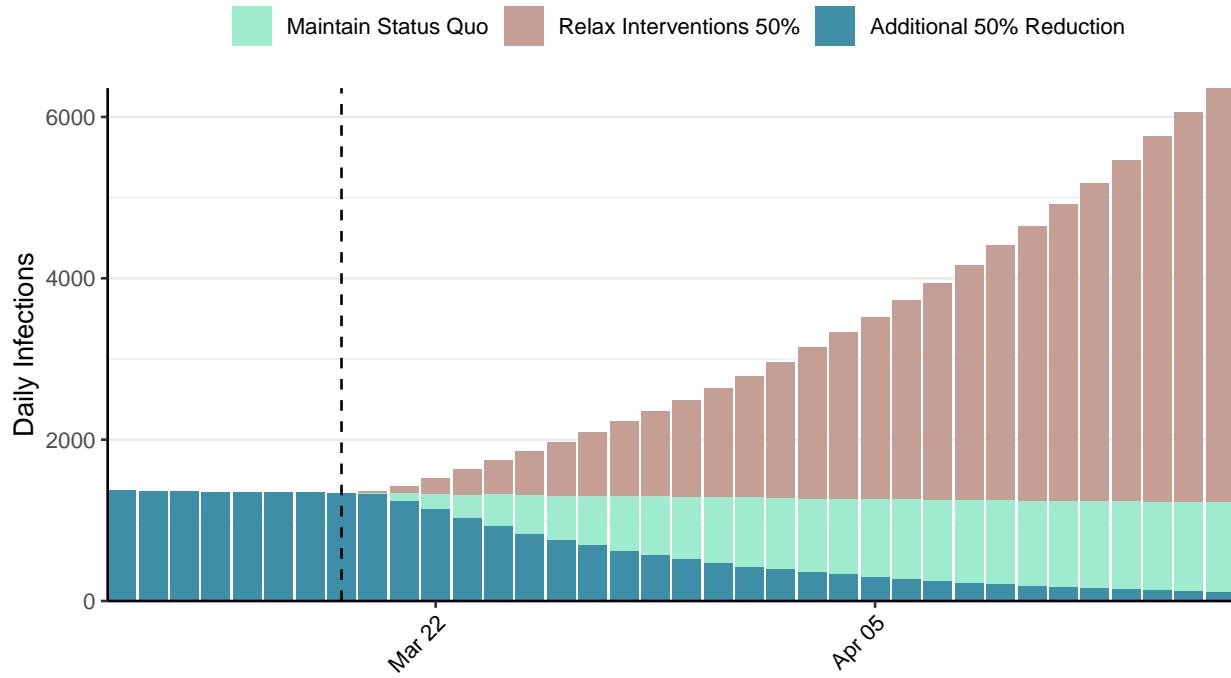


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Ghana, 2021-03-19

[Download the report for Ghana, 2021-03-19 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}
89,008	587	713	8	0.81 (95% CI: 0.68-0.92)

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.

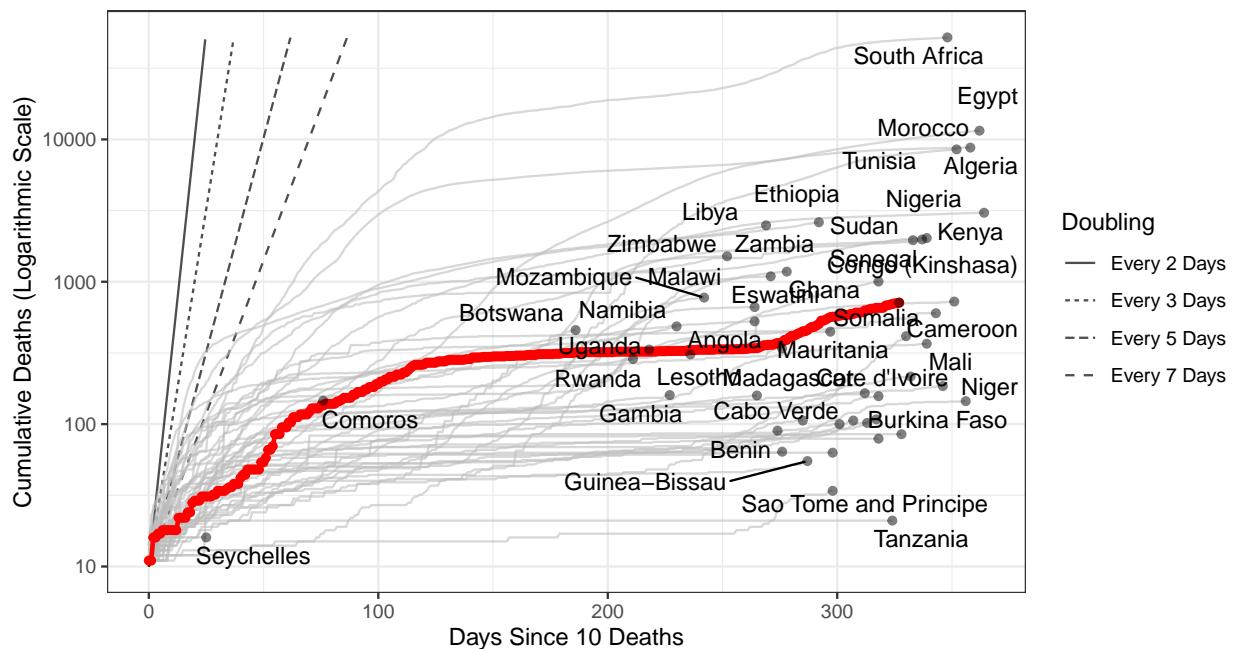


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 104,647 (95% CI: 97,766-111,528) 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).

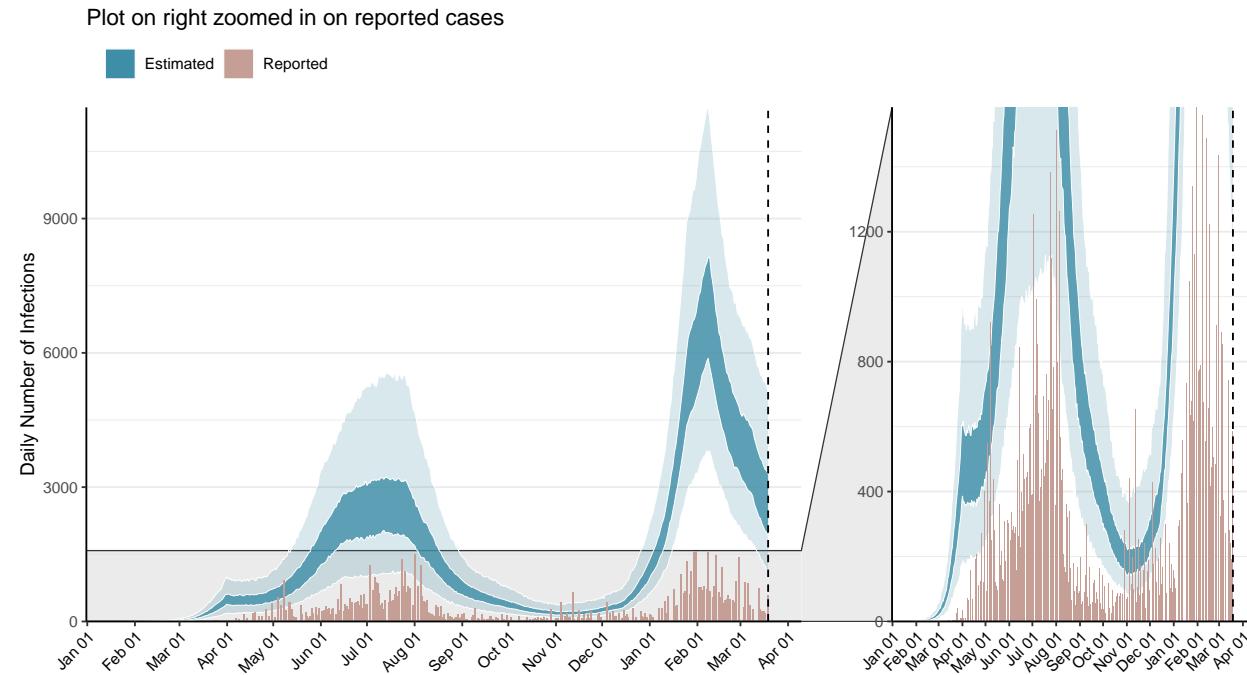


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

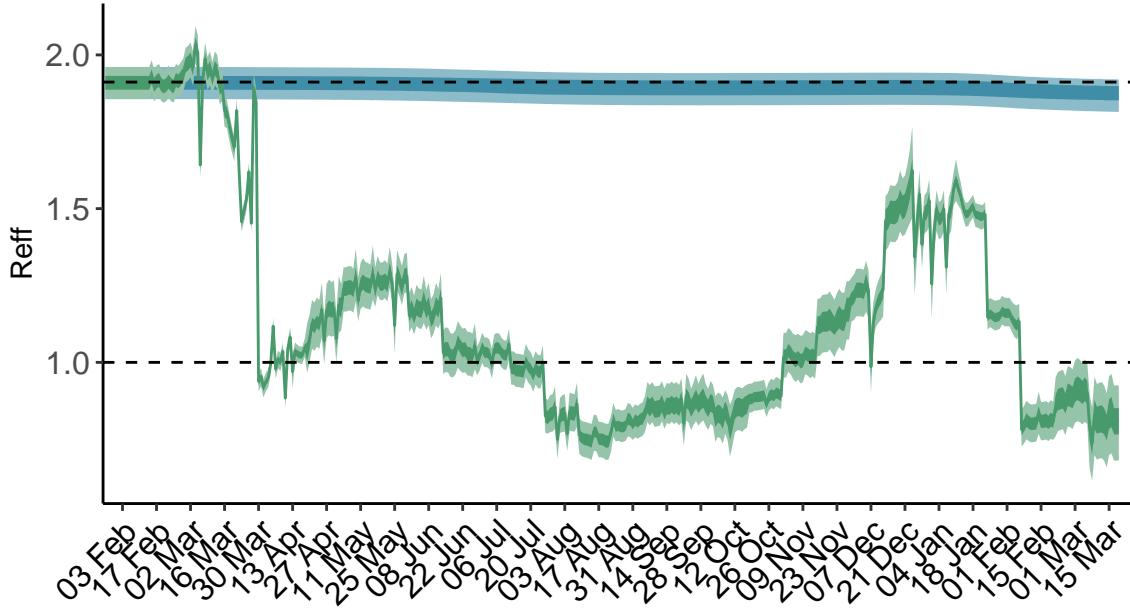


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

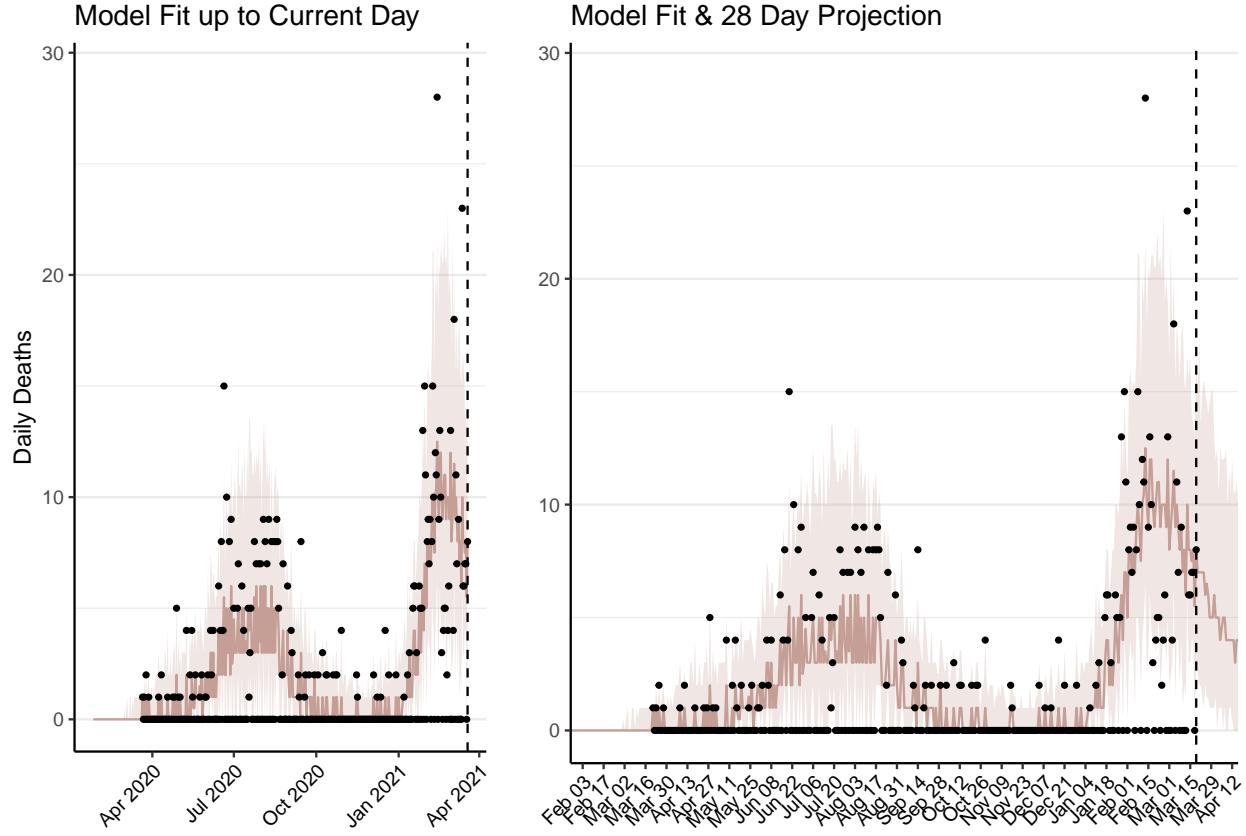


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 298 (95% CI: 277-318) patients requiring treatment with high-pressure oxygen at the current date to 148 (95% CI: 132-164) hospital beds being required on 2021-04-16 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 128 (95% CI: 120-137) patients requiring treatment with mechanical ventilation at the current date to 65 (95% CI: 58-72) by 2021-04-16. 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.**

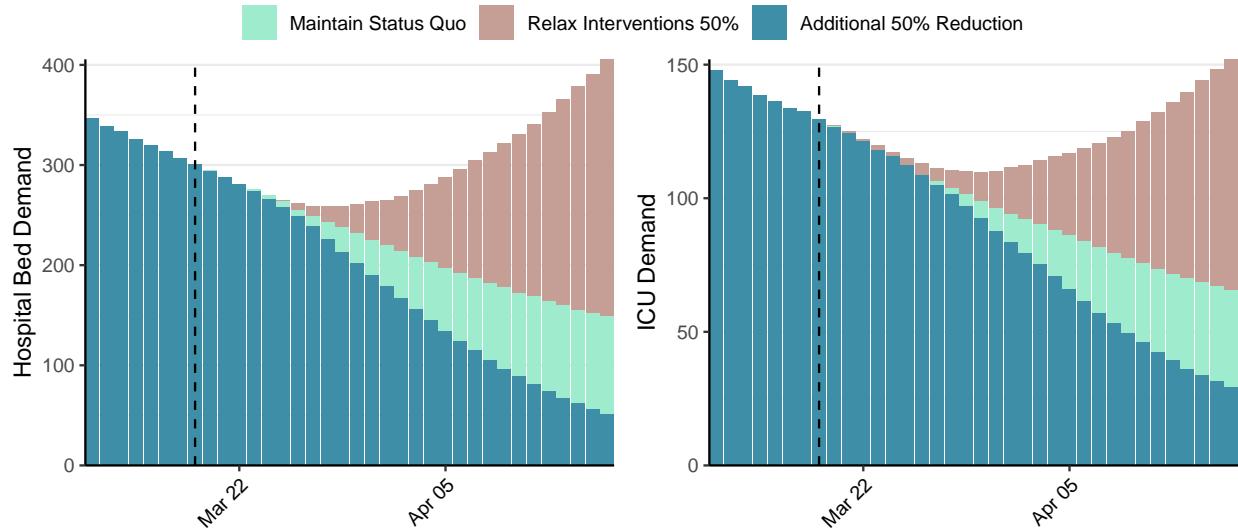


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,705 (95% CI: 2,484-2,927) at the current date to 127 (95% CI: 111-142) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,705 (95% CI: 2,484-2,927) at the current date to 6,997 (95% CI: 6,013-7,980) by 2021-04-16.

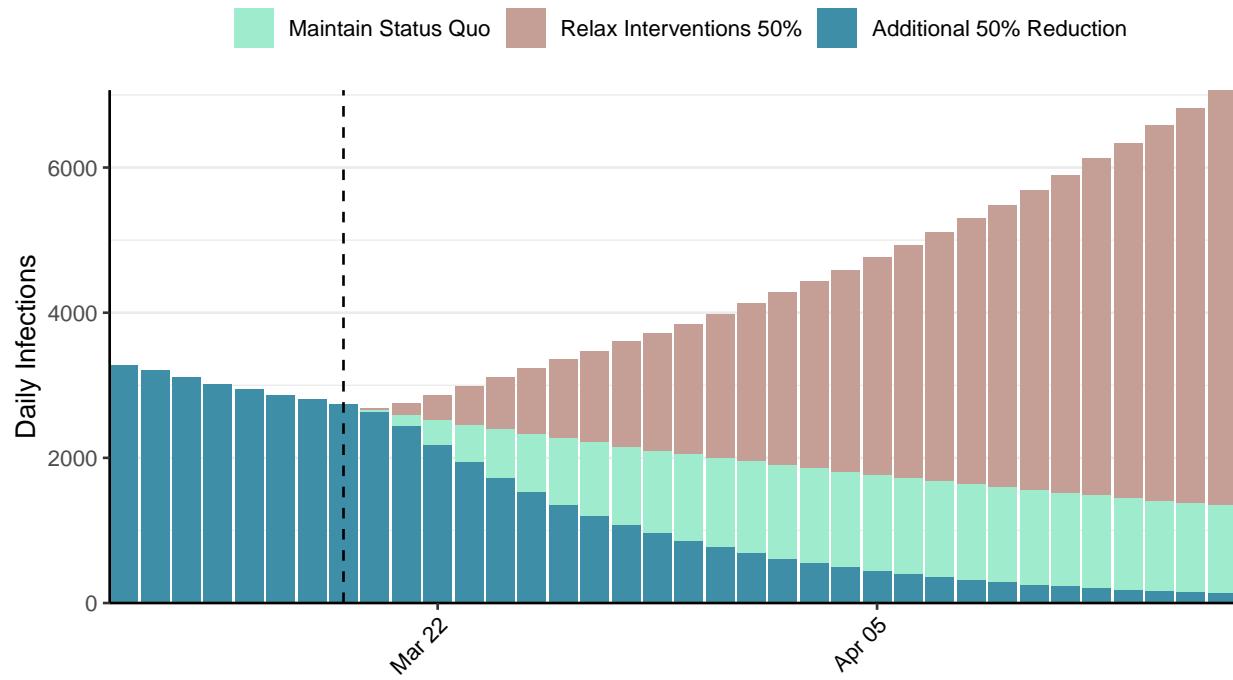


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Guinea, 2021-03-19

Download the report for Guinea, 2021-03-19 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}
18,562	277	108	2	1.09 (95% CI: 0.87-1.3)

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.

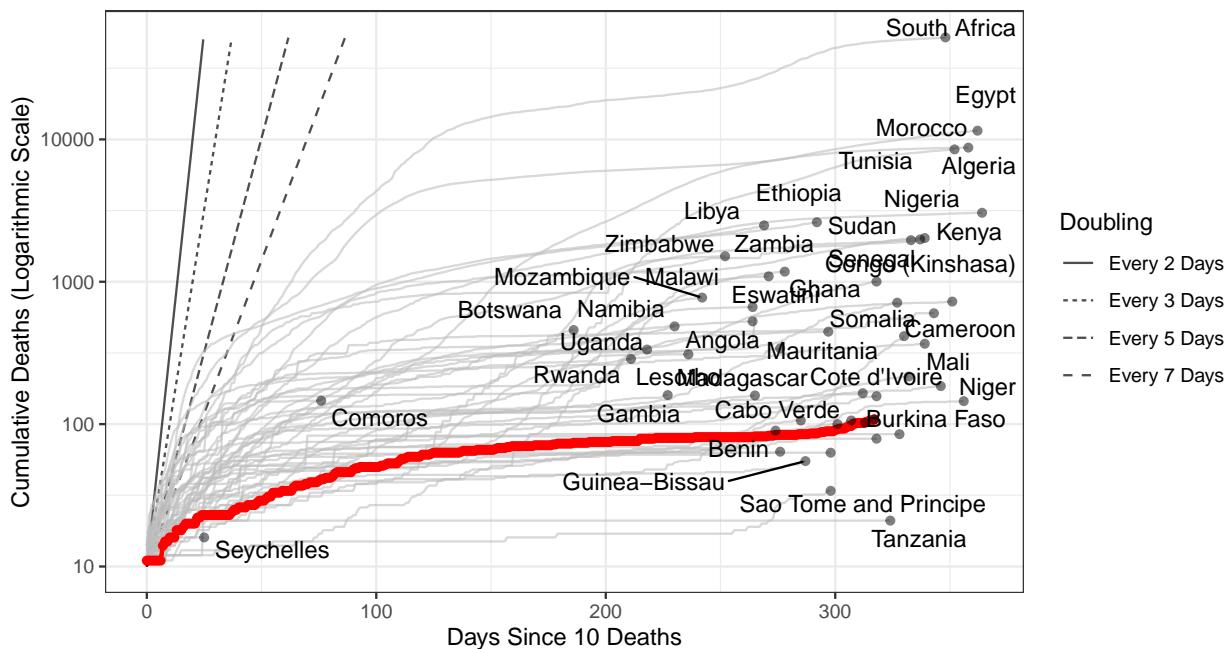


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 36,161 (95% CI: 33,847-38,474) 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).

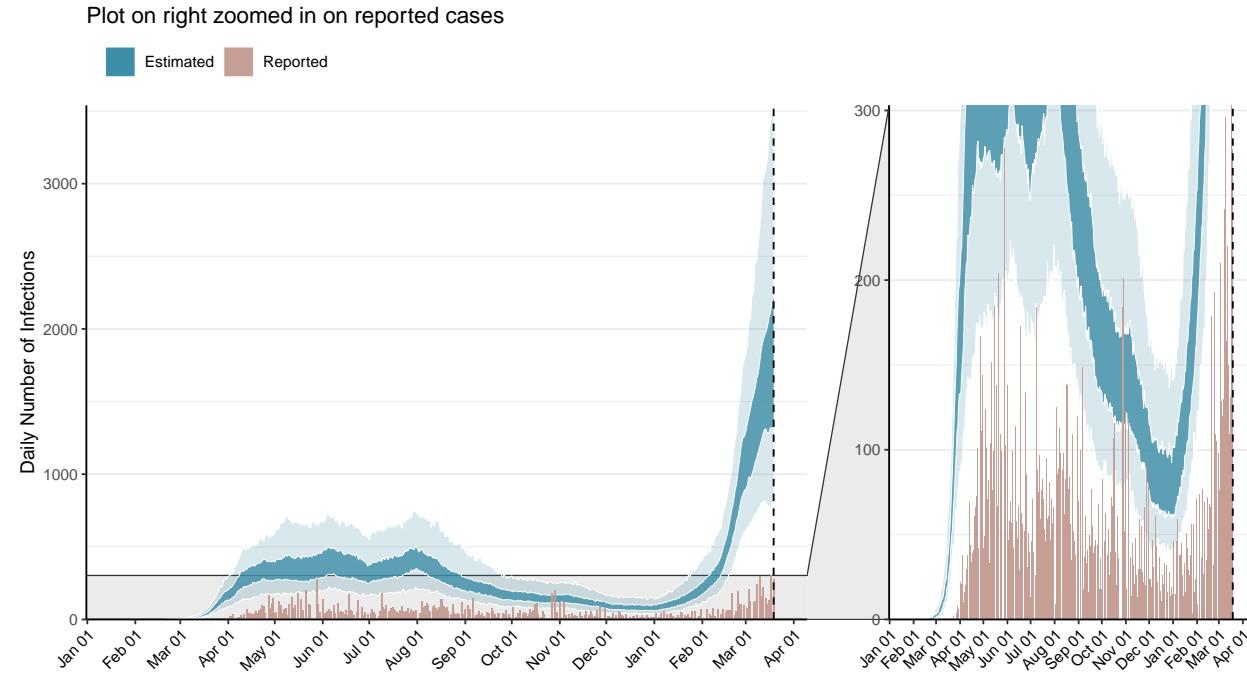


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

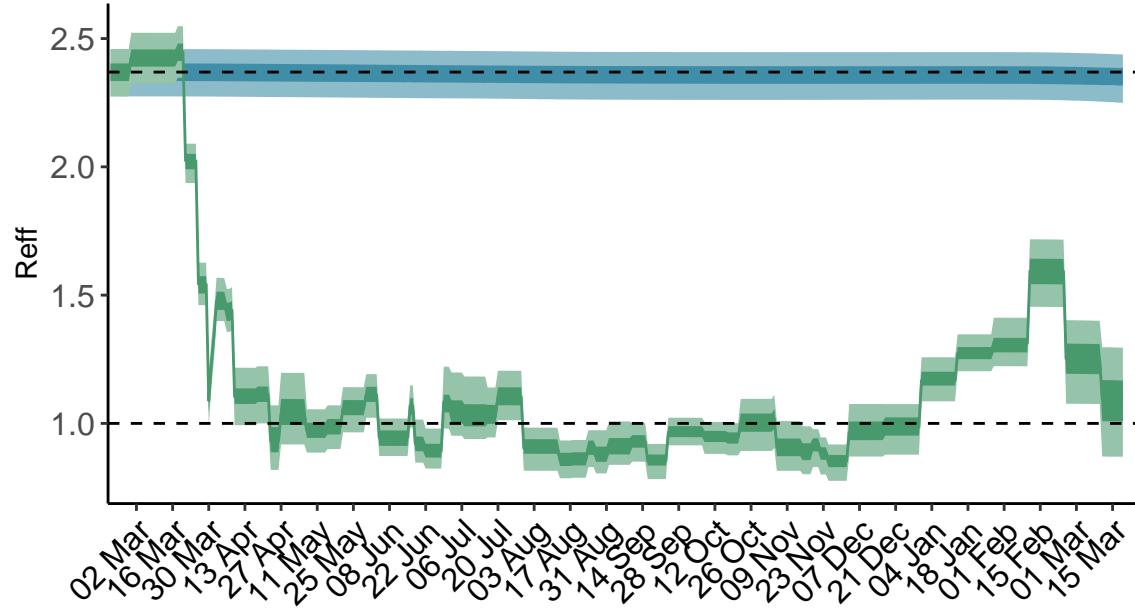


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Guinea 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.](#)

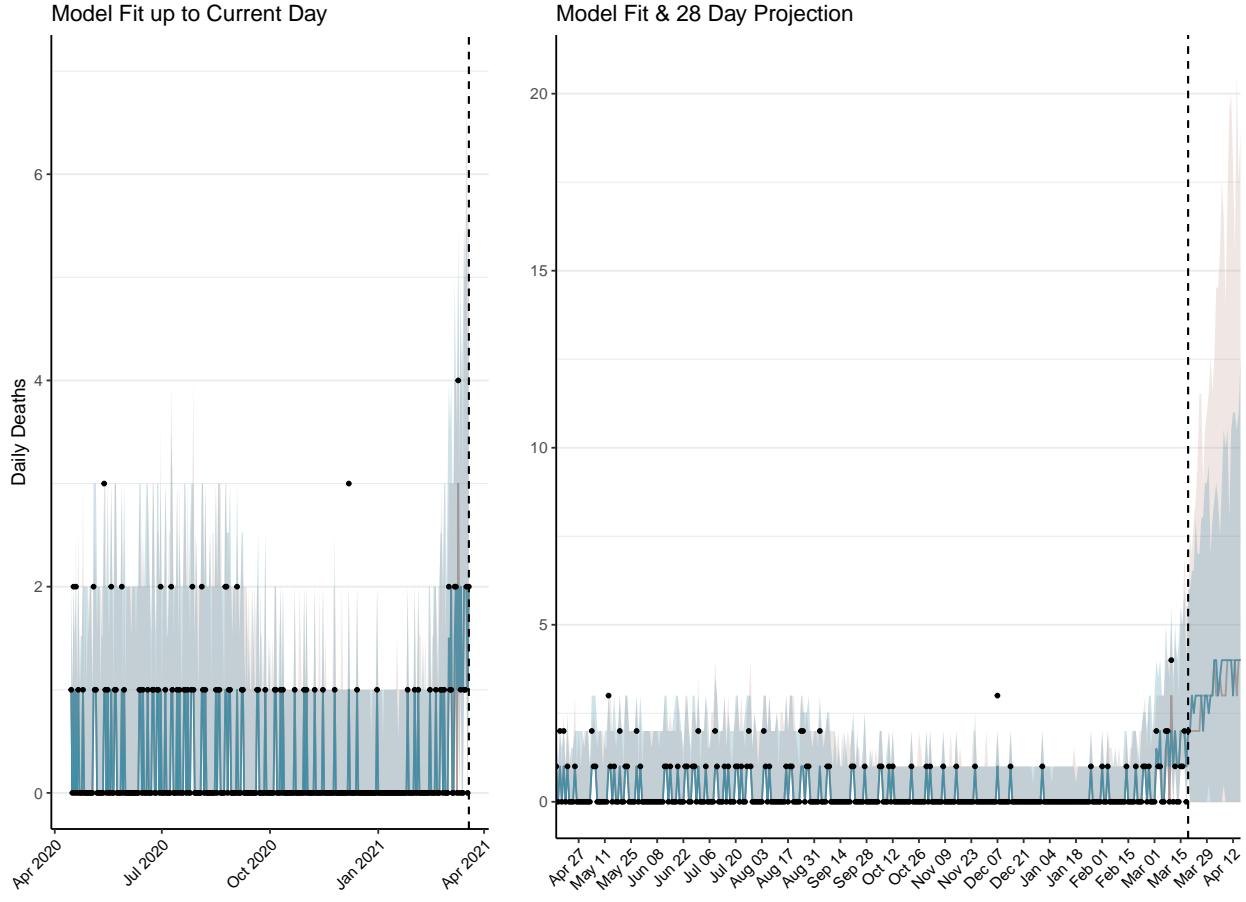


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 108 (95% CI: 101-115) patients requiring treatment with high-pressure oxygen at the current date to 190 (95% CI: 166-213) hospital beds being required on 2021-04-16 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 37 (95% CI: 35-40) patients requiring treatment with mechanical ventilation at the current date to 52 (95% CI: 49-55) by 2021-04-16. 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.**

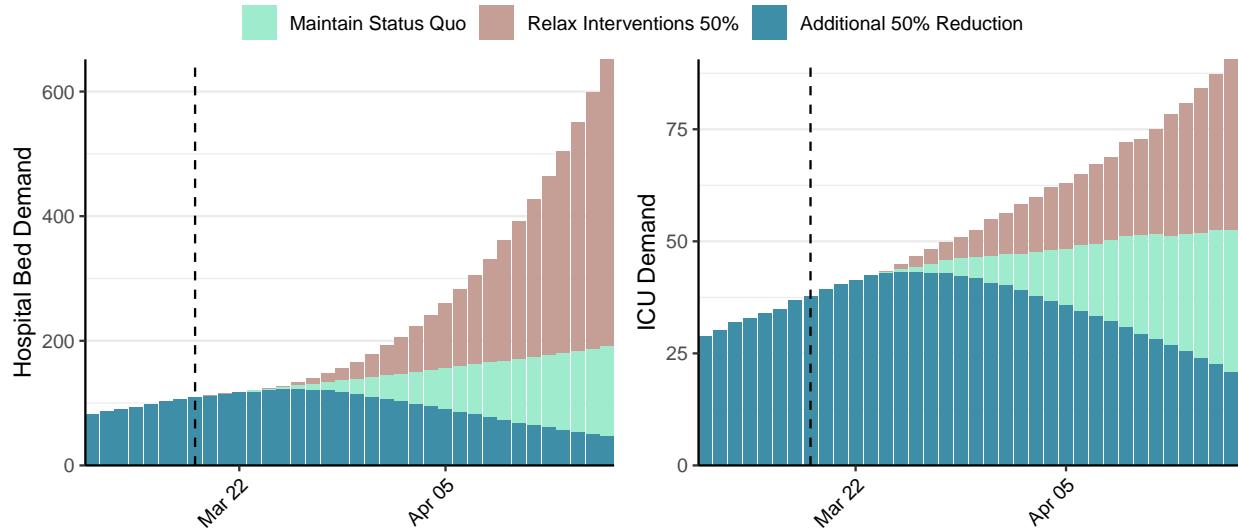


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,811 (95% CI: 1,662-1,960) at the current date to 231 (95% CI: 197-264) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,811 (95% CI: 1,662-1,960) at the current date to 19,223 (95% CI: 16,088-22,358) by 2021-04-16.

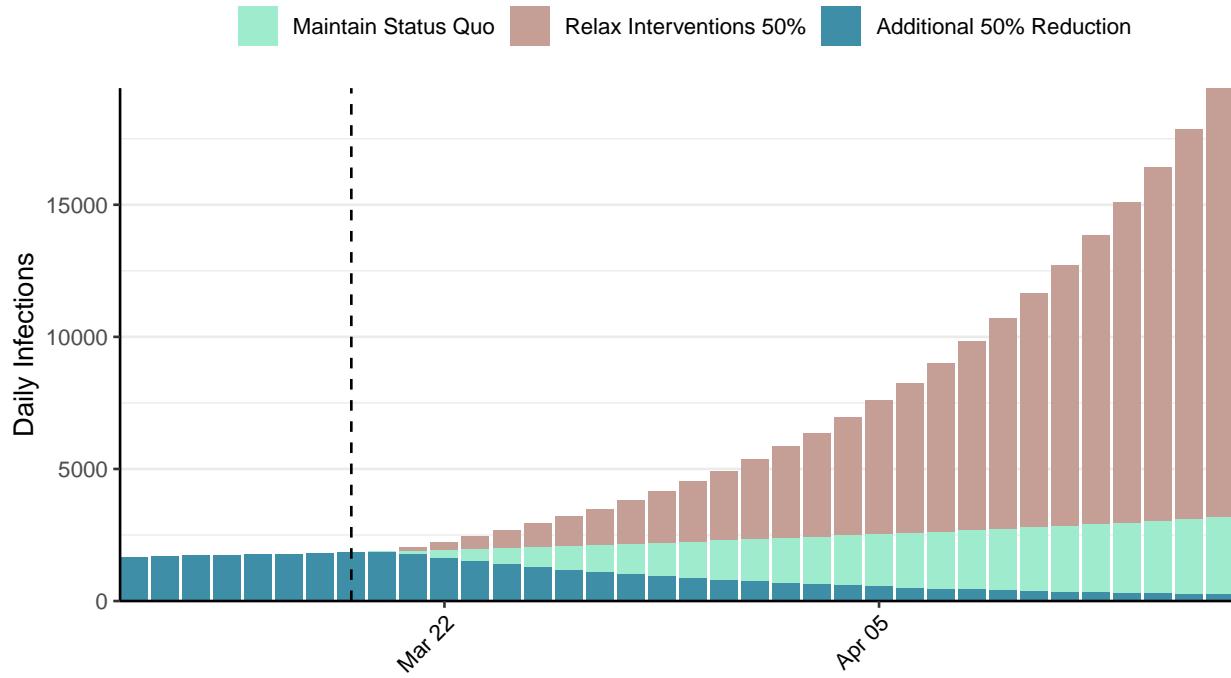


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Gambia, 2021-03-19

[Download the report for Gambia, 2021-03-19 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}
5,153	31	160	0	0.84 (95% CI: 0.66-1)

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.

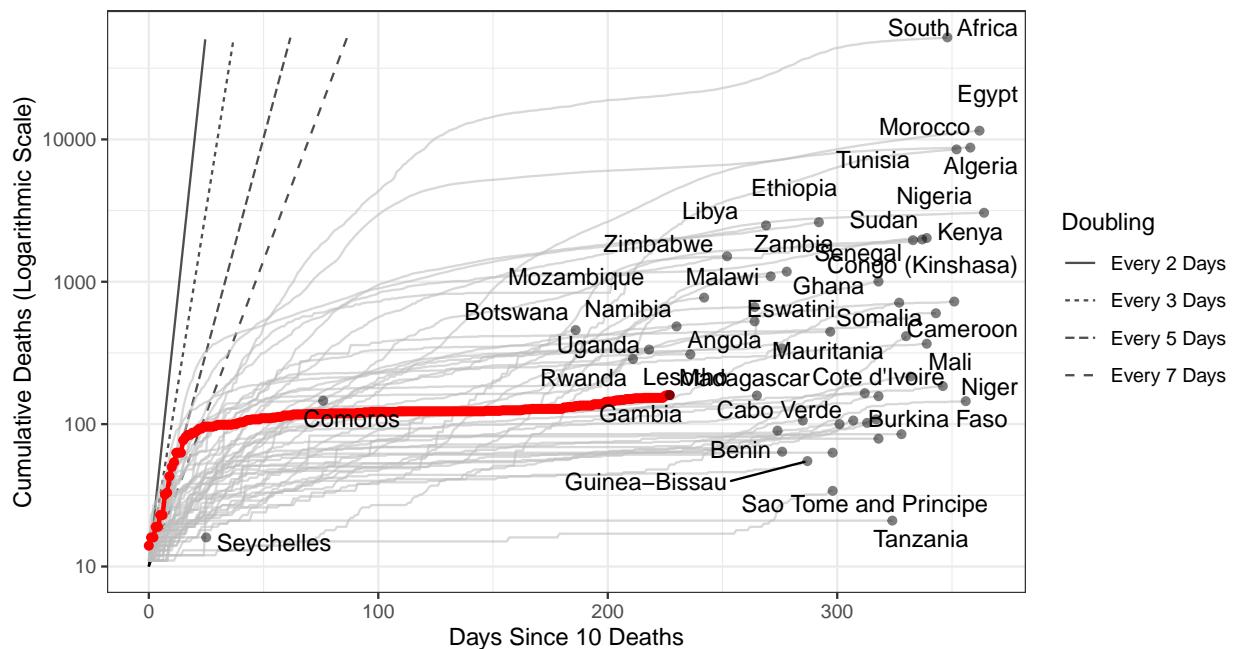


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 13,341 (95% CI: 12,342-14,340) 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.**

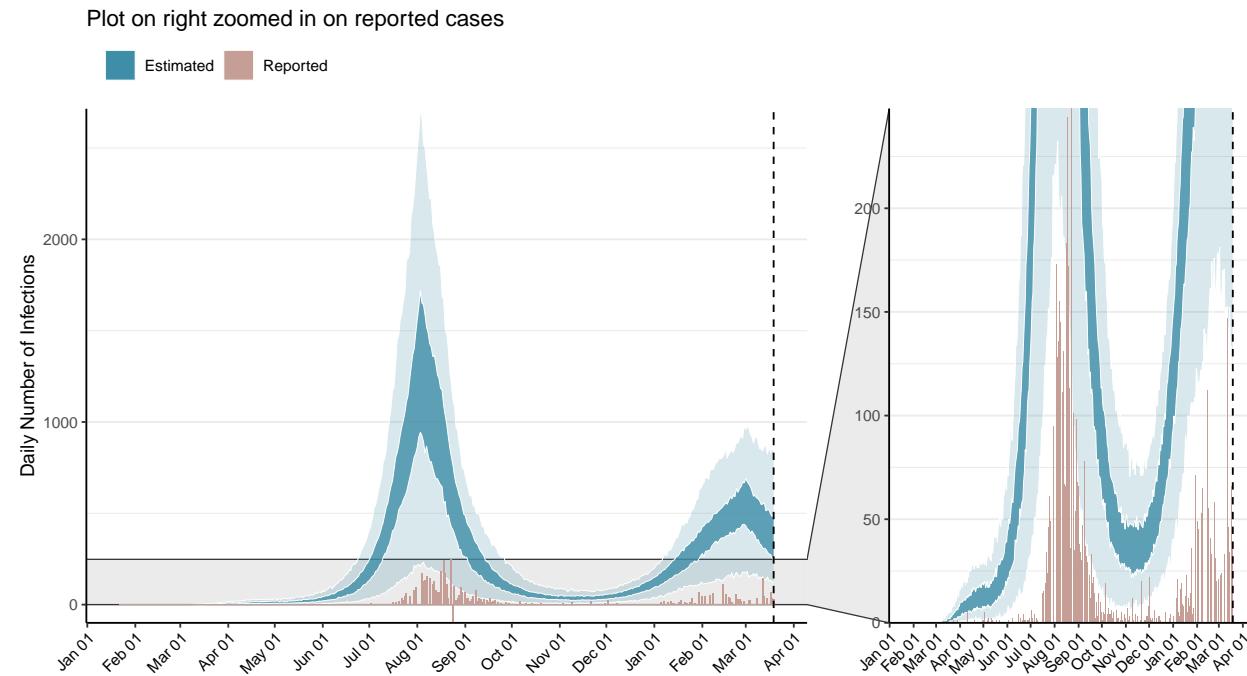


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

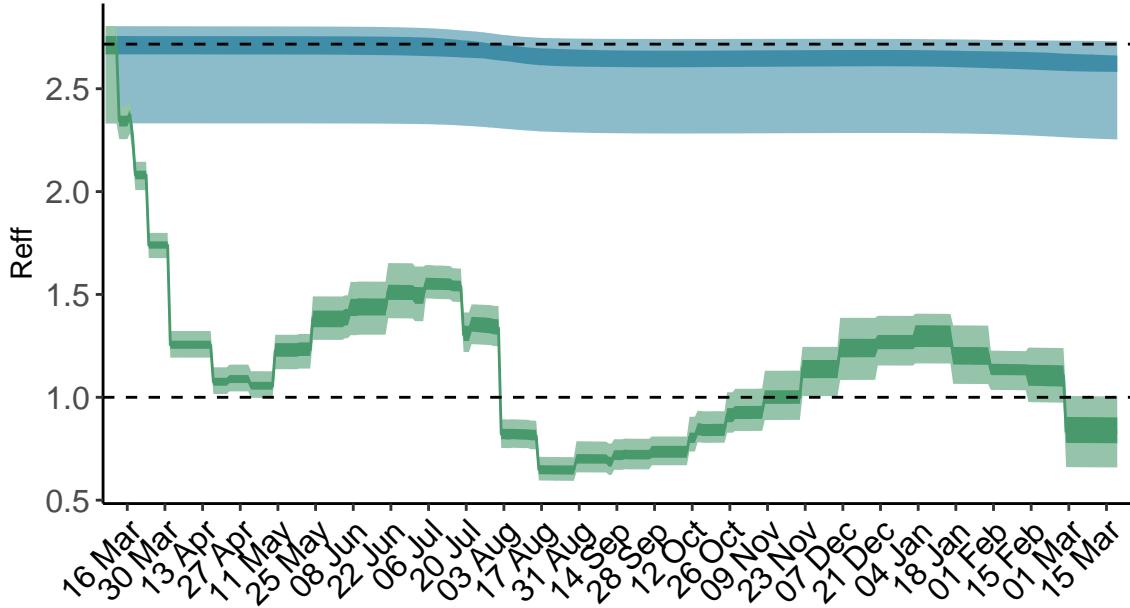


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

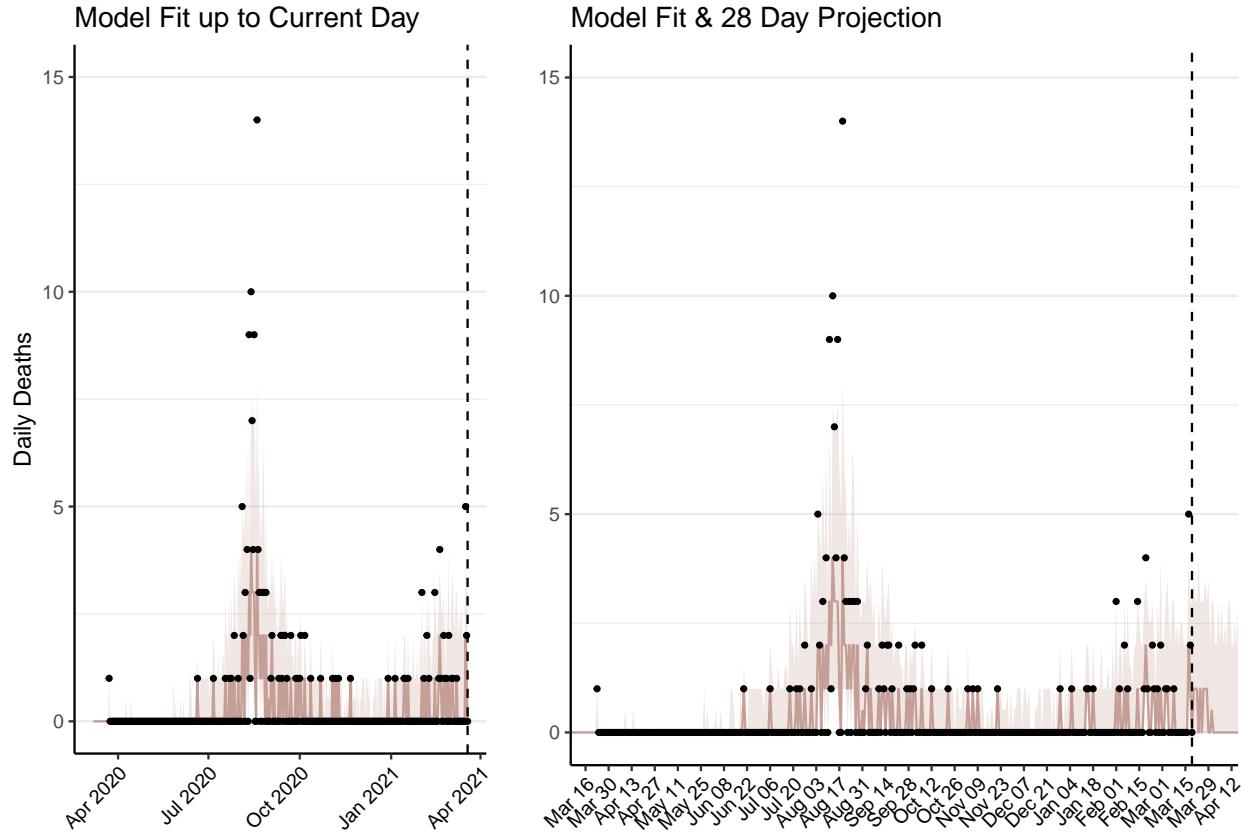


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 34 (95% CI: 31-37) patients requiring treatment with high-pressure oxygen at the current date to 20 (95% CI: 18-23) hospital beds being required on 2021-04-16 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 9 (95% CI: 8-10) by 2021-04-16. 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.**

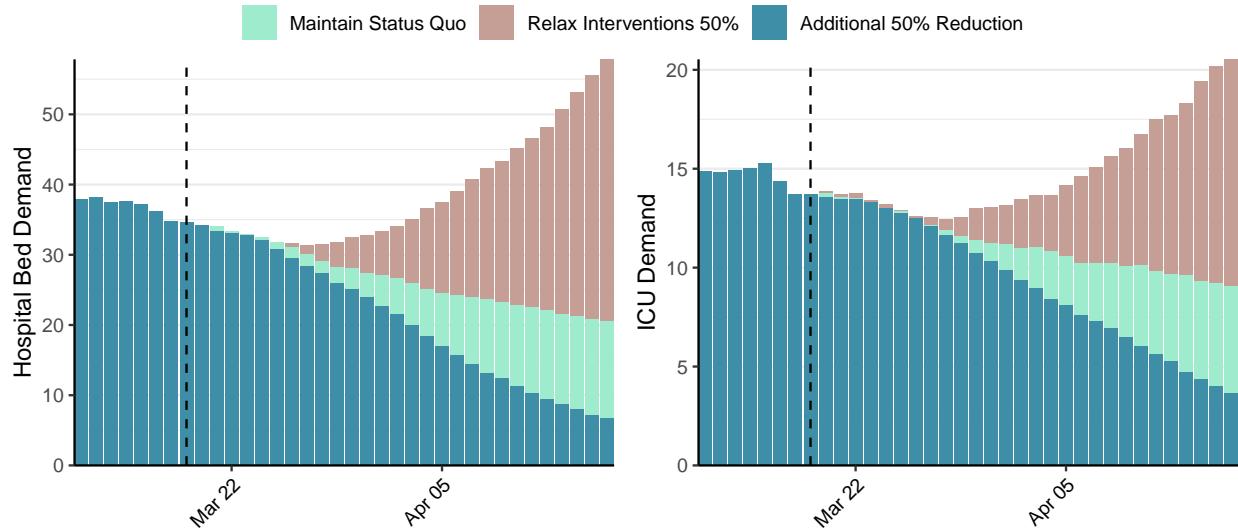


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 368 (95% CI: 333-404) at the current date to 20 (95% CI: 16-23) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 368 (95% CI: 333-404) at the current date to 1,194 (95% CI: 990-1,398) by 2021-04-16.

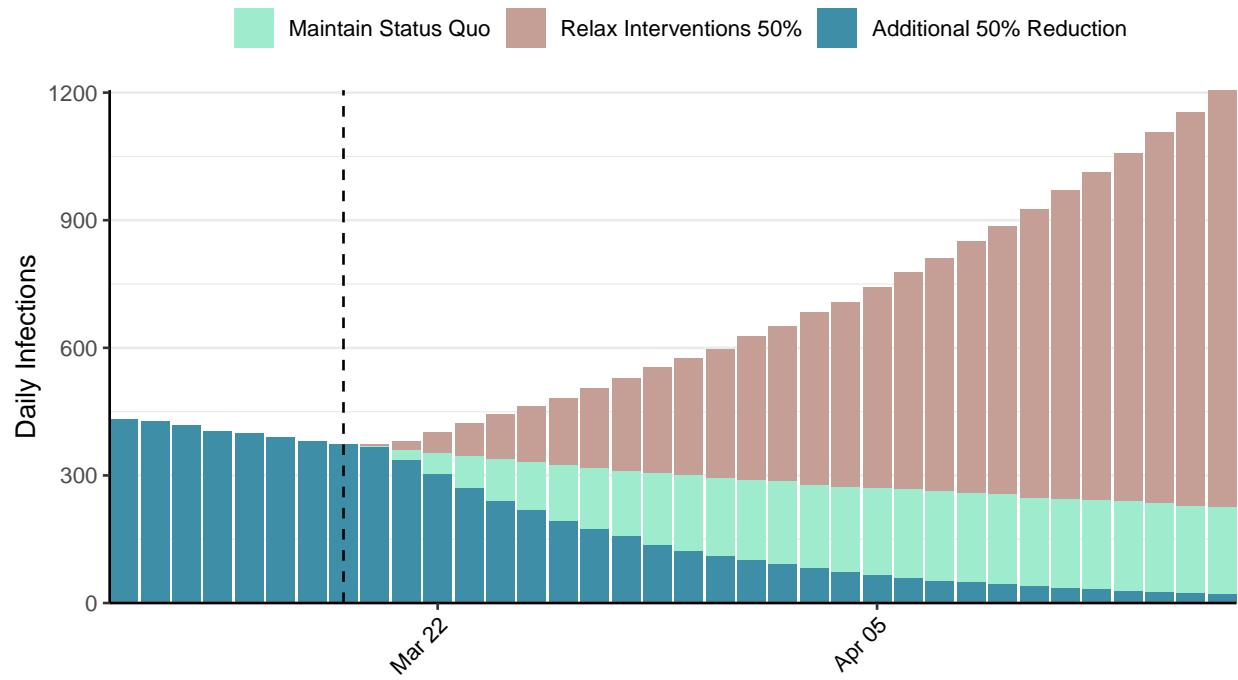


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

Situation Report for COVID-19: Guinea-Bissau, 2021-03-19

[Download the report for Guinea-Bissau, 2021-03-19 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}
3,536	18	55	1	1.53 (95% CI: 1.22-1.82)

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.

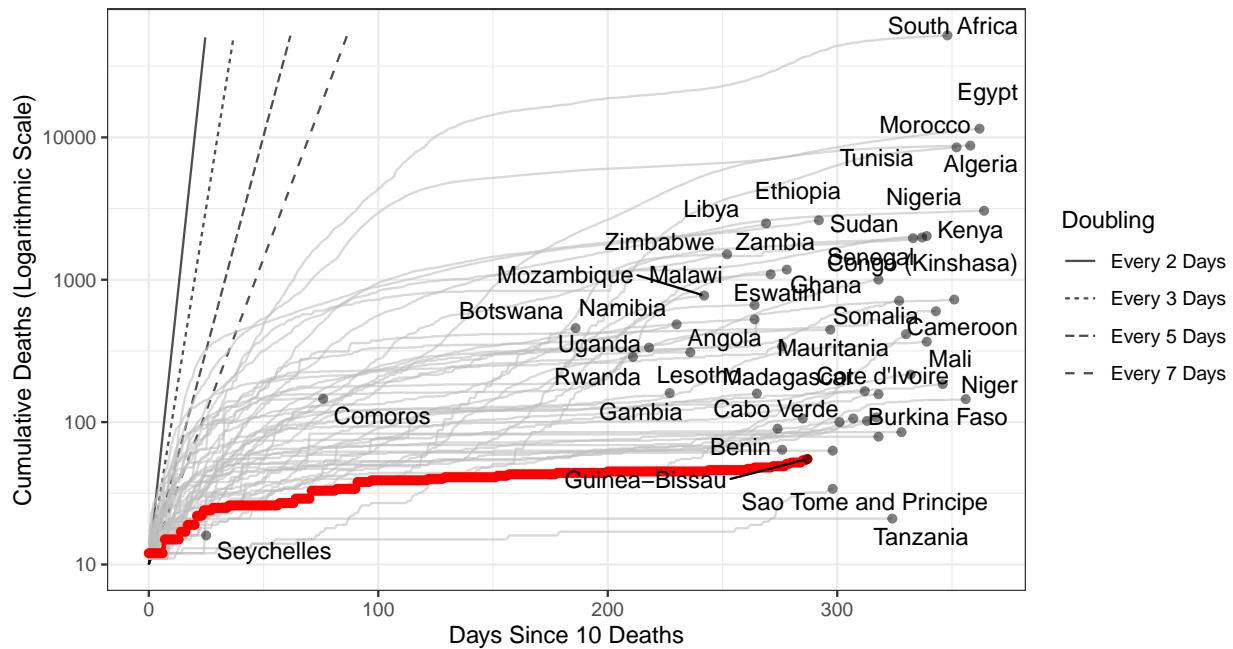


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 13,486 (95% CI: 12,229-14,743) 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).

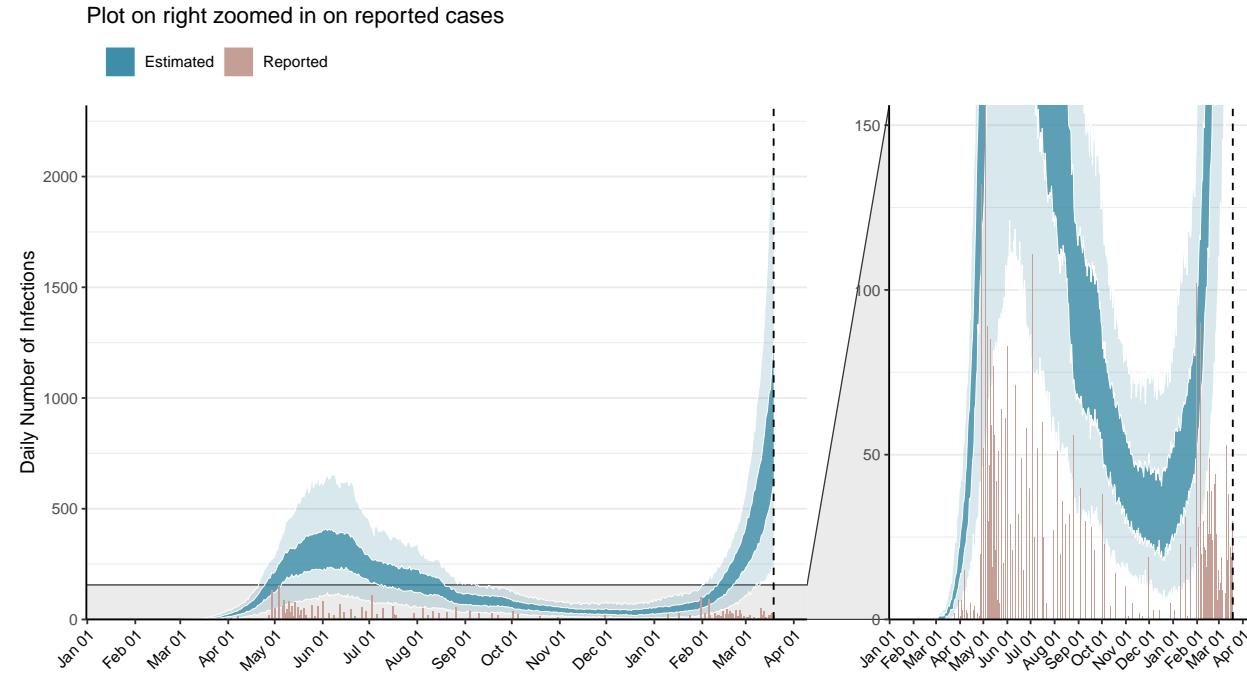


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

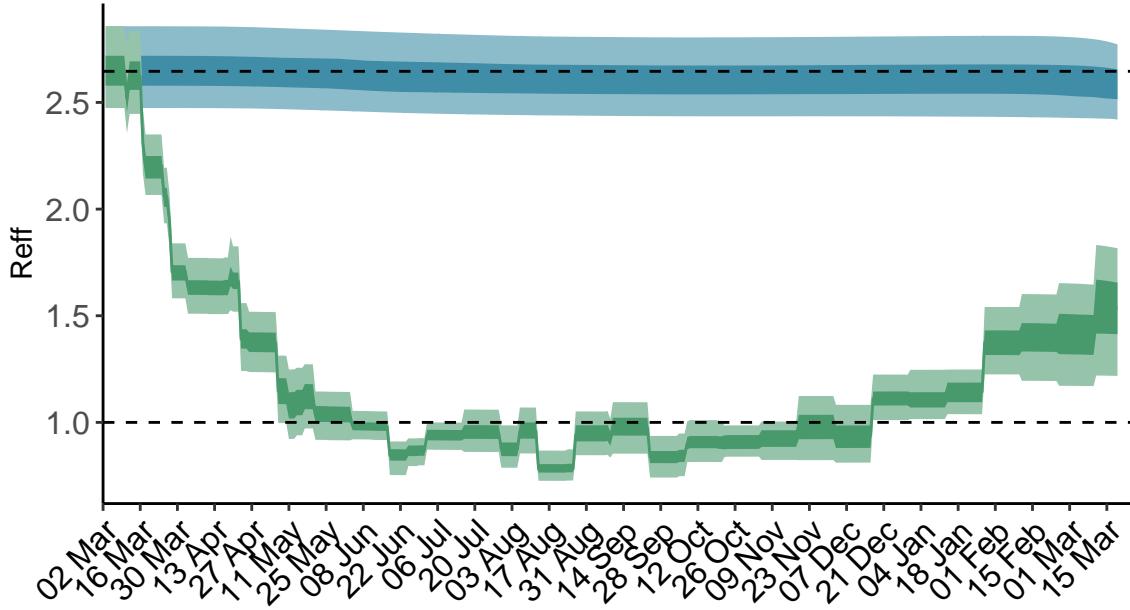


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Guinea-Bissau 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.](#)

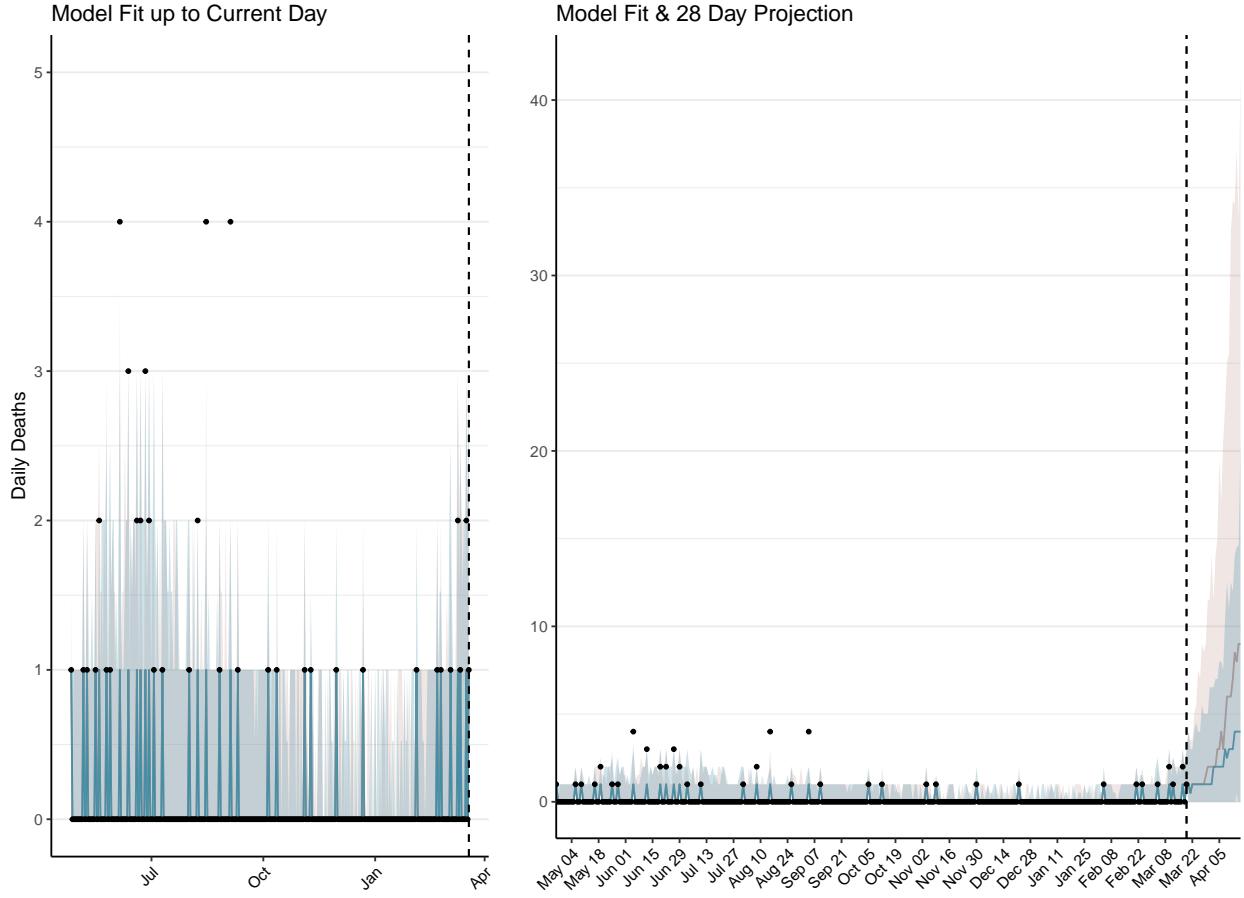


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 41 (95% CI: 37-45) patients requiring treatment with high-pressure oxygen at the current date to 289 (95% CI: 244-333) hospital beds being required on 2021-04-16 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: 13-16) patients requiring treatment with mechanical ventilation at the current date to 46 (95% CI: 43-50) by 2021-04-16. 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.**

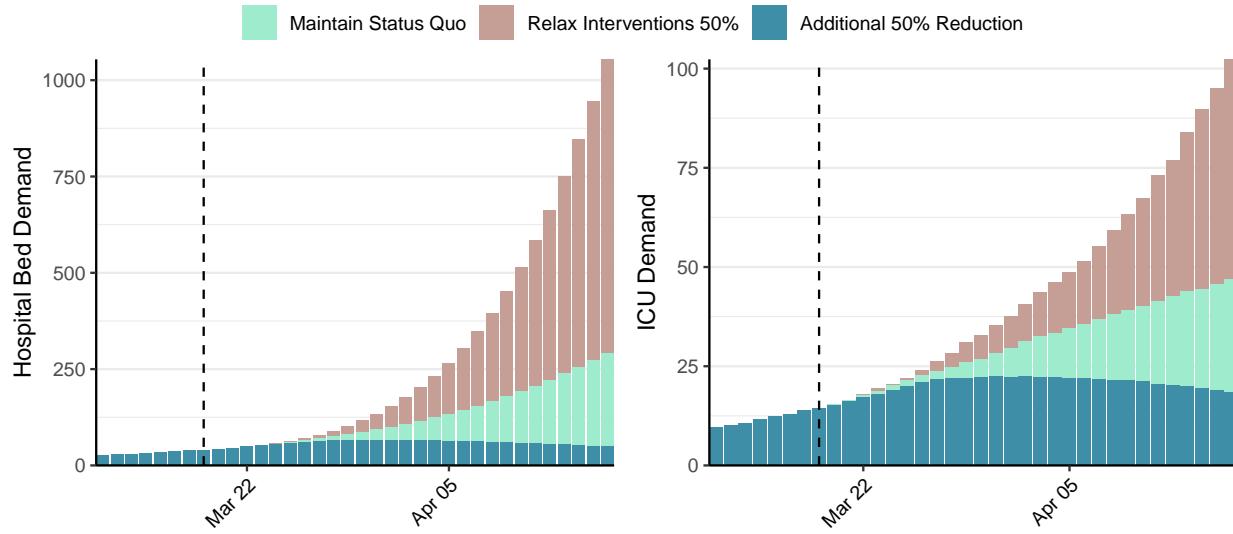


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,031 (95% CI: 914-1,148) at the current date to 466 (95% CI: 384-547) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,031 (95% CI: 914-1,148) at the current date to 35,313 (95% CI: 31,247-39,378) by 2021-04-16.

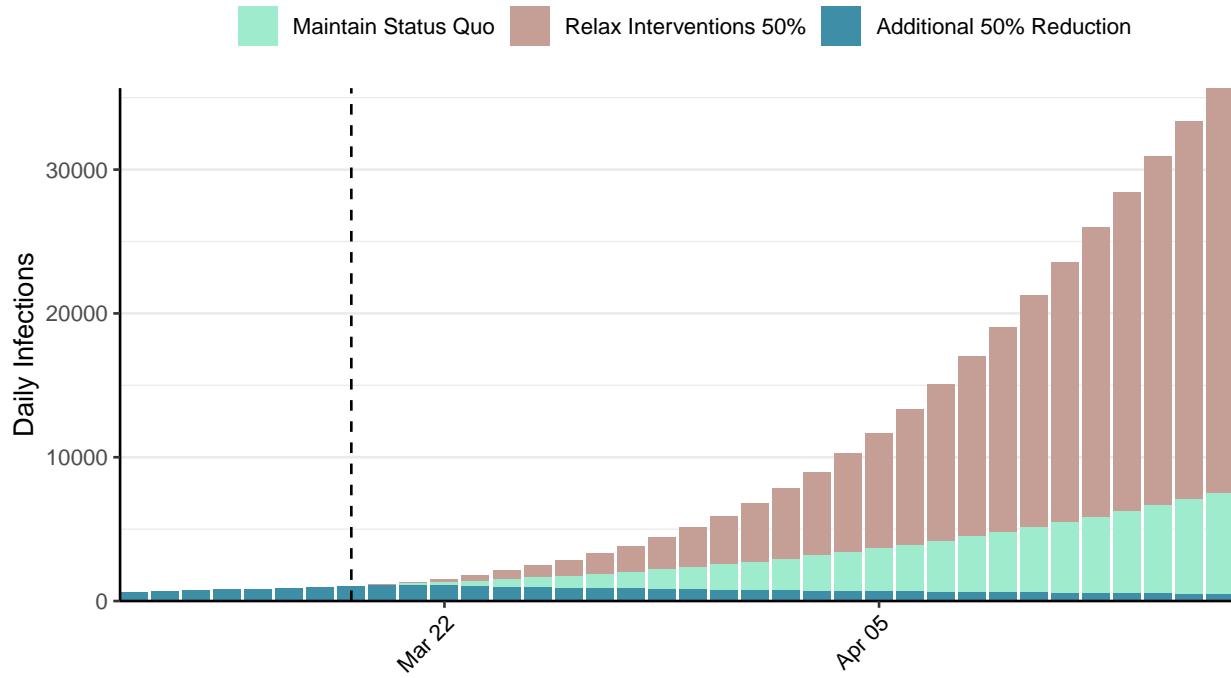


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Equatorial Guinea, 2021-03-19

[Download the report for Equatorial Guinea, 2021-03-19 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}
6,666	0	100	0	1.06 (95% CI: 0.78-1.42)

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.

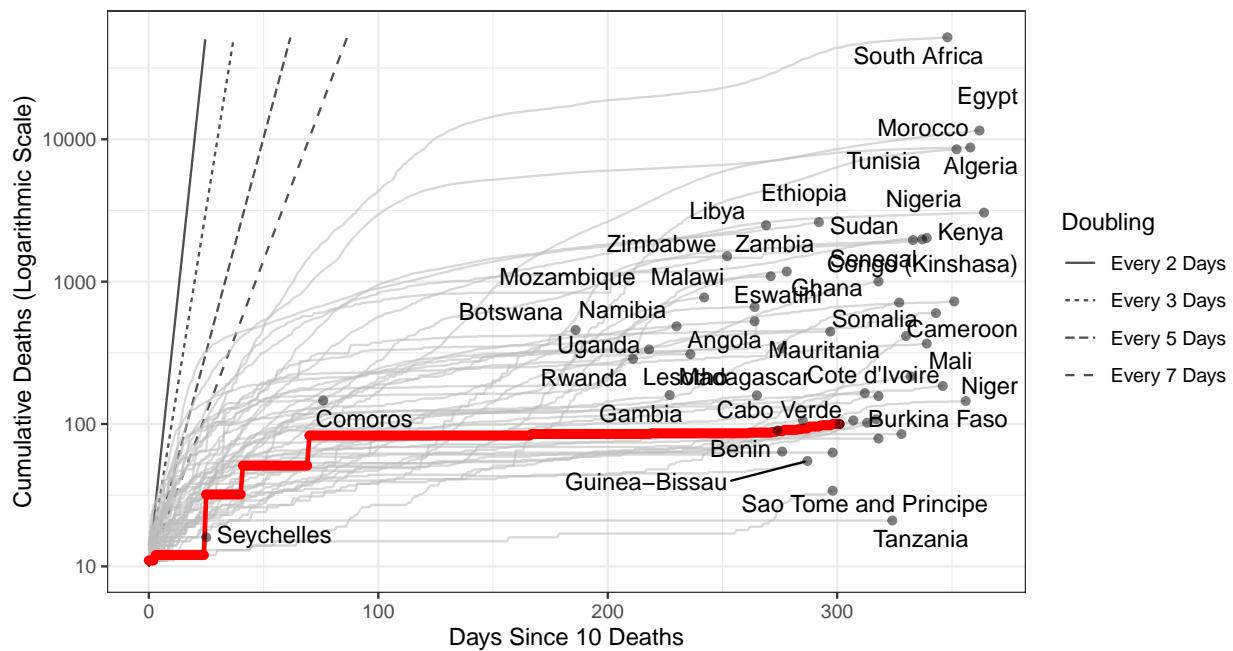


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 14,569 (95% CI: 12,572-16,566) 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).

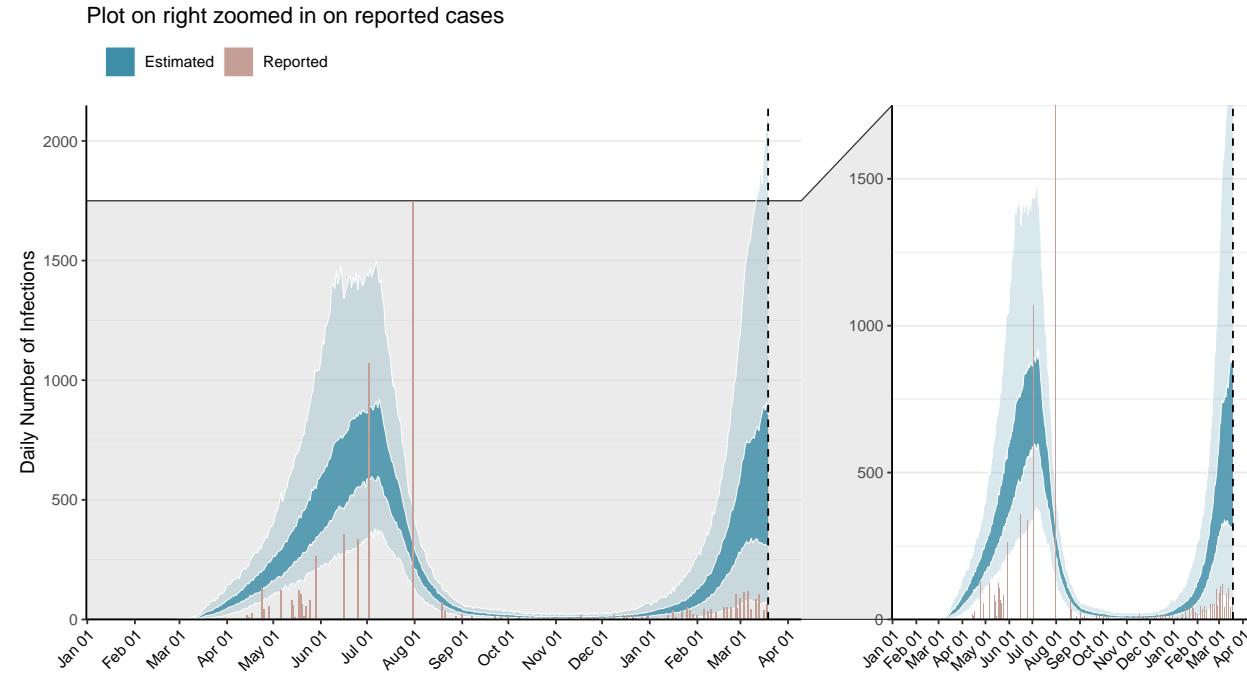


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

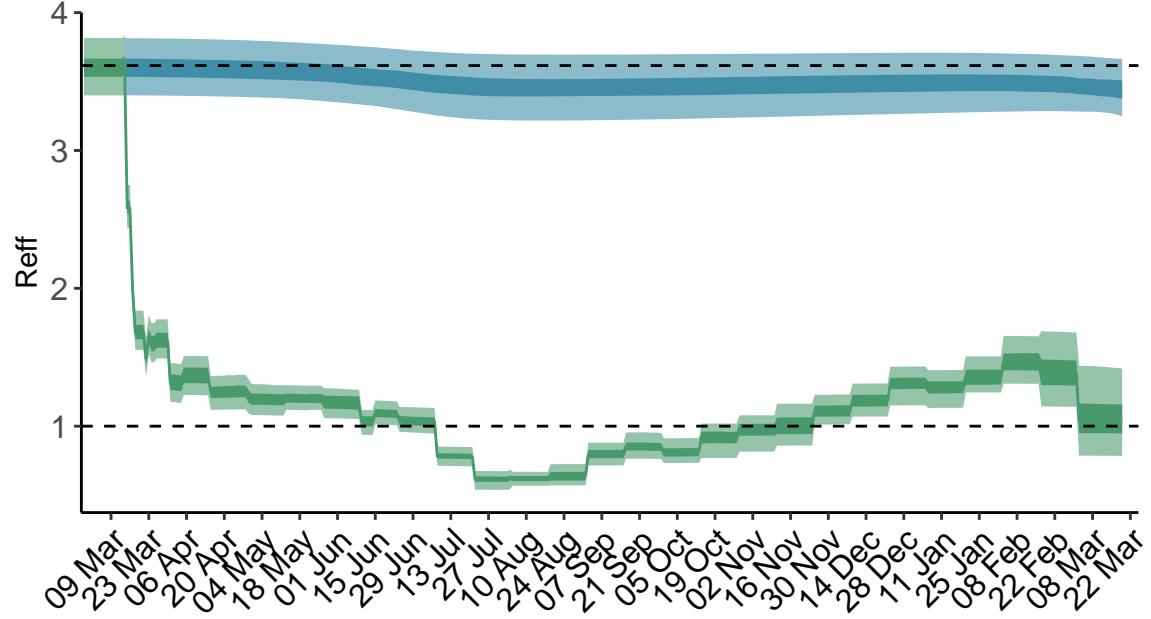


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

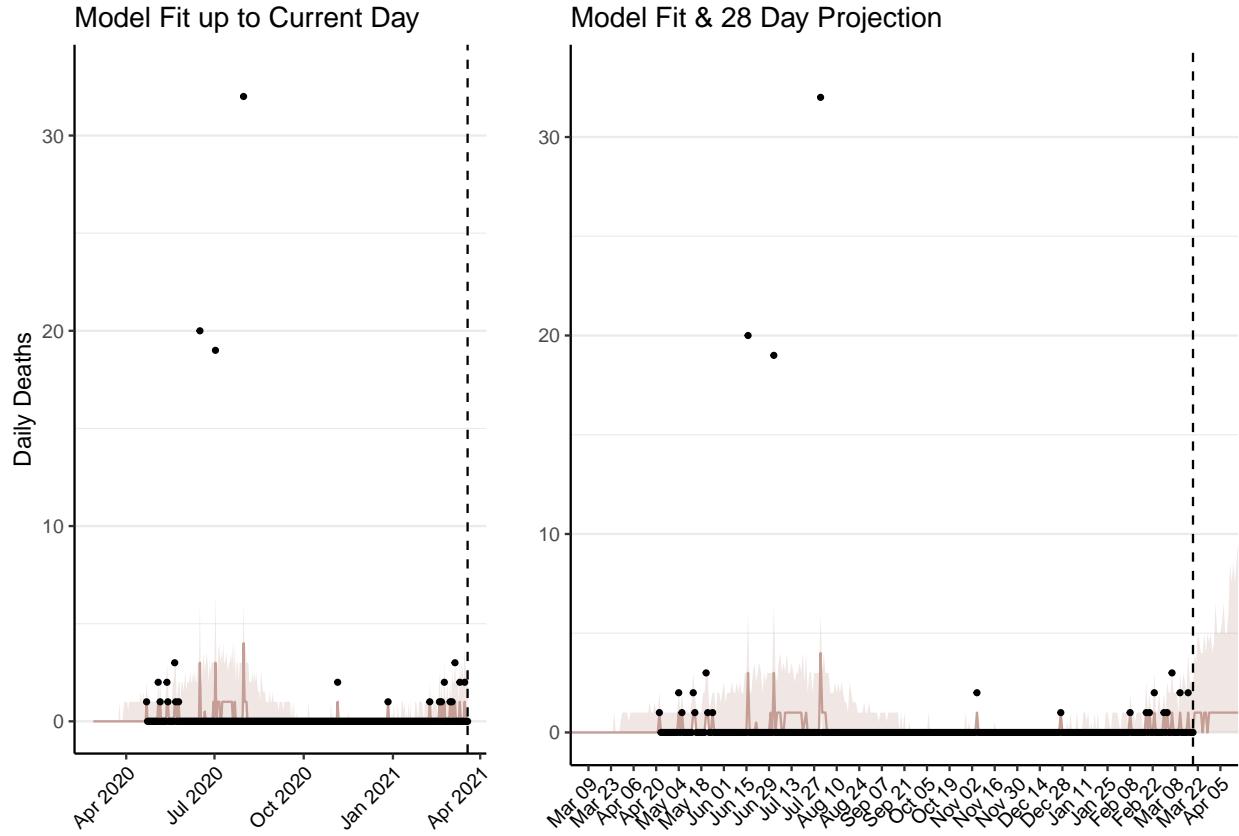


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 43 (95% CI: 37-49) patients requiring treatment with high-pressure oxygen at the current date to 75 (95% CI: 58-92) hospital beds being required on 2021-04-16 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 16 (95% CI: 14-18) patients requiring treatment with mechanical ventilation at the current date to 28 (95% CI: 22-34) by 2021-04-16. 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.**

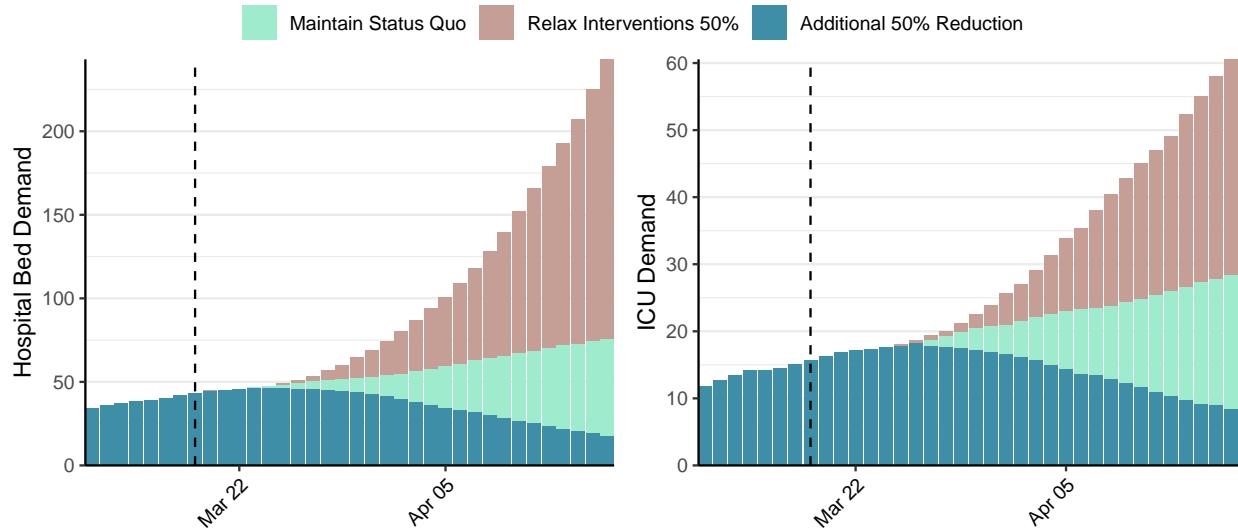


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 690 (95% CI: 577-804) at the current date to 100 (95% CI: 73-126) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 690 (95% CI: 577-804) at the current date to 6,451 (95% CI: 4,897-8,005) by 2021-04-16.

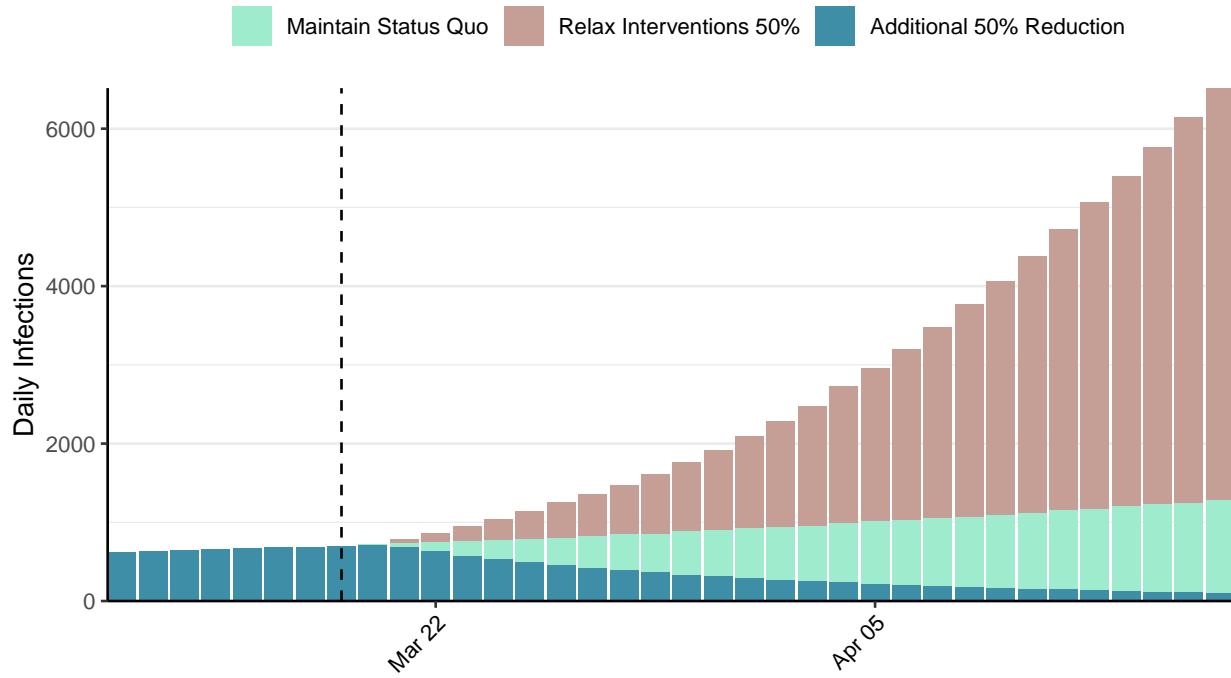


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Grenada, 2021-03-19

[Download the report for Grenada, 2021-03-19 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}
154	0	1	0	1.01 (95% CI: 0.67-1.34)

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. Grenada is not shown in the following plot as only 1 deaths have been reported to date**

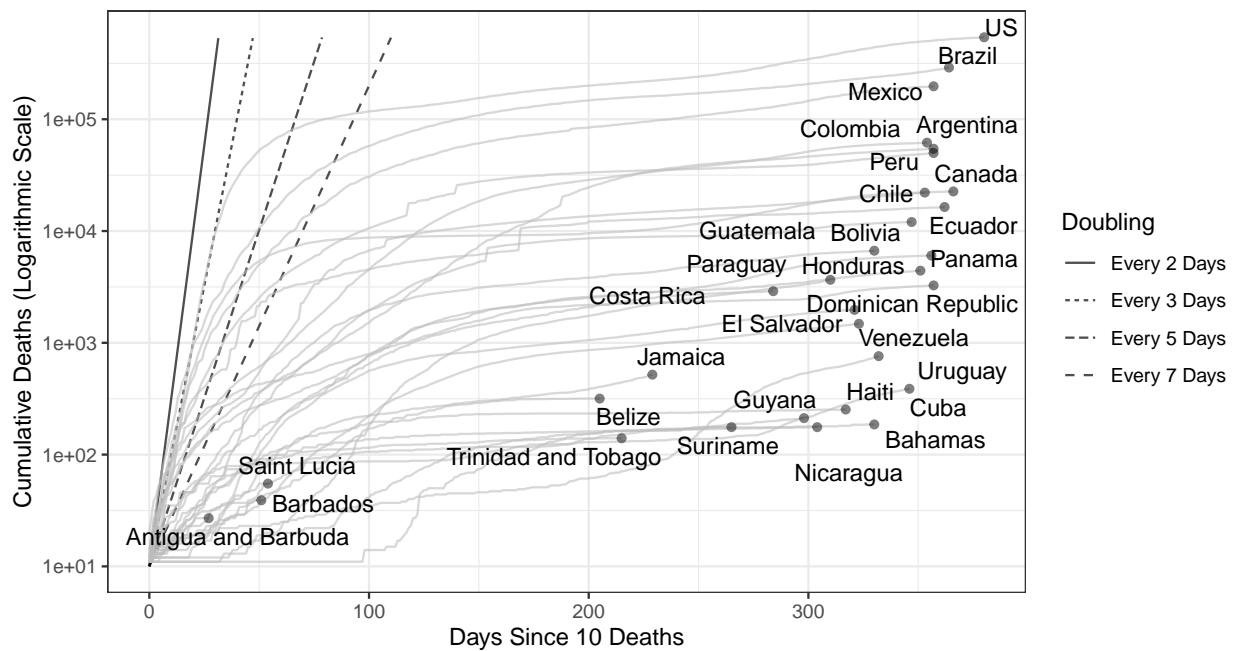


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 110 (95% CI: 47-173) 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).

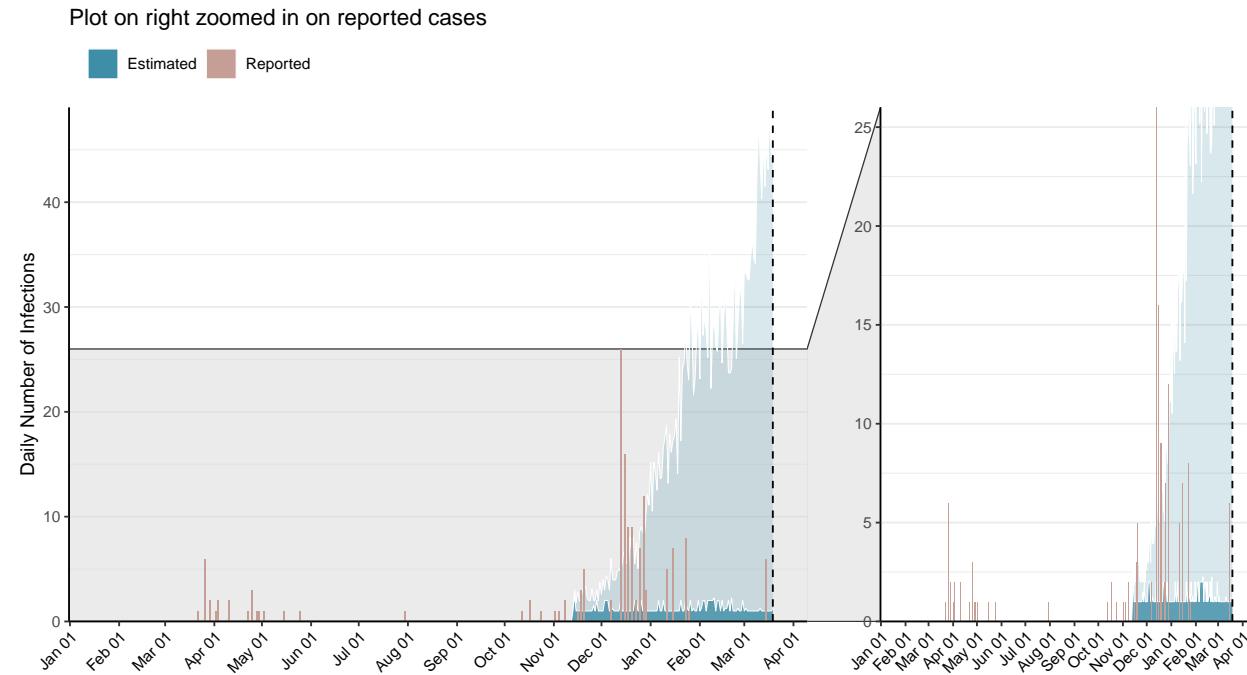


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

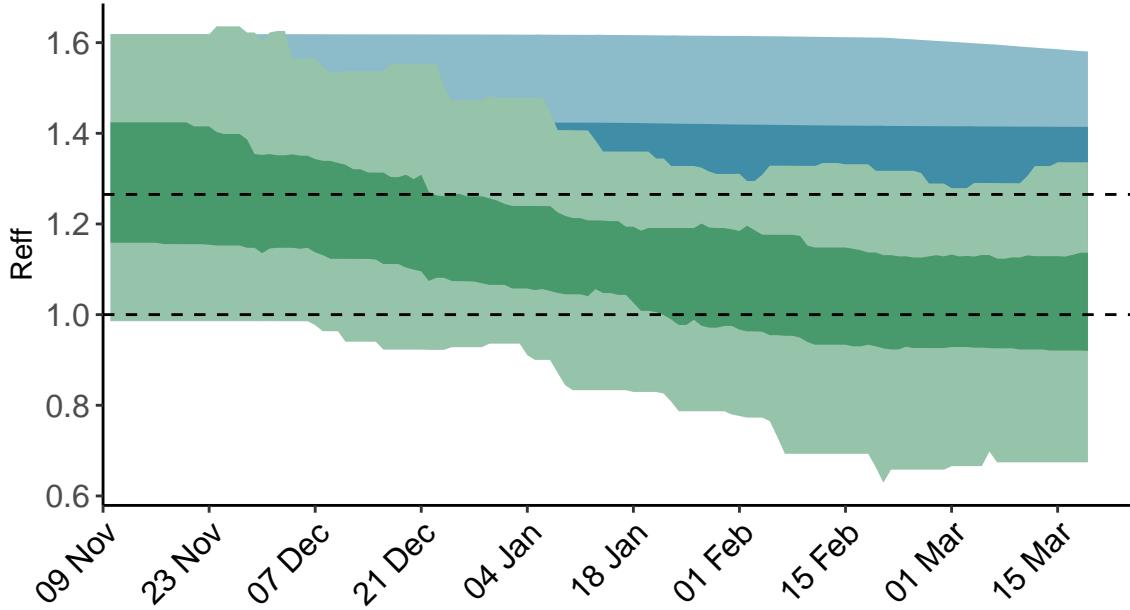


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

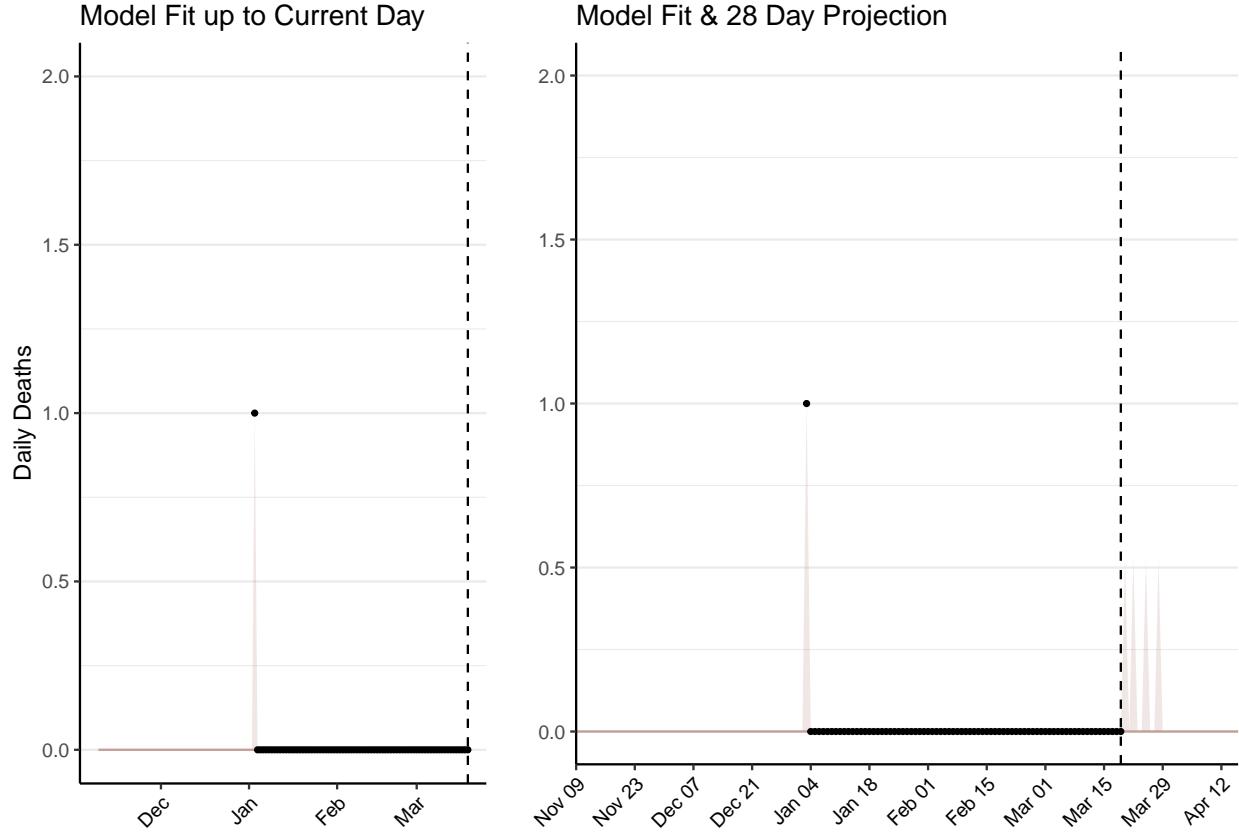


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 0 (95% CI: 0-0) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

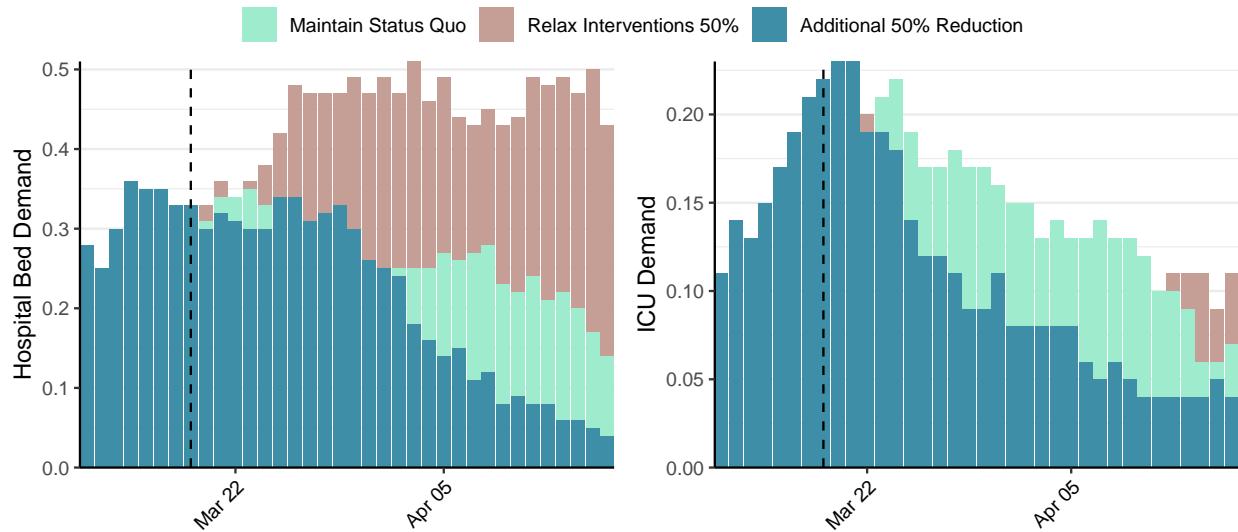


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 2-7) at the current date to 0 (95% CI: 0-0) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4 (95% CI: 2-7) at the current date to 4 (95% CI: 0-8) by 2021-04-16.

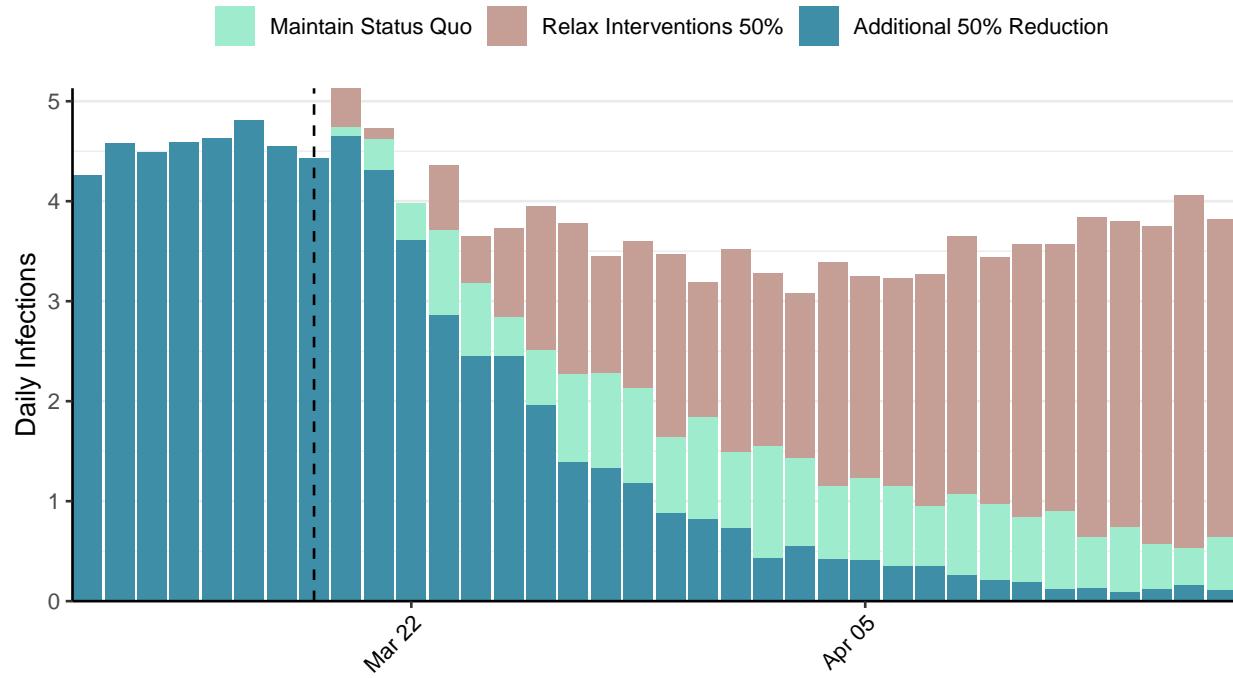


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

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Situation Report for COVID-19: Guatemala, 2021-03-19

[Download the report for Guatemala, 2021-03-19 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}
186,740	908	6,666	24	1.11 (95% CI: 0.95-1.27)

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.

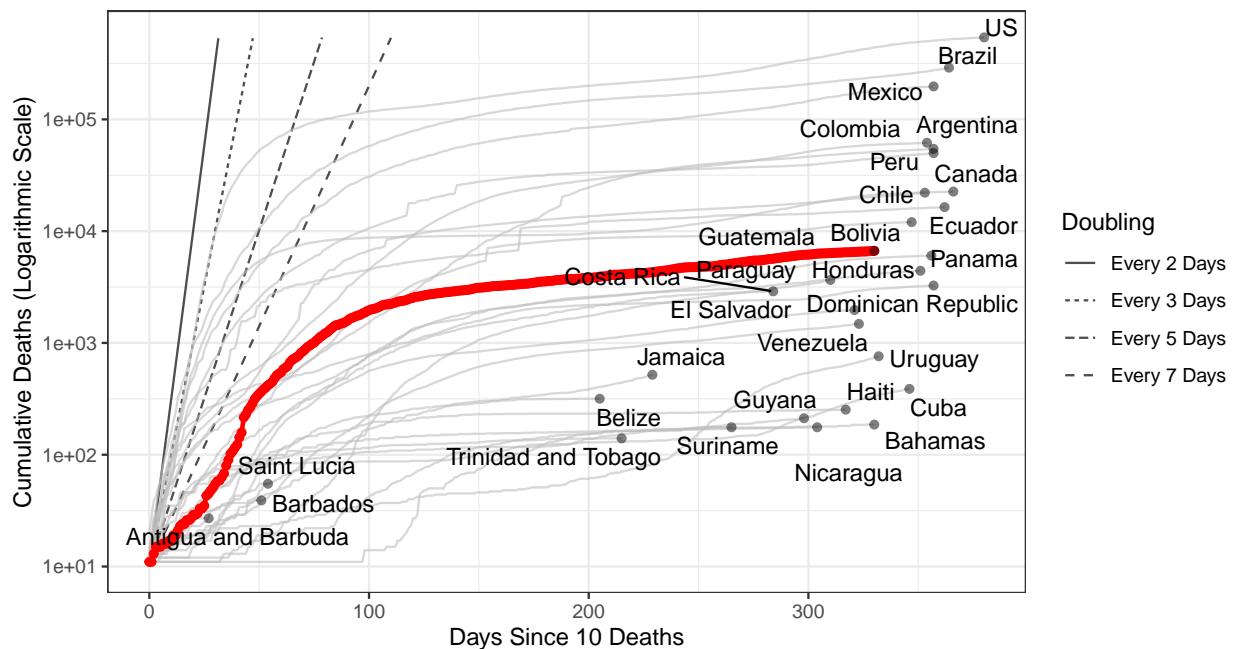


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 180,499 (95% CI: 163,276-197,722) 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).

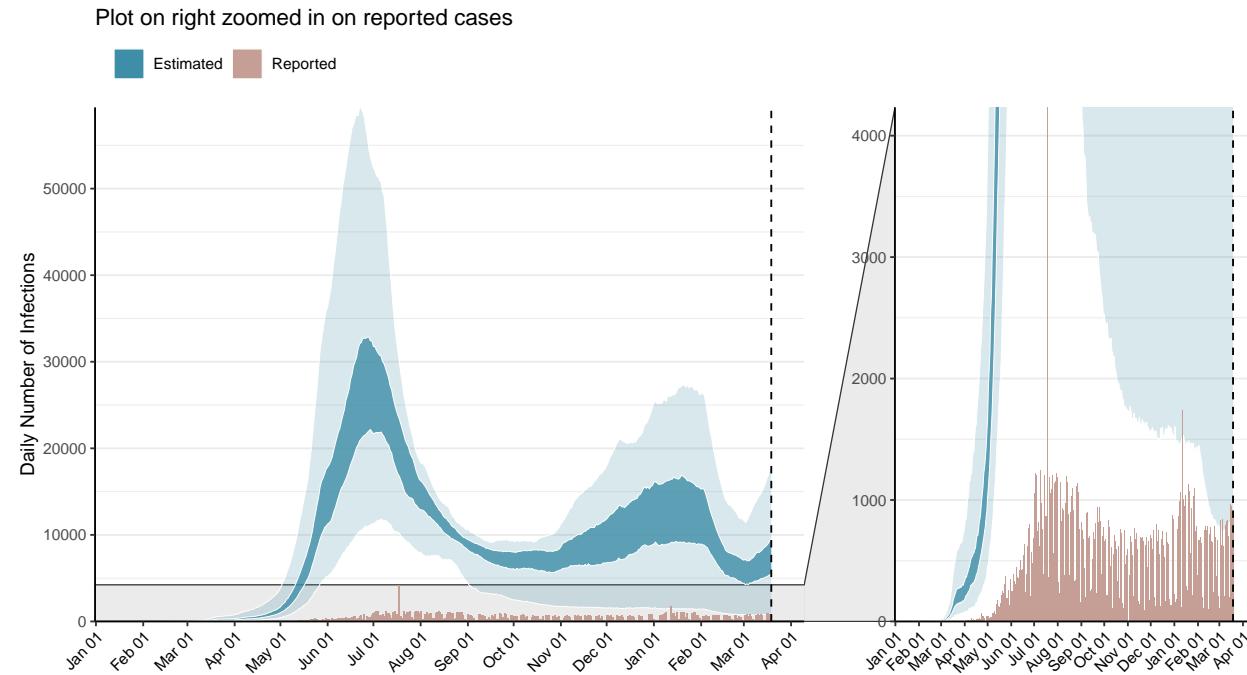


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

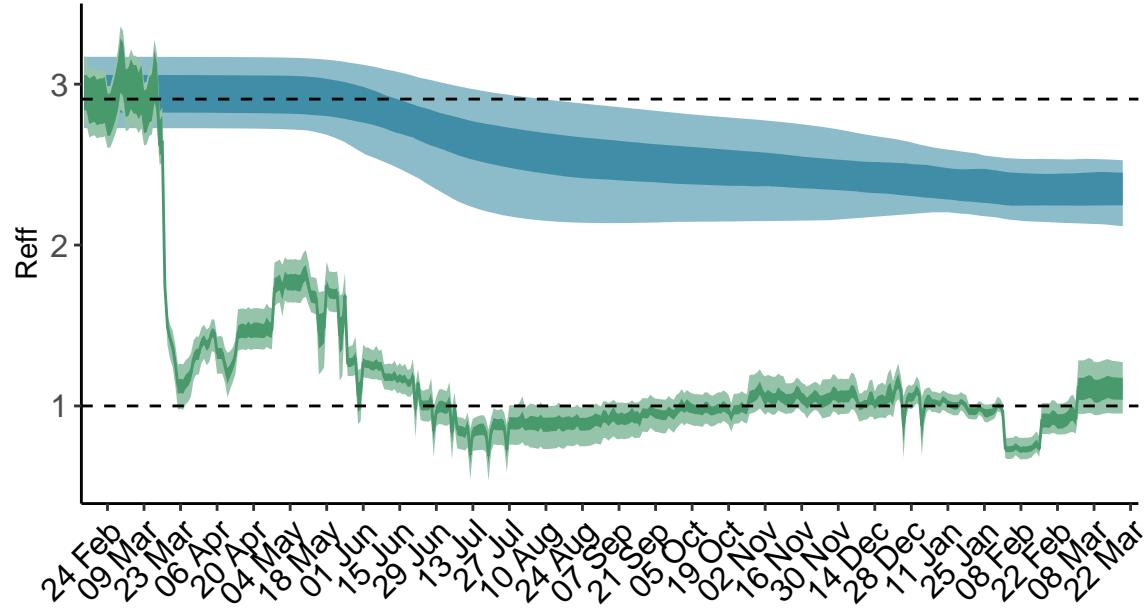


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

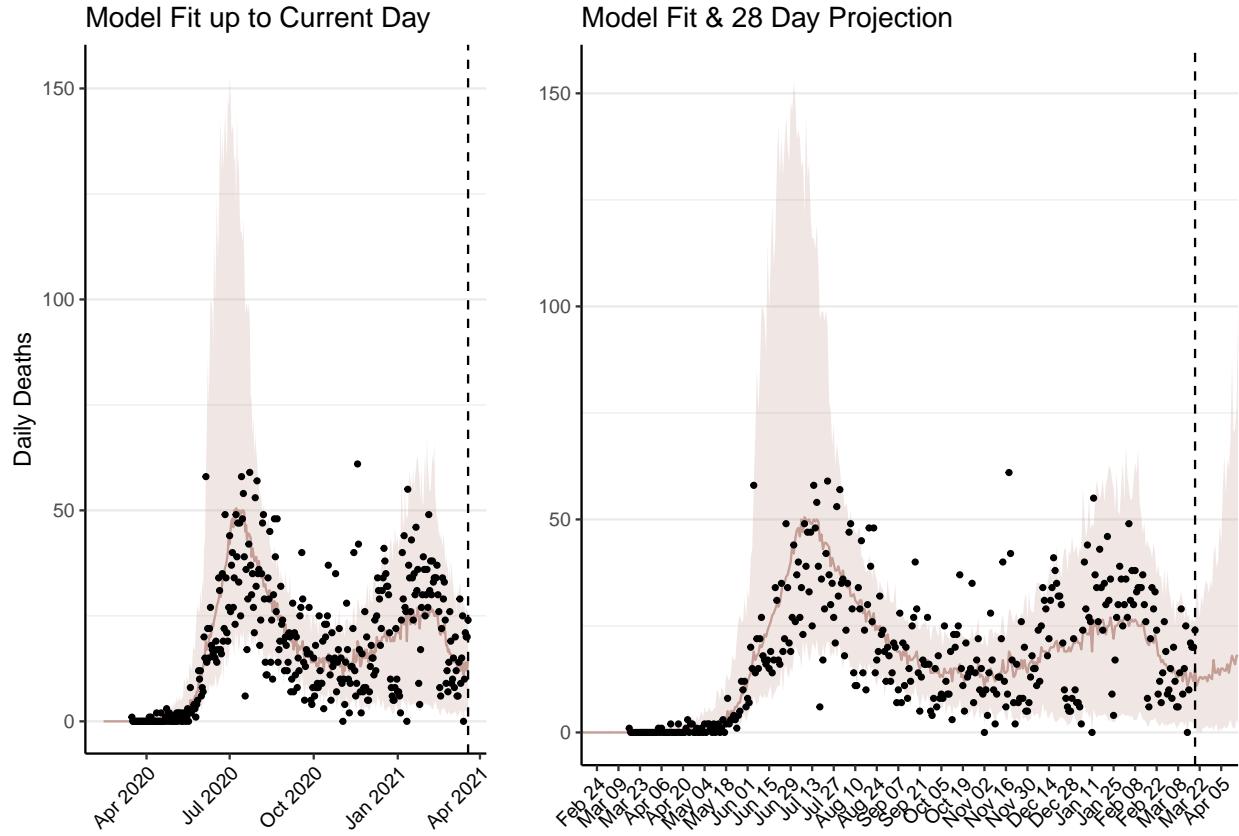


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 519 (95% CI: 467-570) patients requiring treatment with high-pressure oxygen at the current date to 859 (95% CI: 738-980) hospital beds being required on 2021-04-16 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 184 (95% CI: 166-203) patients requiring treatment with mechanical ventilation at the current date to 276 (95% CI: 243-308) by 2021-04-16. 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.**

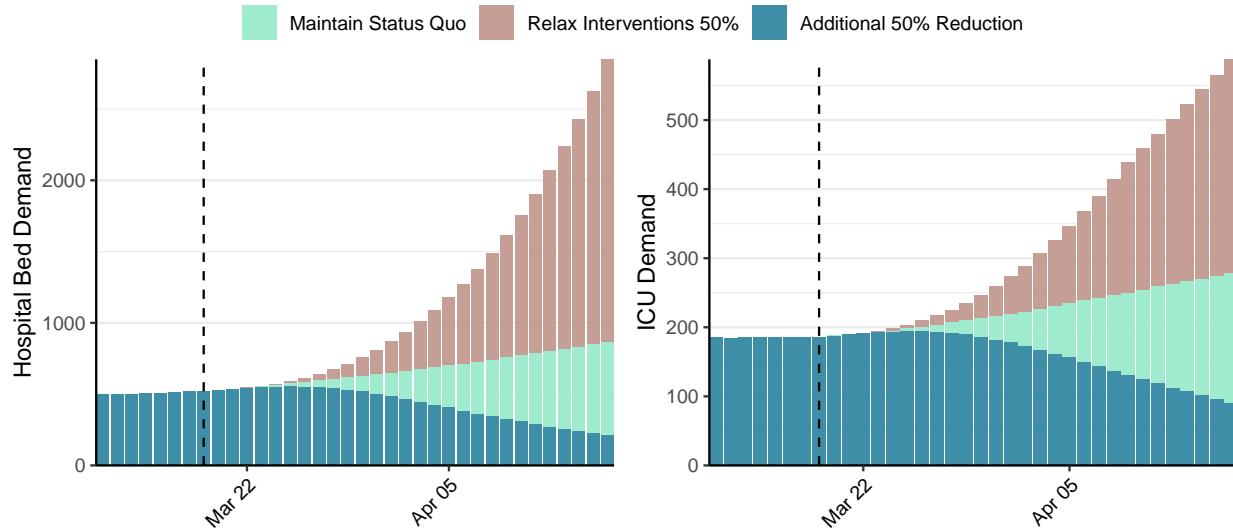


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 7,735 (95% CI: 6,883-8,587) at the current date to 1,020 (95% CI: 867-1,173) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,735 (95% CI: 6,883-8,587) at the current date to 72,455 (95% CI: 62,331-82,579) by 2021-04-16.

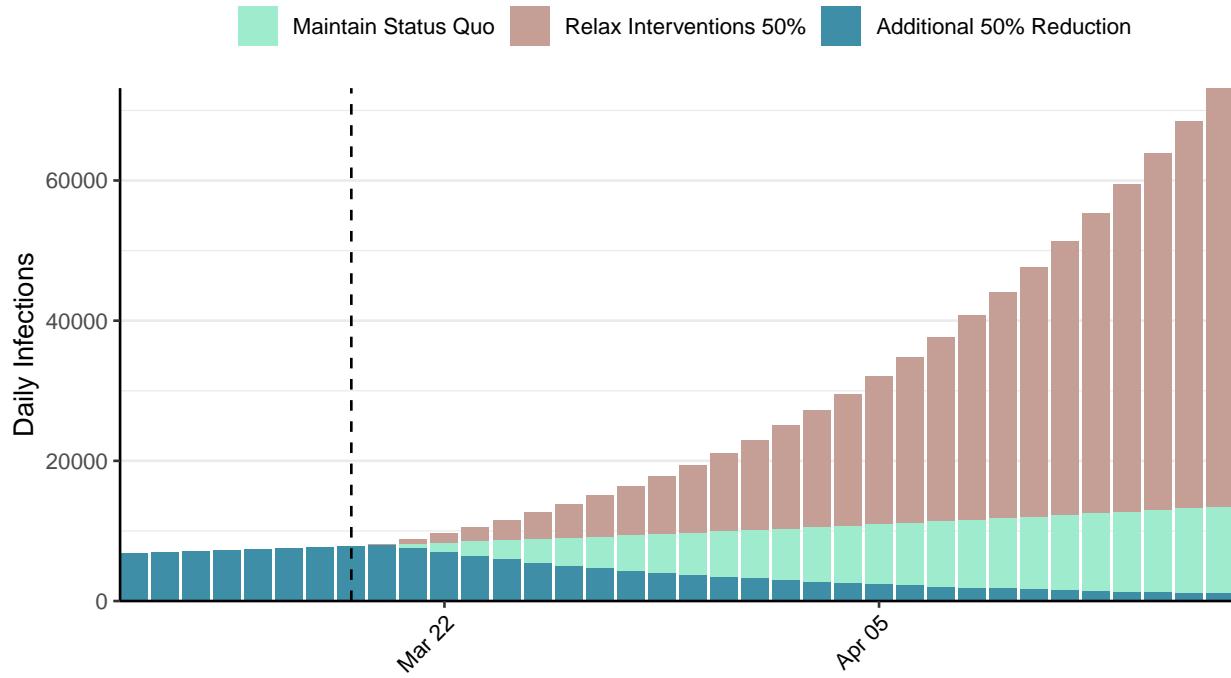


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: French Guiana, 2021-03-19

[Download the report for French Guiana, 2021-03-19 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}
16,759	0	87	0	0.87 (95% CI: 0.62-1.1)

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.

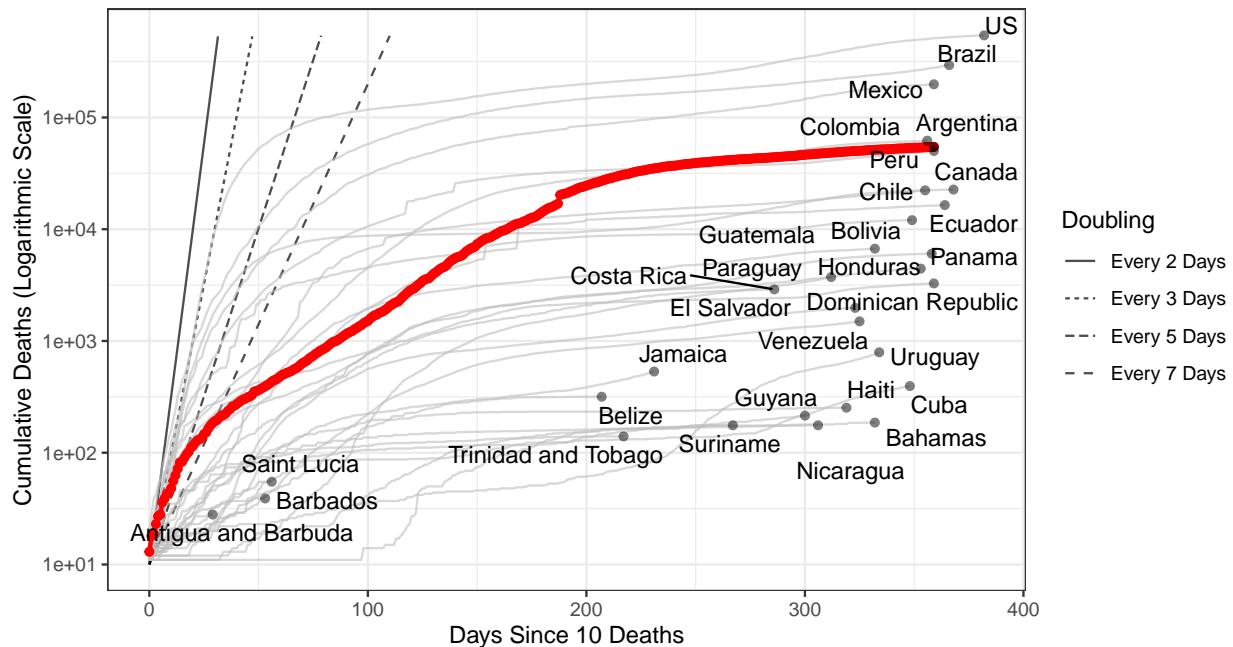


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,013 (95% CI: 843-1,183) 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).

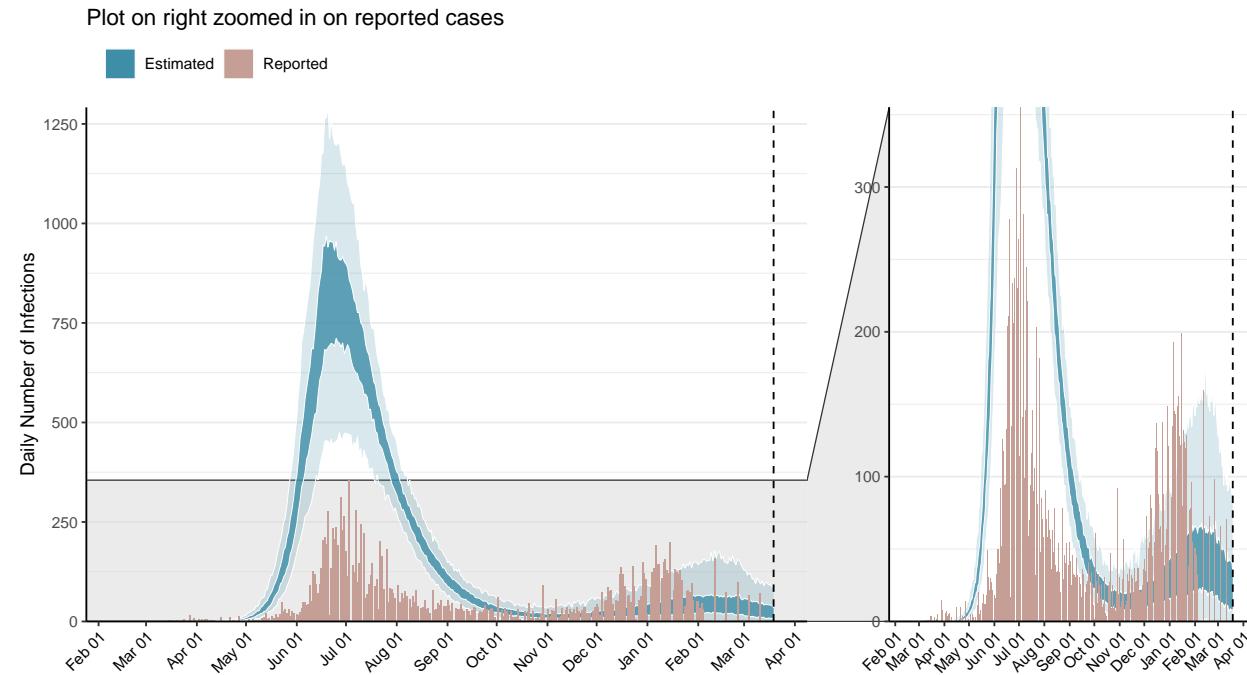


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

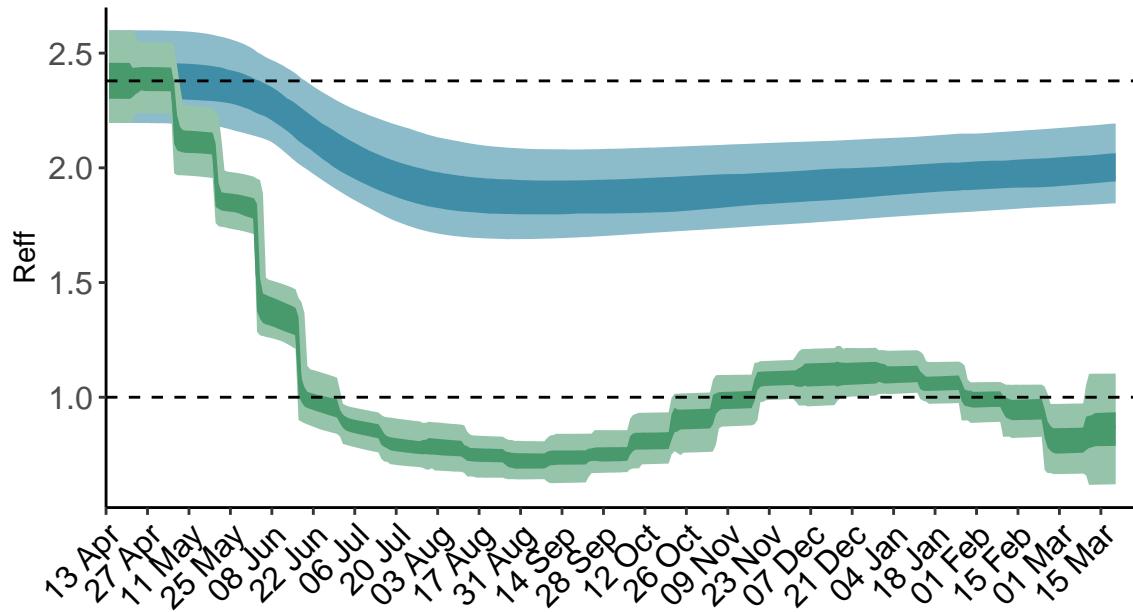


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

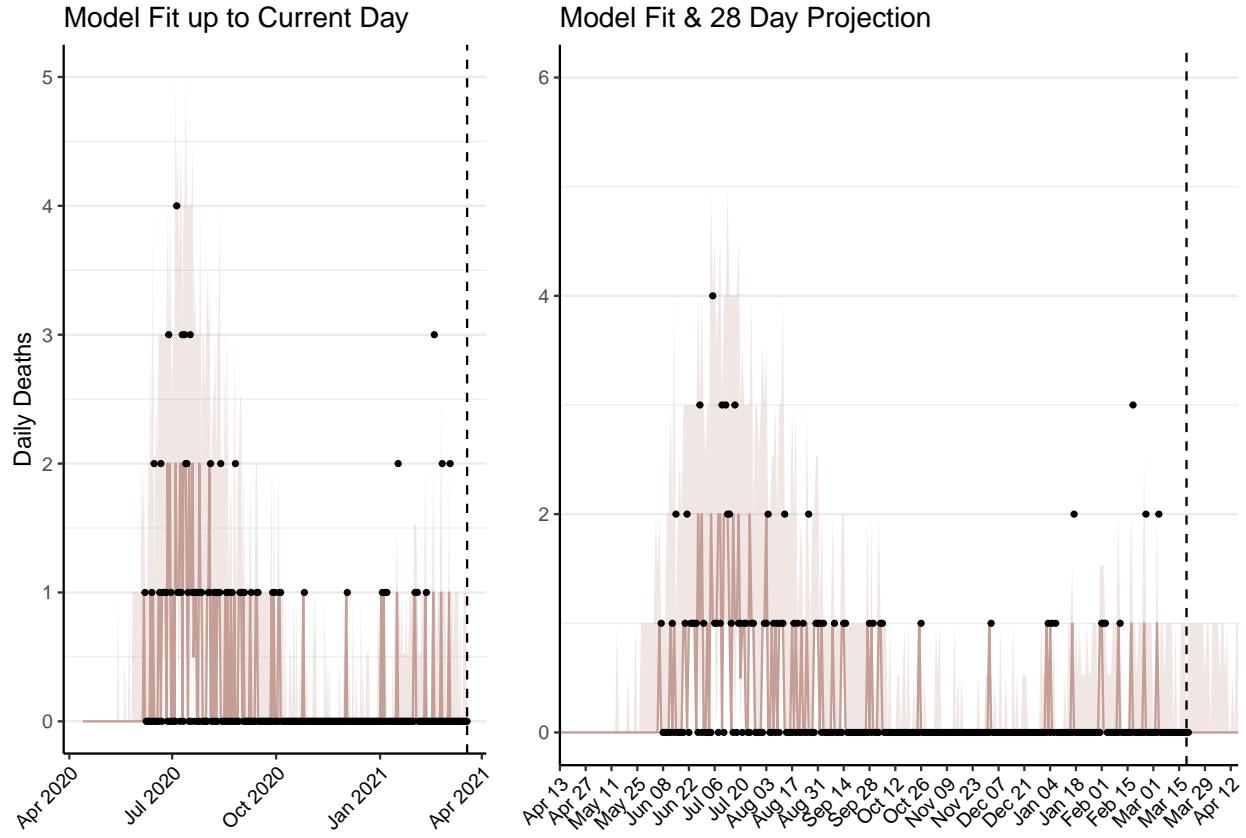


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 2-3) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 1-2) hospital beds being required on 2021-04-16 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: 1-1) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-04-16. 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.**

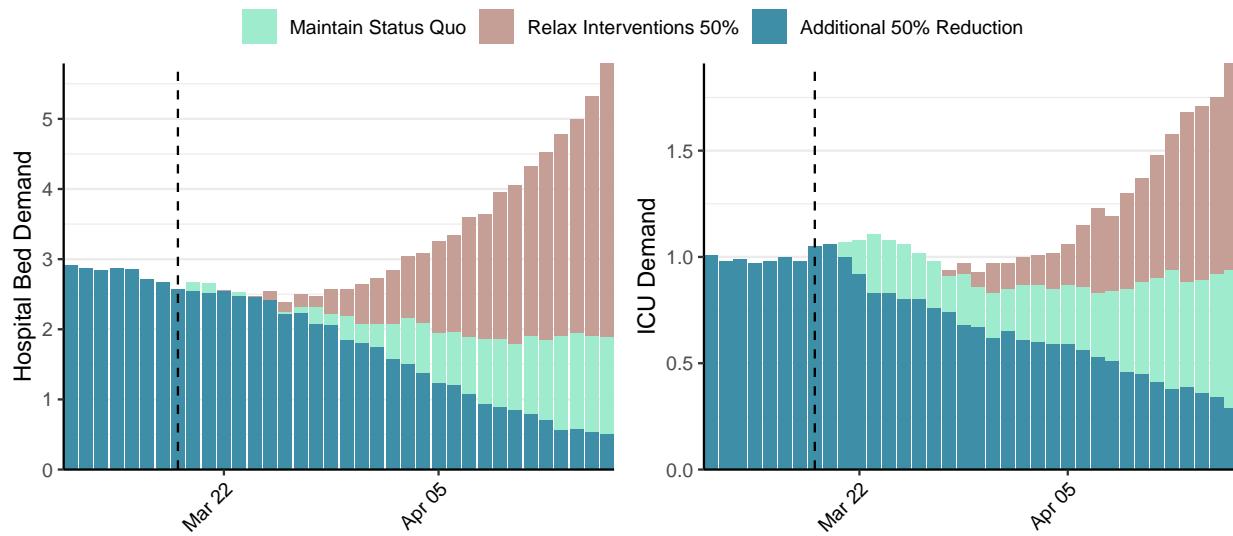


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 27 (95% CI: 22-32) at the current date to 2 (95% CI: 1-3) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 27 (95% CI: 22-32) at the current date to 127 (95% CI: 85-169) by 2021-04-16.

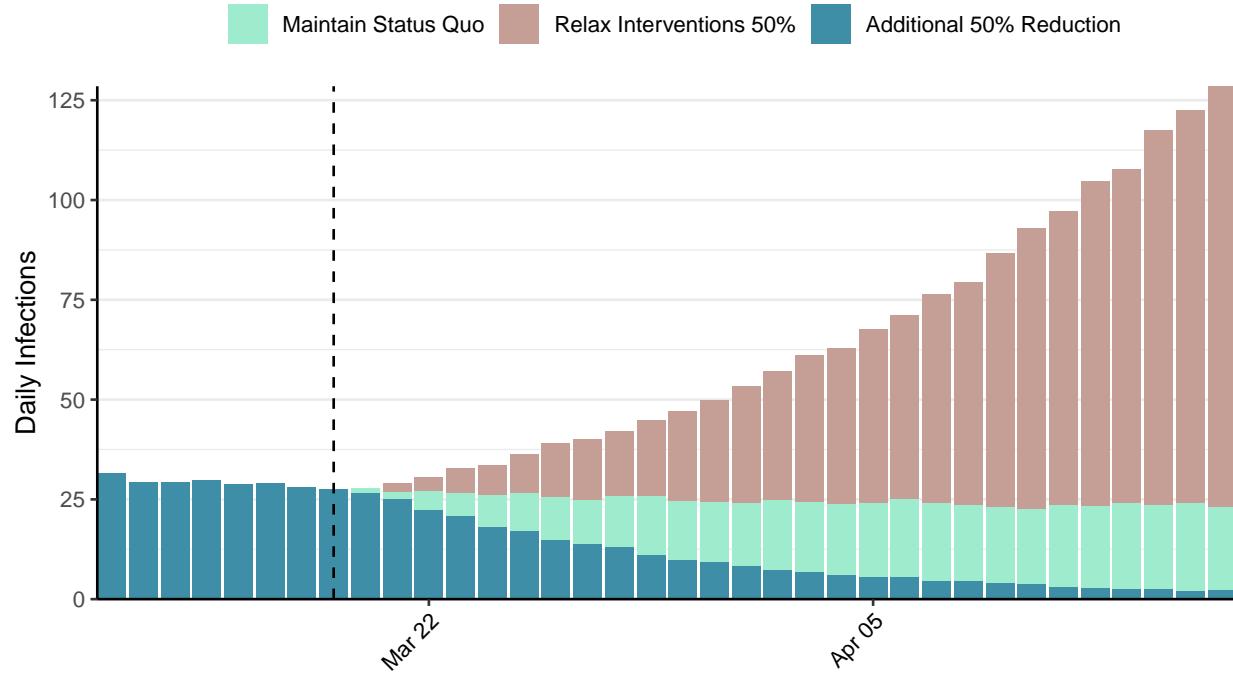


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Guyana, 2021-03-19

[Download the report for Guyana, 2021-03-19 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}
9,486	44	212	0	1.18 (95% CI: 1-1.41)

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.

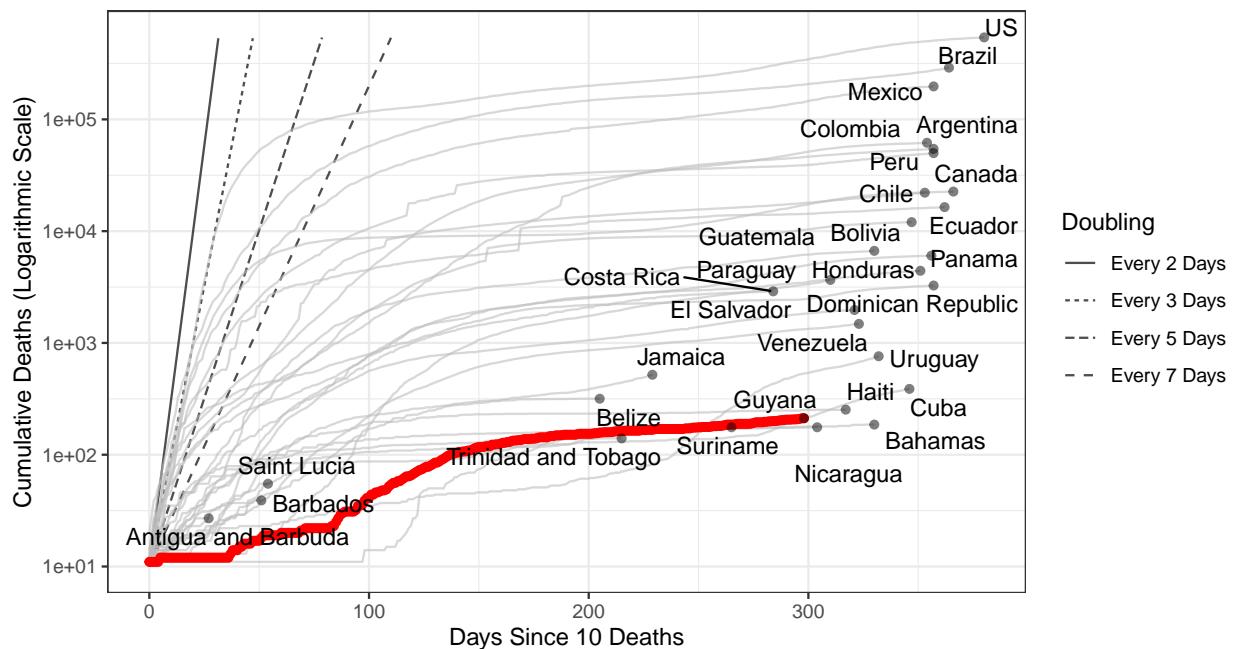


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 10,087 (95% CI: 8,747-11,427) 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.**

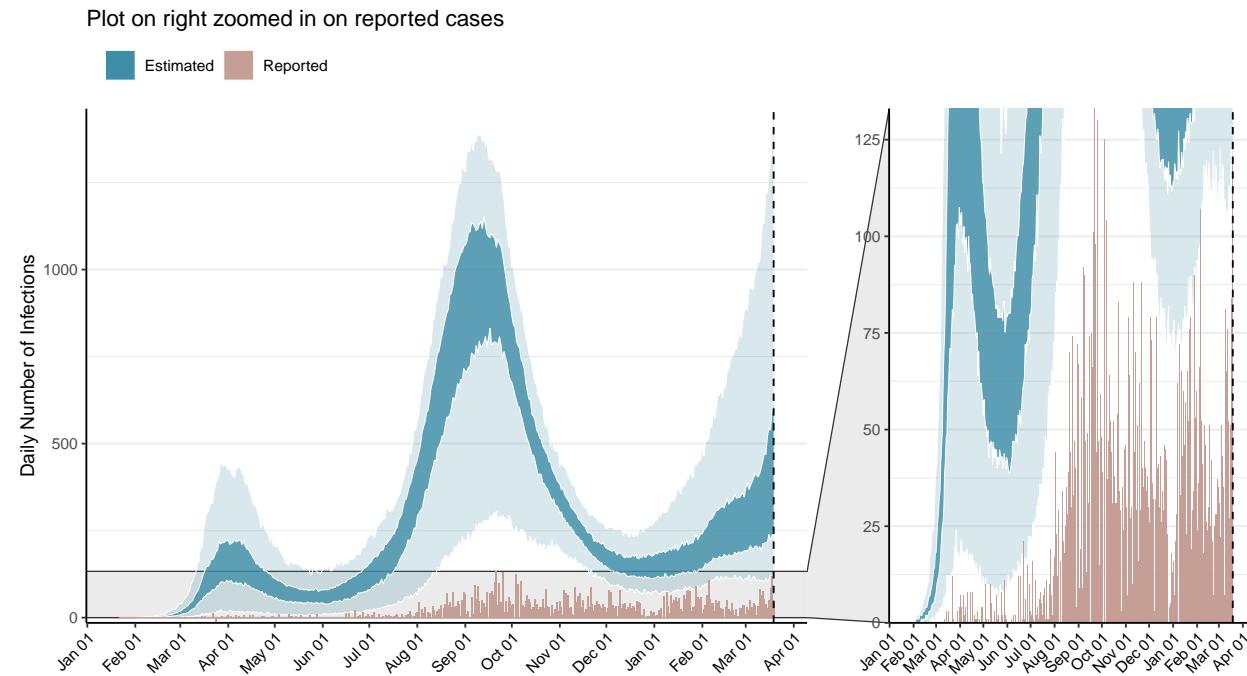


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

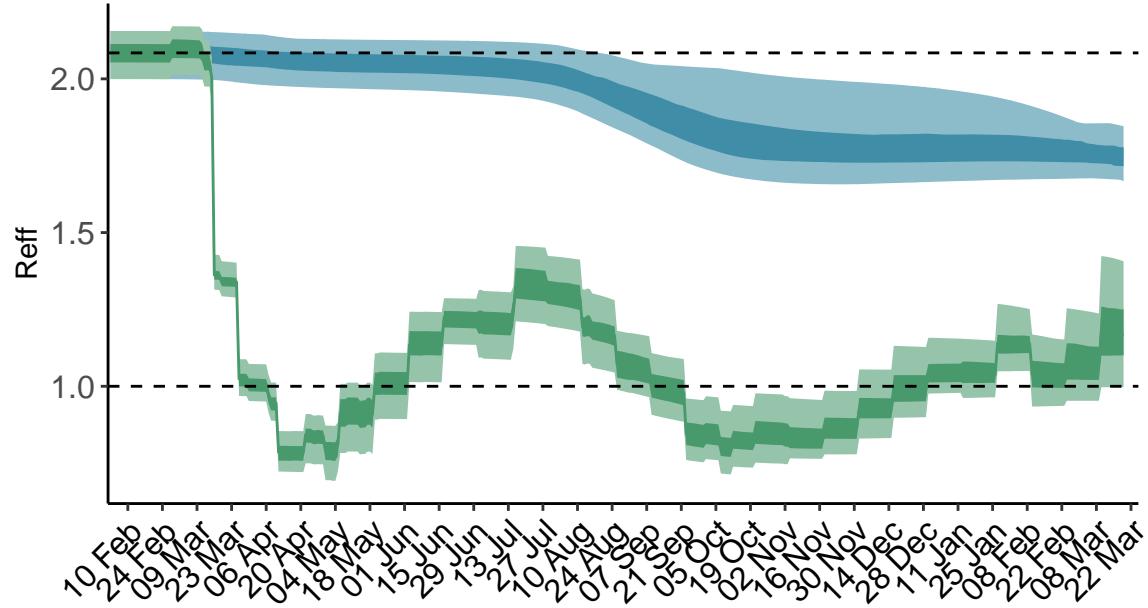


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

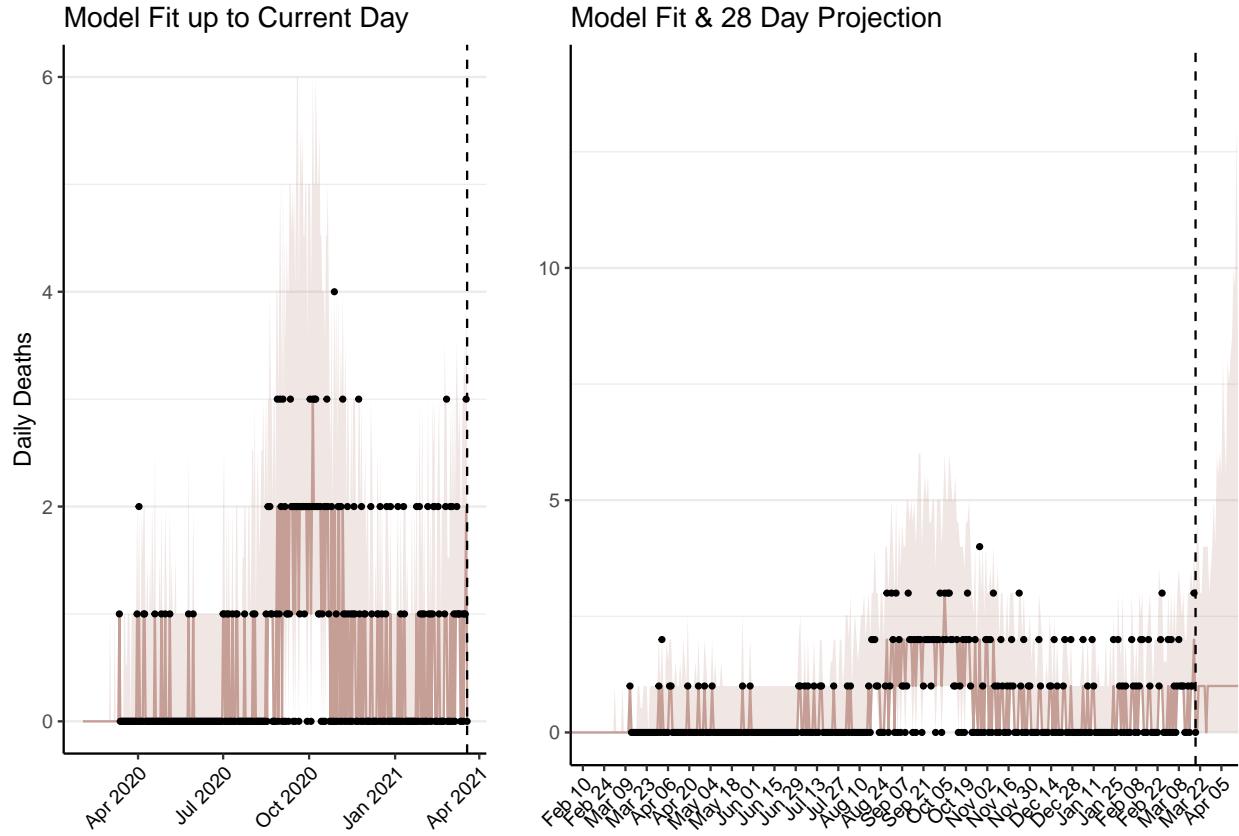


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 32 (95% CI: 28-37) patients requiring treatment with high-pressure oxygen at the current date to 74 (95% CI: 61-86) hospital beds being required on 2021-04-16 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 12 (95% CI: 10-14) patients requiring treatment with mechanical ventilation at the current date to 24 (95% CI: 21-28) by 2021-04-16. 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.**

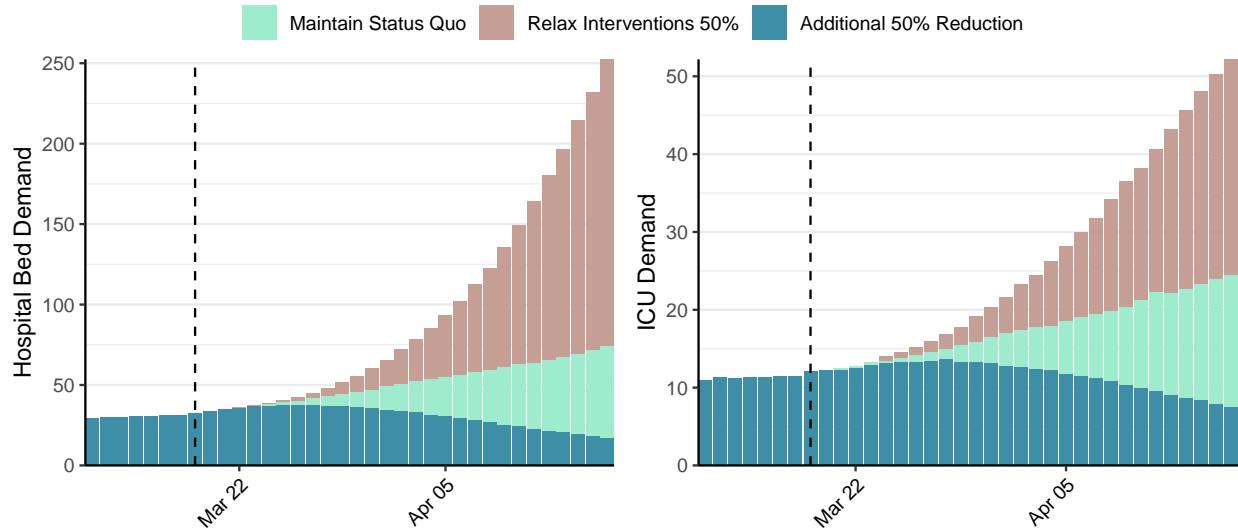


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 488 (95% CI: 413-563) at the current date to 83 (95% CI: 67-99) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 488 (95% CI: 413-563) at the current date to 5,338 (95% CI: 4,554-6,122) by 2021-04-16.

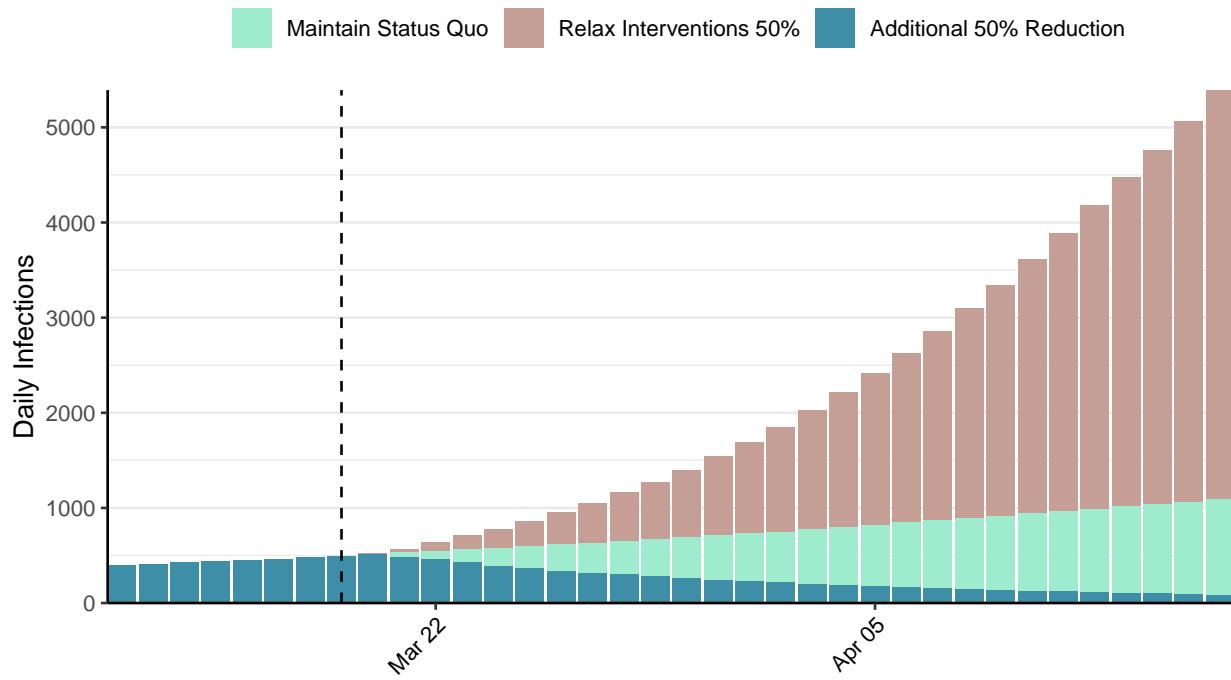


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Honduras, 2021-03-19

[Download the report for Honduras, 2021-03-19 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}
181,357	561	4,422	20	0.95 (95% CI: 0.8-1.11)

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.

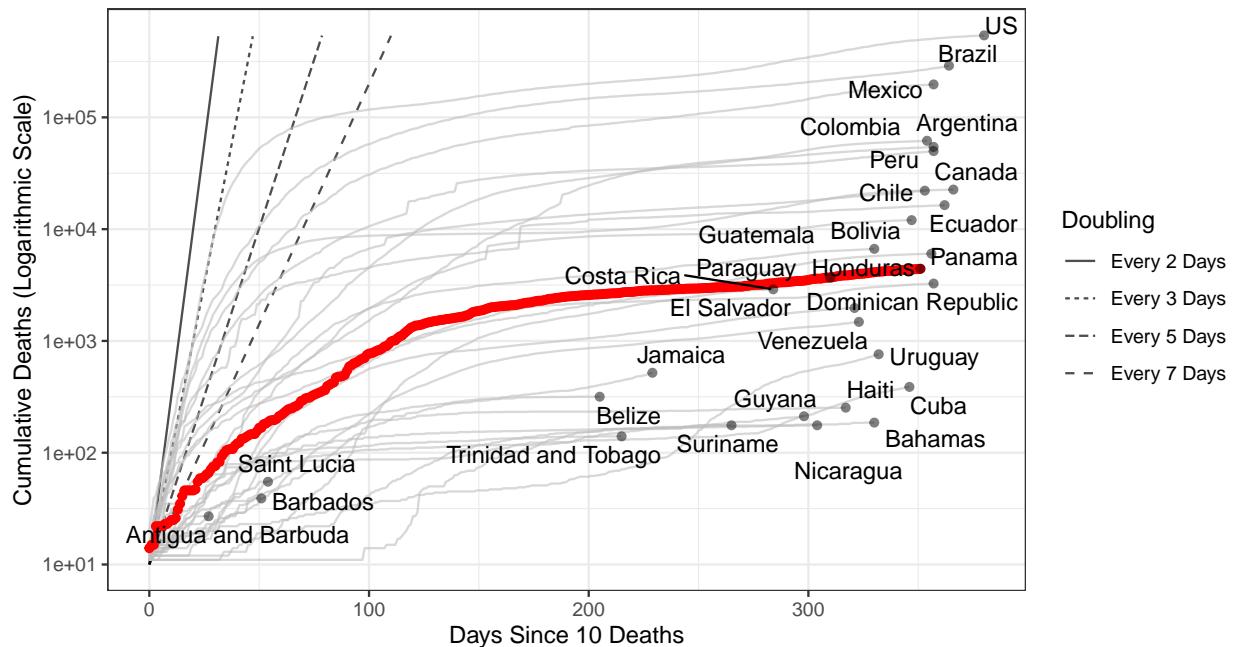


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 160,257 (95% CI: 152,916-167,598) 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.**

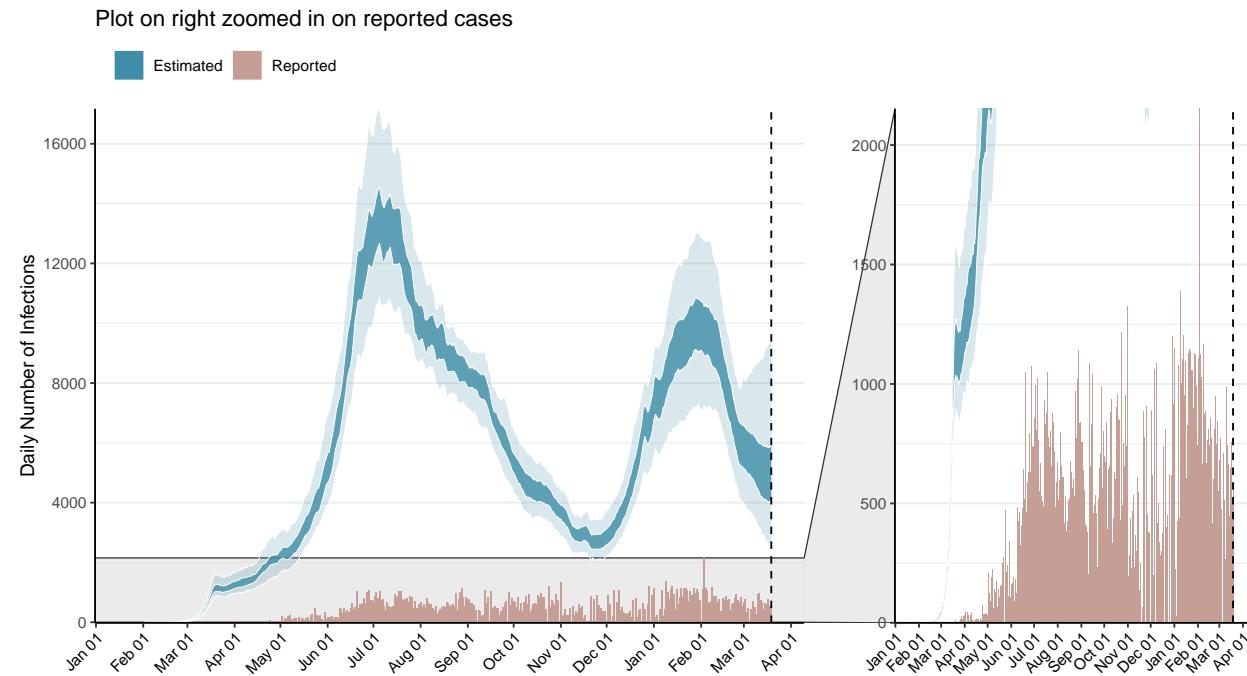


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

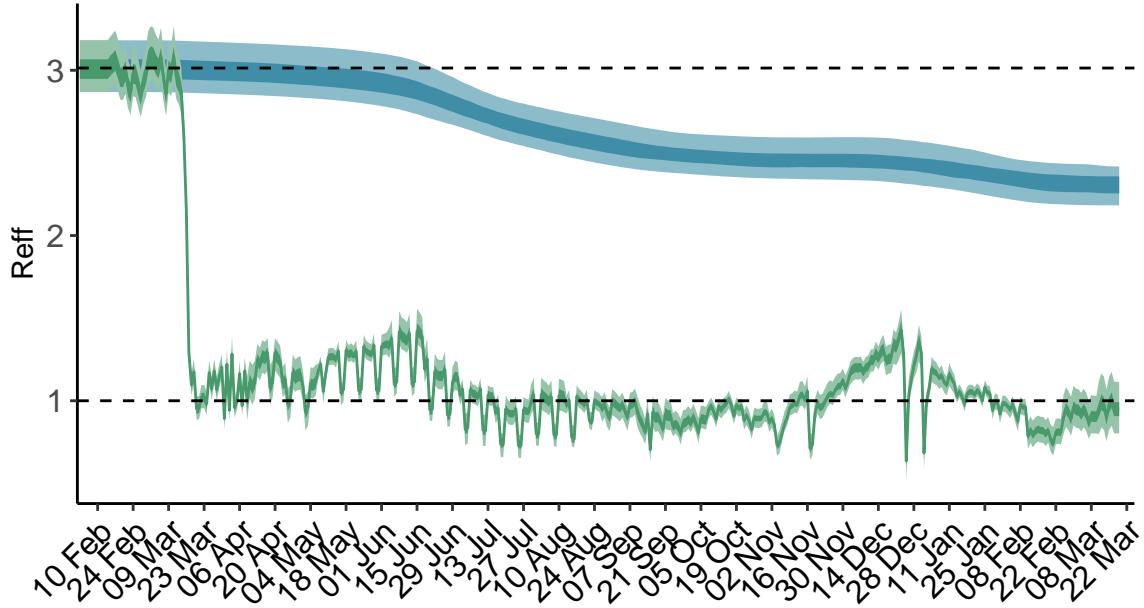


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

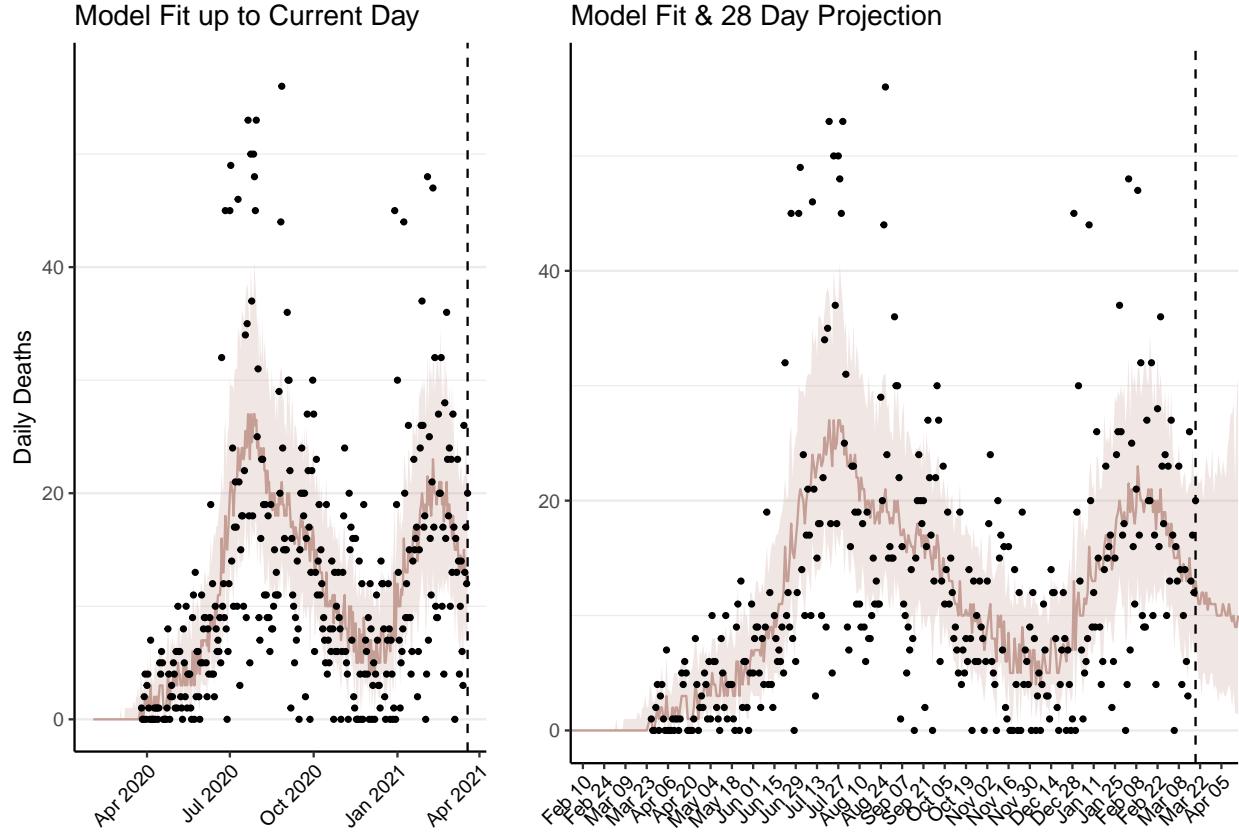


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 459 (95% CI: 436-483) patients requiring treatment with high-pressure oxygen at the current date to 406 (95% CI: 356-456) hospital beds being required on 2021-04-16 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 173 (95% CI: 165-181) patients requiring treatment with mechanical ventilation at the current date to 147 (95% CI: 131-164) by 2021-04-16. 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.**

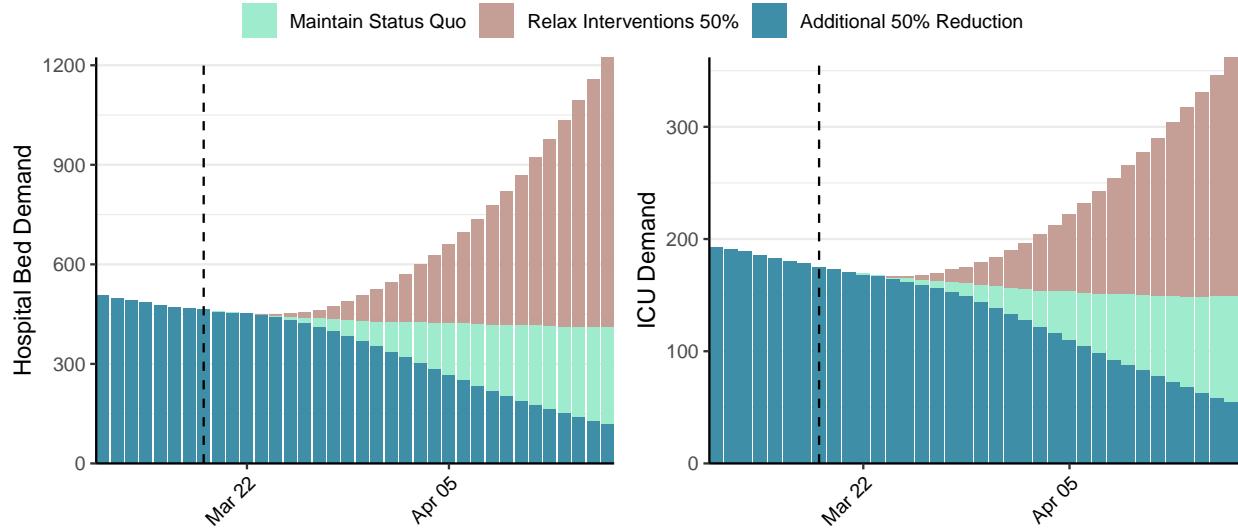


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 5,135 (95% CI: 4,761-5,508) at the current date to 414 (95% CI: 355-473) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 5,135 (95% CI: 4,761-5,508) at the current date to 24,996 (95% CI: 21,351-28,641) by 2021-04-16.

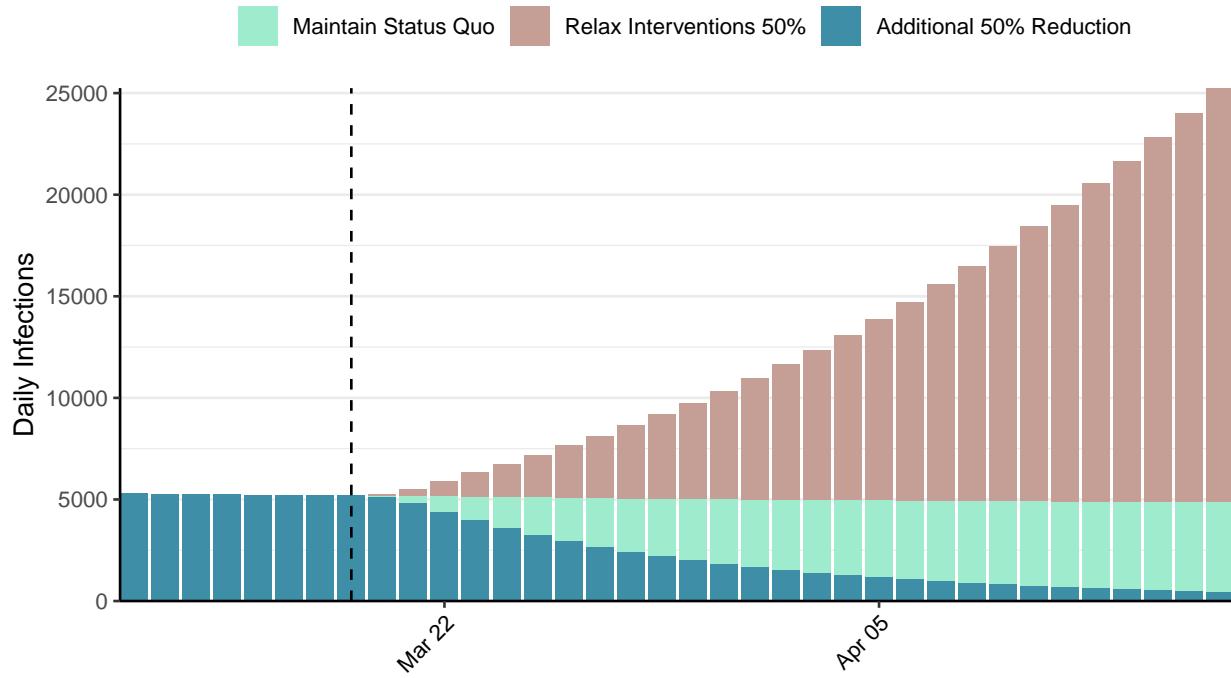


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Haiti, 2021-03-19

[Download the report for Haiti, 2021-03-19 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}
12,688	2	253	0	0.66 (95% CI: 0.52-0.81)

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.

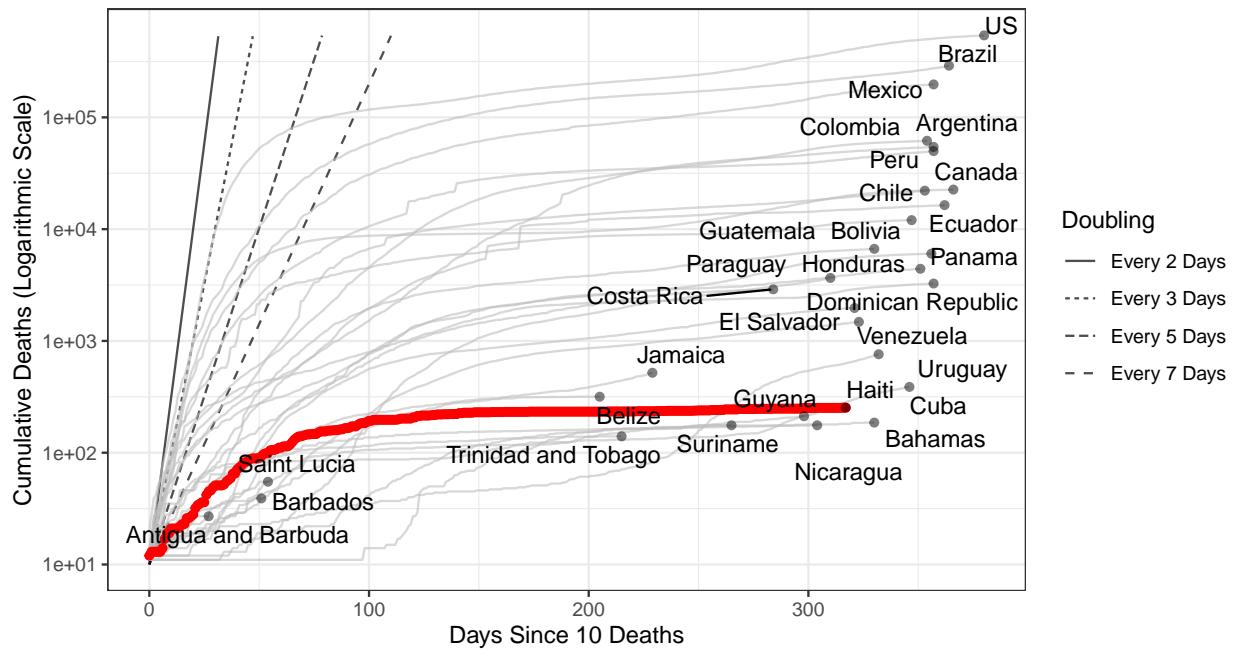


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 2,794 (95% CI: 2,512-3,076) 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).

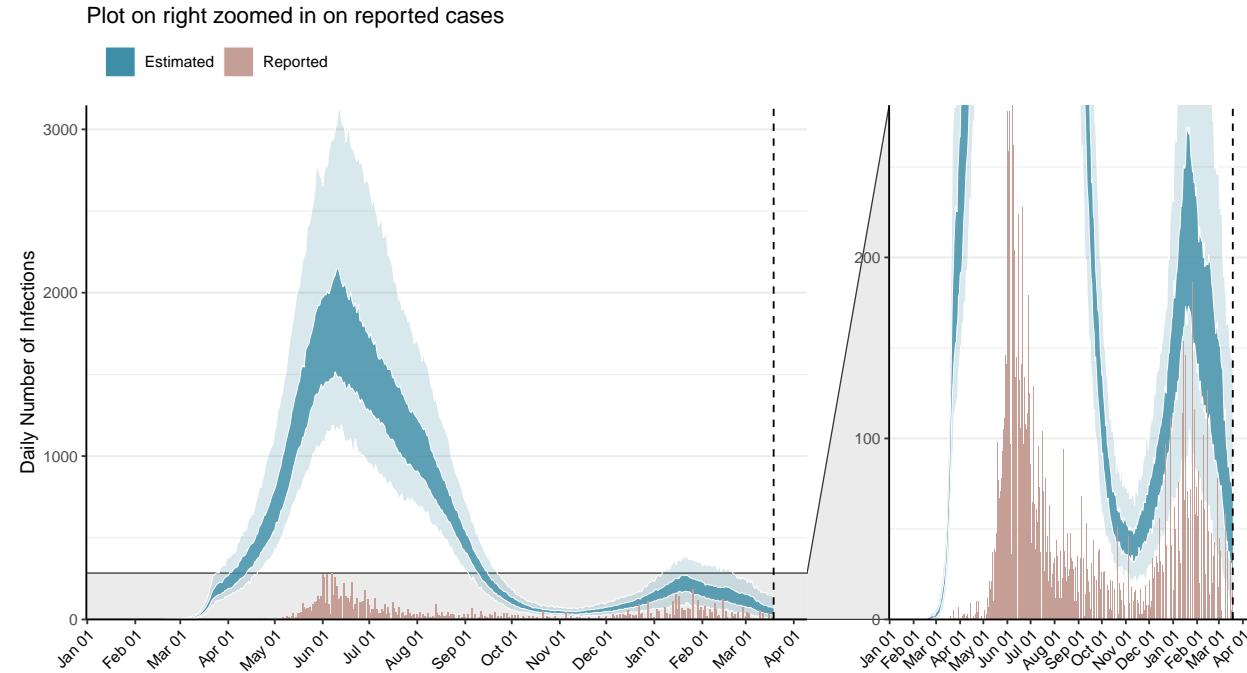


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

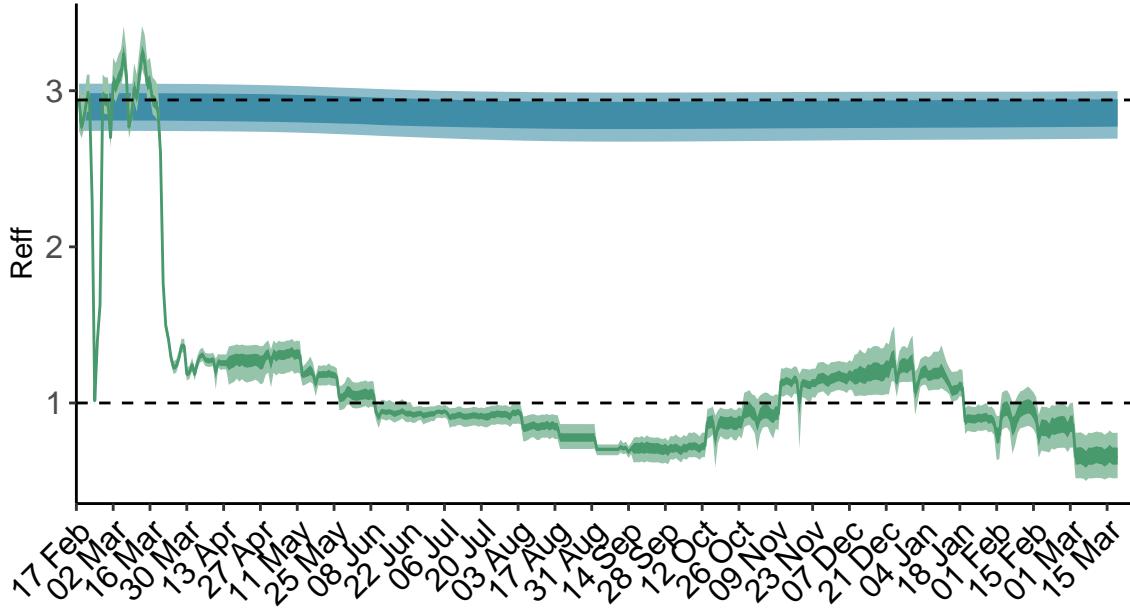


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

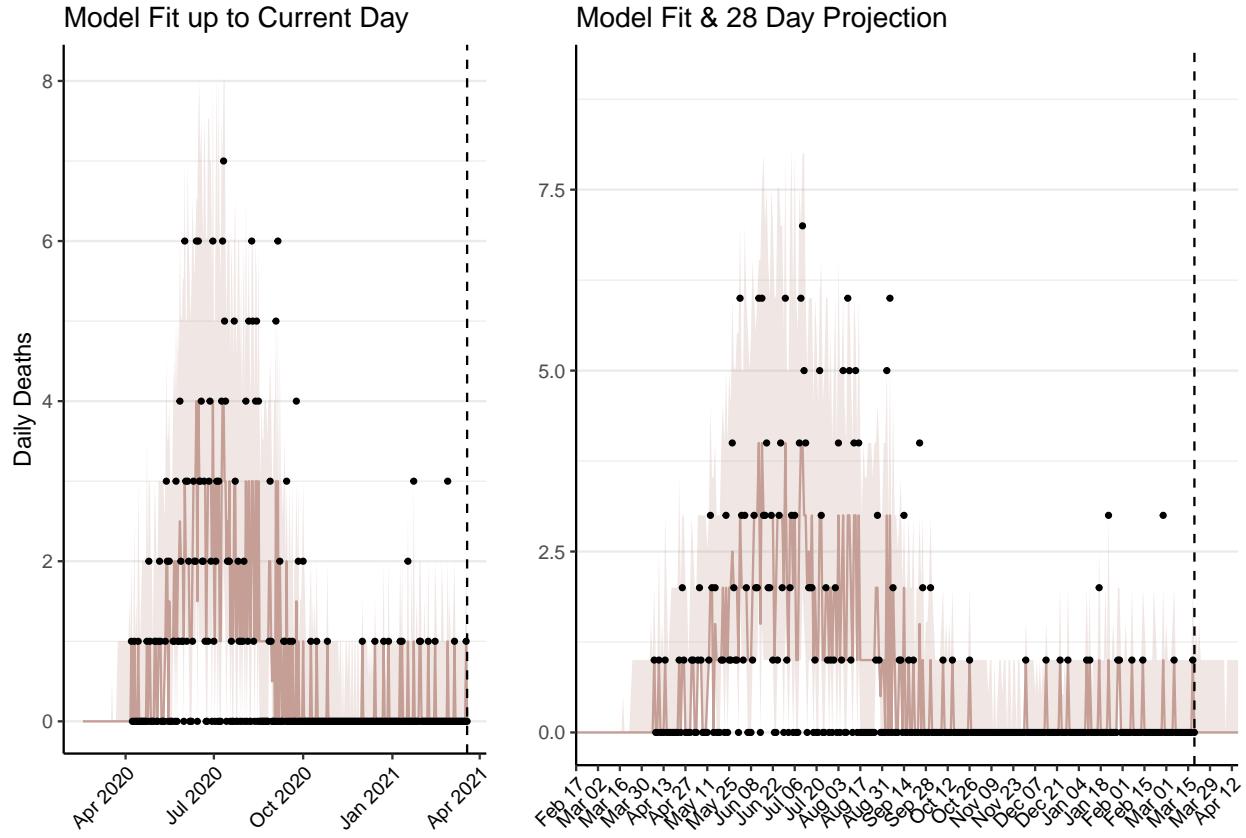


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 7 (95% CI: 6-8) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 1-2) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

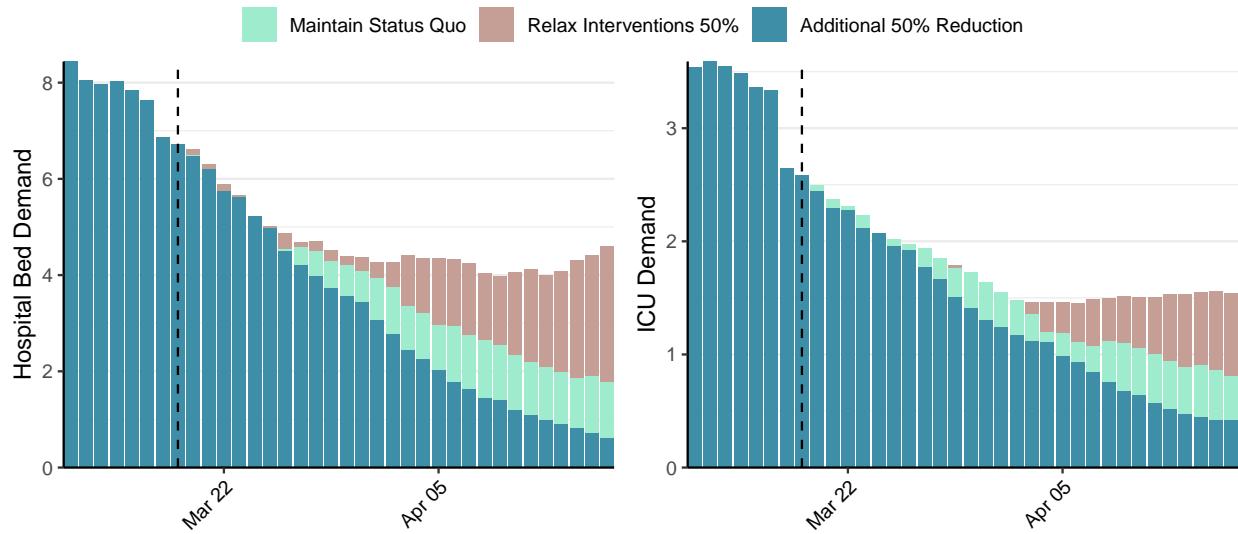


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 (95% CI: 45-59) at the current date to 1 (95% CI: 1-2) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 52 (95% CI: 45-59) at the current date to 66 (95% CI: 49-84) by 2021-04-16.

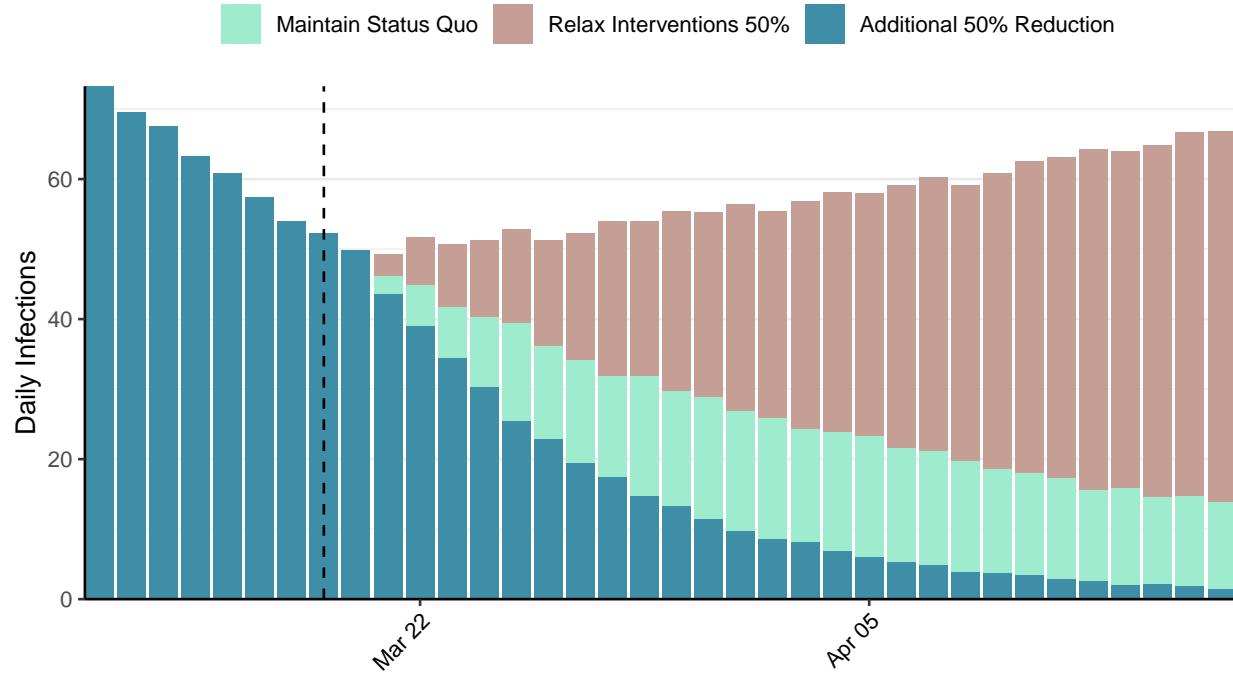


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

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Situation Report for COVID-19: Indonesia, 2021-03-19

[Download the report for Indonesia, 2021-03-19 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}
1,450,132	6,279	39,339	197	0.95 (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.

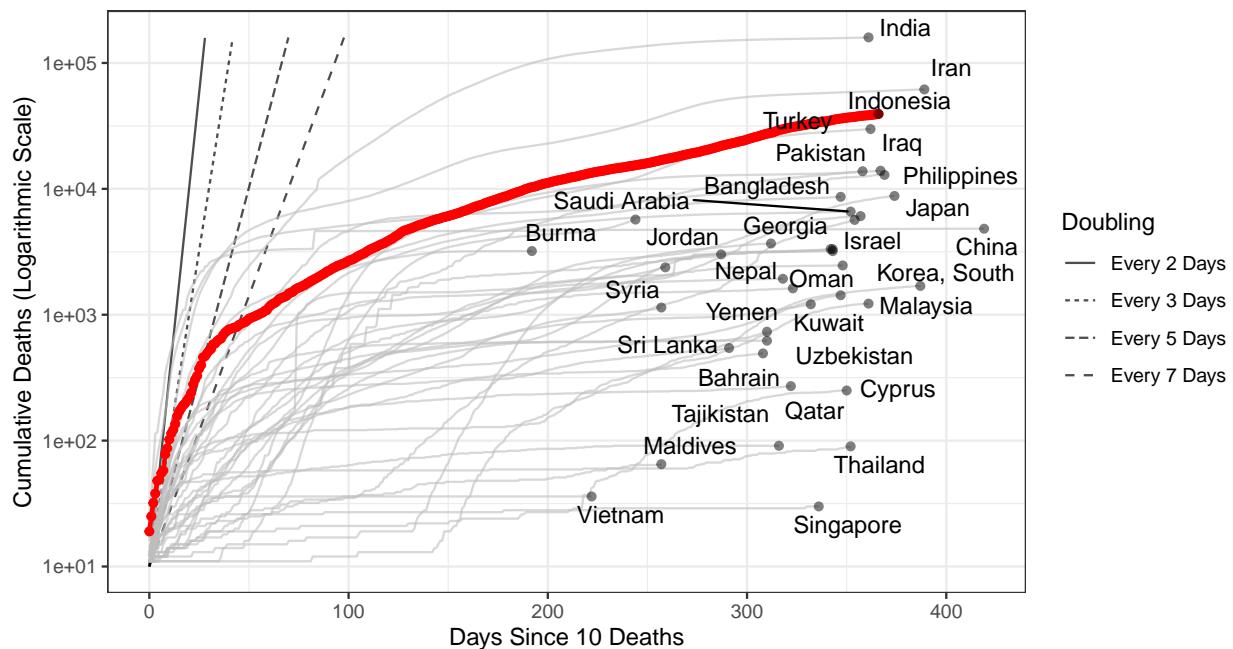


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,529,856 (95% CI: 1,460,227-1,599,485) 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

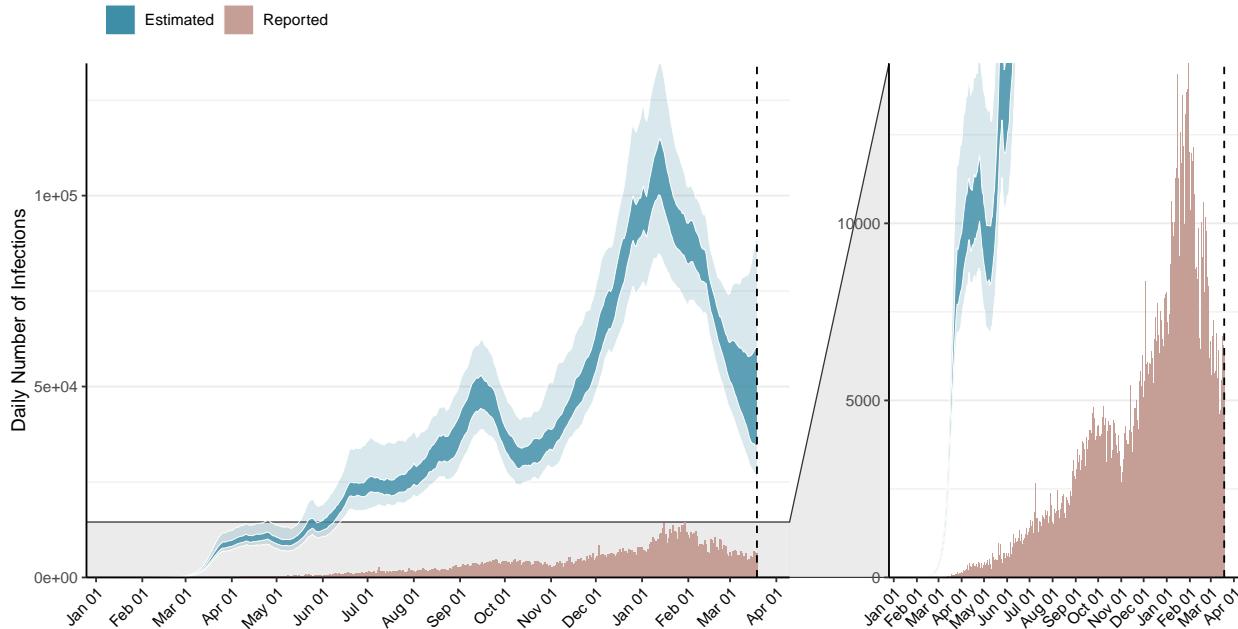


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

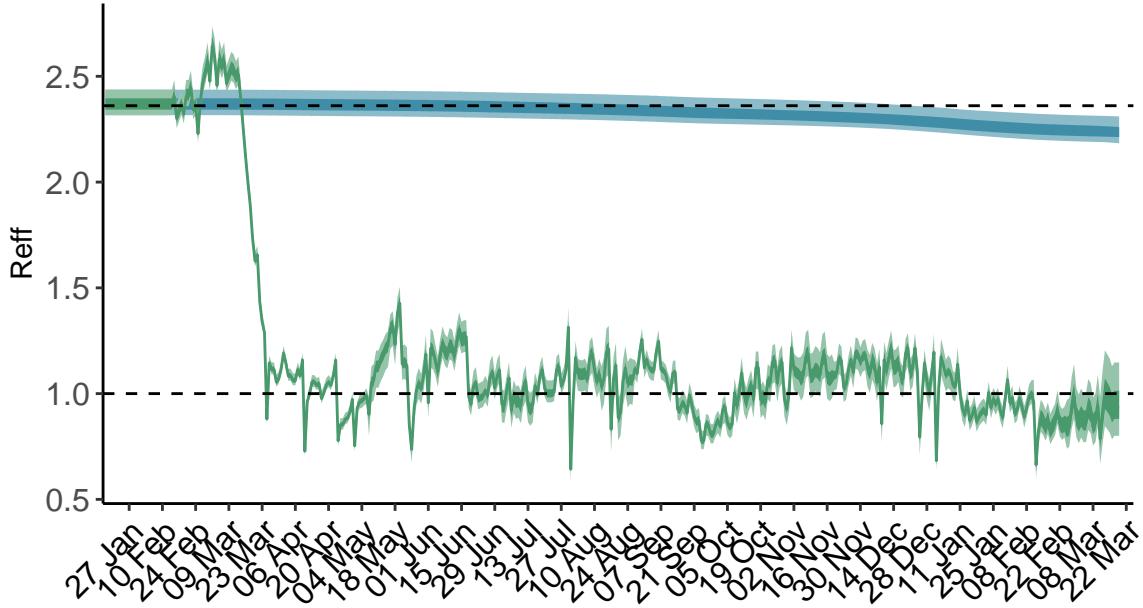


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

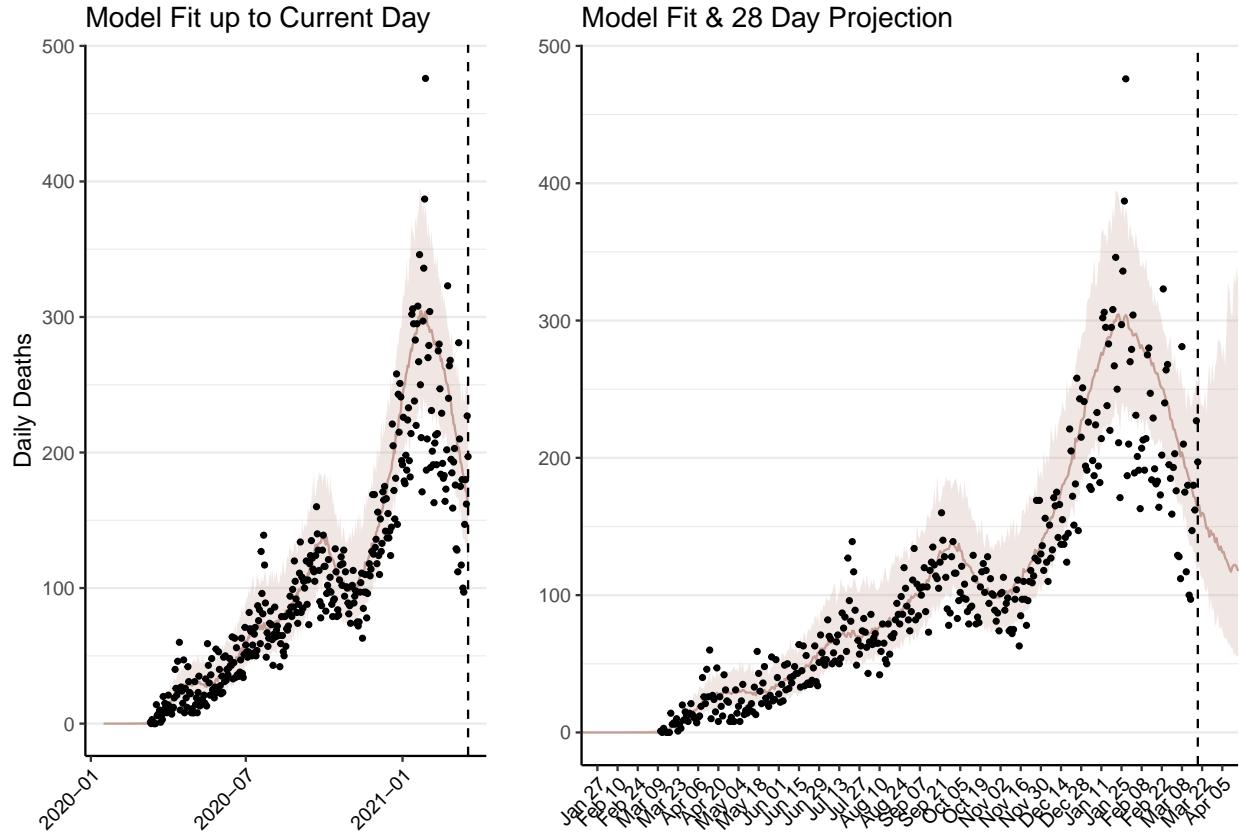


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 6,367 (95% CI: 6,049-6,686) patients requiring treatment with high-pressure oxygen at the current date to 5,695 (95% CI: 4,904-6,486) hospital beds being required on 2021-04-16 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 2,644 (95% CI: 2,528-2,761) patients requiring treatment with mechanical ventilation at the current date to 2,275 (95% CI: 1,982-2,569) by 2021-04-16. 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.**

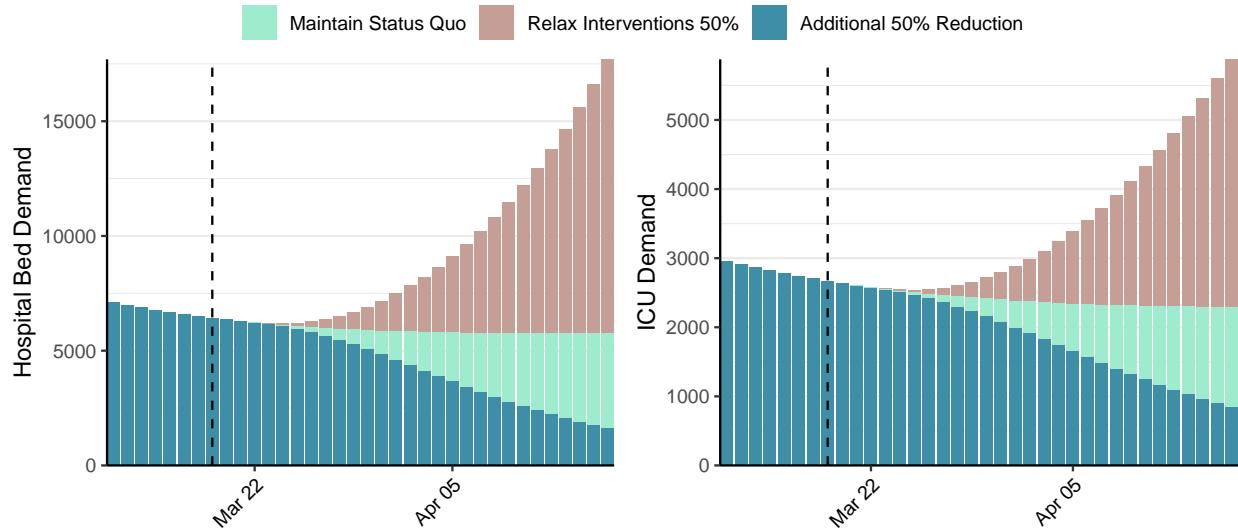


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 47,759 (95% CI: 43,908-51,610) at the current date to 3,980 (95% CI: 3,335-4,625) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 47,759 (95% CI: 43,908-51,610) at the current date to 272,625 (95% CI: 221,310-323,941) by 2021-04-16.

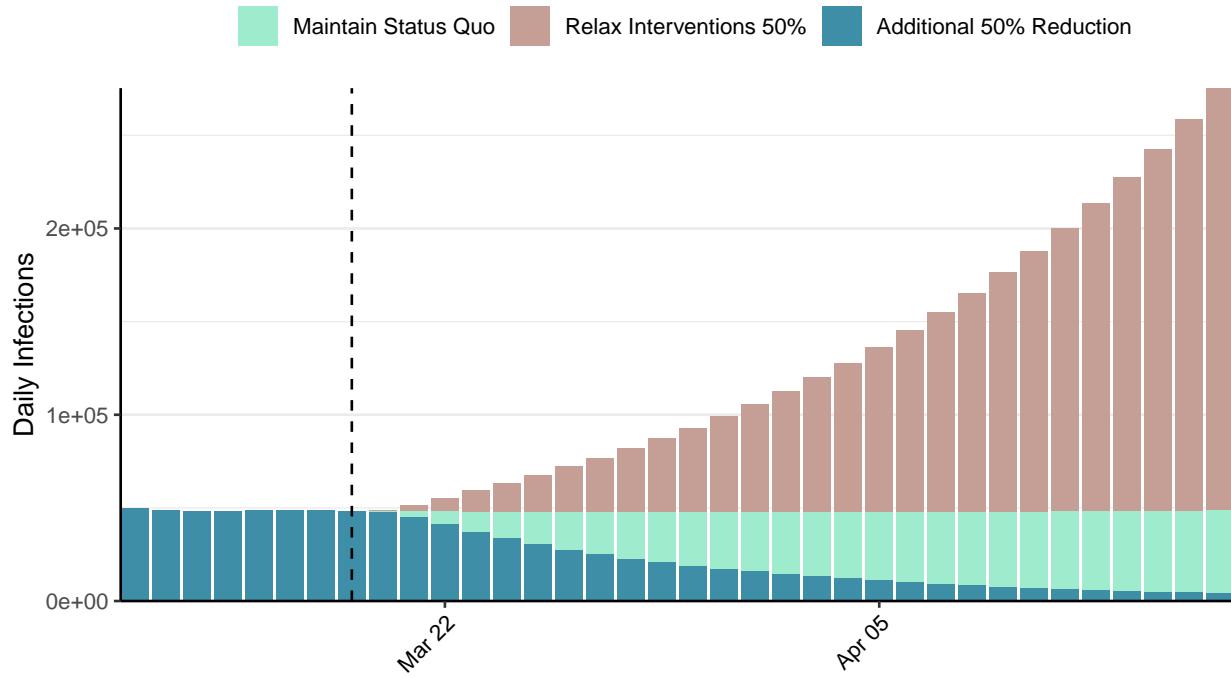


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: India, 2021-03-19

[Download the report for India, 2021-03-19 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}
11,555,284	40,953	159,559	188	1.23 (95% CI: 1.07-1.37)

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.

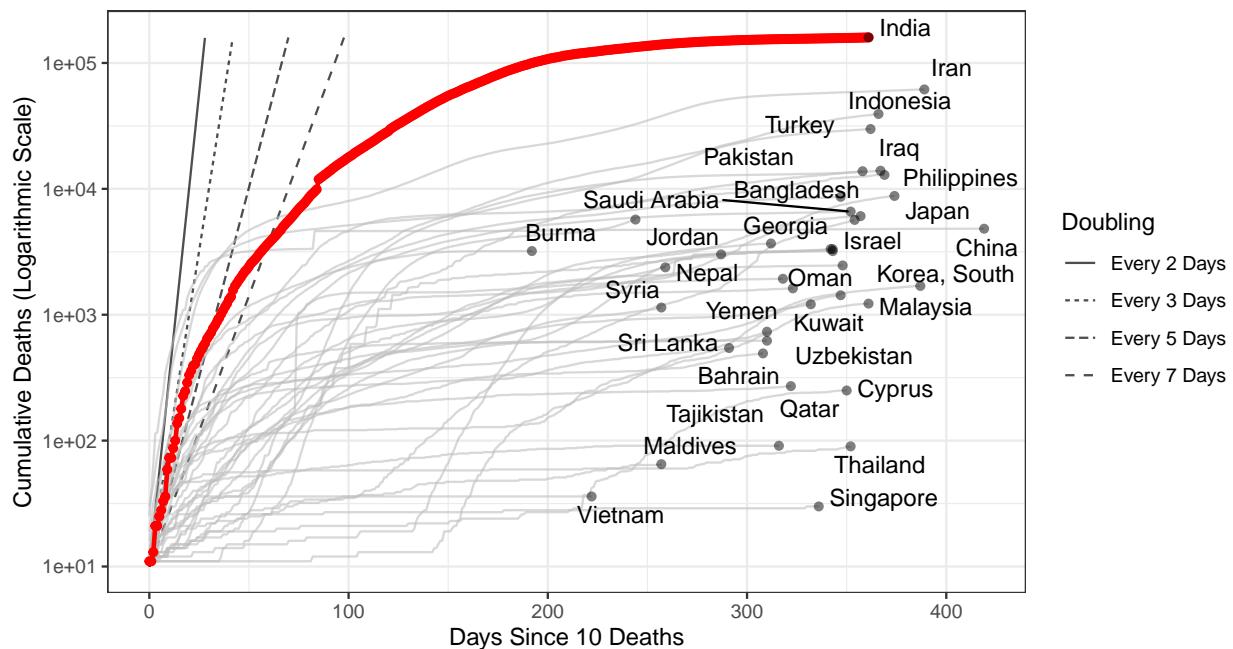


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,795,525 (95% CI: 1,712,055-1,878,995) 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

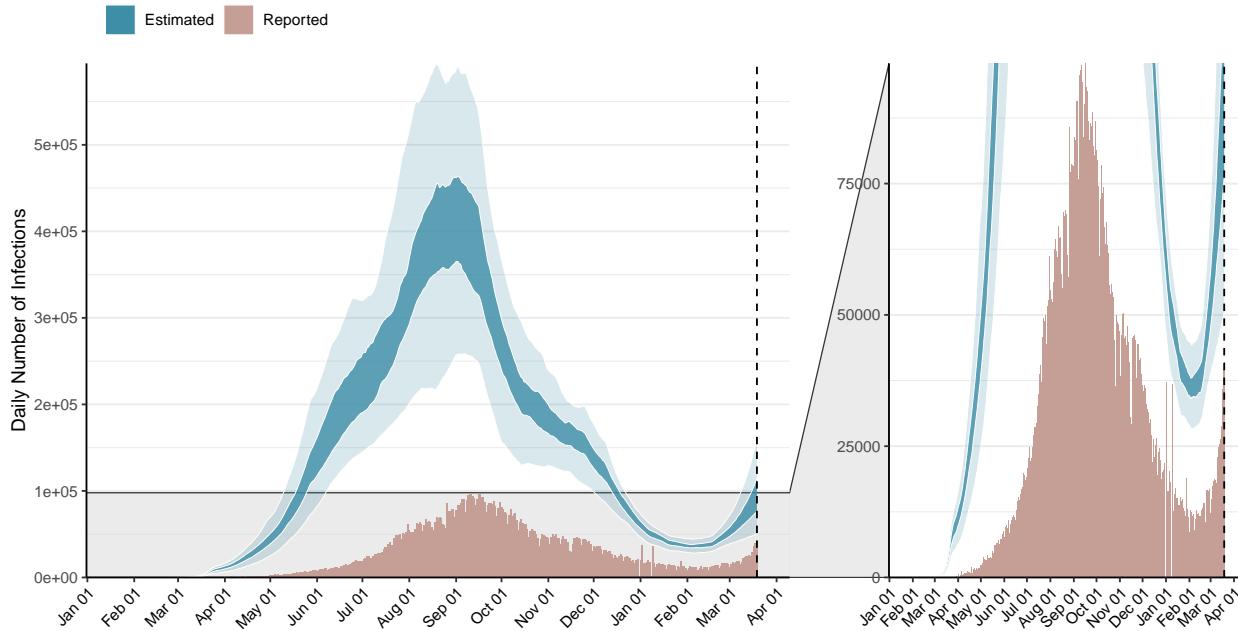


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

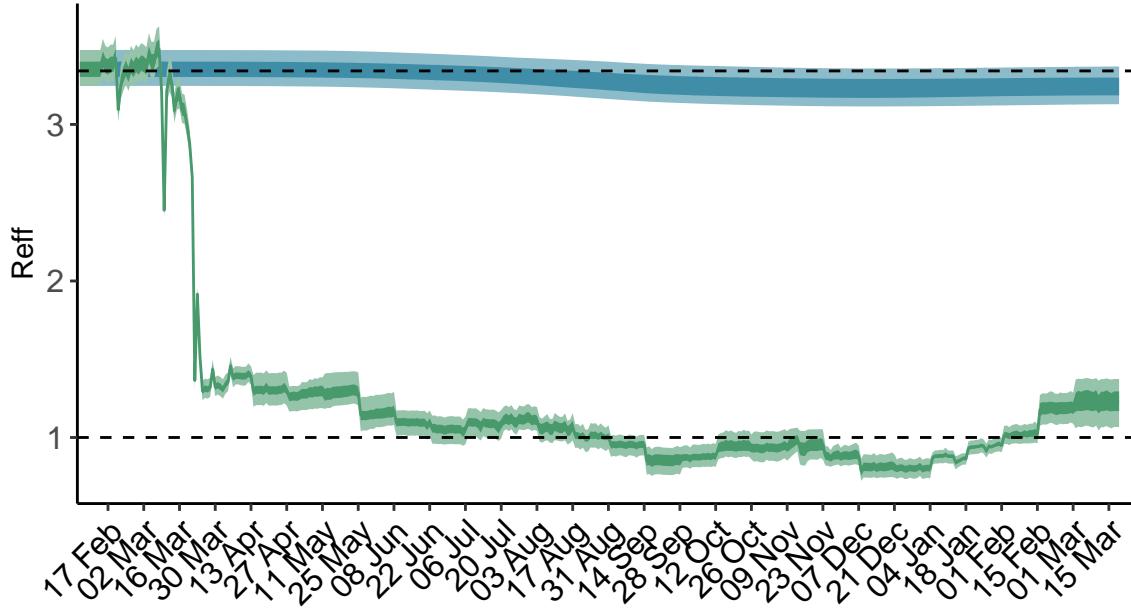


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. India 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.](#)

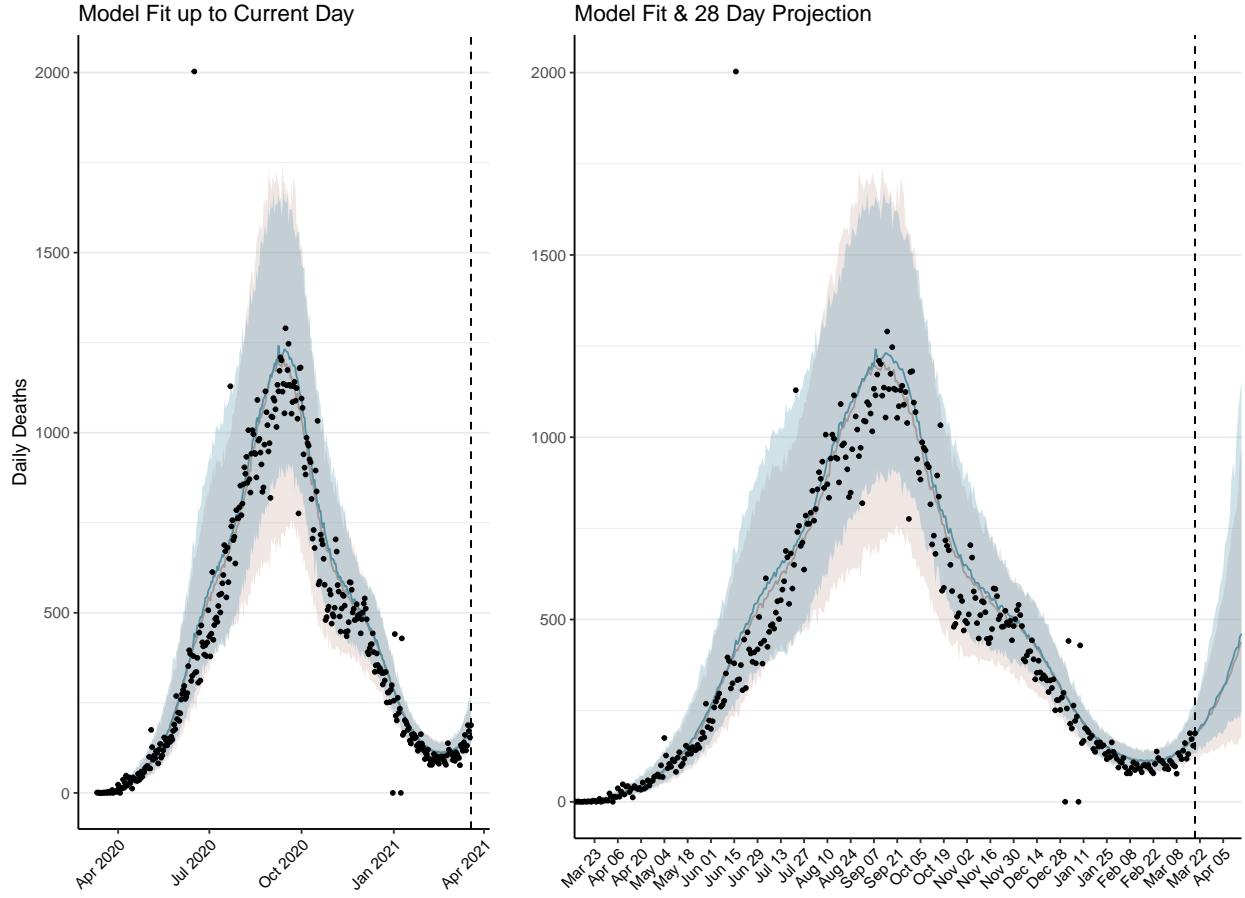


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 7,652 (95% CI: 7,277-8,028) patients requiring treatment with high-pressure oxygen at the current date to 20,760 (95% CI: 18,614-22,906) hospital beds being required on 2021-04-16 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 2,831 (95% CI: 2,701-2,960) patients requiring treatment with mechanical ventilation at the current date to 7,577 (95% CI: 6,820-8,334) by 2021-04-16. 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.**

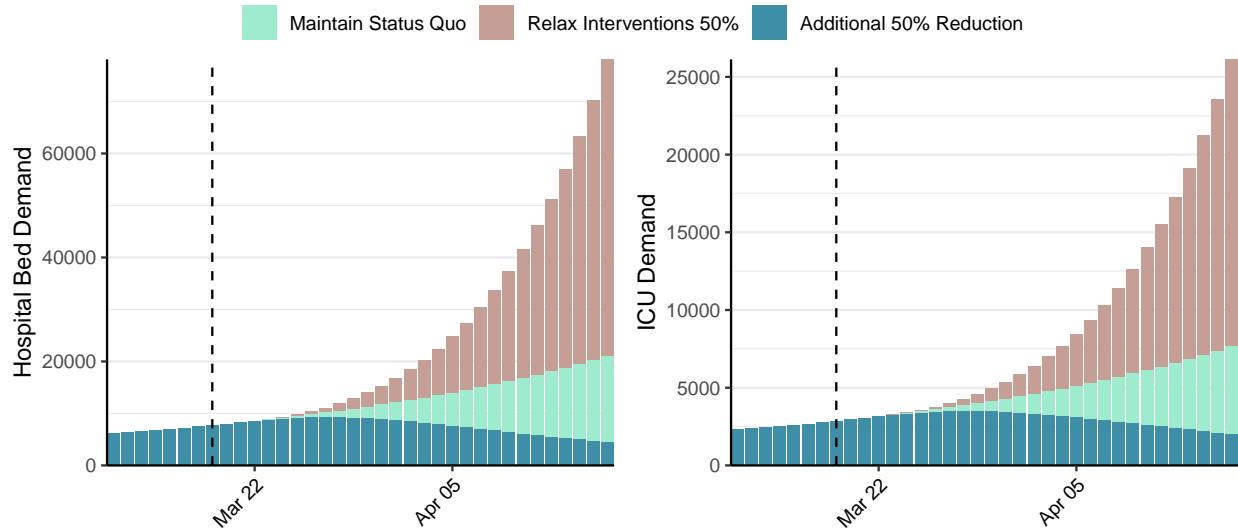


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 97,434 (95% CI: 91,024-103,843) at the current date to 18,457 (95% CI: 16,383-20,530) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 97,434 (95% CI: 91,024-103,843) at the current date to 1,805,030 (95% CI: 1,571,127-2,038,932) by 2021-04-16.

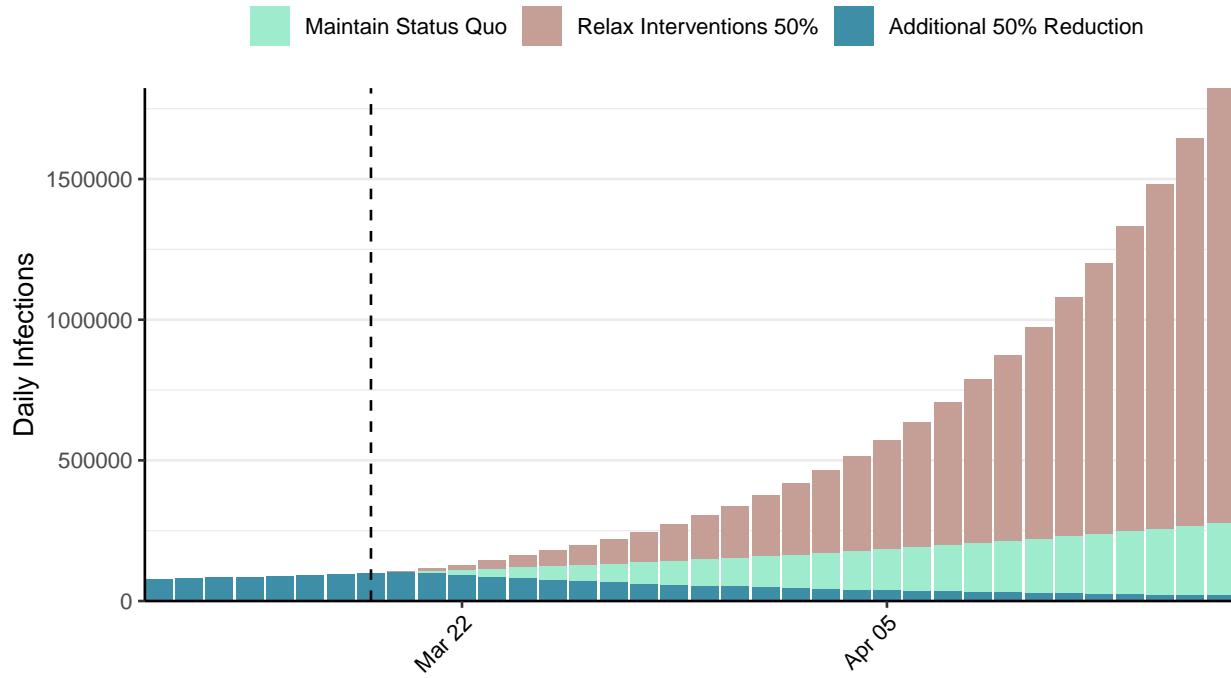


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Iraq, 2021-03-19

[Download the report for Iraq, 2021-03-19 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}
784,716	5,258	13,937	41	1.15 (95% CI: 1.03-1.28)

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.

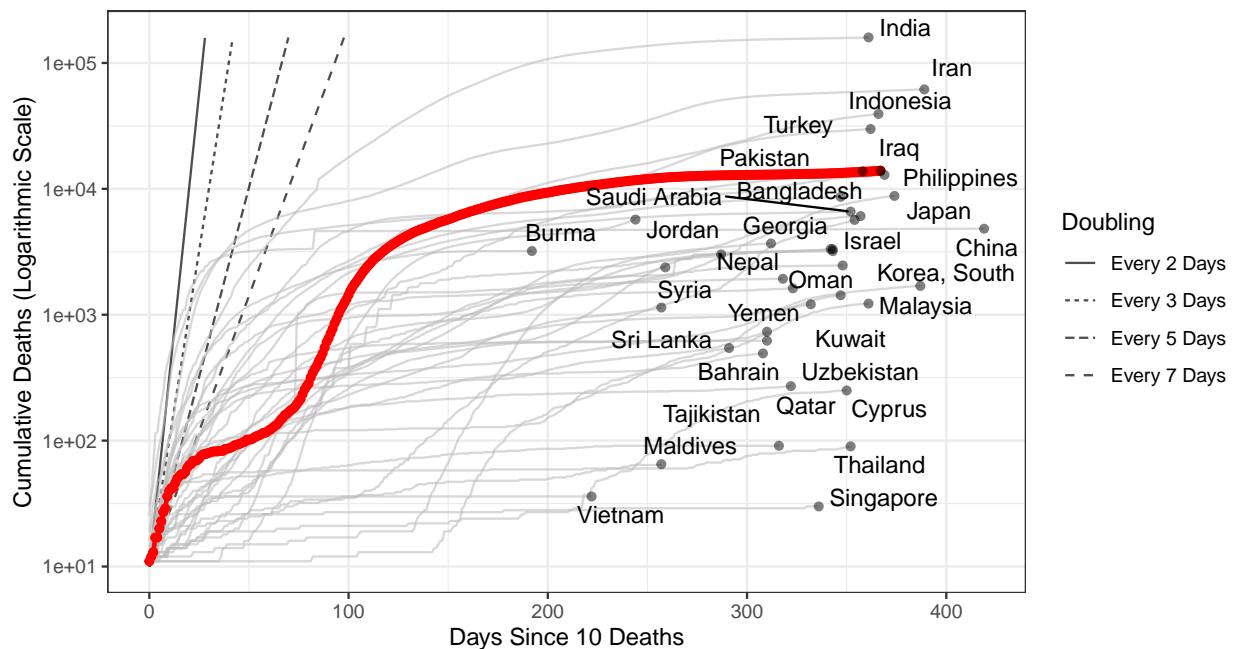


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 288,376 (95% CI: 264,285-312,467) 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).

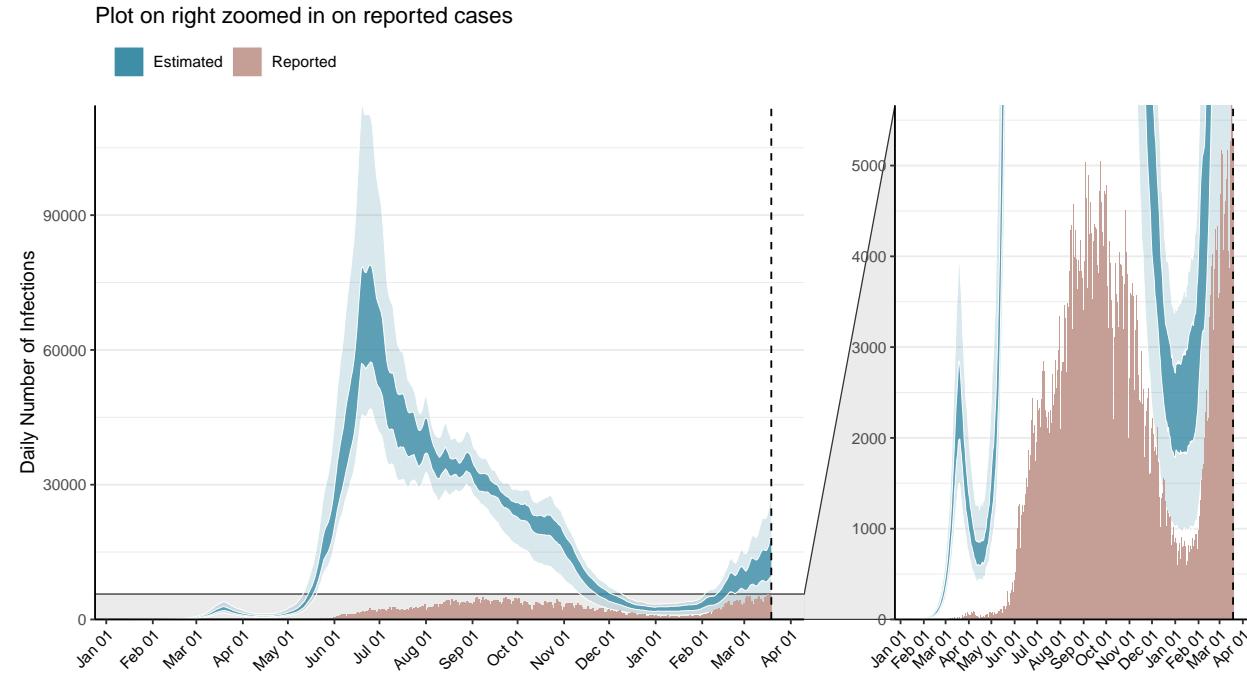


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

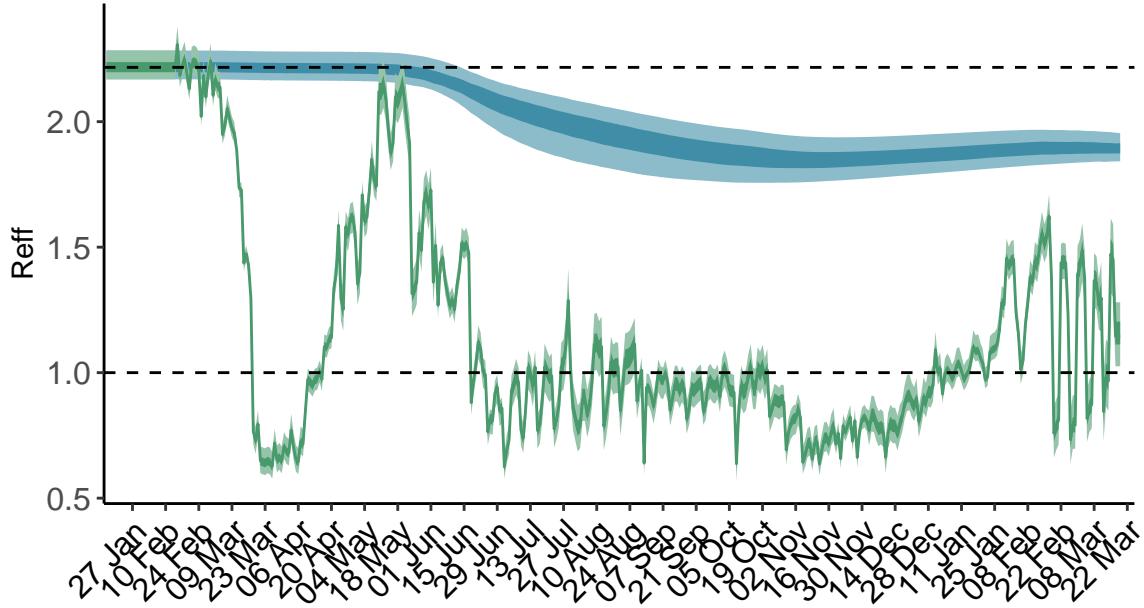


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

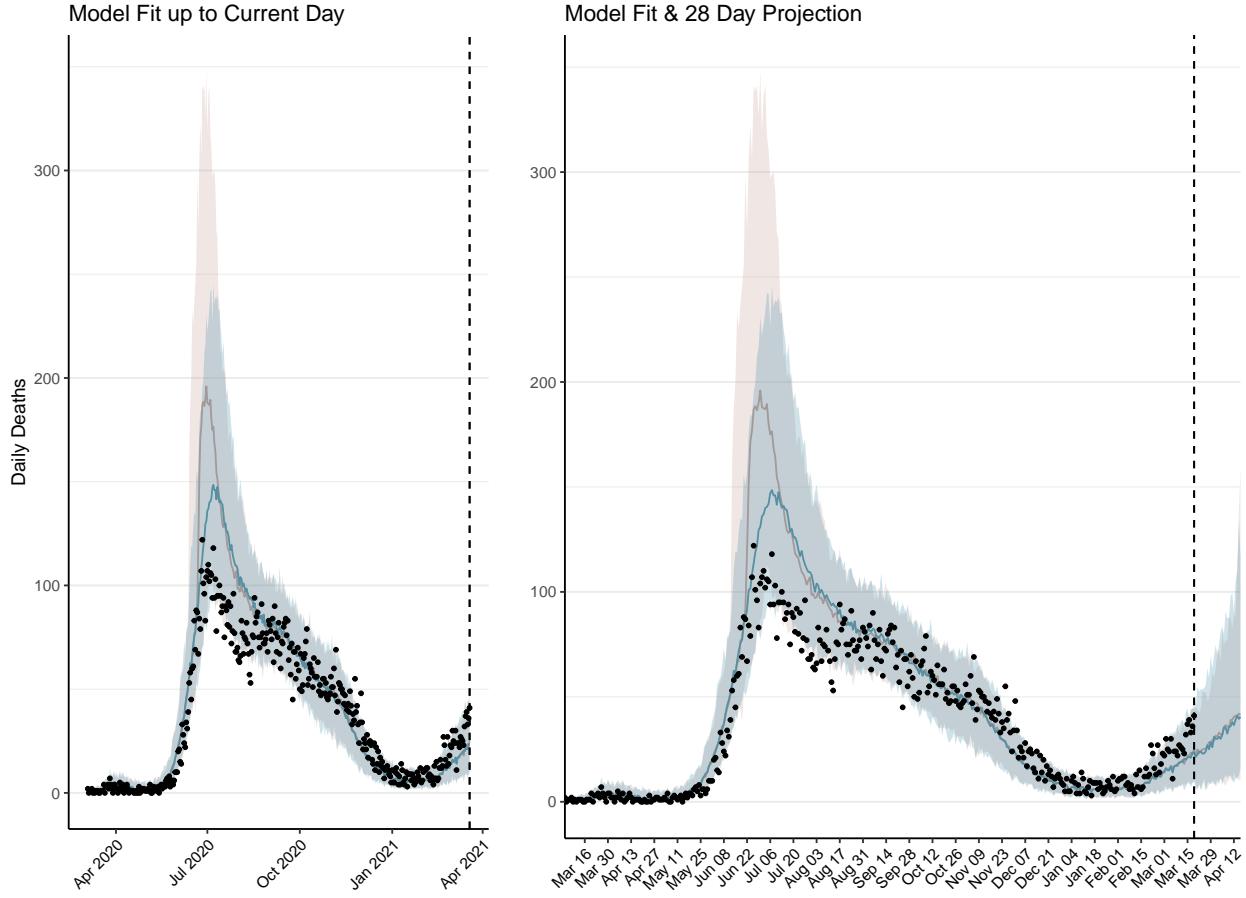


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,033 (95% CI: 945-1,122) patients requiring treatment with high-pressure oxygen at the current date to 2,116 (95% CI: 1,862-2,369) hospital beds being required on 2021-04-16 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 376 (95% CI: 344-408) patients requiring treatment with mechanical ventilation at the current date to 747 (95% CI: 676-819) by 2021-04-16. 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.**

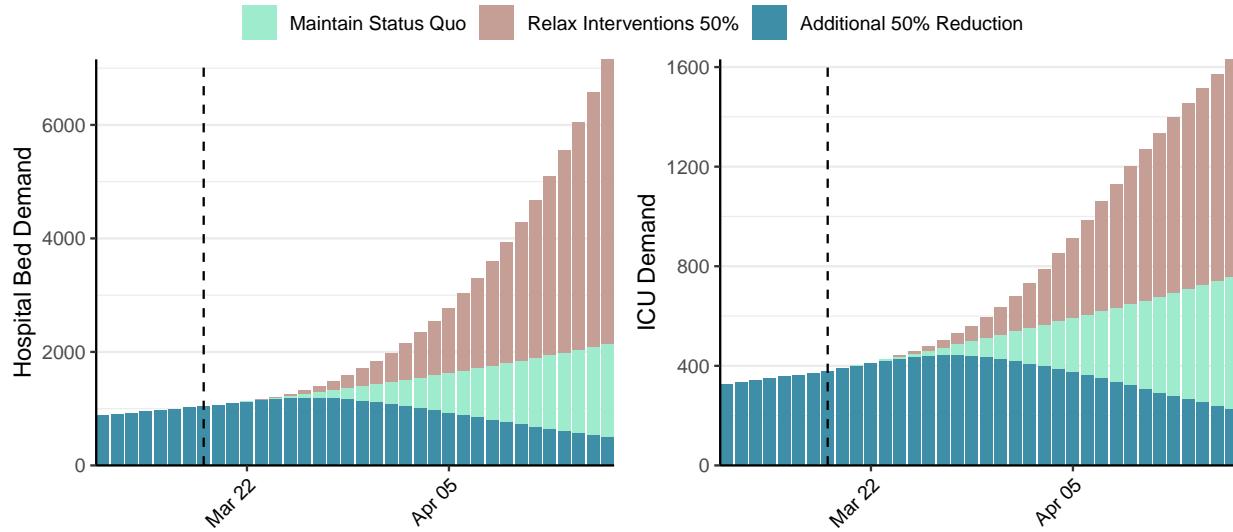


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 14,347 (95% CI: 12,955-15,739) at the current date to 2,132 (95% CI: 1,852-2,411) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14,347 (95% CI: 12,955-15,739) at the current date to 162,503 (95% CI: 143,247-181,759) by 2021-04-16.

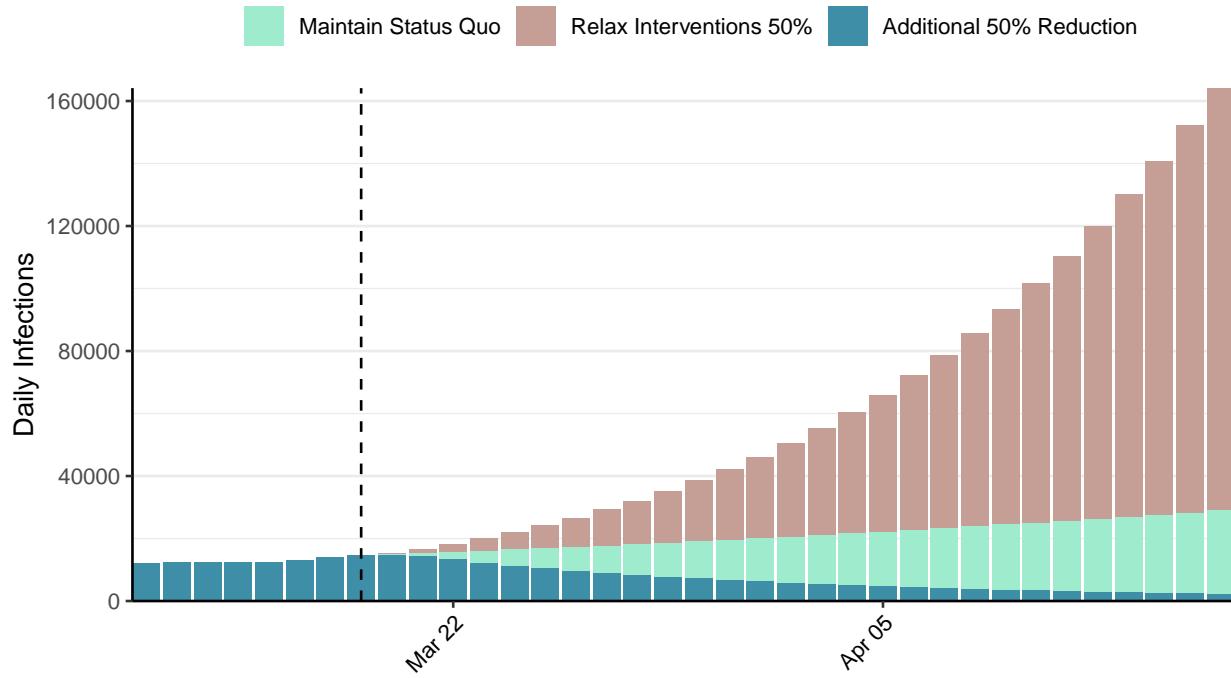


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Jamaica, 2021-03-19

[Download the report for Jamaica, 2021-03-19 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}
33,970	604	519	8	1.25 (95% CI: 1.11-1.4)

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.

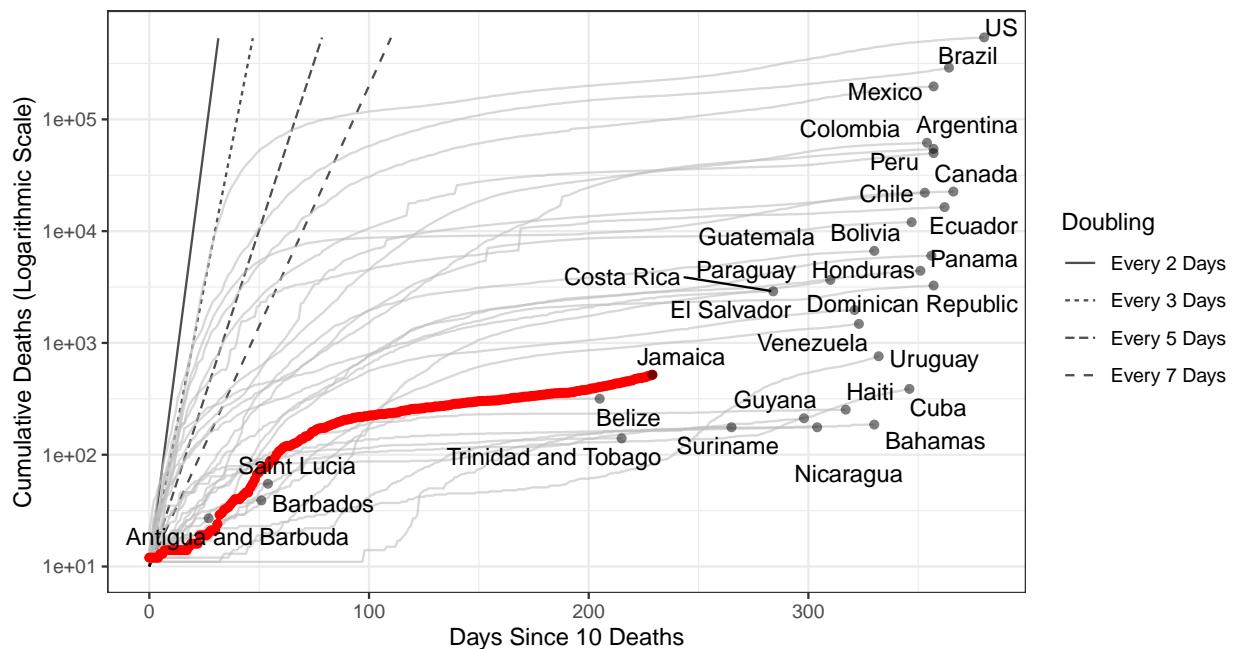


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 69,196 (95% CI: 65,728-72,665) 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).

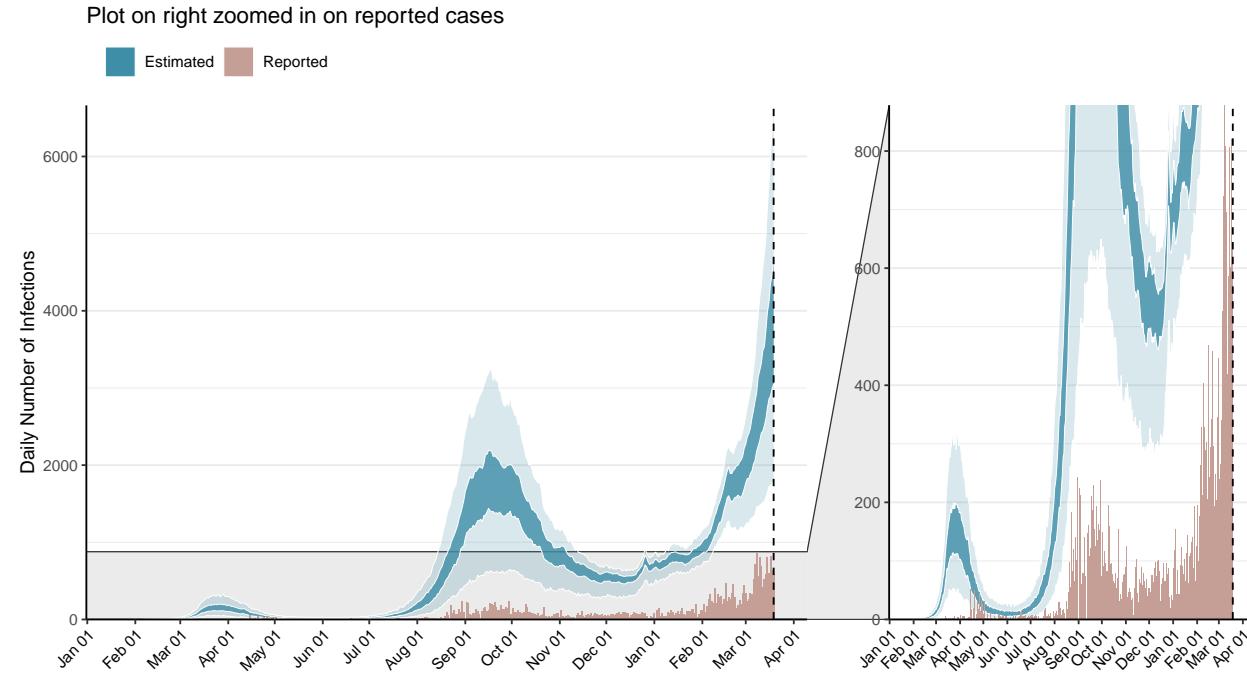


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

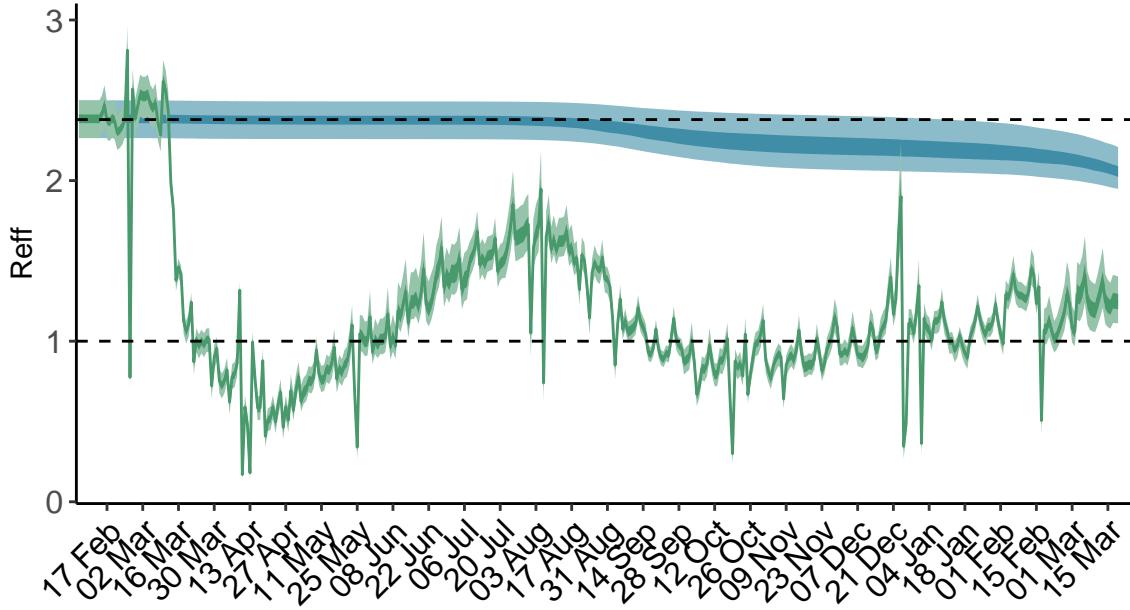


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Jamaica 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.](#)

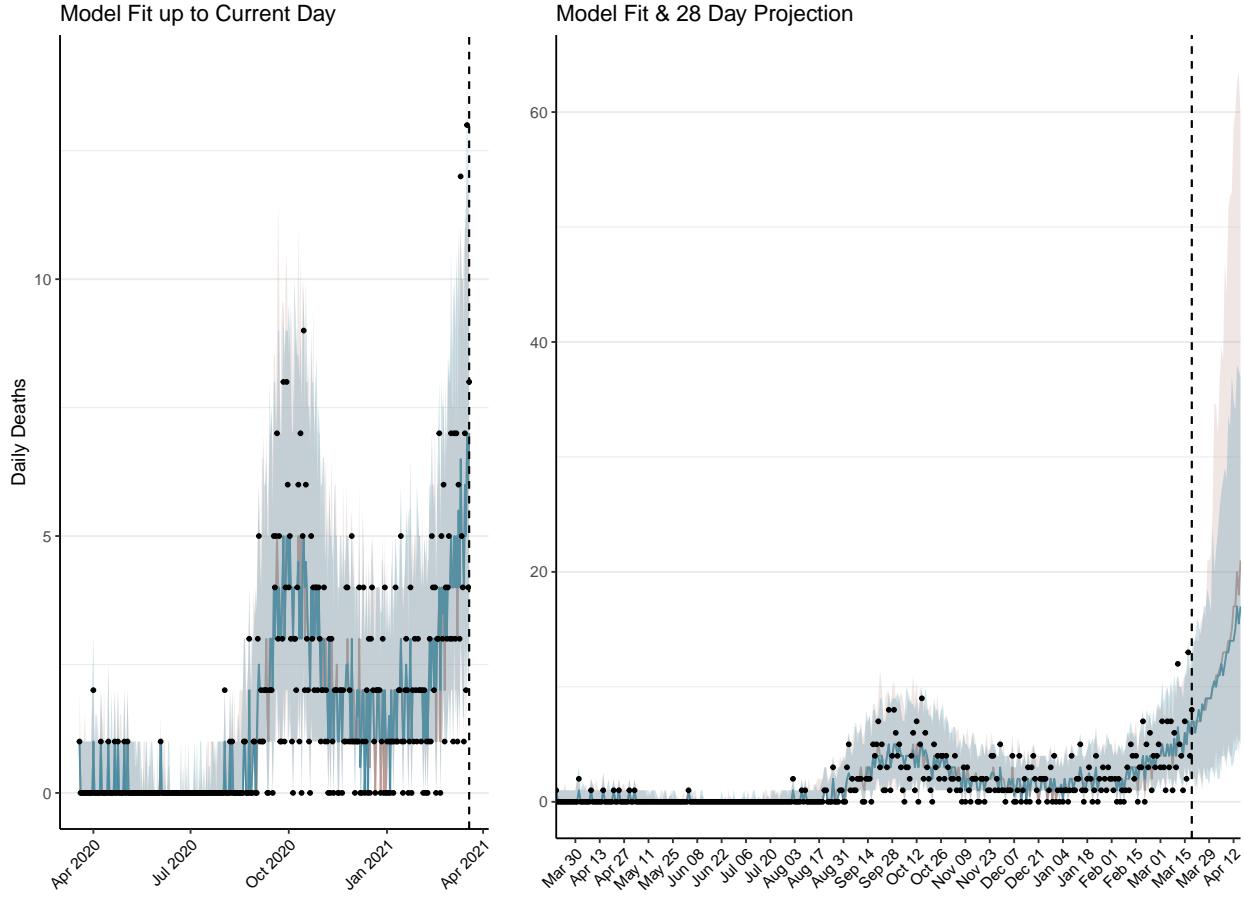


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 261 (95% CI: 247-275) patients requiring treatment with high-pressure oxygen at the current date to 722 (95% CI: 656-789) hospital beds being required on 2021-04-16 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: 84-93) patients requiring treatment with mechanical ventilation at the current date to 190 (95% CI: 181-199) by 2021-04-16. 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.**

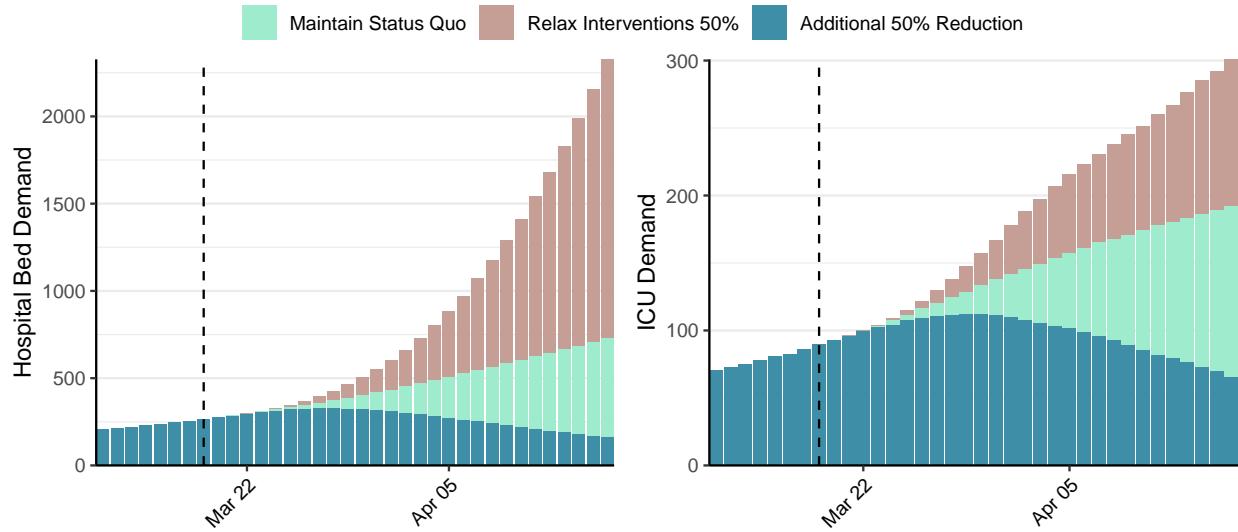
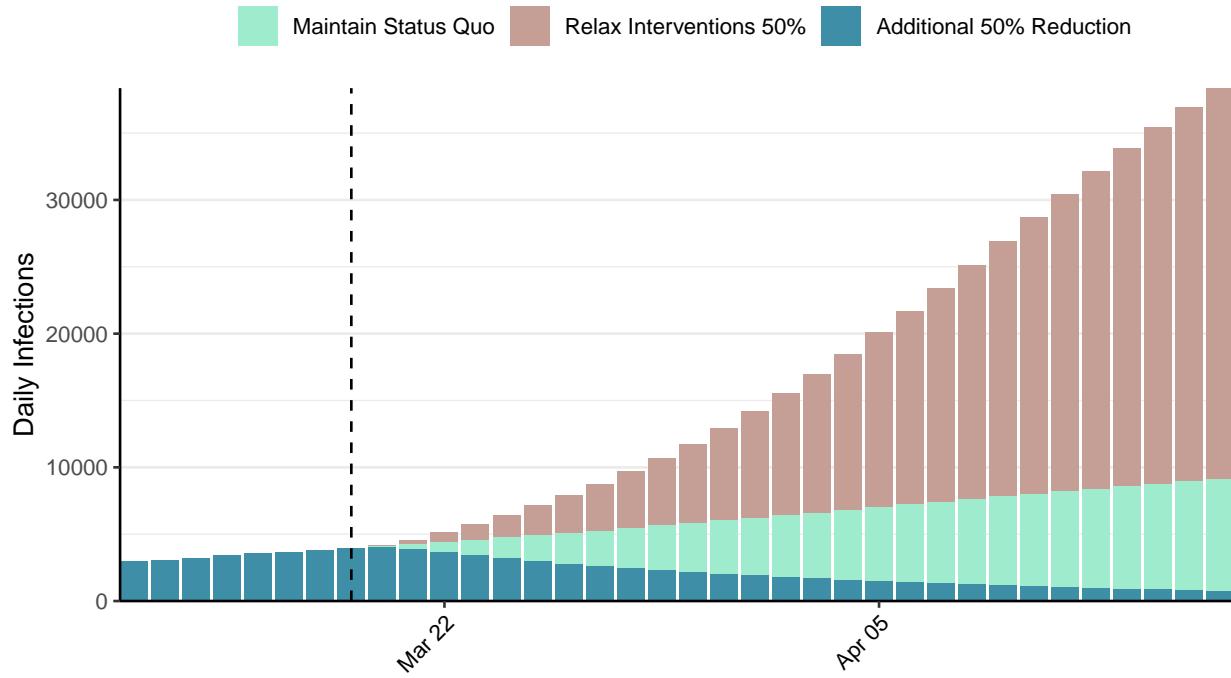


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 3,871 (95% CI: 3,612-4,130) at the current date to 724 (95% CI: 648-800) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,871 (95% CI: 3,612-4,130) at the current date to 37,984 (95% CI: 35,442-40,526) by 2021-04-16.



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: Jordan, 2021-03-19

[Download the report for Jordan, 2021-03-19 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}
521,461	7,354	5,701	74	1.07 (95% CI: 0.98-1.16)

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.

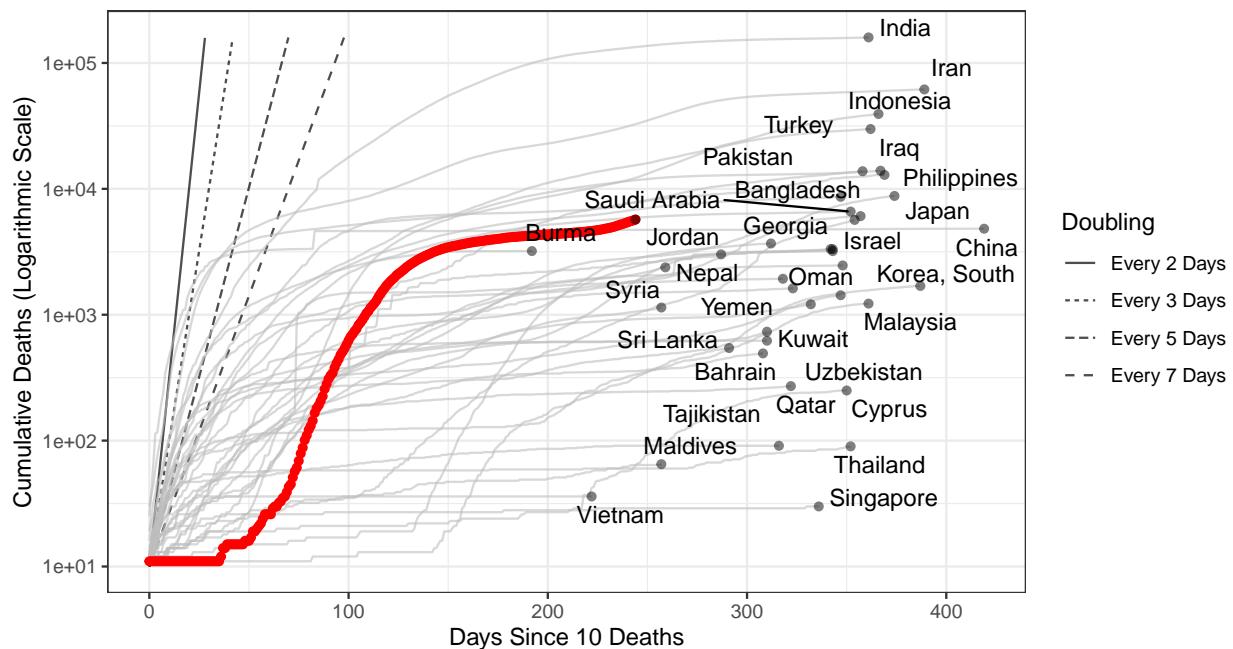


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 484,630 (95% CI: 413,042–556,218) 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.**

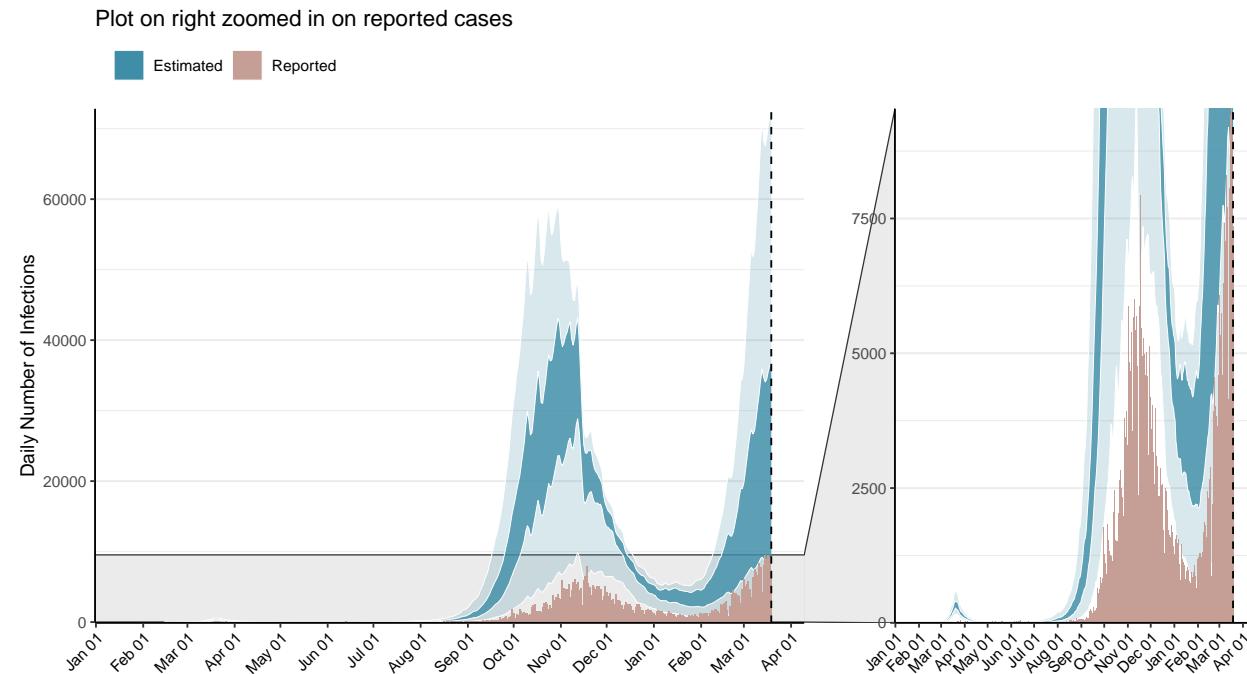


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

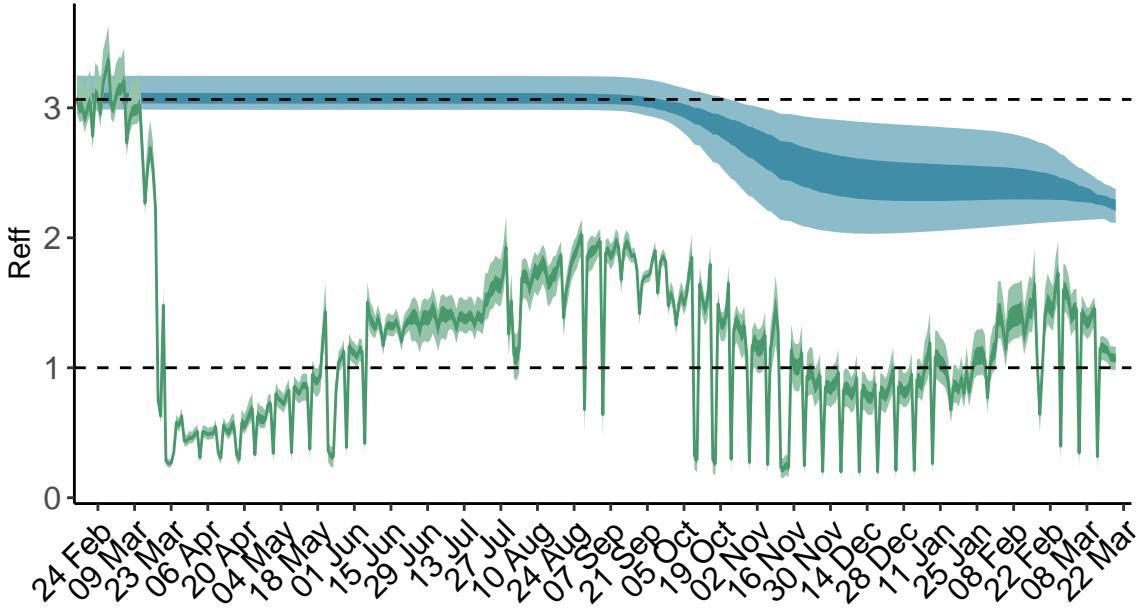


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

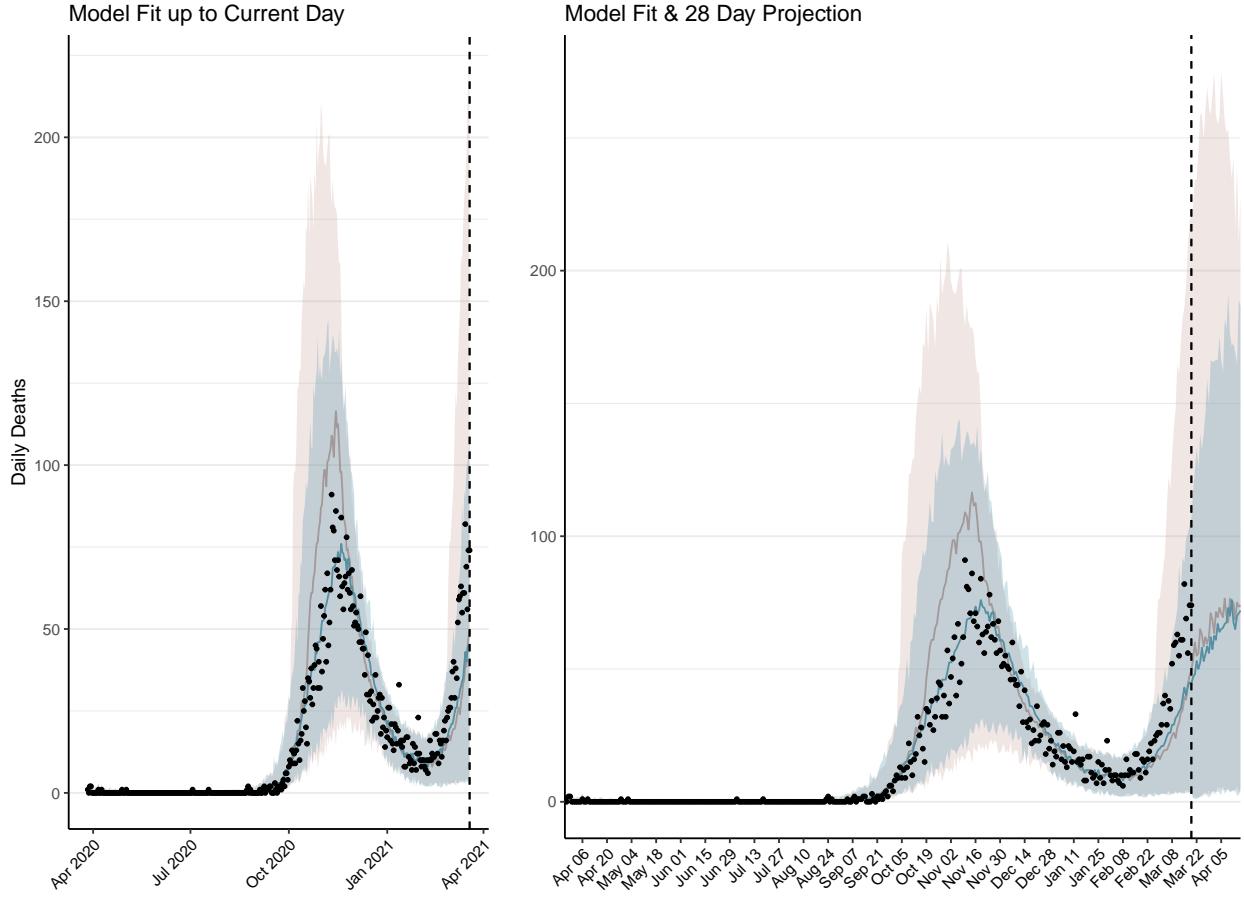


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,954 (95% CI: 1,661-2,246) patients requiring treatment with high-pressure oxygen at the current date to 2,598 (95% CI: 2,249-2,947) hospital beds being required on 2021-04-16 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 462 (95% CI: 418-506) patients requiring treatment with mechanical ventilation at the current date to 525 (95% CI: 487-562) by 2021-04-16. 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.**

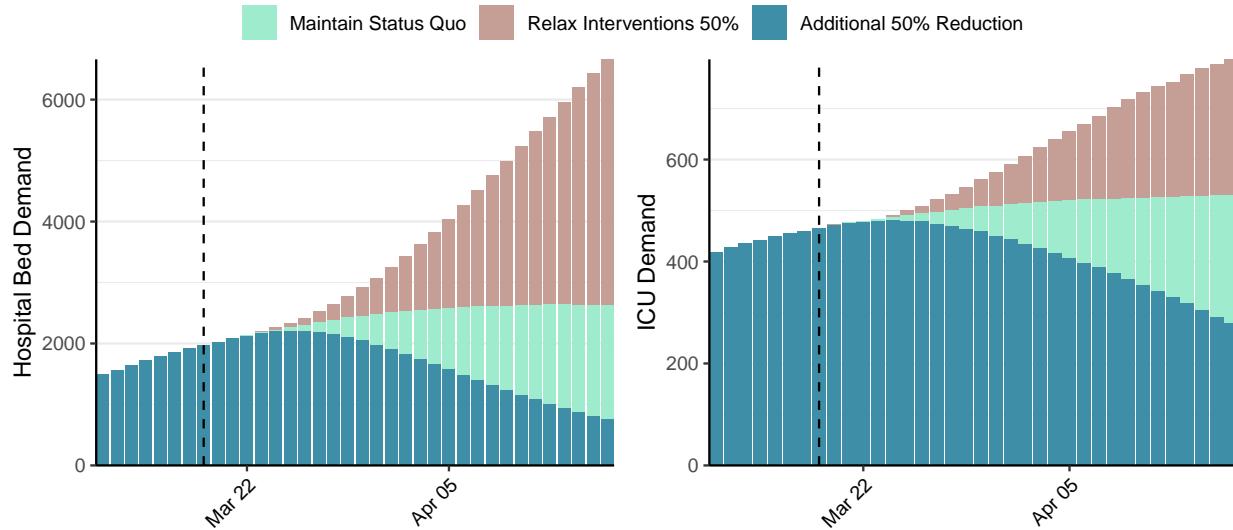


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 24,930 (95% CI: 21,060-28,801) at the current date to 2,507 (95% CI: 2,150-2,864) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 24,930 (95% CI: 21,060-28,801) at the current date to 91,433 (95% CI: 83,655-99,211) by 2021-04-16.

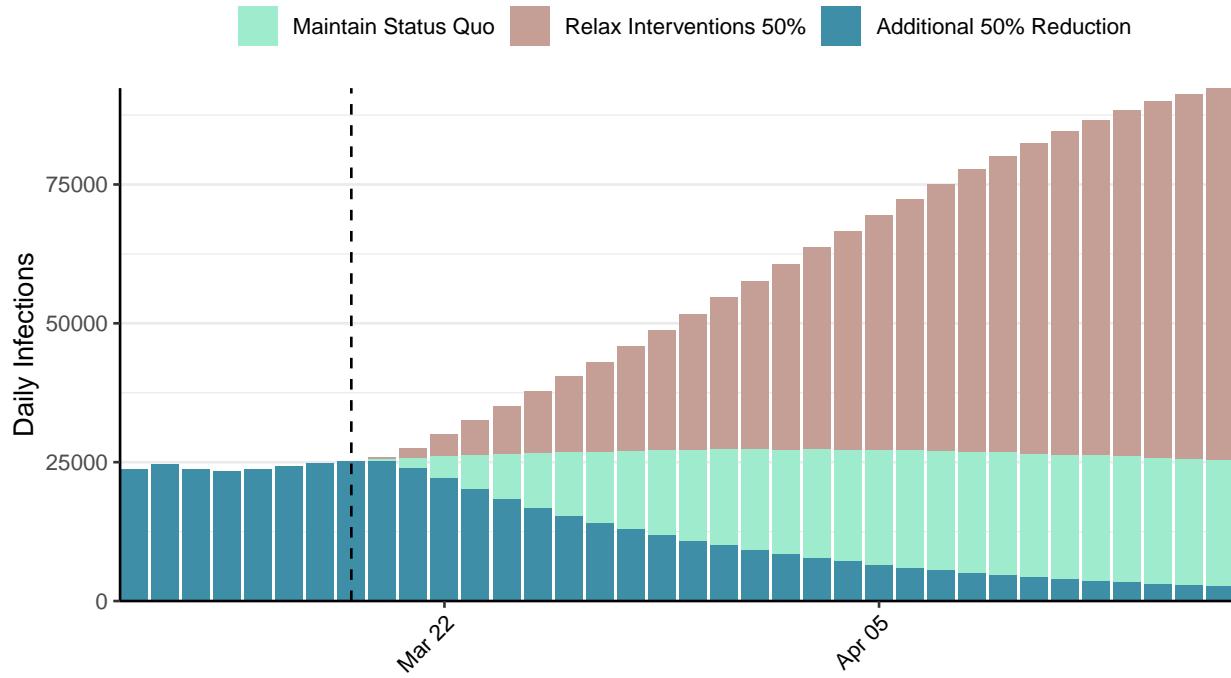


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Kazakhstan, 2021-03-19

[Download the report for Kazakhstan, 2021-03-19 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}
280,576	1,356	3,201	1	0.9 (95% CI: 0.73-1.12)

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.

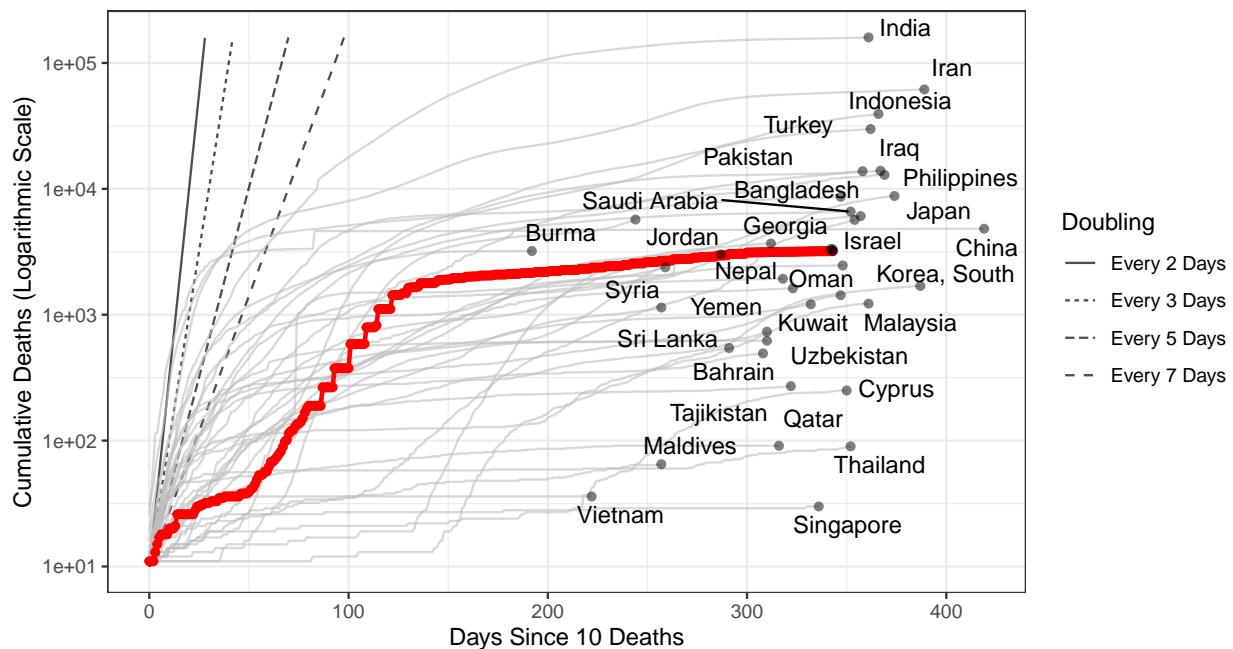


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 10,538 (95% CI: 9,792-11,285) 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).

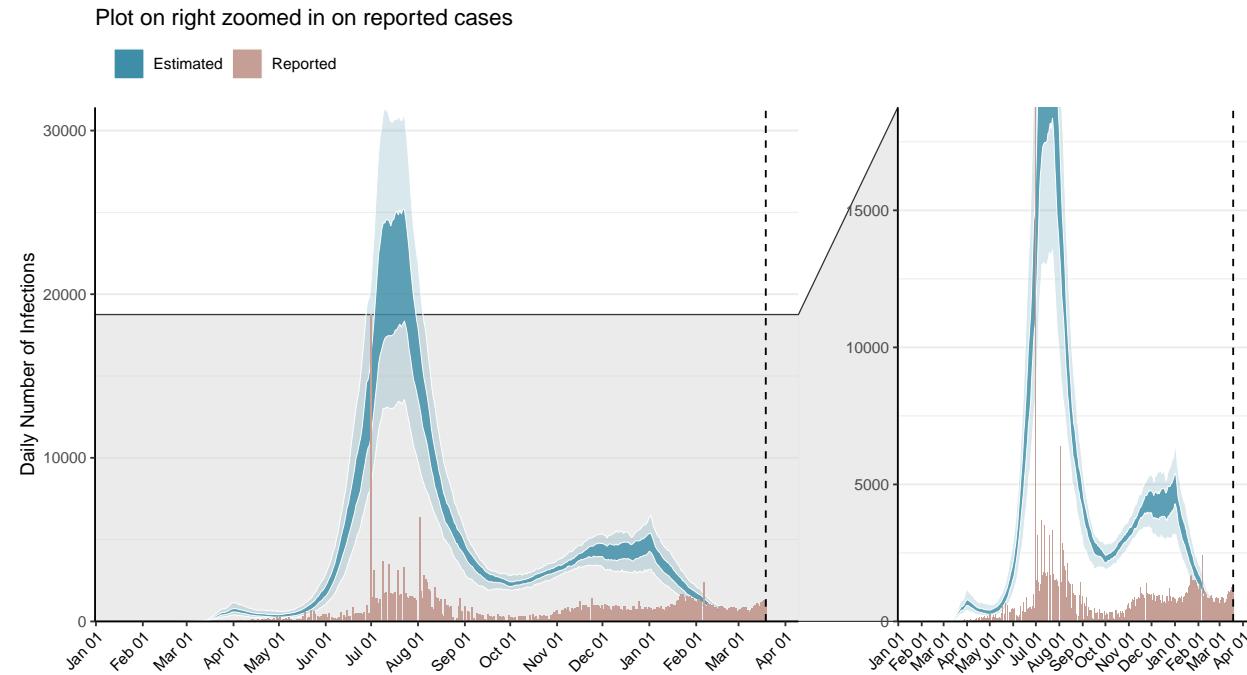


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

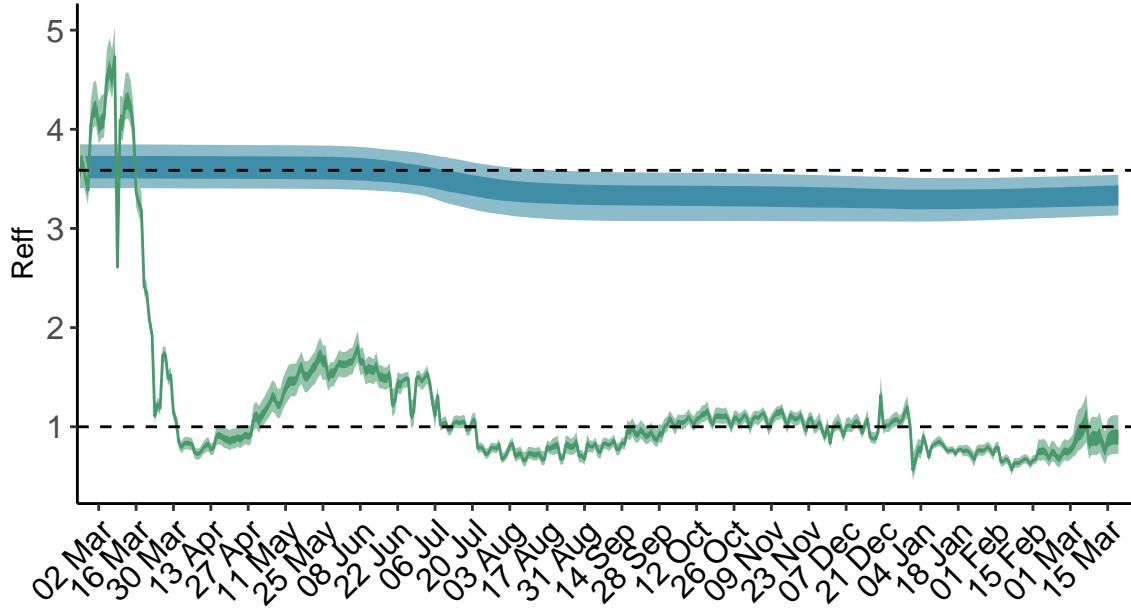


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

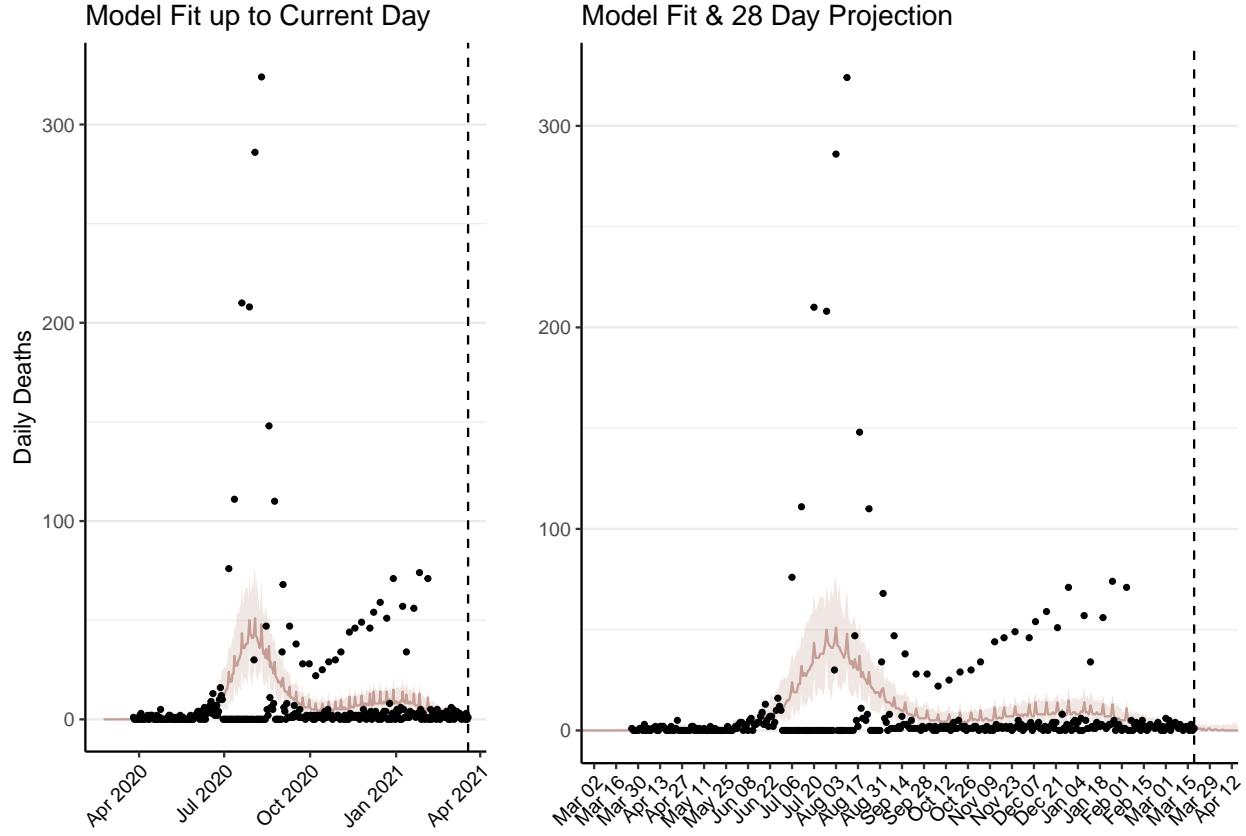


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 34 (95% CI: 31-36) patients requiring treatment with high-pressure oxygen at the current date to 27 (95% CI: 22-32) hospital beds being required on 2021-04-16 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: 14-16) patients requiring treatment with mechanical ventilation at the current date to 10 (95% CI: 8-12) by 2021-04-16. 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.**

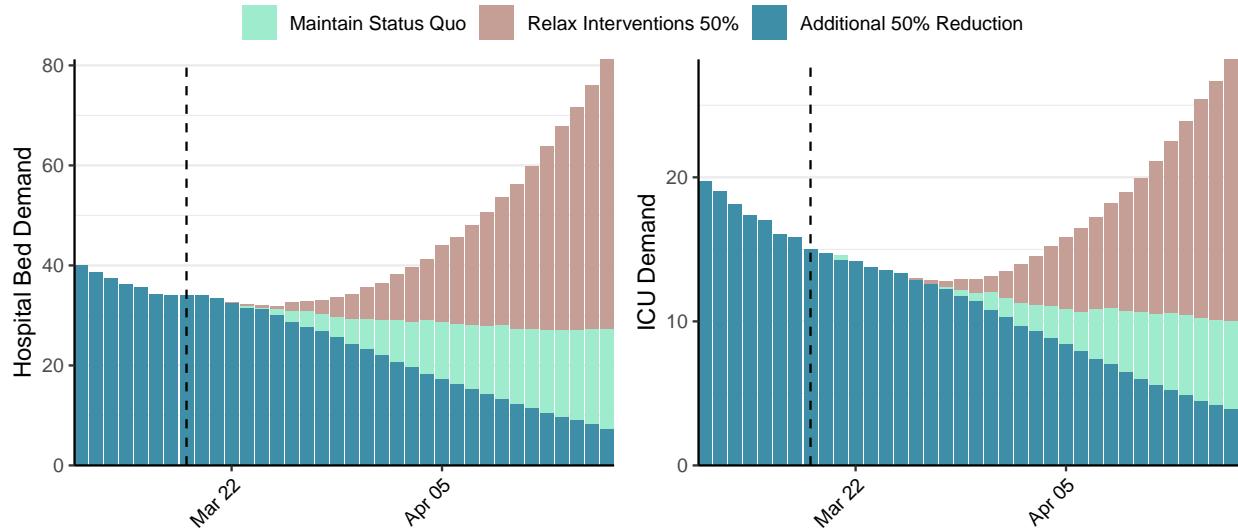


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 298 (95% CI: 264-331) at the current date to 23 (95% CI: 19-28) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 298 (95% CI: 264-331) at the current date to 1,622 (95% CI: 1,231-2,014) by 2021-04-16.

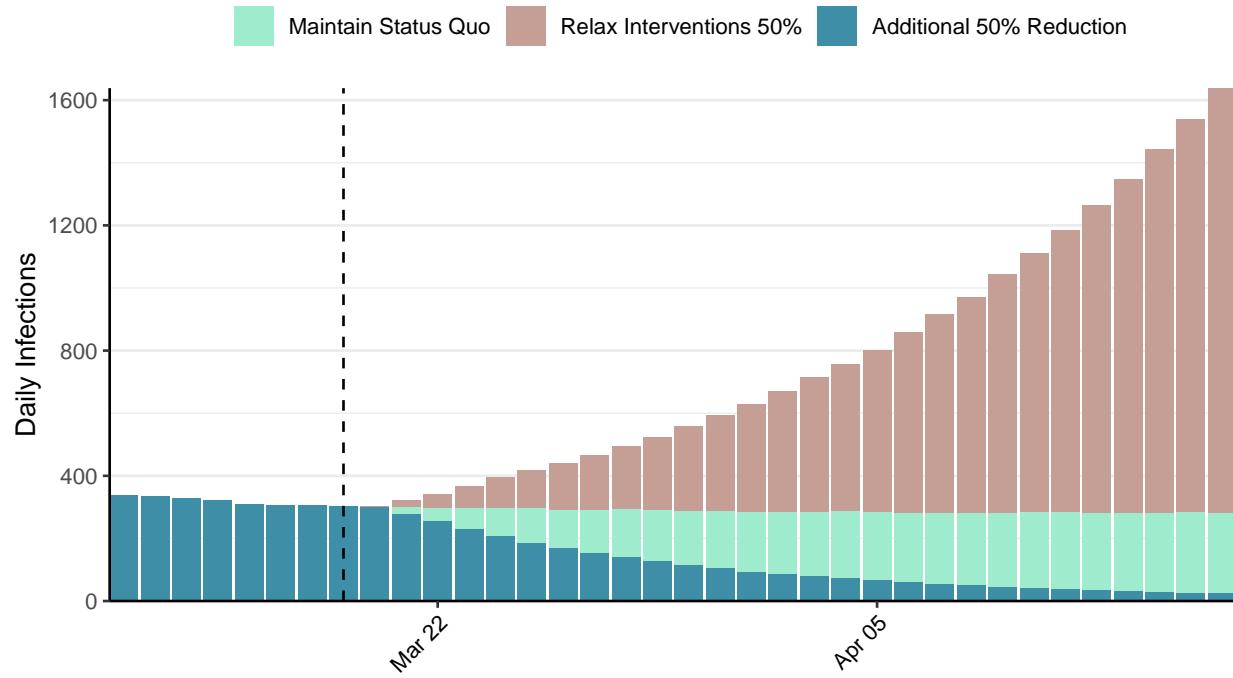


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Kenya, 2021-03-19

[Download the report for Kenya, 2021-03-19 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}
118,889	1,354	1,982	28	1.58 (95% CI: 1.32-1.79)

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.

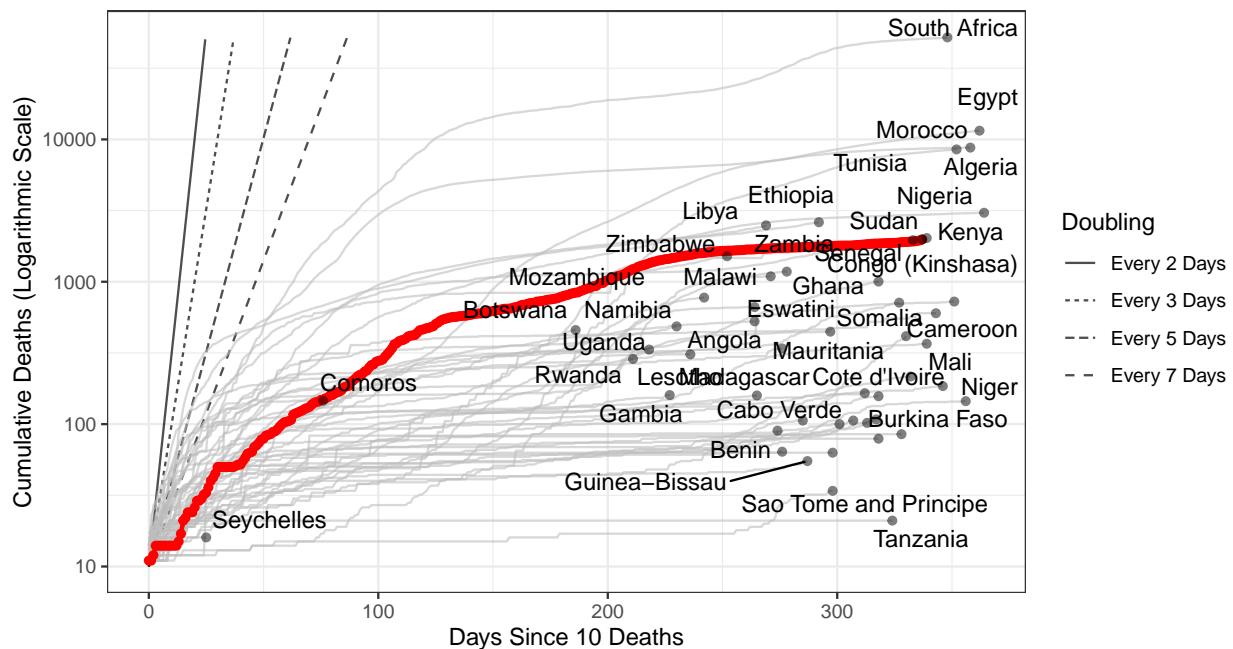


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 232,614 (95% CI: 221,241-243,987) 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).

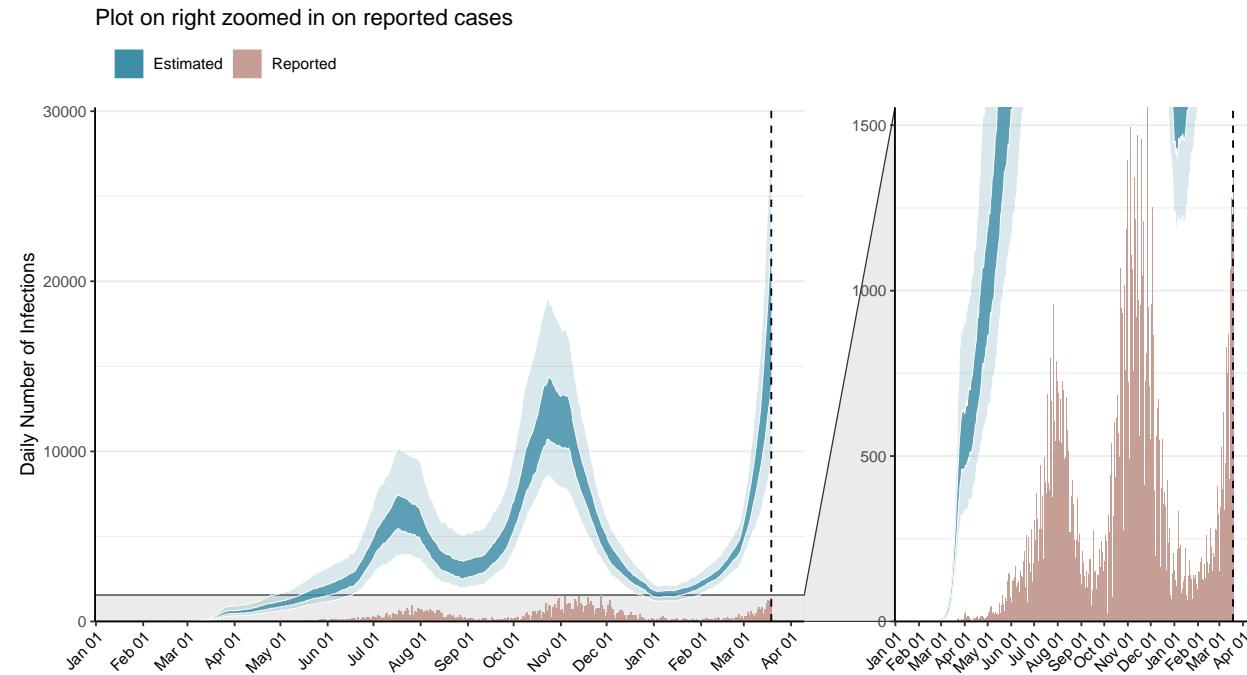


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

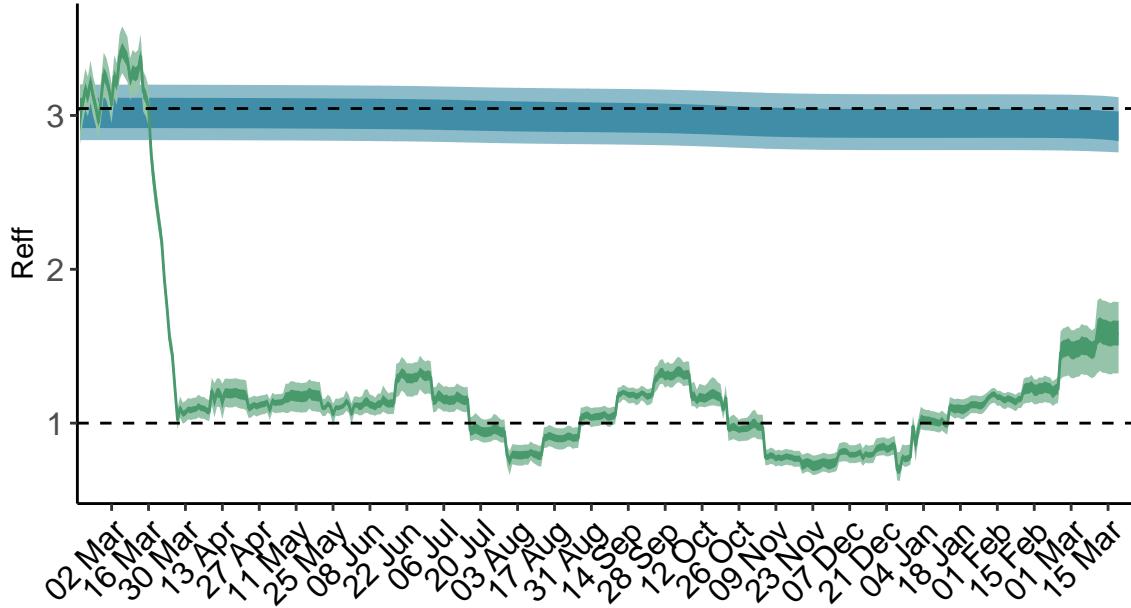


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Kenya 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.](#)

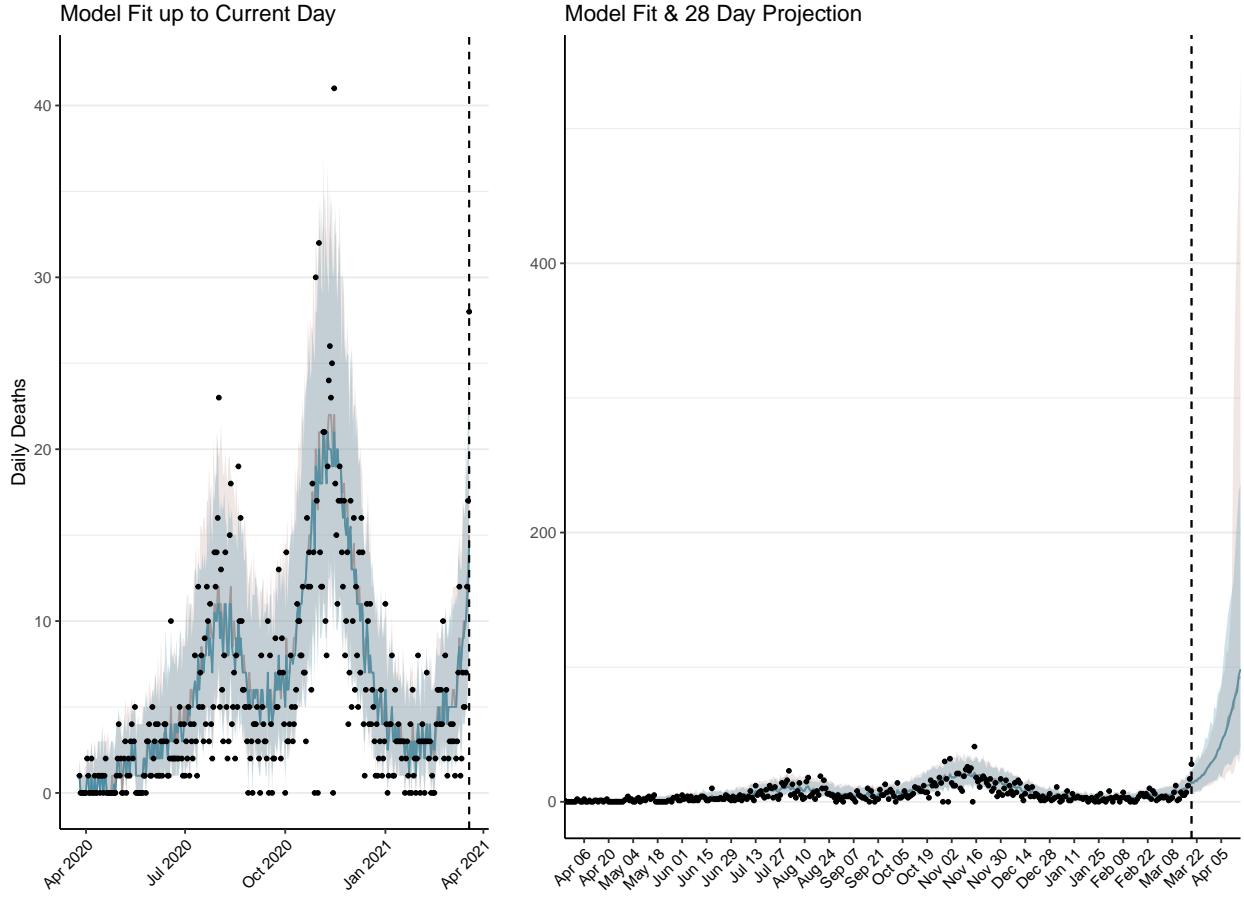


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 698 (95% CI: 662-734) patients requiring treatment with high-pressure oxygen at the current date to 5,663 (95% CI: 5,081-6,246) hospital beds being required on 2021-04-16 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: 233-258) patients requiring treatment with mechanical ventilation at the current date to 1,851 (95% CI: 1,692-2,009) by 2021-04-16. 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.**

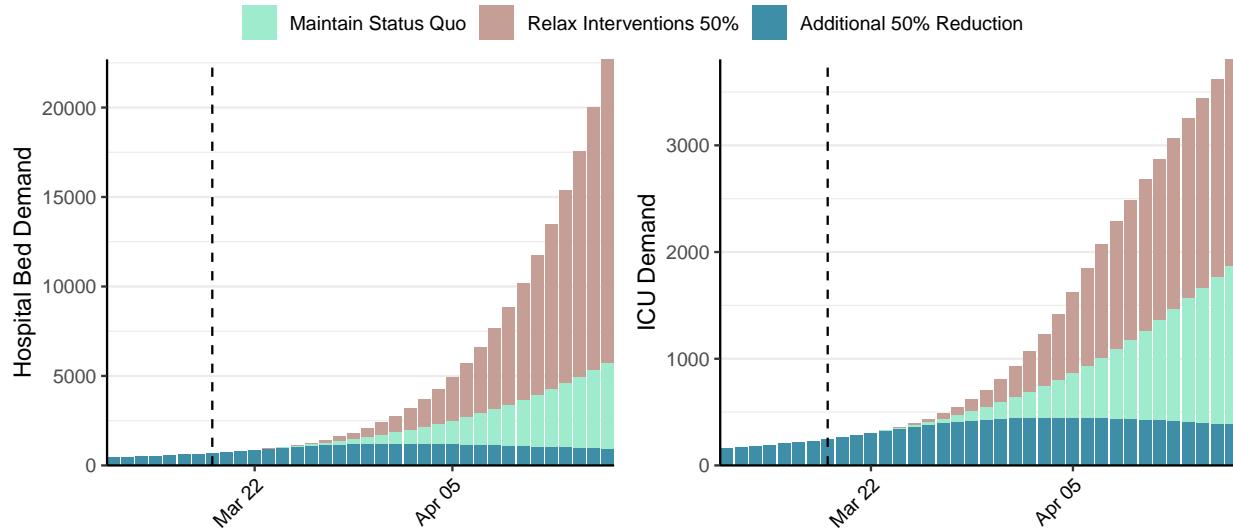


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 18,347 (95% CI: 17,156-19,539) at the current date to 8,665 (95% CI: 7,701-9,630) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 18,347 (95% CI: 17,156-19,539) at the current date to 870,440 (95% CI: 785,820-955,060) by 2021-04-16.

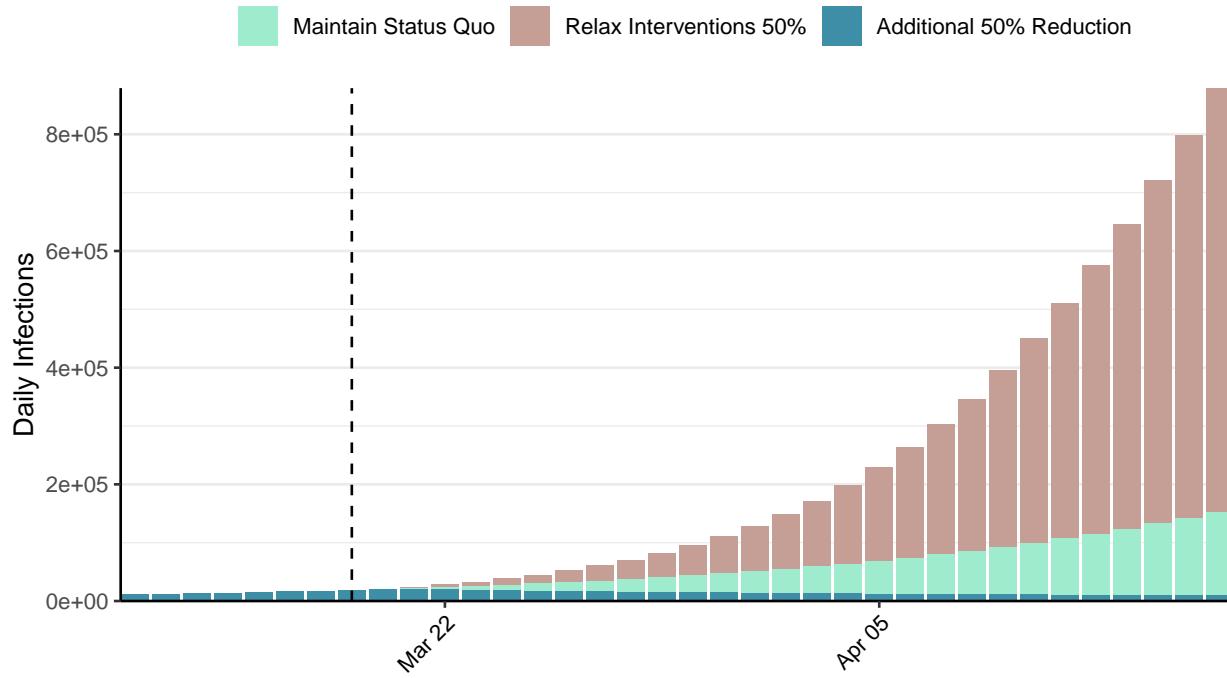


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Kyrgyz Republic, 2021-03-19

[Download the report for Kyrgyz Republic, 2021-03-19 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}
87,316	82	1,488	1	1.06 (95% CI: 0.94-1.21)

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.

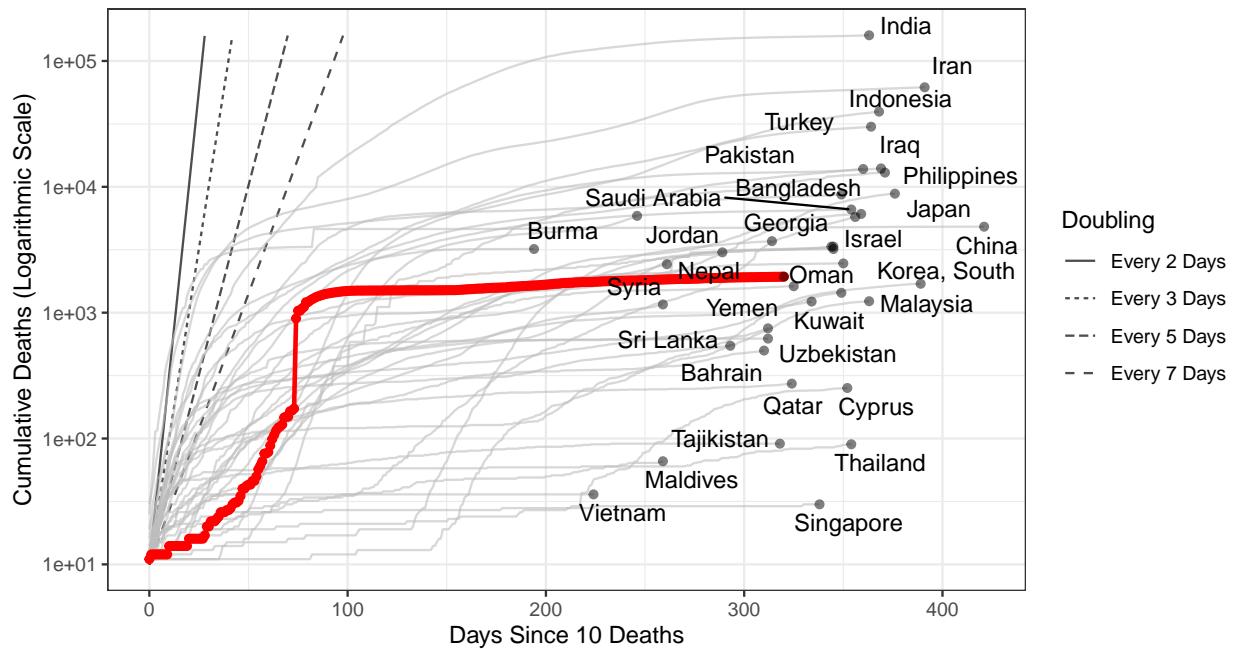


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 28,463 (95% CI: 26,685-30,241) 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

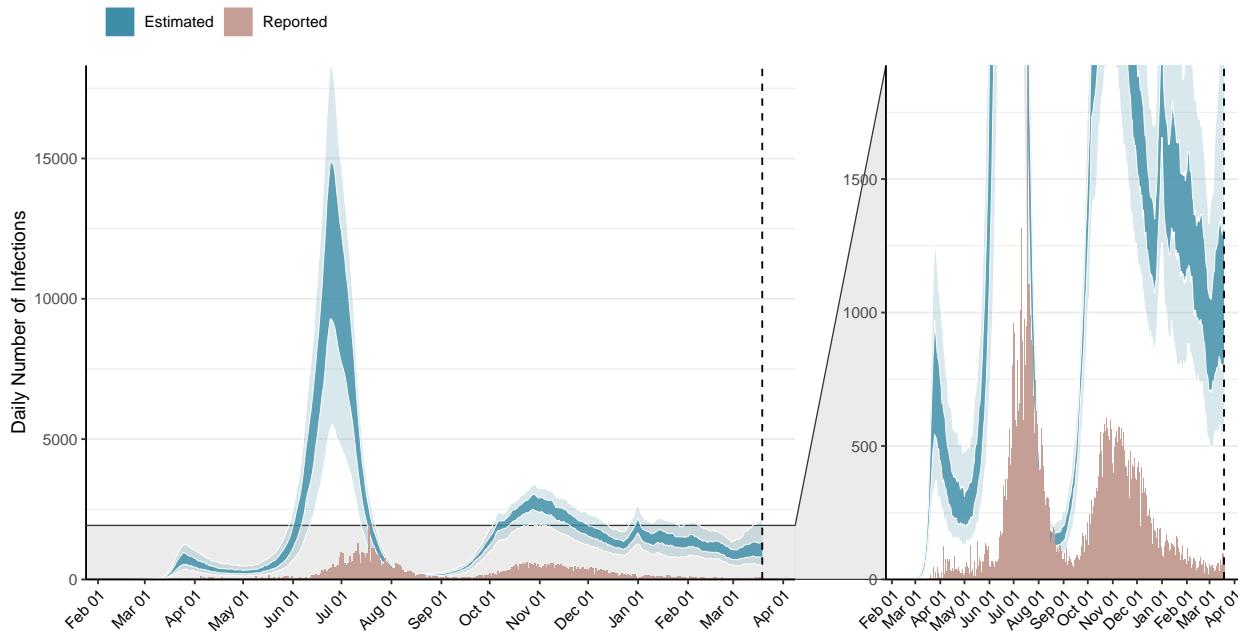


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

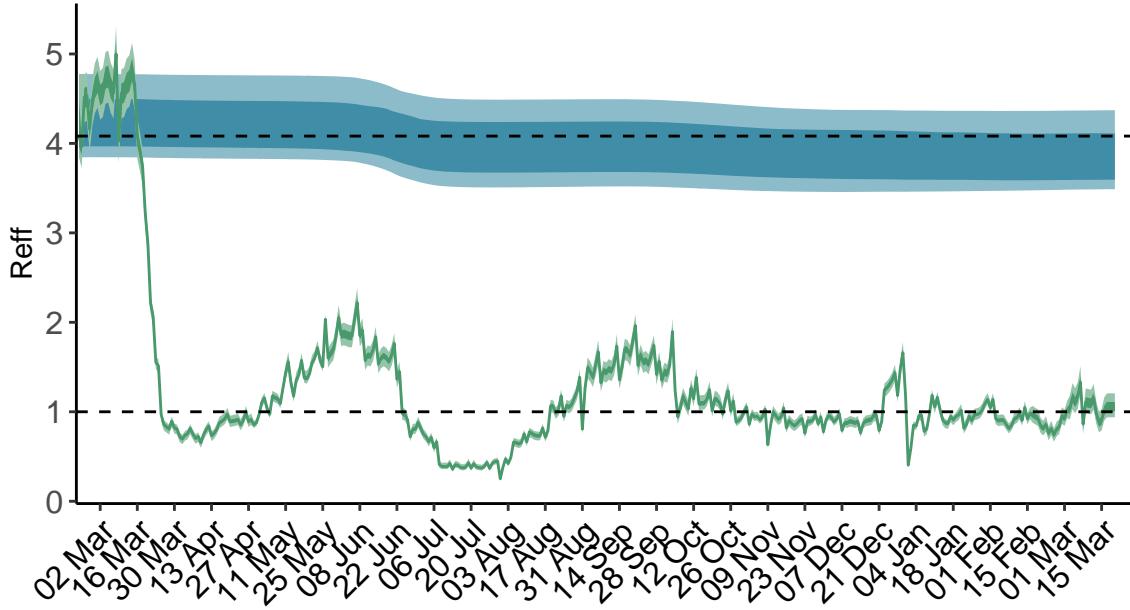


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

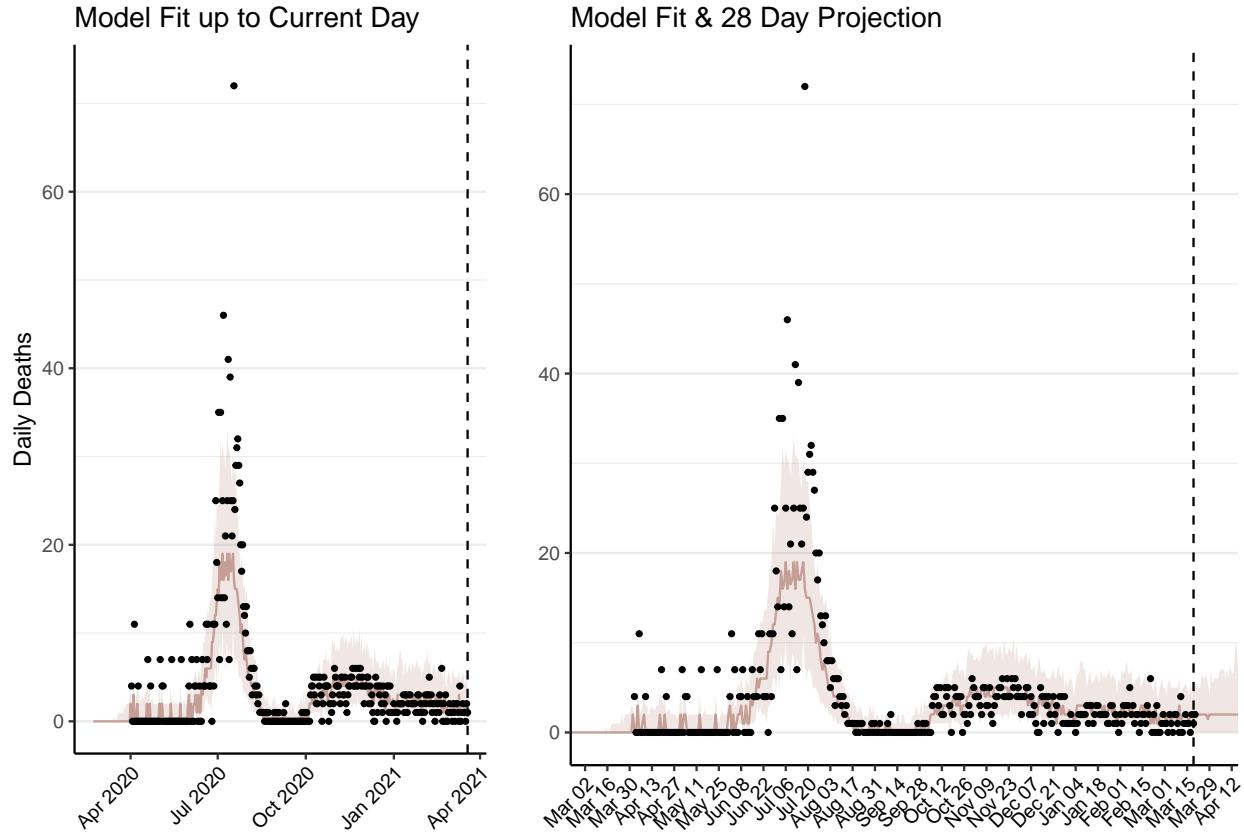


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 87 (95% CI: 81-93) patients requiring treatment with high-pressure oxygen at the current date to 114 (95% CI: 101-127) hospital beds being required on 2021-04-16 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 34 (95% CI: 31-36) patients requiring treatment with mechanical ventilation at the current date to 44 (95% CI: 39-49) by 2021-04-16. 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.**

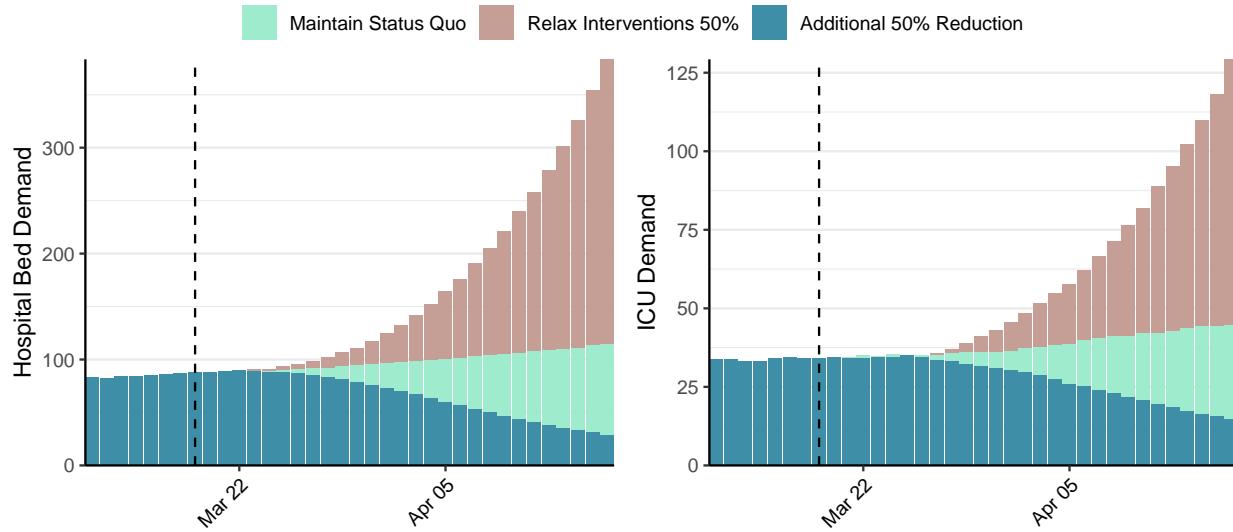


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,095 (95% CI: 1,004-1,185) at the current date to 125 (95% CI: 109-141) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,095 (95% CI: 1,004-1,185) at the current date to 9,680 (95% CI: 8,338-11,021) by 2021-04-16.

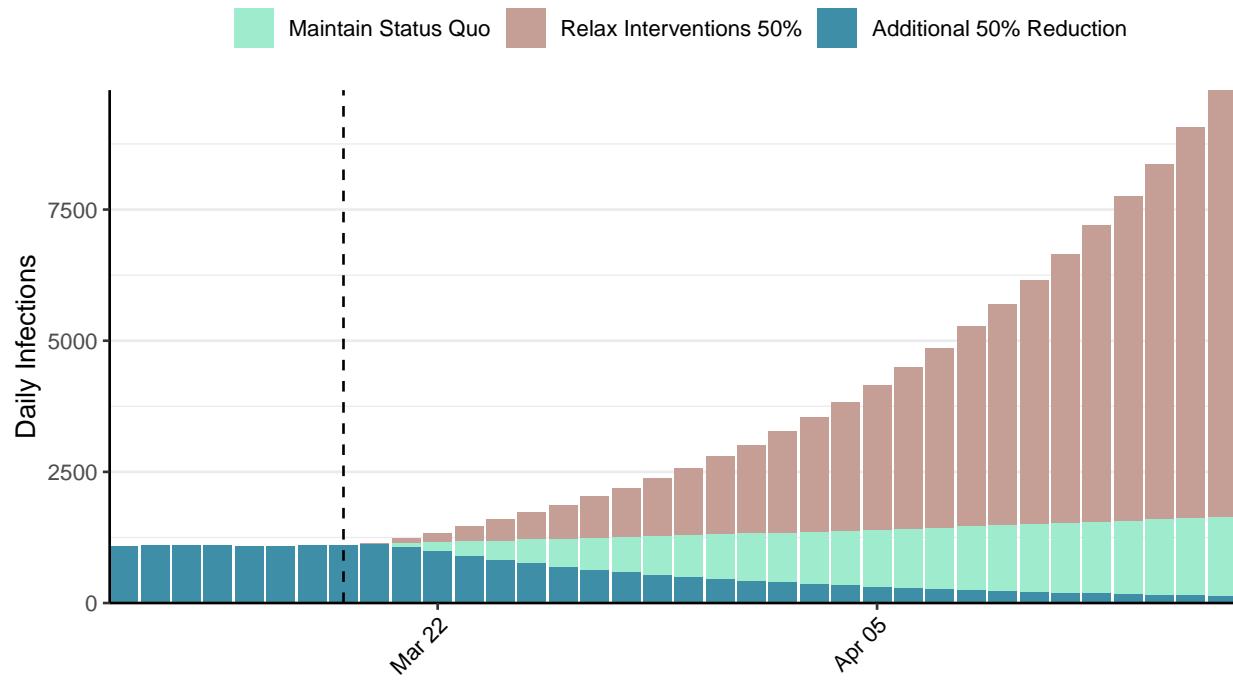


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: South Korea, 2021-03-19

[Download the report for South Korea, 2021-03-19 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}
98,208	452	1,693	3	1.1 (95% CI: 0.96-1.21)

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.

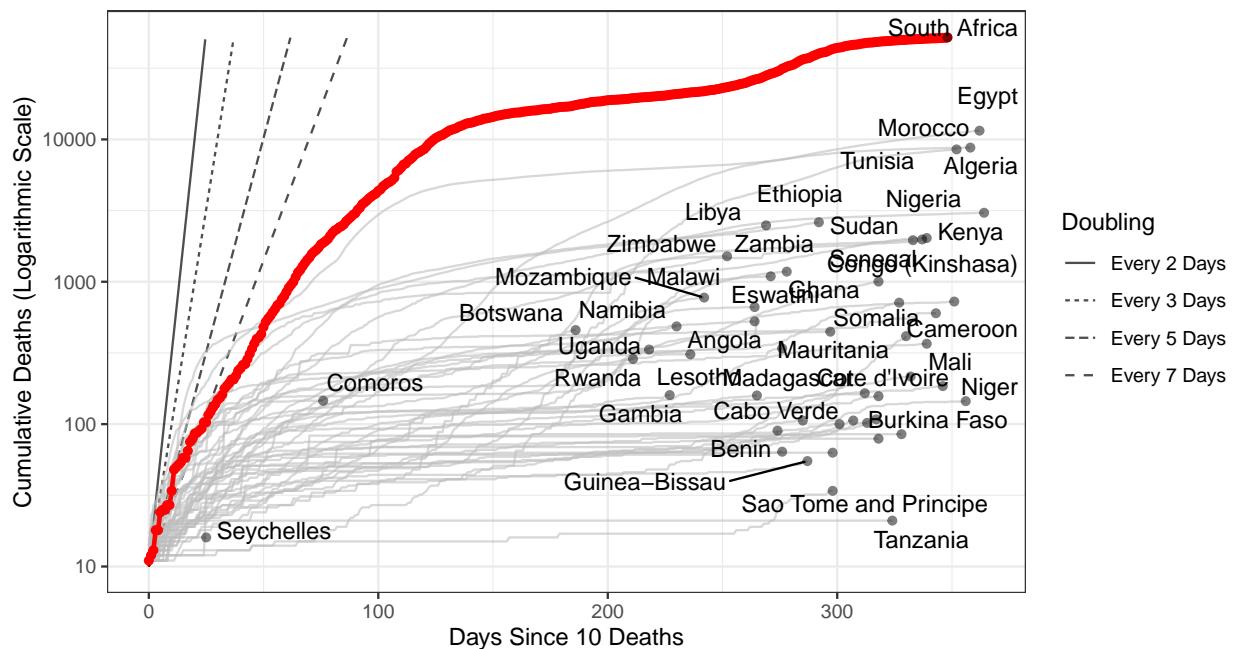


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 53,214 (95% CI: 50,904–55,525) 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).

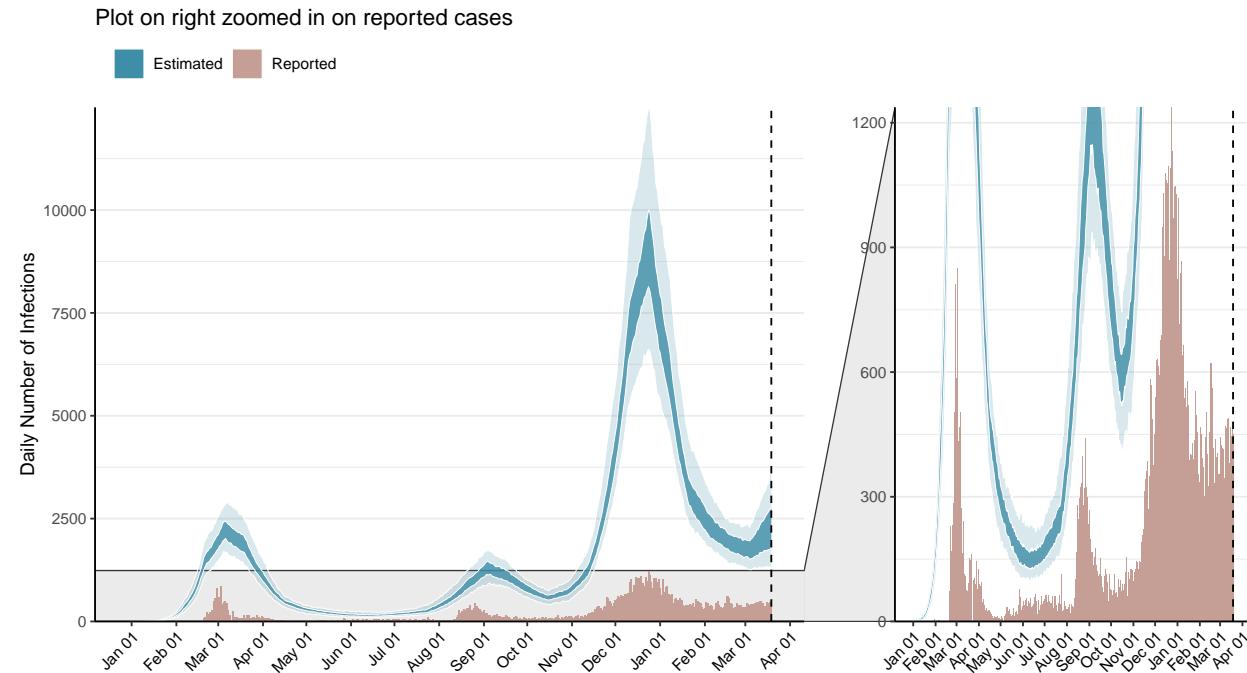


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

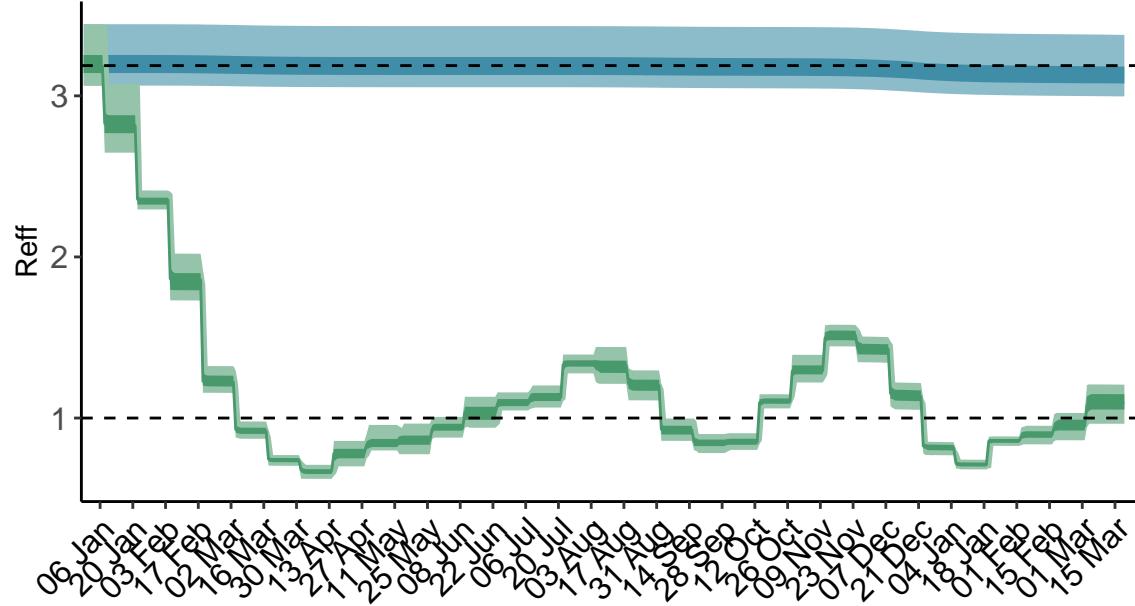


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

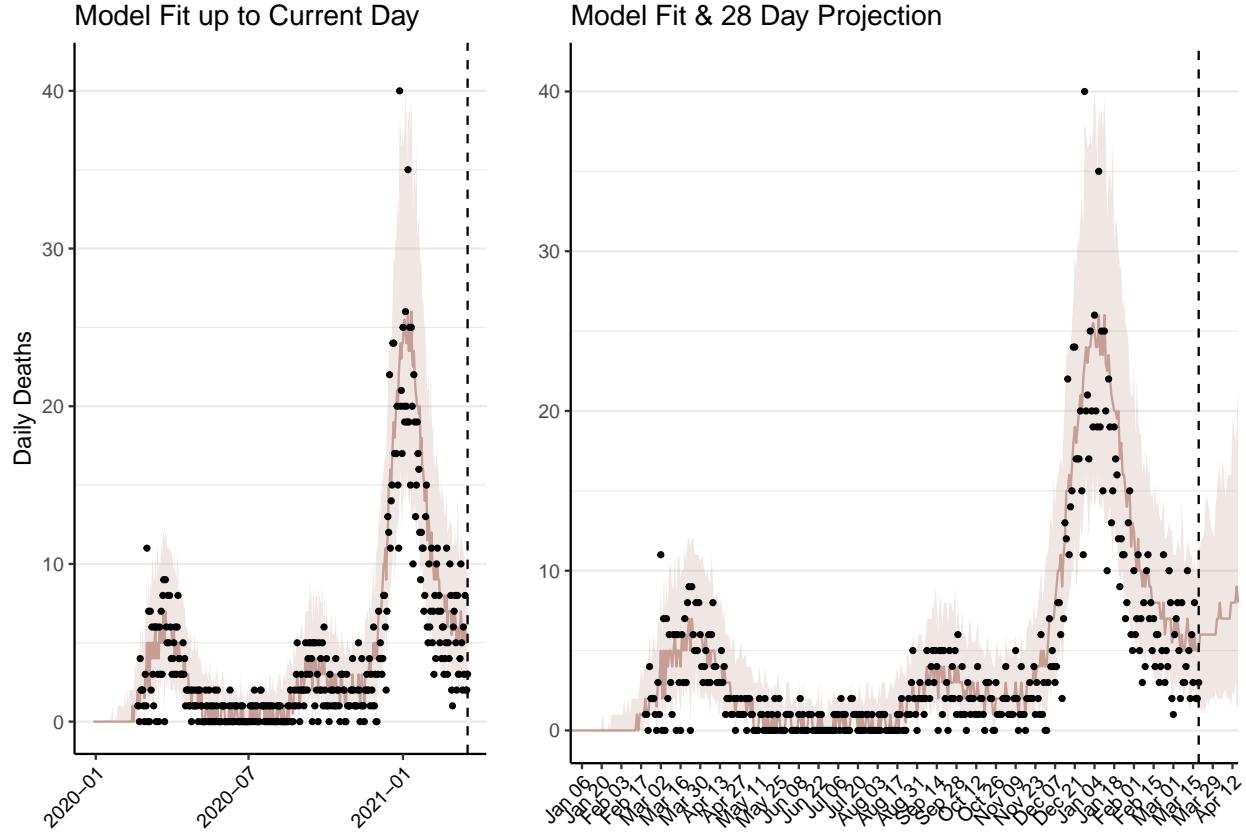


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 237 (95% CI: 226-249) patients requiring treatment with high-pressure oxygen at the current date to 367 (95% CI: 334-399) hospital beds being required on 2021-04-16 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 90 (95% CI: 86-94) patients requiring treatment with mechanical ventilation at the current date to 134 (95% CI: 123-146) by 2021-04-16. 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.**

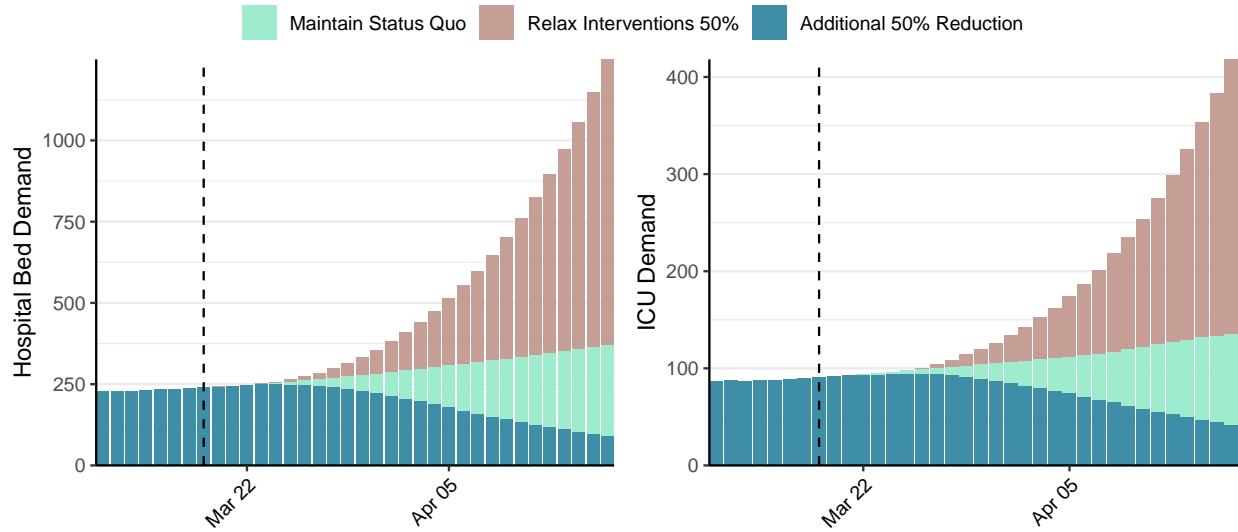


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,231 (95% CI: 2,098-2,363) at the current date to 275 (95% CI: 249-301) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,231 (95% CI: 2,098-2,363) at the current date to 22,527 (95% CI: 20,090-24,965) by 2021-04-16.

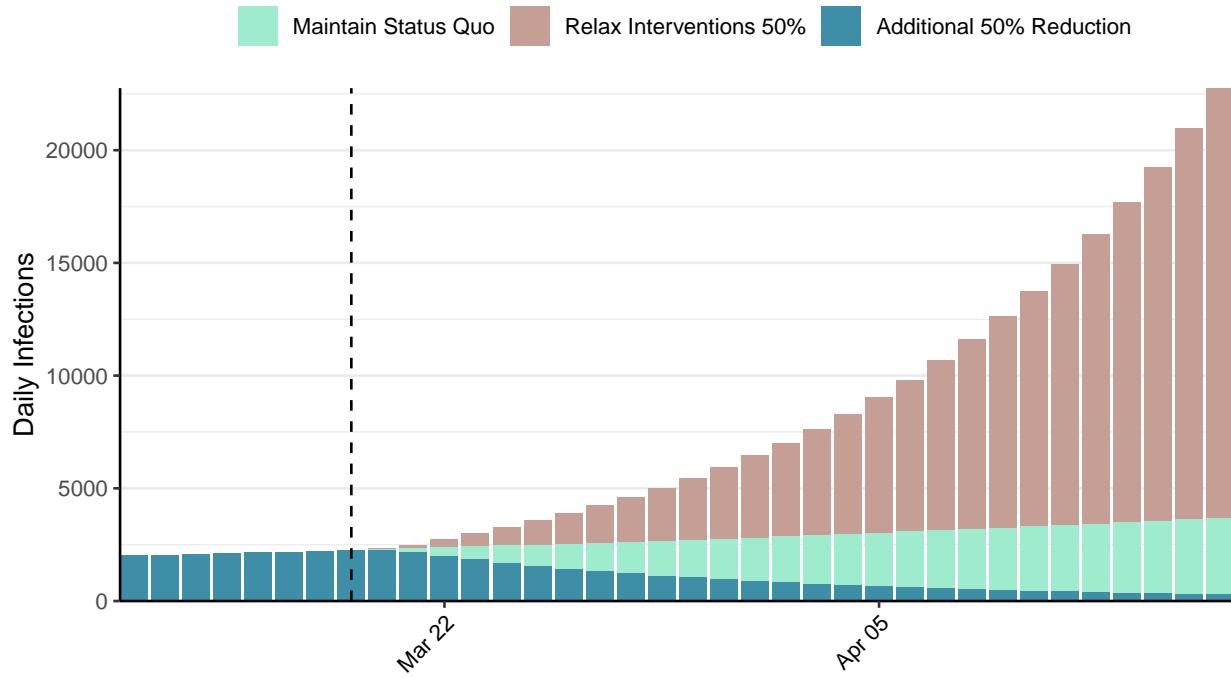


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Lebanon, 2021-03-19

[Download the report for Lebanon, 2021-03-19 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}
434,322	3,588	5,664	55	1 (95% CI: 0.9-1.13)

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.

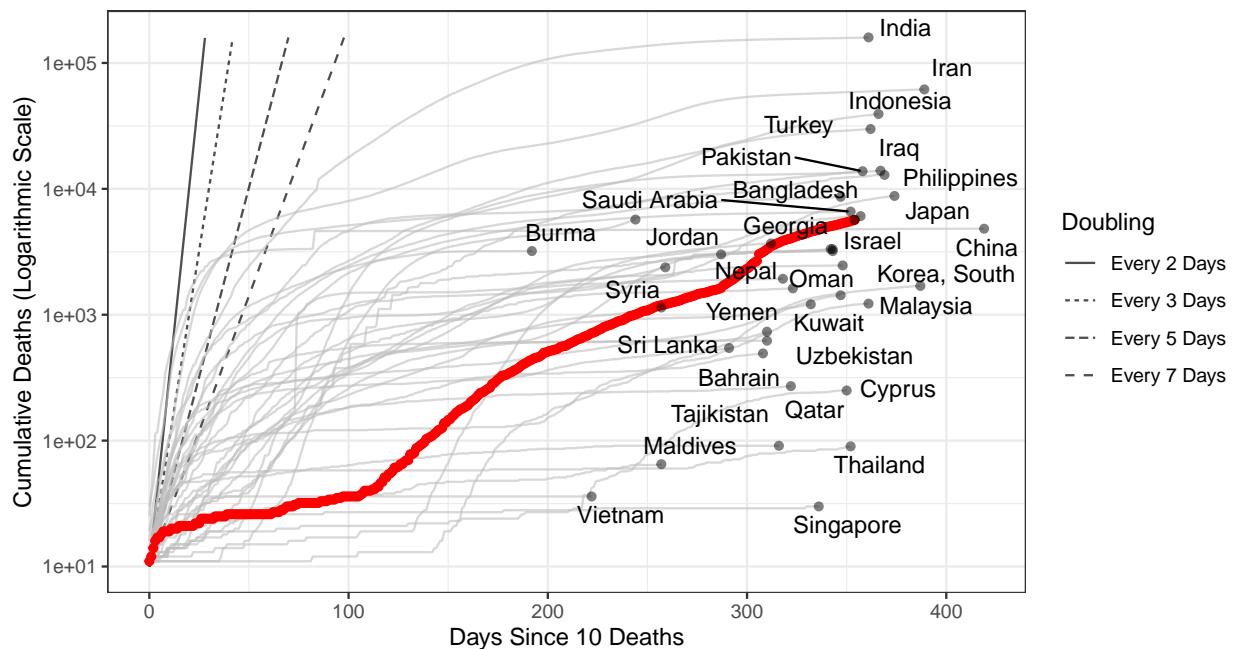


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 365,702 (95% CI: 352,369-379,035) 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).

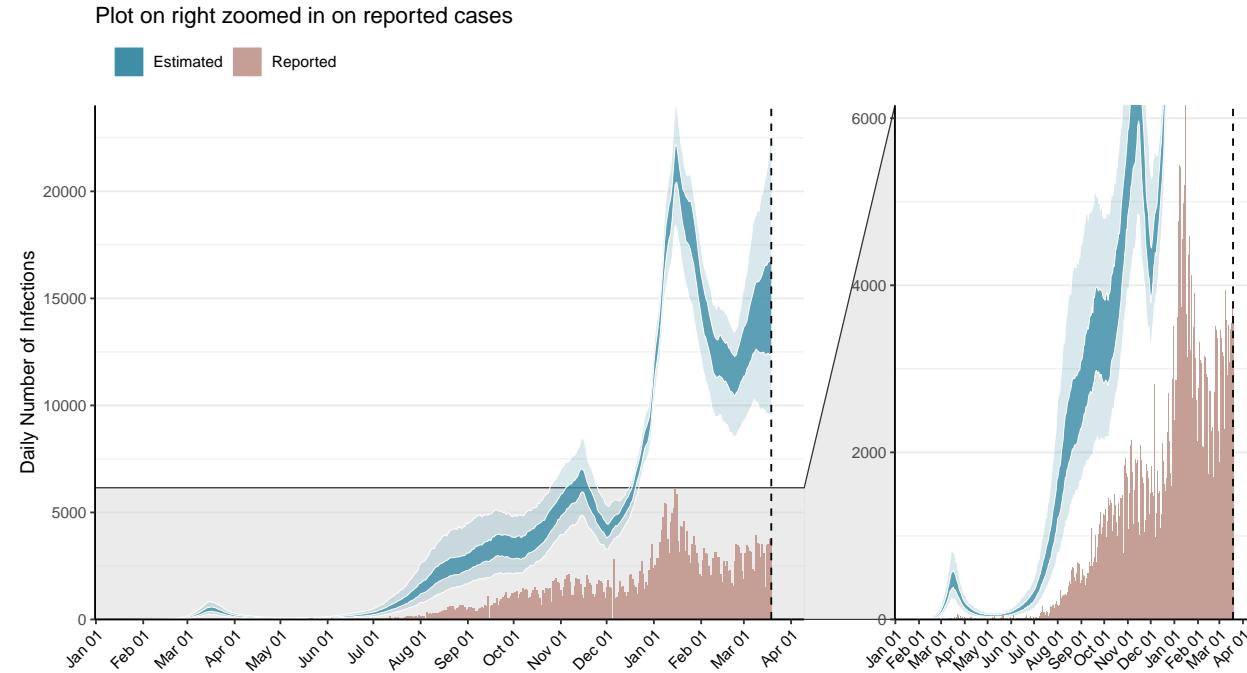


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

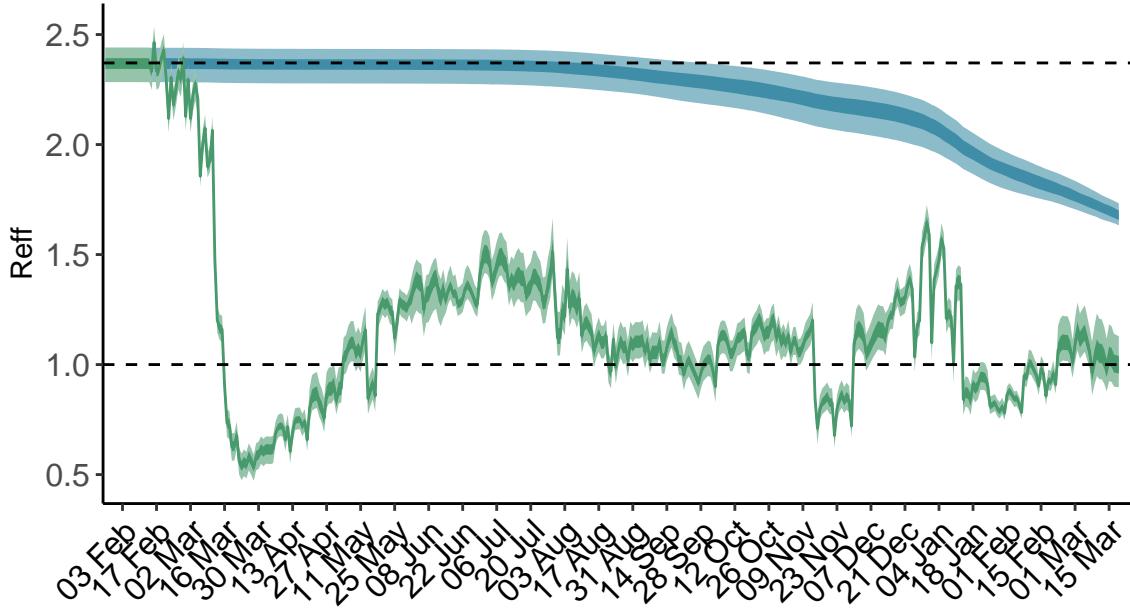


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

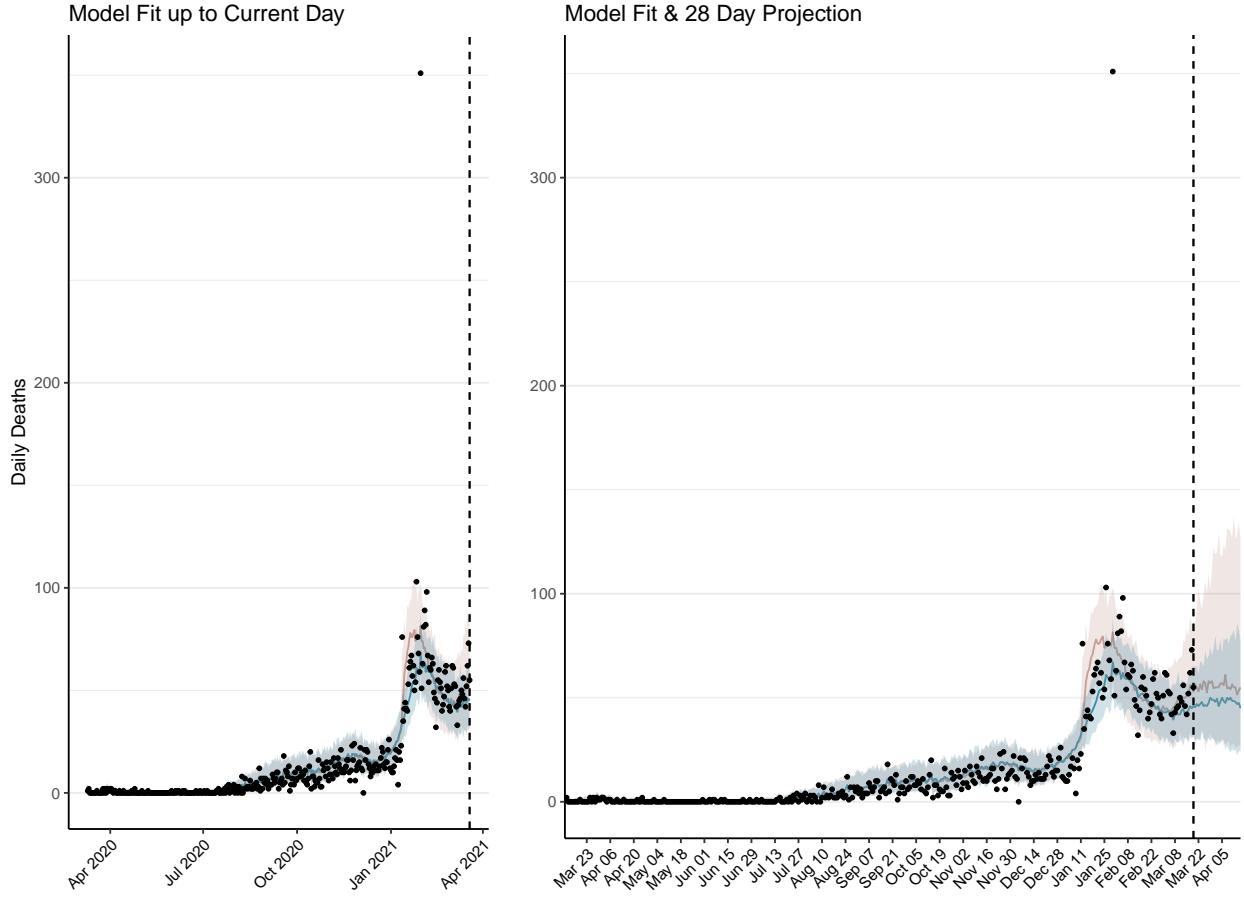


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,757 (95% CI: 1,691-1,823) patients requiring treatment with high-pressure oxygen at the current date to 1,903 (95% CI: 1,766-2,039) hospital beds being required on 2021-04-16 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 529 (95% CI: 518-540) patients requiring treatment with mechanical ventilation at the current date to 519 (95% CI: 504-533) by 2021-04-16. 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.**

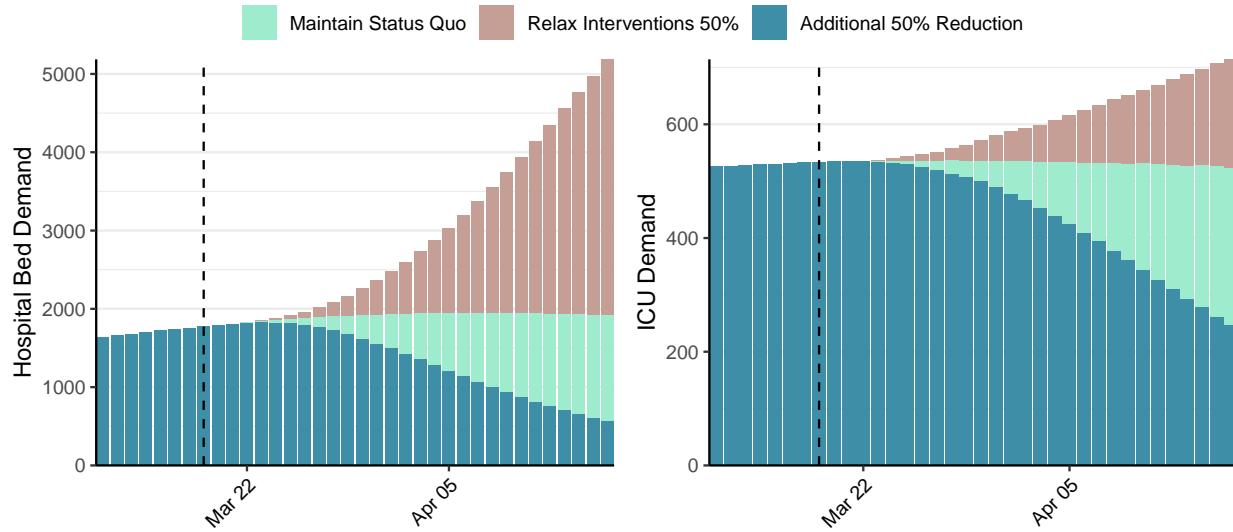


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 14,807 (95% CI: 14,040-15,573) at the current date to 1,304 (95% CI: 1,195-1,414) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14,807 (95% CI: 14,040-15,573) at the current date to 55,678 (95% CI: 52,231-59,125) by 2021-04-16.

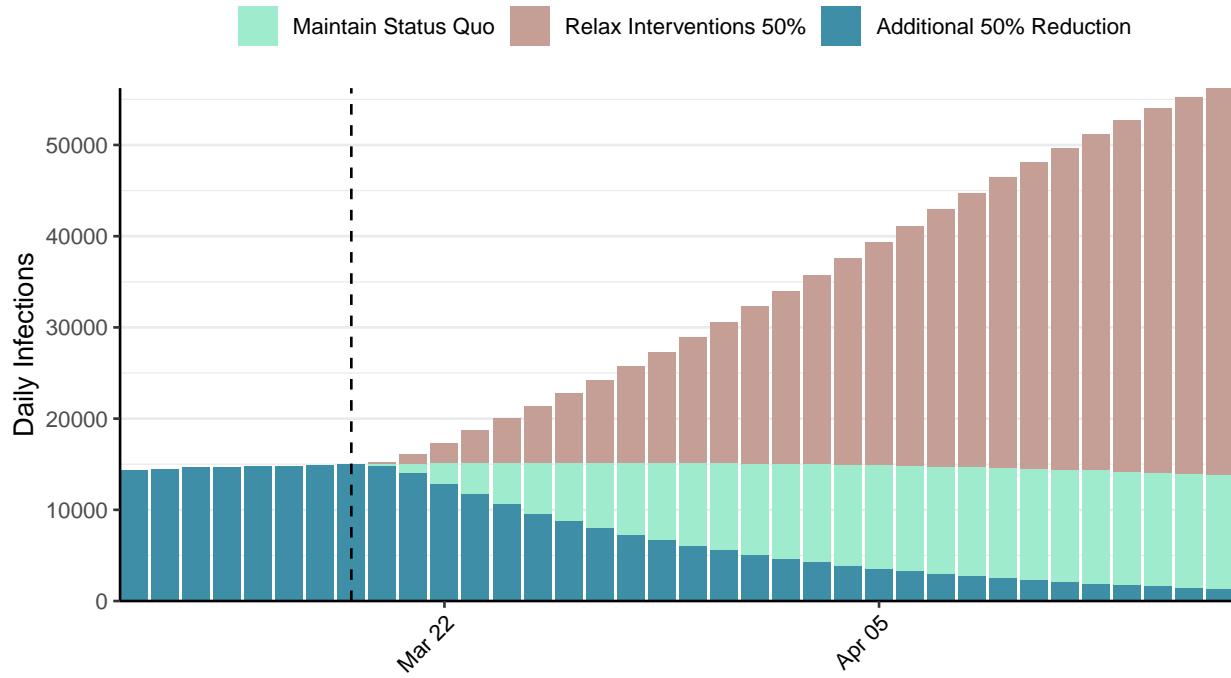


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Liberia, 2021-03-19

[Download the report for Liberia, 2021-03-19 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}
2,042	0	85	0	0.87 (95% CI: 0.56-1.27)

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.

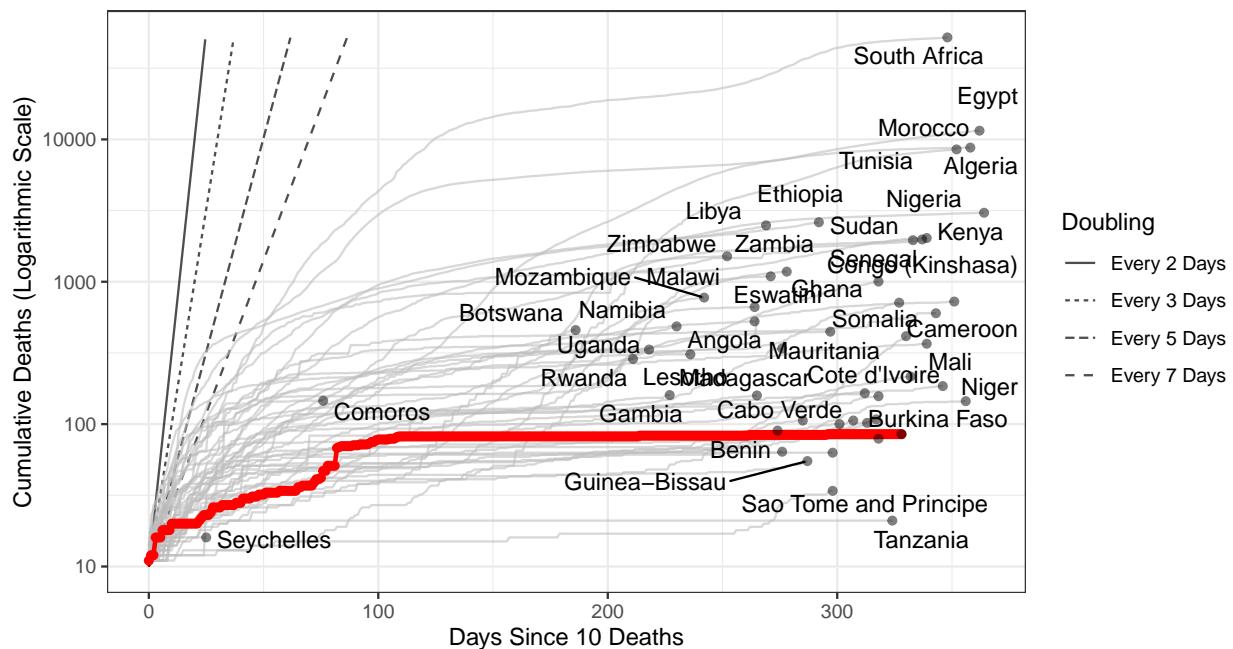


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 110 (95% CI: 55-164) 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).

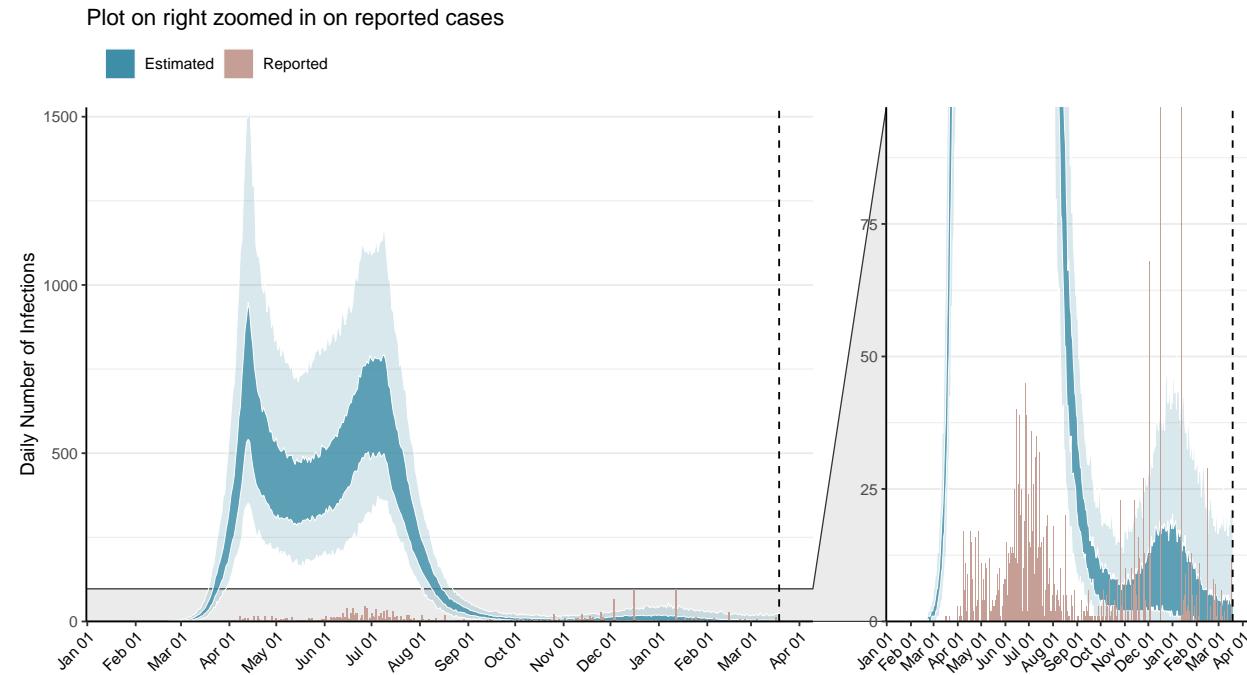


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

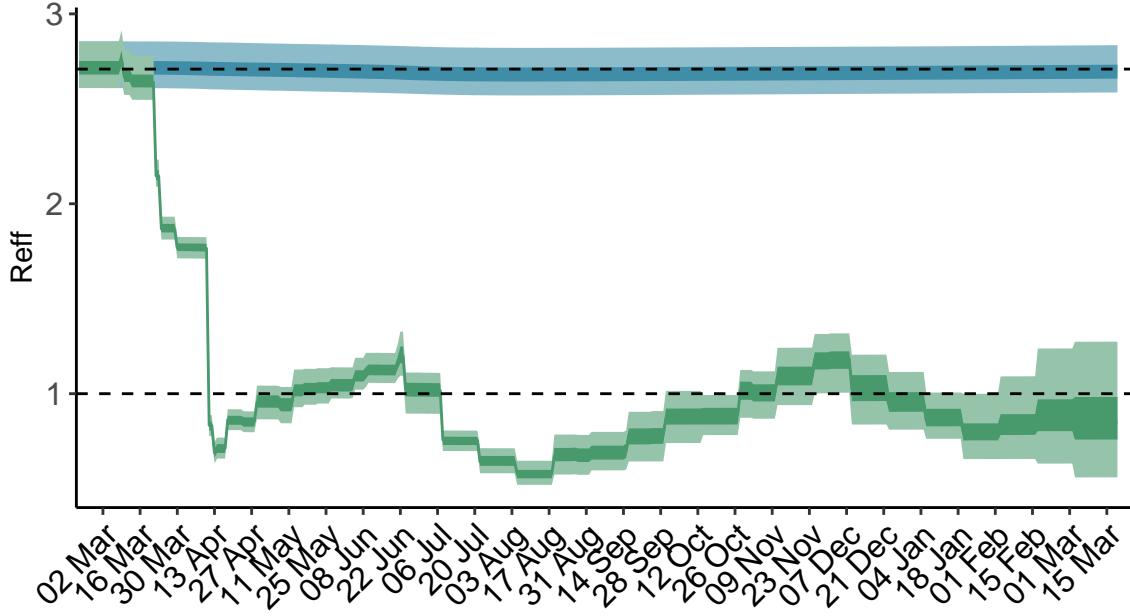


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

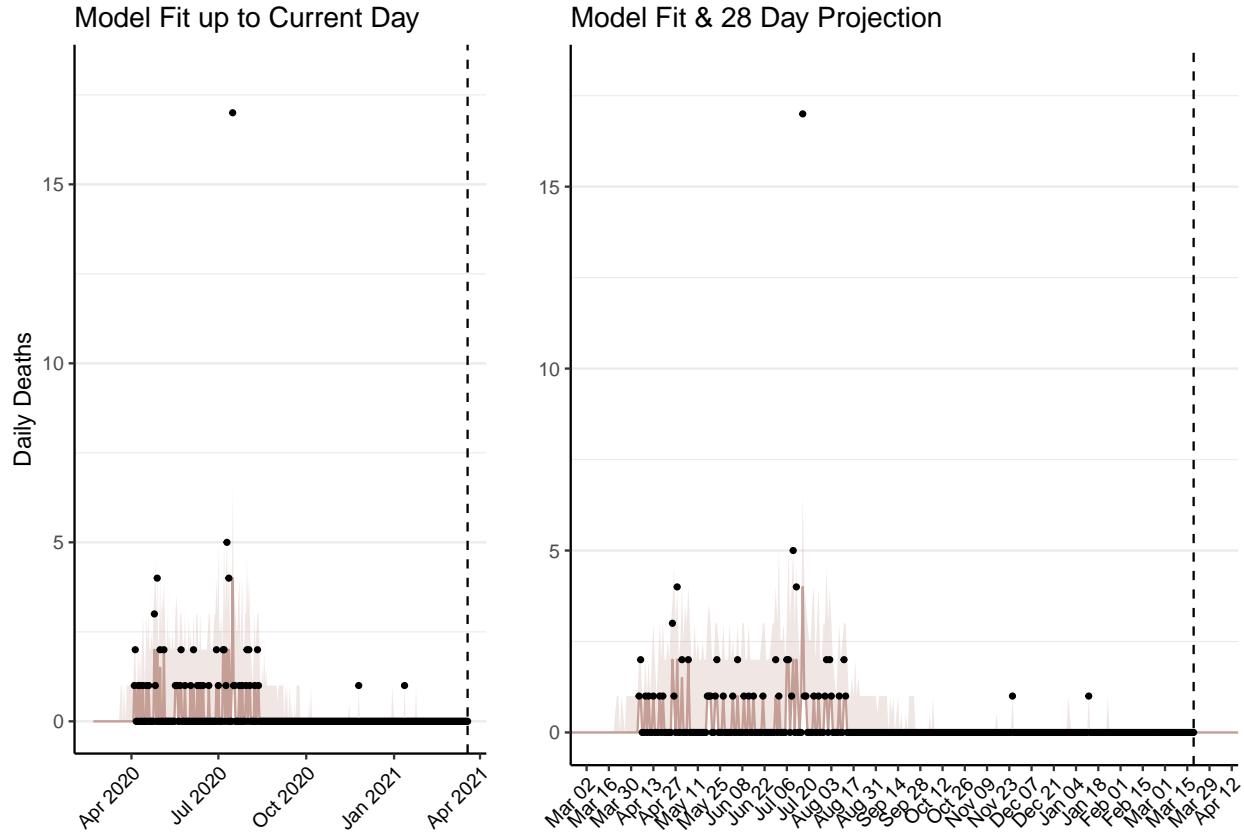


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

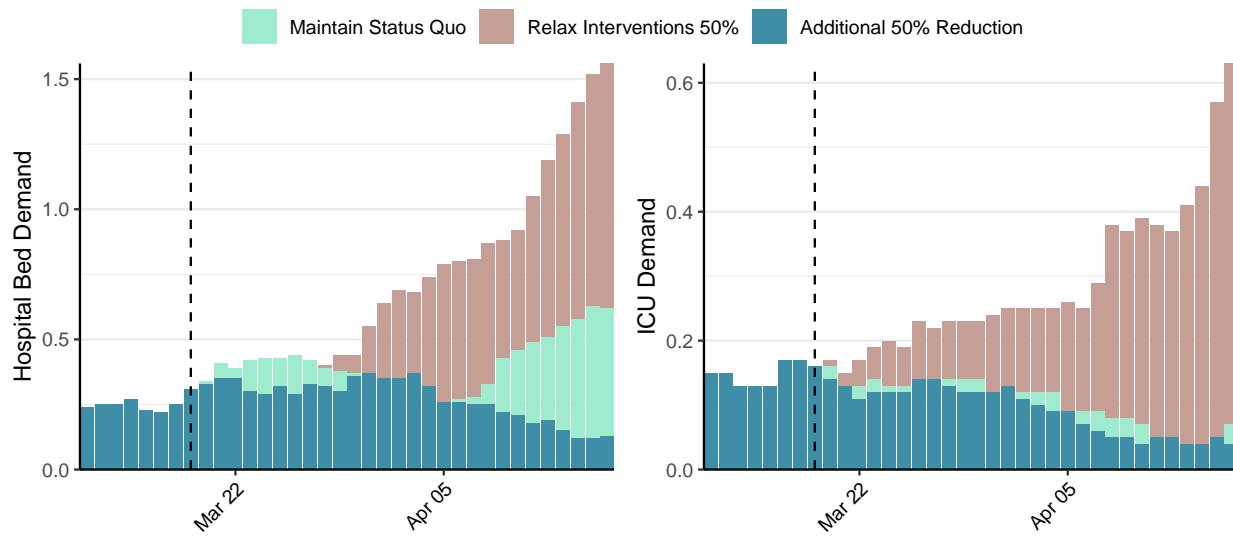


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 1-8) at the current date to 1 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4 (95% CI: 1-8) at the current date to 52 (95% CI: -8-113) by 2021-04-16.

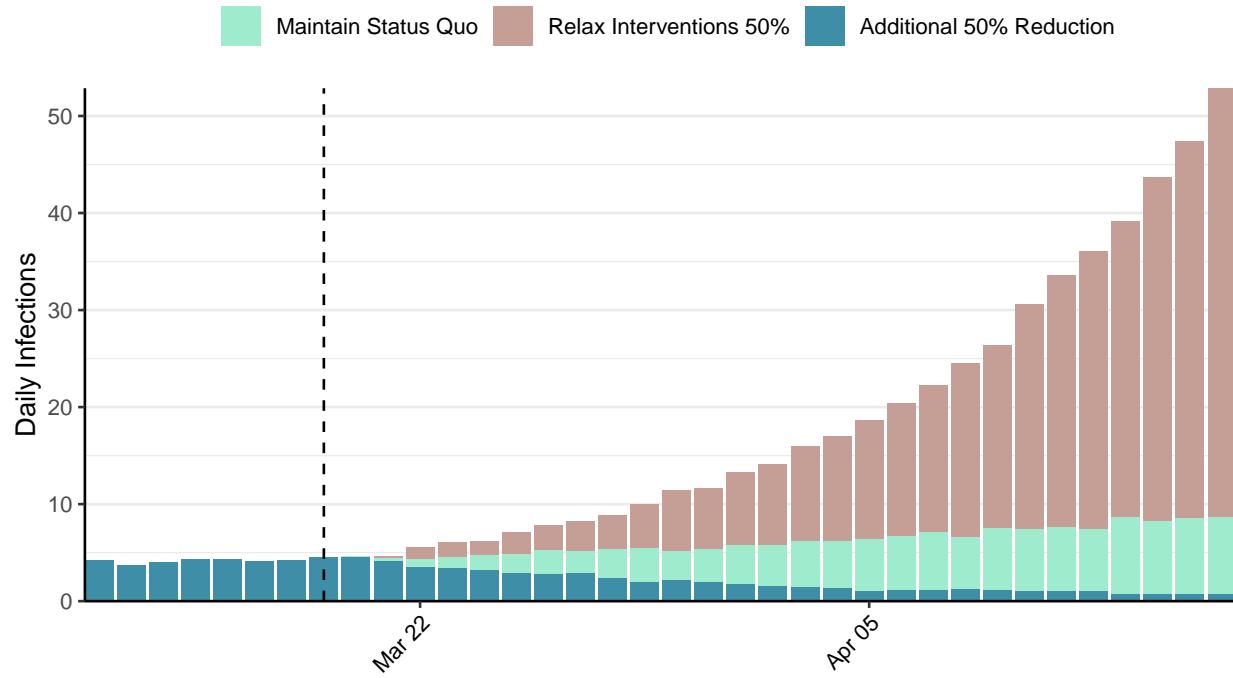


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Libya, 2021-03-19

[Download the report for Libya, 2021-03-19 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}
150,341	1,134	2,490	52	1.43 (95% CI: 1.29-1.58)

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.

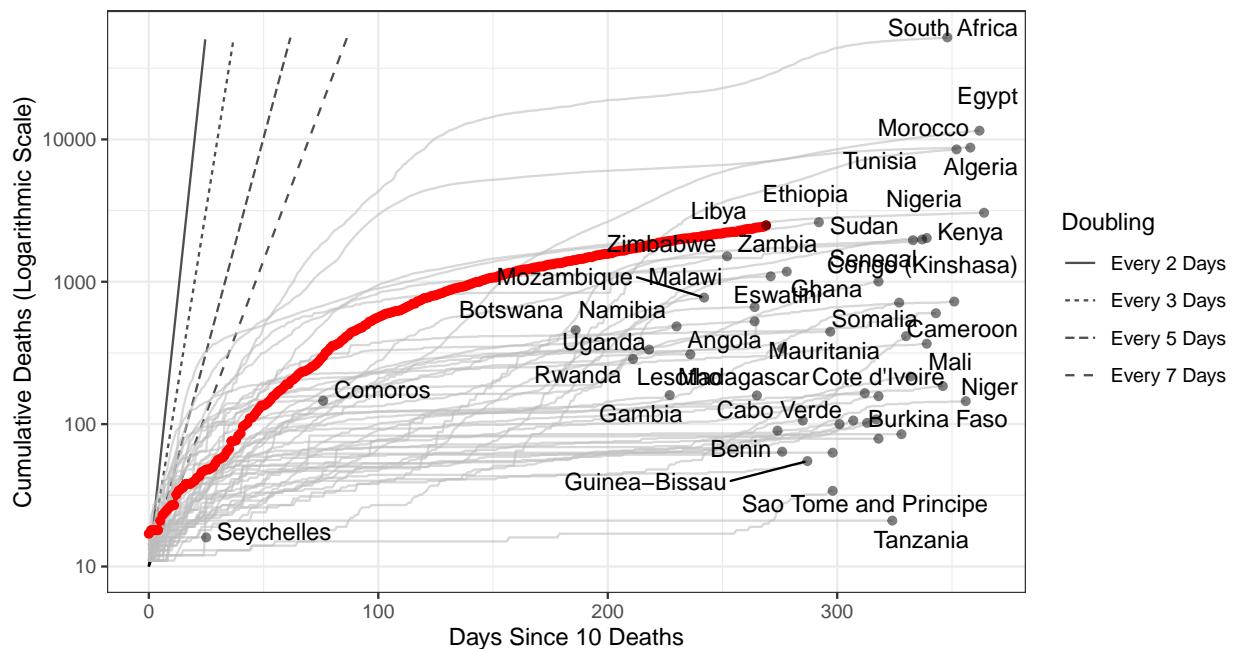


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 206,028 (95% CI: 194,275–217,781) 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

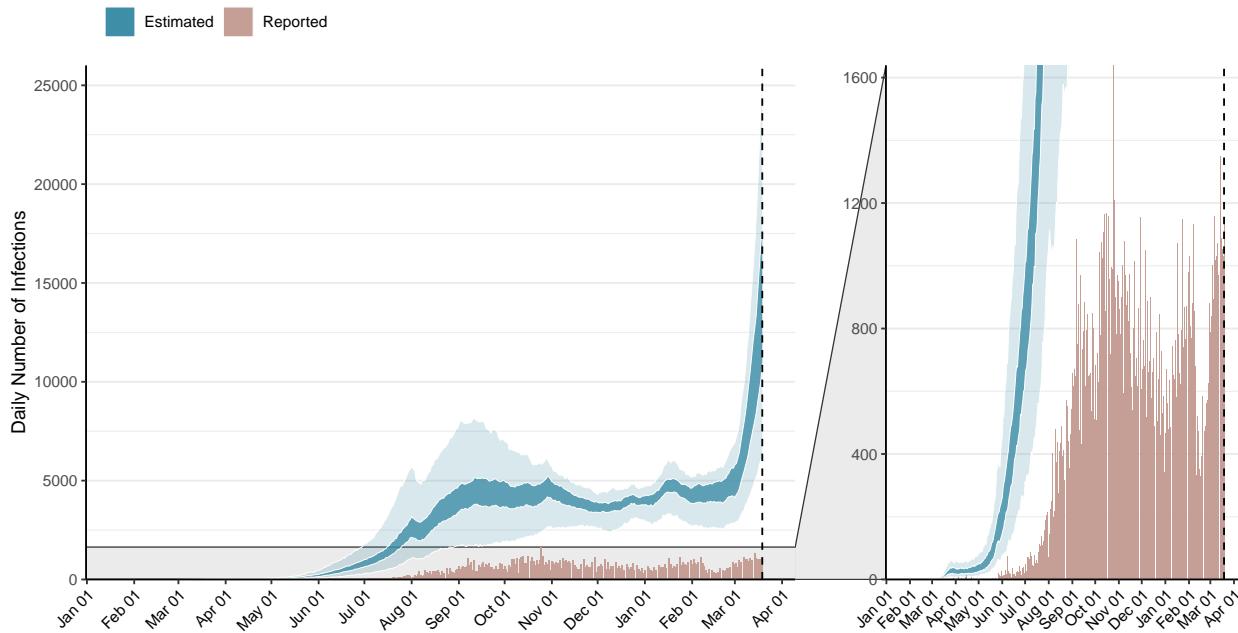


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

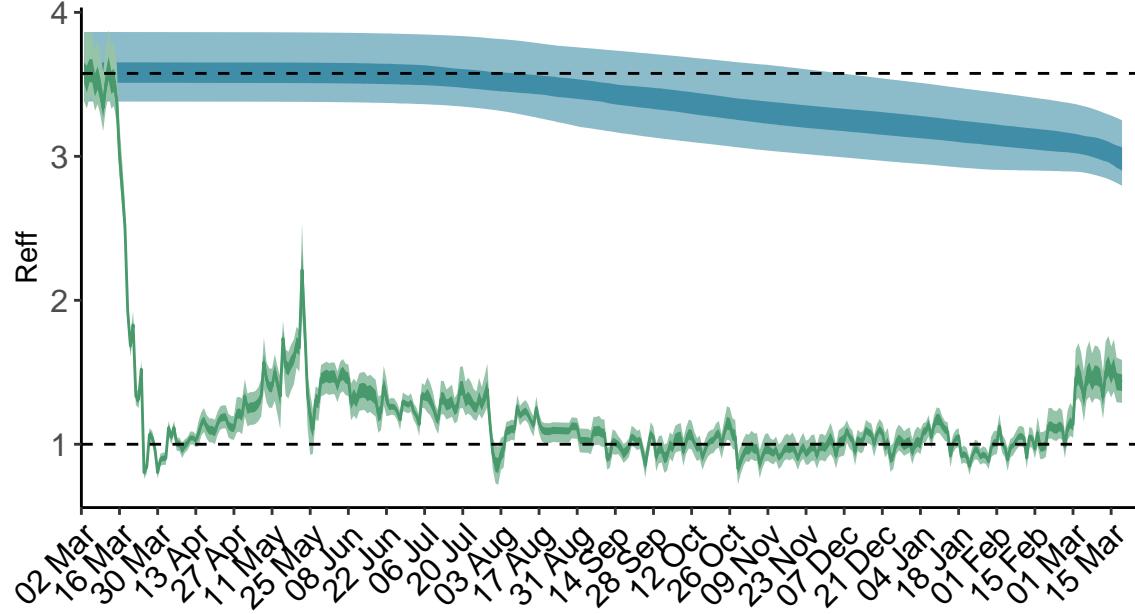


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Libya 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.](#)

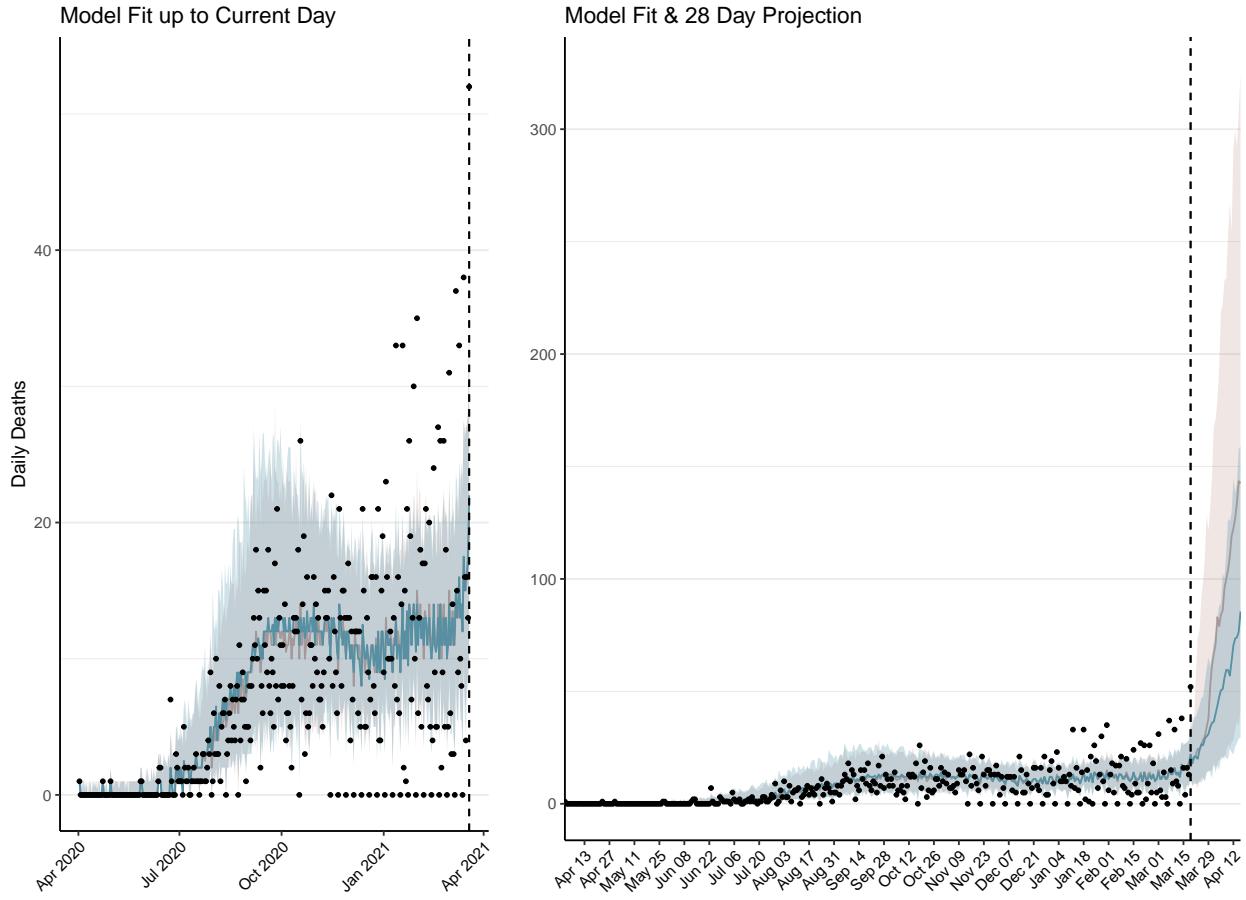


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 905 (95% CI: 852-958) patients requiring treatment with high-pressure oxygen at the current date to 3,936 (95% CI: 3,602-4,269) hospital beds being required on 2021-04-16 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 321 (95% CI: 302-340) patients requiring treatment with mechanical ventilation at the current date to 650 (95% CI: 629-671) by 2021-04-16. 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.**

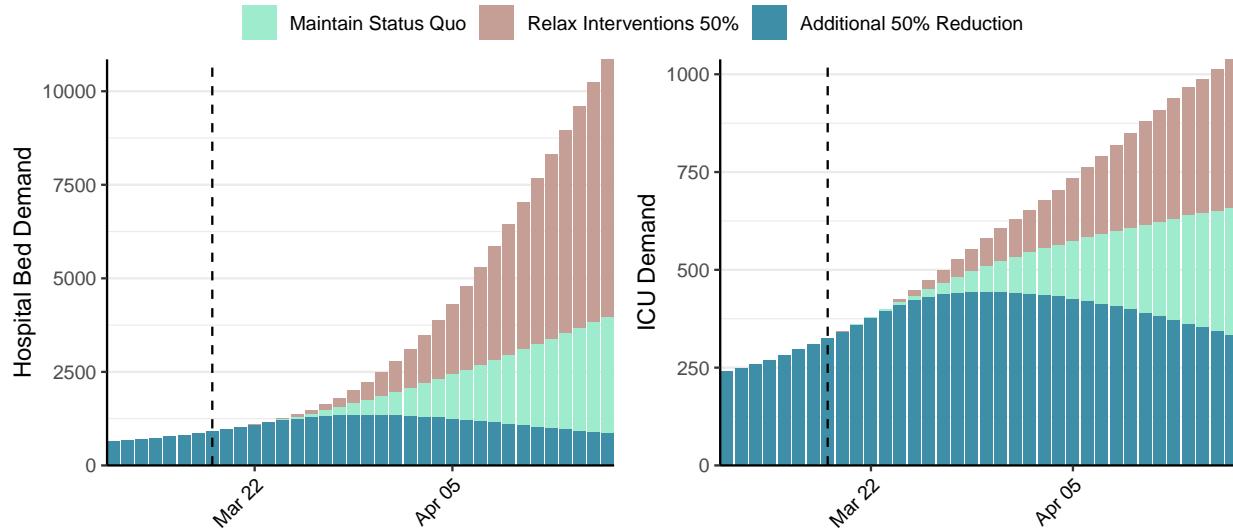


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 14,494 (95% CI: 13,431-15,557) at the current date to 4,257 (95% CI: 3,823-4,691) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 14,494 (95% CI: 13,431-15,557) at the current date to 148,944 (95% CI: 143,690-154,197) by 2021-04-16.

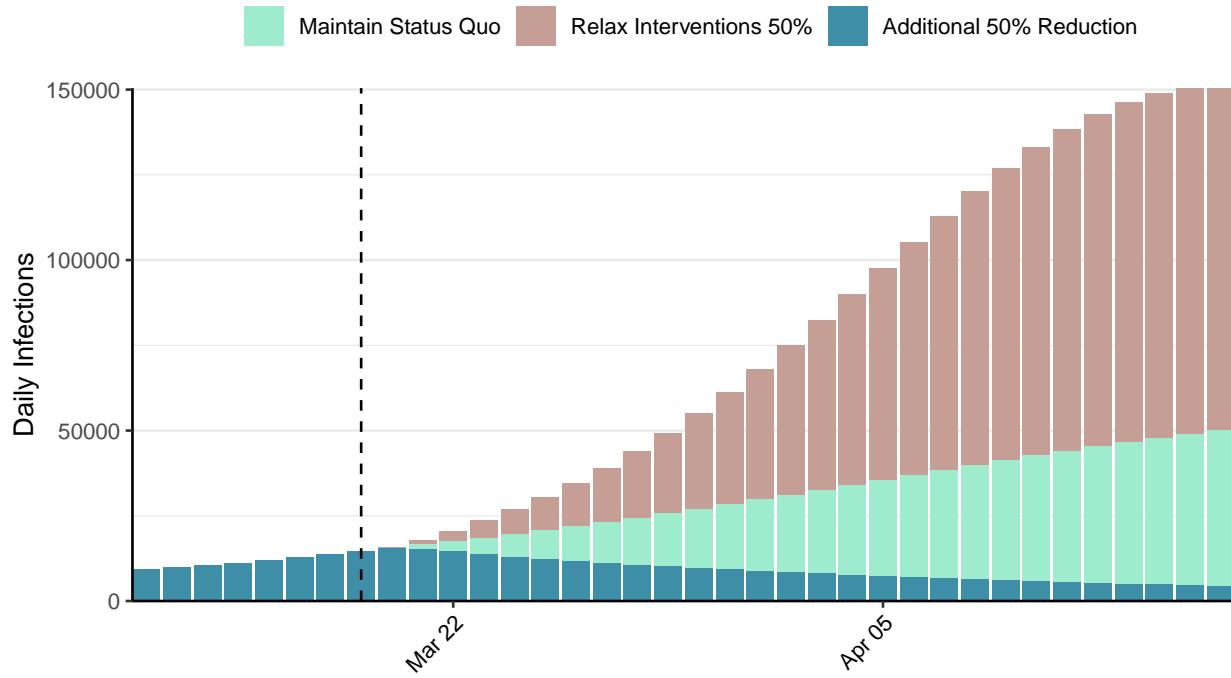


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

Situation Report for COVID-19: St. Lucia, 2021-03-19

[Download the report for St. Lucia, 2021-03-19 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}
4,113	16	55	0	0.84 (95% CI: 0.68-1.03)

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.

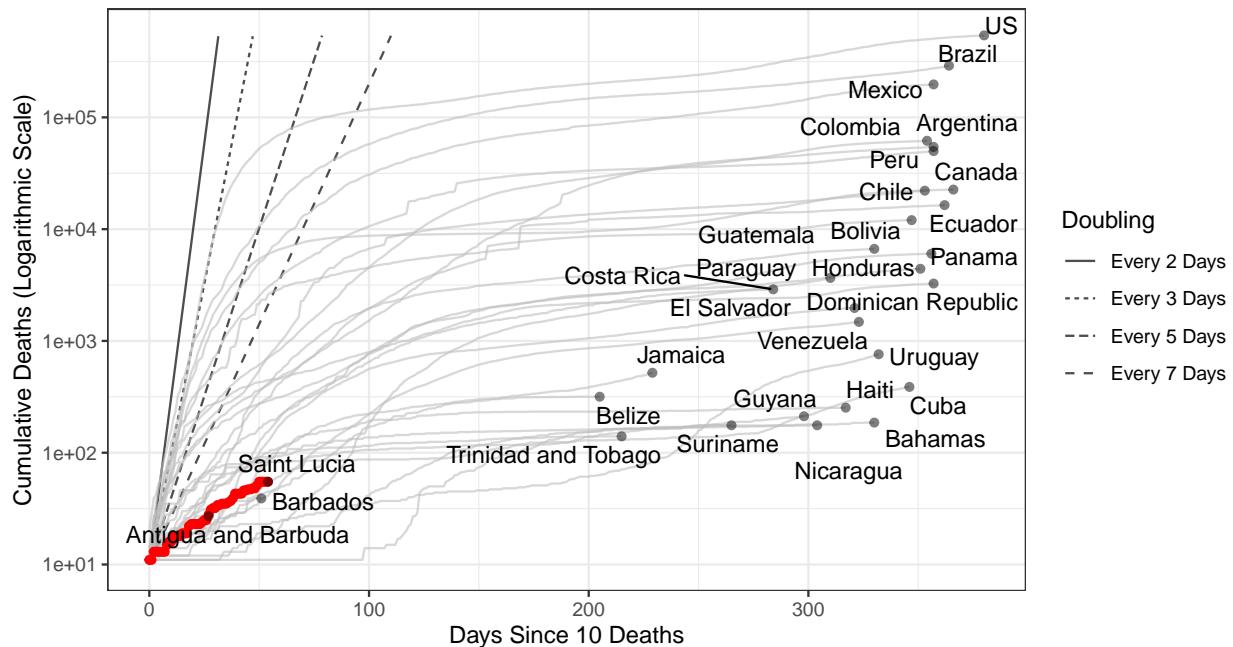


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 8,728 (95% CI: 8,229-9,227) 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).

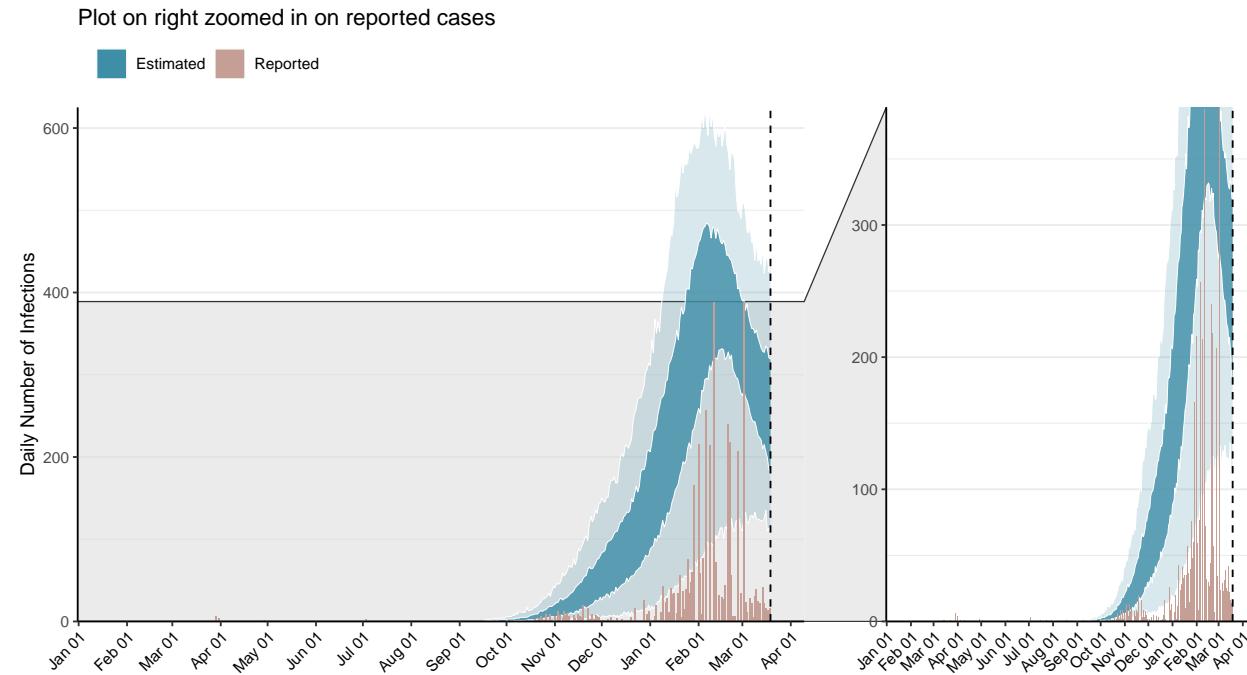


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

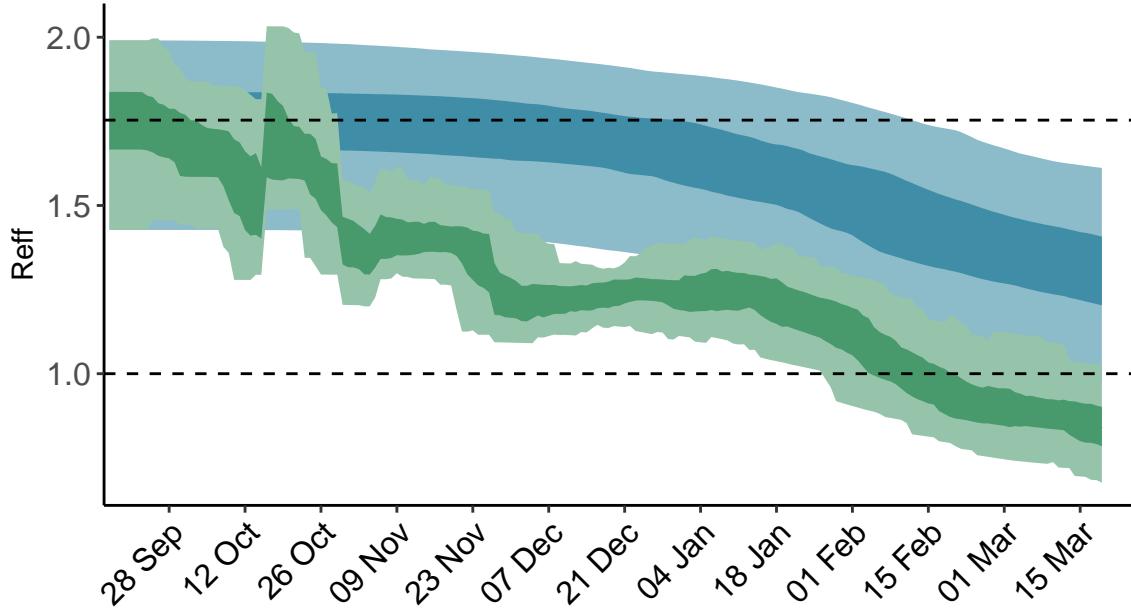


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

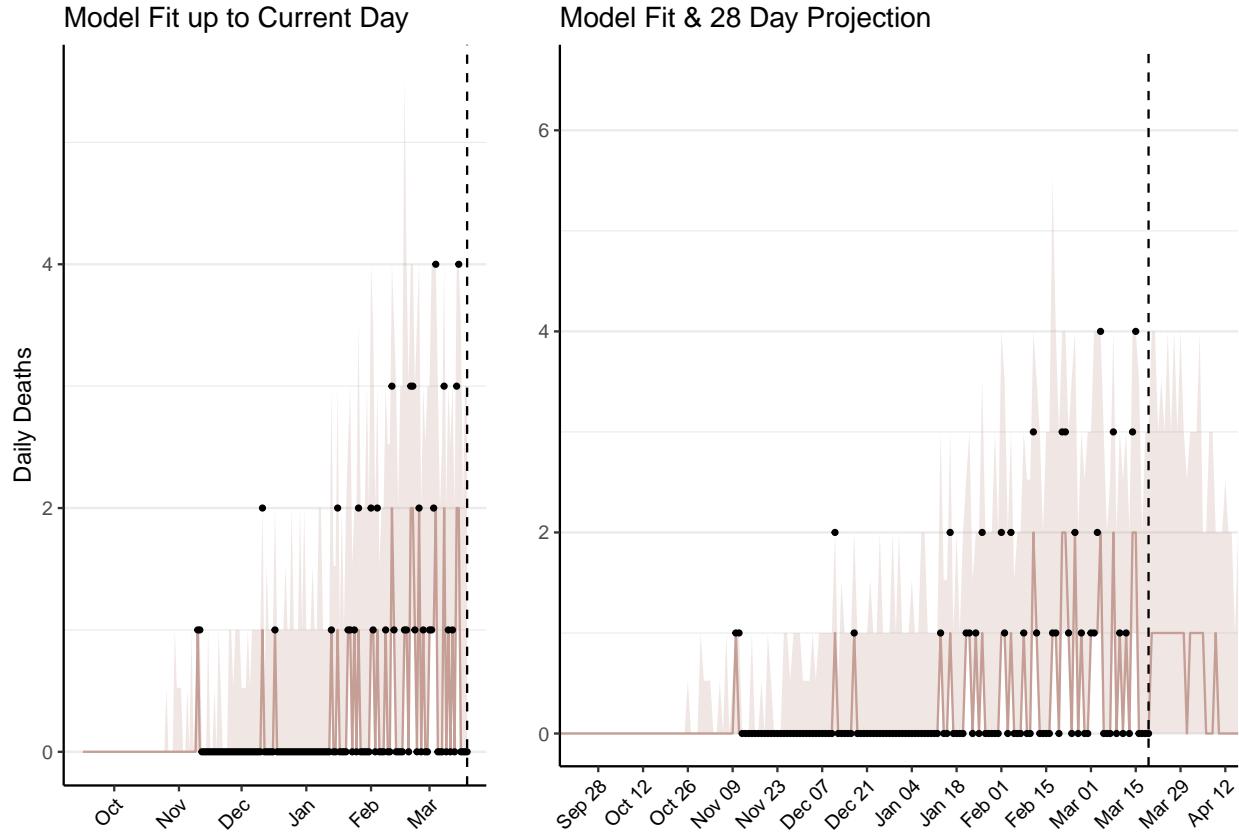


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 37 (95% CI: 34-39) patients requiring treatment with high-pressure oxygen at the current date to 12 (95% CI: 10-13) hospital beds being required on 2021-04-16 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 12 (95% CI: 12-13) patients requiring treatment with mechanical ventilation at the current date to 5 (95% CI: 4-6) by 2021-04-16. 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.**

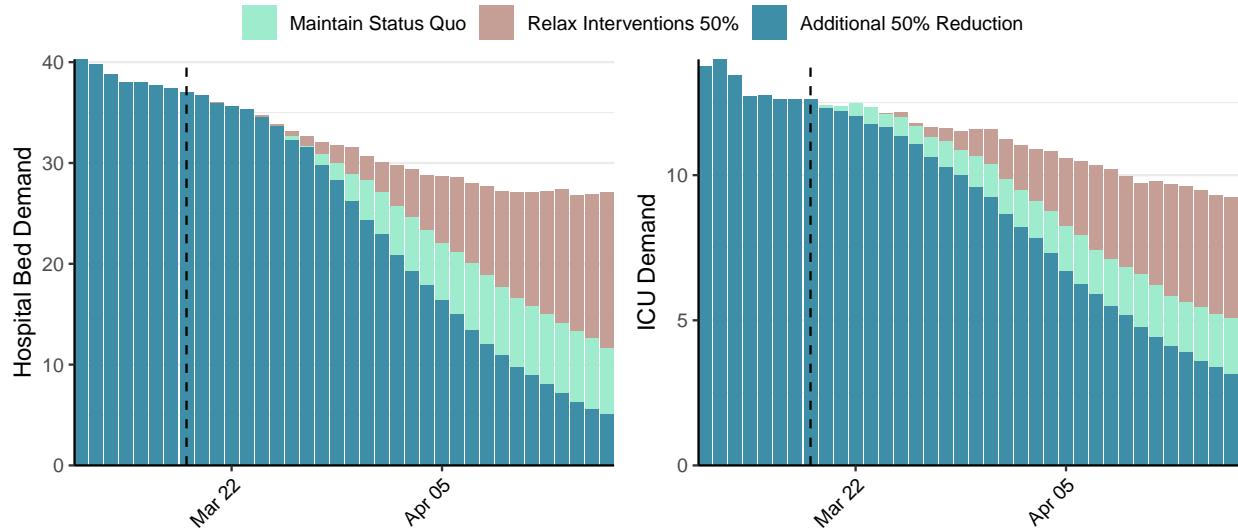


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 252 (95% CI: 233-270) at the current date to 5 (95% CI: 4-6) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 252 (95% CI: 233-270) at the current date to 203 (95% CI: 151-256) by 2021-04-16.

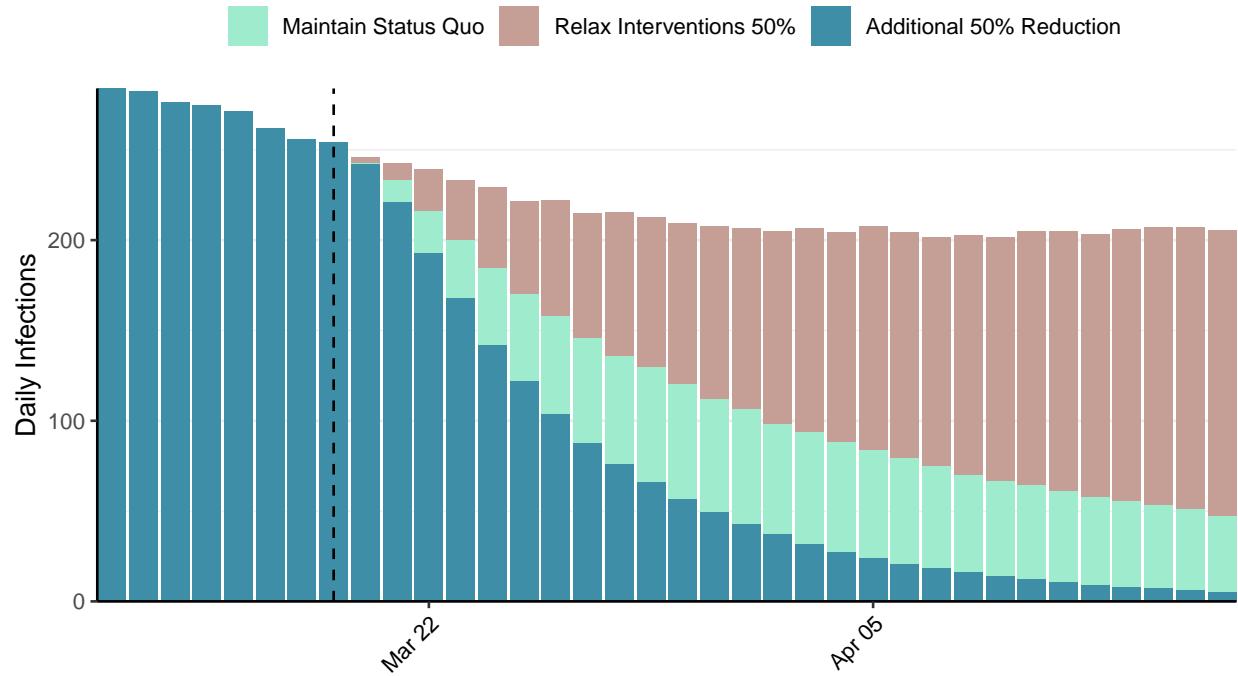


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Sri Lanka, 2021-03-19

[Download the report for Sri Lanka, 2021-03-19 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}
89,497	473	544	7	0.87 (95% CI: 0.74-1)

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.

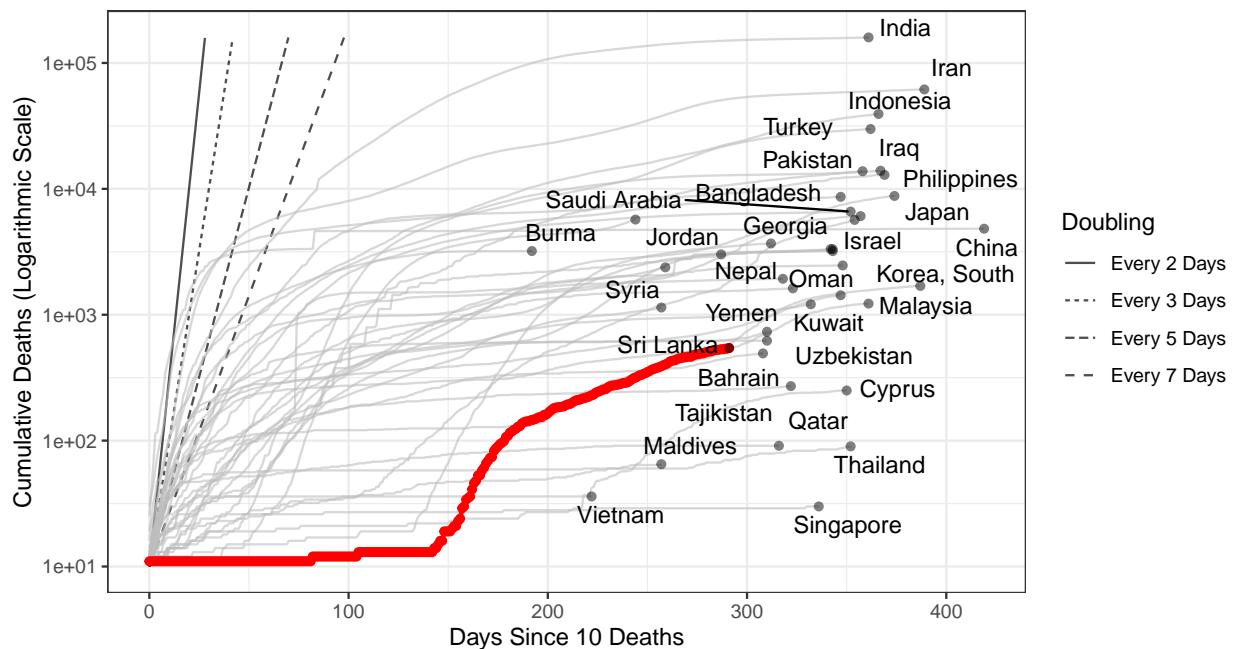


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 38,419 (95% CI: 31,277-45,561) 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).

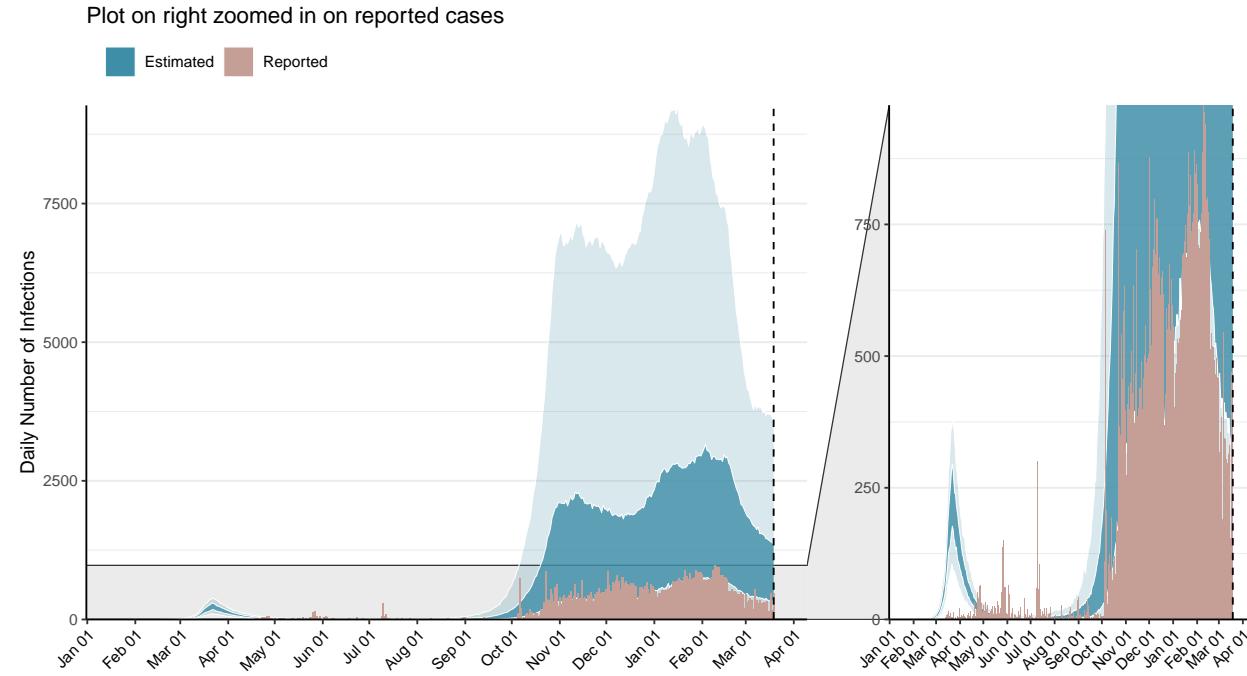


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

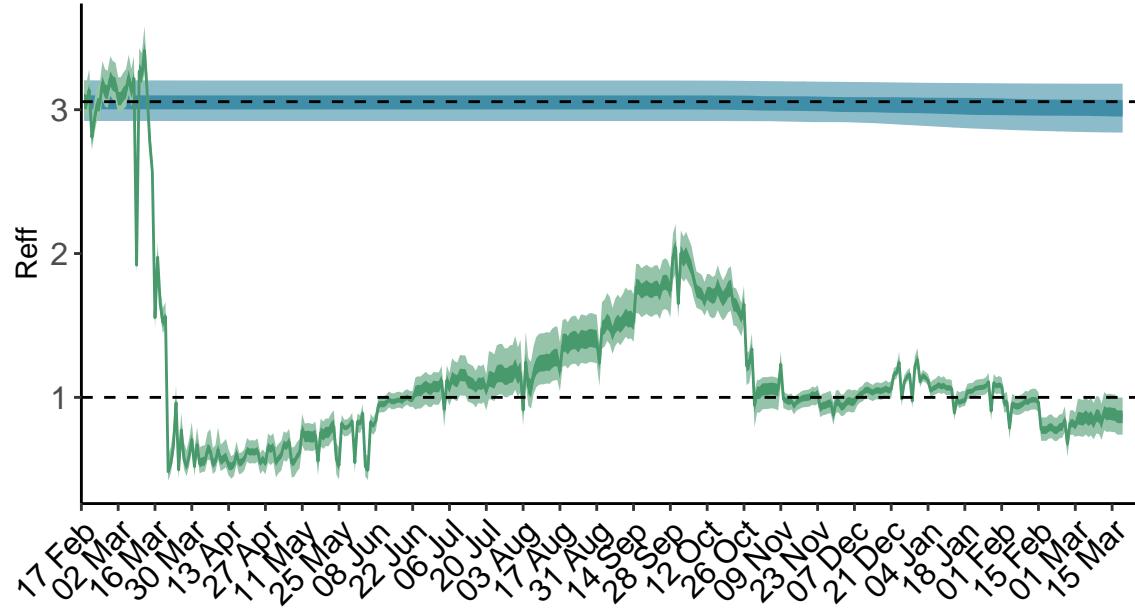


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

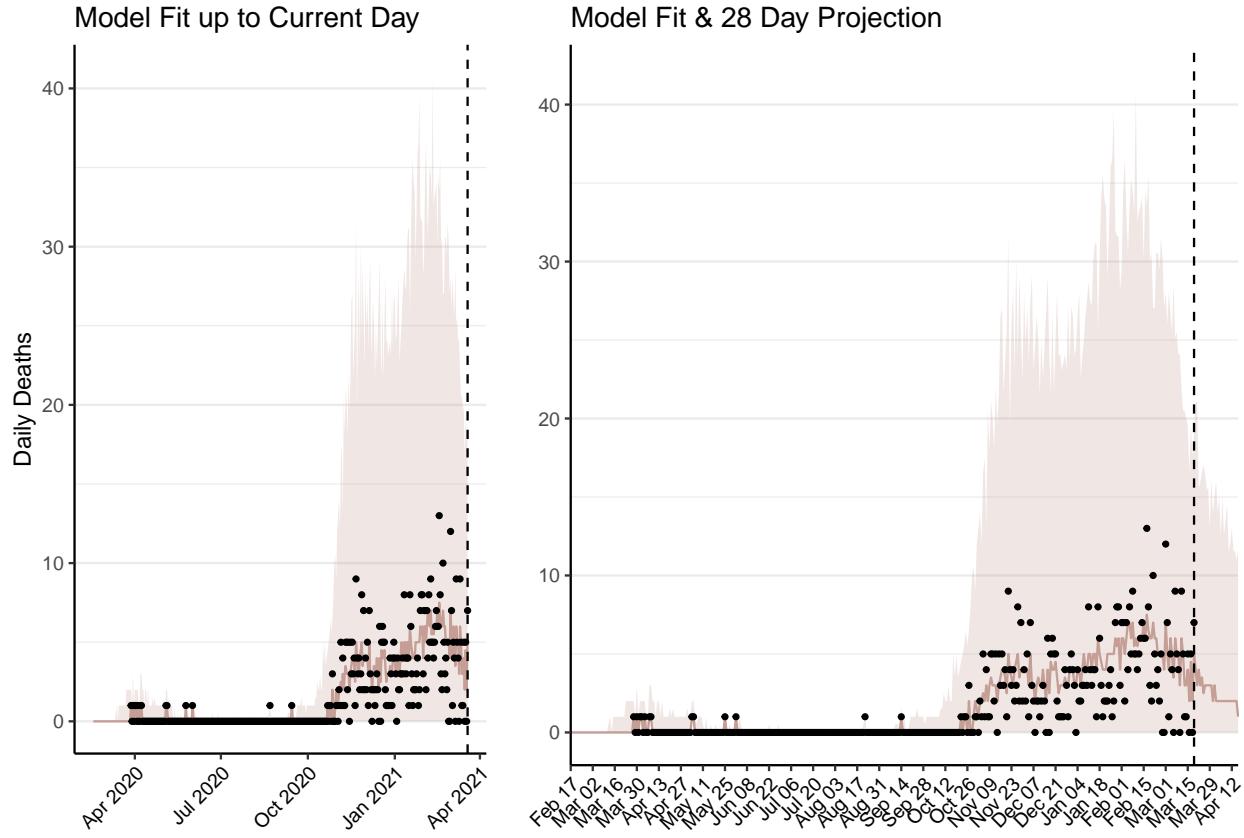


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 171 (95% CI: 139-203) patients requiring treatment with high-pressure oxygen at the current date to 102 (95% CI: 81-123) hospital beds being required on 2021-04-16 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 73 (95% CI: 59-87) patients requiring treatment with mechanical ventilation at the current date to 42 (95% CI: 33-50) by 2021-04-16. 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.**

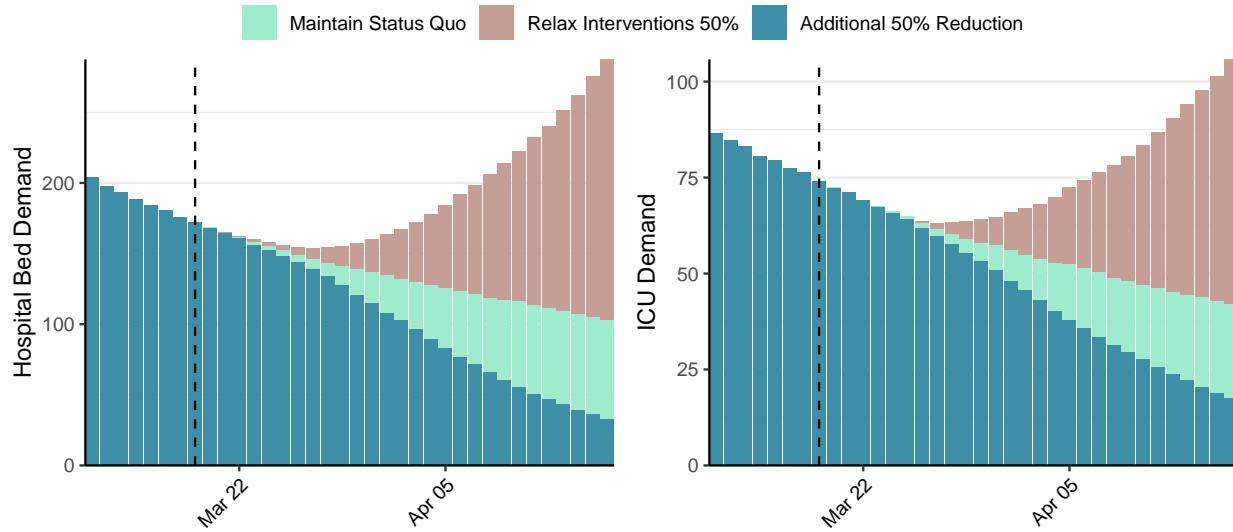


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,009 (95% CI: 819-1,198) at the current date to 54 (95% CI: 43-66) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,009 (95% CI: 819-1,198) at the current date to 3,344 (95% CI: 2,596-4,092) by 2021-04-16.

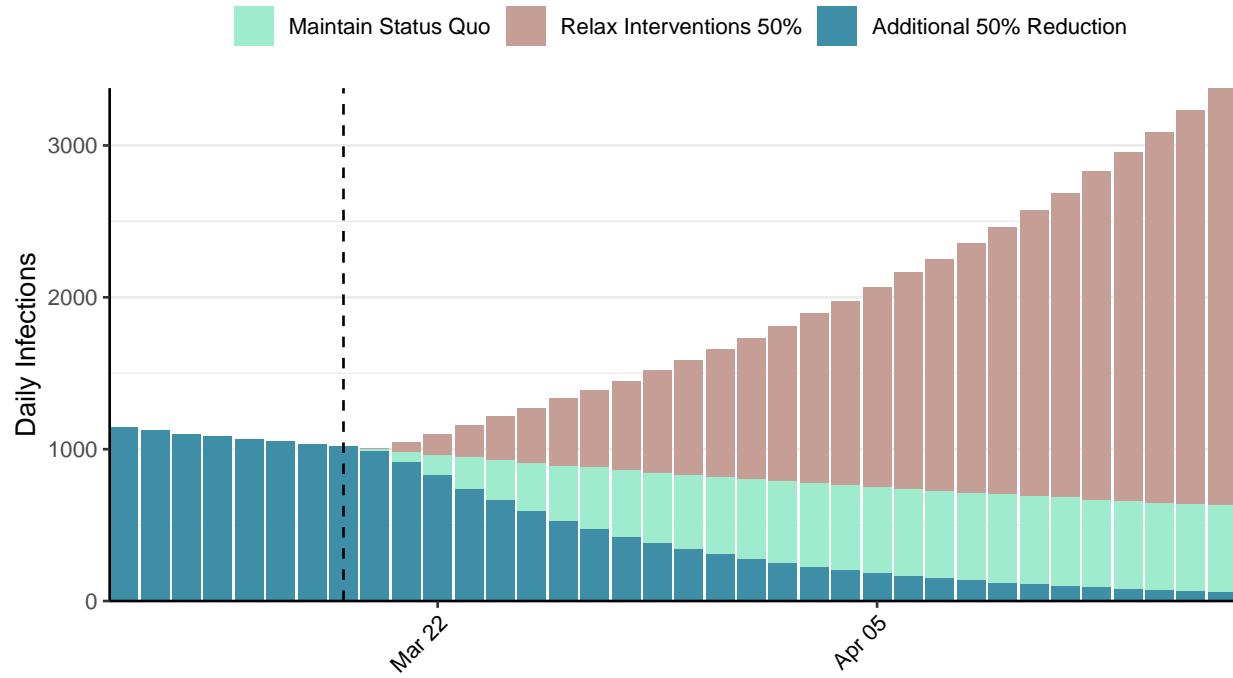


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Lesotho, 2021-03-19

[Download the report for Lesotho, 2021-03-19 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}
10,535	5	309	0	0.52 (95% CI: 0.38-0.67)

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.

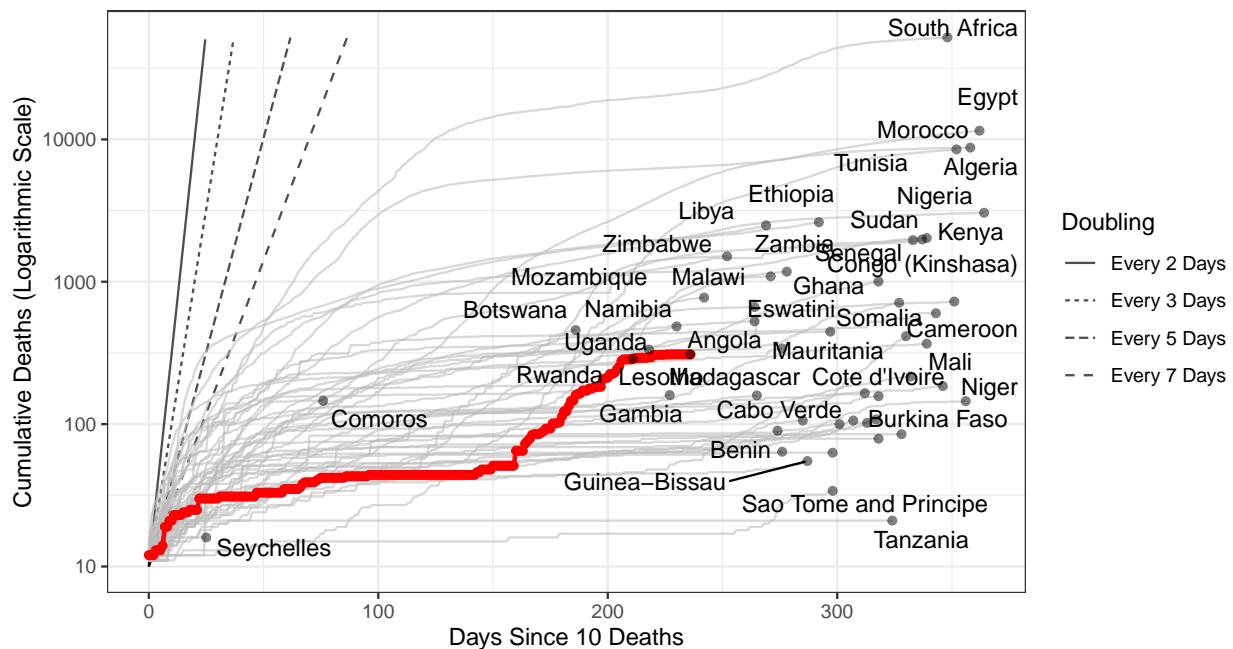


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 6,917 (95% CI: 6,458-7,375) 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).

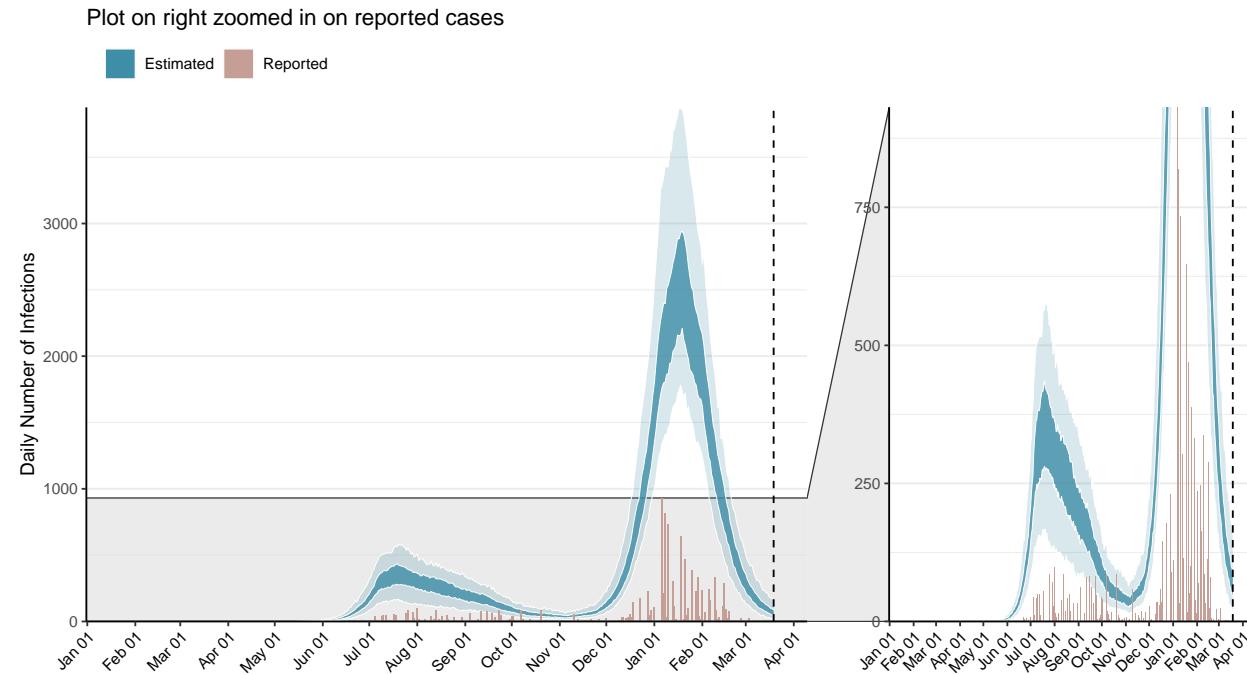


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

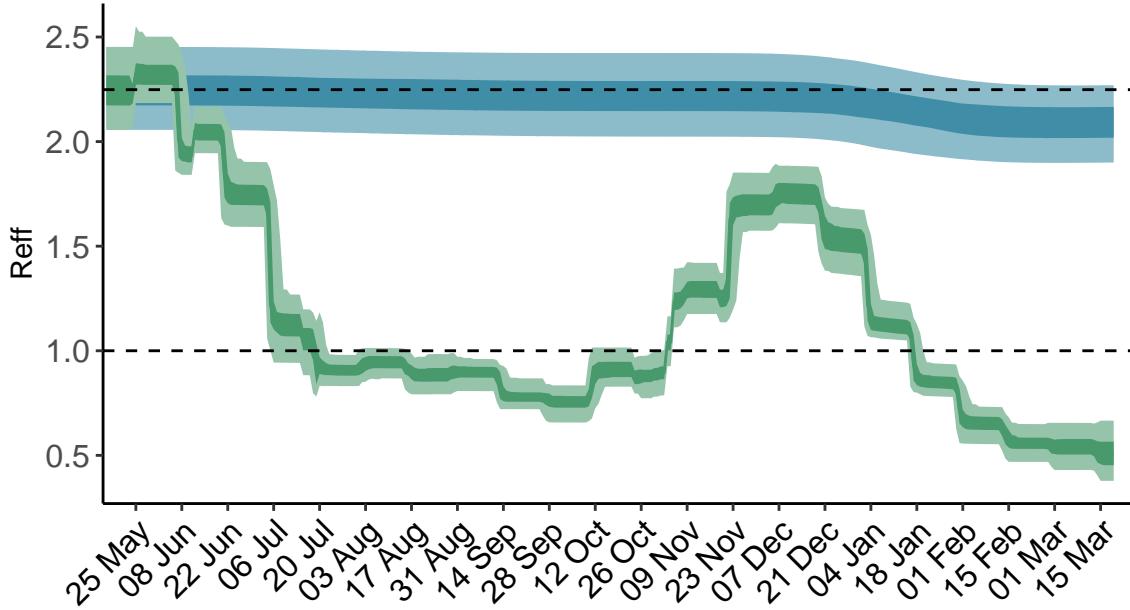


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

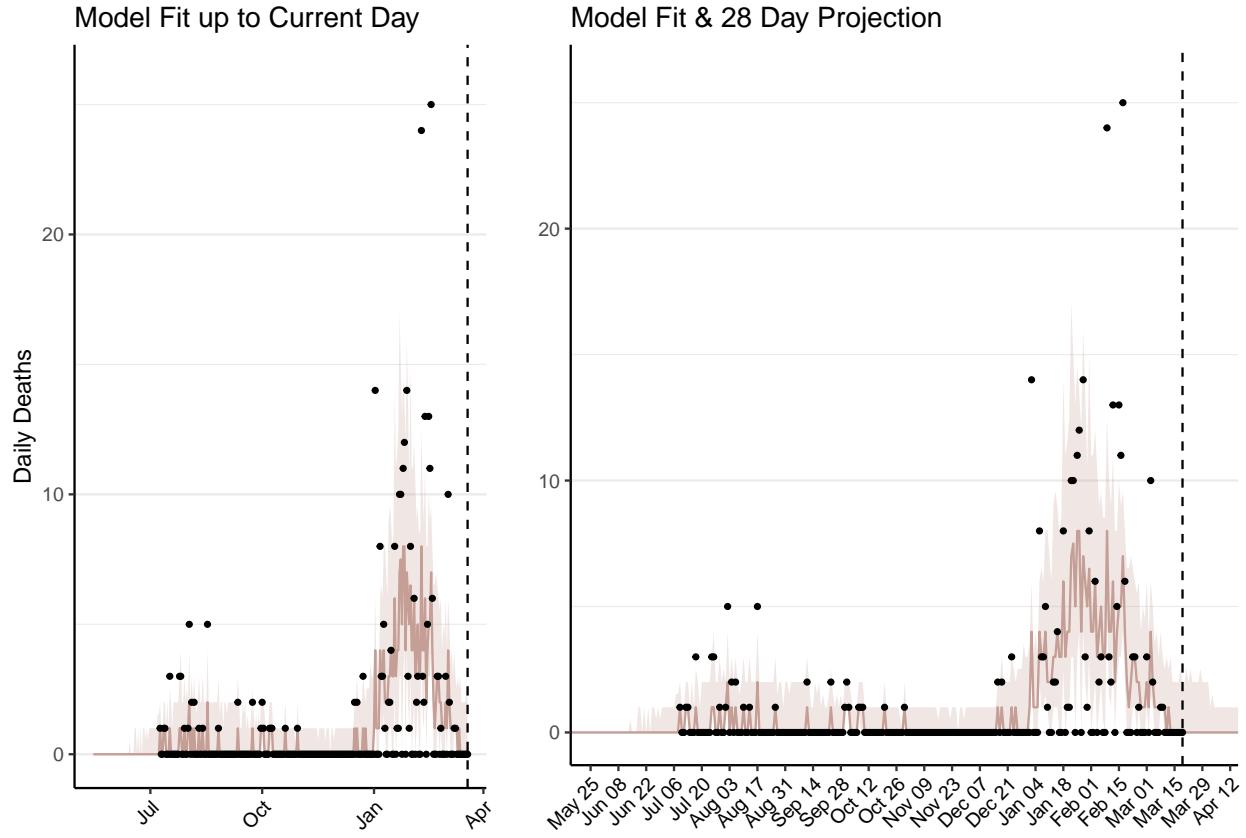


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 20 (95% CI: 18-21) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 1-2) hospital beds being required on 2021-04-16 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 10 (95% CI: 9-11) patients requiring treatment with mechanical ventilation at the current date to 1 (95% CI: 1-1) by 2021-04-16. 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.**

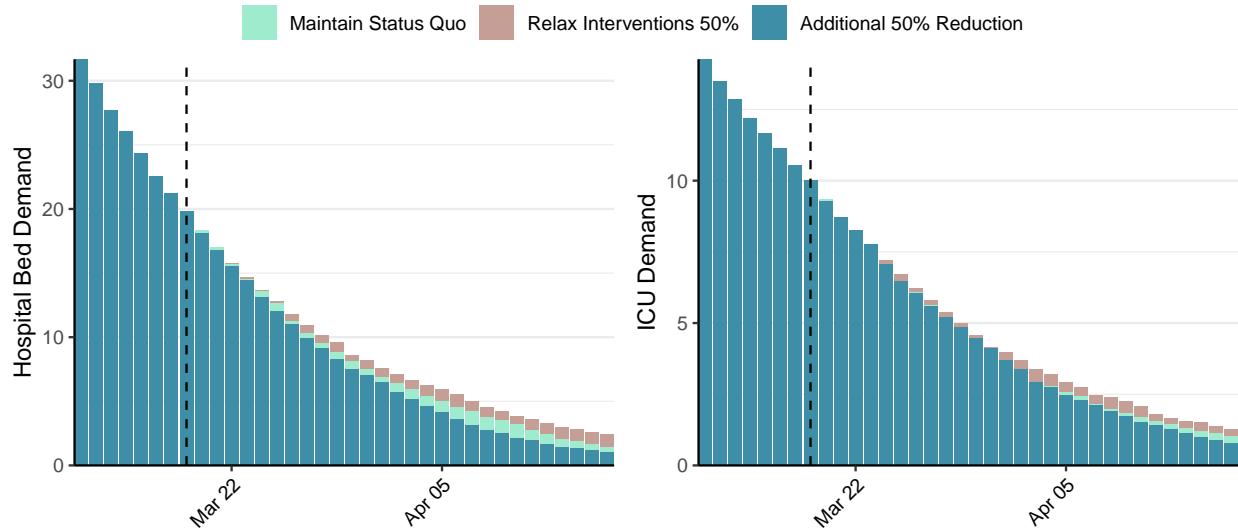


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 70 (95% CI: 63-77) at the current date to 1 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 70 (95% CI: 63-77) at the current date to 11 (95% CI: 9-14) by 2021-04-16.

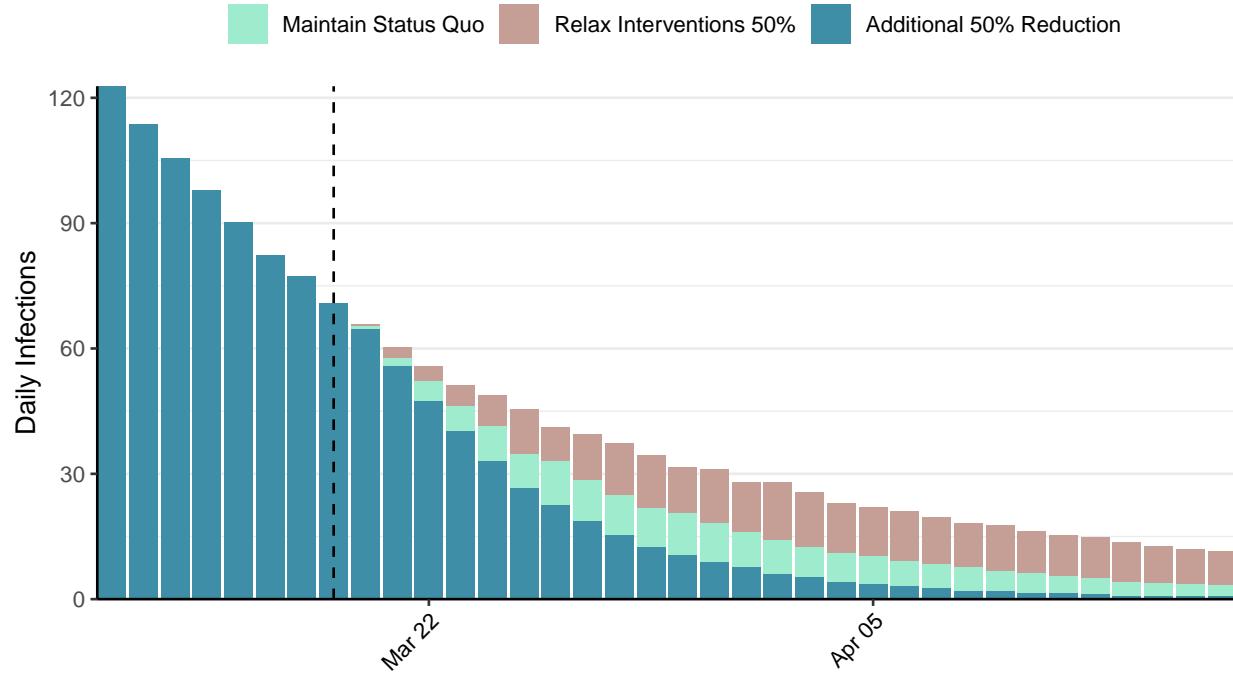


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Morocco, 2021-03-19

[Download the report for Morocco, 2021-03-19 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}
491,019	444	8,755	7	1.1 (95% CI: 0.95-1.29)

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.

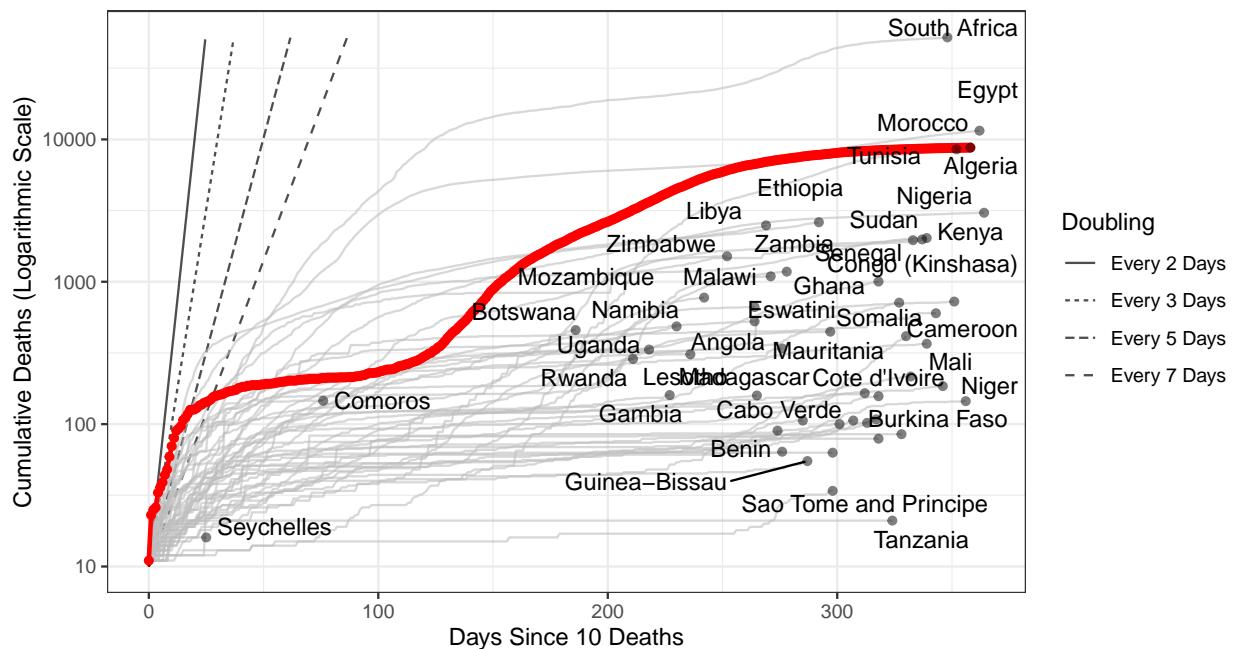


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 60,946 (95% CI: 58,038-63,855) 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).

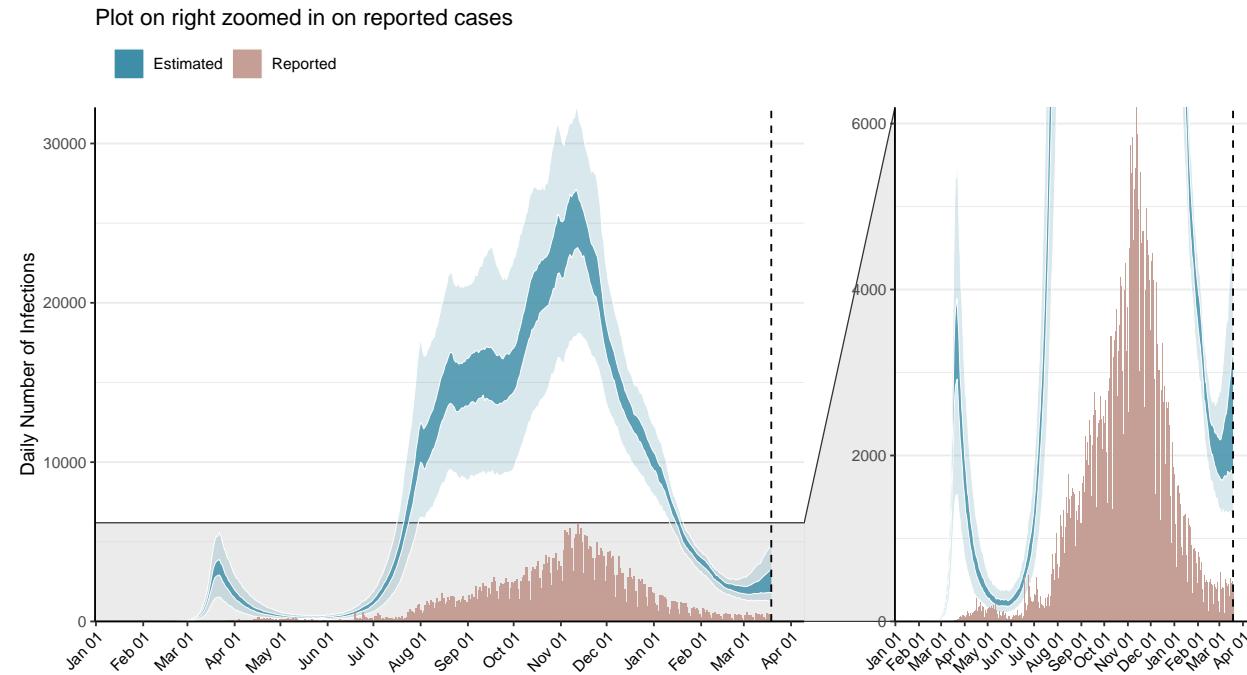


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

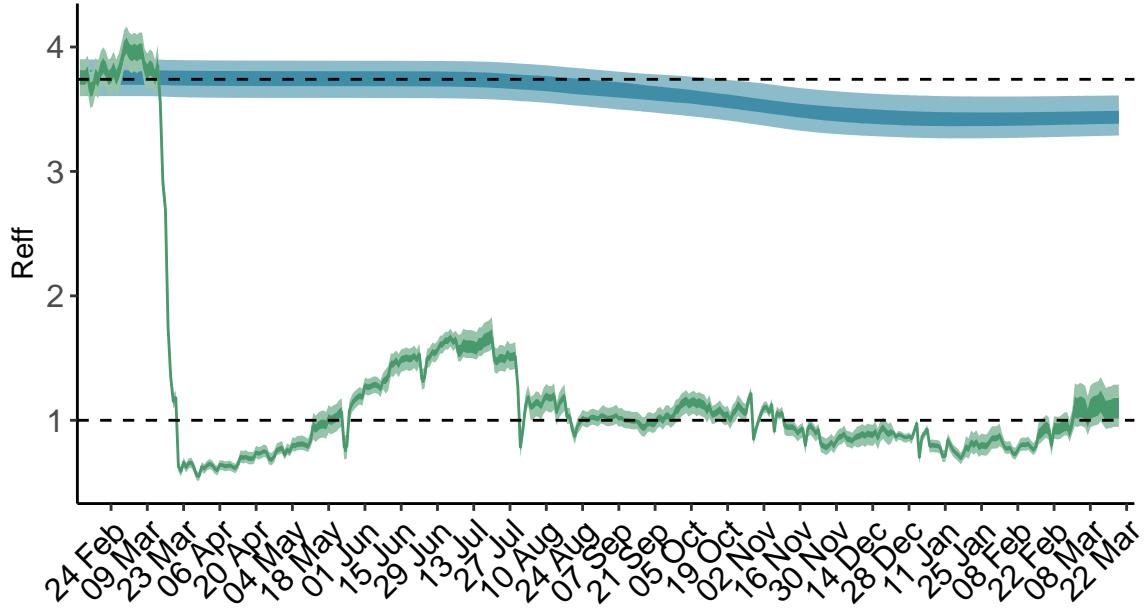


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

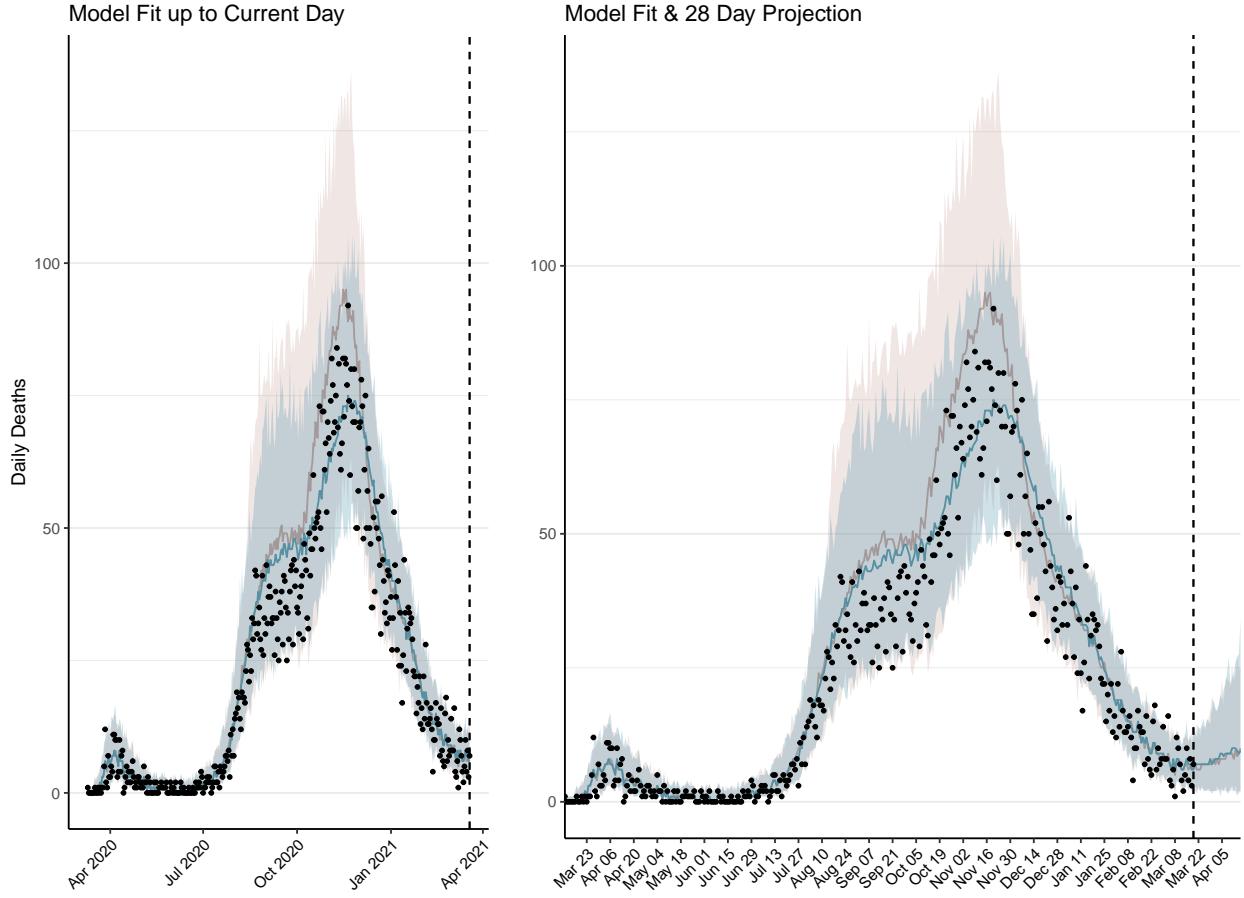


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 275 (95% CI: 261-289) patients requiring treatment with high-pressure oxygen at the current date to 467 (95% CI: 409-524) hospital beds being required on 2021-04-16 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 108 (95% CI: 103-113) patients requiring treatment with mechanical ventilation at the current date to 176 (95% CI: 155-197) by 2021-04-16. 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.**

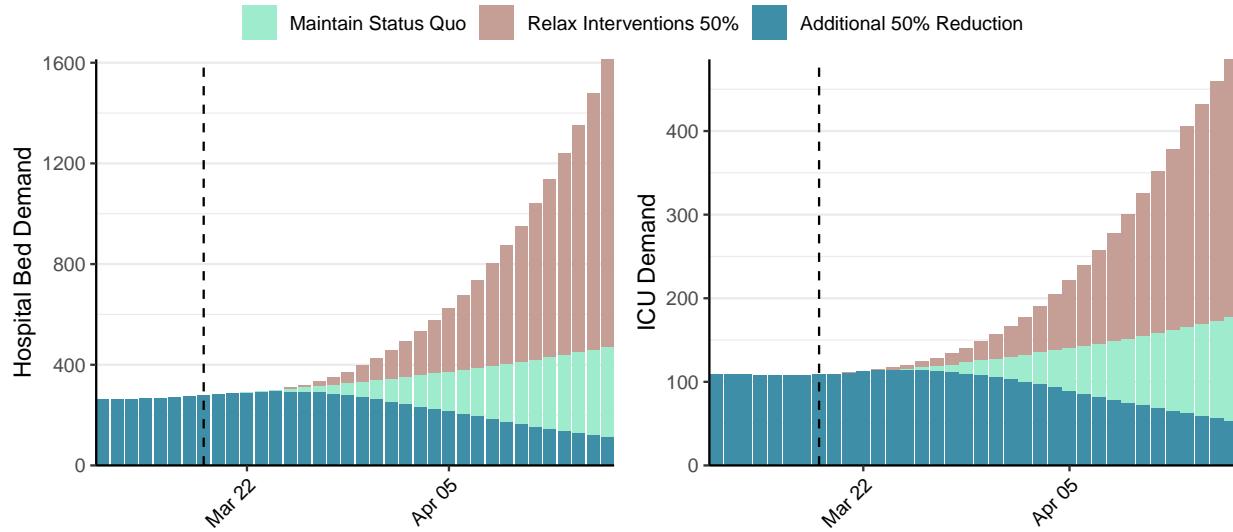


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,617 (95% CI: 2,417-2,816) at the current date to 357 (95% CI: 307-407) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,617 (95% CI: 2,417-2,816) at the current date to 30,188 (95% CI: 25,369-35,007) by 2021-04-16.

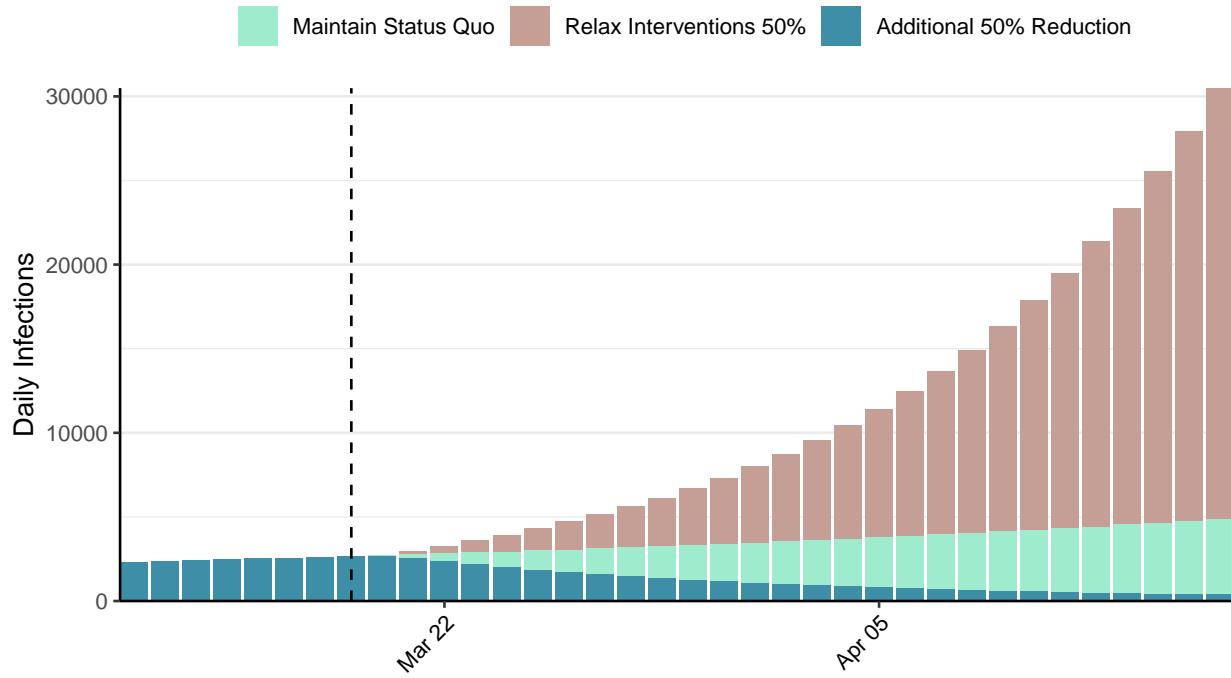


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

Situation Report for COVID-19: Moldova, 2021-03-19

[Download the report for Moldova, 2021-03-19 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}
212,568	1,843	4,501	29	0.94 (95% CI: 0.87-1.03)

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.

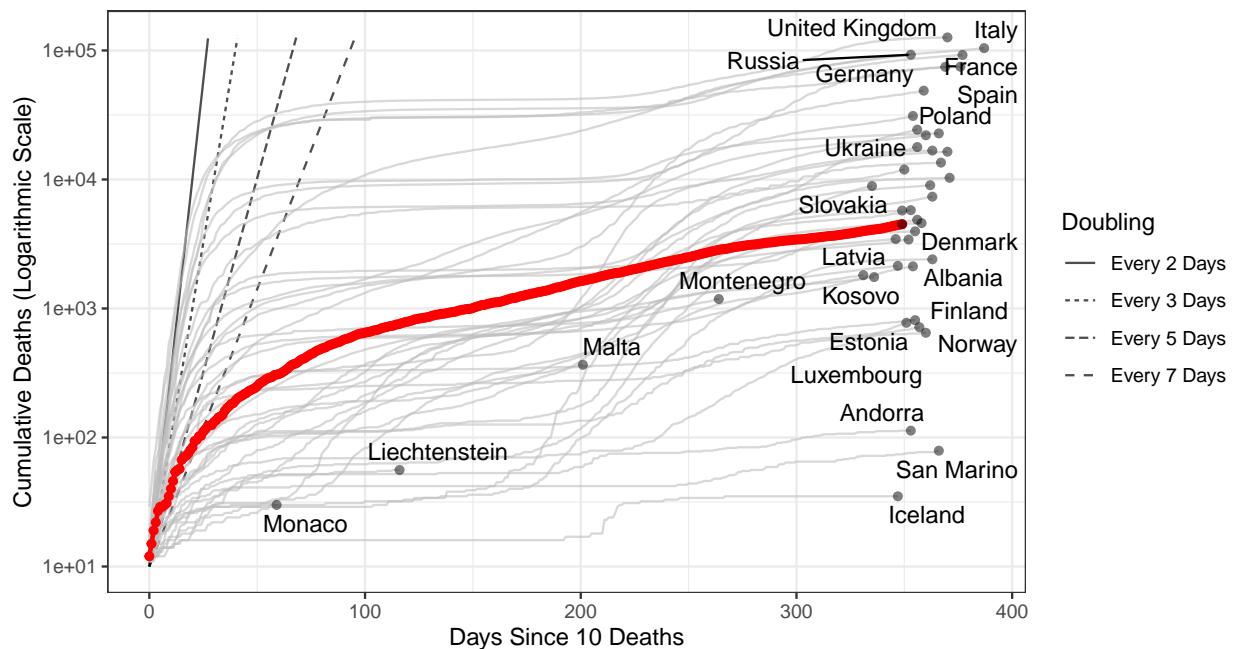


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 247,013 (95% CI: 238,609–255,417) 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

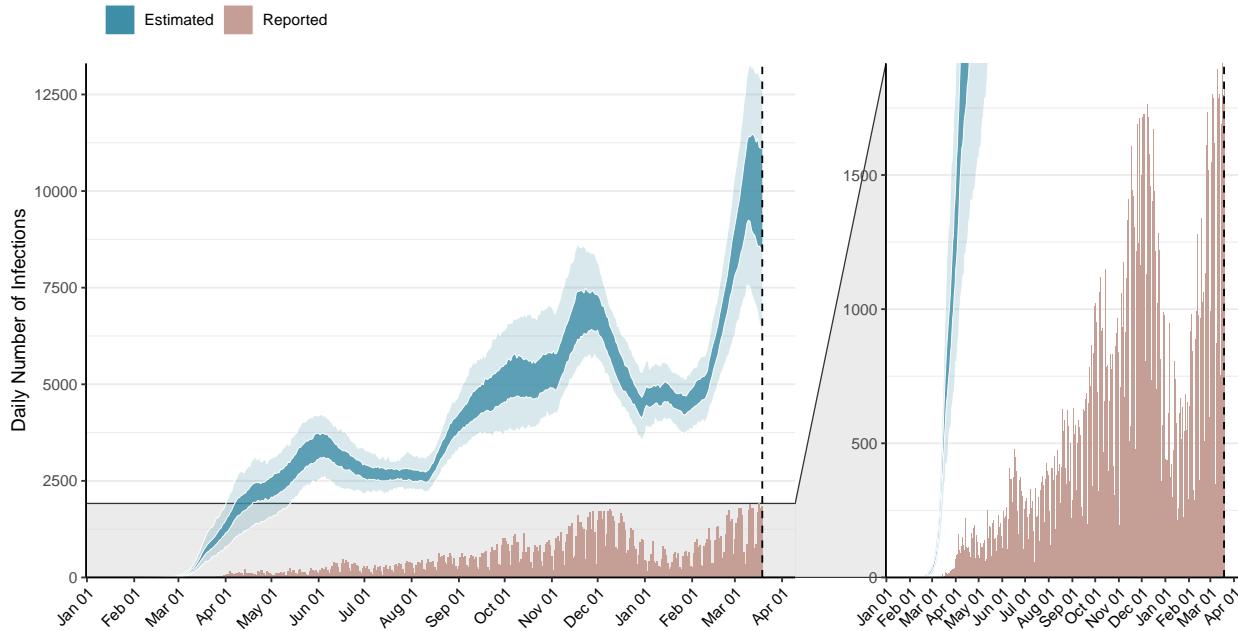


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

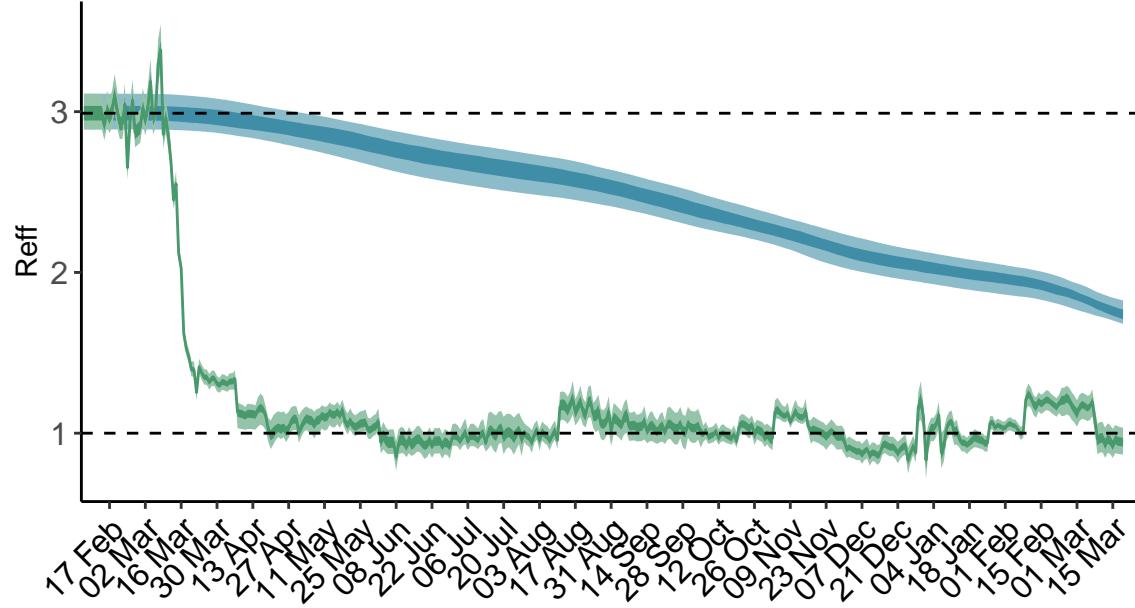


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

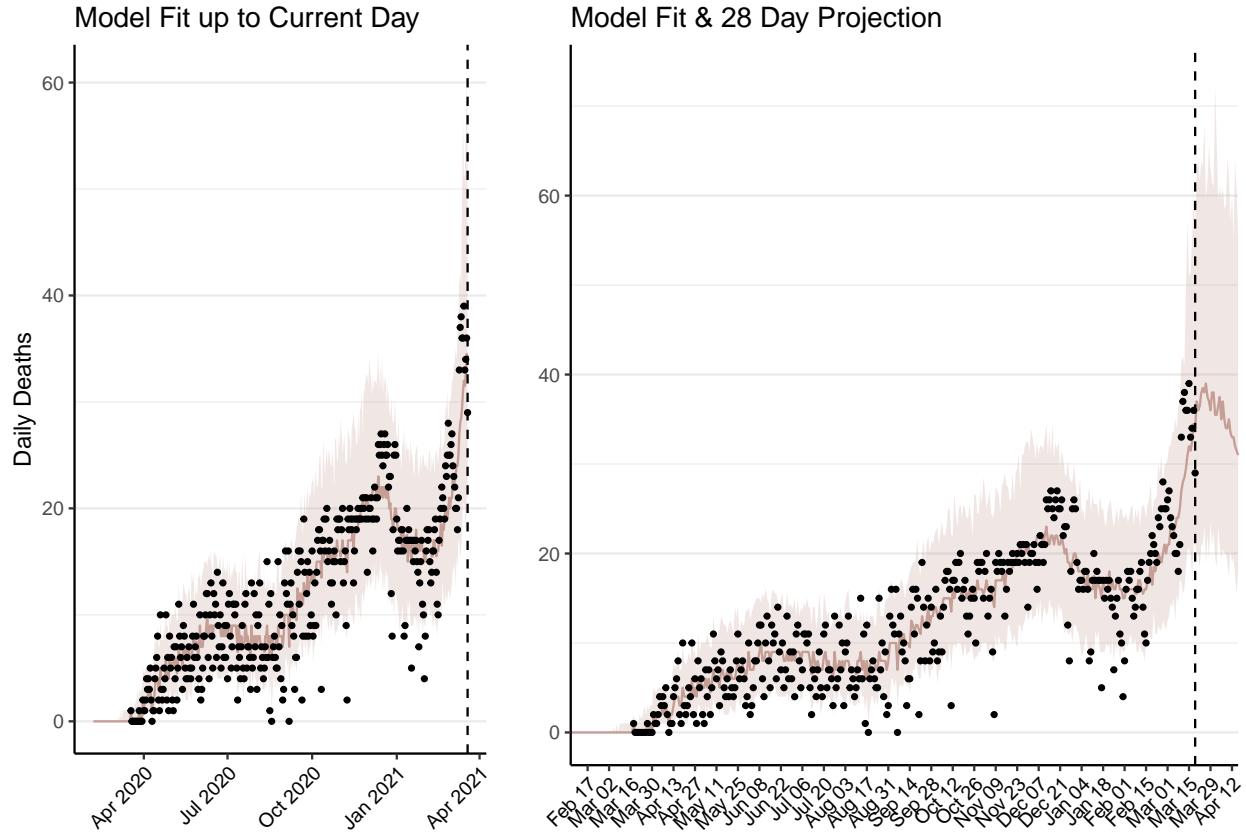


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,298 (95% CI: 1,252-1,344) patients requiring treatment with high-pressure oxygen at the current date to 1,163 (95% CI: 1,102-1,225) hospital beds being required on 2021-04-16 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 473 (95% CI: 460-486) patients requiring treatment with mechanical ventilation at the current date to 438 (95% CI: 422-454) by 2021-04-16. 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.**

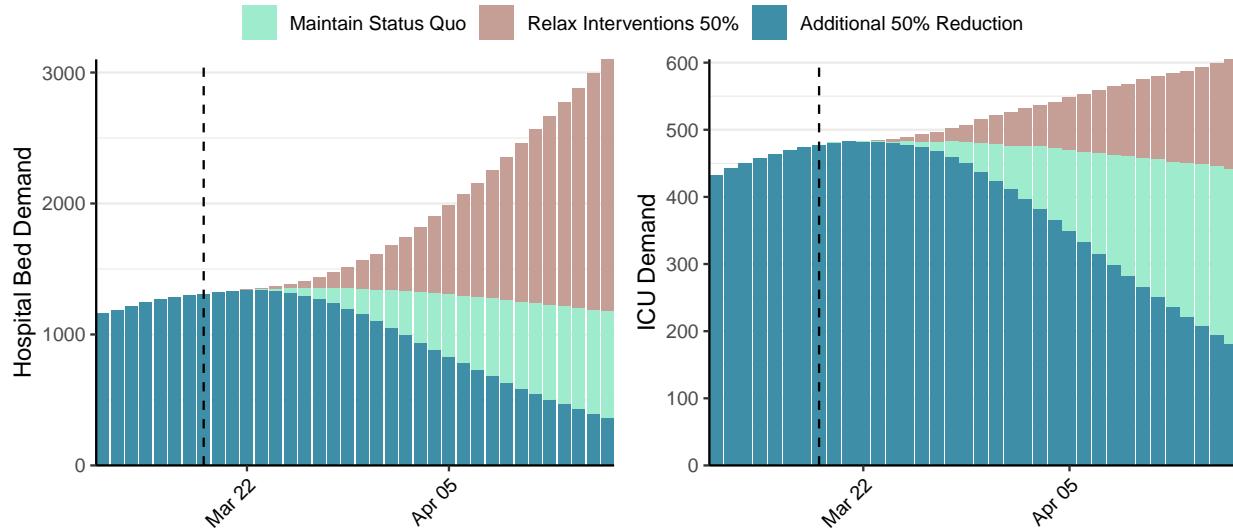


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 9,629 (95% CI: 9,226-10,033) at the current date to 684 (95% CI: 644-724) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 9,629 (95% CI: 9,226-10,033) at the current date to 27,553 (95% CI: 26,298-28,809) by 2021-04-16.

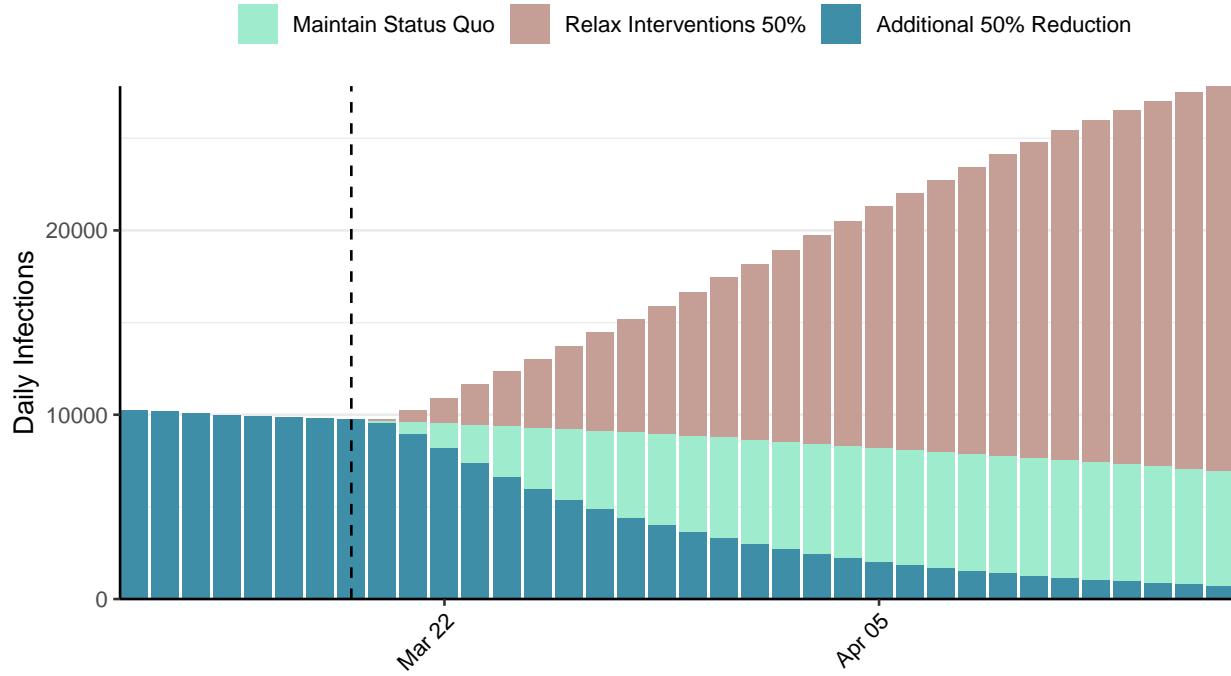


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Madagascar, 2021-03-19

[Download the report for Madagascar, 2021-03-19 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}
22,113	114	340	2	1.77 (95% CI: 1.49-2.04)

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.

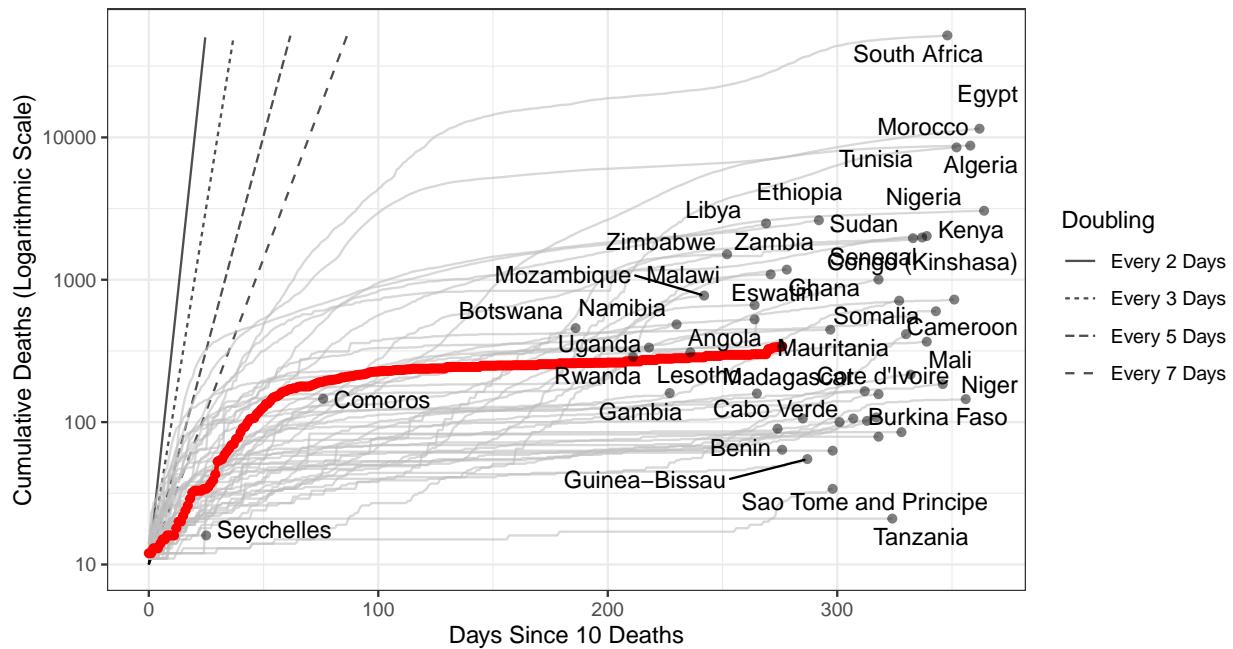


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 104,503 (95% CI: 96,026-112,980) 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.**

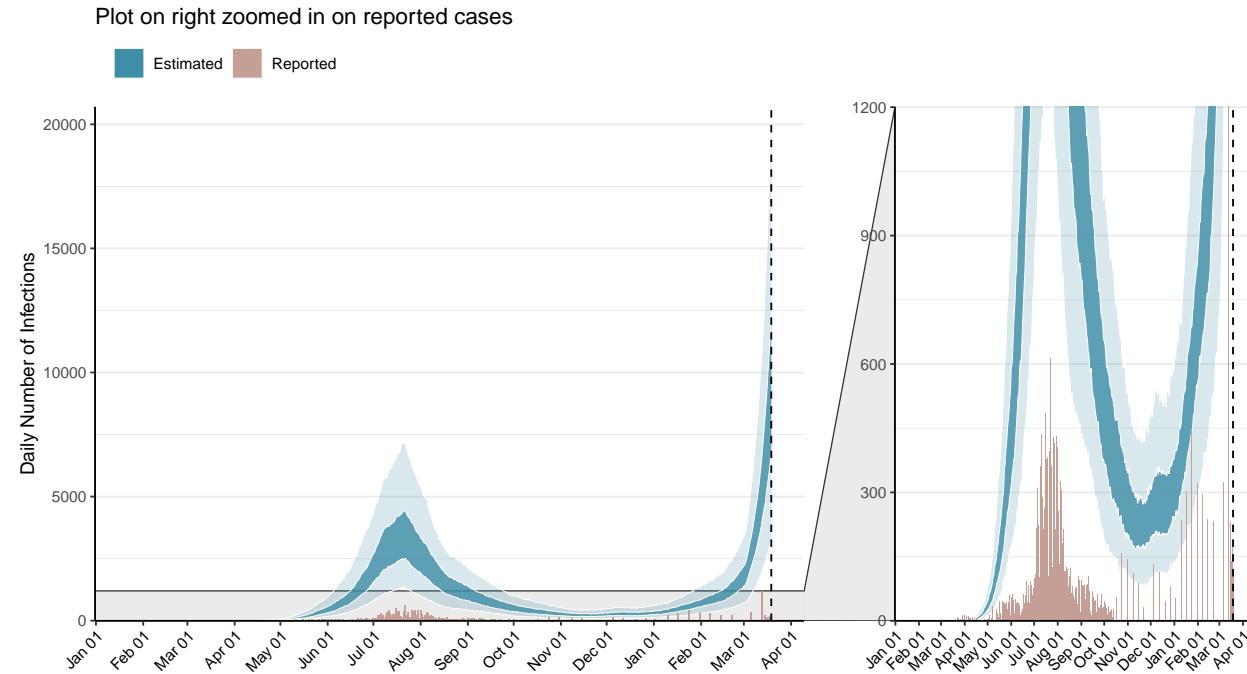


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

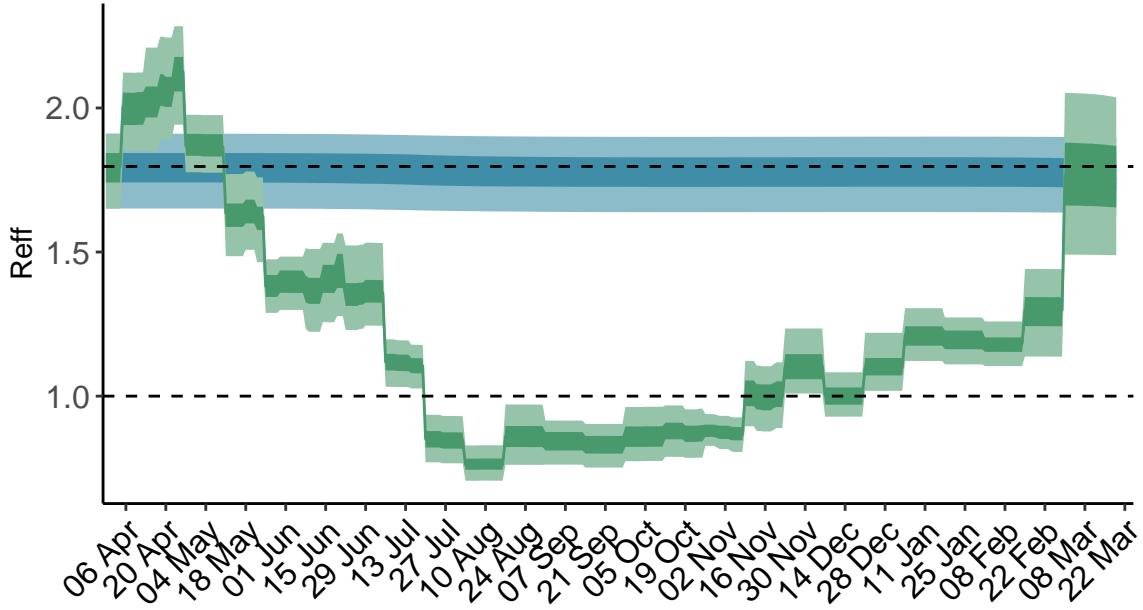


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

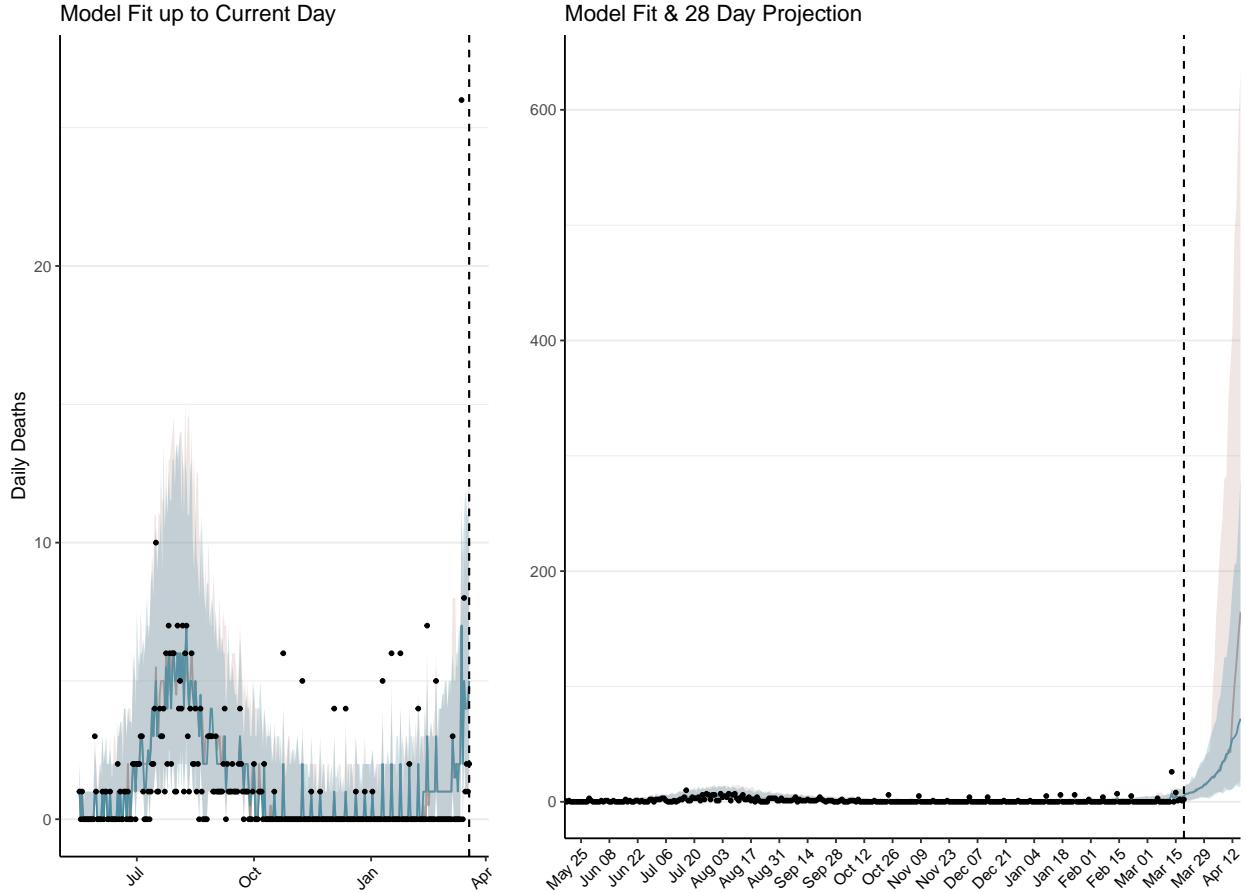


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 332 (95% CI: 304-361) patients requiring treatment with high-pressure oxygen at the current date to 4,753 (95% CI: 4,114-5,391) hospital beds being required on 2021-04-16 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 114 (95% CI: 105-123) patients requiring treatment with mechanical ventilation at the current date to 944 (95% CI: 887-1,001) by 2021-04-16. 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.**

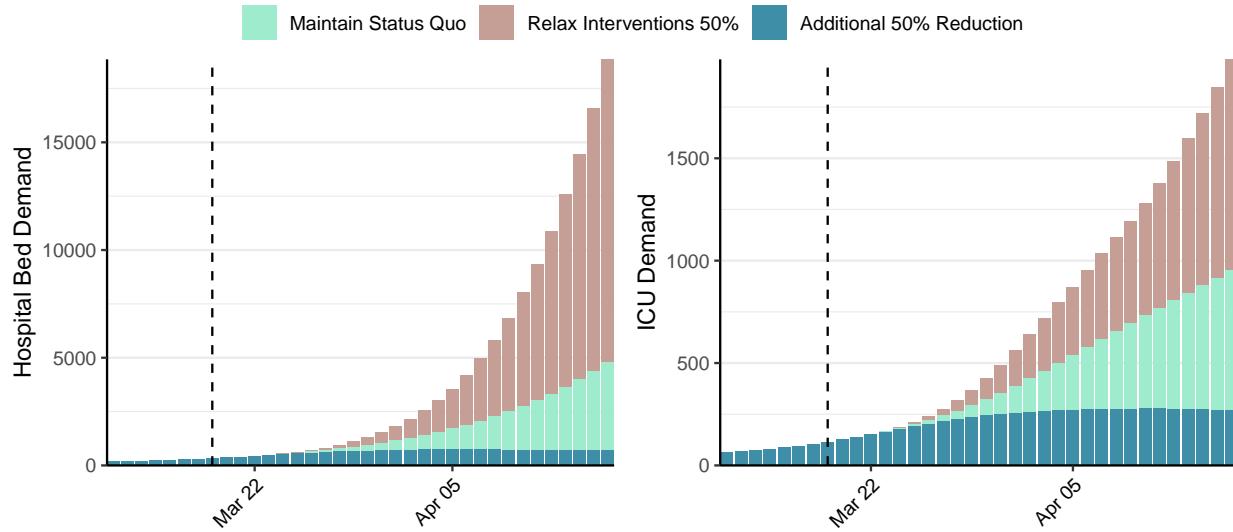


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 9,987 (95% CI: 9,025-10,949) at the current date to 7,458 (95% CI: 6,342-8,574) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 9,987 (95% CI: 9,025-10,949) at the current date to 668,445 (95% CI: 606,053-730,837) by 2021-04-16.

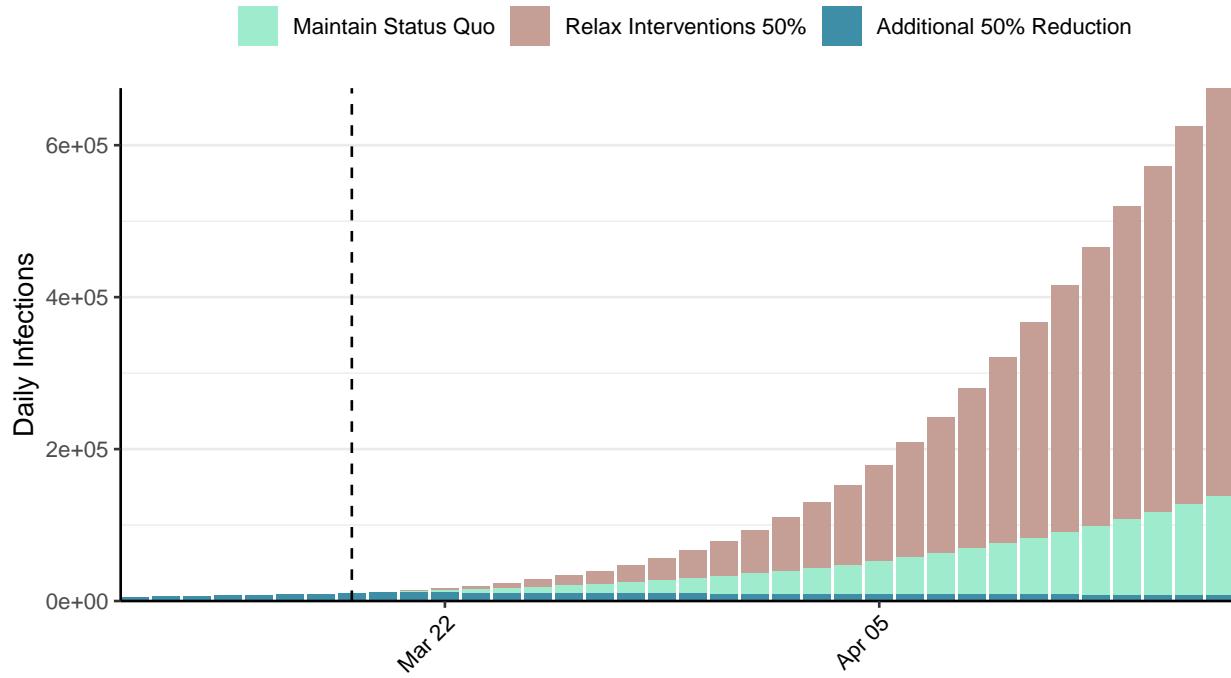


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Maldives, 2021-03-19

[Download the report for Maldives, 2021-03-19 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}
22,292	145	65	1	1.01 (95% CI: 0.75-1.25)

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.

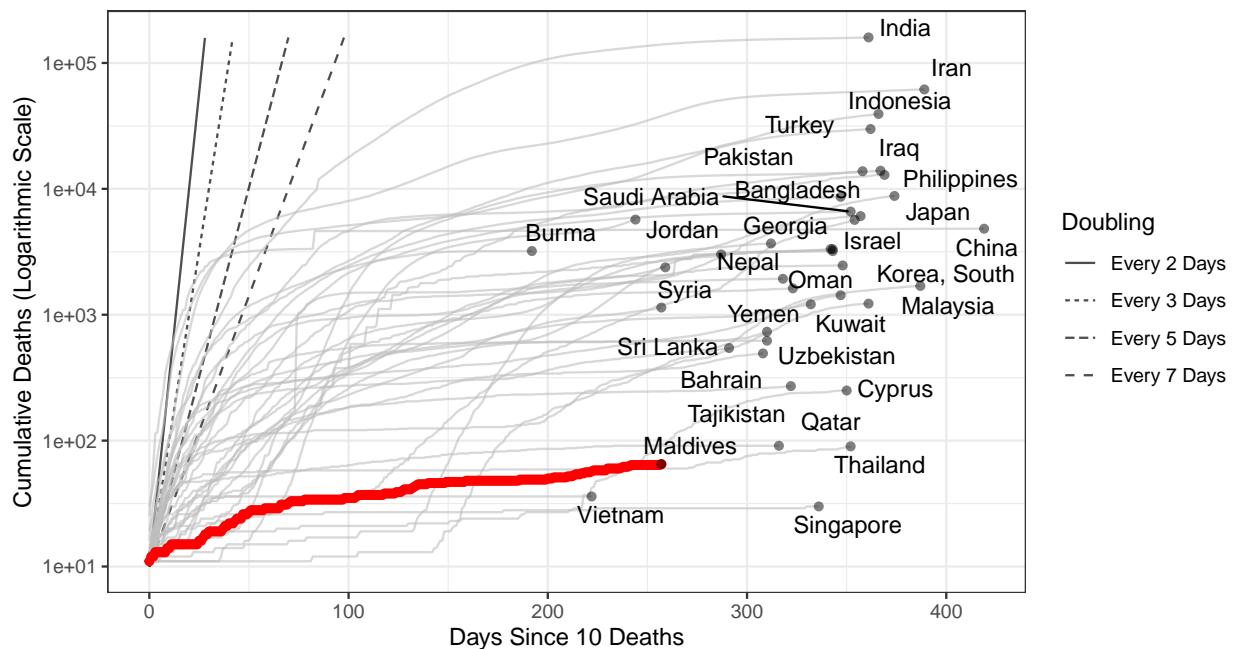


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 2,468 (95% CI: 2,241-2,695) 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).

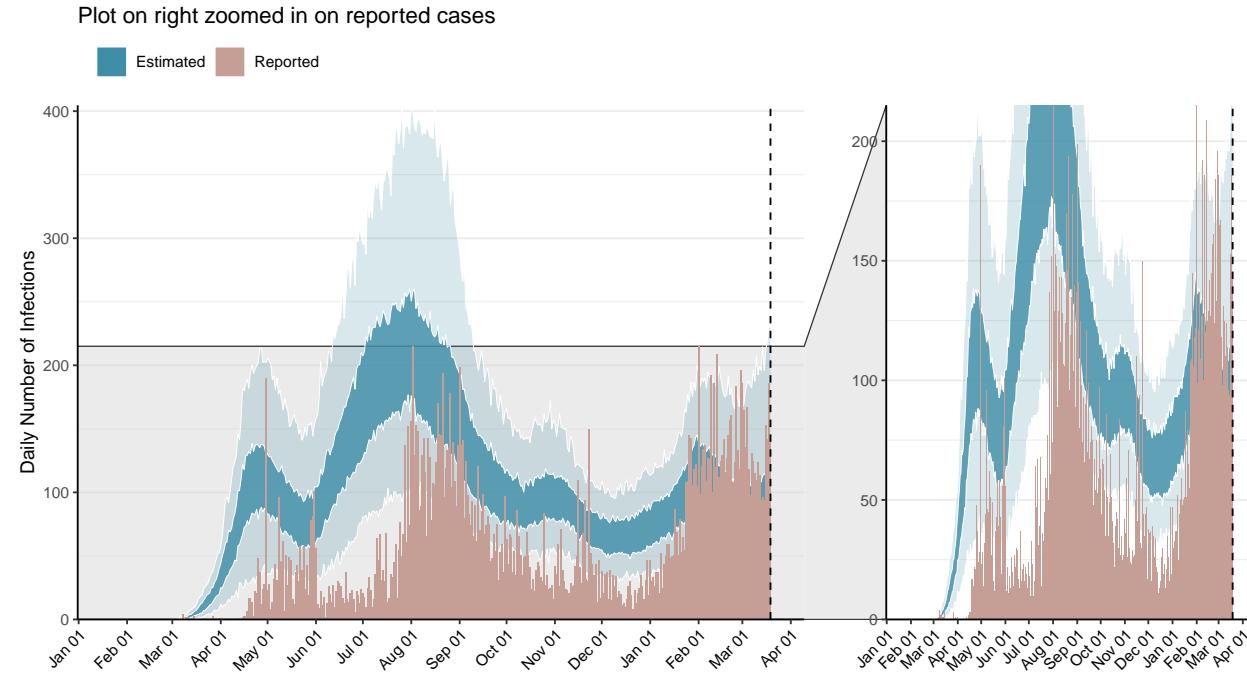


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

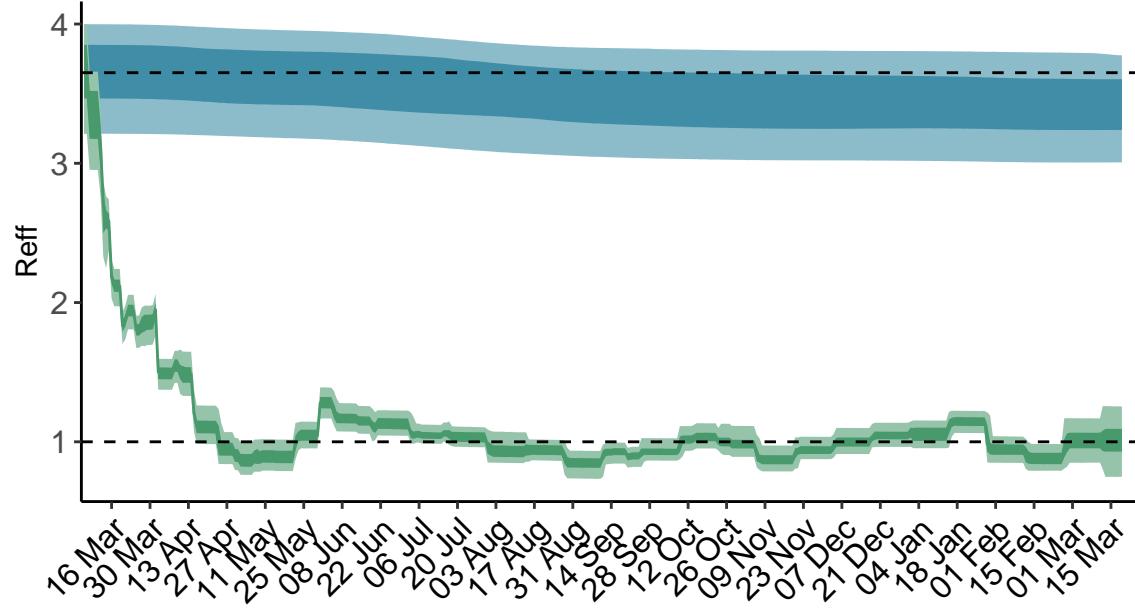


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

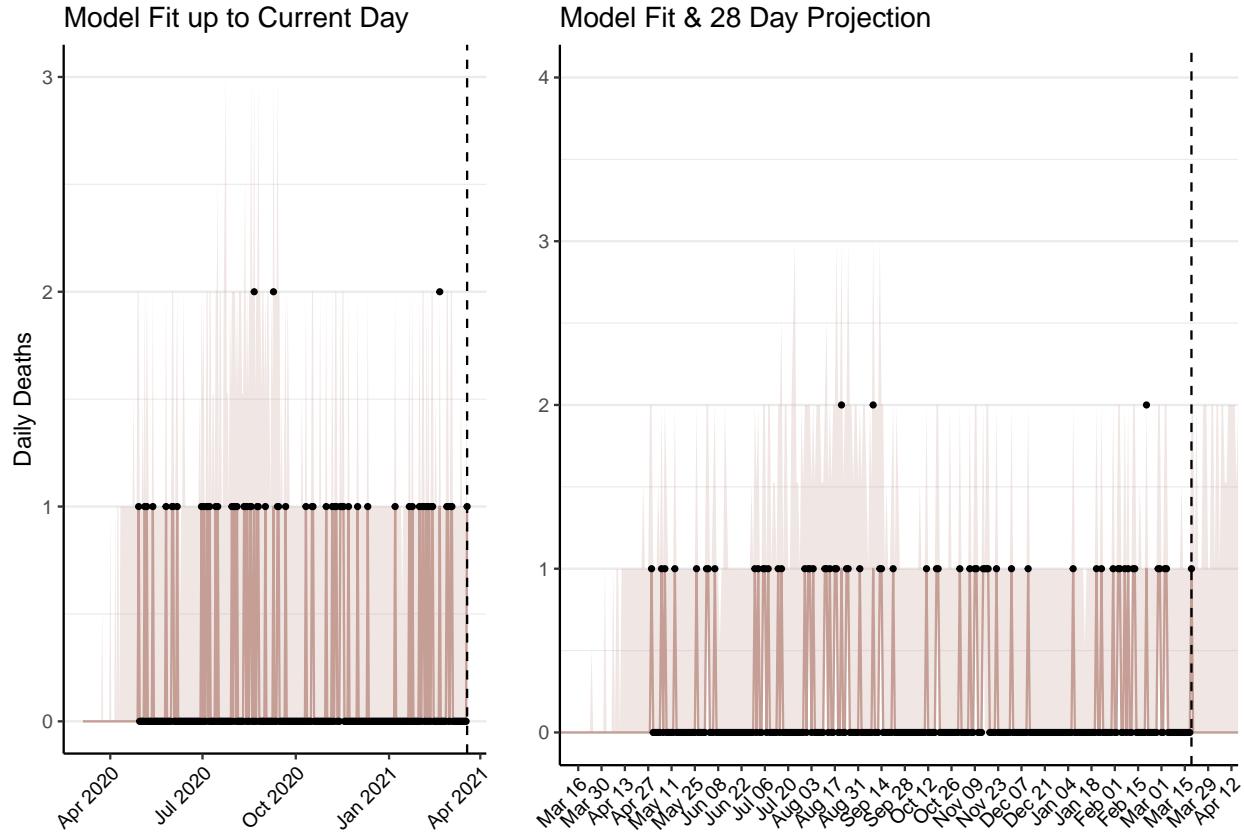


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 9 (95% CI: 8-10) patients requiring treatment with high-pressure oxygen at the current date to 14 (95% CI: 11-16) hospital beds being required on 2021-04-16 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 5 (95% CI: 4-6) by 2021-04-16. 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.**

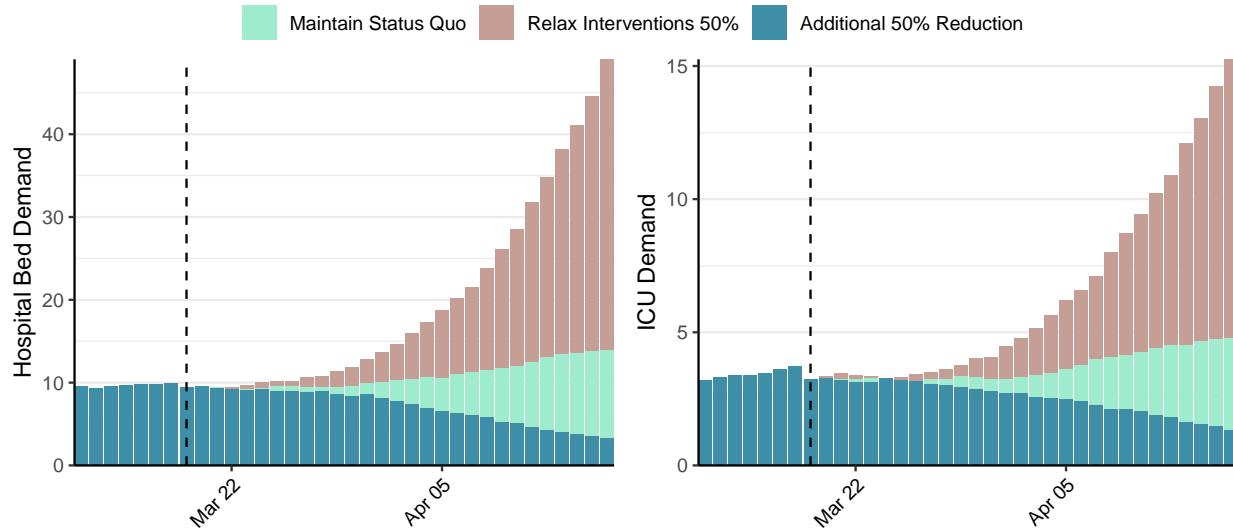


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 94 (95% CI: 83-105) at the current date to 14 (95% CI: 11-16) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 94 (95% CI: 83-105) at the current date to 1,089 (95% CI: 858-1,319) by 2021-04-16.

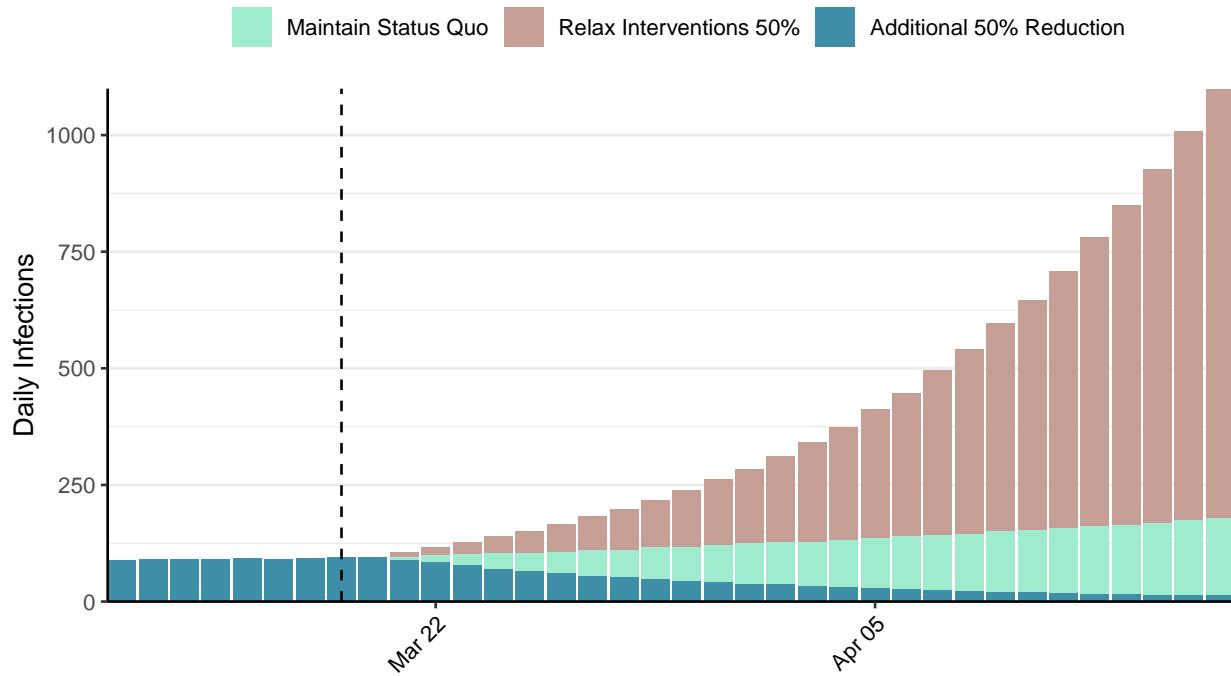


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Mexico, 2021-03-19

[Download the report for Mexico, 2021-03-19 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}
2,187,908	5,722	197,219	613	0.8 (95% CI: 0.71-0.87)

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.

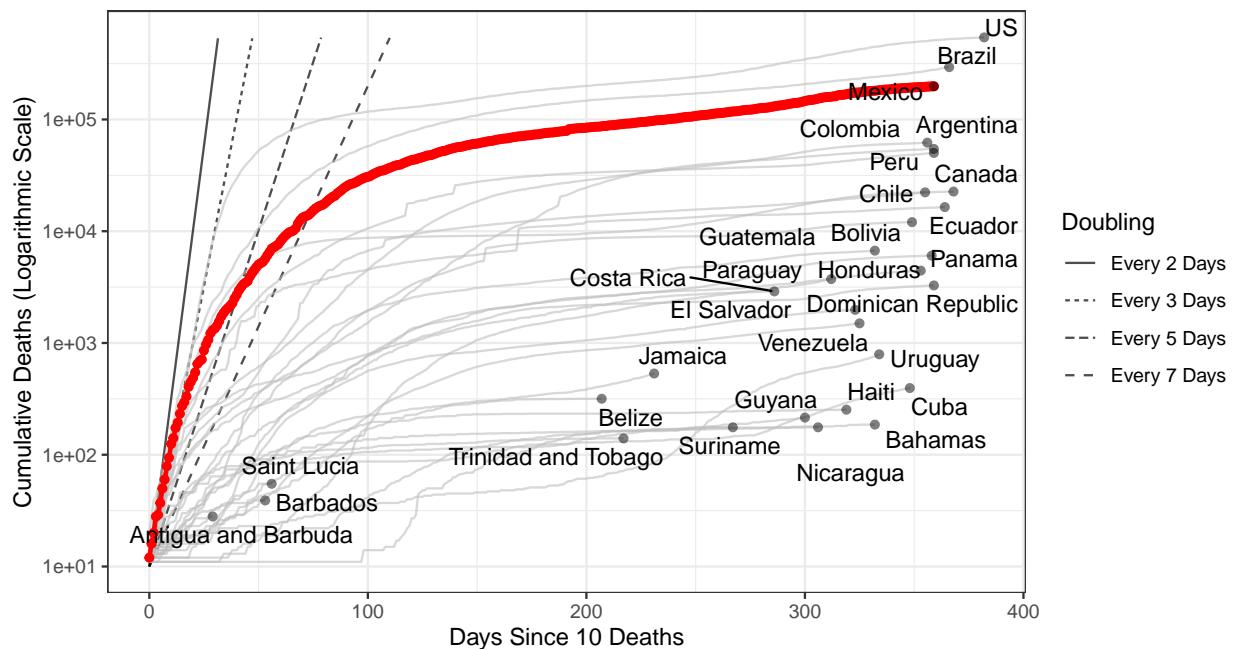


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 4,118,562 (95% CI: 3,977,476-4,259,649) 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).

Plot on right zoomed in on reported cases

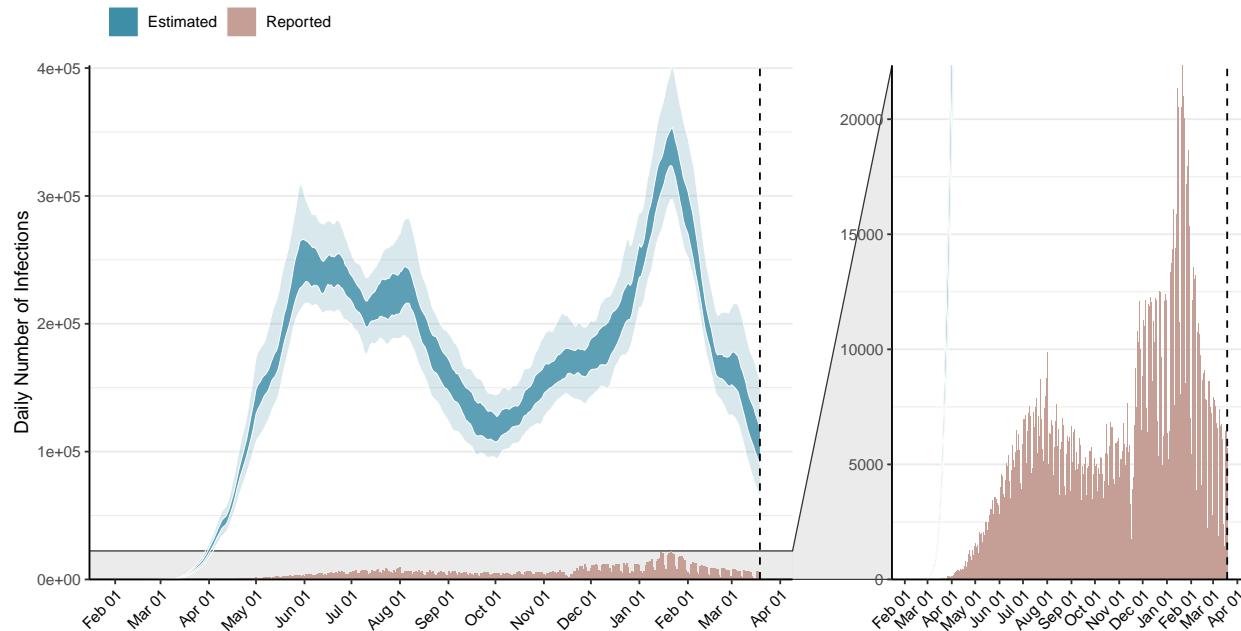


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

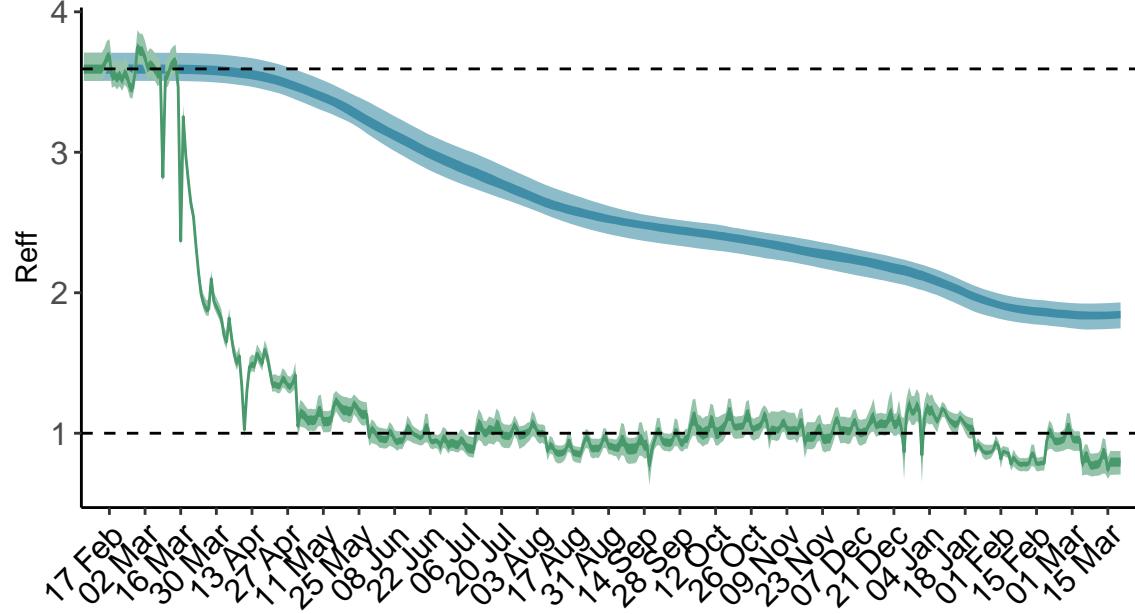


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

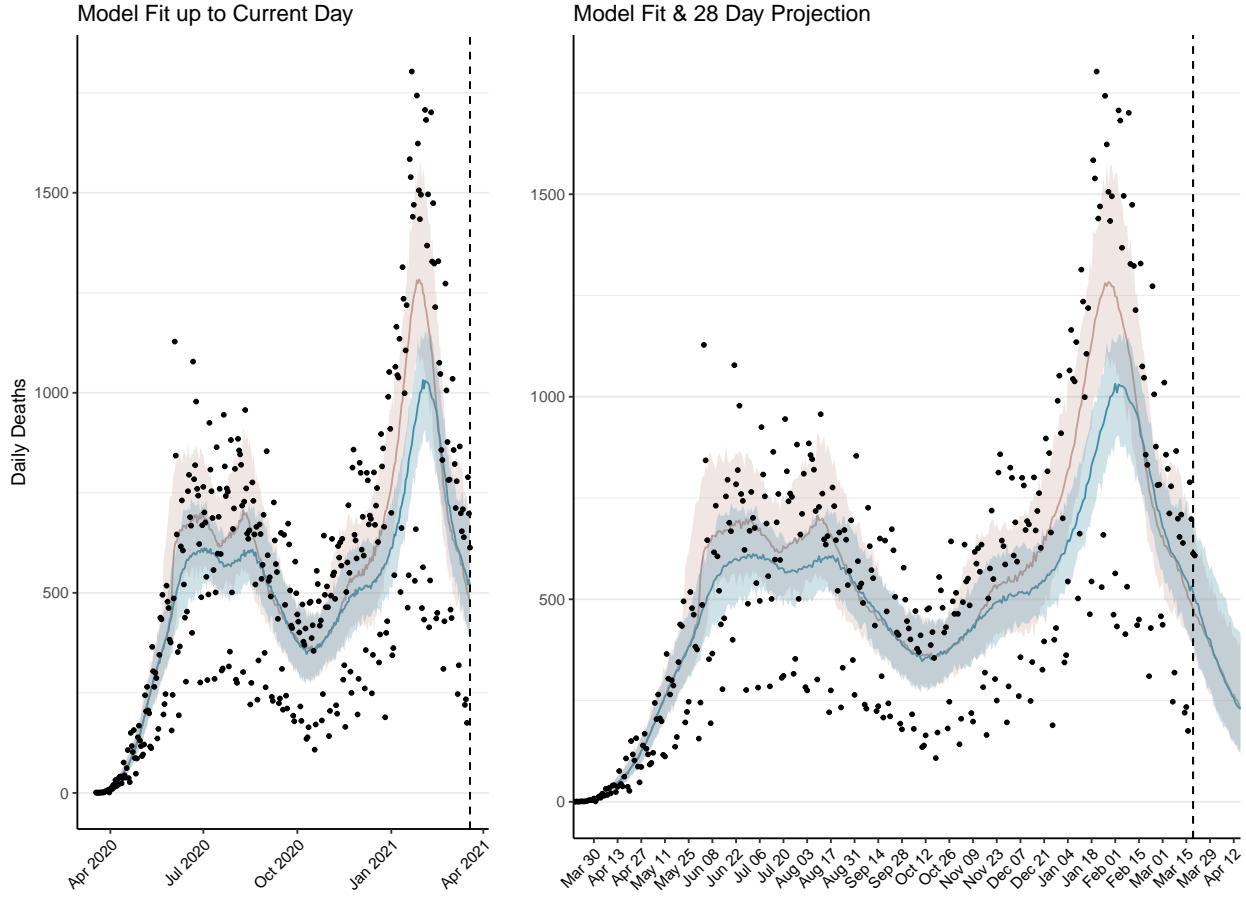


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 16,722 (95% CI: 16,119-17,325) patients requiring treatment with high-pressure oxygen at the current date to 7,663 (95% CI: 7,131-8,194) hospital beds being required on 2021-04-16 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 5,644 (95% CI: 5,511-5,777) patients requiring treatment with mechanical ventilation at the current date to 3,061 (95% CI: 2,873-3,250) by 2021-04-16. 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.

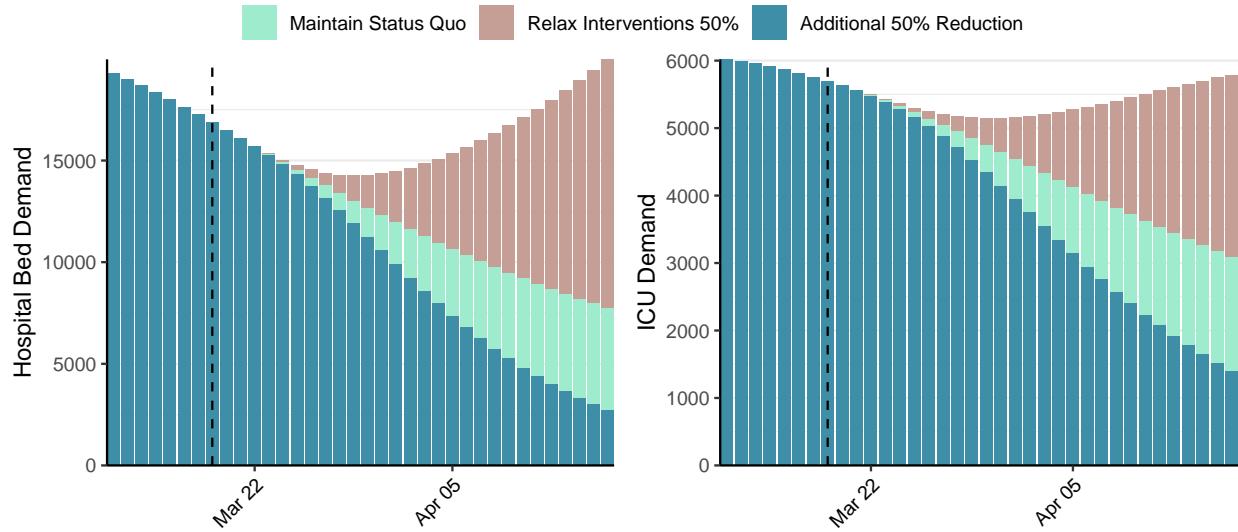


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 104,666 (95% CI: 99,373-109,960) at the current date to 4,696 (95% CI: 4,323-5,069) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 104,666 (95% CI: 99,373-109,960) at the current date to 222,569 (95% CI: 204,241-240,896) by 2021-04-16.

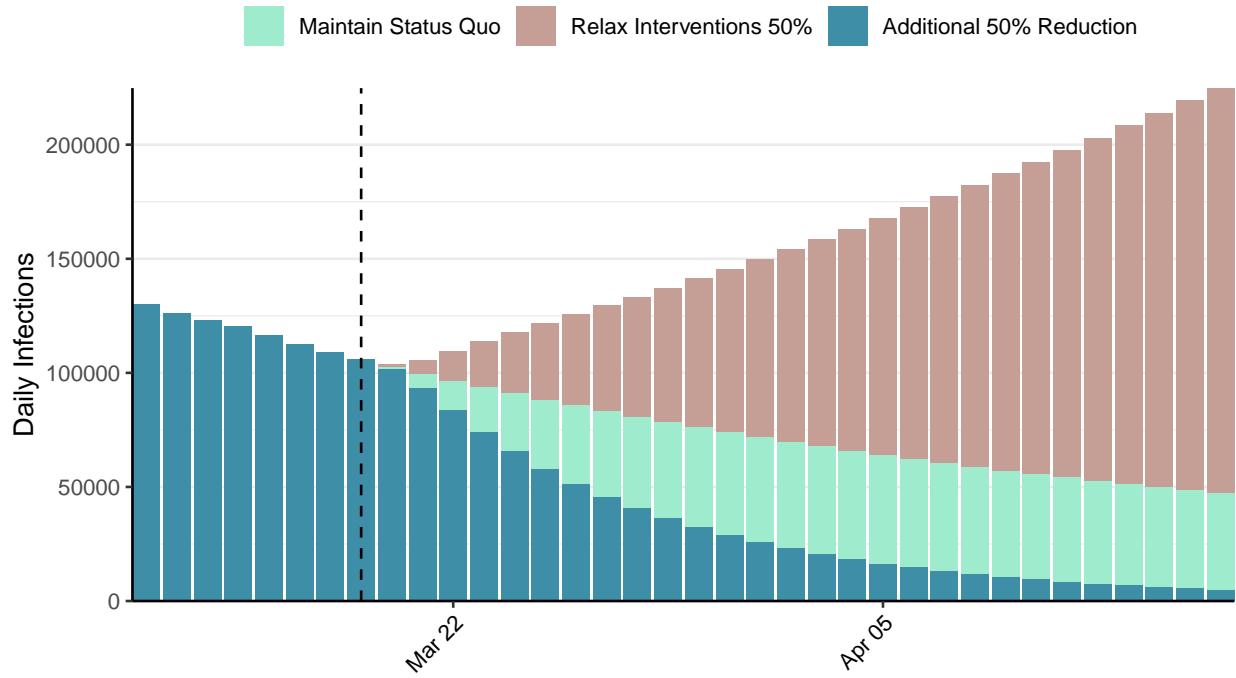


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: North Macedonia, 2021-03-19

[Download the report for North Macedonia, 2021-03-19 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}
117,437	999	3,424	21	1.1 (95% CI: 0.97-1.21)

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.

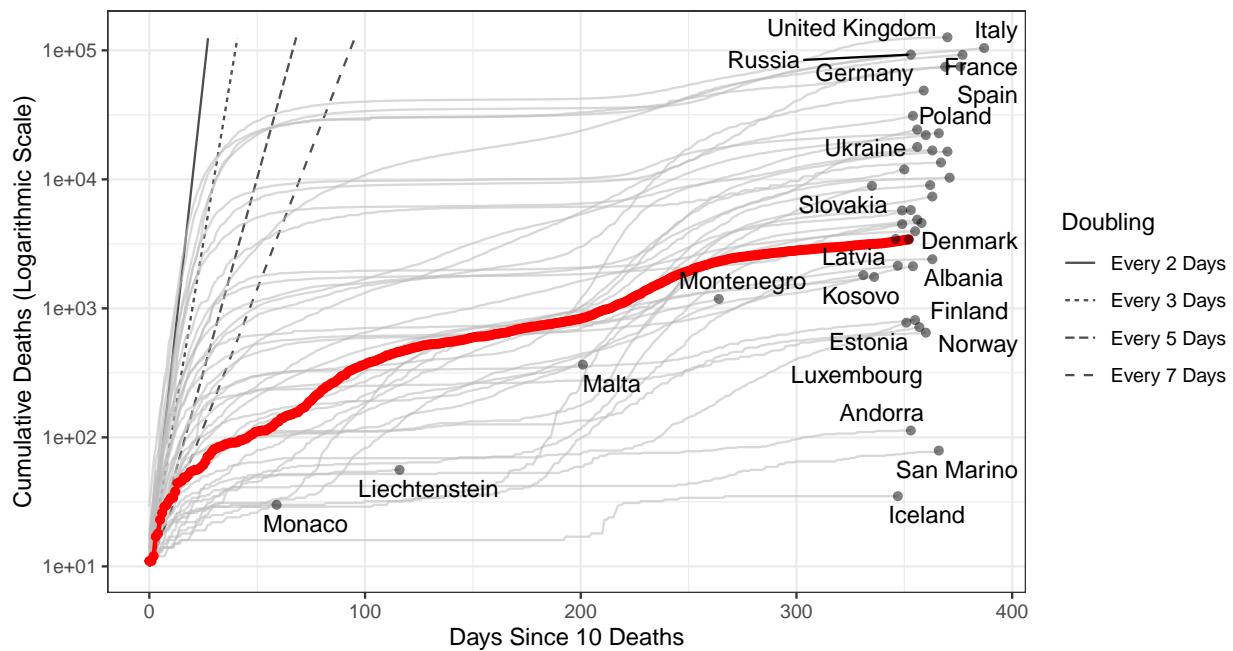


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 147,389 (95% CI: 141,628–153,150) 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).

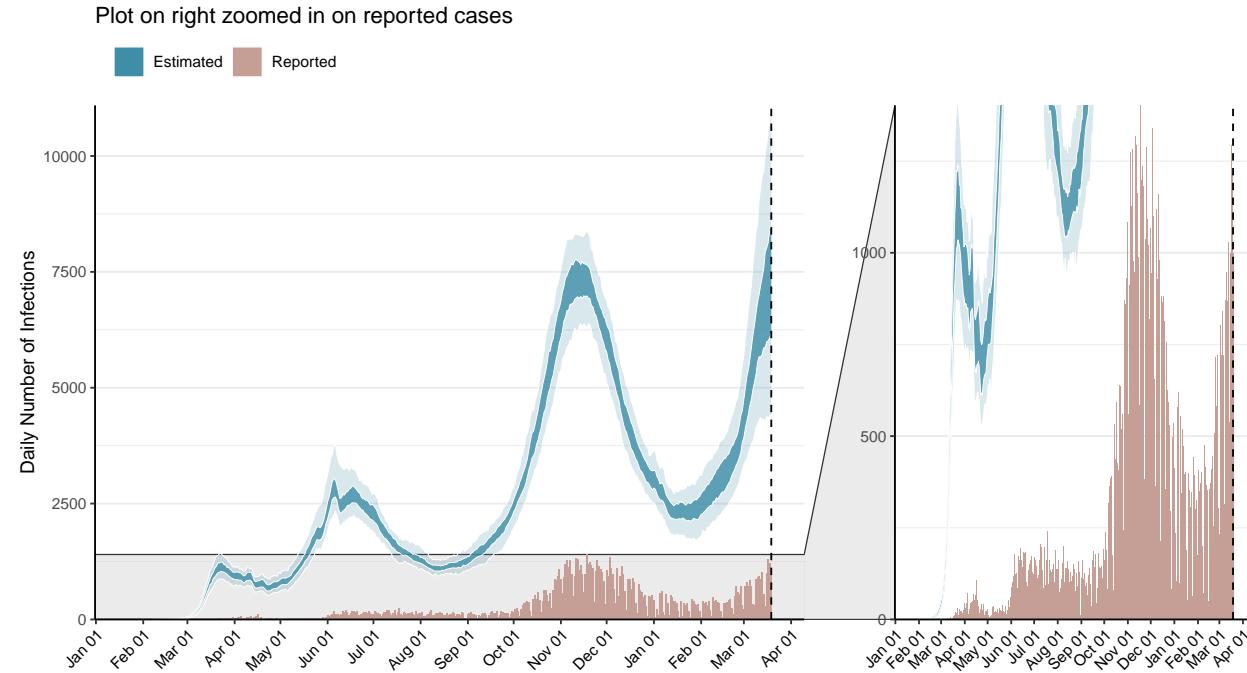


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

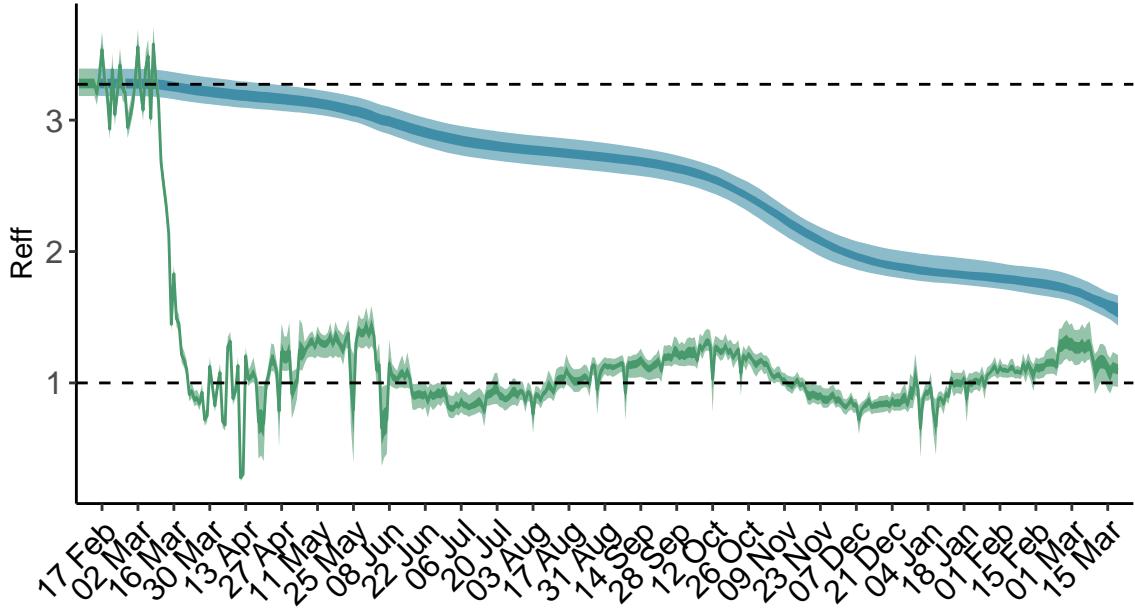


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. North Macedonia 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.](#)

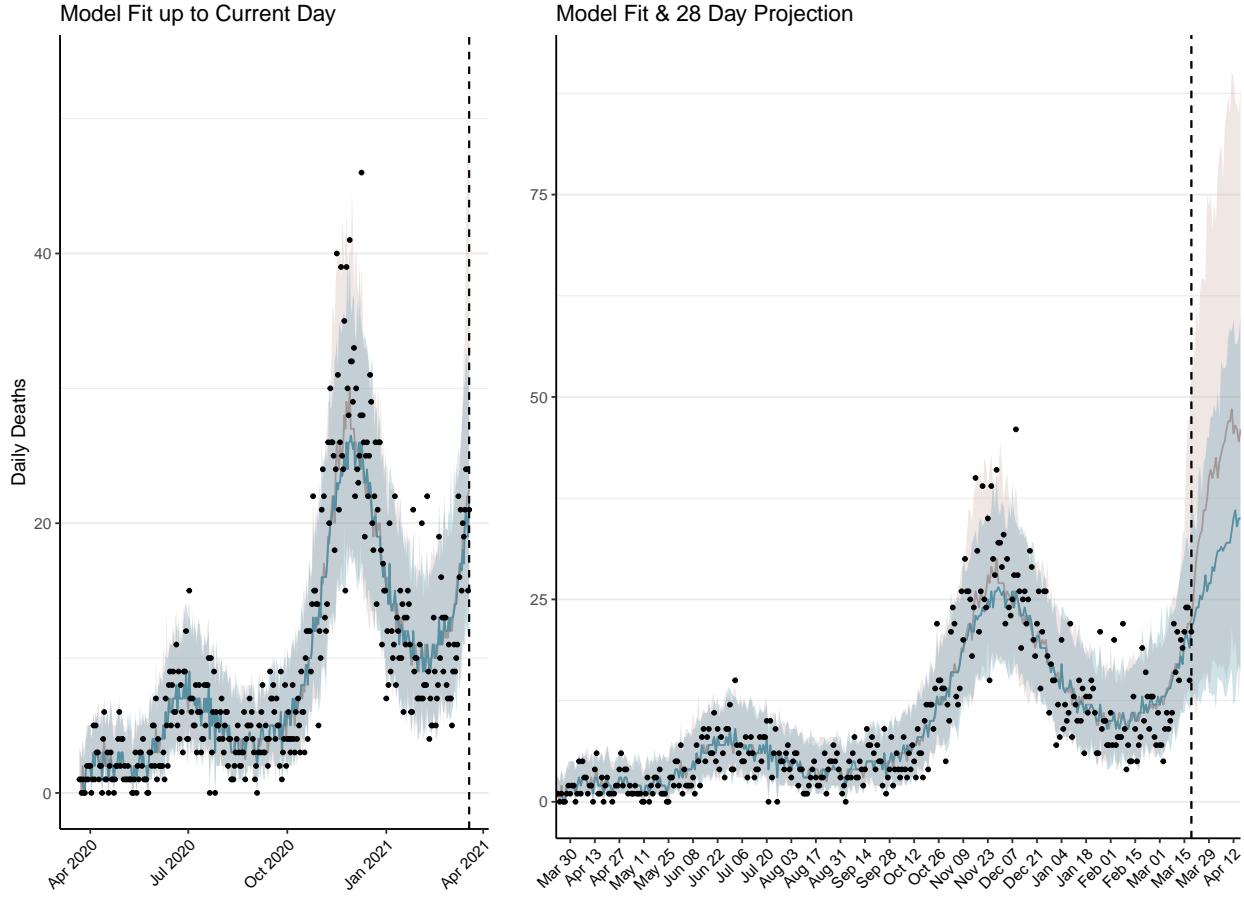


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 909 (95% CI: 870-947) patients requiring treatment with high-pressure oxygen at the current date to 1,414 (95% CI: 1,325-1,504) hospital beds being required on 2021-04-16 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: 307-327) patients requiring treatment with mechanical ventilation at the current date to 354 (95% CI: 345-364) by 2021-04-16. 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.**

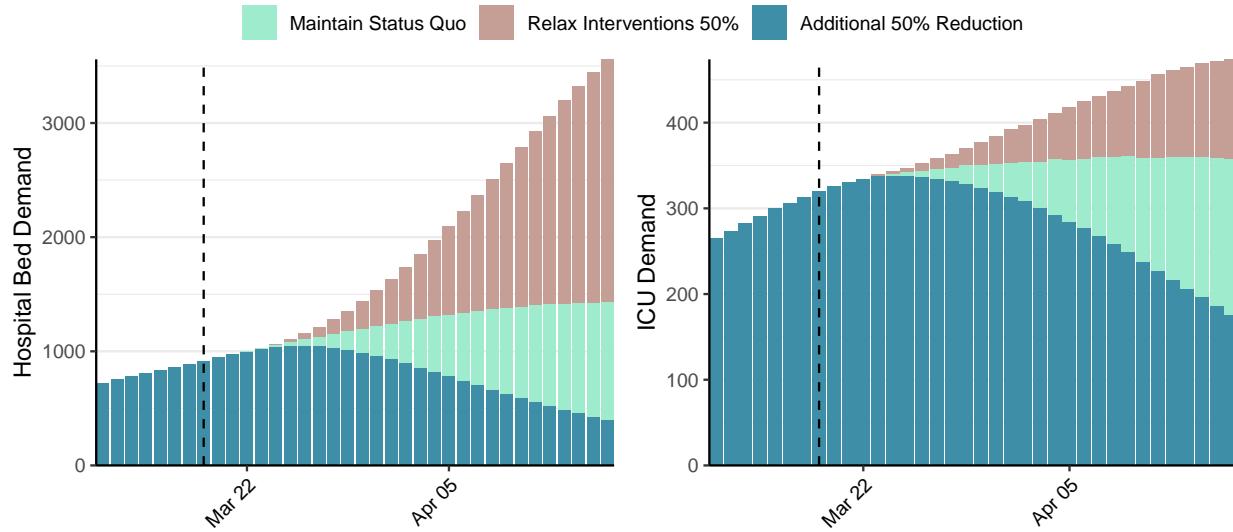


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 7,378 (95% CI: 6,998-7,757) at the current date to 858 (95% CI: 796-920) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,378 (95% CI: 6,998-7,757) at the current date to 21,596 (95% CI: 20,898-22,294) by 2021-04-16.

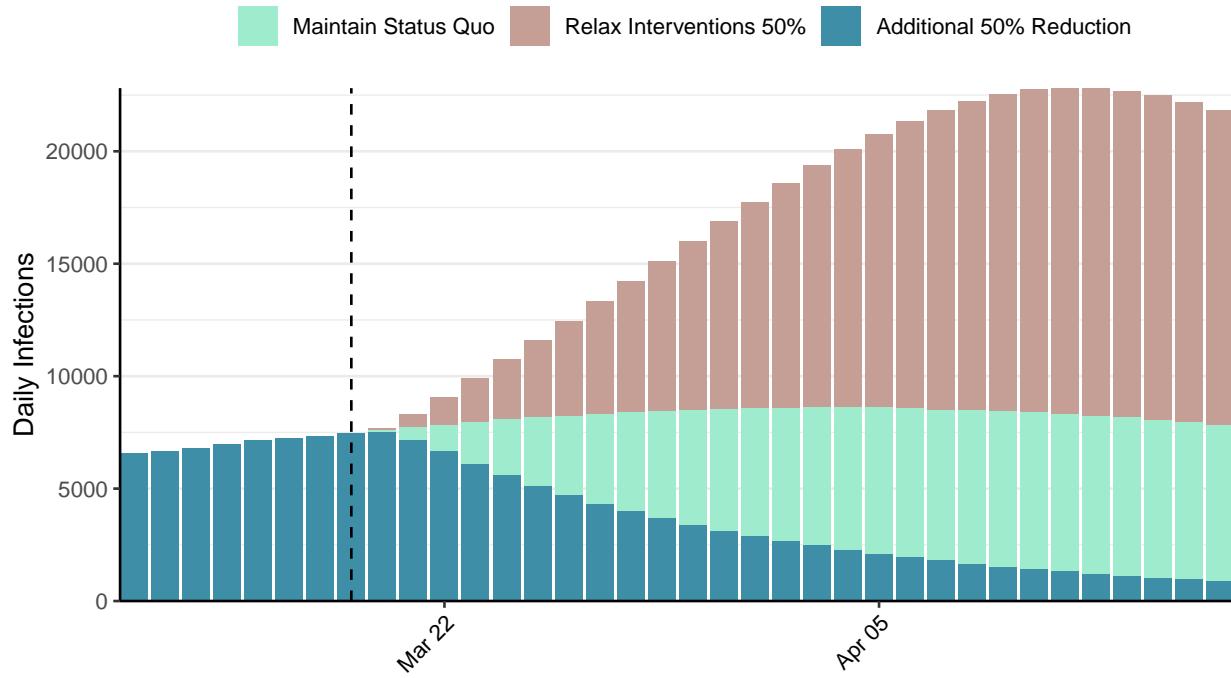


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Mali, 2021-03-19

[Download the report for Mali, 2021-03-19 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}
9,191	73	367	1	1.3 (95% CI: 1.06-1.56)

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.

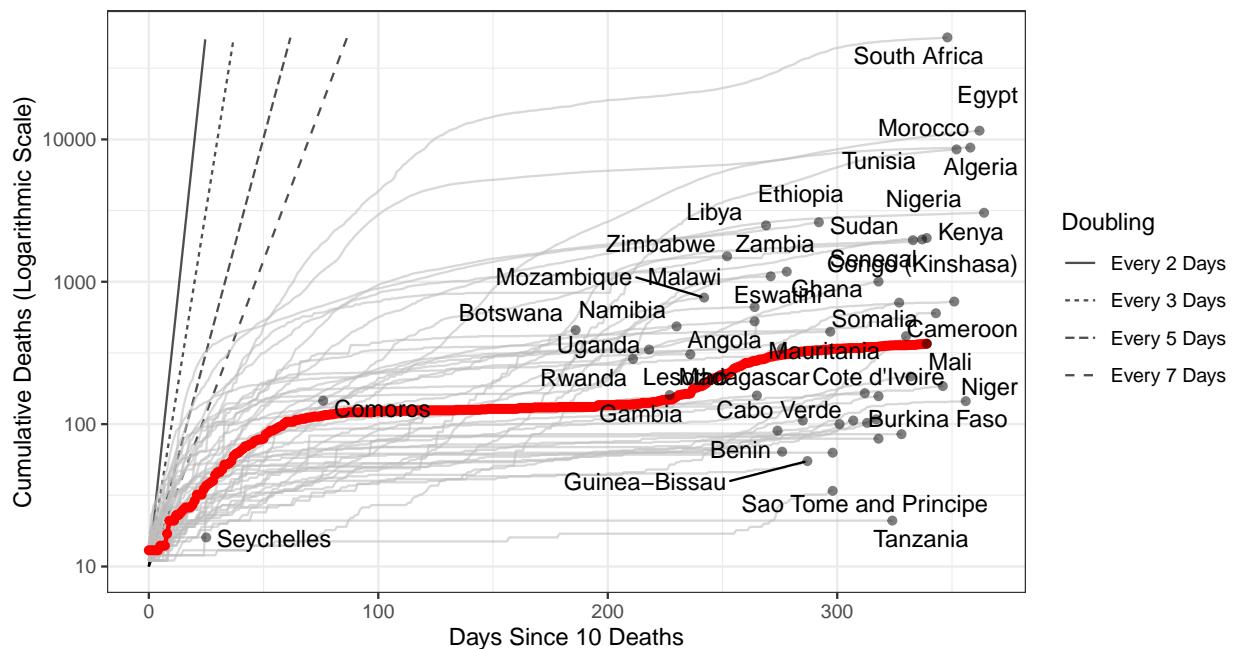


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 18,589 (95% CI: 17,279-19,898) 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).

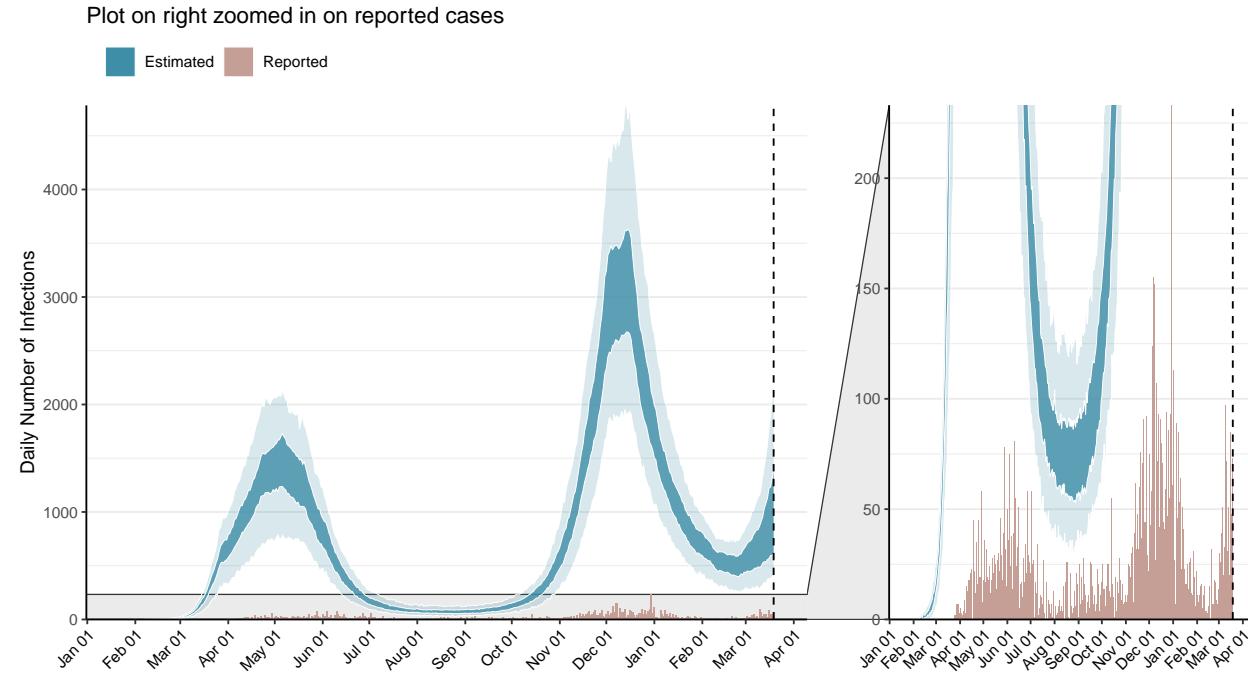


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

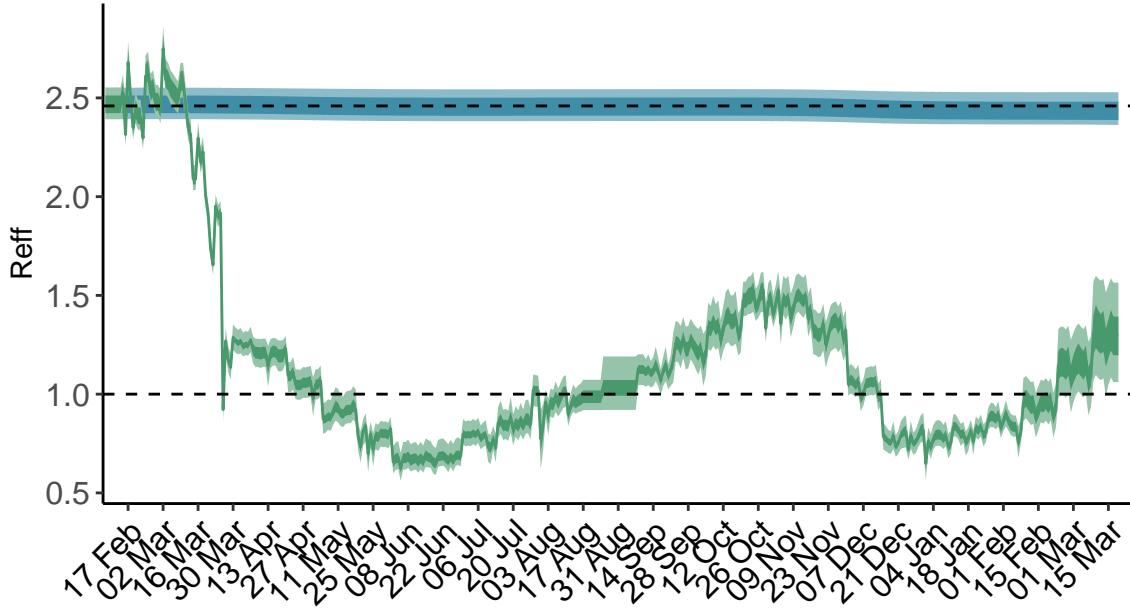


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Mali 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.](#)

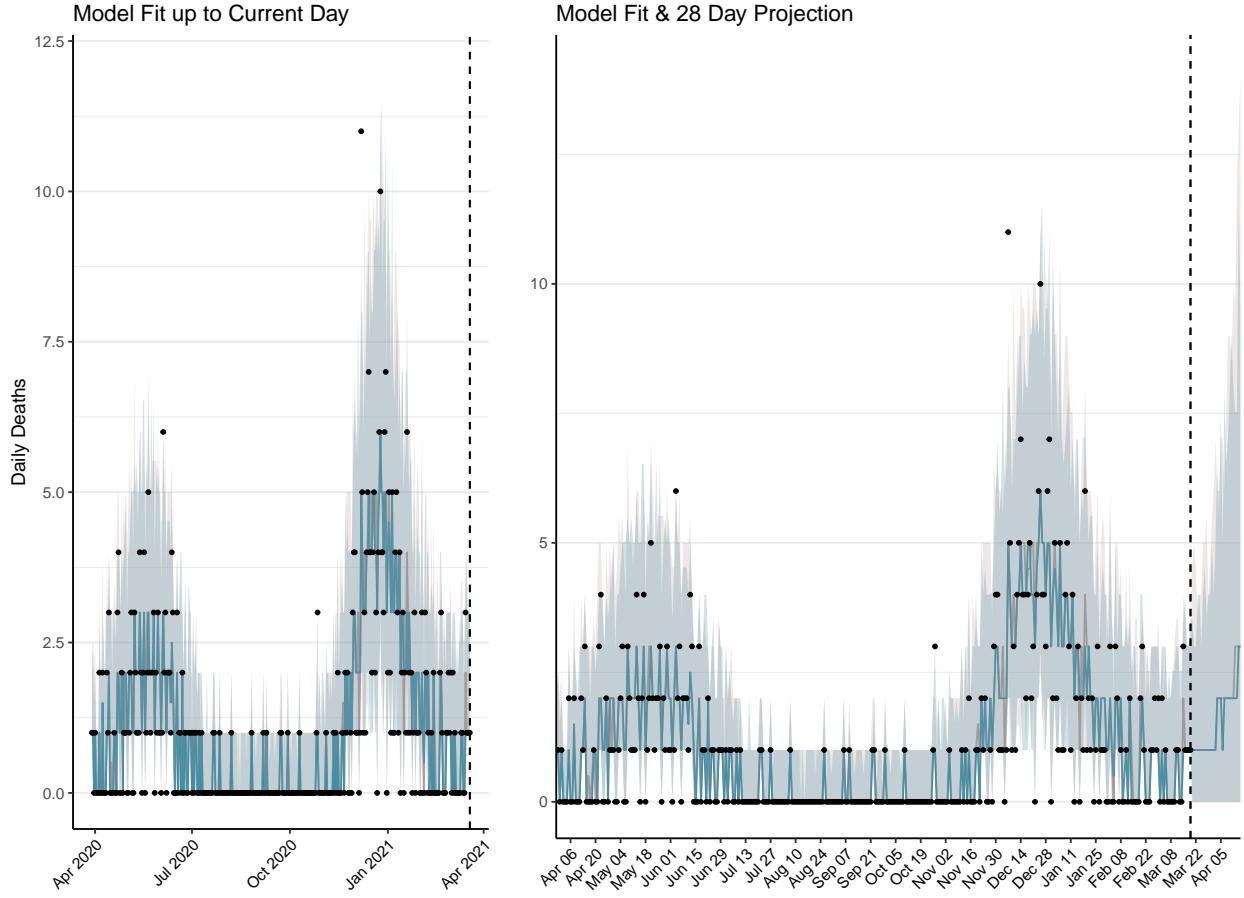


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 51 (95% CI: 46-55) patients requiring treatment with high-pressure oxygen at the current date to 190 (95% CI: 160-221) hospital beds being required on 2021-04-16 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 18 (95% CI: 17-20) patients requiring treatment with mechanical ventilation at the current date to 68 (95% CI: 58-78) by 2021-04-16. 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.**

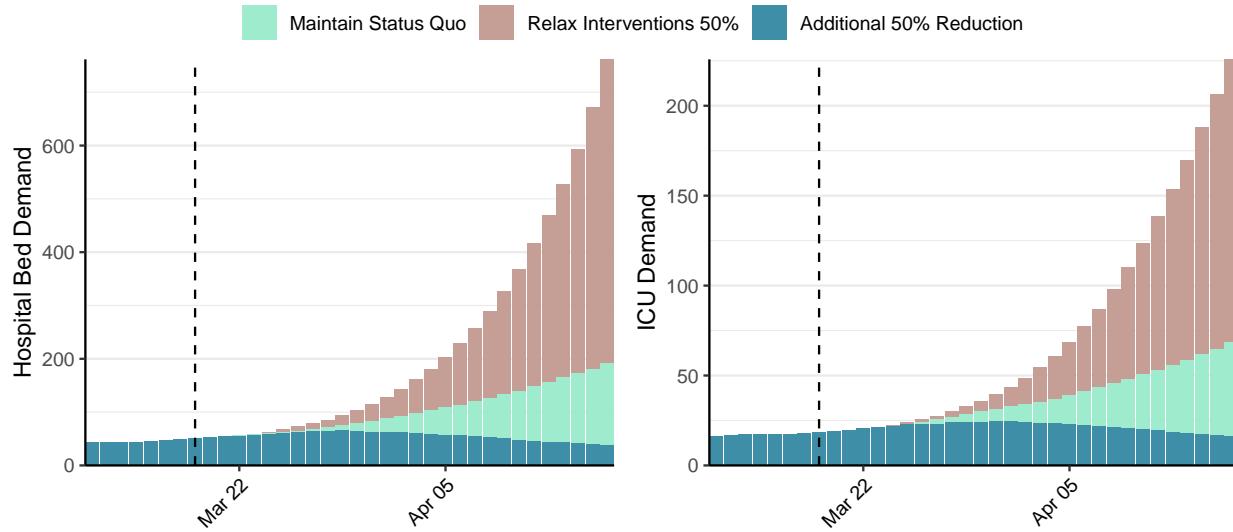


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,051 (95% CI: 947-1,156) at the current date to 273 (95% CI: 225-321) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,051 (95% CI: 947-1,156) at the current date to 30,864 (95% CI: 24,584-37,144) by 2021-04-16.

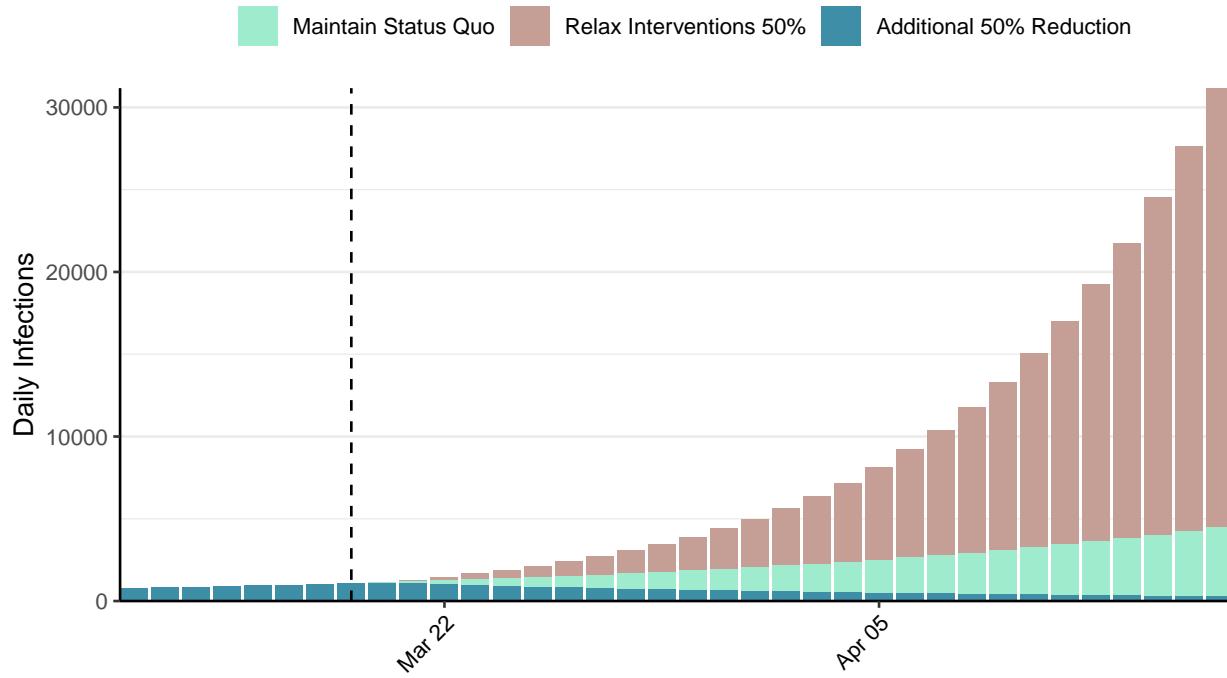


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Myanmar, 2021-03-19

[Download the report for Myanmar, 2021-03-19 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}
142,212	0	3,205	0	0.2 (95% CI: 0.13-0.29)

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.

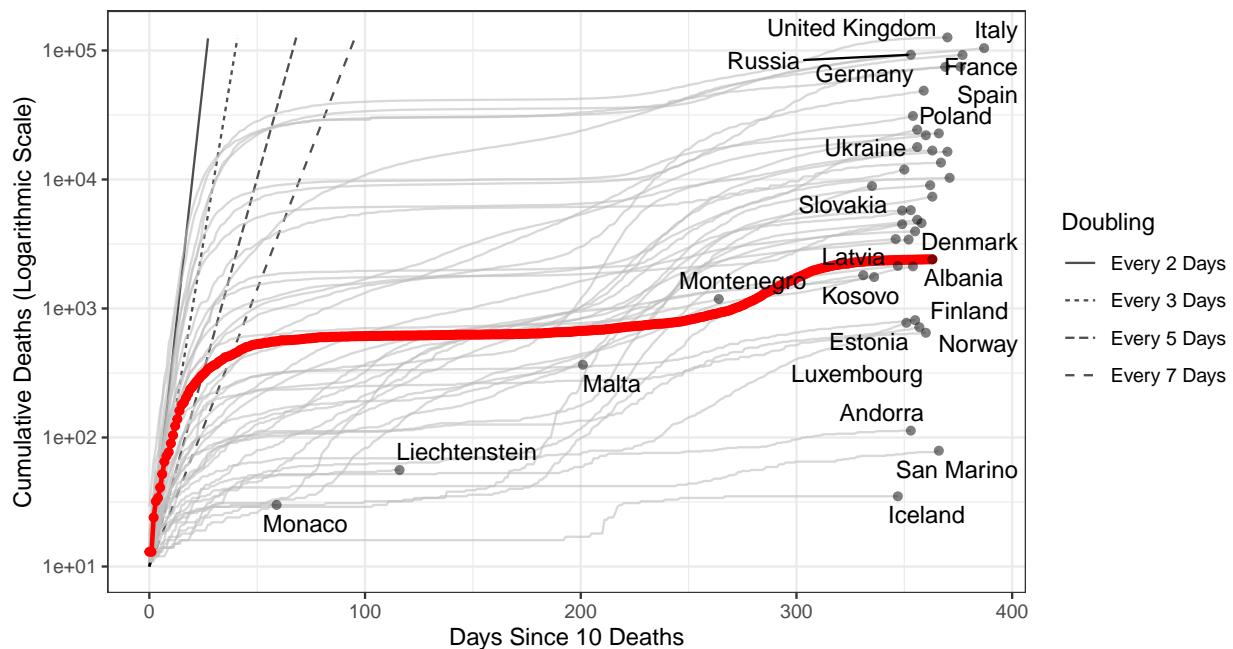


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 665 (95% CI: 611-719) 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

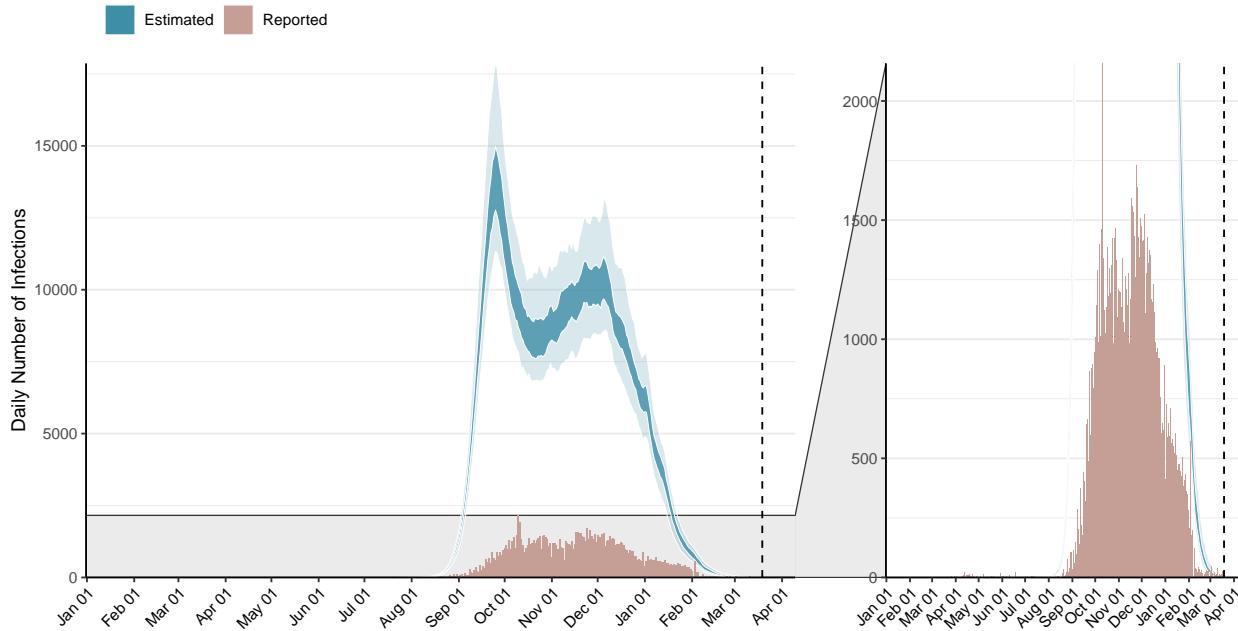


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

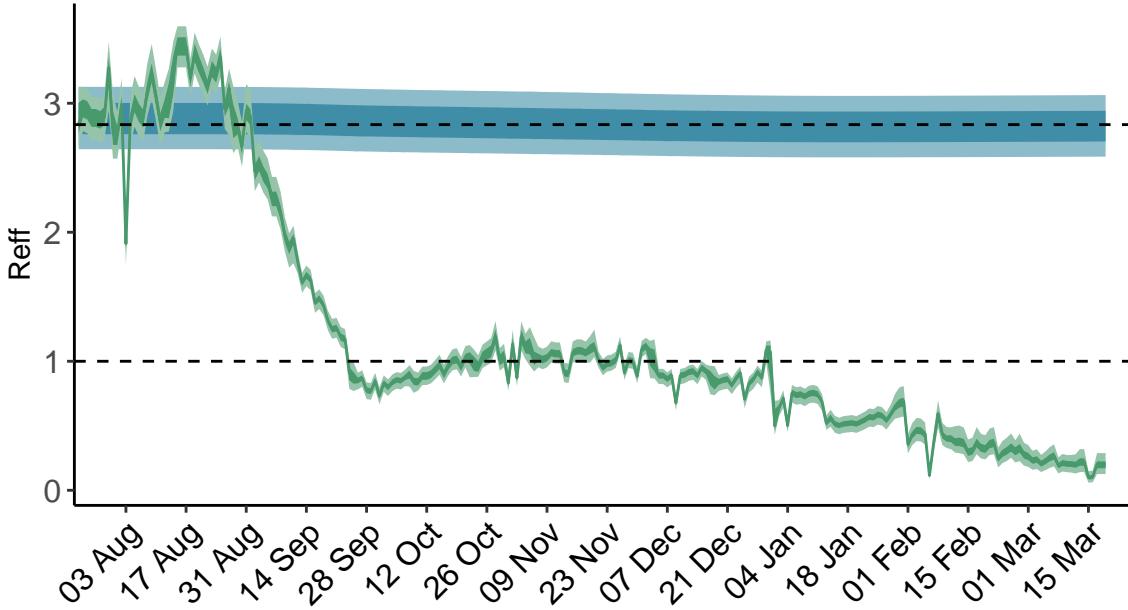


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

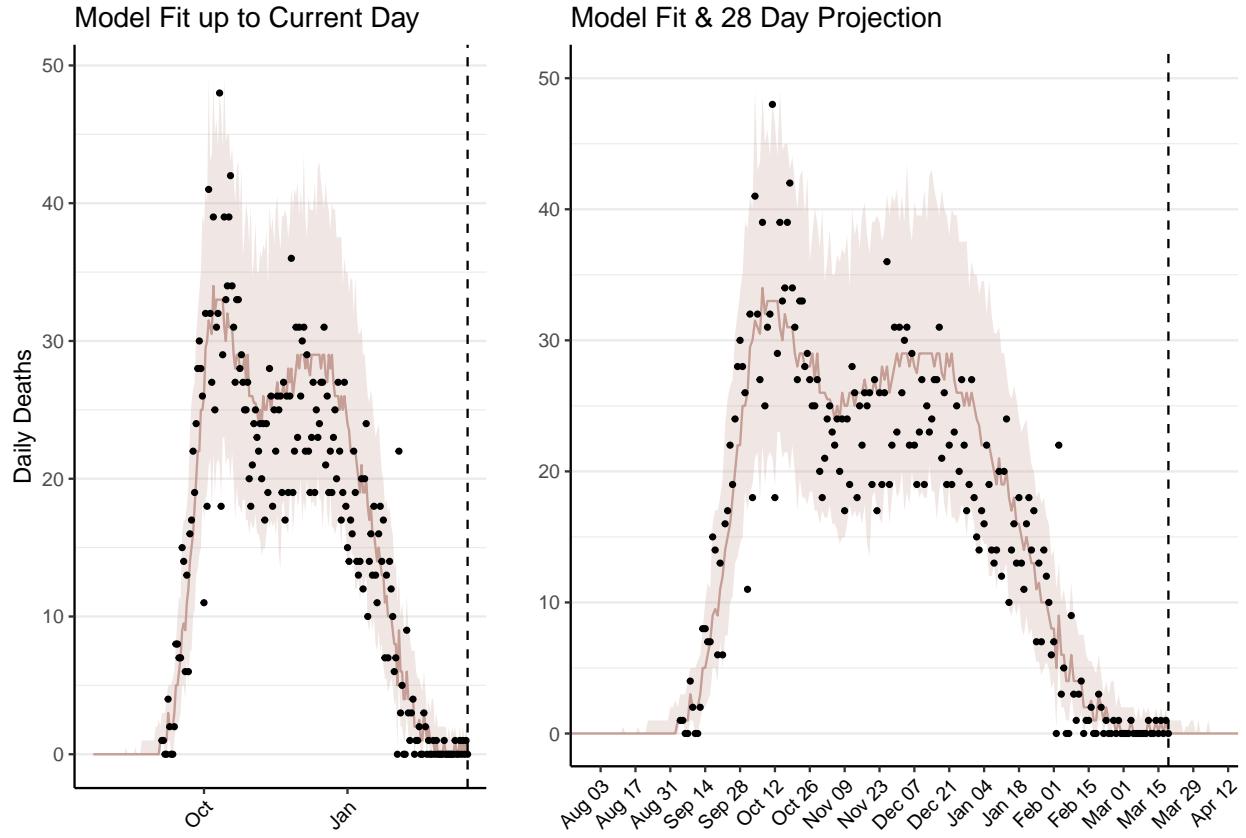


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 (95% CI: 2-3) patients requiring treatment with high-pressure oxygen at the current date to 0 (95% CI: 0-0) hospital beds being required on 2021-04-16 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 0 (95% CI: 0-0) by 2021-04-16. 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.**

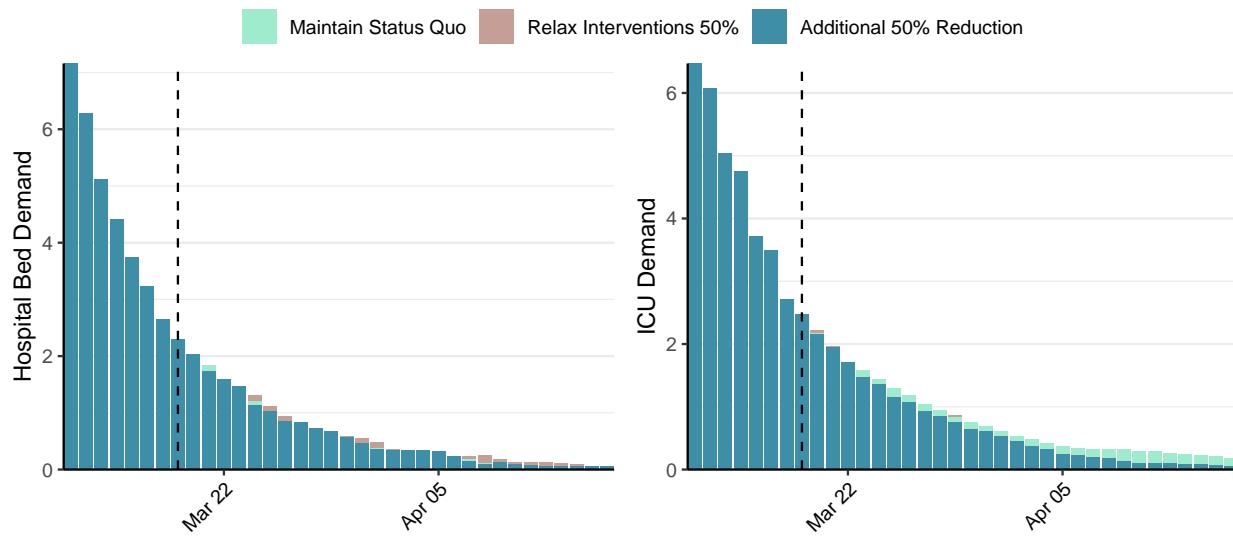


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 1-1) at the current date to 0 (95% CI: NaN-NaN) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 1-1) at the current date to 0 (95% CI: 0-0) by 2021-04-16.

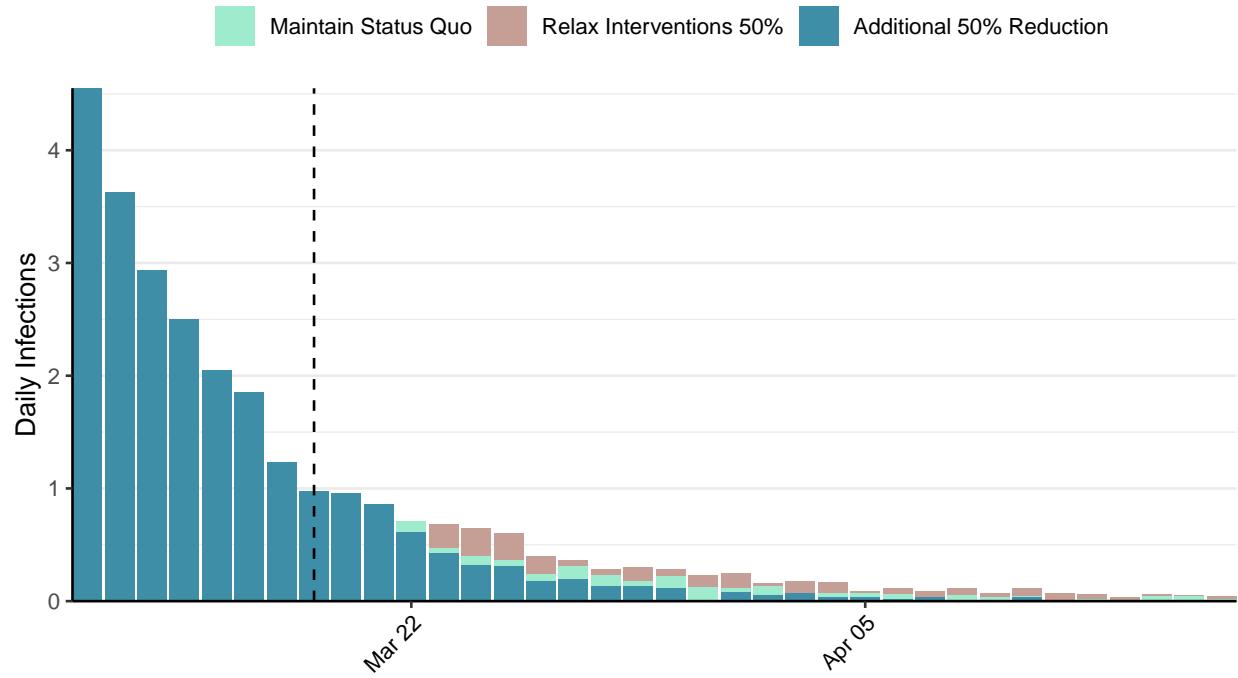


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

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Situation Report for COVID-19: Montenegro, 2021-03-19

[Download the report for Montenegro, 2021-03-19 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}
86,282	508	1,184	6	0.87 (95% CI: 0.8-0.92)

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.

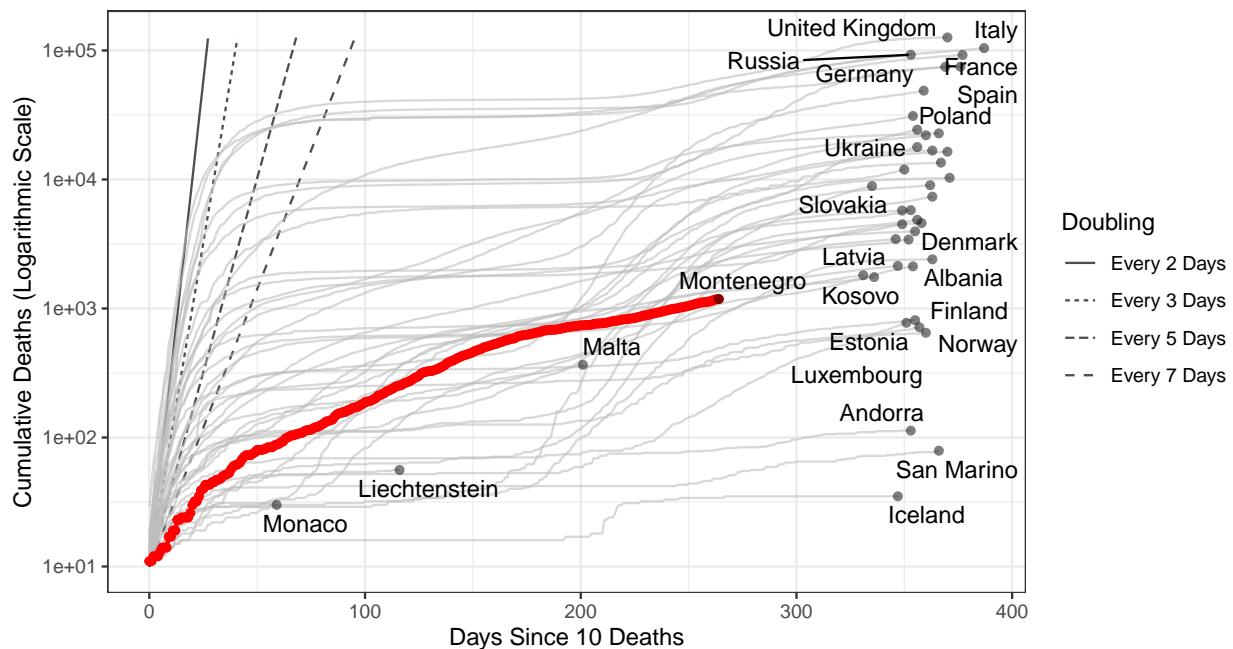


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 47,467 (95% CI: 45,865-49,069) 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).

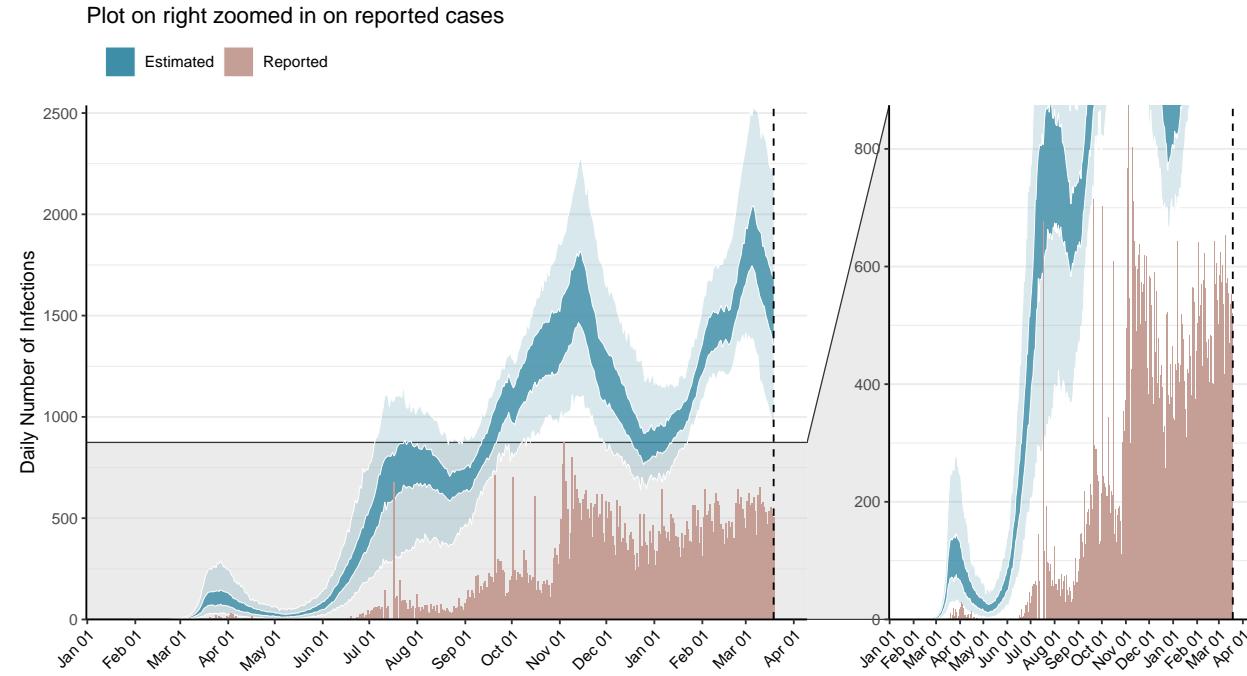


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

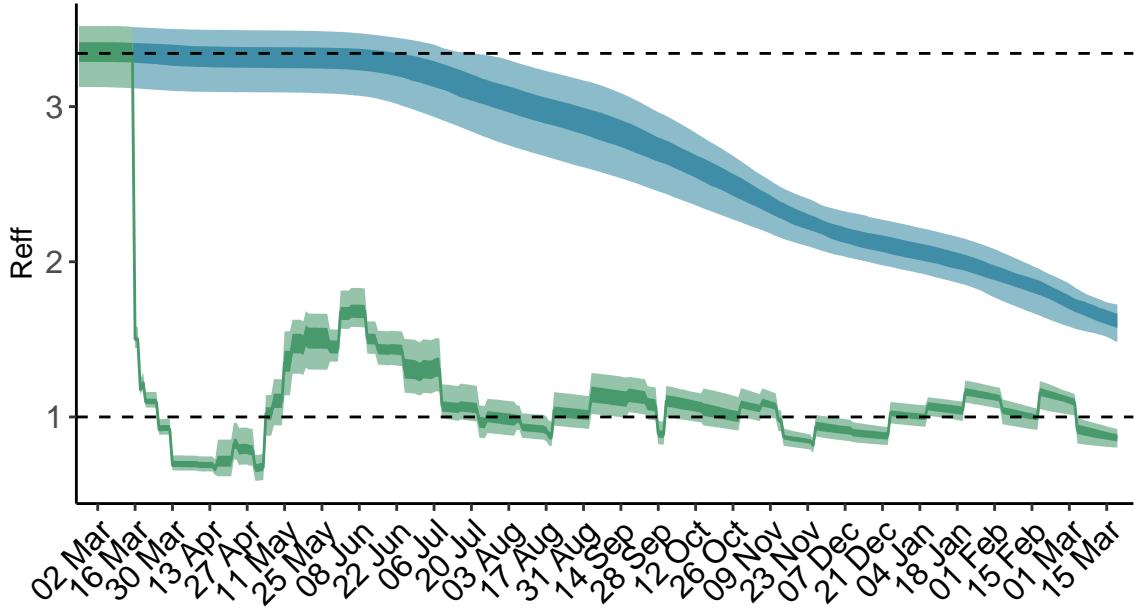


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

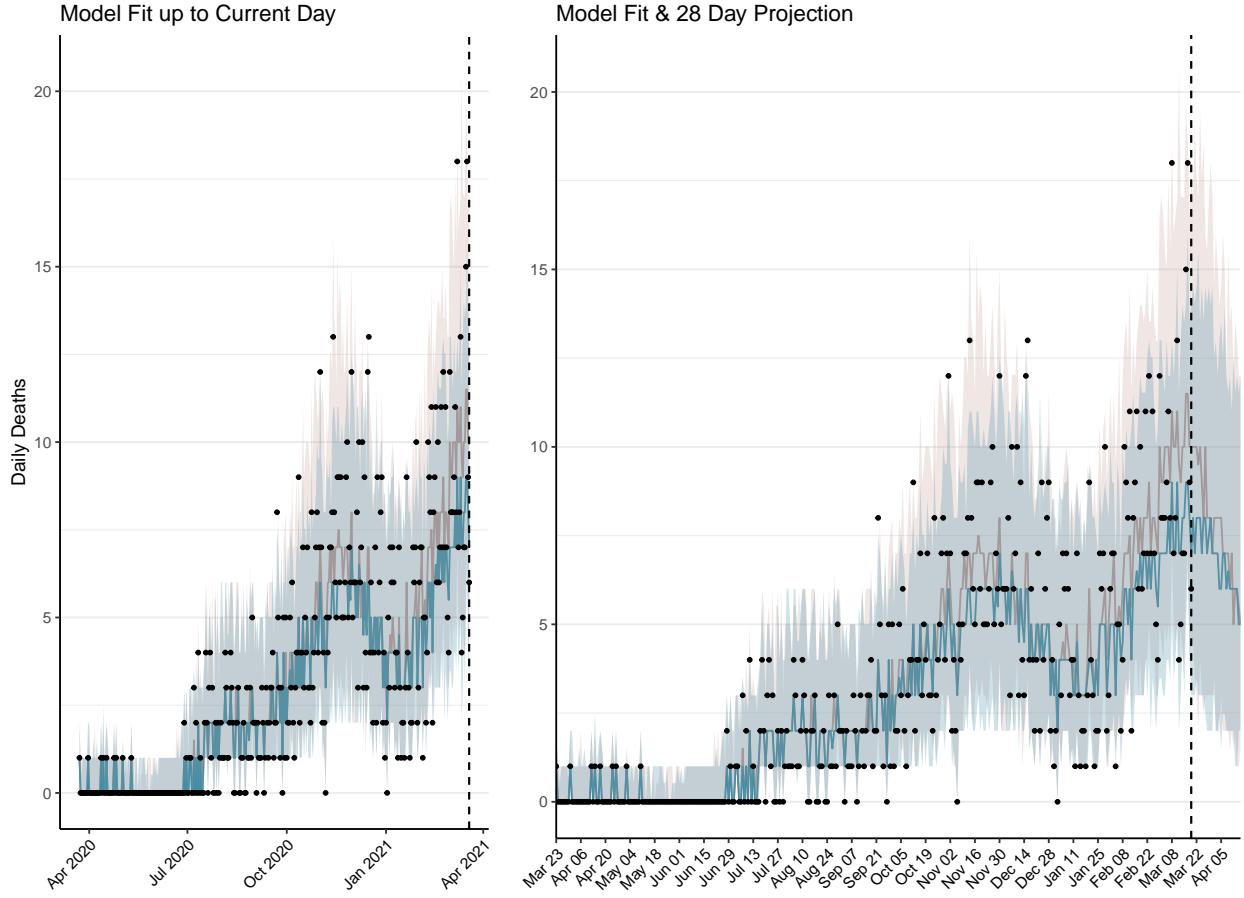


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 285 (95% CI: 274-295) patients requiring treatment with high-pressure oxygen at the current date to 176 (95% CI: 167-184) hospital beds being required on 2021-04-16 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 52 (95% CI: 51-54) patients requiring treatment with mechanical ventilation at the current date to 46 (95% CI: 45-48) by 2021-04-16. 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.**

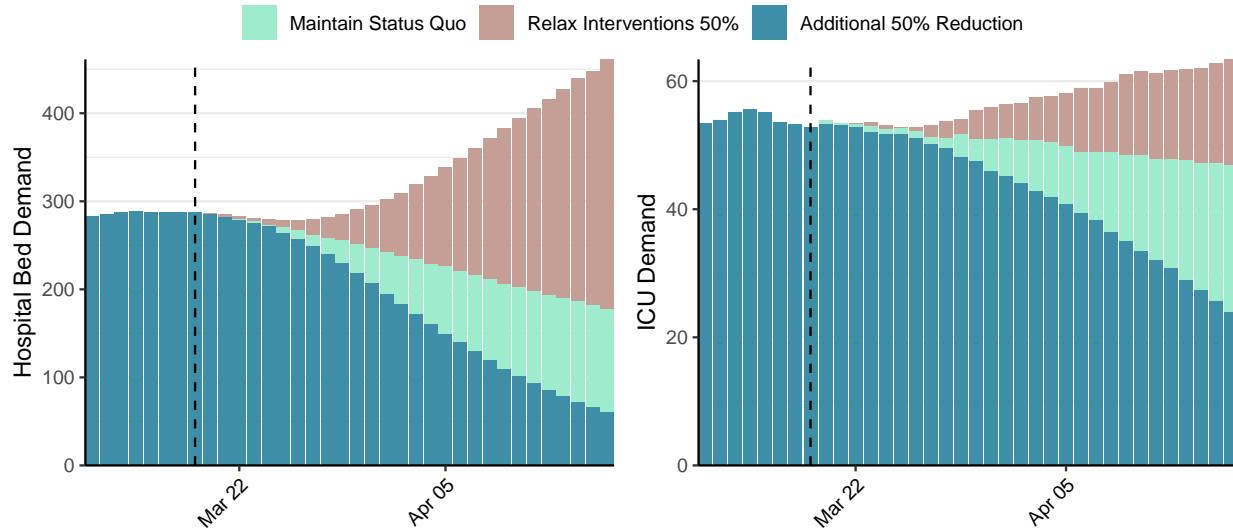


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,512 (95% CI: 1,447-1,577) at the current date to 85 (95% CI: 80-90) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,512 (95% CI: 1,447-1,577) at the current date to 3,116 (95% CI: 2,975-3,256) by 2021-04-16.

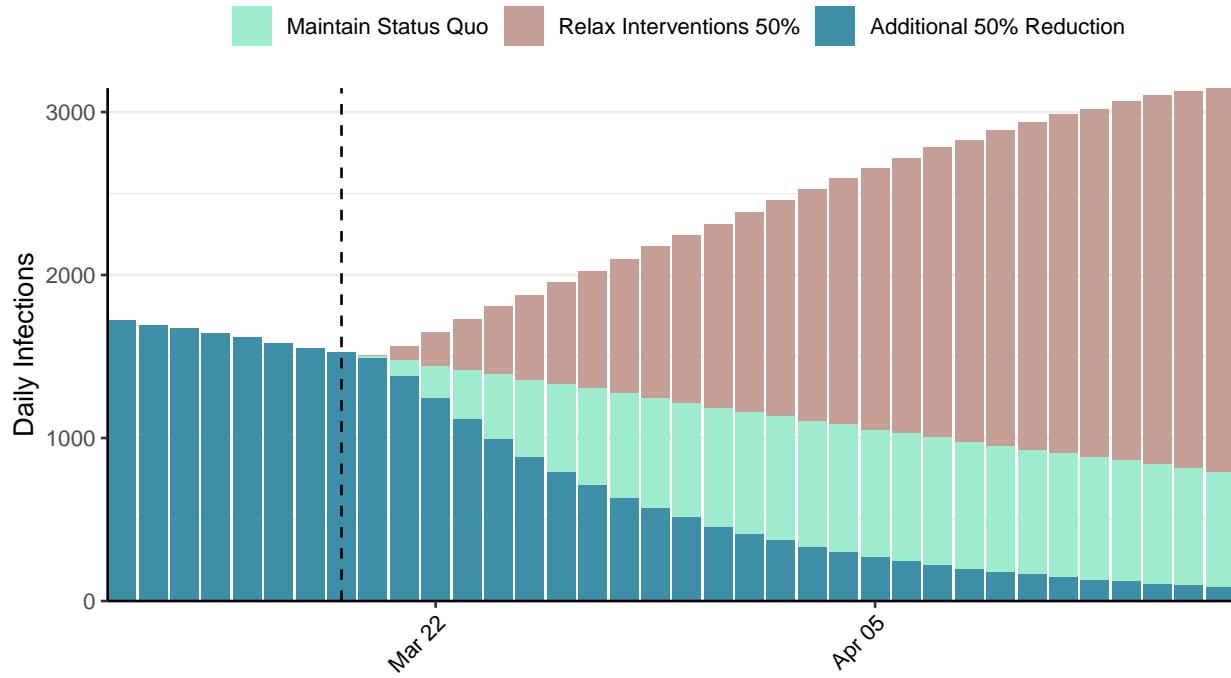


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Mongolia, 2021-03-19

[Download the report for Mongolia, 2021-03-19 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}
4,806	148	4	0	1.7 (95% CI: 1.26-2.22)

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. Mongolia is not shown in the following plot as only 4 deaths have been reported to date**

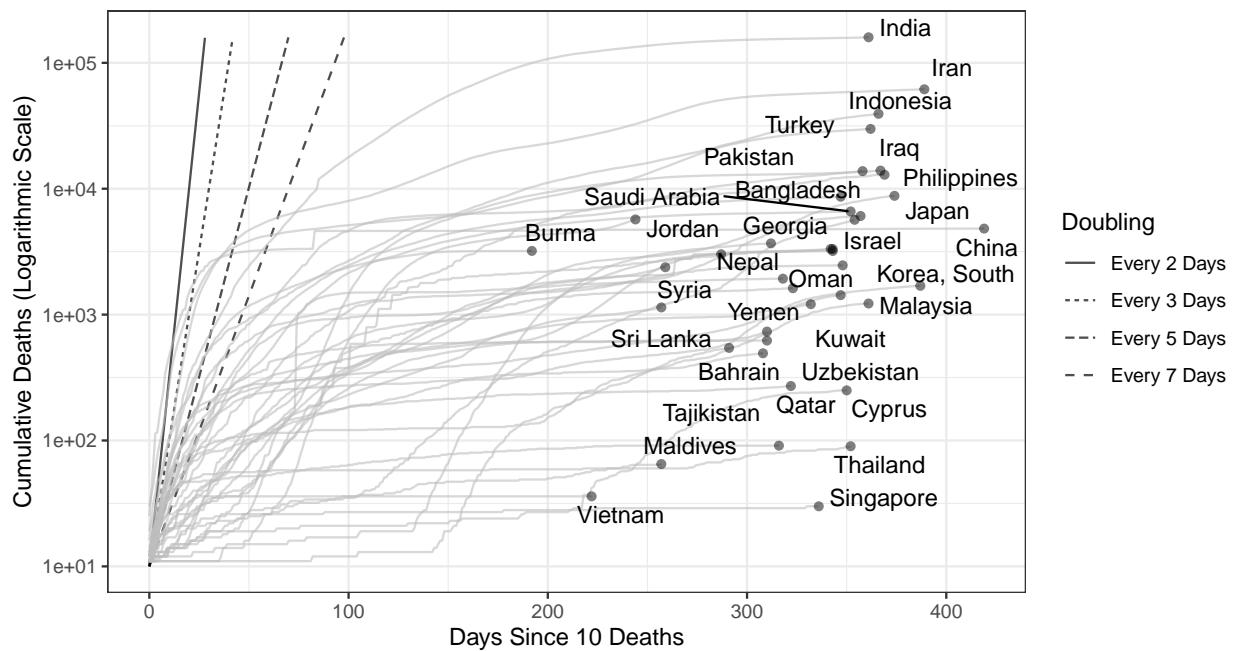


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 5,794 (95% CI: 4,293-7,296) 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).

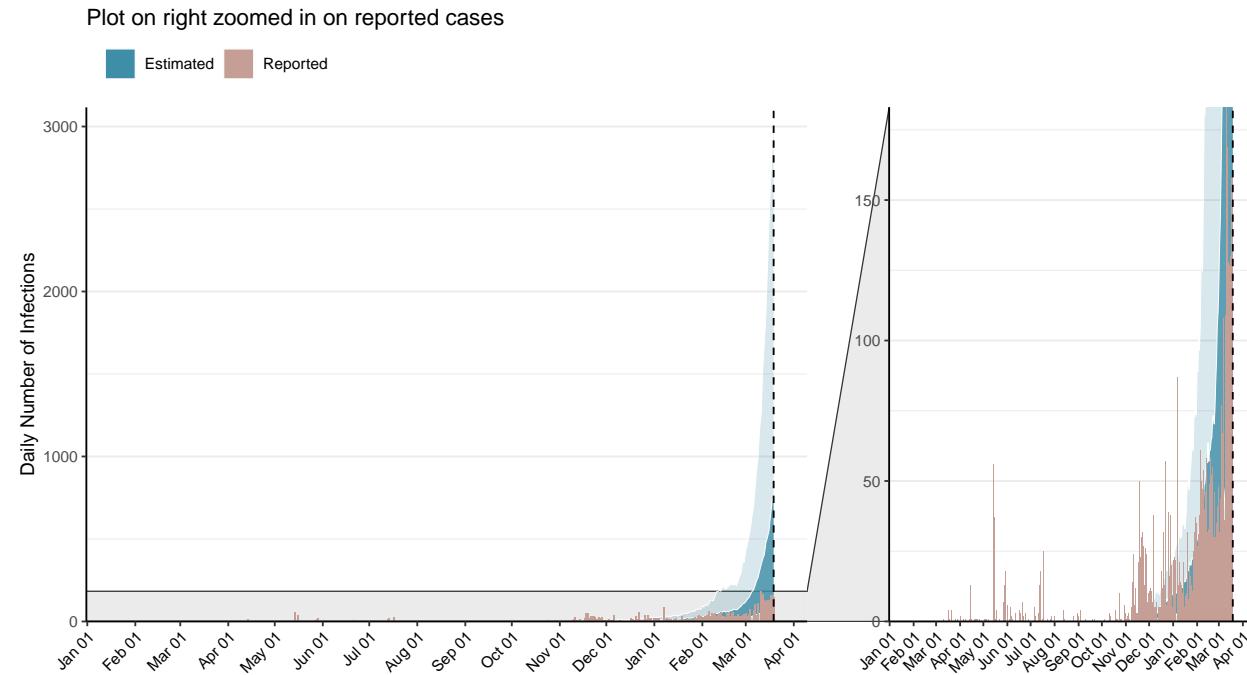


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

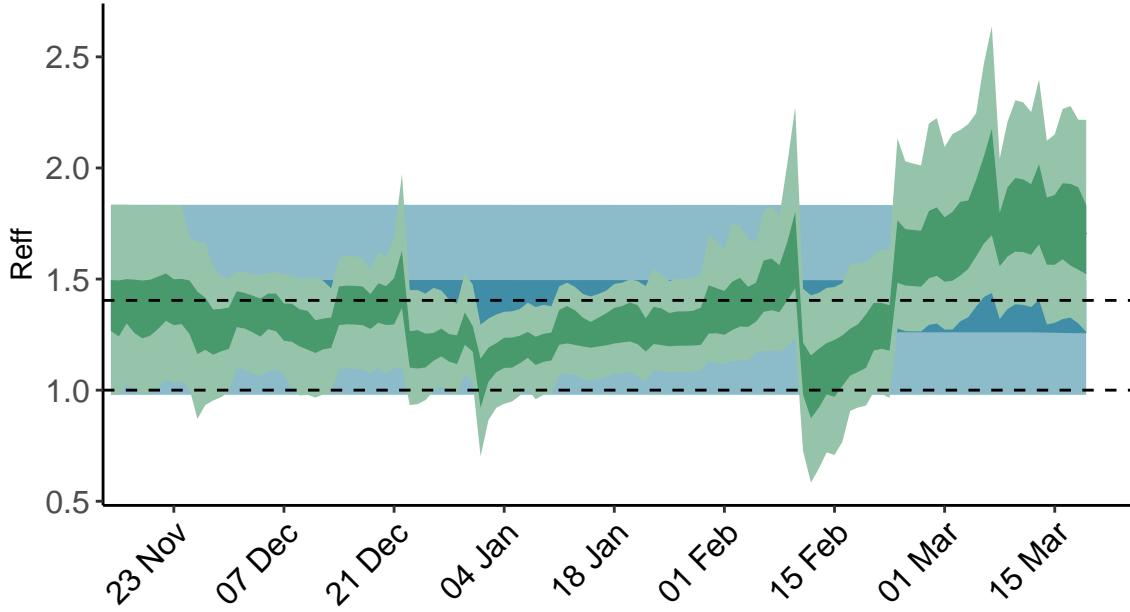


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Mongolia 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.](#)

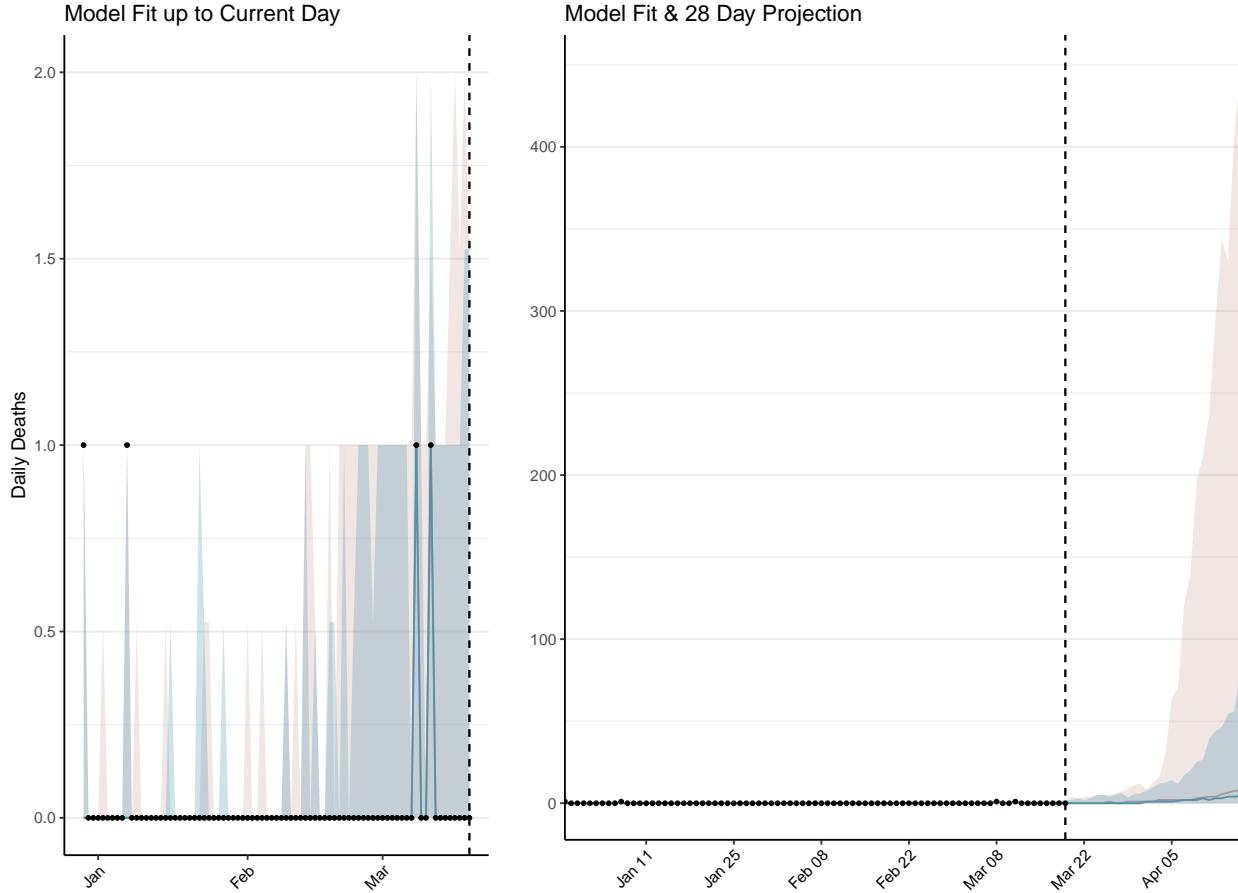


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 27 (95% CI: 20-33) patients requiring treatment with high-pressure oxygen at the current date to 1,224 (95% CI: 814-1,635) hospital beds being required on 2021-04-16 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: 6-11) patients requiring treatment with mechanical ventilation at the current date to 235 (95% CI: 188-282) by 2021-04-16. 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.**

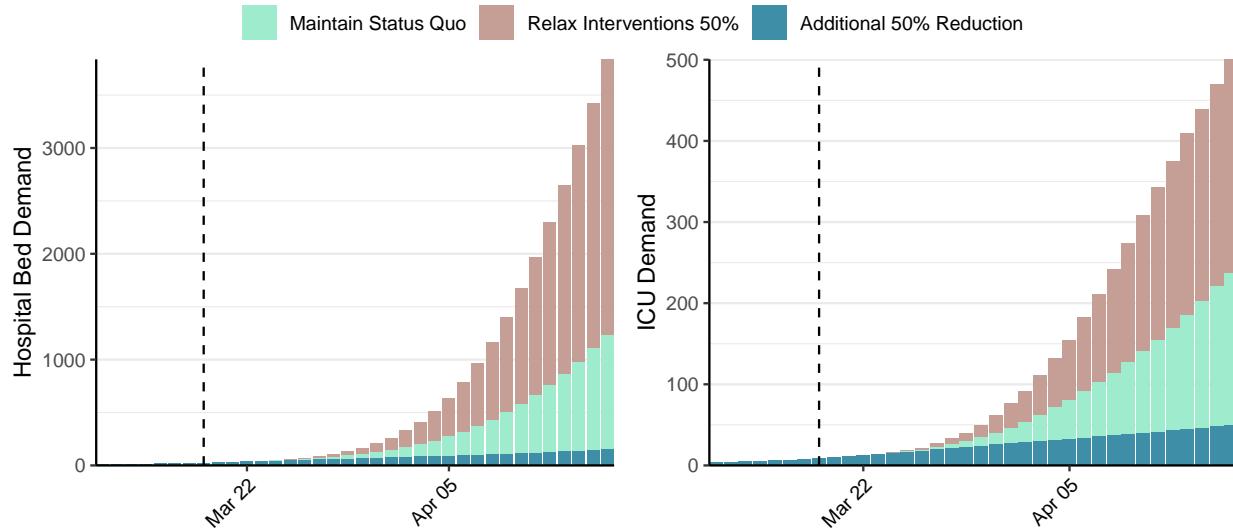


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 609 (95% CI: 428-790) at the current date to 2,030 (95% CI: 1,006-3,054) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 609 (95% CI: 428-790) at the current date to 81,637 (95% CI: 69,634-93,640) by 2021-04-16.

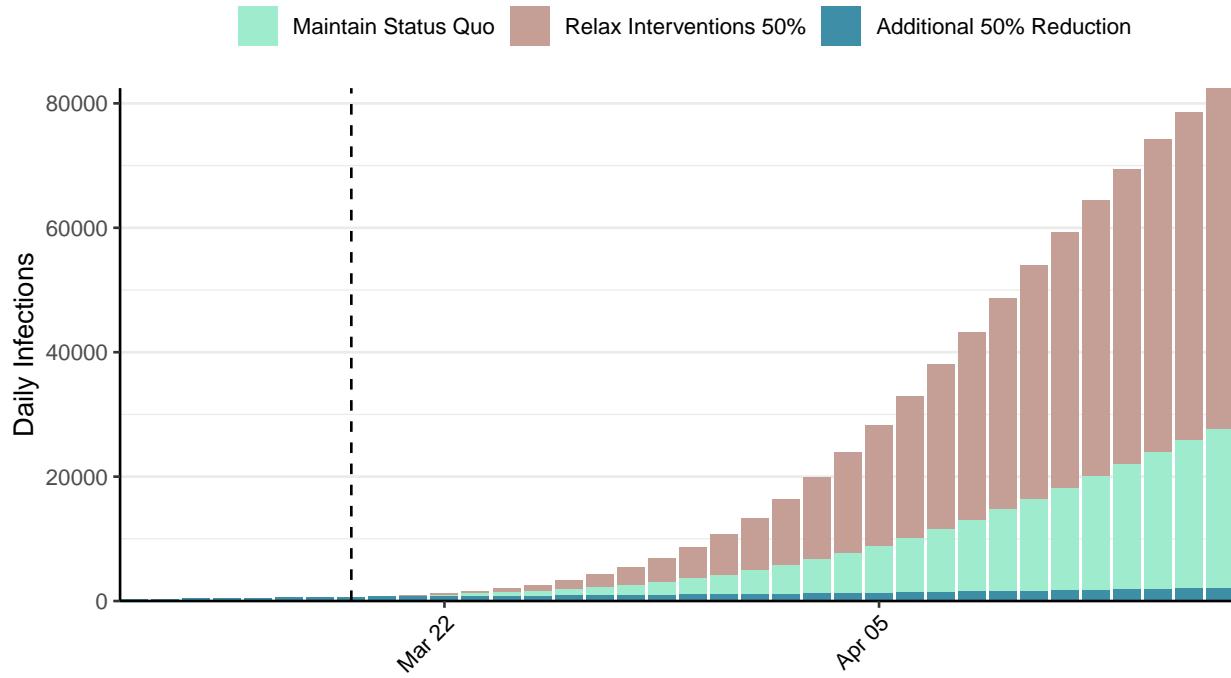


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Mozambique, 2021-03-19

[Download the report for Mozambique, 2021-03-19 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}
65,799	347	774	3	0.67 (95% CI: 0.54-0.81)

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.

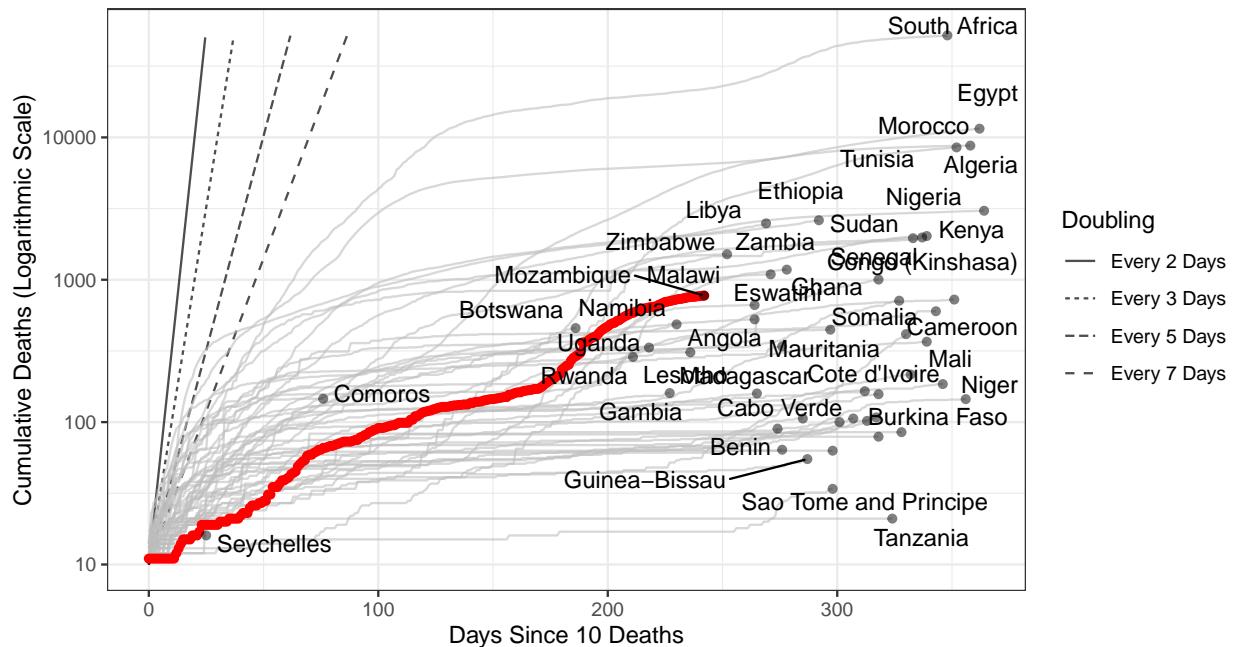


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 91,243 (95% CI: 82,960-99,527) 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).

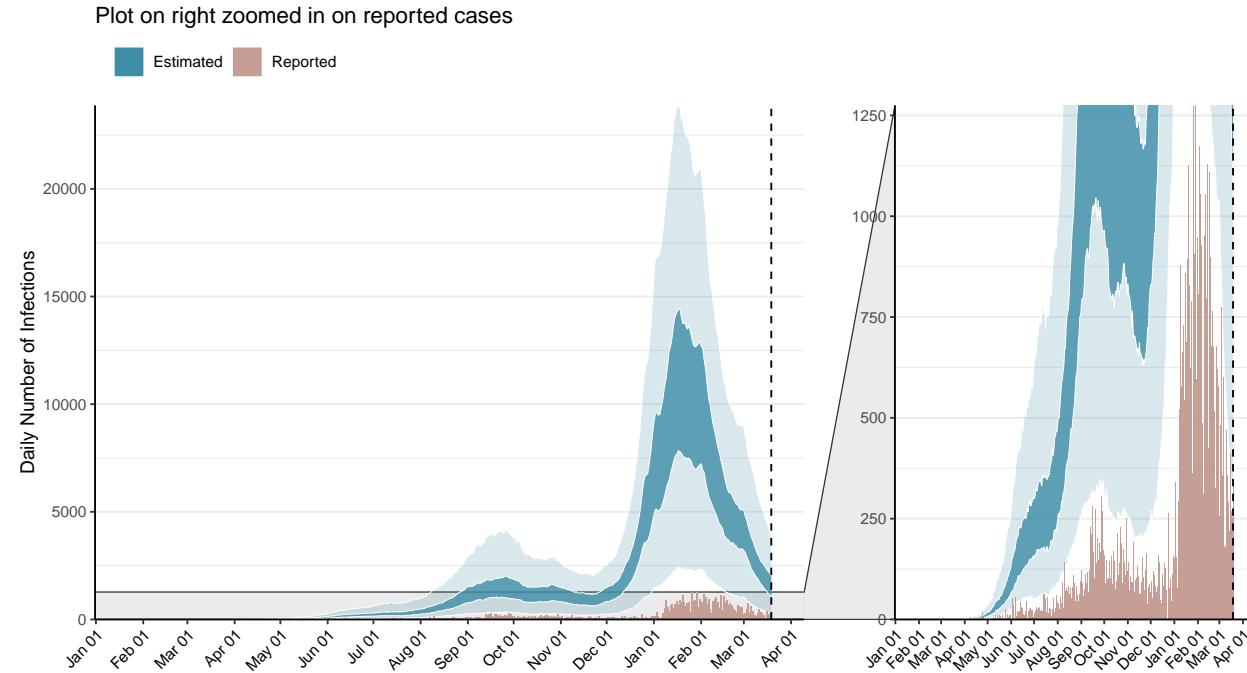


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

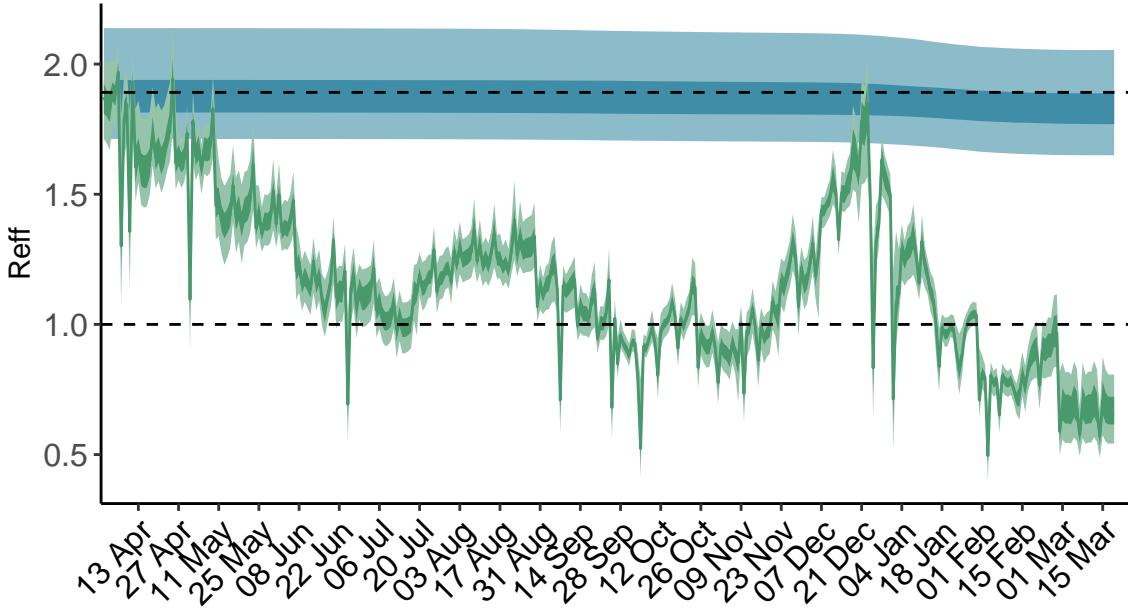


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

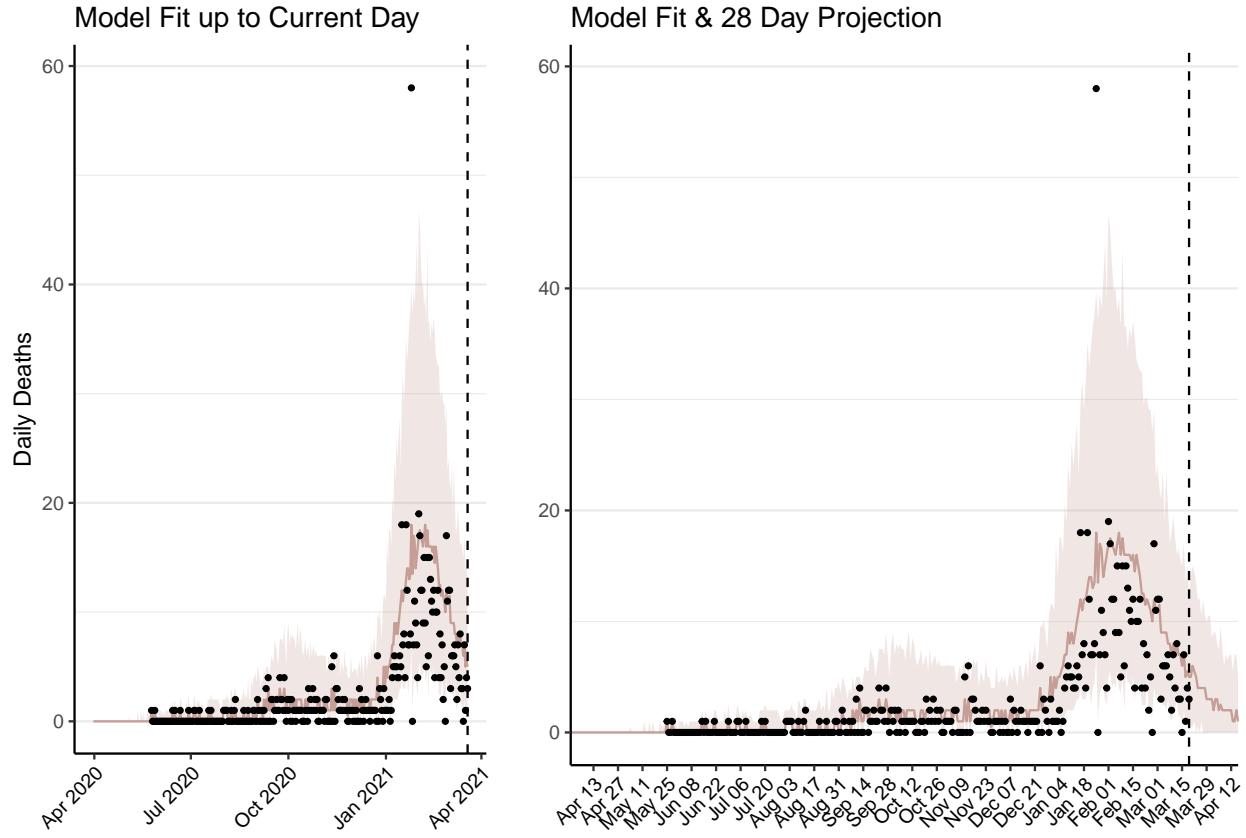


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 226 (95% CI: 205-247) patients requiring treatment with high-pressure oxygen at the current date to 57 (95% CI: 49-65) hospital beds being required on 2021-04-16 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 99 (95% CI: 89-108) patients requiring treatment with mechanical ventilation at the current date to 27 (95% CI: 23-30) by 2021-04-16. 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.**

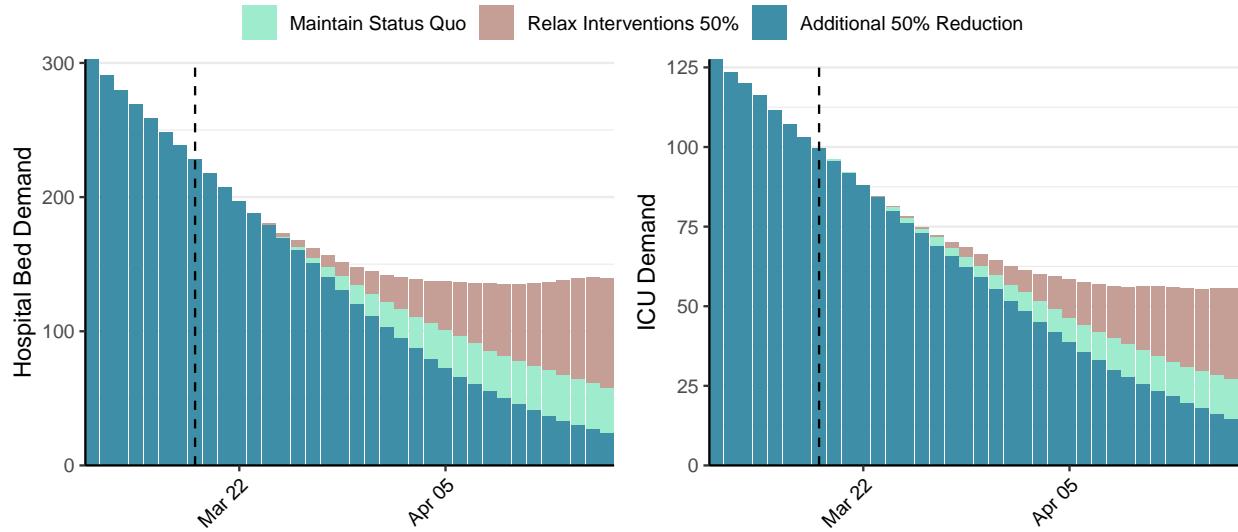


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,612 (95% CI: 1,437-1,787) at the current date to 44 (95% CI: 37-51) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,612 (95% CI: 1,437-1,787) at the current date to 1,999 (95% CI: 1,640-2,359) by 2021-04-16.

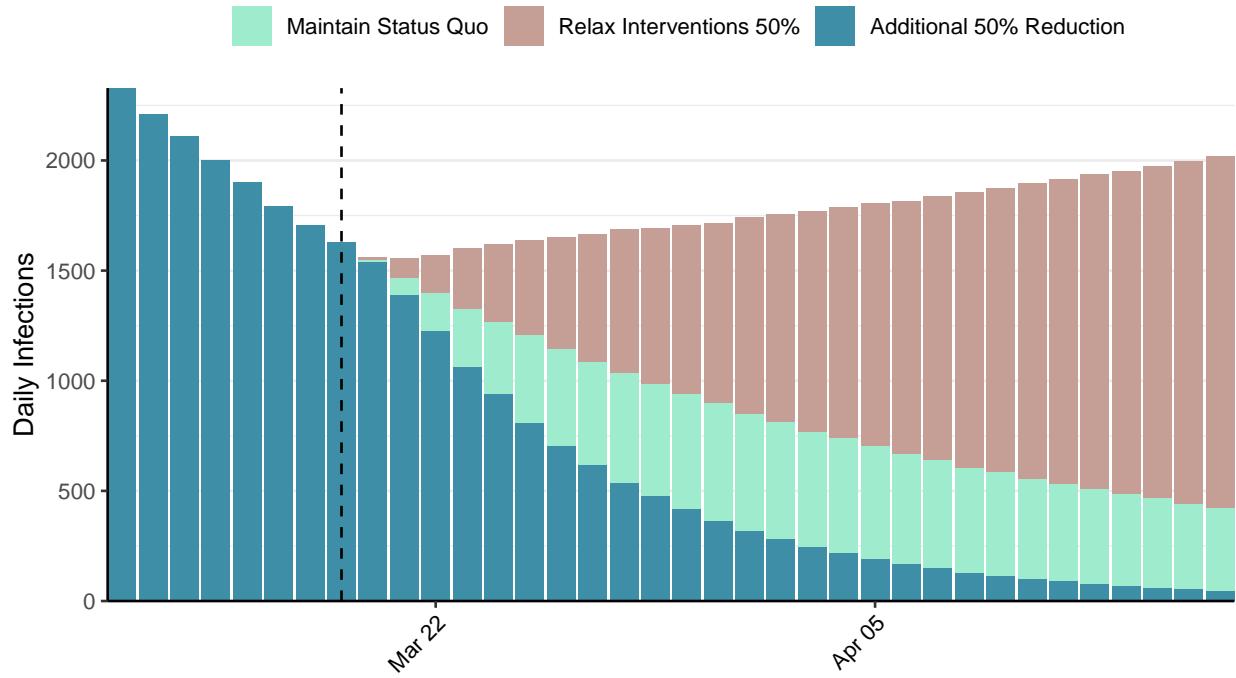


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

Situation Report for COVID-19: Mauritania, 2021-03-19

[Download the report for Mauritania, 2021-03-19 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}
17,570	28	446	1	0.99 (95% CI: 0.75-1.23)

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.

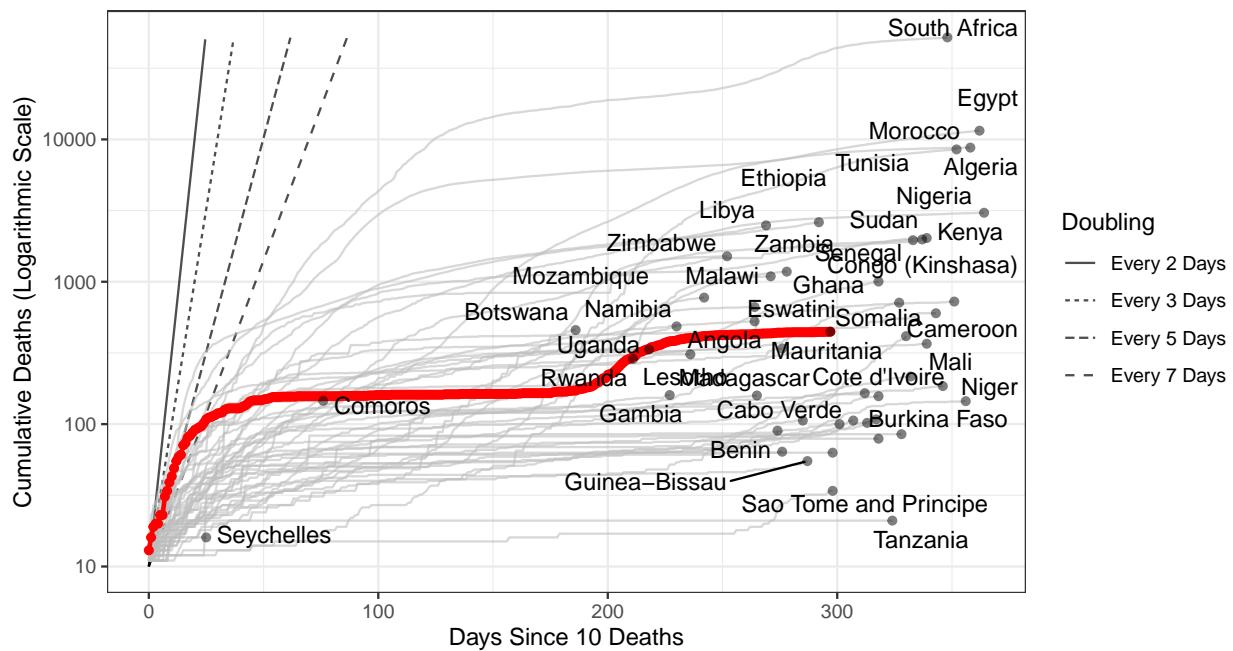


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 4,274 (95% CI: 3,897-4,652) 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).

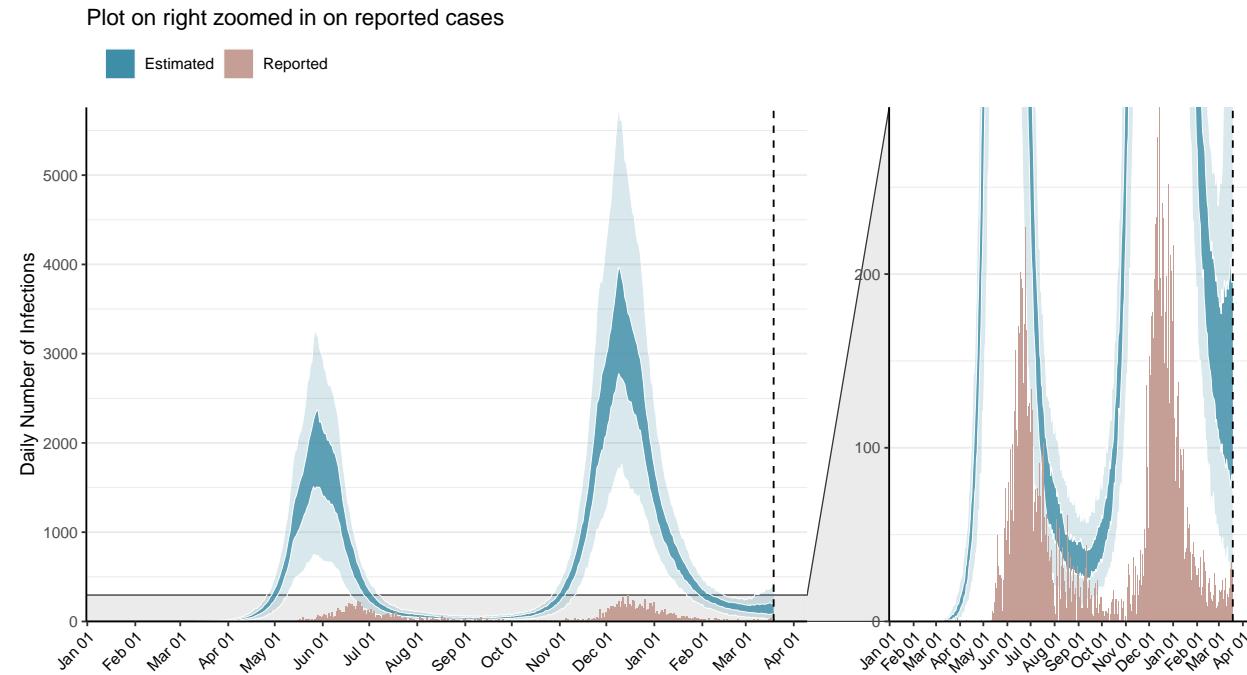


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

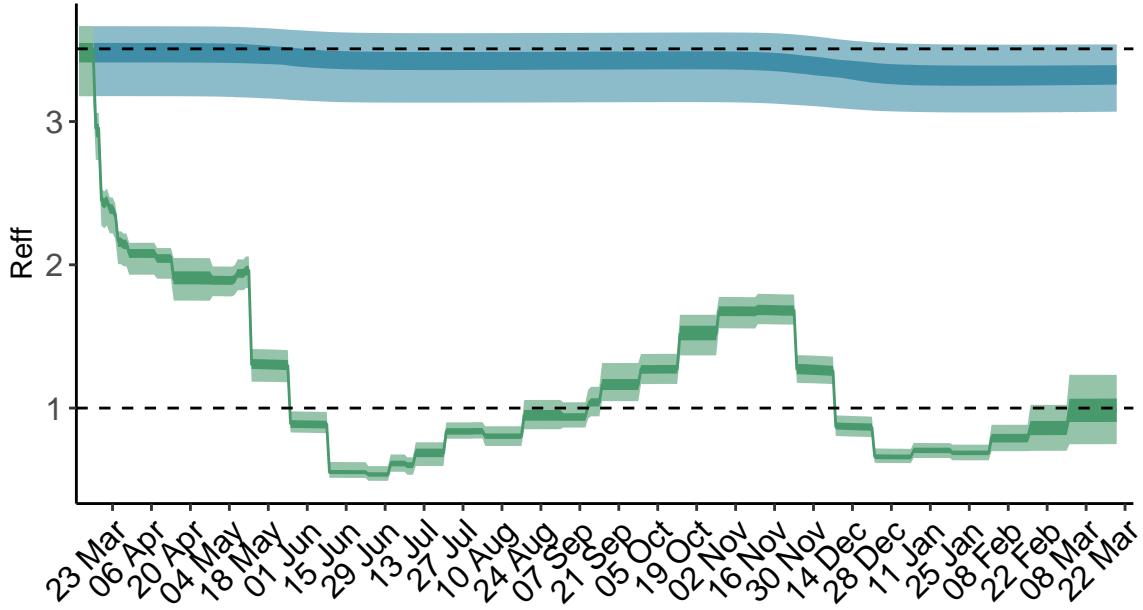


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

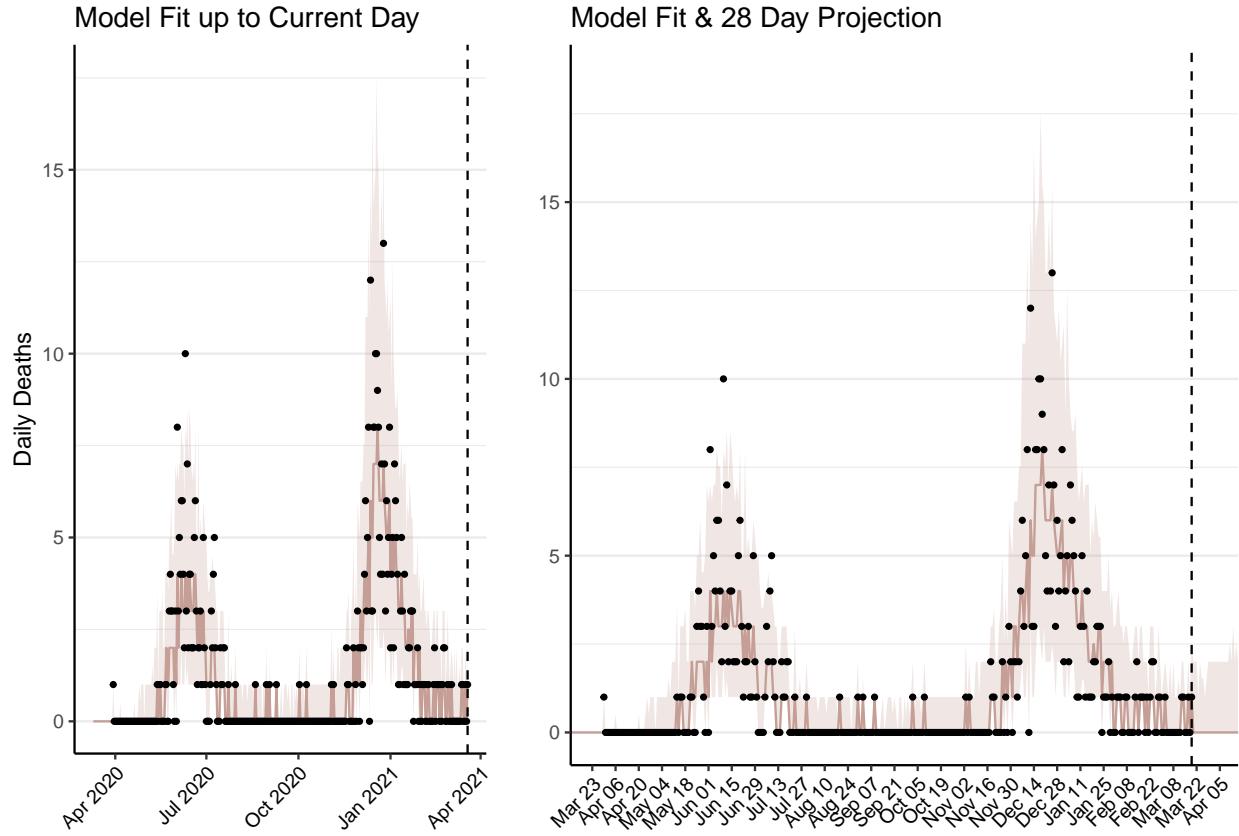


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 12 (95% CI: 11-14) patients requiring treatment with high-pressure oxygen at the current date to 15 (95% CI: 12-18) hospital beds being required on 2021-04-16 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 6 (95% CI: 5-8) by 2021-04-16. 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.**

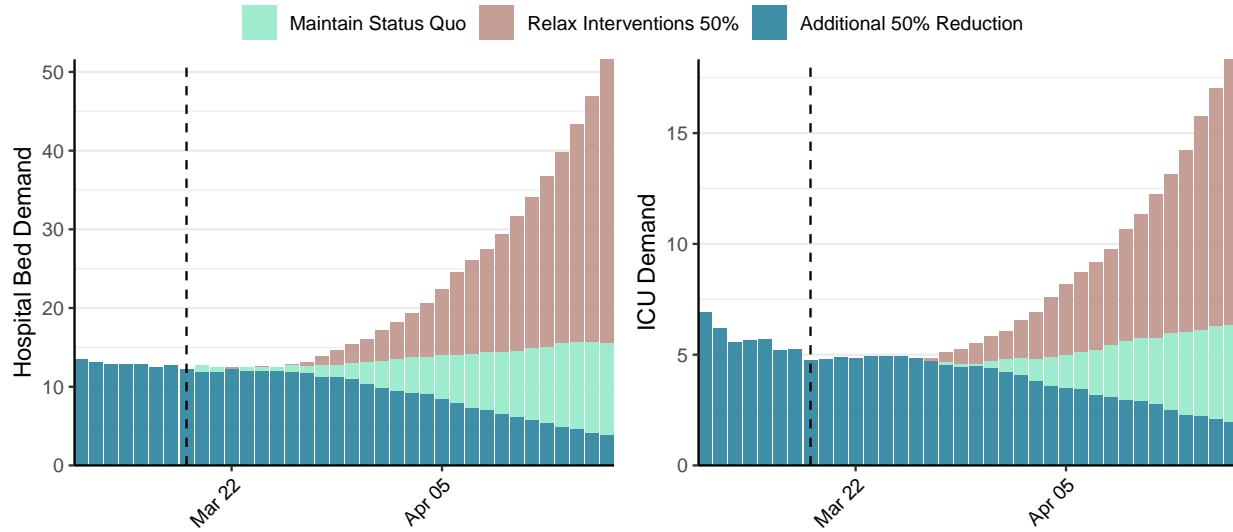


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 158 (95% CI: 138-179) at the current date to 17 (95% CI: 13-22) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 158 (95% CI: 138-179) at the current date to 1,402 (95% CI: 1,052-1,751) by 2021-04-16.

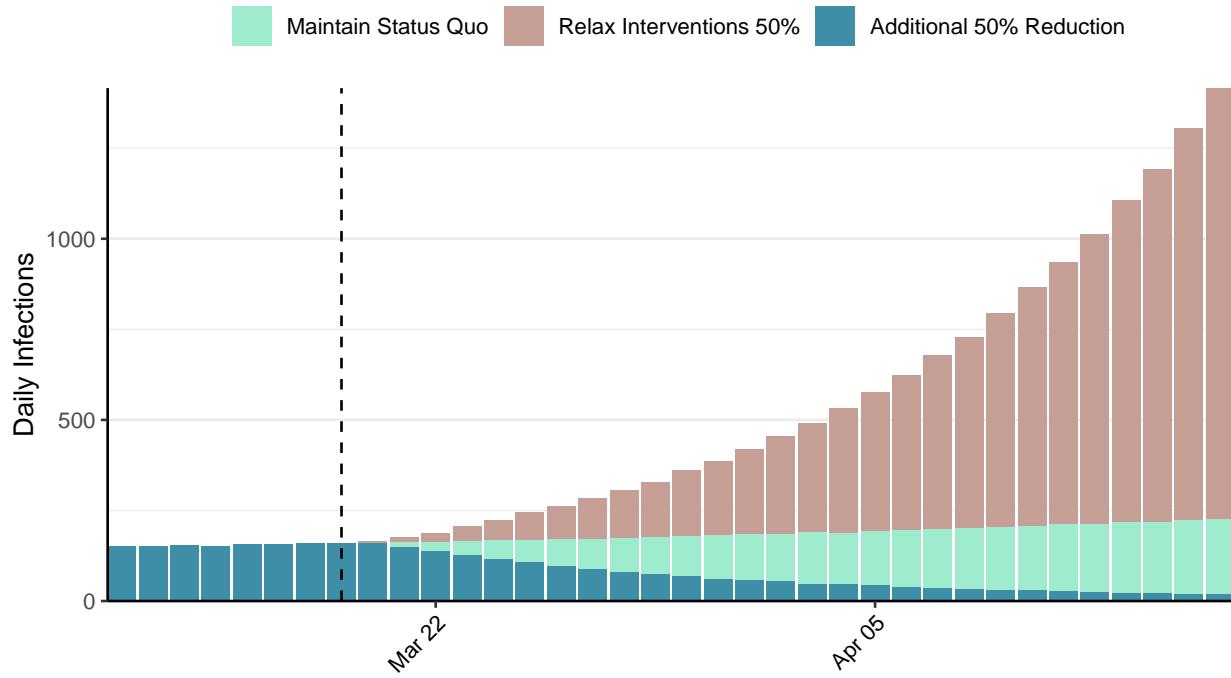


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Mauritius, 2021-03-19

[Download the report for Mauritius, 2021-03-19 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}
793	25	10	0	0.29 (95% CI: 0.11-0.58)

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.

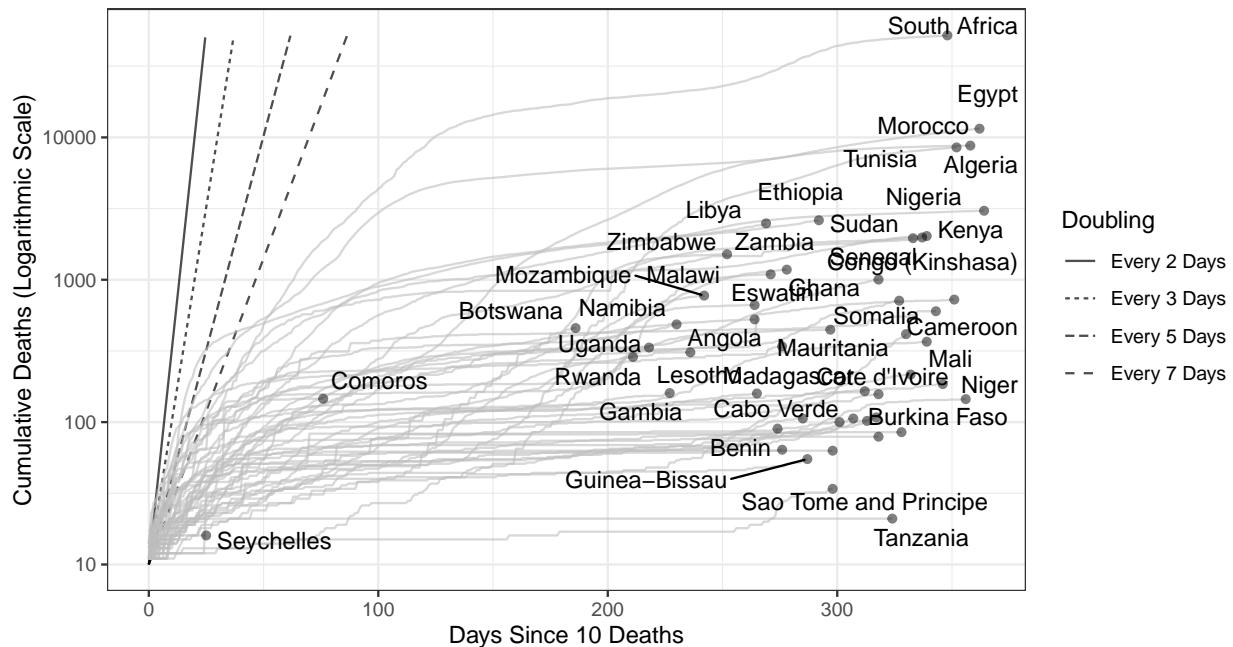


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 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.**

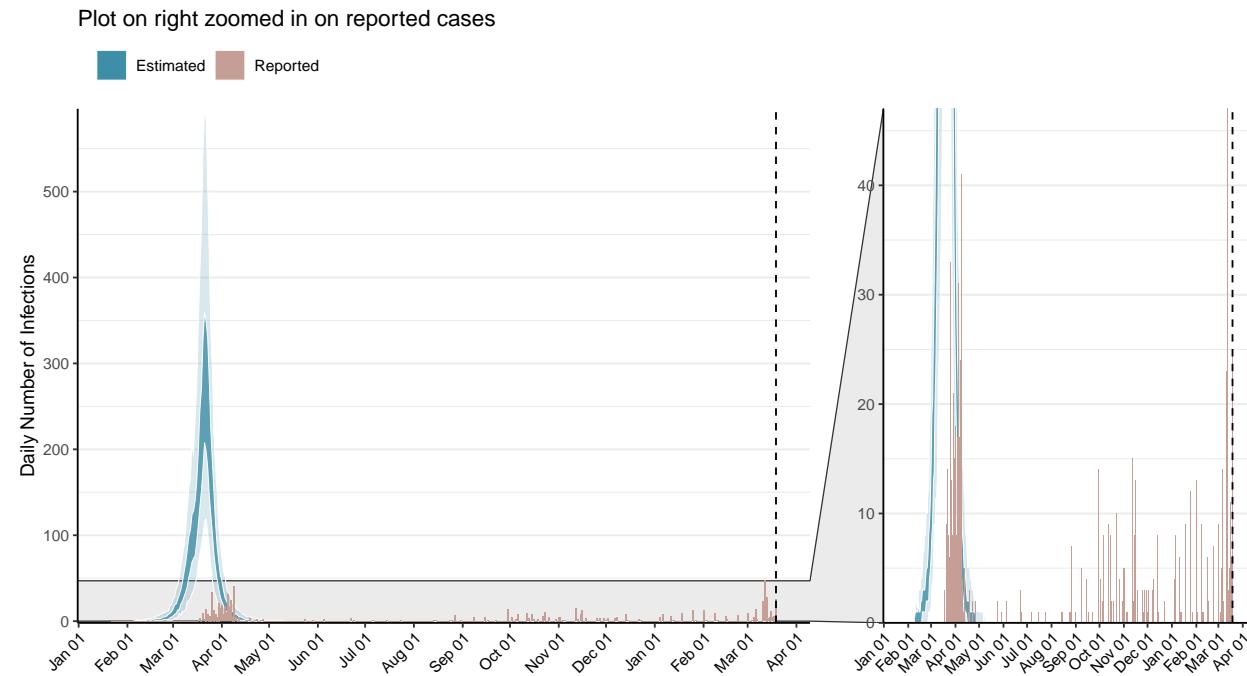


Figure 2: Daily number of infections estimated by fitting to the current total of deaths. Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

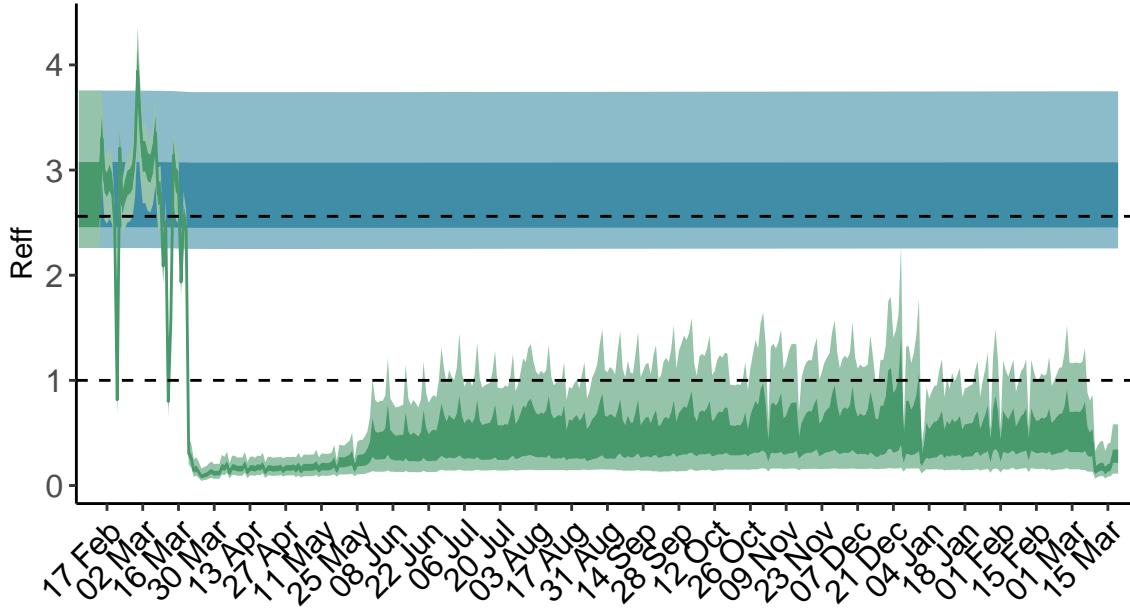


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

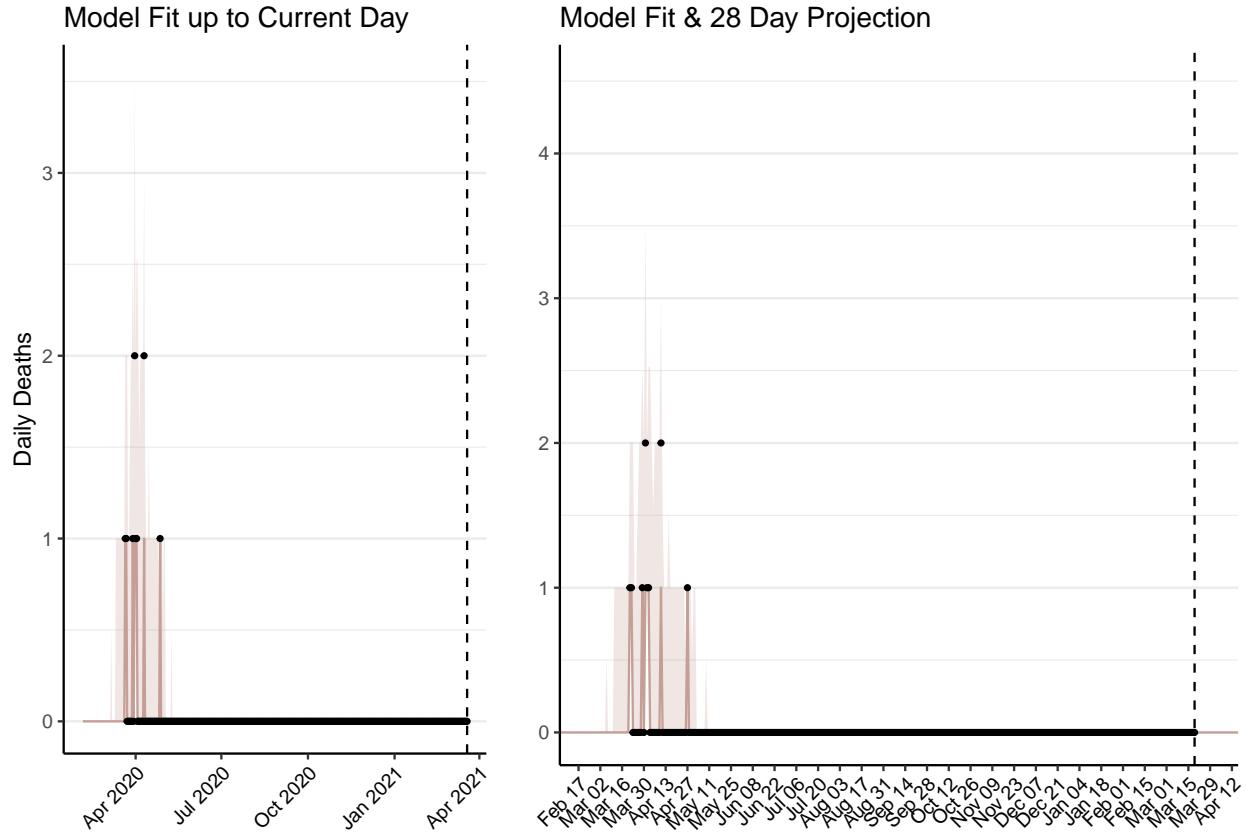


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

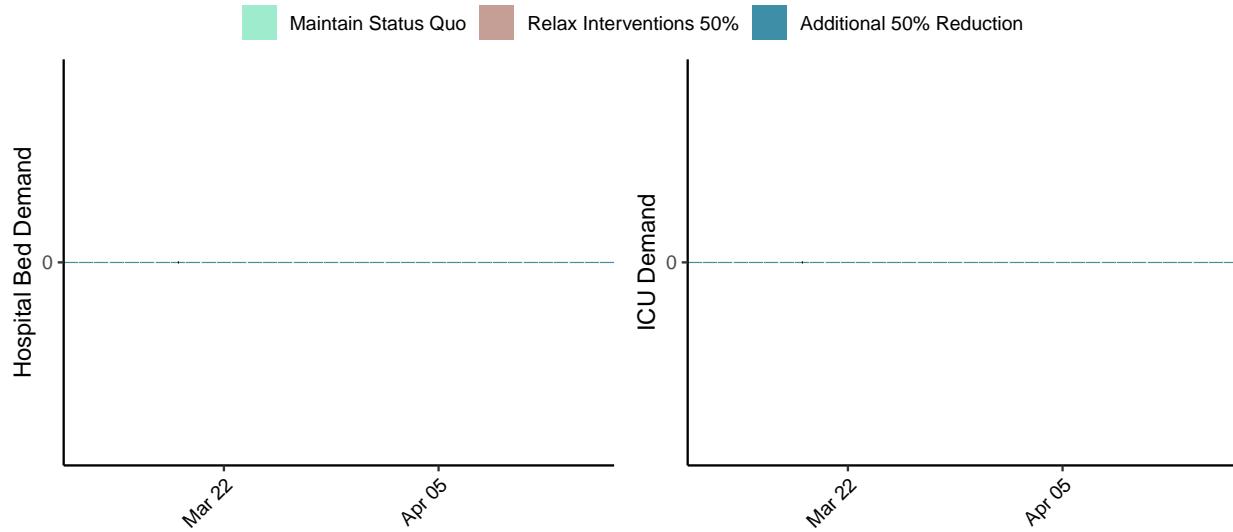


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2021-04-16. 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 2021-04-16.

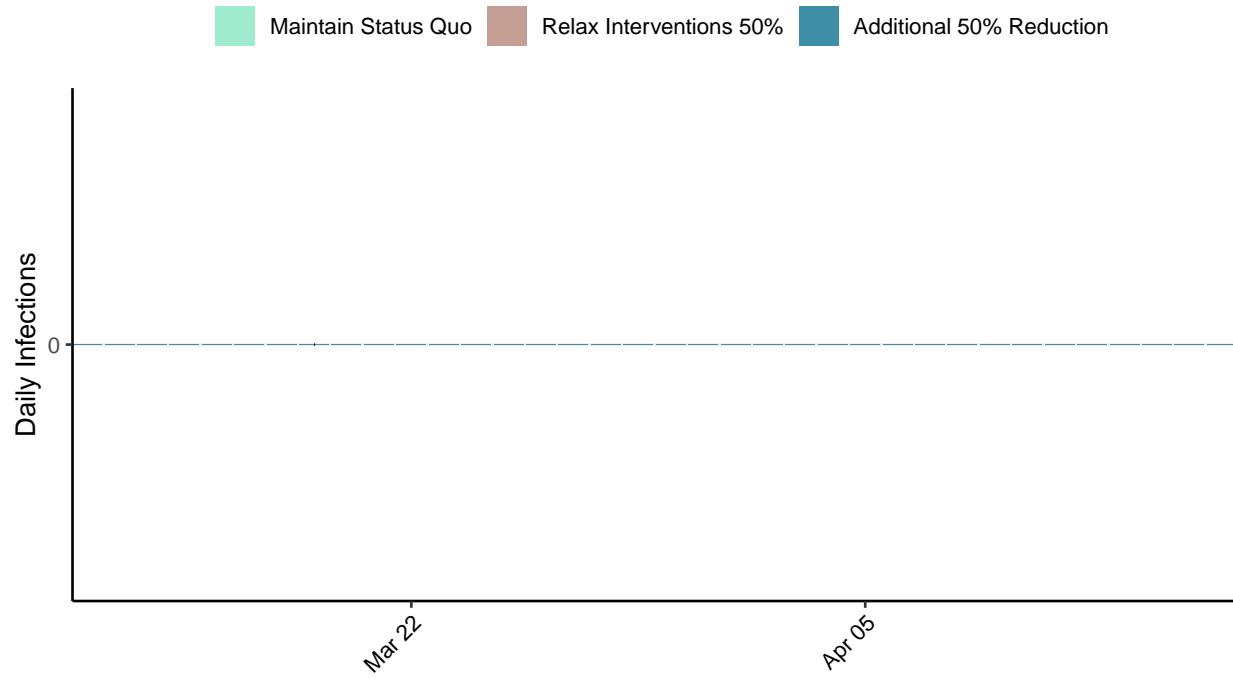


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Malawi, 2021-03-19

[Download the report for Malawi, 2021-03-19 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}
33,174	129	1,092	1	0.54 (95% CI: 0.42-0.66)

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.

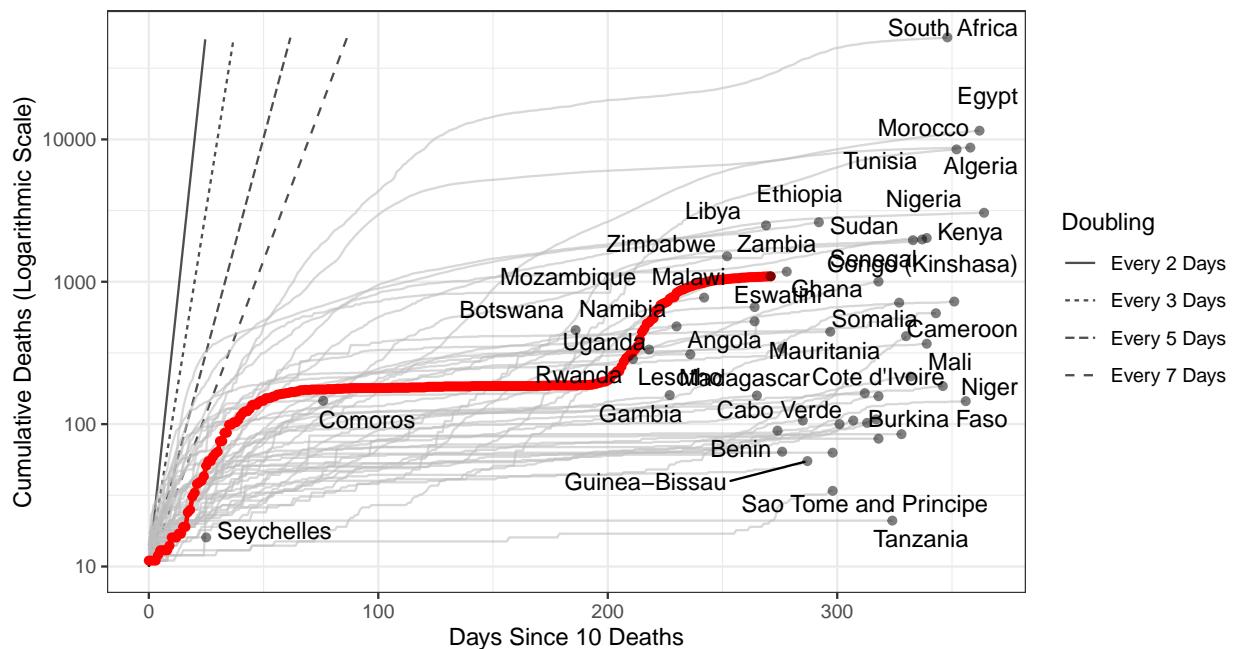


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 26,957 (95% CI: 25,084–28,830) 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).

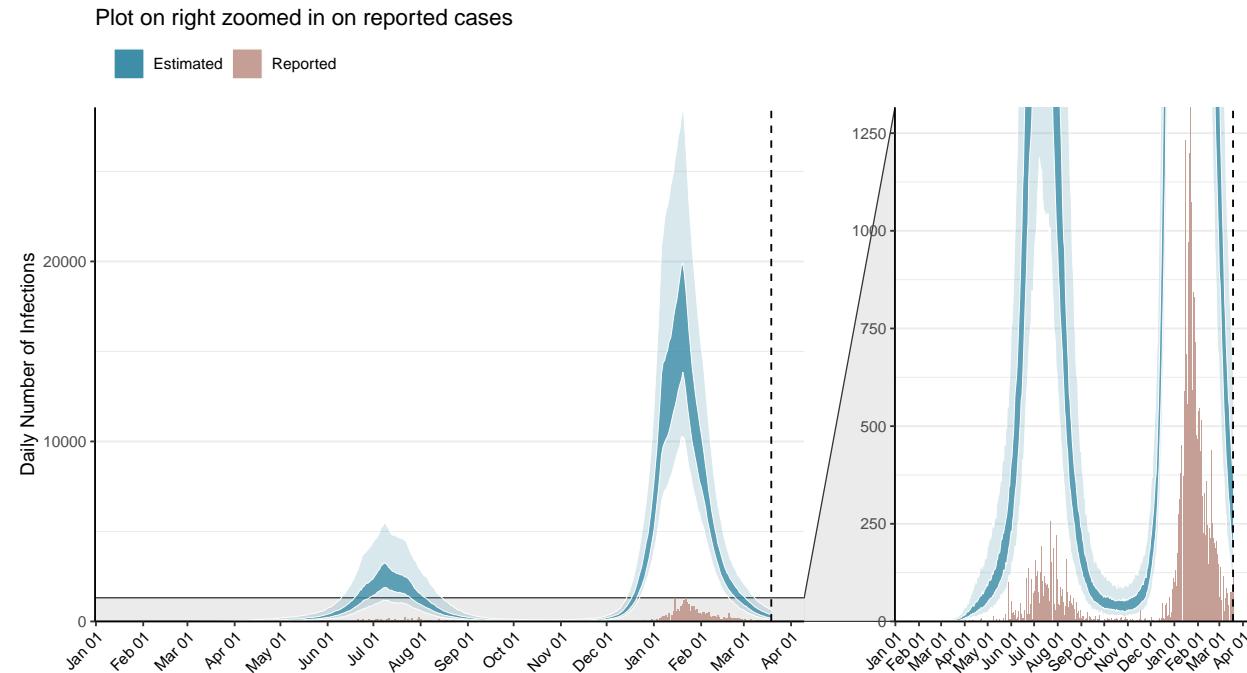


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

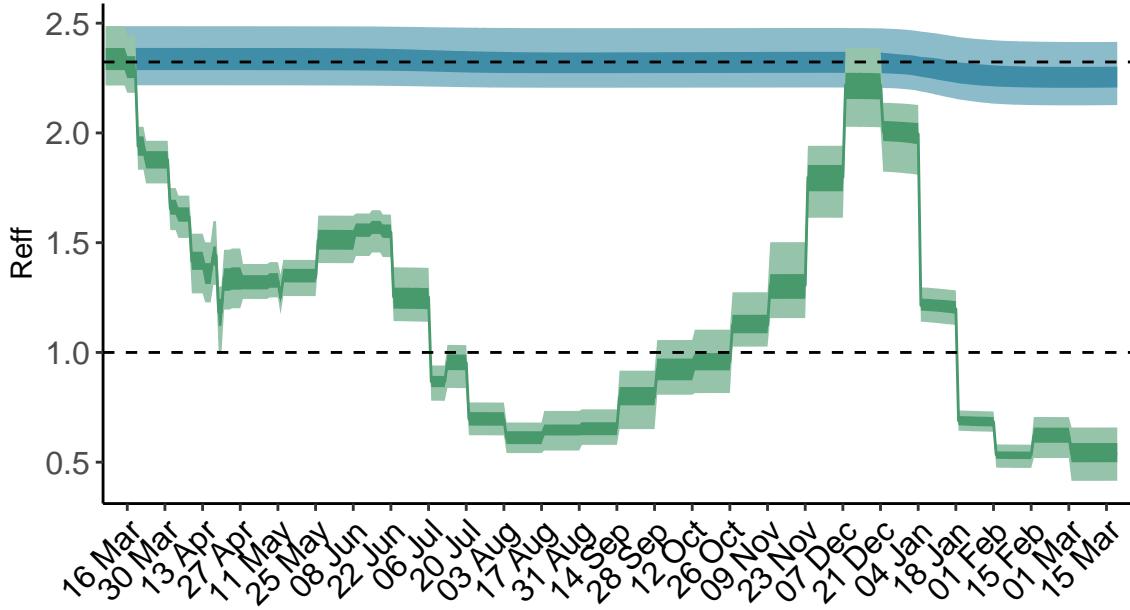


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

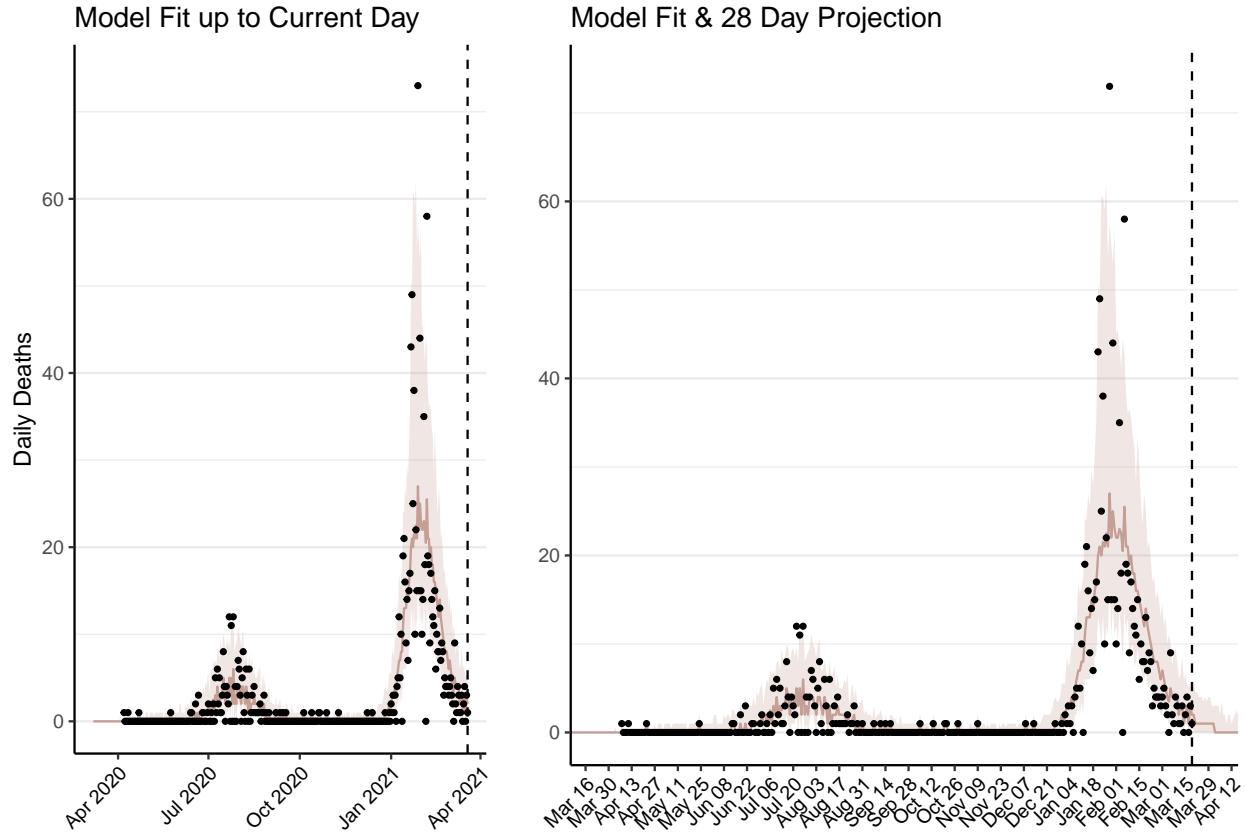


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 62 (95% CI: 57-67) patients requiring treatment with high-pressure oxygen at the current date to 8 (95% CI: 7-9) hospital beds being required on 2021-04-16 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: 31-36) patients requiring treatment with mechanical ventilation at the current date to 5 (95% CI: 4-5) by 2021-04-16. 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.**

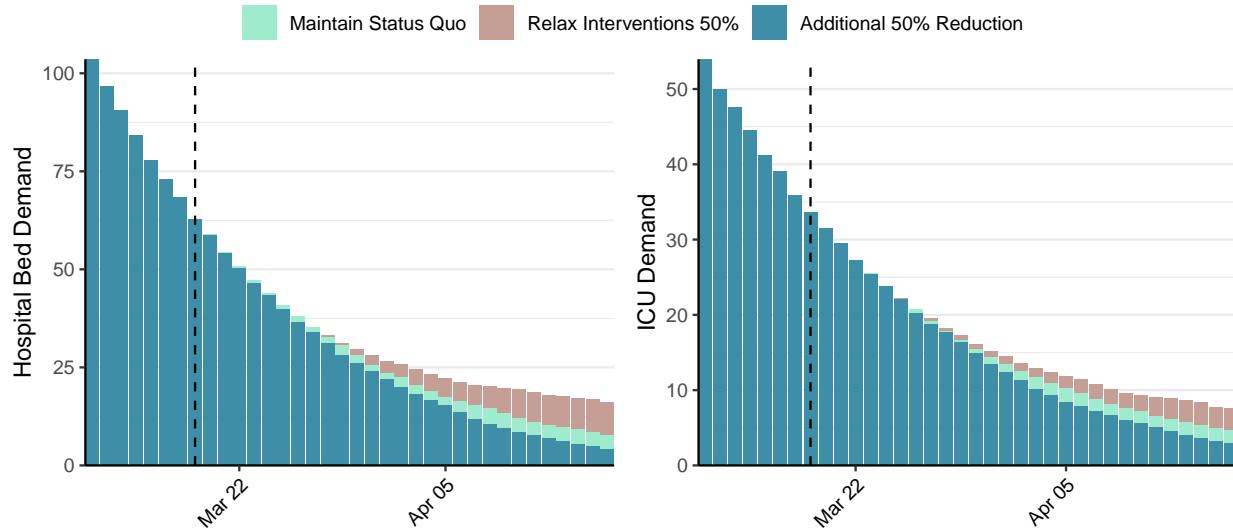


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 296 (95% CI: 264-327) at the current date to 5 (95% CI: 4-6) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 296 (95% CI: 264-327) at the current date to 167 (95% CI: 136-198) by 2021-04-16.

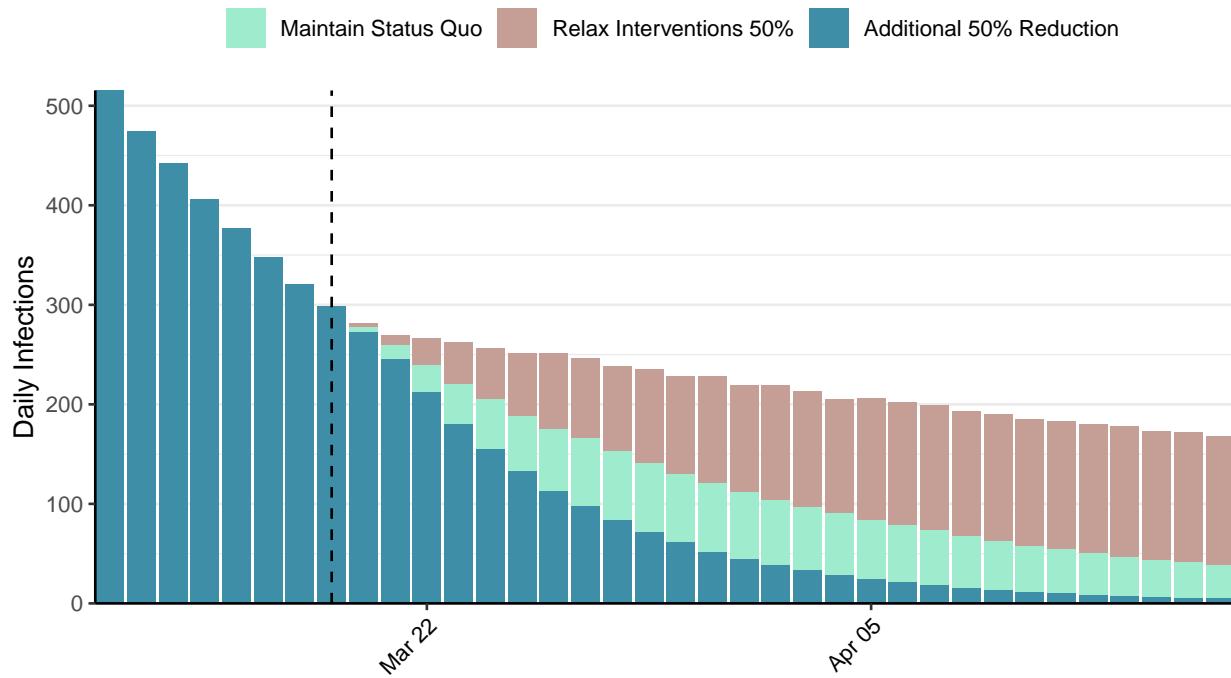


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Malaysia, 2021-03-19

[Download the report for Malaysia, 2021-03-19 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}
330,042	1,576	1,225	2	0.75 (95% CI: 0.64-0.87)

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.

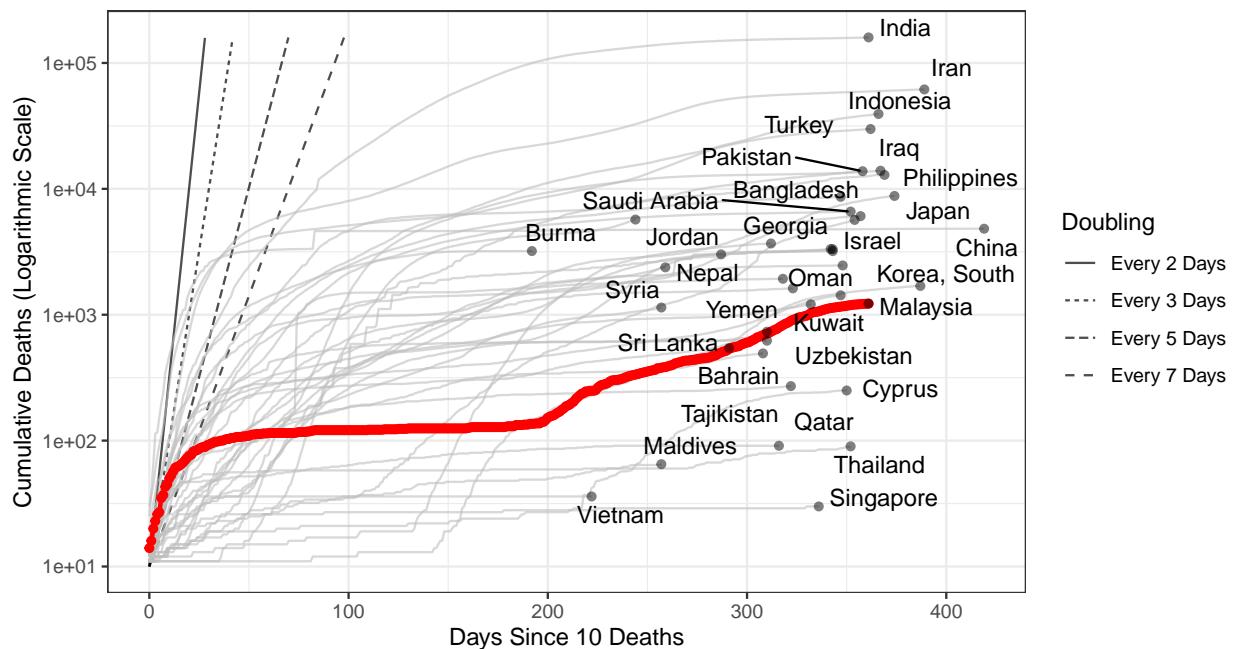


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 49,443 (95% CI: 46,414-52,473) 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).

Plot on right zoomed in on reported cases

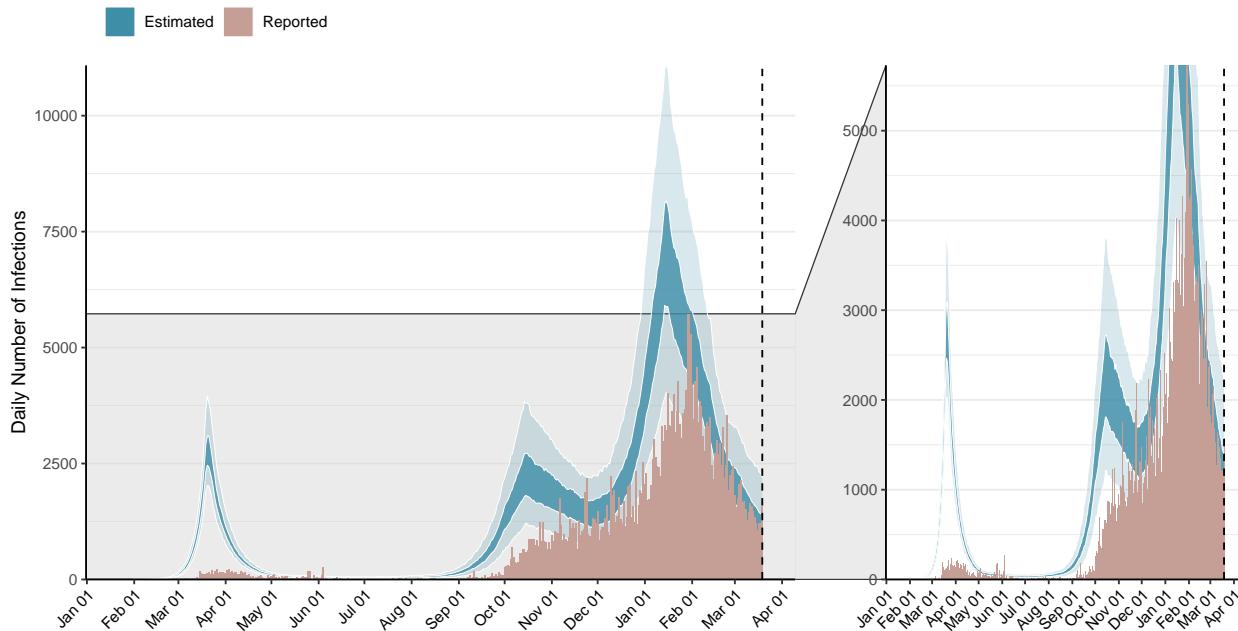


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

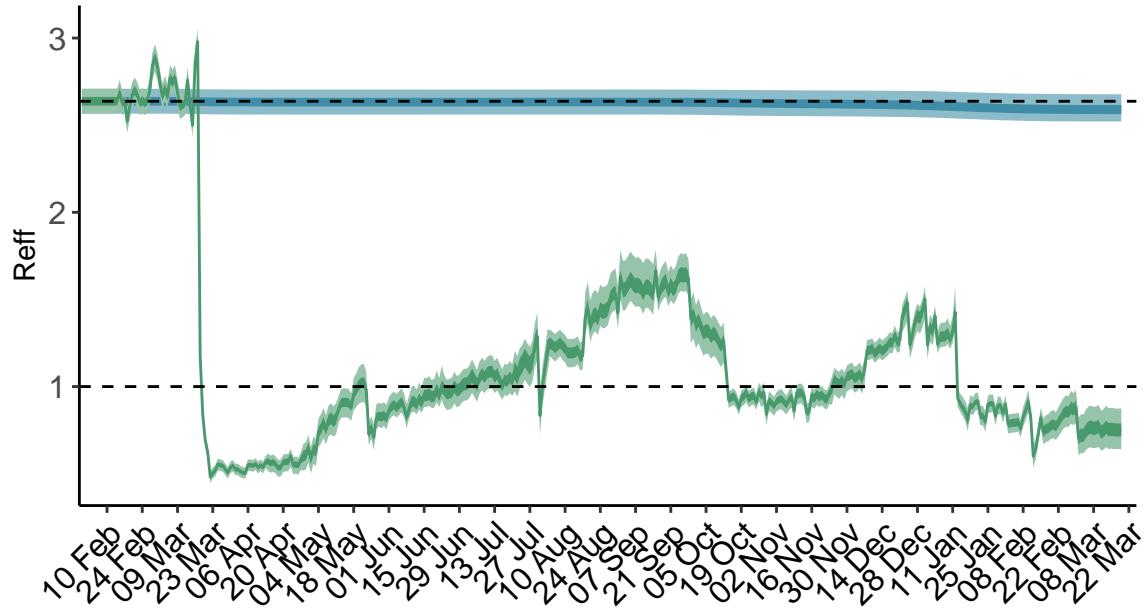


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

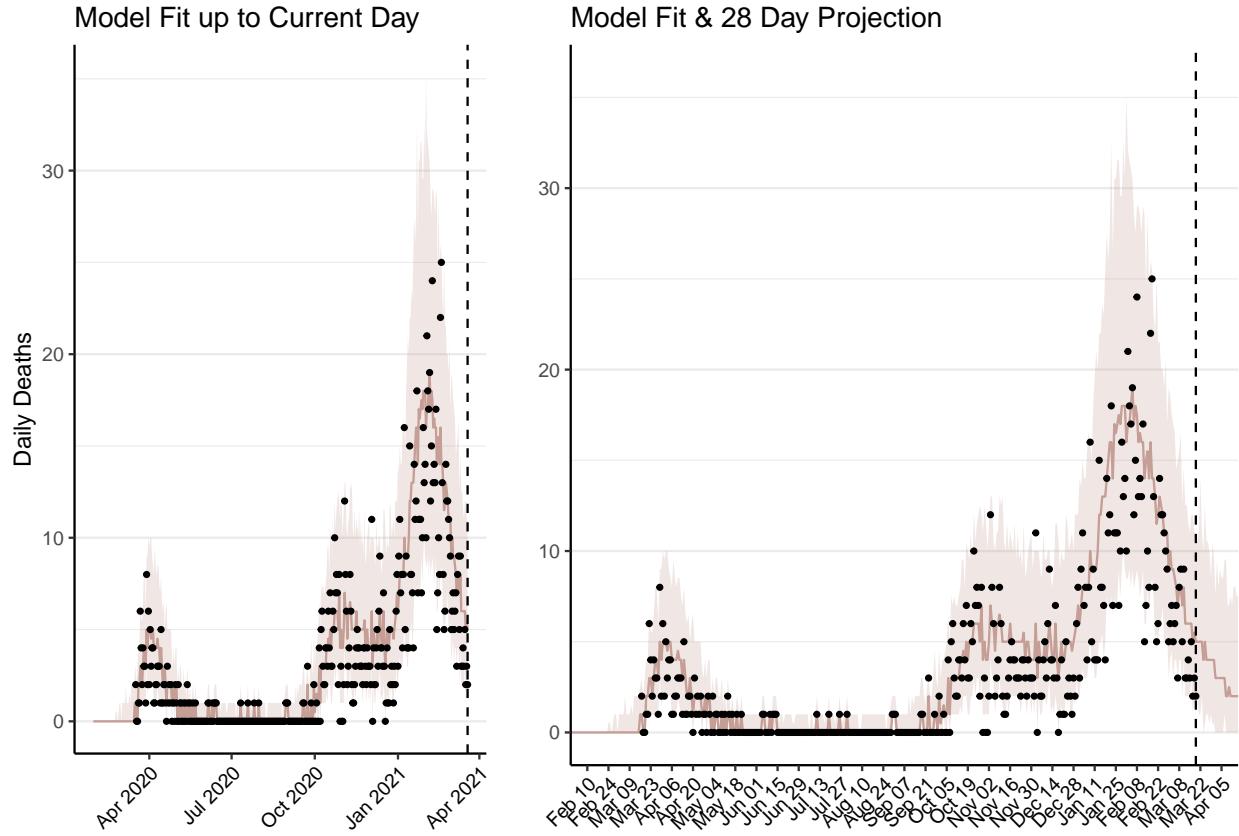


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 201 (95% CI: 189-214) patients requiring treatment with high-pressure oxygen at the current date to 75 (95% CI: 66-84) hospital beds being required on 2021-04-16 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 86 (95% CI: 81-92) patients requiring treatment with mechanical ventilation at the current date to 34 (95% CI: 30-37) by 2021-04-16. 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.**

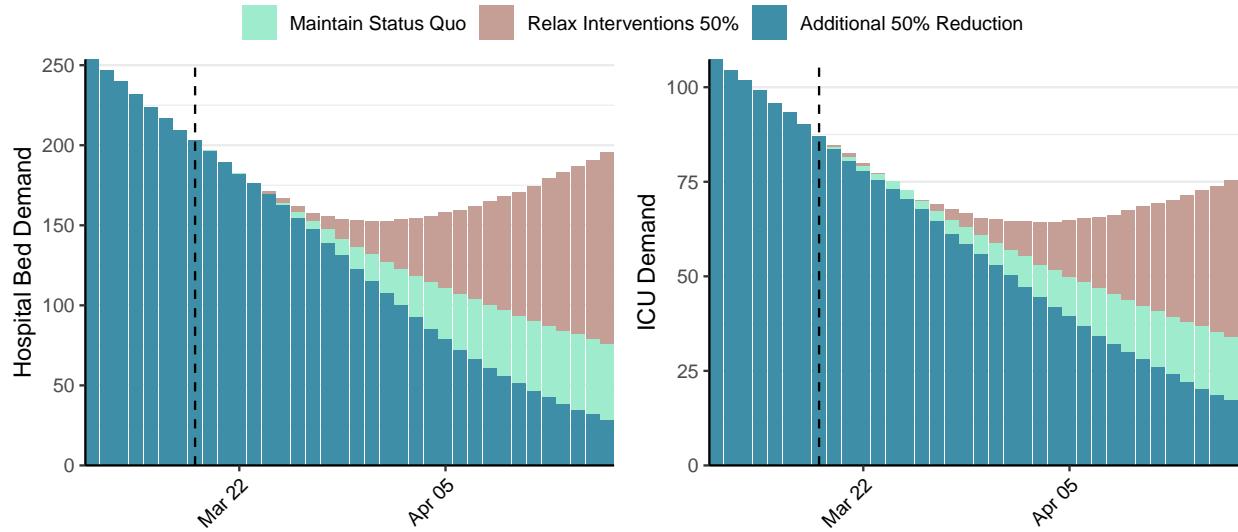


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,070 (95% CI: 980-1,159) at the current date to 41 (95% CI: 36-47) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,070 (95% CI: 980-1,159) at the current date to 2,079 (95% CI: 1,754-2,404) by 2021-04-16.

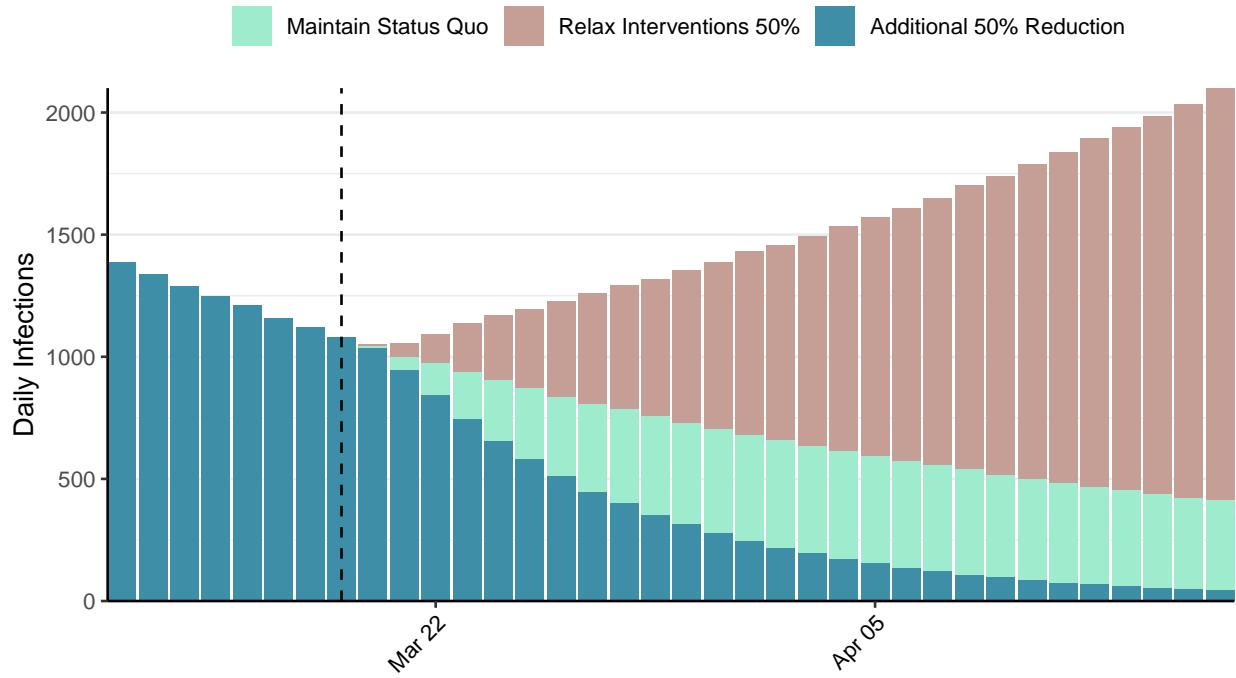


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Namibia, 2021-03-19

[Download the report for Namibia, 2021-03-19 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}
41,965	281	486	3	1.33 (95% CI: 1.16-1.5)

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.

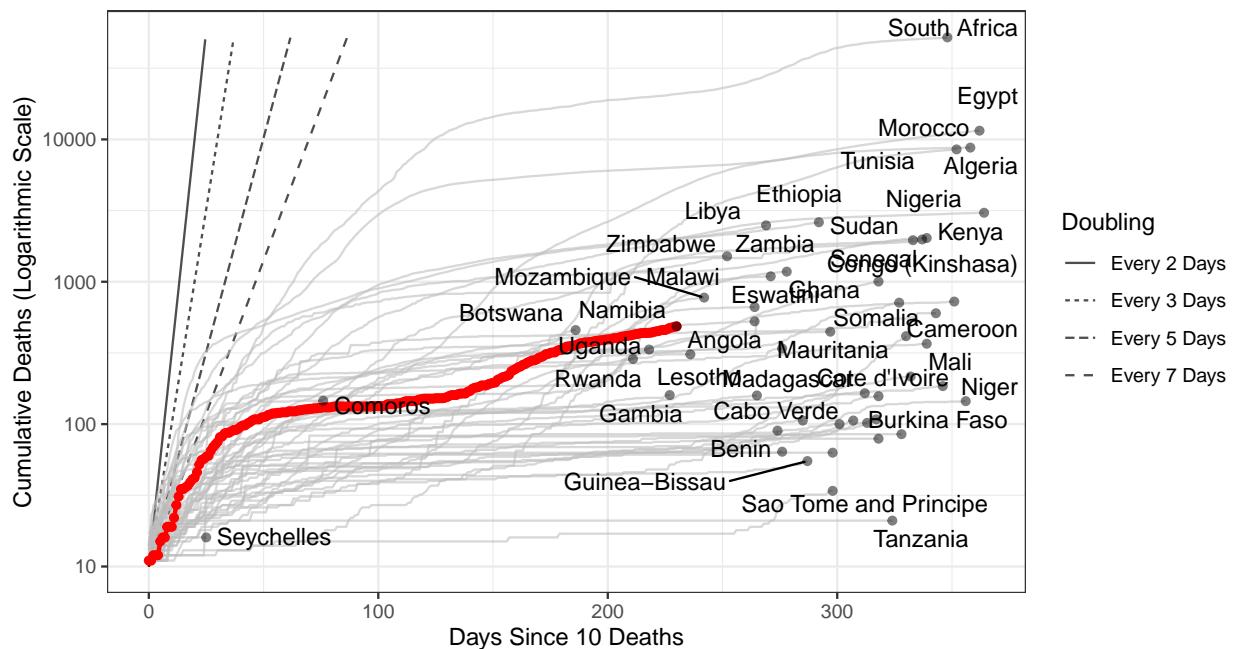


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 50,900 (95% CI: 48,739-53,062) 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).

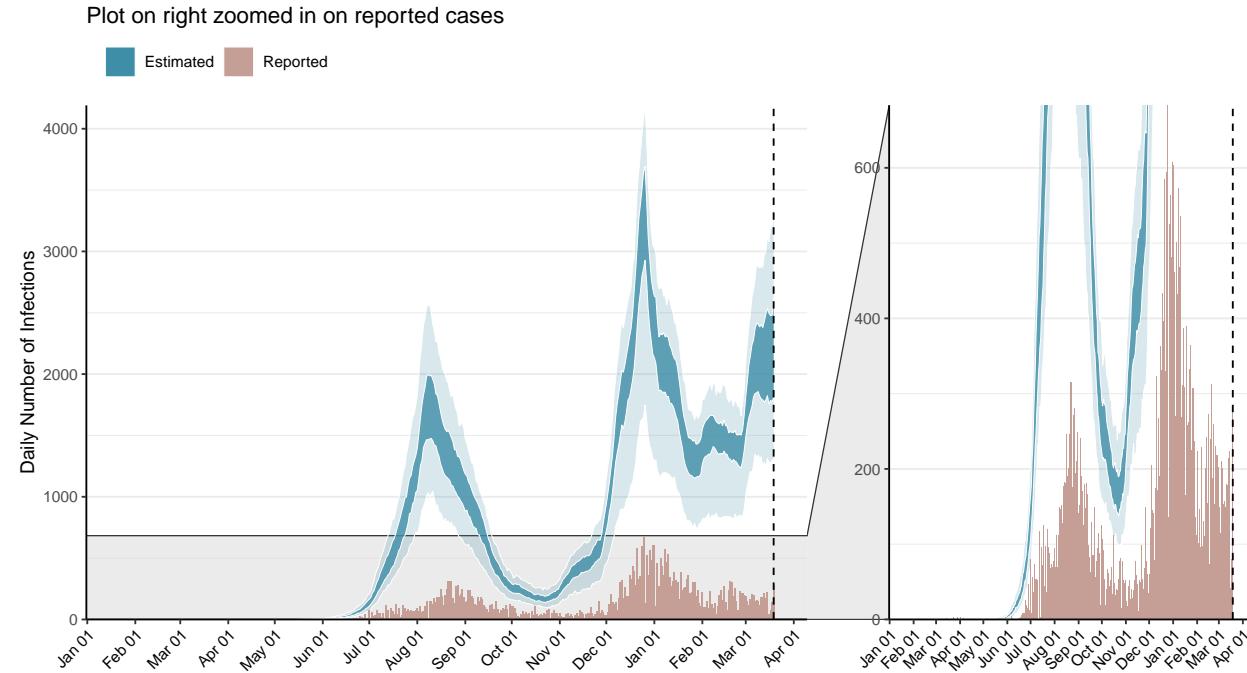


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

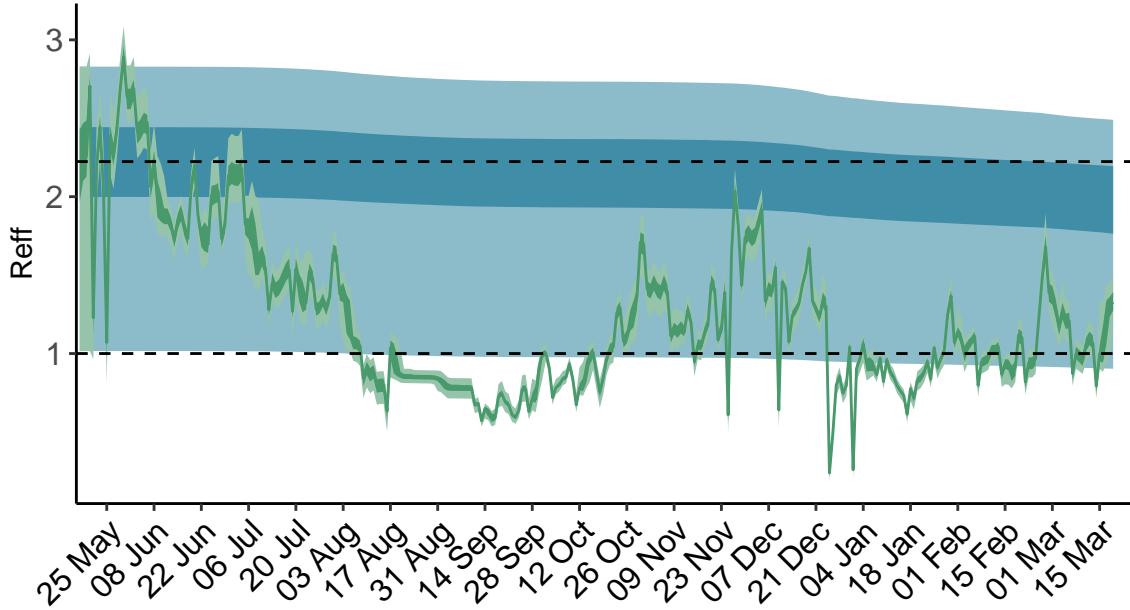


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

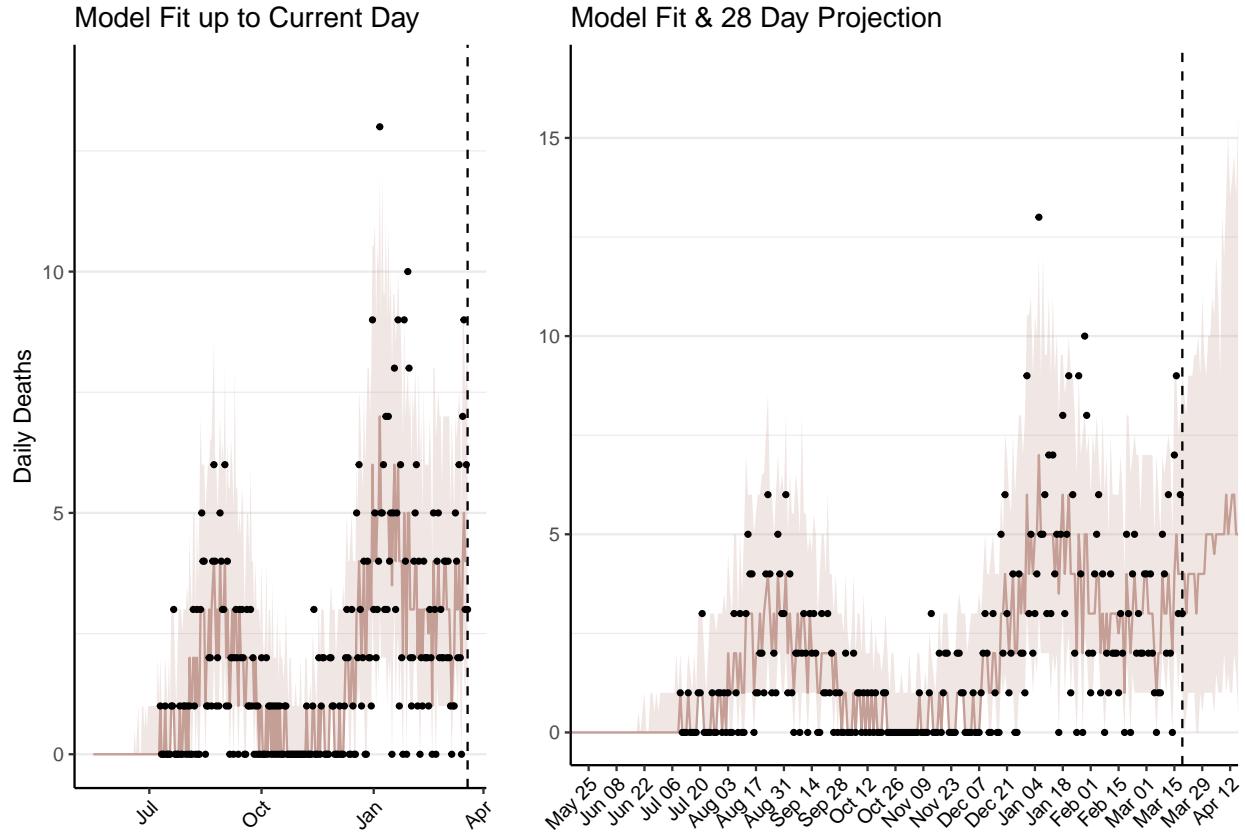


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 166 (95% CI: 158-173) patients requiring treatment with high-pressure oxygen at the current date to 277 (95% CI: 253-301) hospital beds being required on 2021-04-16 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 100 (95% CI: 92-108) by 2021-04-16. 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.**

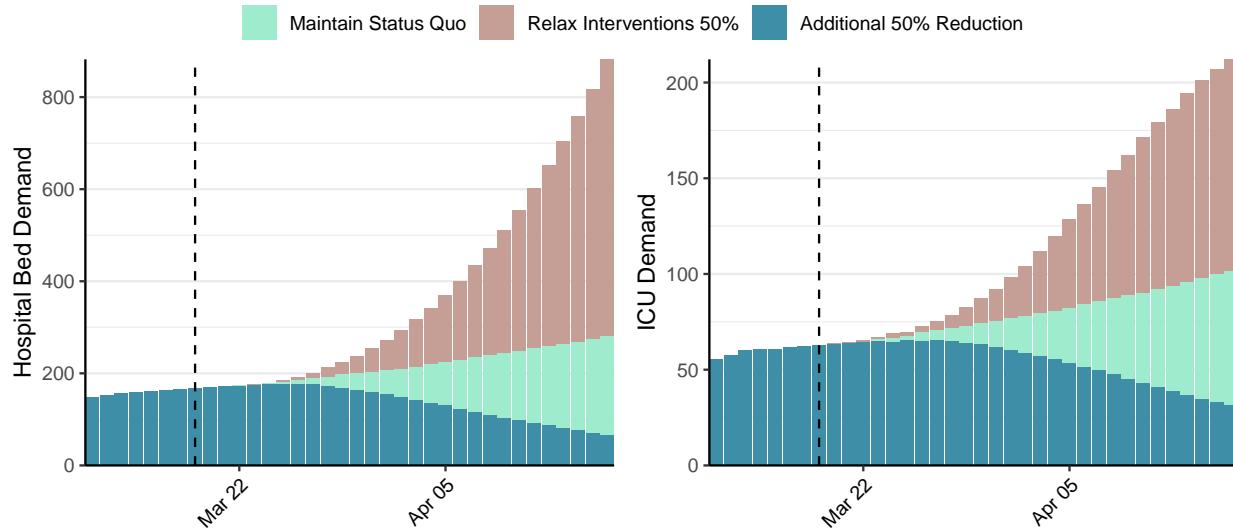


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,191 (95% CI: 2,069-2,313) at the current date to 313 (95% CI: 282-344) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,191 (95% CI: 2,069-2,313) at the current date to 20,570 (95% CI: 18,663-22,477) by 2021-04-16.

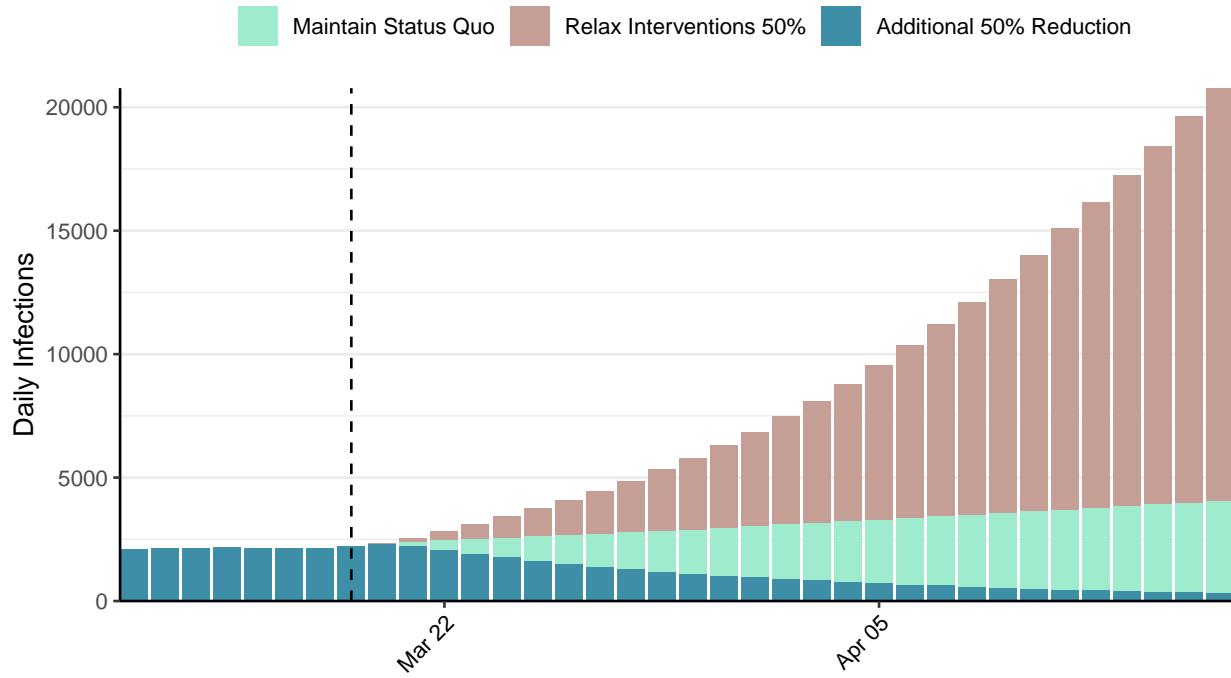


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Niger, 2021-03-19

[Download the report for Niger, 2021-03-19 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}
4,911	5	185	0	0.97 (95% CI: 0.75-1.22)

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.

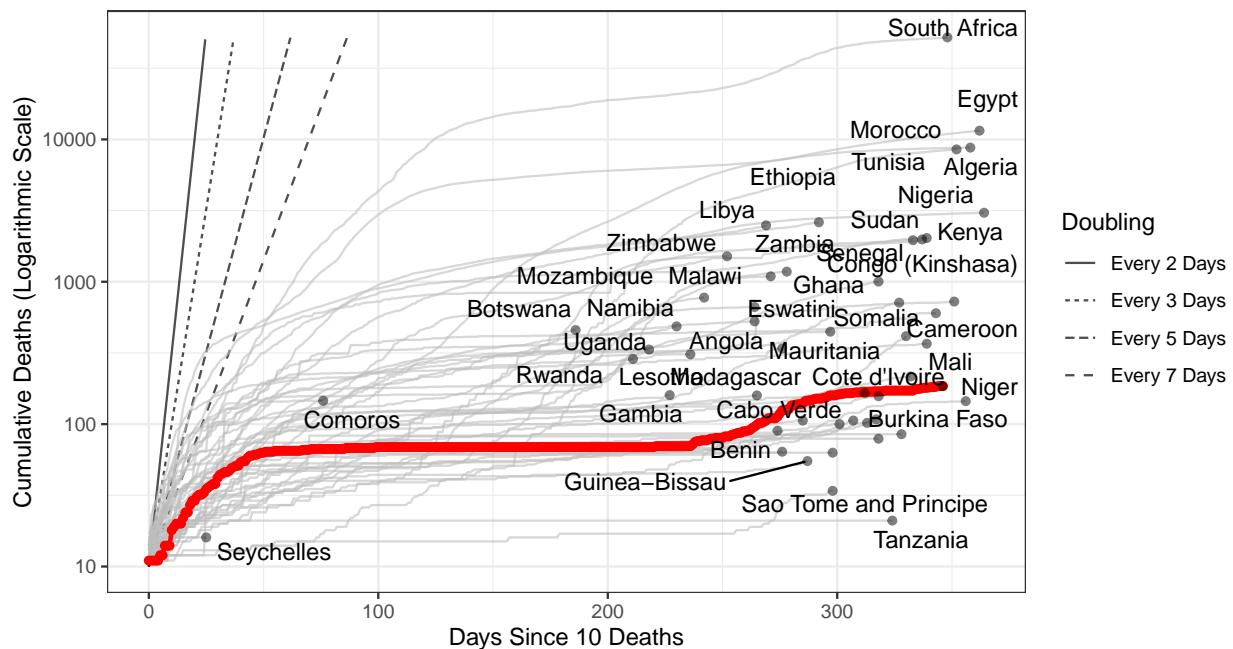


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 8,544 (95% CI: 7,580-9,508) 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.**

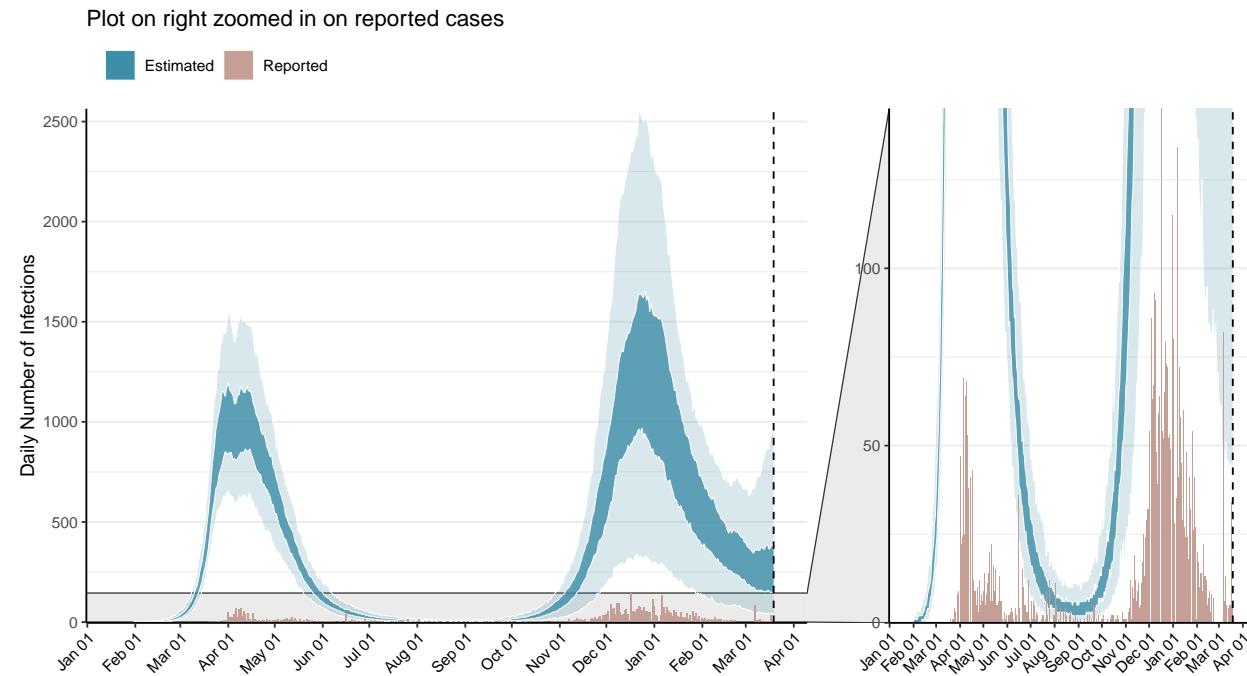


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

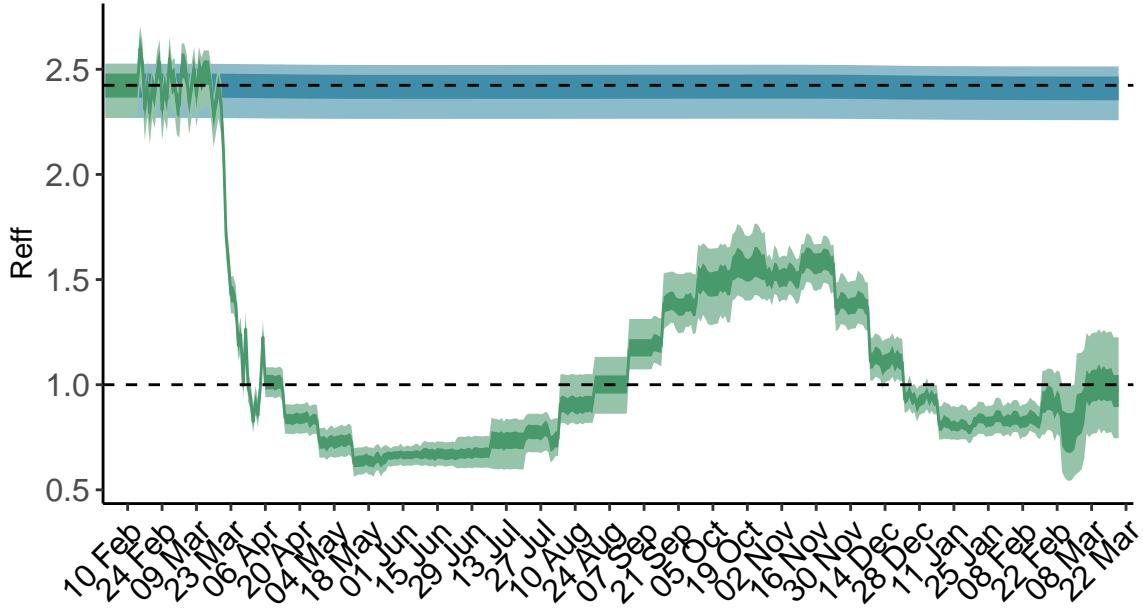


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

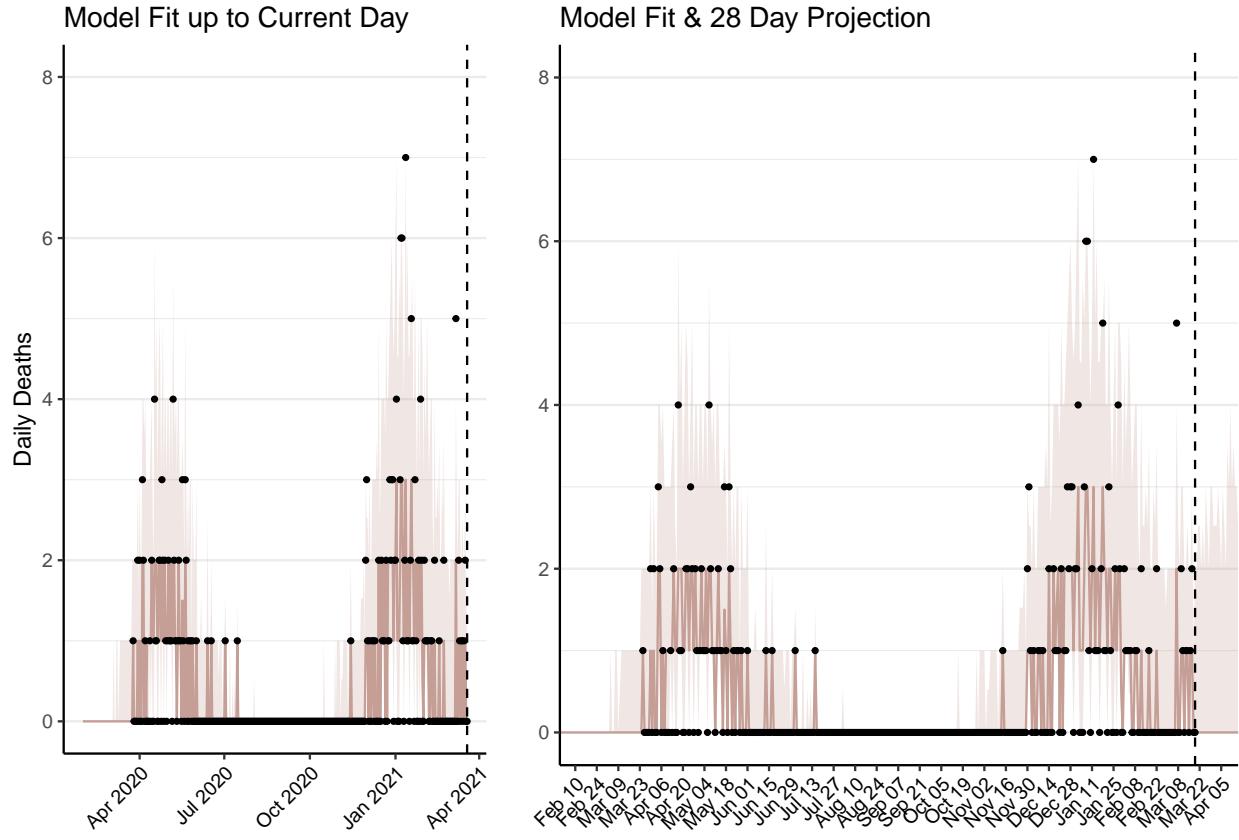


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 21 (95% CI: 19-24) patients requiring treatment with high-pressure oxygen at the current date to 25 (95% CI: 19-31) hospital beds being required on 2021-04-16 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 11 (95% CI: 8-13) by 2021-04-16. 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.**

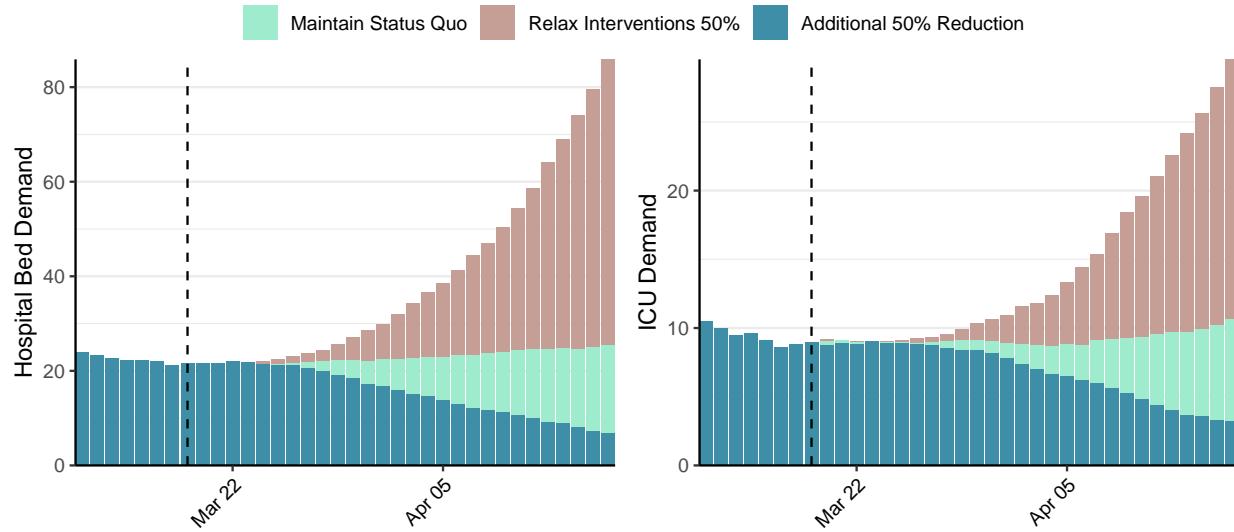


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 302 (95% CI: 254-349) at the current date to 33 (95% CI: 24-41) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 302 (95% CI: 254-349) at the current date to 2,505 (95% CI: 1,745-3,265) by 2021-04-16.

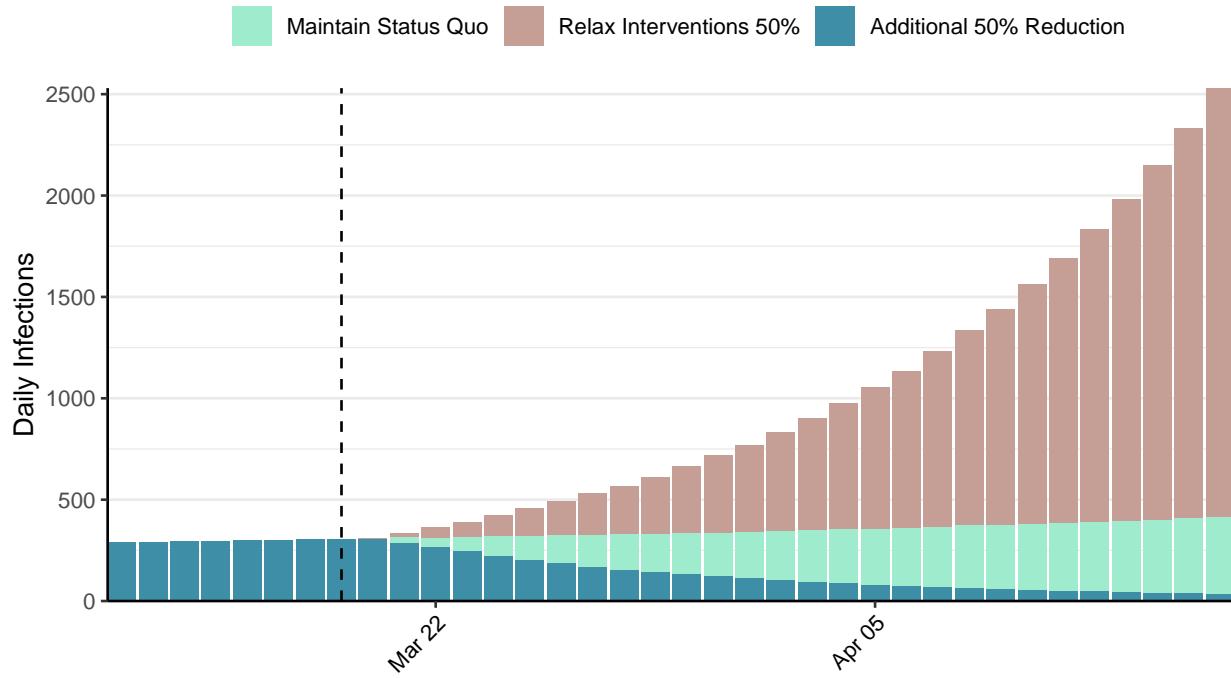


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Nigeria, 2021-03-19

[Download the report for Nigeria, 2021-03-19 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}
161,539	130	2,028	0	0.74 (95% CI: 0.6-0.9)

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.

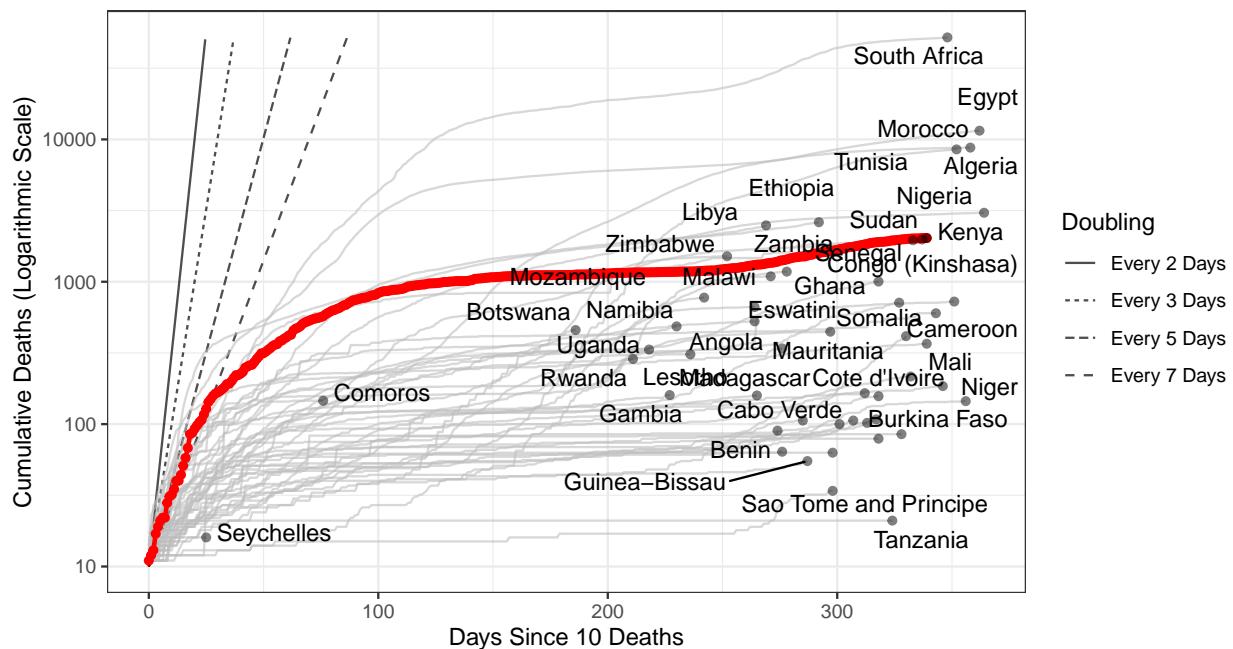


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 83,157 (95% CI: 76,642-89,673) 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

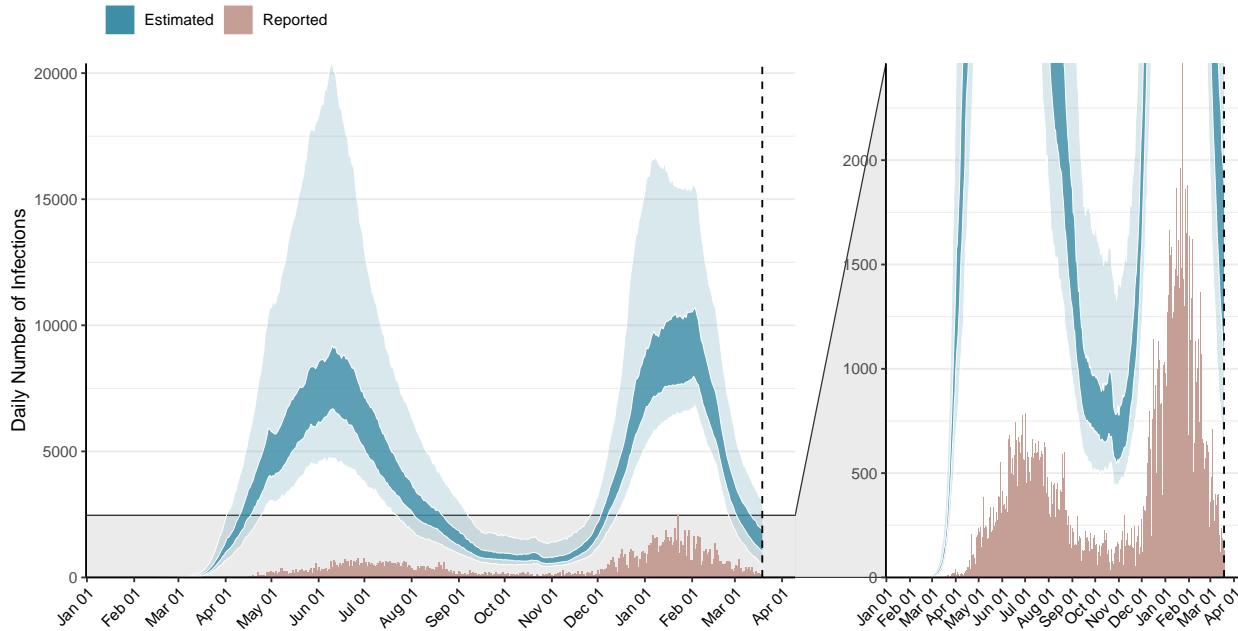


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

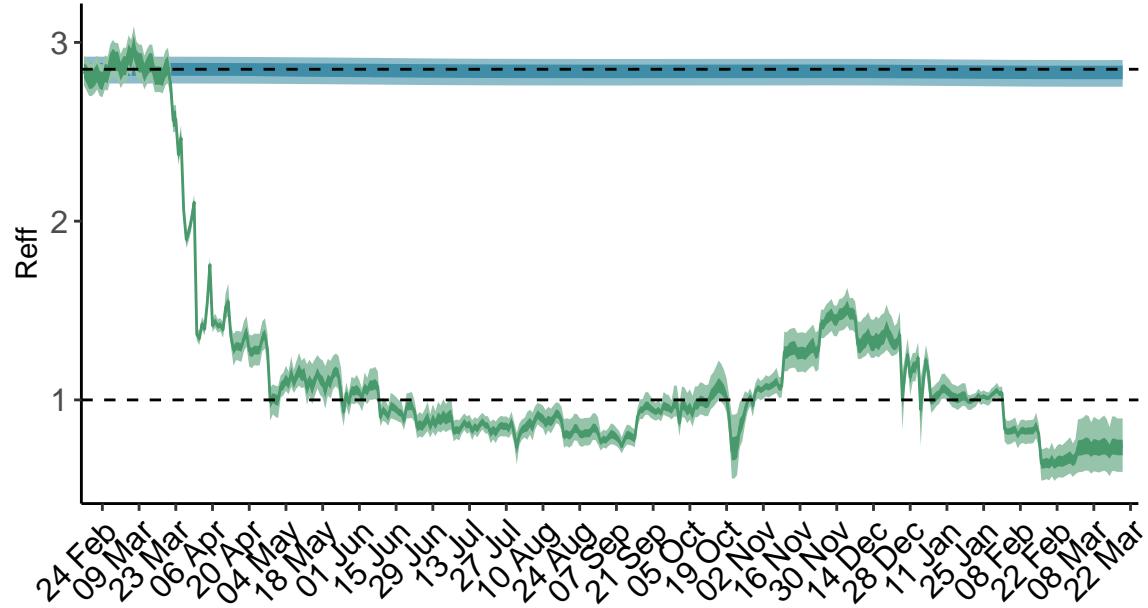


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

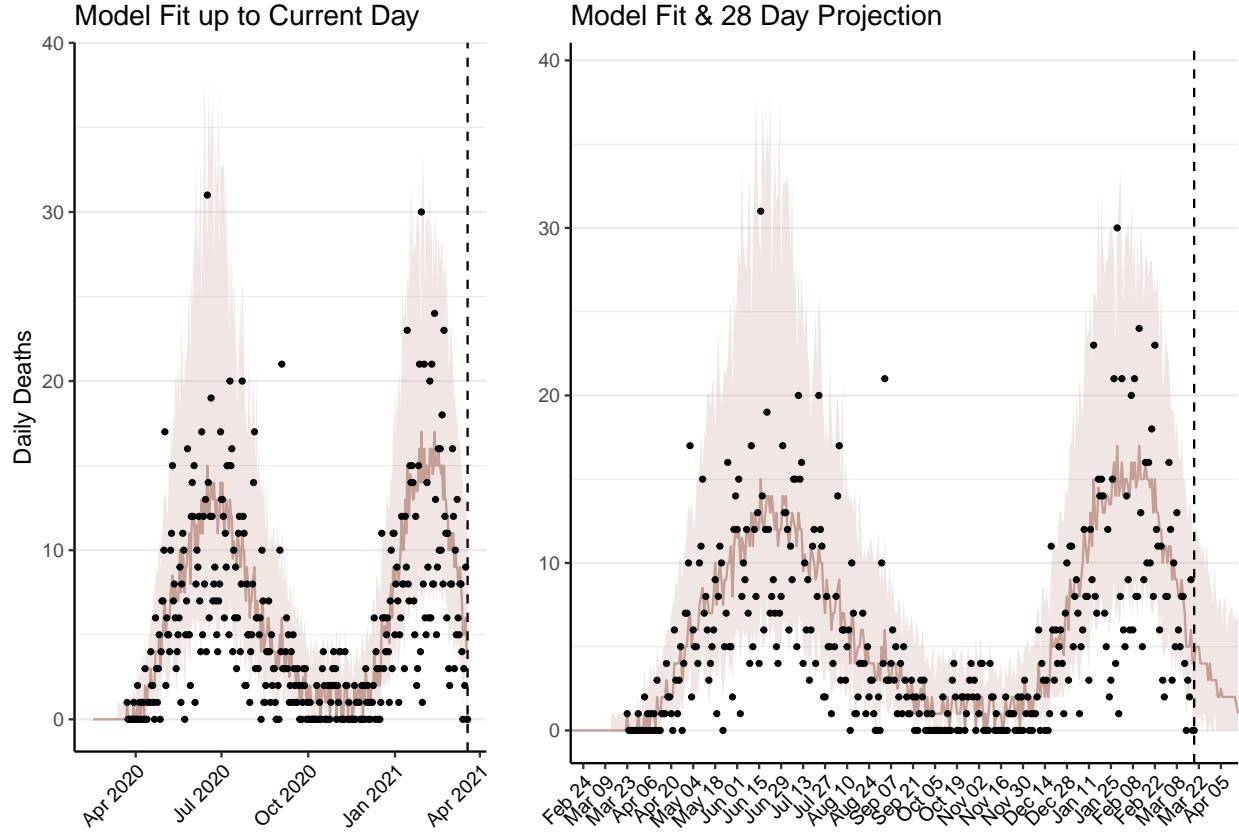


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 202 (95% CI: 185-219) patients requiring treatment with high-pressure oxygen at the current date to 71 (95% CI: 59-82) hospital beds being required on 2021-04-16 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 96 (95% CI: 88-103) patients requiring treatment with mechanical ventilation at the current date to 33 (95% CI: 28-38) by 2021-04-16. 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.**

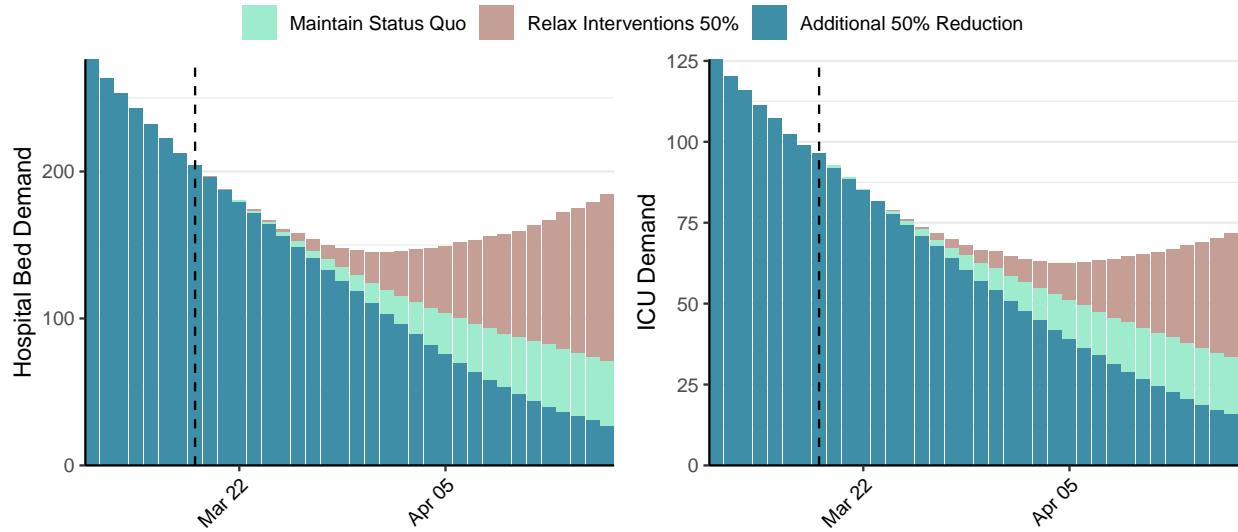


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,601 (95% CI: 1,410-1,793) at the current date to 60 (95% CI: 48-73) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,601 (95% CI: 1,410-1,793) at the current date to 3,115 (95% CI: 2,380-3,850) by 2021-04-16.

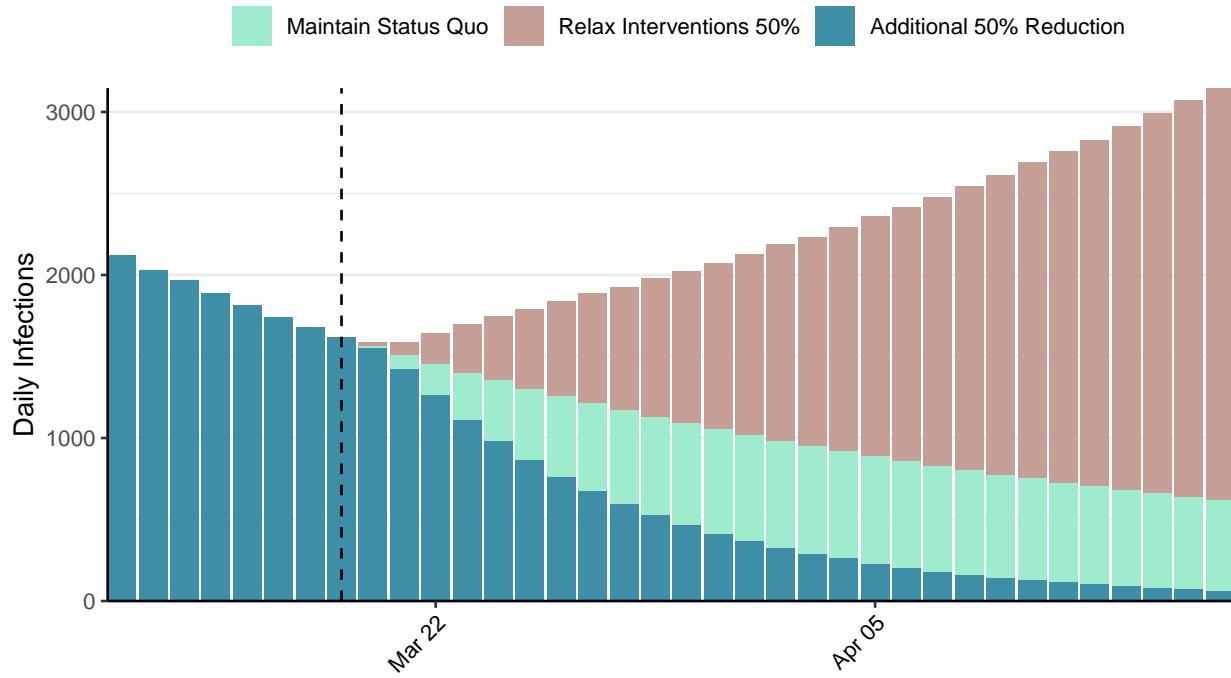


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Nicaragua, 2021-03-19

[Download the report for Nicaragua, 2021-03-19 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}
6,582	0	176	0	1.11 (95% CI: 0.82-1.47)

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.

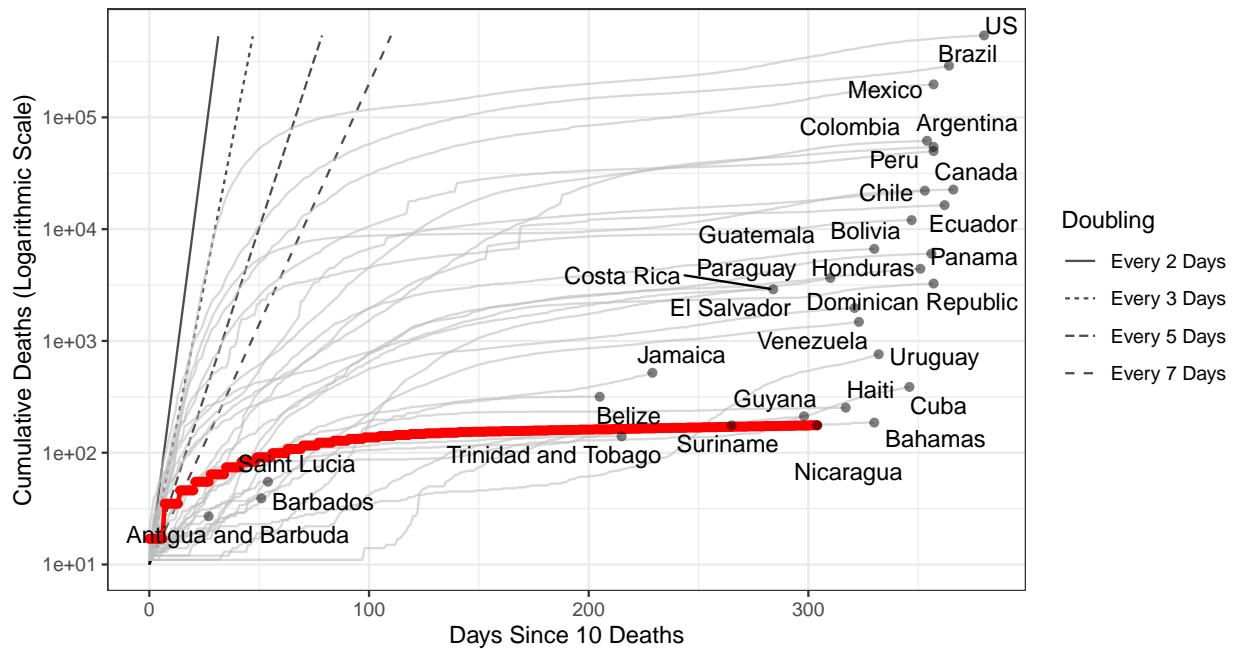


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 2,577 (95% CI: 2,284-2,869) 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).

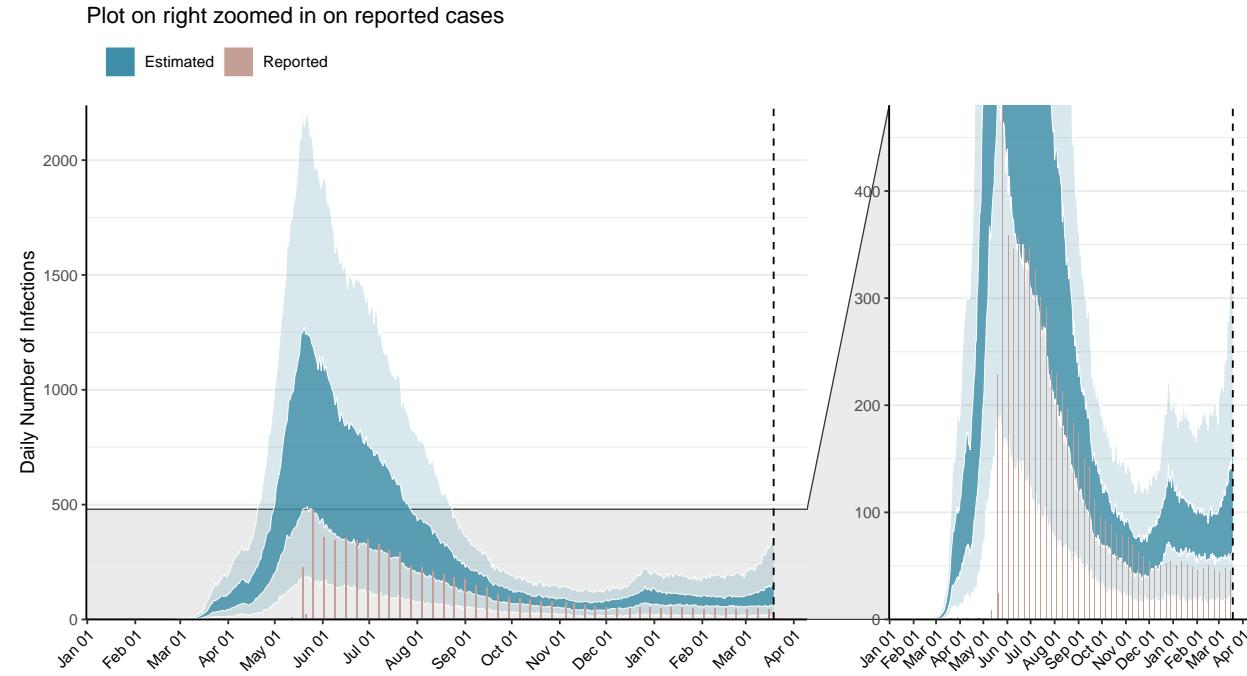


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

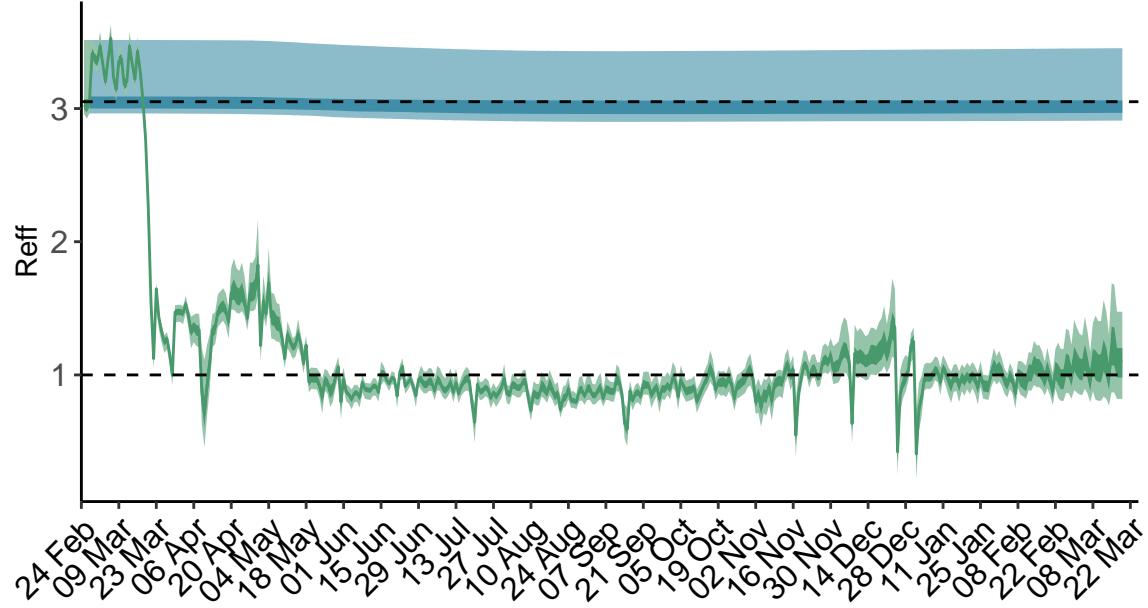


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

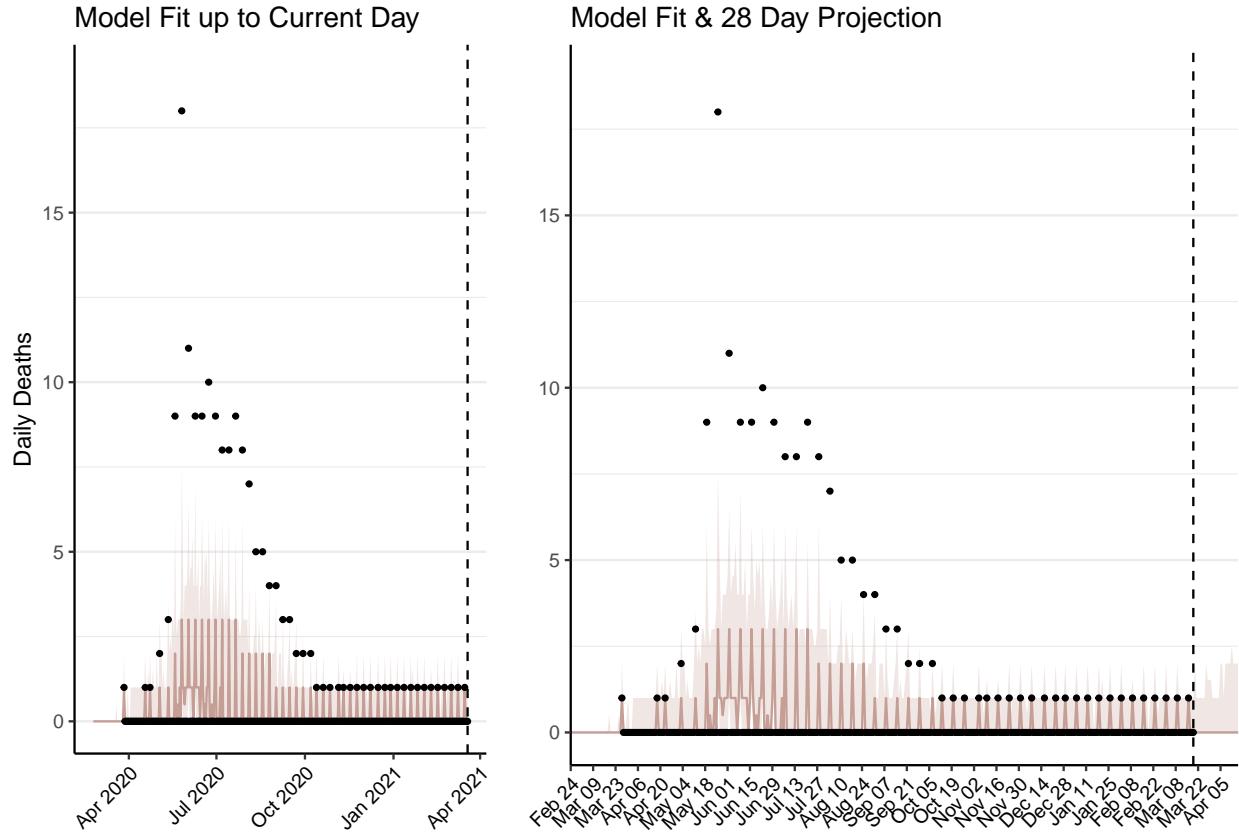


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 7 (95% CI: 6-8) patients requiring treatment with high-pressure oxygen at the current date to 17 (95% CI: 13-22) hospital beds being required on 2021-04-16 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 6 (95% CI: 4-7) by 2021-04-16. 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.**

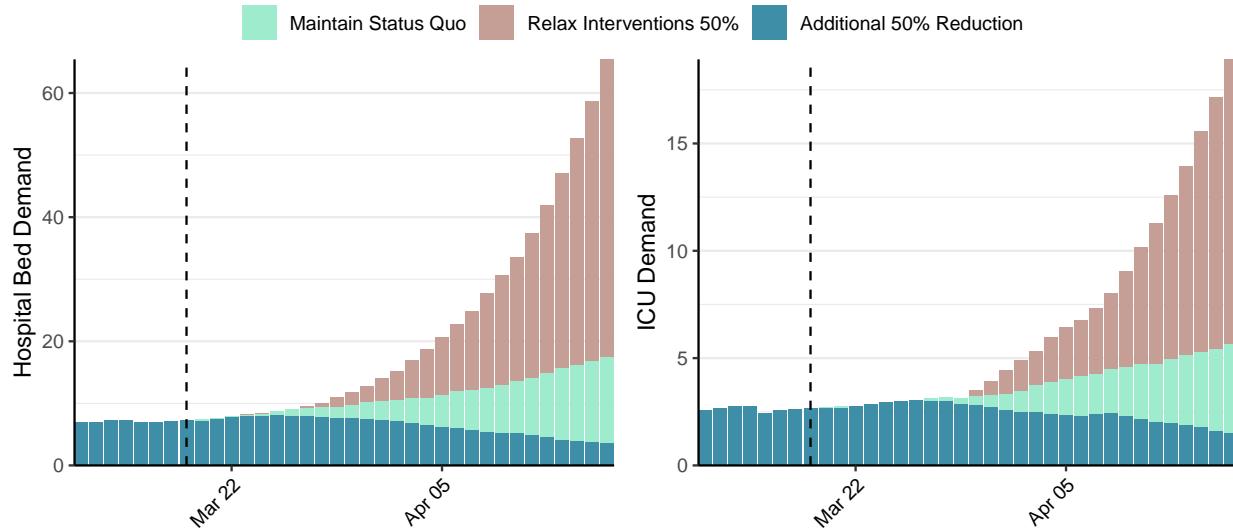


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 101-139) at the current date to 22 (95% CI: 16-28) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 120 (95% CI: 101-139) at the current date to 2,232 (95% CI: 1,471-2,994) by 2021-04-16.

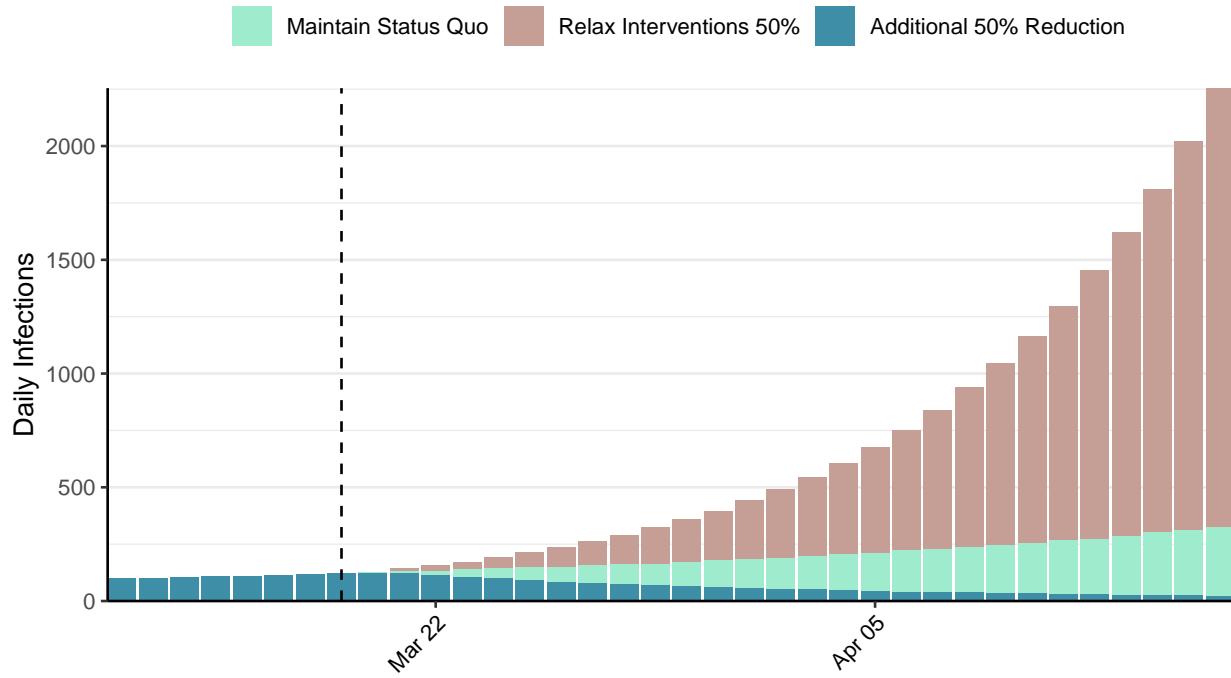


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Nepal, 2021-03-19

[Download the report for Nepal, 2021-03-19 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}
275,828	79	3,016	0	0.89 (95% CI: 0.77-1.02)

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.

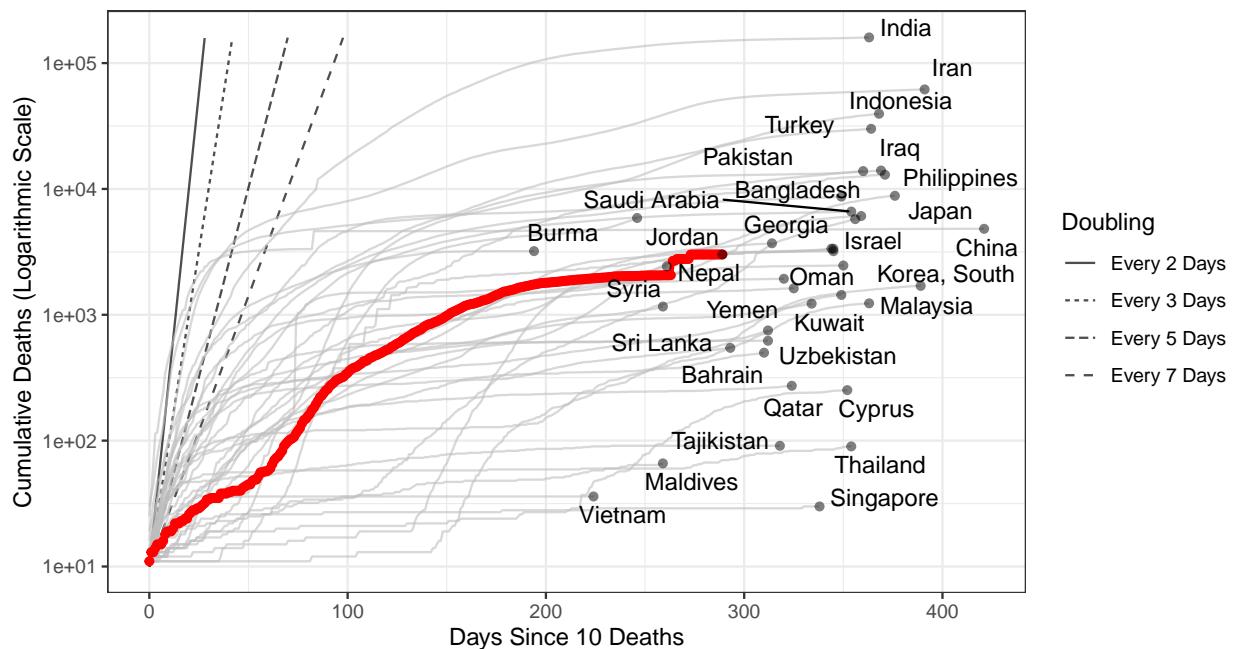


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 4,275 (95% CI: 4,033-4,517) 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).

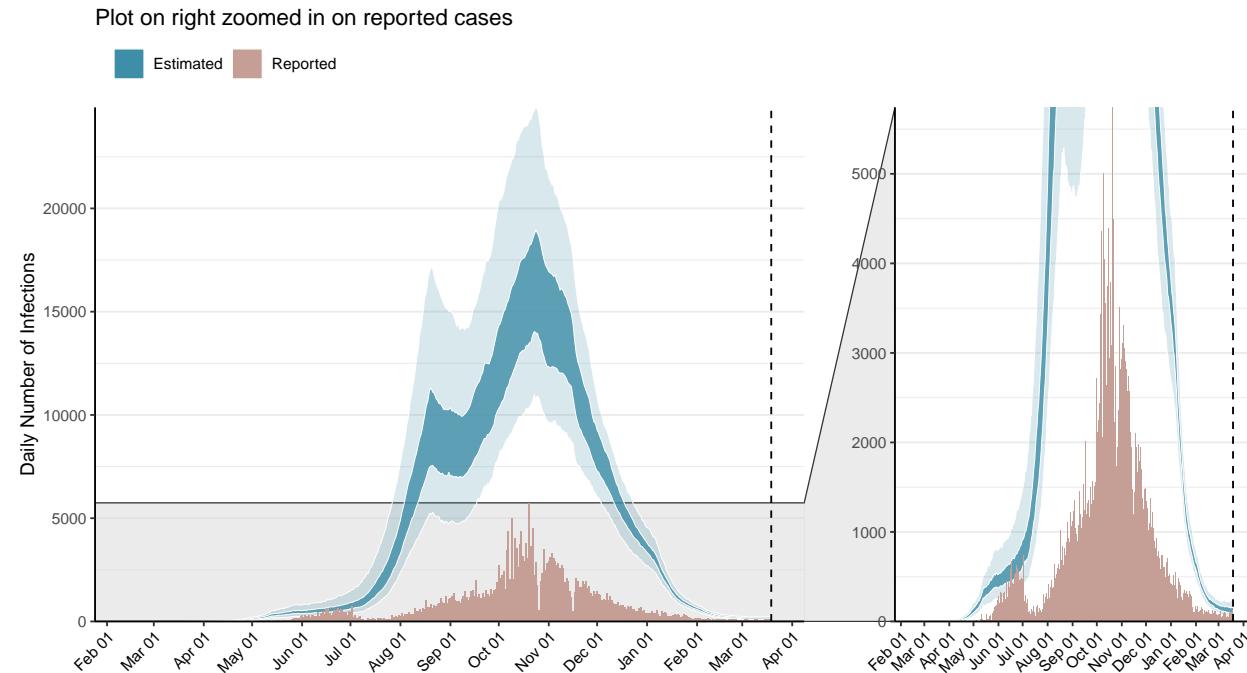


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

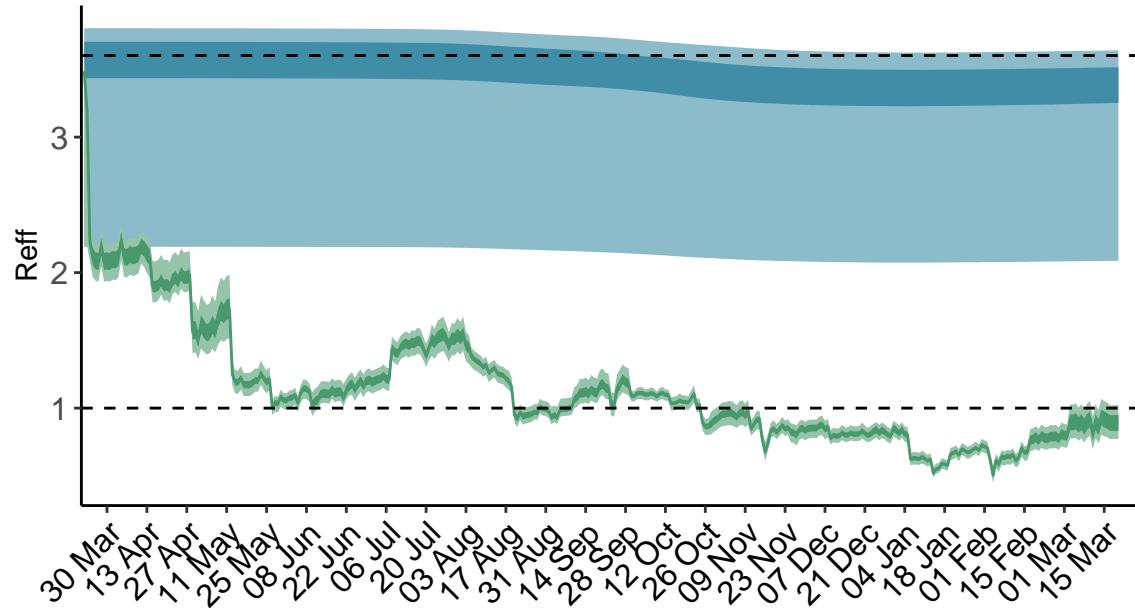


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

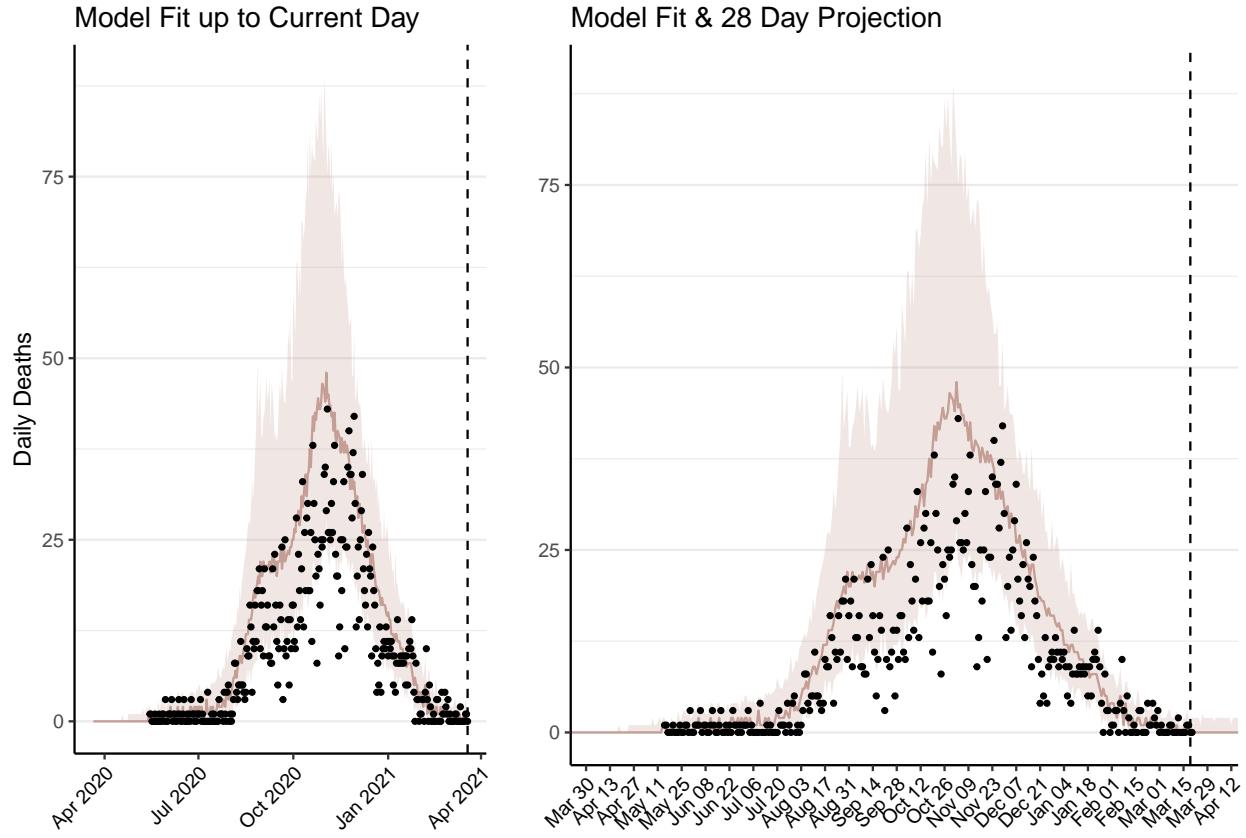


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 15 (95% CI: 14-16) patients requiring treatment with high-pressure oxygen at the current date to 10 (95% CI: 9-11) hospital beds being required on 2021-04-16 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 5 (95% CI: 4-5) by 2021-04-16. 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.**

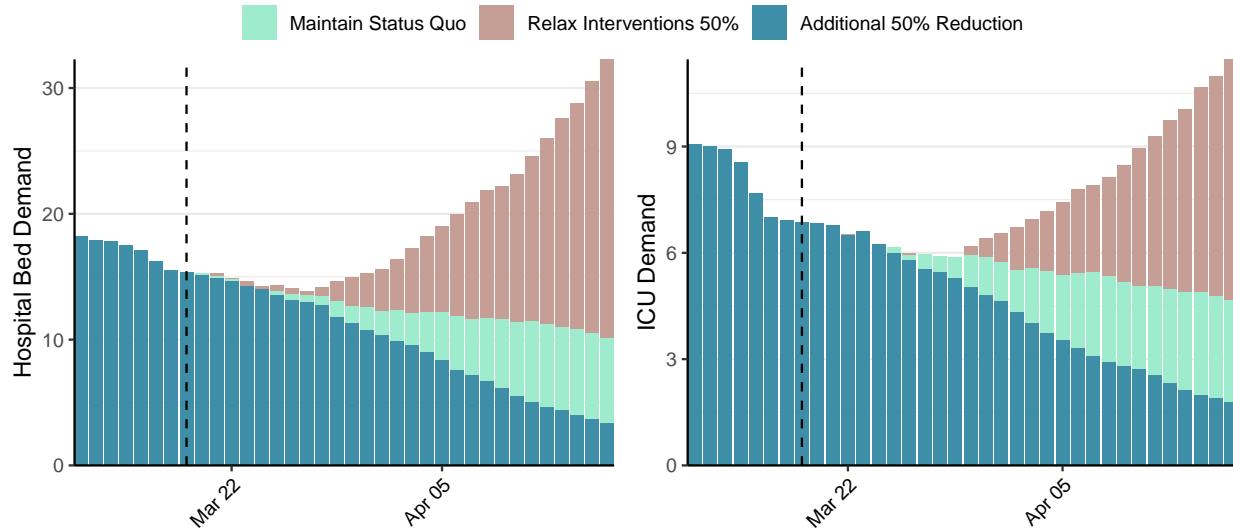


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 112-133) at the current date to 8 (95% CI: 7-9) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 122 (95% CI: 112-133) at the current date to 509 (95% CI: 434-584) by 2021-04-16.

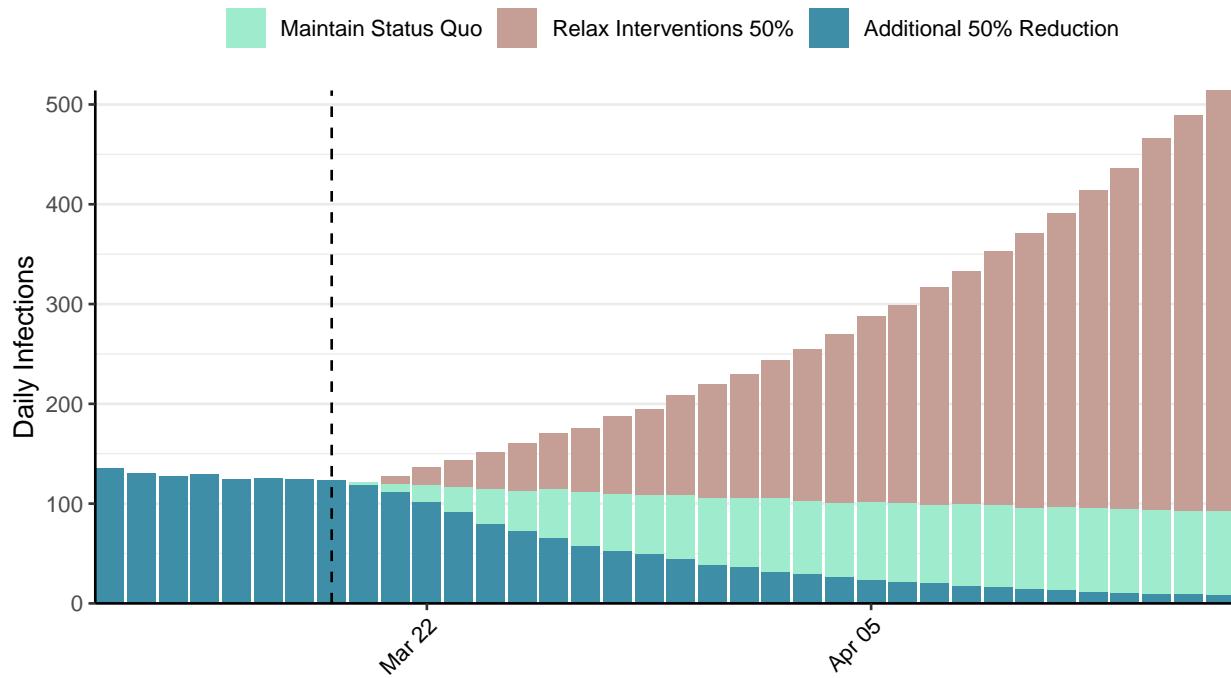


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Pakistan, 2021-03-19

[Download the report for Pakistan, 2021-03-19 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}
623,135	3,876	13,799	42	1.29 (95% CI: 1.11-1.47)

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.

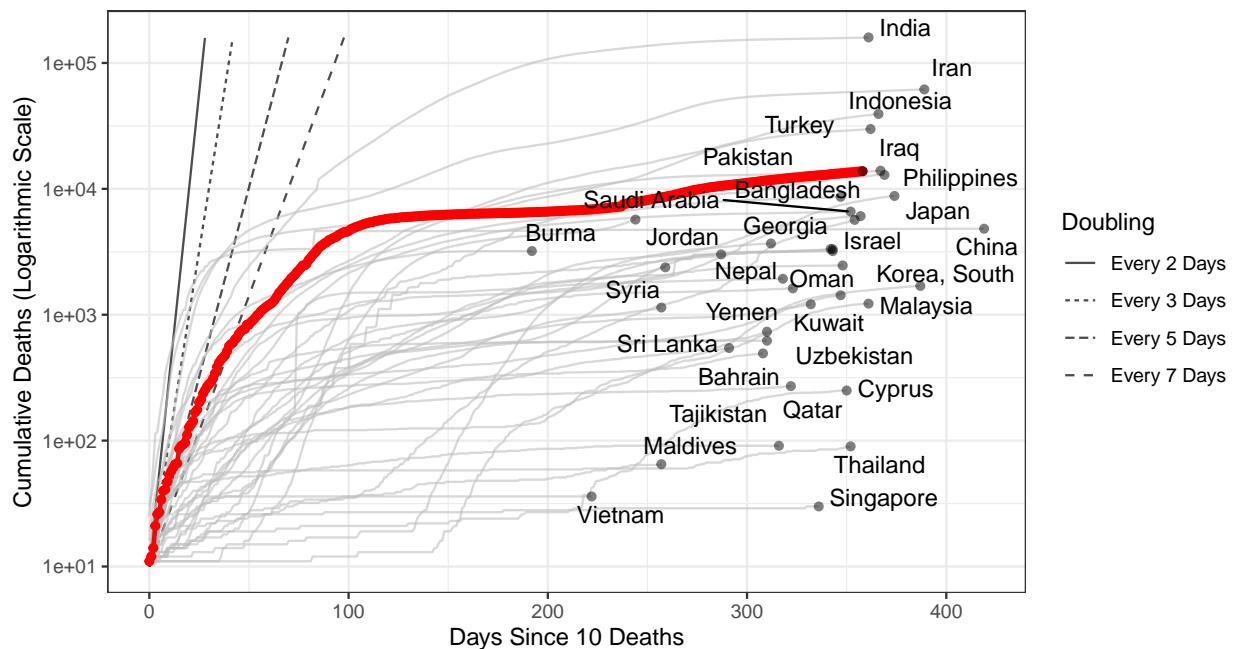


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 809,666 (95% CI: 774,435-844,897) 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

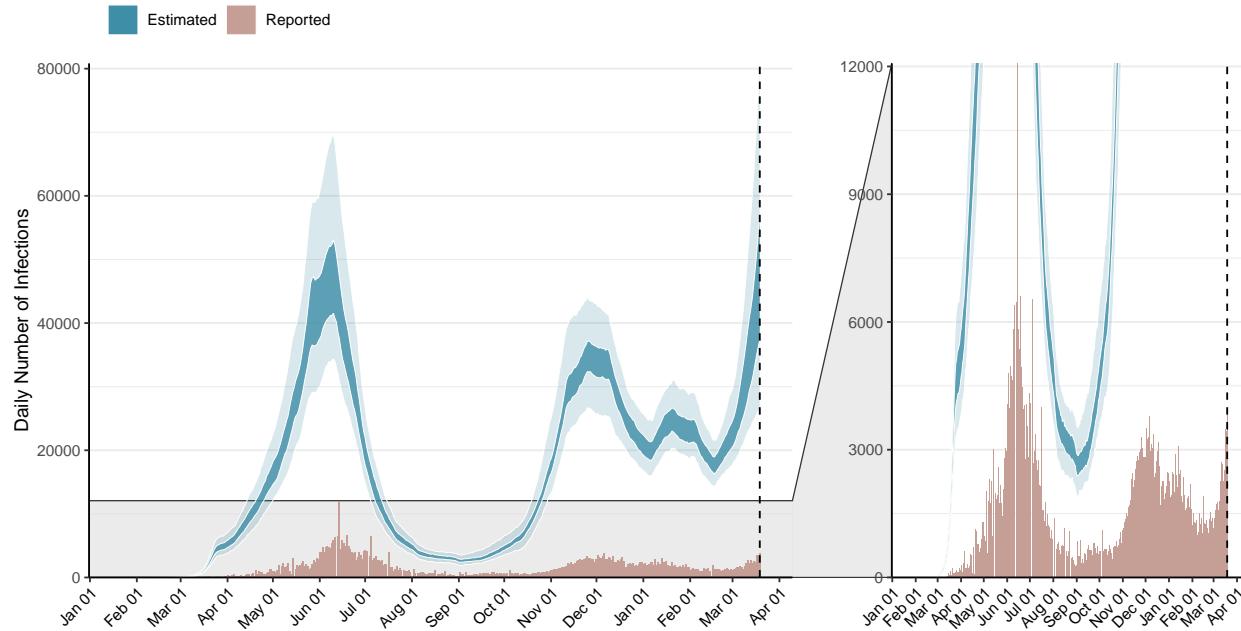


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

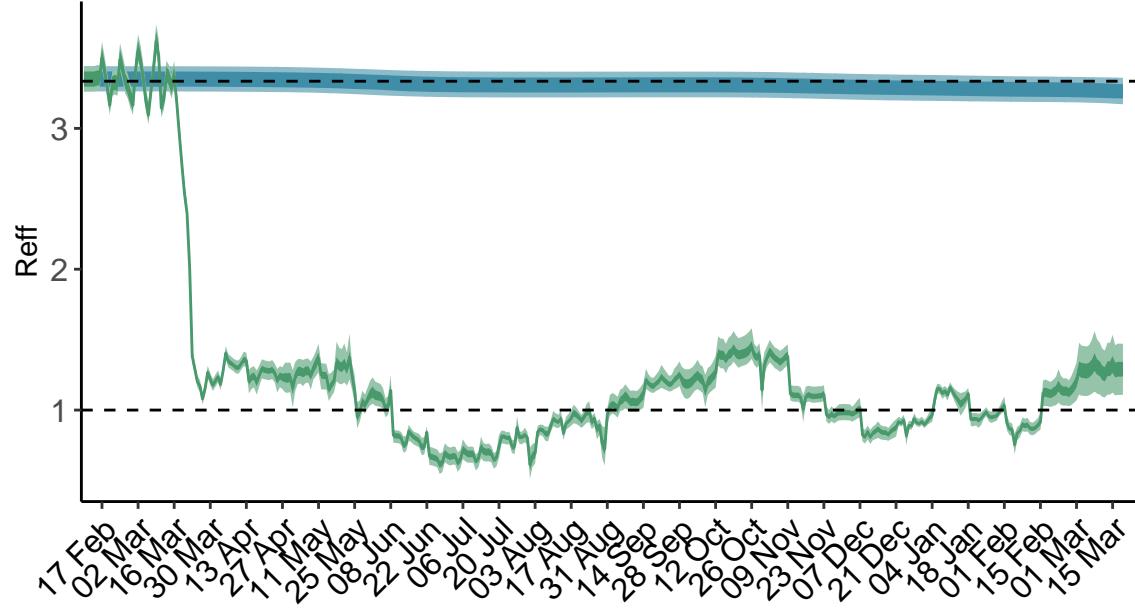


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

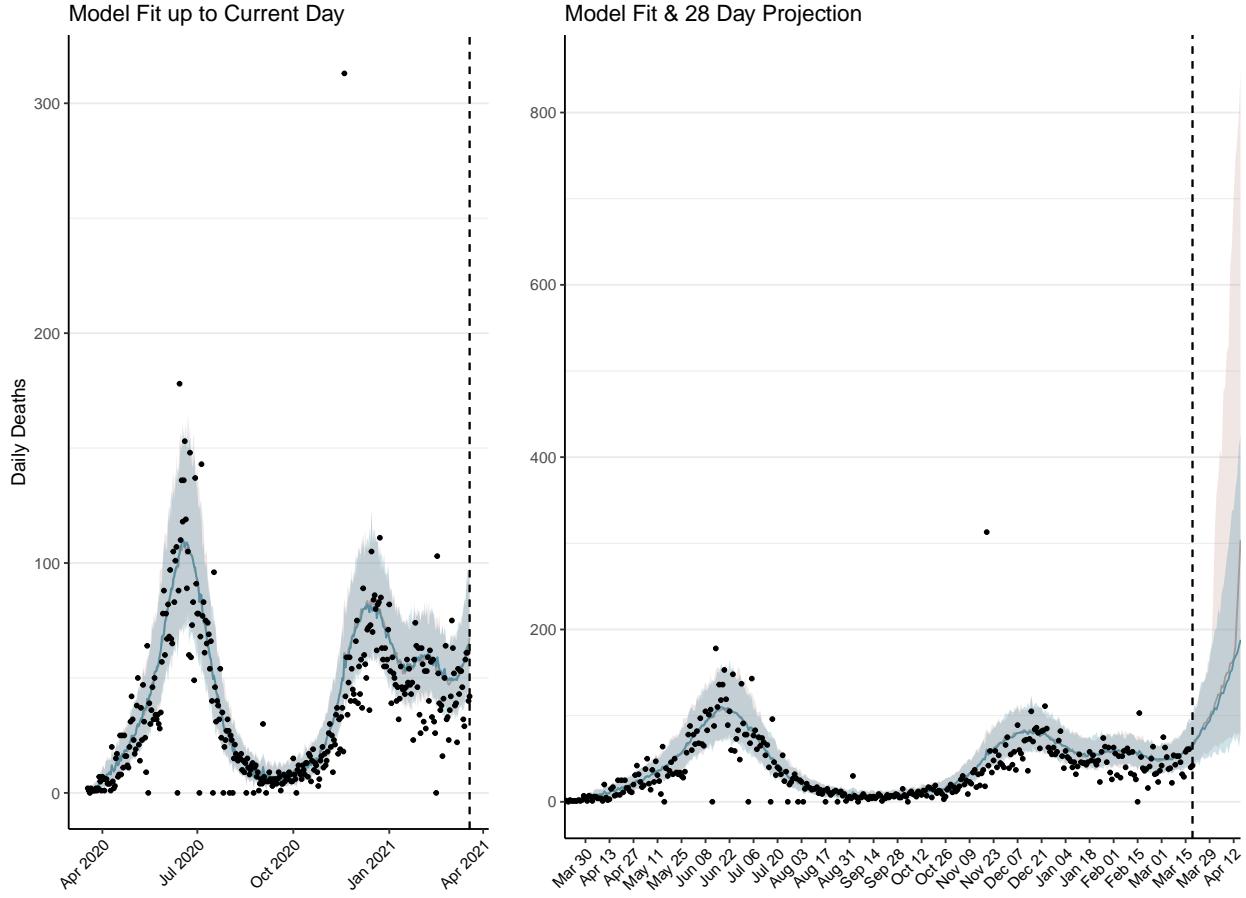


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 3,024 (95% CI: 2,887-3,161) patients requiring treatment with high-pressure oxygen at the current date to 9,864 (95% CI: 8,857-10,871) hospital beds being required on 2021-04-16 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 1,103 (95% CI: 1,056-1,149) patients requiring treatment with mechanical ventilation at the current date to 2,785 (95% CI: 2,637-2,933) by 2021-04-16. 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.**

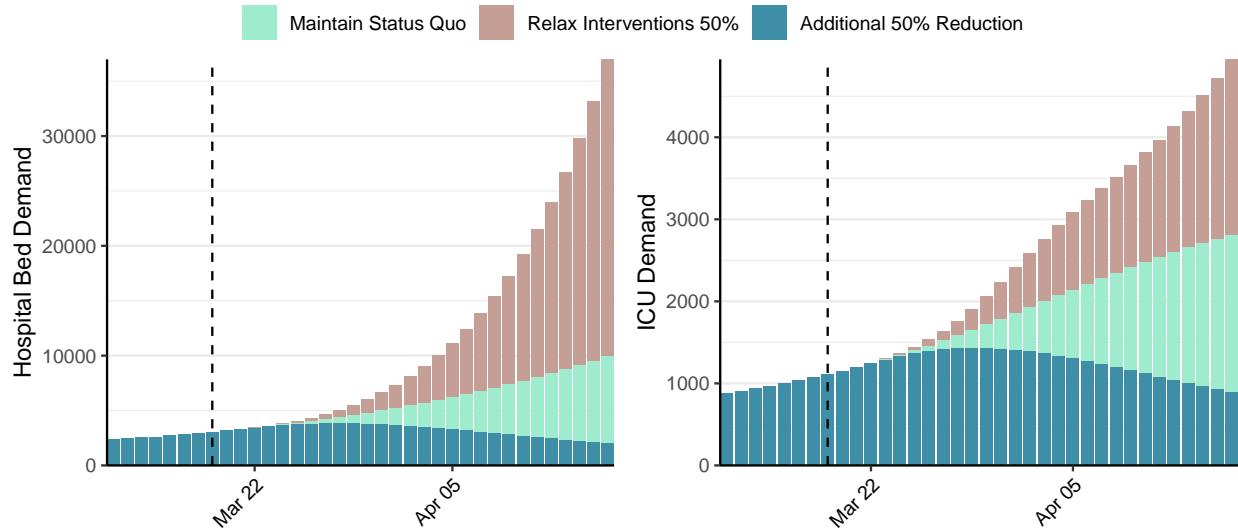


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 47,014 (95% CI: 44,041-49,988) at the current date to 10,438 (95% CI: 9,255-11,621) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 47,014 (95% CI: 44,041-49,988) at the current date to 1,004,660 (95% CI: 883,318-1,126,003) by 2021-04-16.

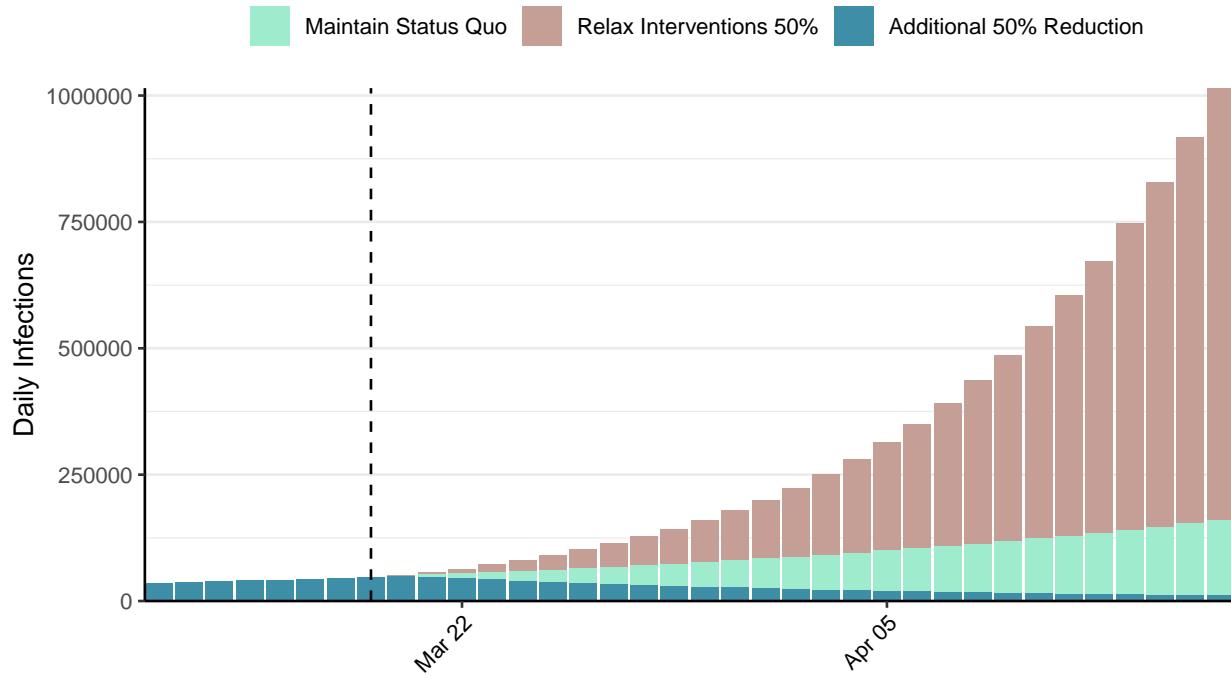


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Panama, 2021-03-19

[Download the report for Panama, 2021-03-19 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}
350,220	715	6,035	10	0.85 (95% CI: 0.68-1.04)

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.

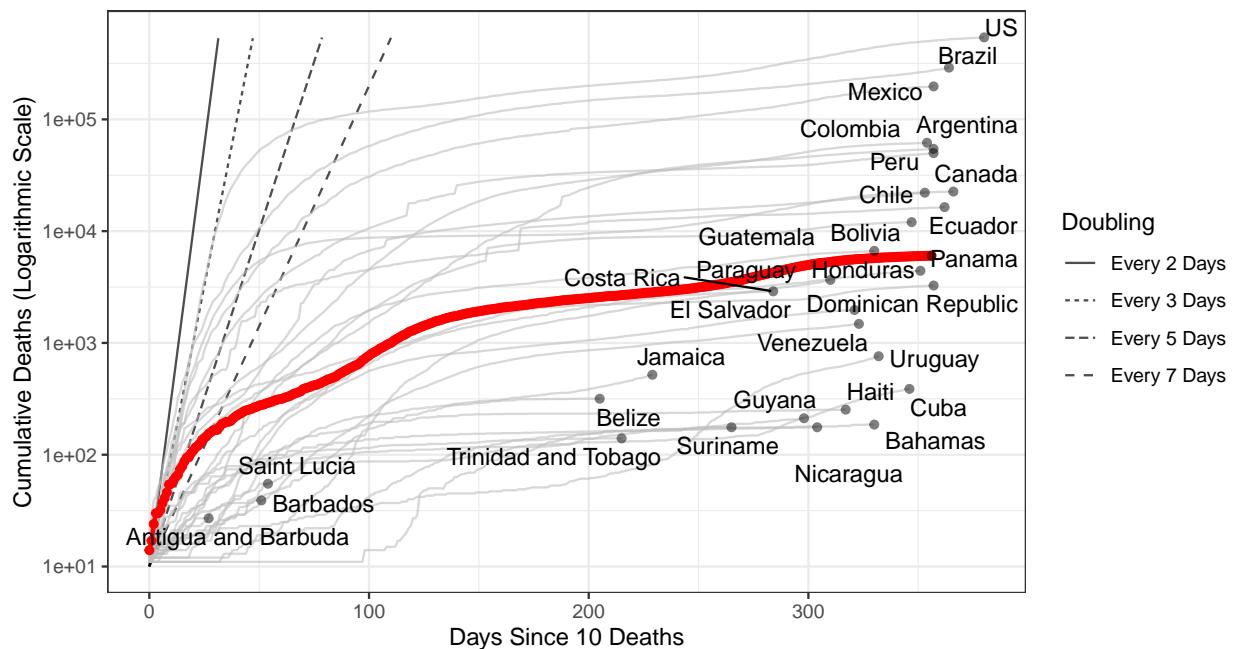


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 61,144 (95% CI: 57,184-65,104) 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

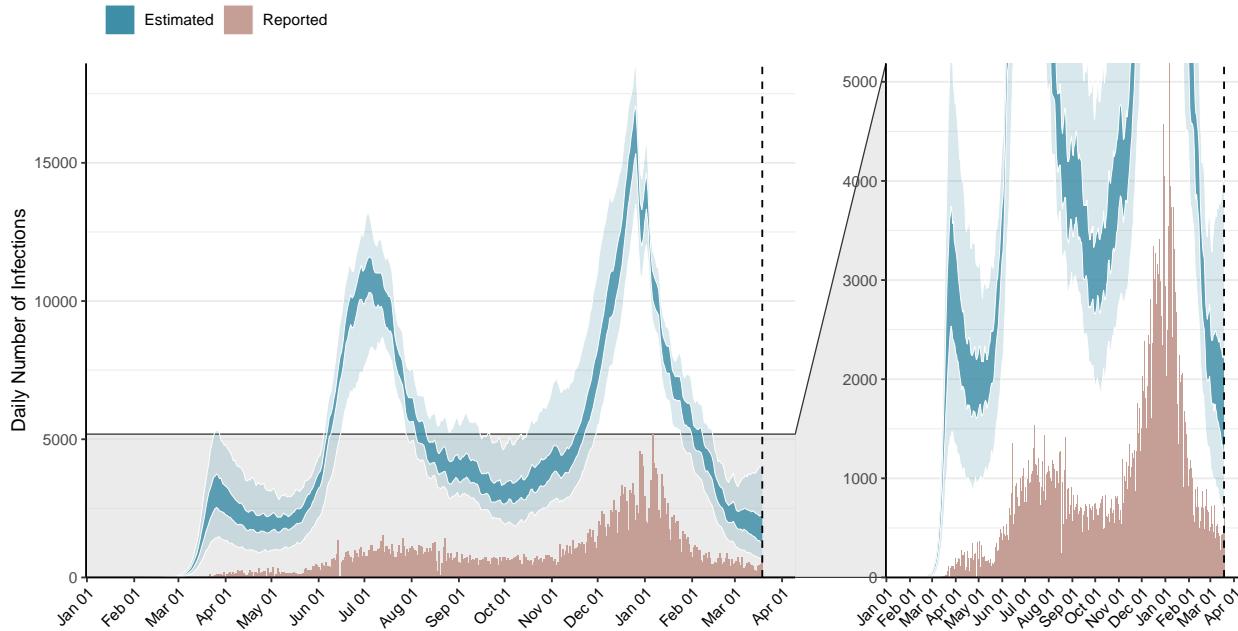


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

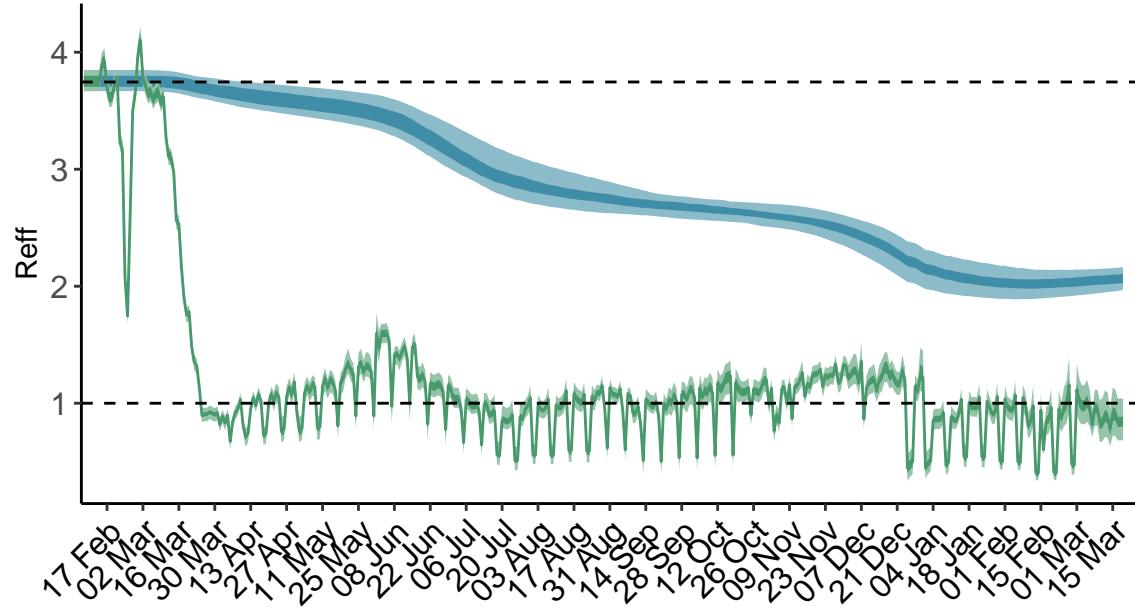


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

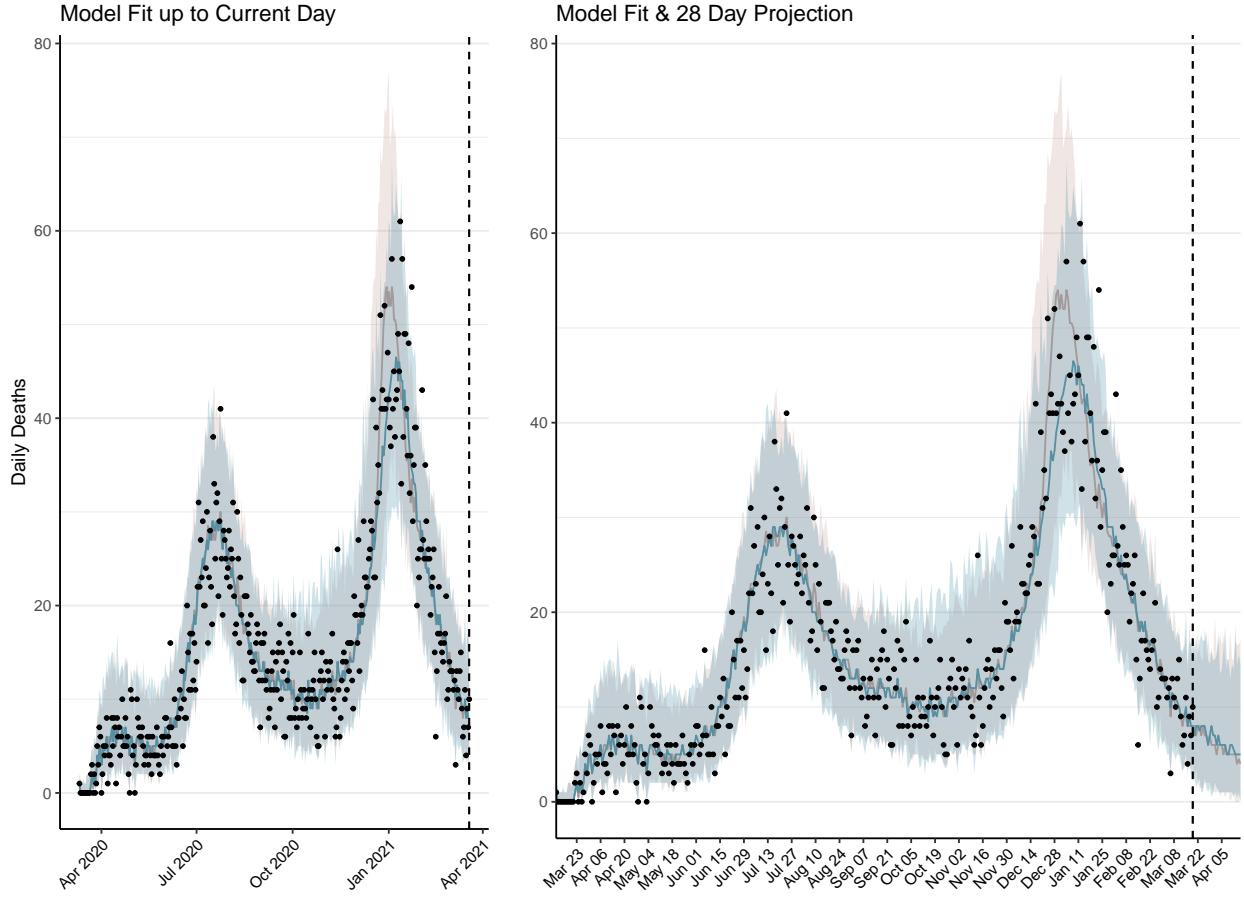


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 263 (95% CI: 244-282) patients requiring treatment with high-pressure oxygen at the current date to 170 (95% CI: 145-196) hospital beds being required on 2021-04-16 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 101 (95% CI: 95-107) patients requiring treatment with mechanical ventilation at the current date to 65 (95% CI: 56-74) by 2021-04-16. 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.**

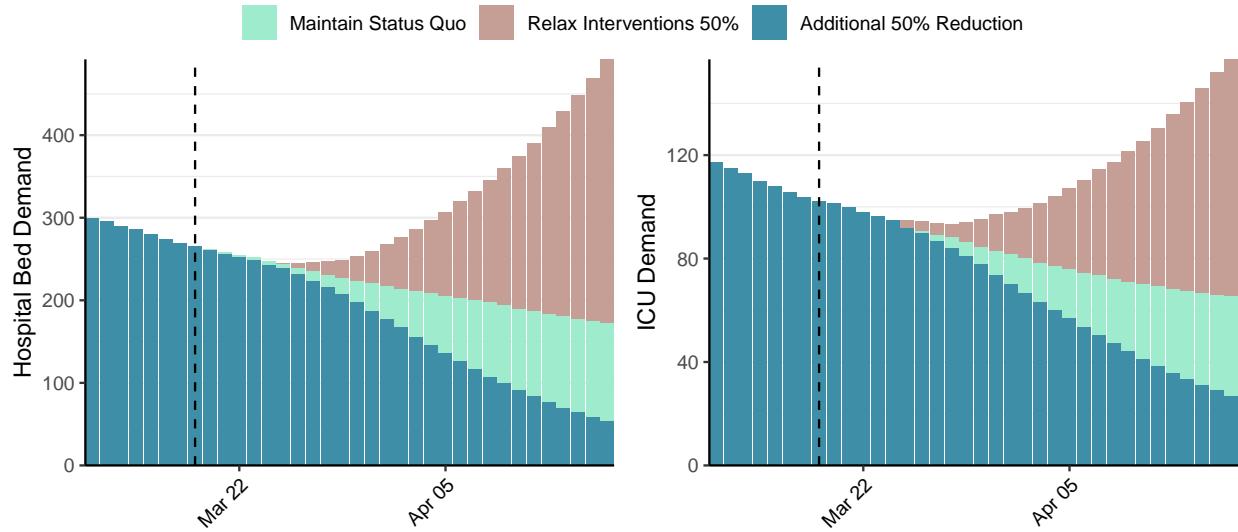


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,811 (95% CI: 1,631-1,991) at the current date to 113 (95% CI: 94-133) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,811 (95% CI: 1,631-1,991) at the current date to 6,278 (95% CI: 5,157-7,400) by 2021-04-16.

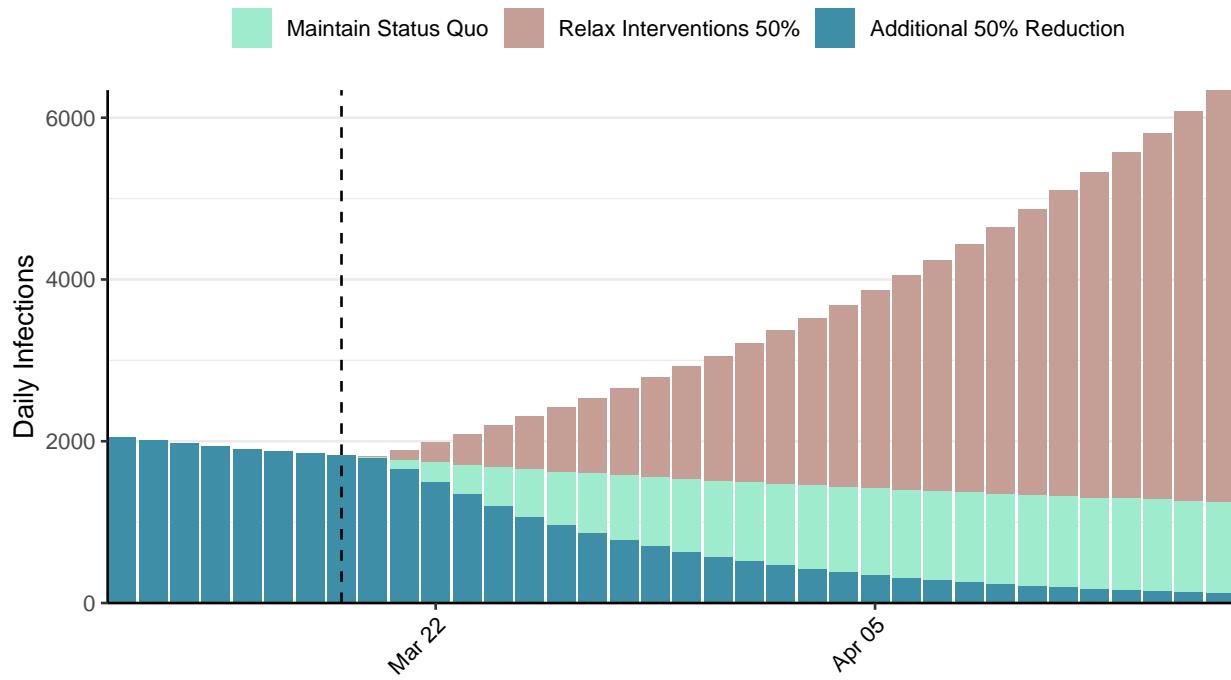


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Peru, 2021-03-19

[Download the report for Peru, 2021-03-19 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}
1,460,778	9,134	50,085	188	0.93 (95% CI: 0.88-0.99)

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.

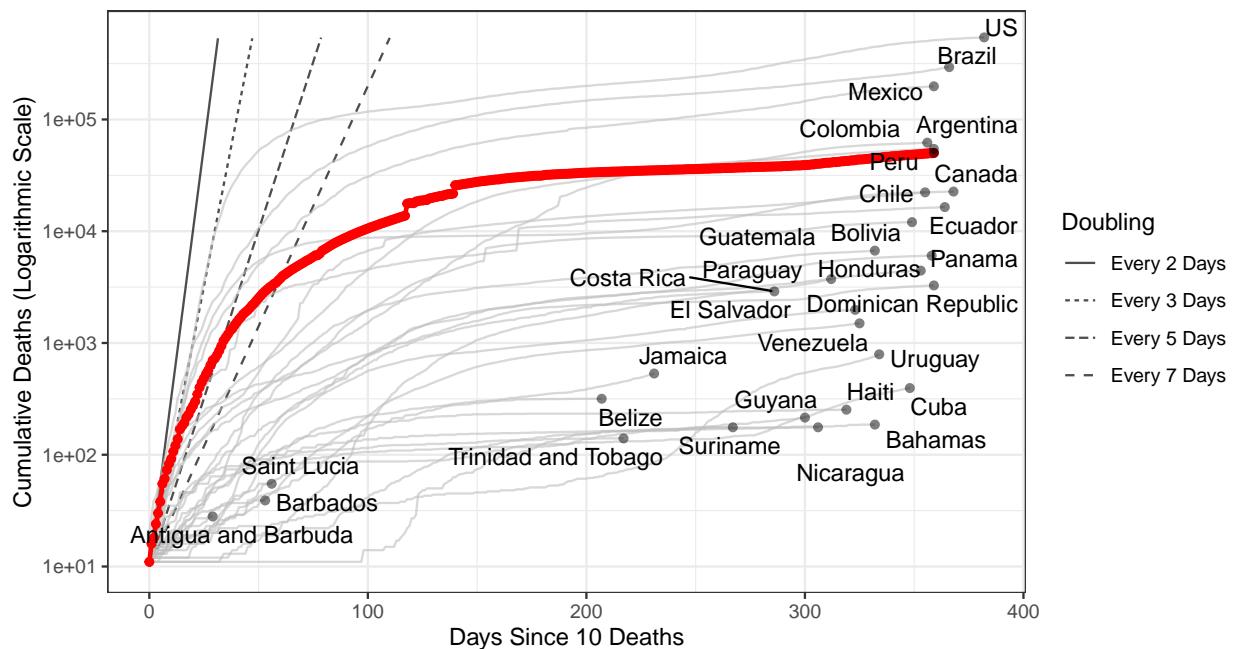


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 1,409,857 (95% CI: 1,365,137-1,454,578) 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).

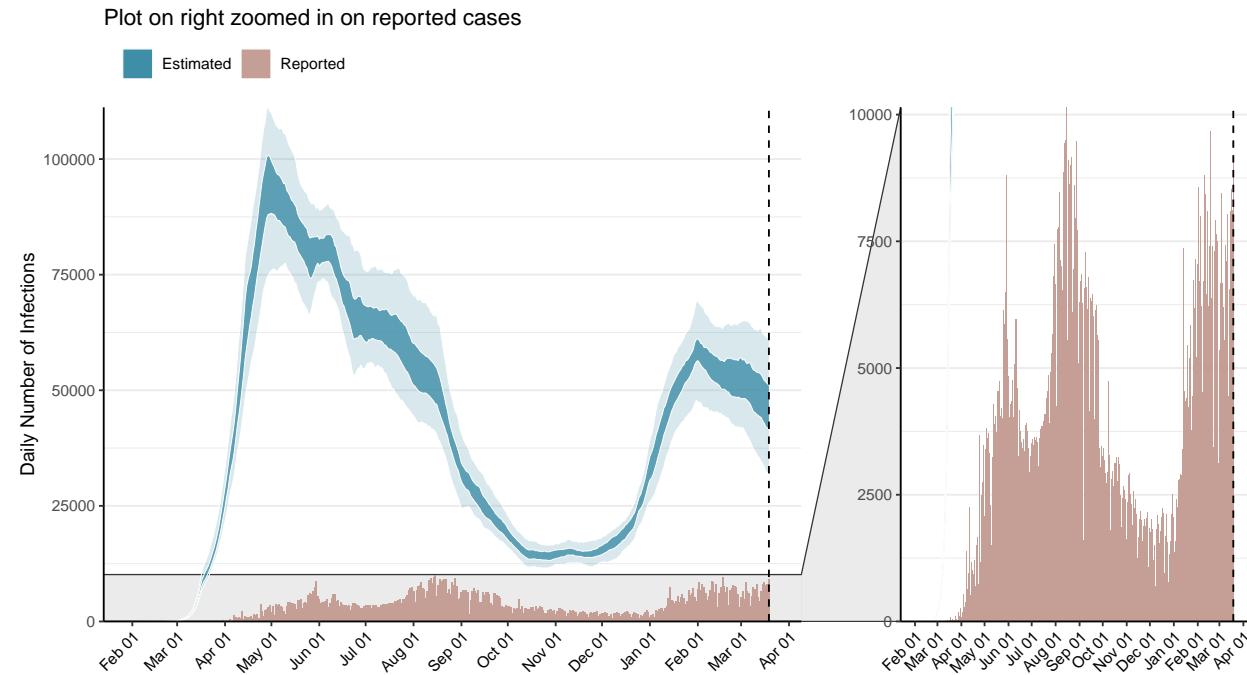


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

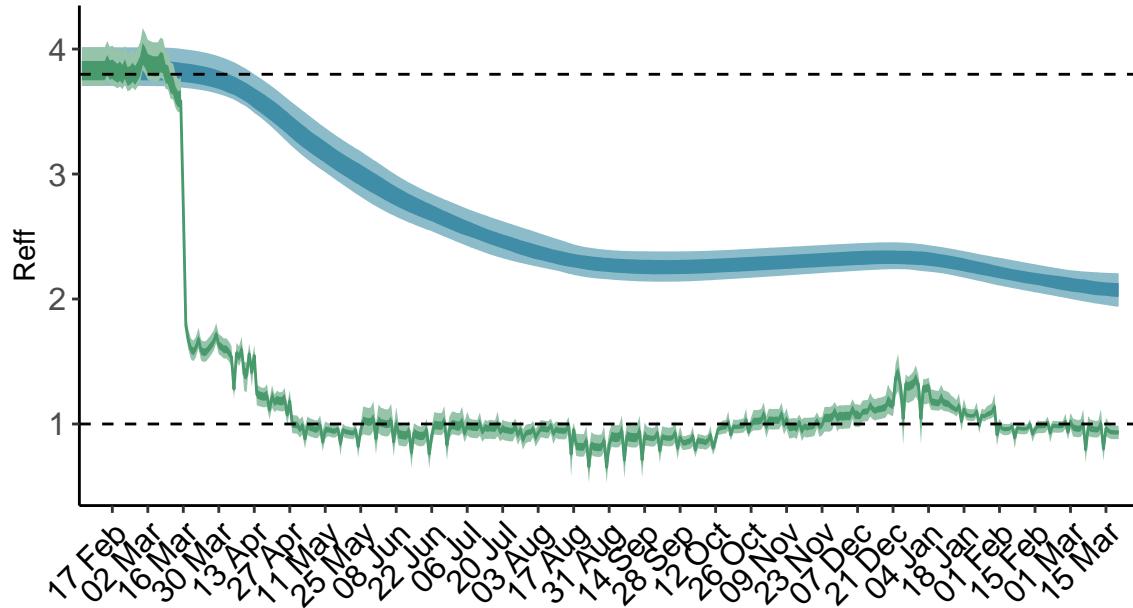


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

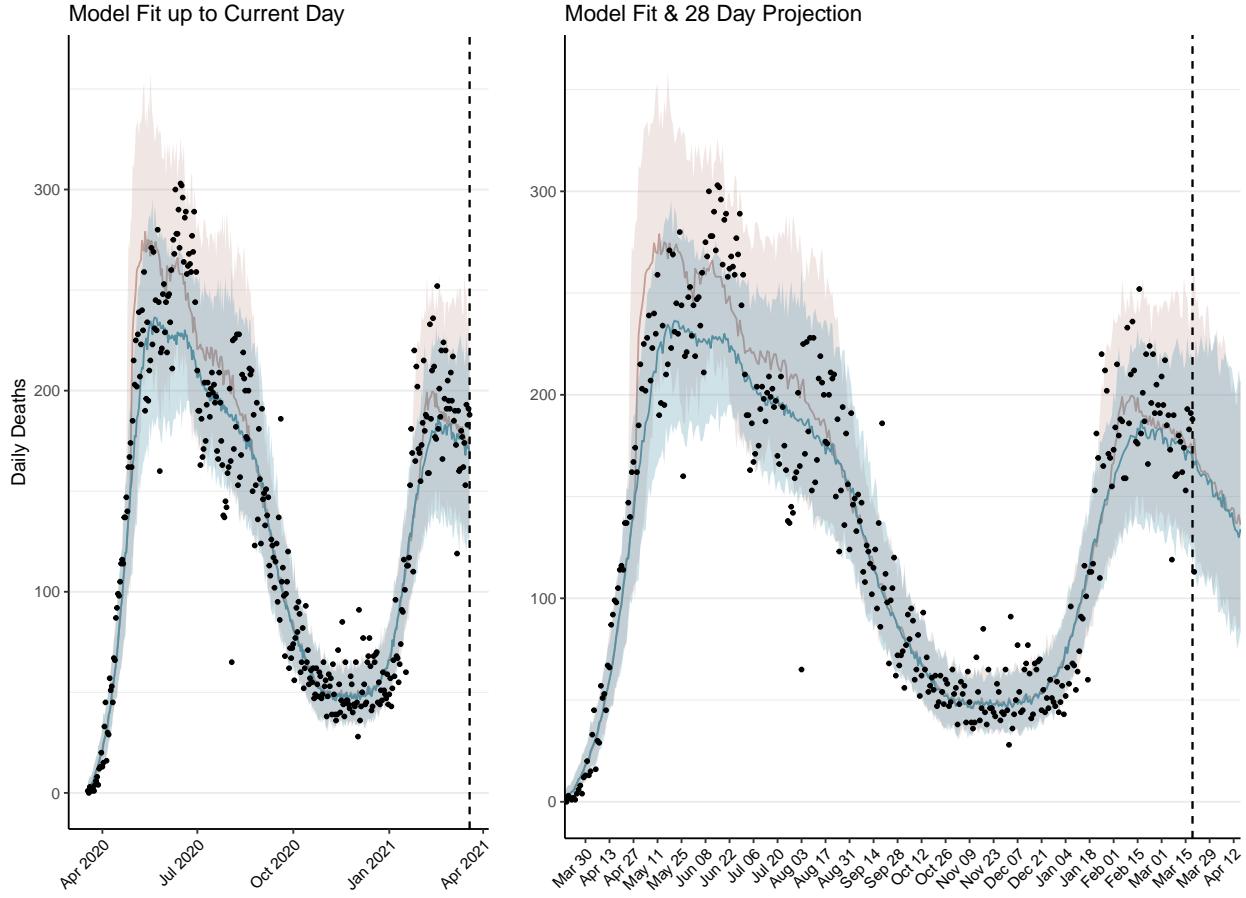


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 6,039 (95% CI: 5,840-6,237) patients requiring treatment with high-pressure oxygen at the current date to 4,775 (95% CI: 4,552-4,997) hospital beds being required on 2021-04-16 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 2,006 (95% CI: 1,959-2,053) patients requiring treatment with mechanical ventilation at the current date to 1,740 (95% CI: 1,674-1,806) by 2021-04-16. 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.**

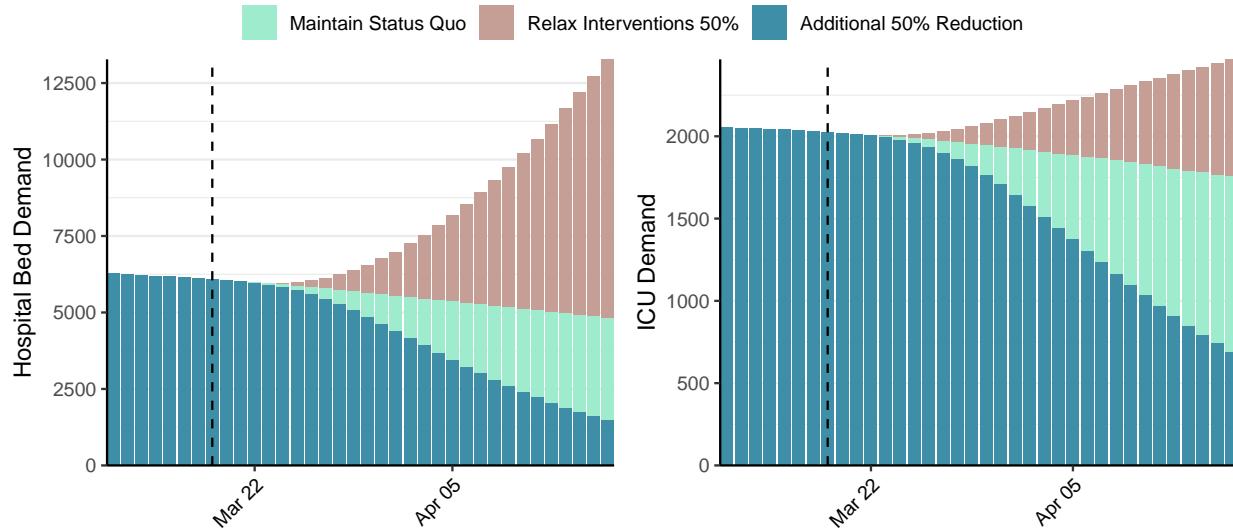


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 46,081 (95% CI: 44,315-47,847) at the current date to 3,259 (95% CI: 3,094-3,423) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 46,081 (95% CI: 44,315-47,847) at the current date to 156,671 (95% CI: 149,645-163,696) by 2021-04-16.

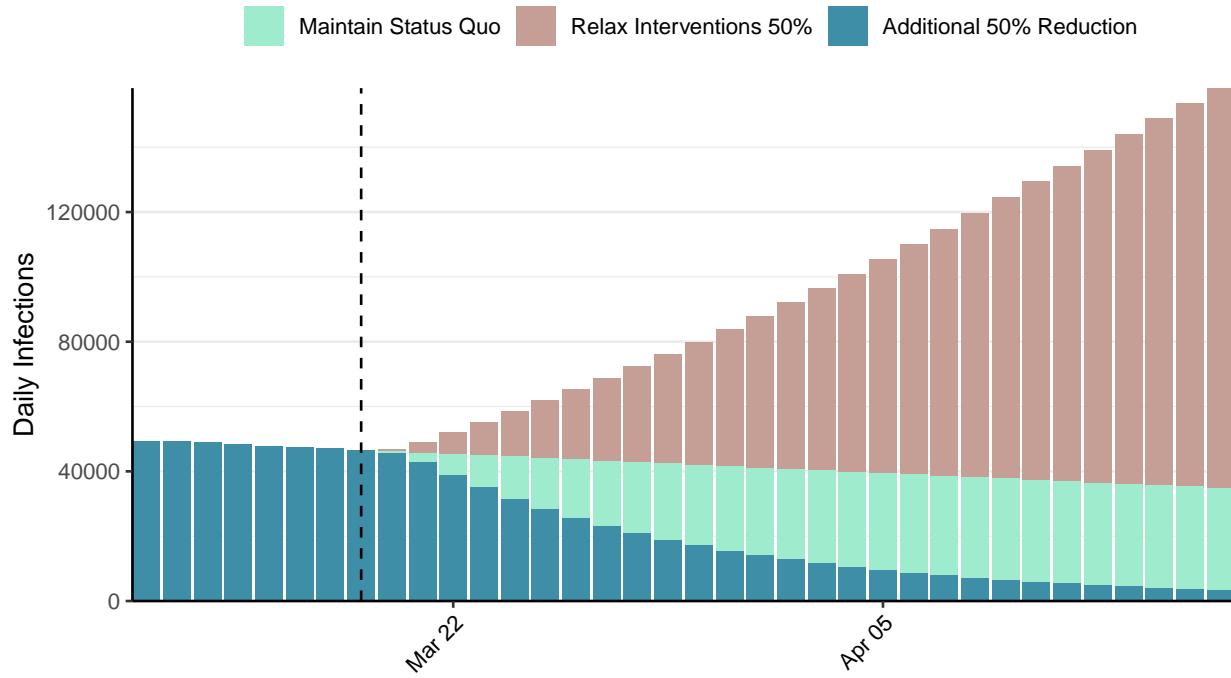


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Philippines, 2021-03-19

[Download the report for Philippines, 2021-03-19 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}
648,066	7,082	12,902	13	1.03 (95% CI: 0.93-1.13)

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.

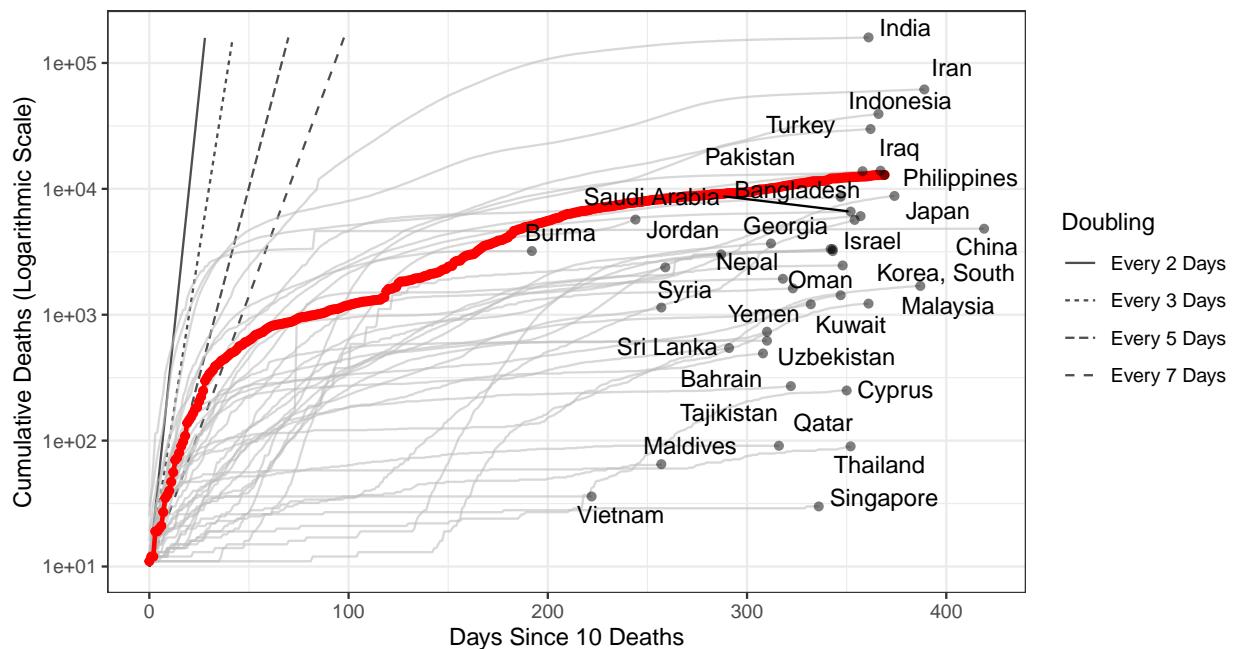


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 319,177 (95% CI: 305,407-332,947) 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).

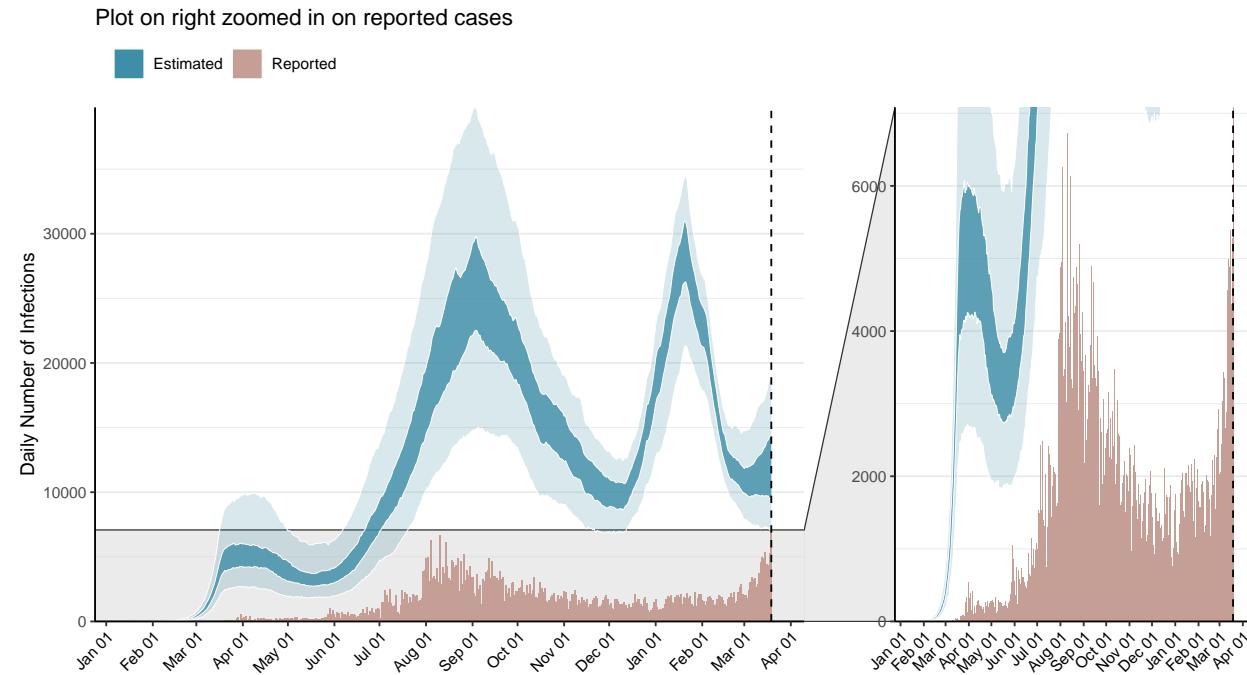


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

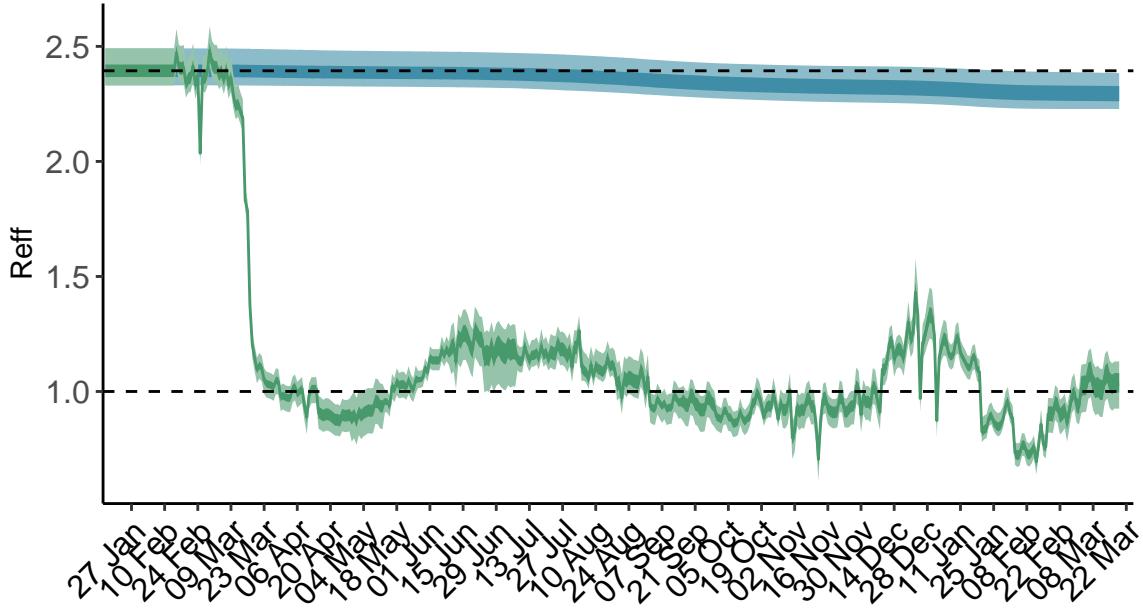


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

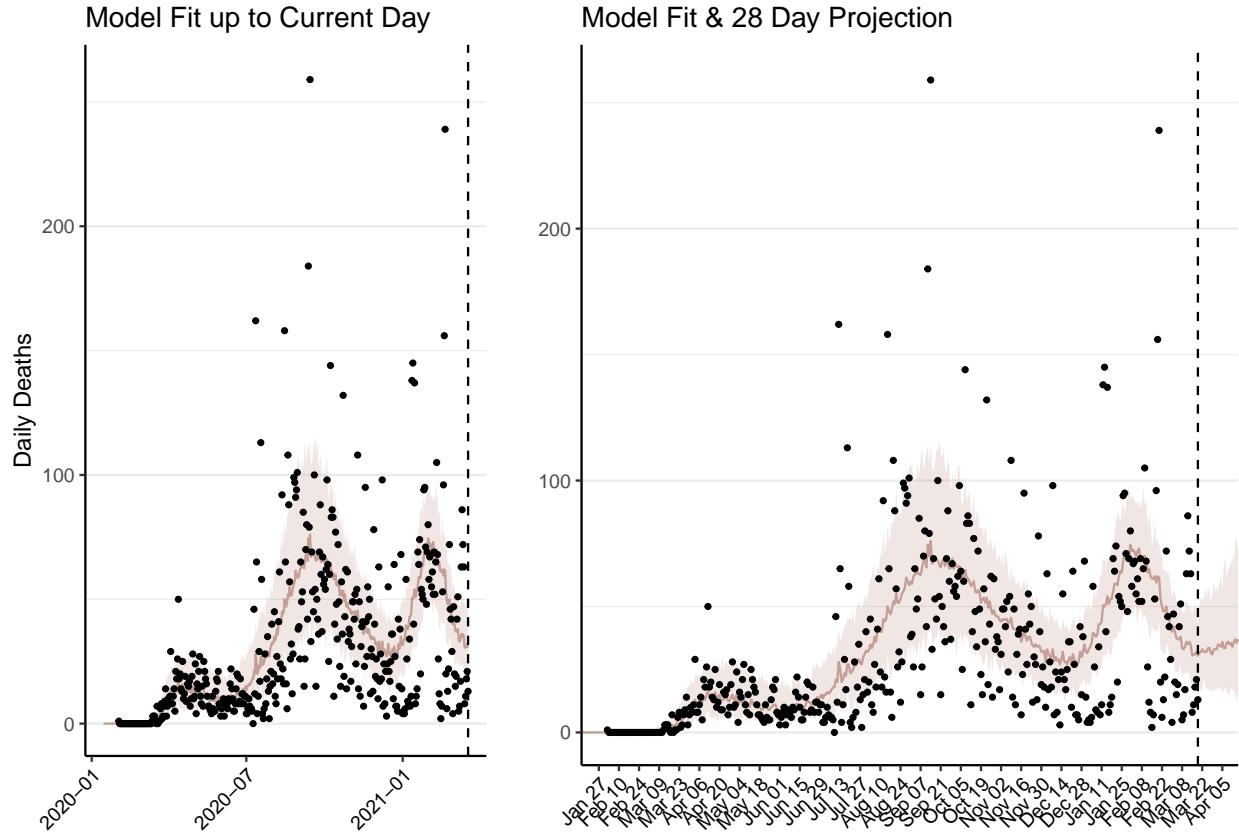


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,290 (95% CI: 1,231-1,349) patients requiring treatment with high-pressure oxygen at the current date to 1,564 (95% CI: 1,425-1,704) hospital beds being required on 2021-04-16 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 516 (95% CI: 494-539) patients requiring treatment with mechanical ventilation at the current date to 598 (95% CI: 547-648) by 2021-04-16. 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.**

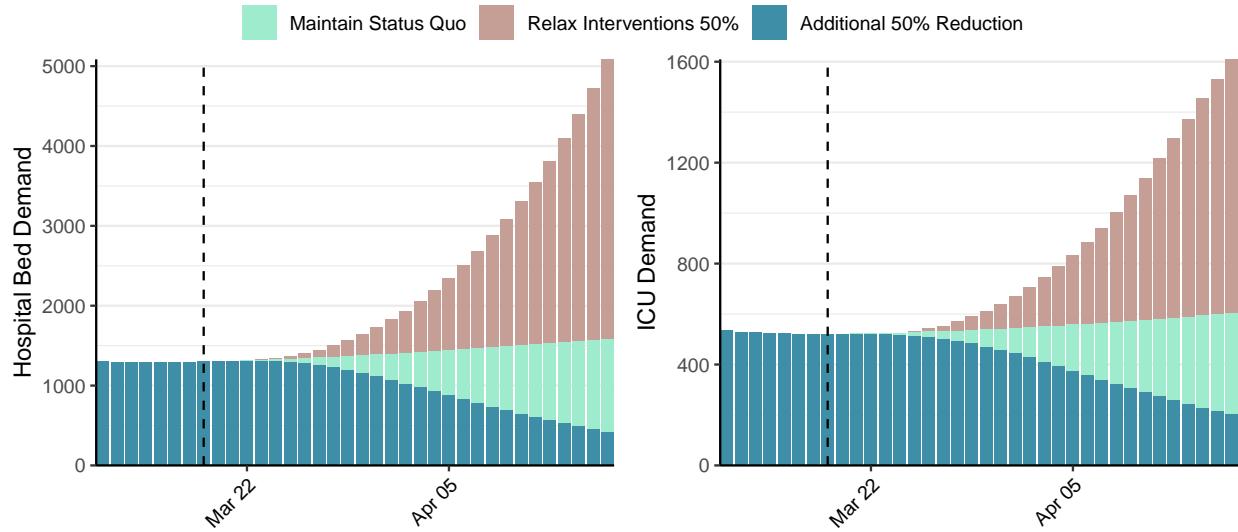


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 12,094 (95% CI: 11,350-12,838) at the current date to 1,222 (95% CI: 1,099-1,345) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 12,094 (95% CI: 11,350-12,838) at the current date to 91,353 (95% CI: 81,048-101,659) by 2021-04-16.

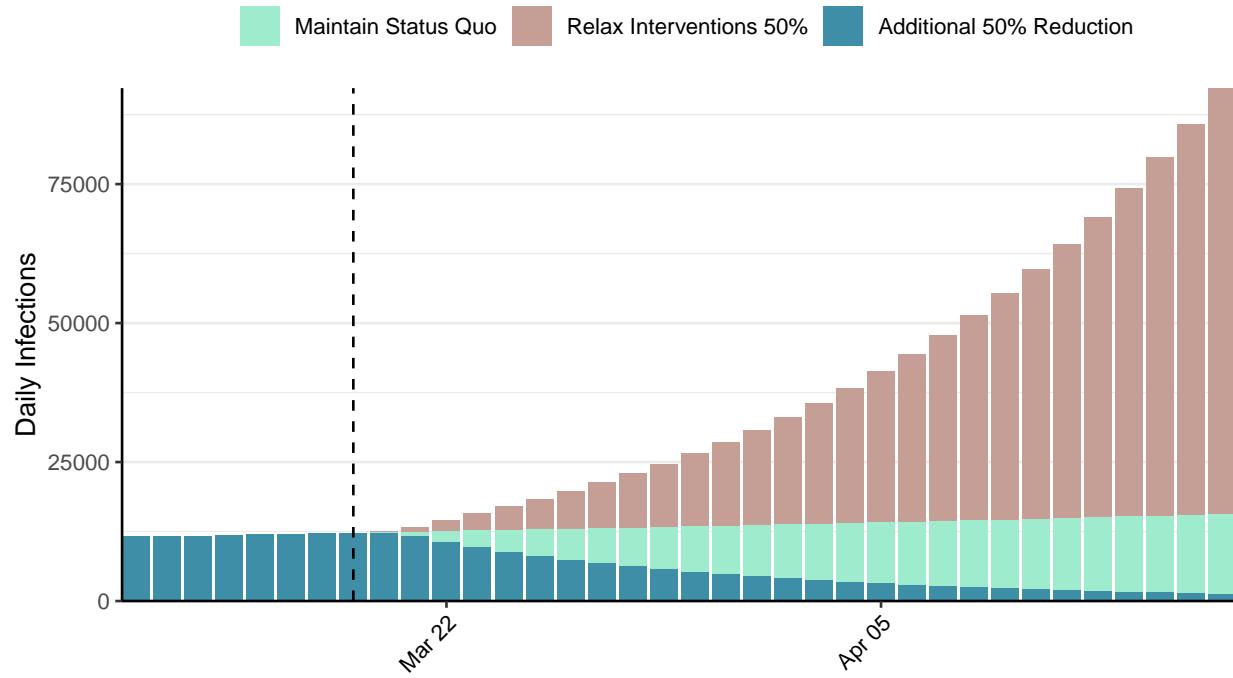


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Papua New Guinea, 2021-03-19

[Download the report for Papua New Guinea, 2021-03-19 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}
2,658	179	37	5	1.72 (95% CI: 1.43-2.05)

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.

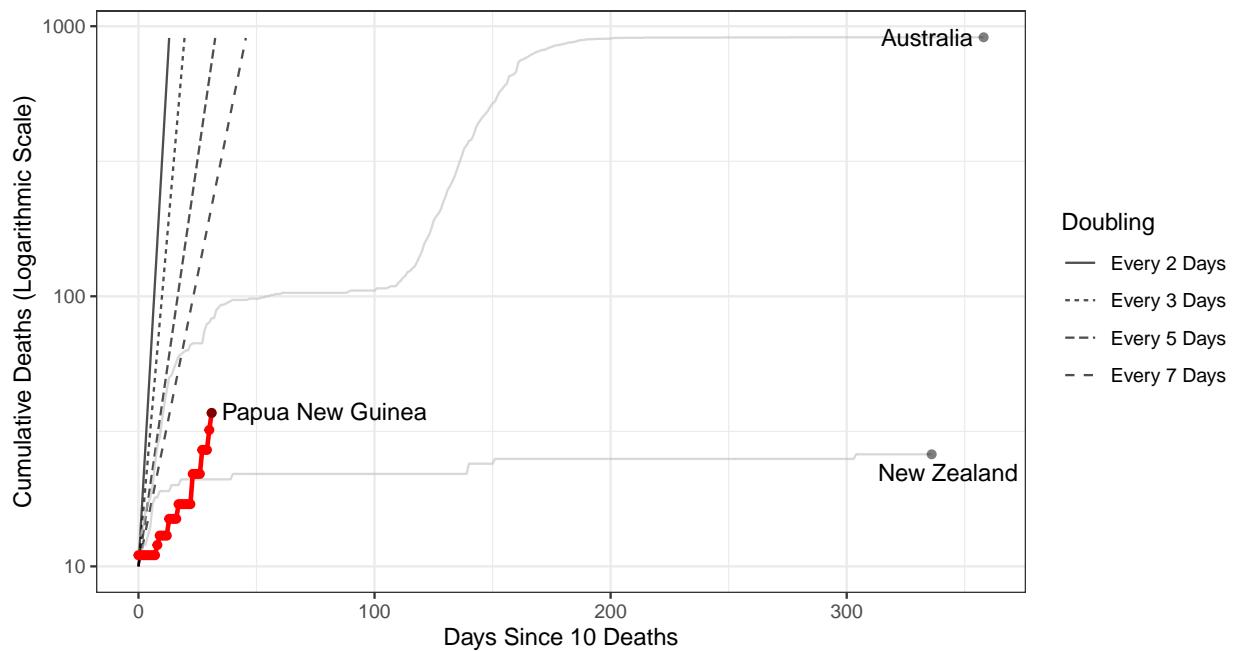


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 47,359 (95% CI: 41,648–53,070) 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.**

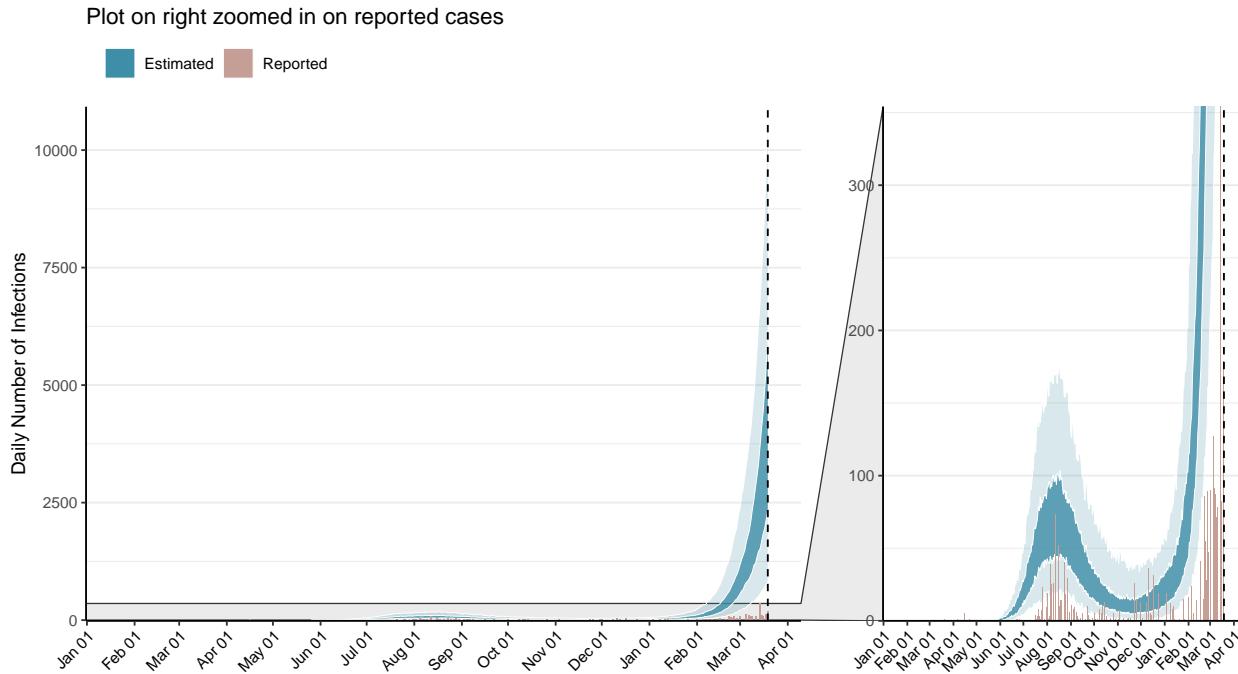


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

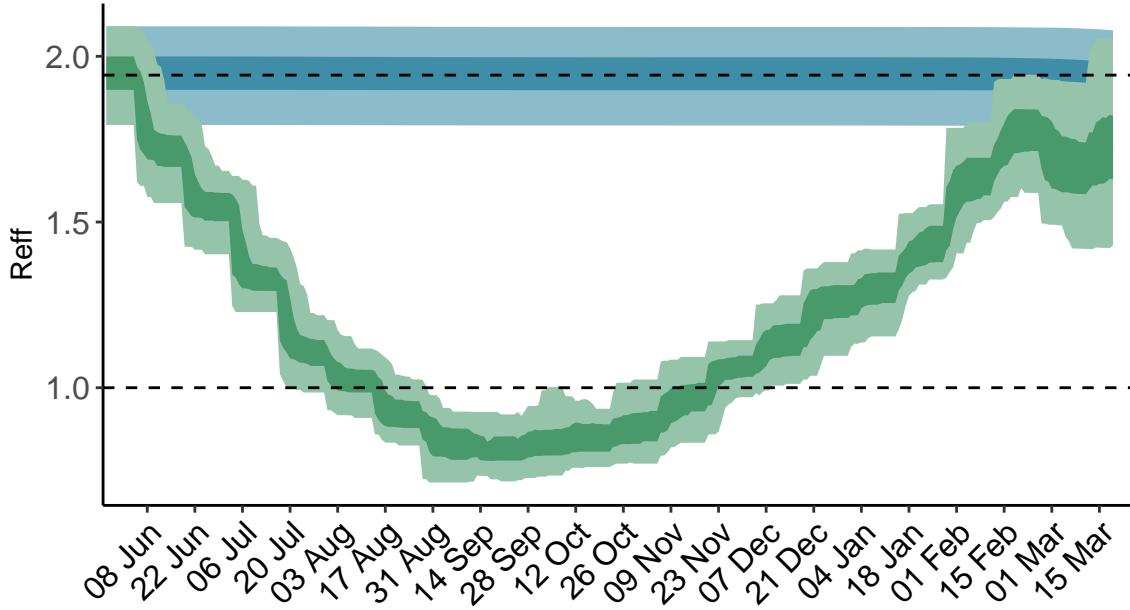


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Papua New Guinea 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.](#)

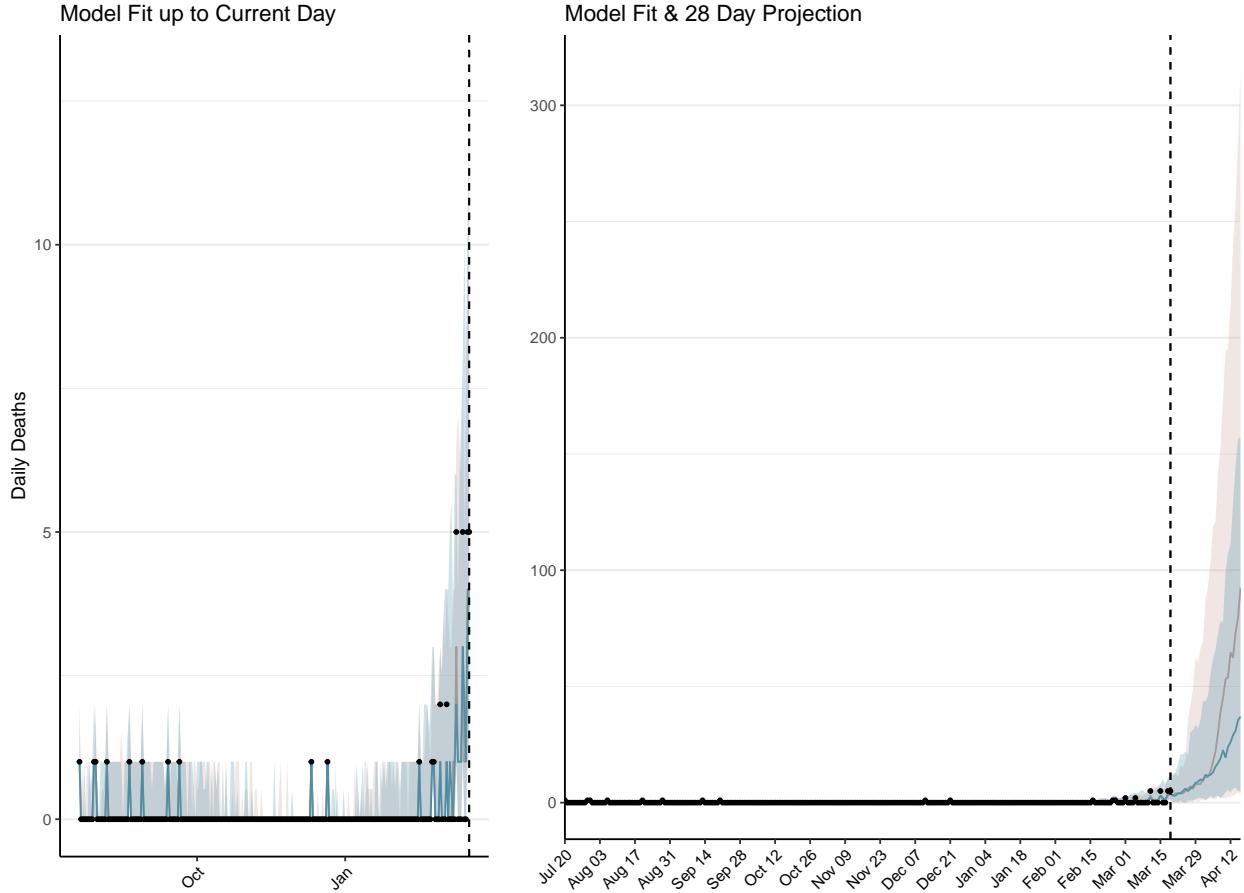


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 172-220) patients requiring treatment with high-pressure oxygen at the current date to 2,288 (95% CI: 1,955-2,621) hospital beds being required on 2021-04-16 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: 59-75) patients requiring treatment with mechanical ventilation at the current date to 346 (95% CI: 321-372) by 2021-04-16. 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.**

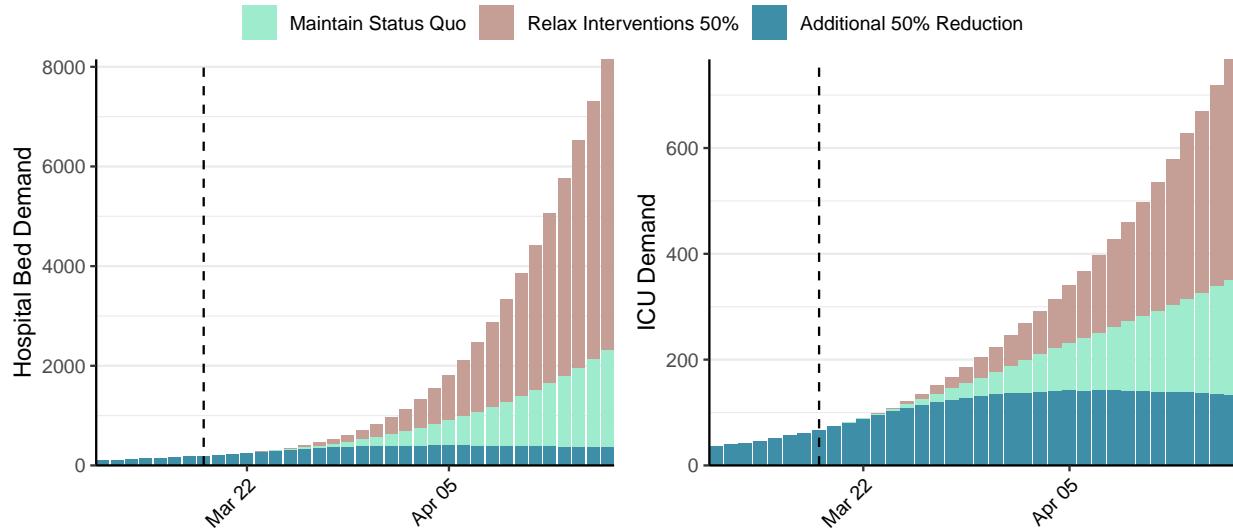


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 4,358 (95% CI: 3,806-4,910) at the current date to 2,924 (95% CI: 2,440-3,409) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,358 (95% CI: 3,806-4,910) at the current date to 206,564 (95% CI: 186,805-226,323) by 2021-04-16.

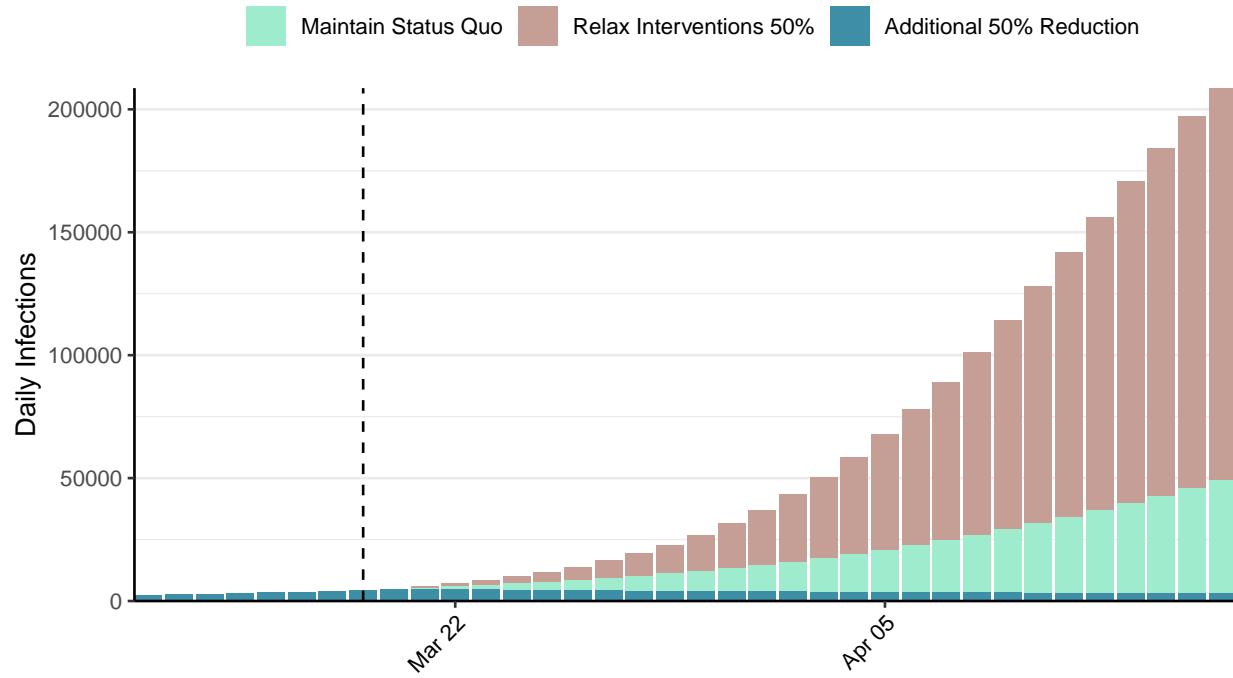


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Paraguay, 2021-03-19

[Download the report for Paraguay, 2021-03-19 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}
190,499	2,006	3,662	42	1.2 (95% CI: 1.06-1.34)

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.

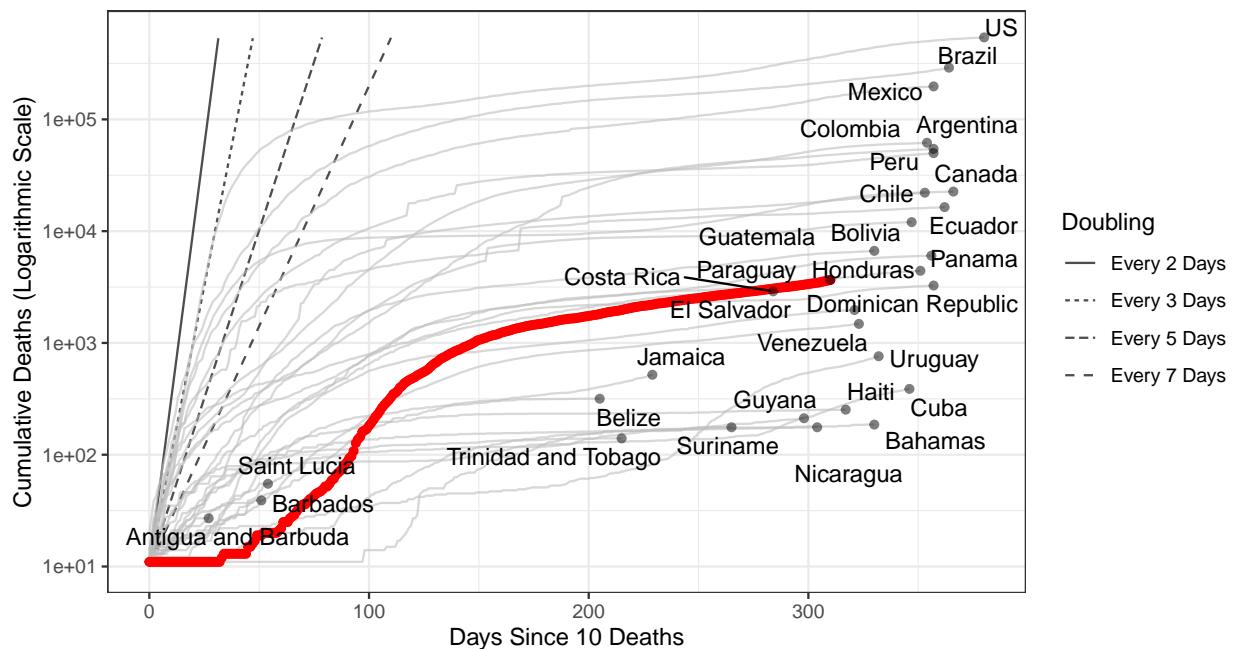


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 247,778 (95% CI: 230,936–264,620) 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

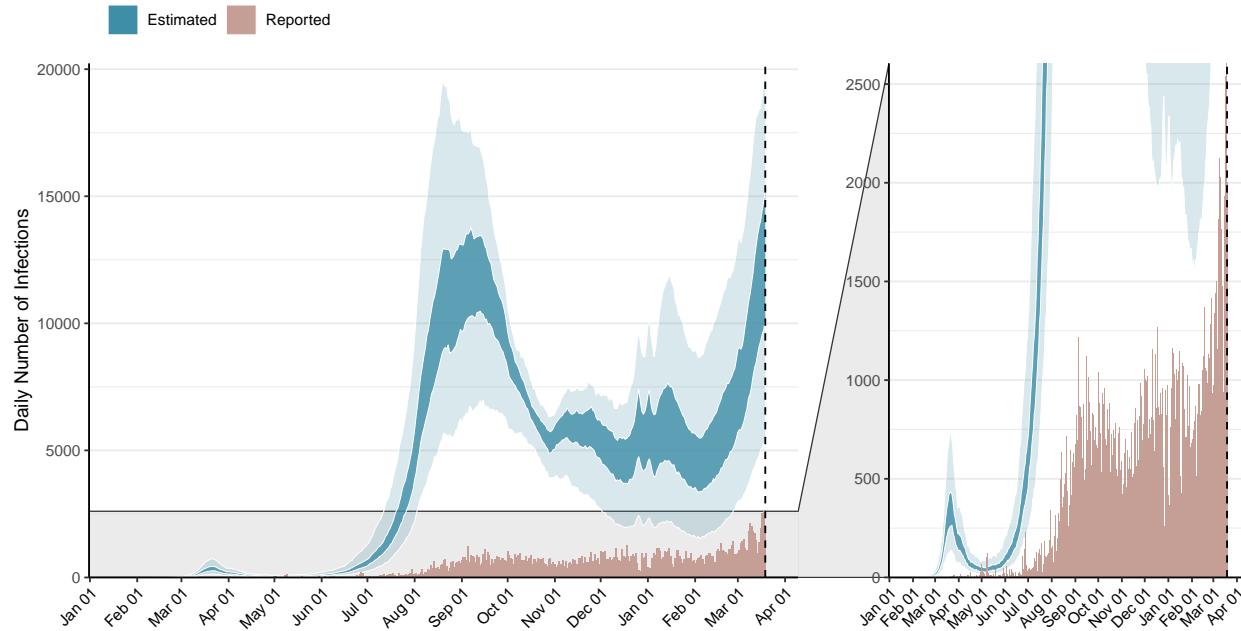


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

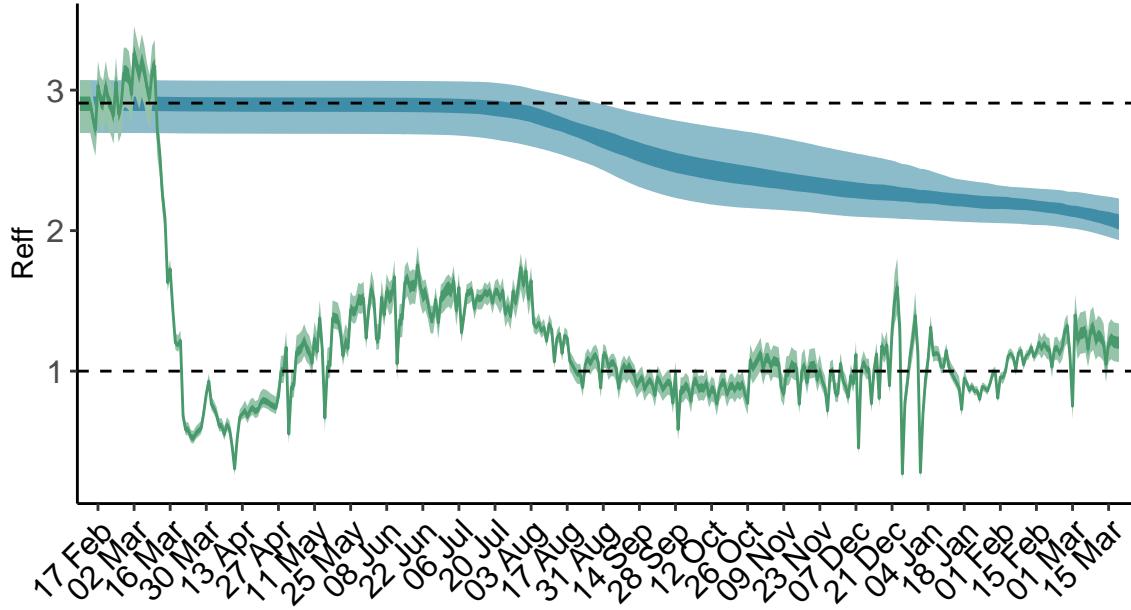


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Paraguay 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.](#)

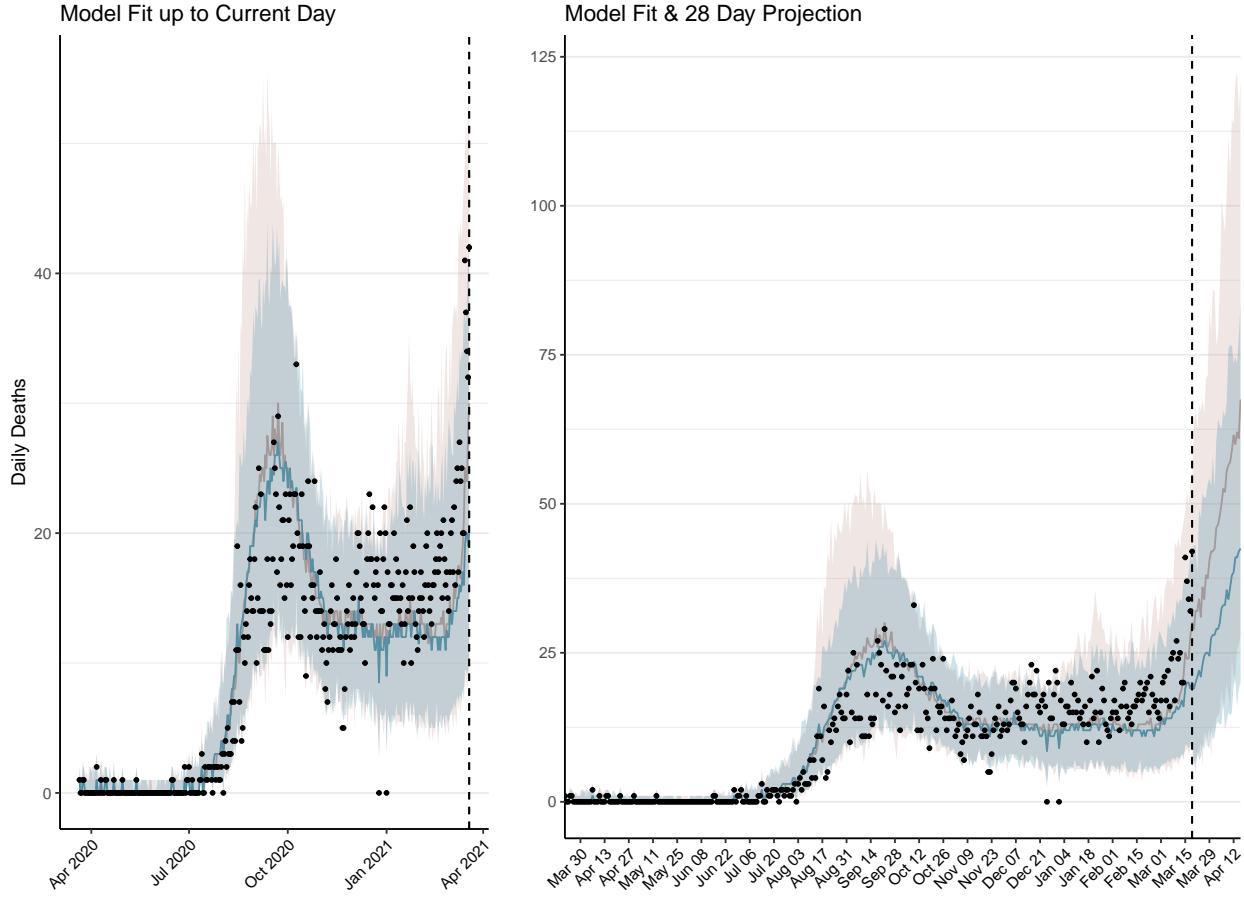


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 869 (95% CI: 811-927) patients requiring treatment with high-pressure oxygen at the current date to 1,807 (95% CI: 1,685-1,929) hospital beds being required on 2021-04-16 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 248 (95% CI: 237-259) patients requiring treatment with mechanical ventilation at the current date to 308 (95% CI: 300-316) by 2021-04-16. 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.**

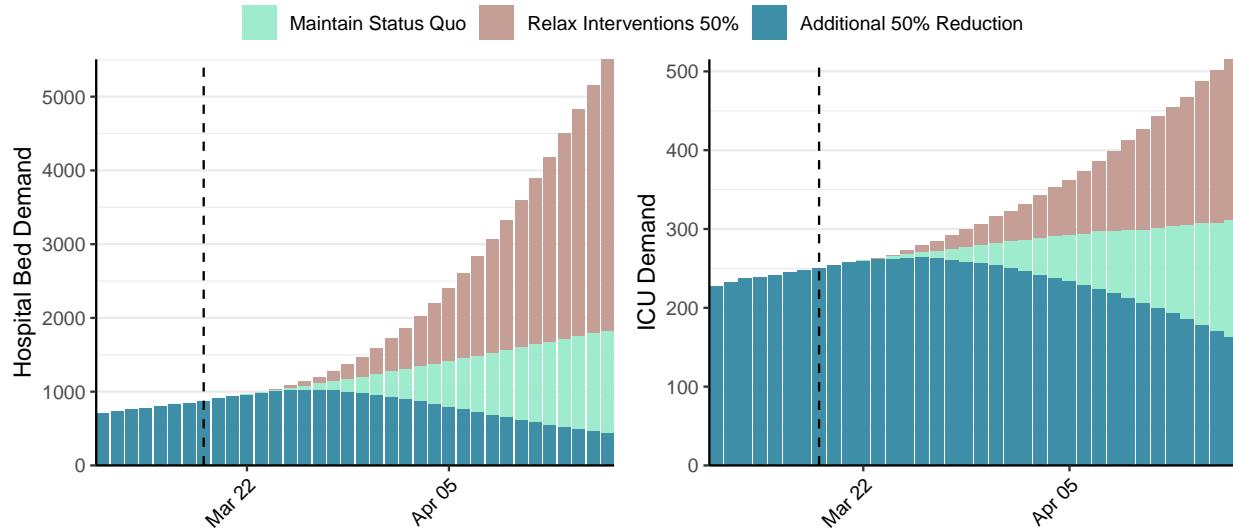


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 12,694 (95% CI: 11,894-13,495) at the current date to 1,974 (95% CI: 1,830-2,119) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 12,694 (95% CI: 11,894-13,495) at the current date to 91,420 (95% CI: 87,345-95,496) by 2021-04-16.

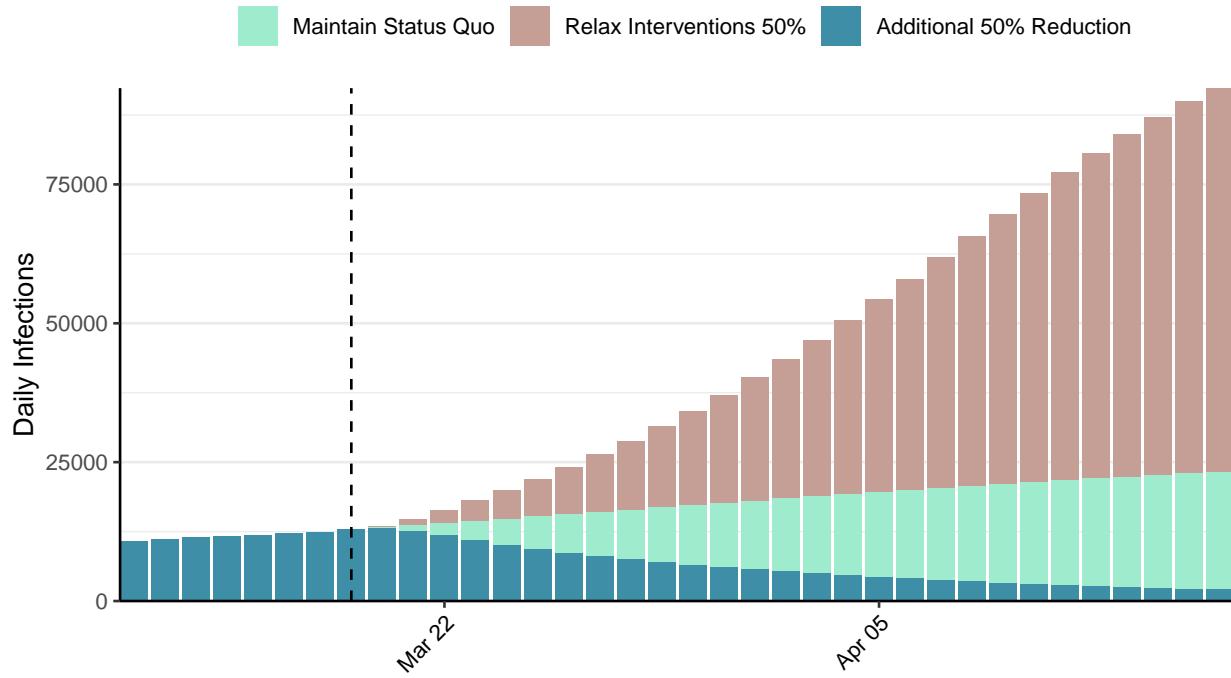


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: State of Palestine, 2021-03-19

[Download the report for State of Palestine, 2021-03-19 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}
219,912	1,851	2,379	21	1.07 (95% CI: 0.91-1.22)

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.

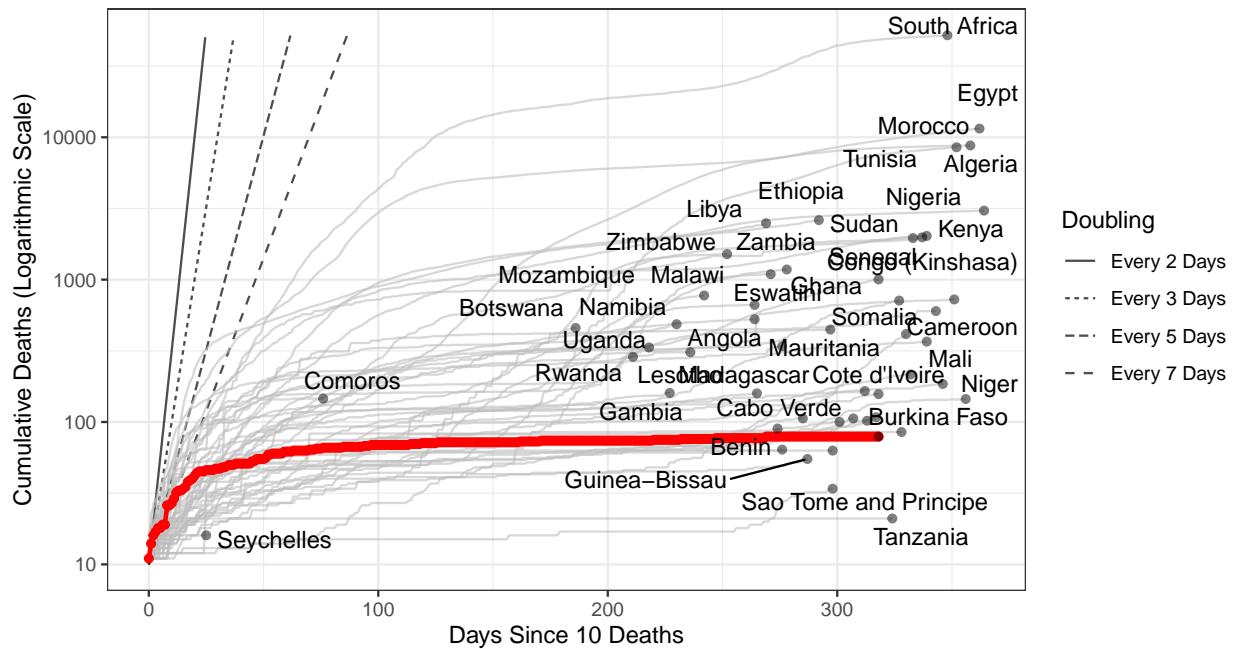


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 183,953 (95% CI: 169,153–198,752) 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).

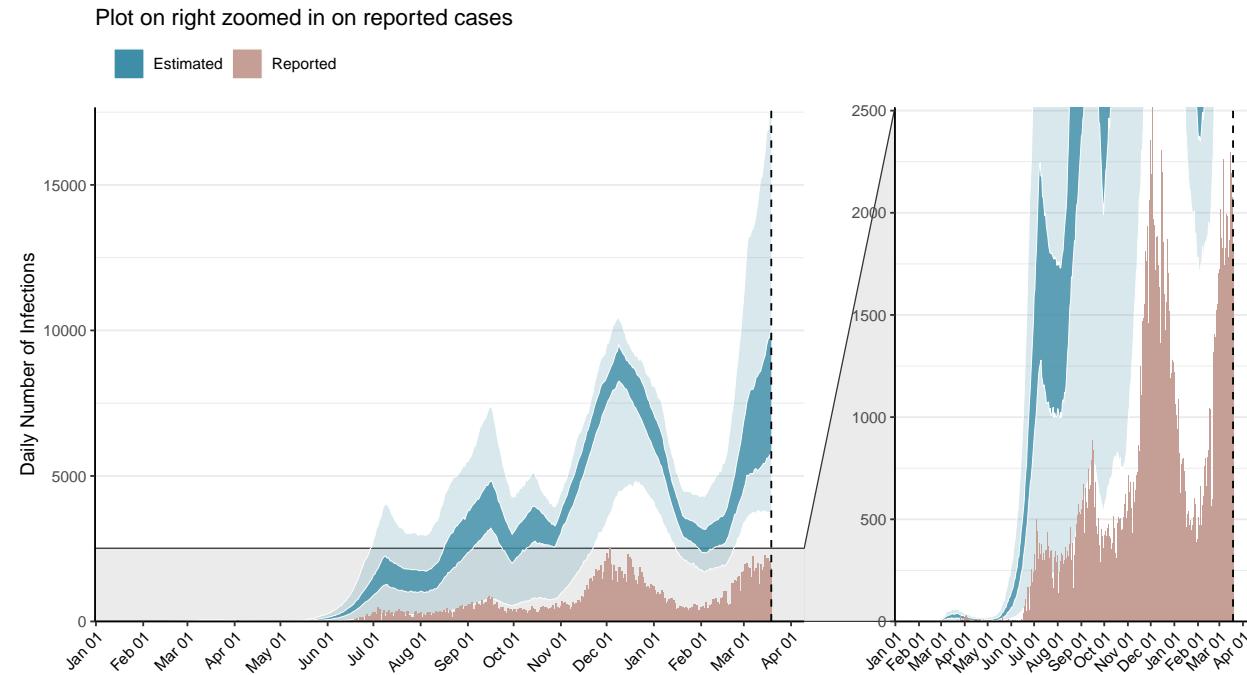


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

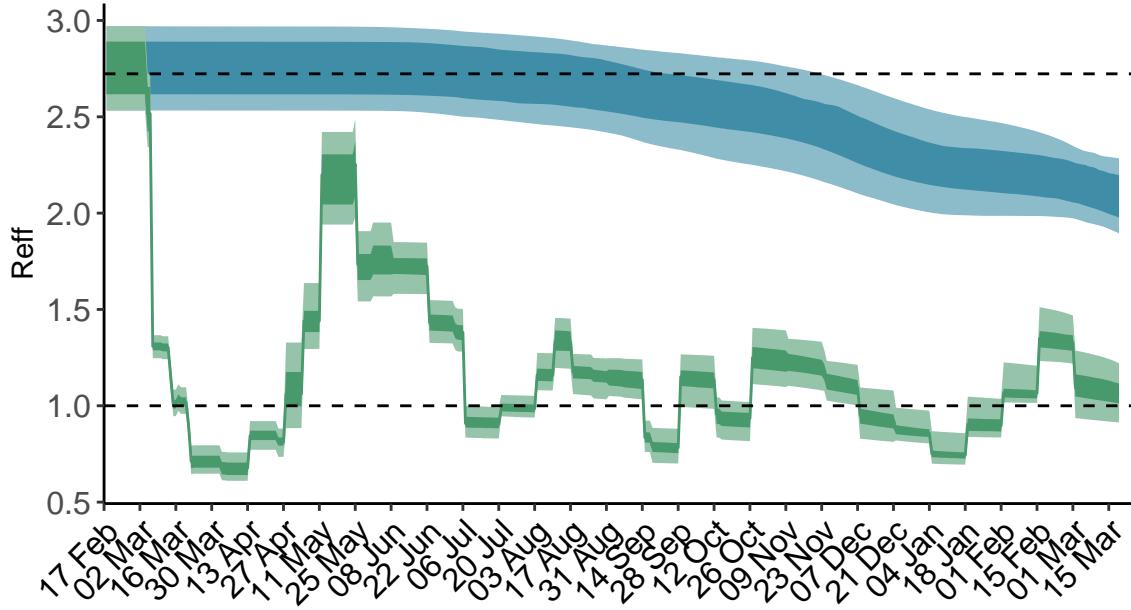


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

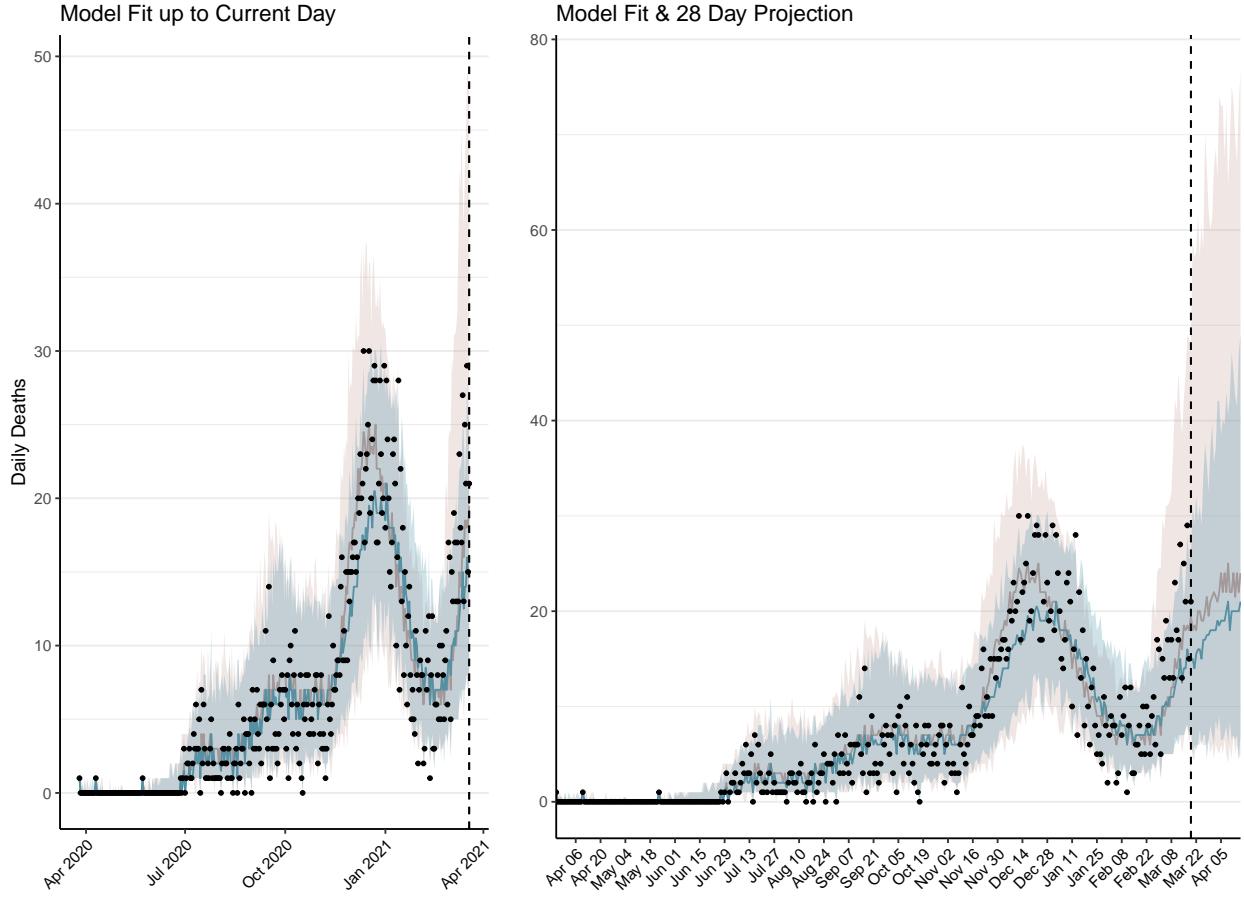


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 648 (95% CI: 593-703) patients requiring treatment with high-pressure oxygen at the current date to 885 (95% CI: 779-991) hospital beds being required on 2021-04-16 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 180 (95% CI: 174-187) patients requiring treatment with mechanical ventilation at the current date to 189 (95% CI: 182-197) by 2021-04-16. 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.**

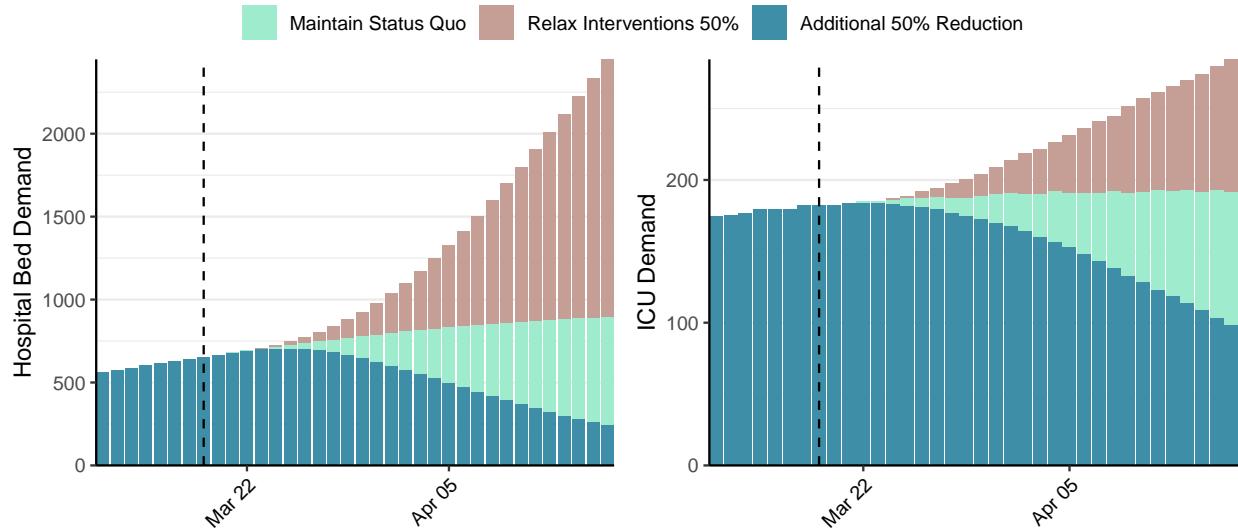


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 8,479 (95% CI: 7,612-9,345) at the current date to 940 (95% CI: 803-1,077) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 8,479 (95% CI: 7,612-9,345) at the current date to 42,503 (95% CI: 38,971-46,034) by 2021-04-16.

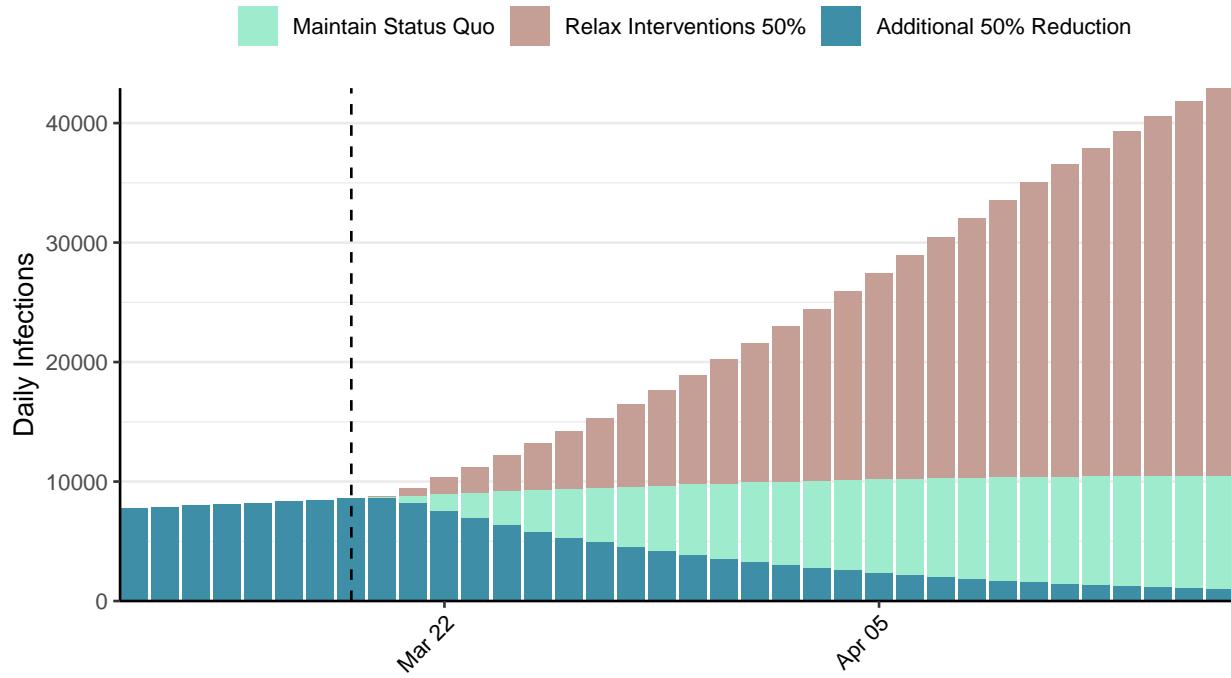


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Romania, 2021-03-19

[Download the report for Romania, 2021-03-19 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}
886,752	5,593	22,020	143	1.11 (95% CI: 1.01-1.23)

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.

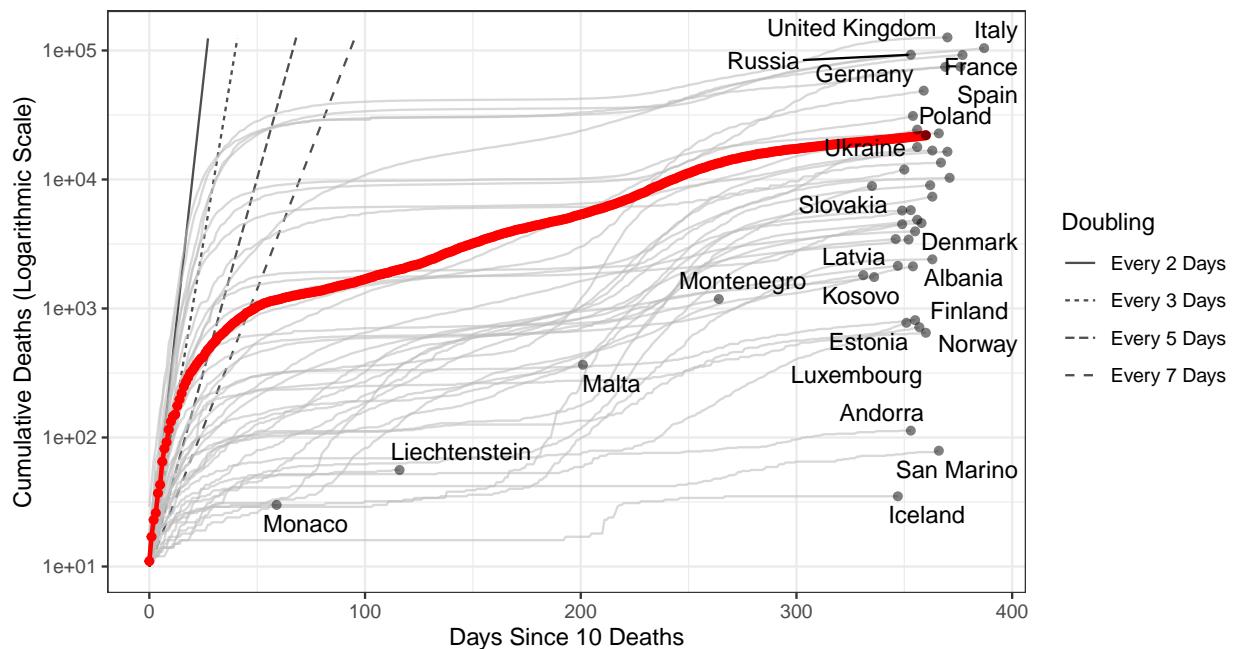


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 628,153 (95% CI: 605,090-651,216) 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).

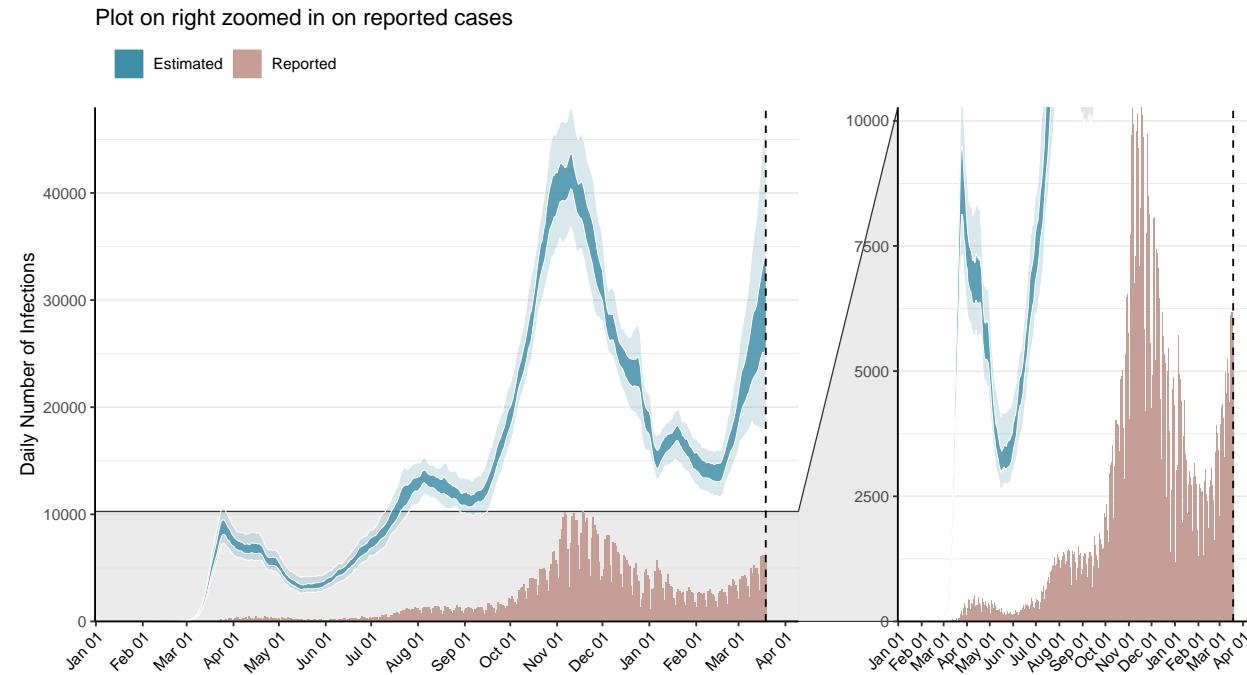


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

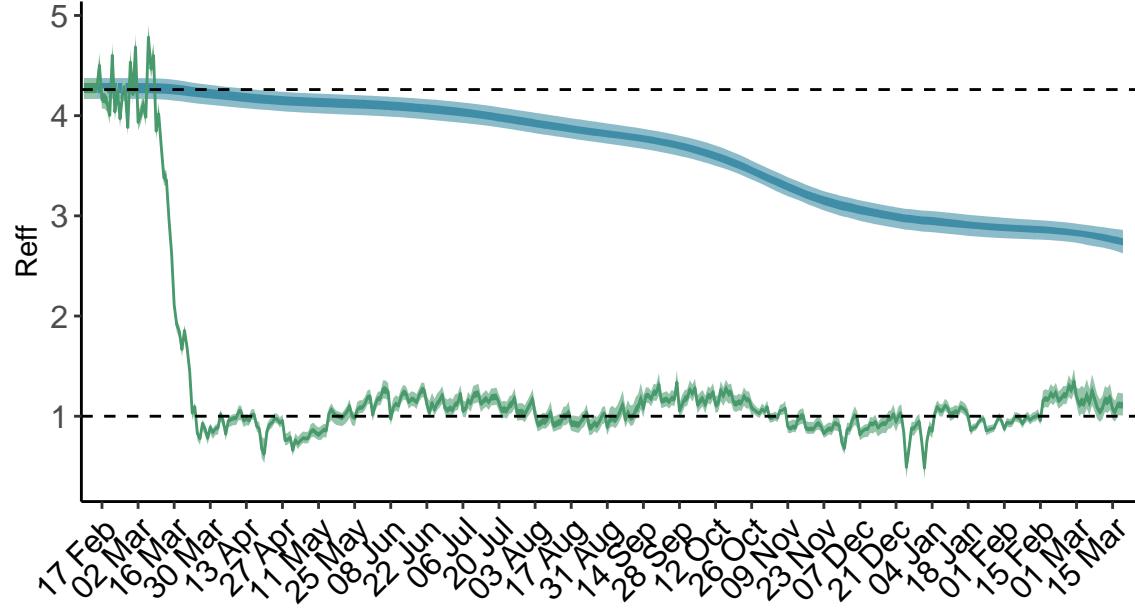


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

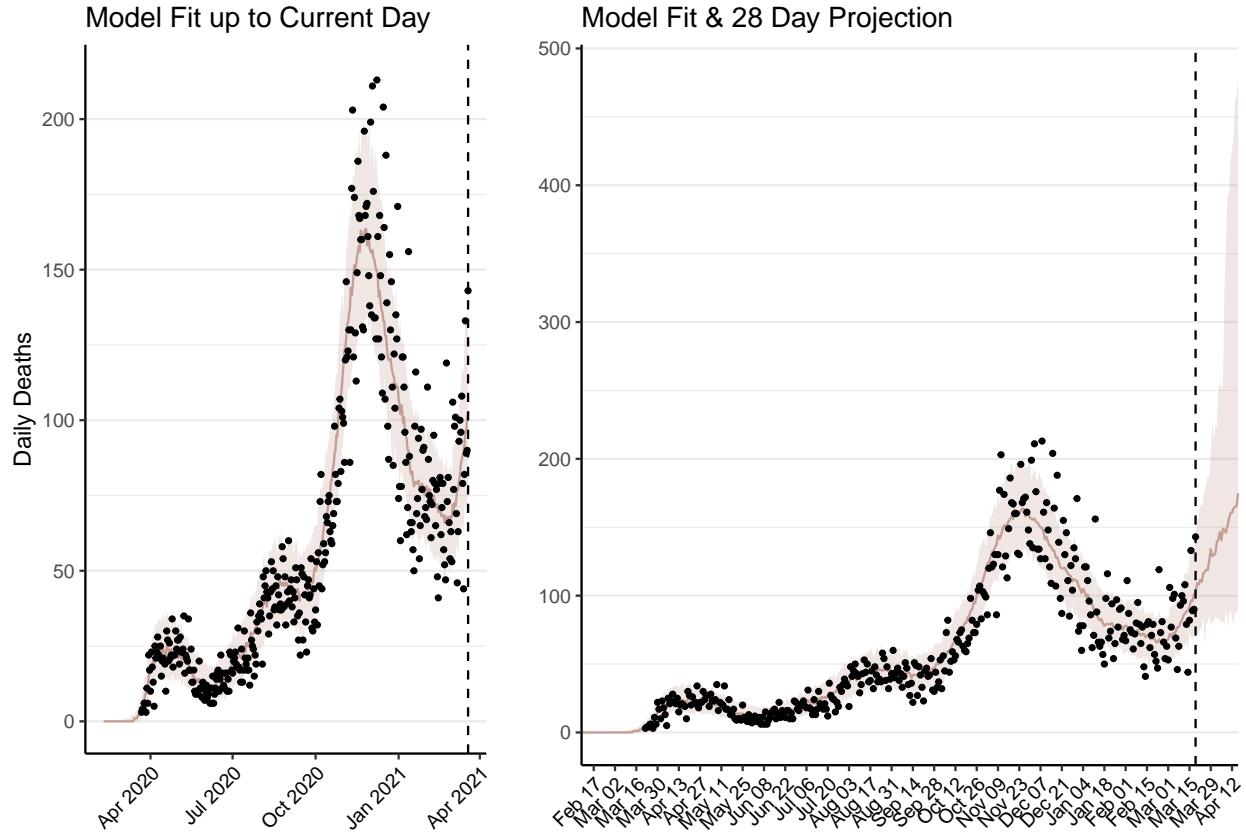


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 3,922 (95% CI: 3,769-4,076) patients requiring treatment with high-pressure oxygen at the current date to 6,500 (95% CI: 6,008-6,991) hospital beds being required on 2021-04-16 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 1,349 (95% CI: 1,298-1,399) patients requiring treatment with mechanical ventilation at the current date to 2,227 (95% CI: 2,088-2,366) by 2021-04-16. 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.**

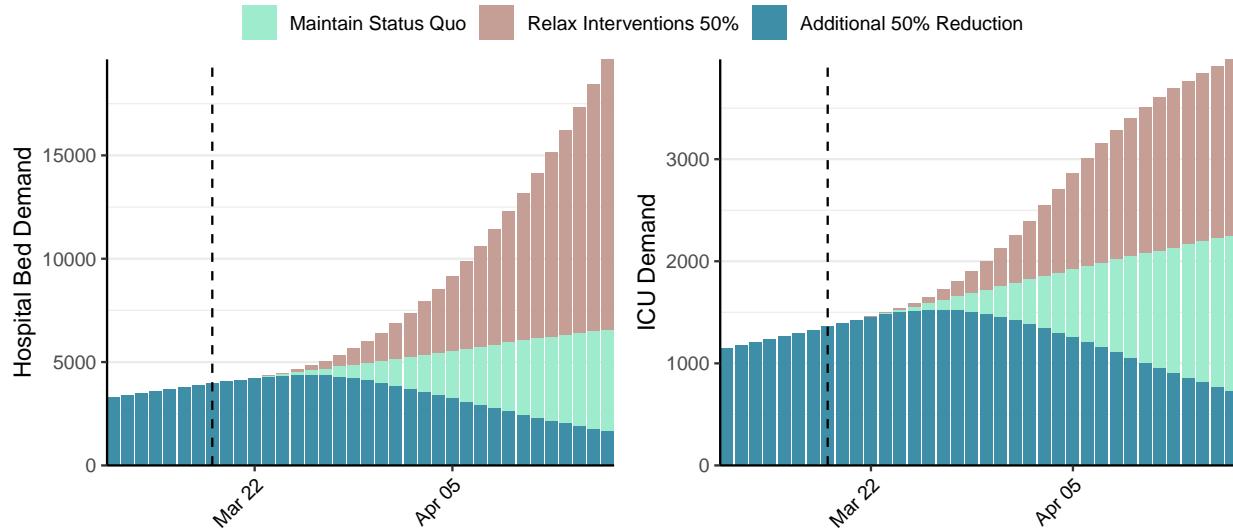


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 29,643 (95% CI: 28,073-31,214) at the current date to 3,726 (95% CI: 3,419-4,033) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 29,643 (95% CI: 28,073-31,214) at the current date to 178,018 (95% CI: 168,035-188,001) by 2021-04-16.

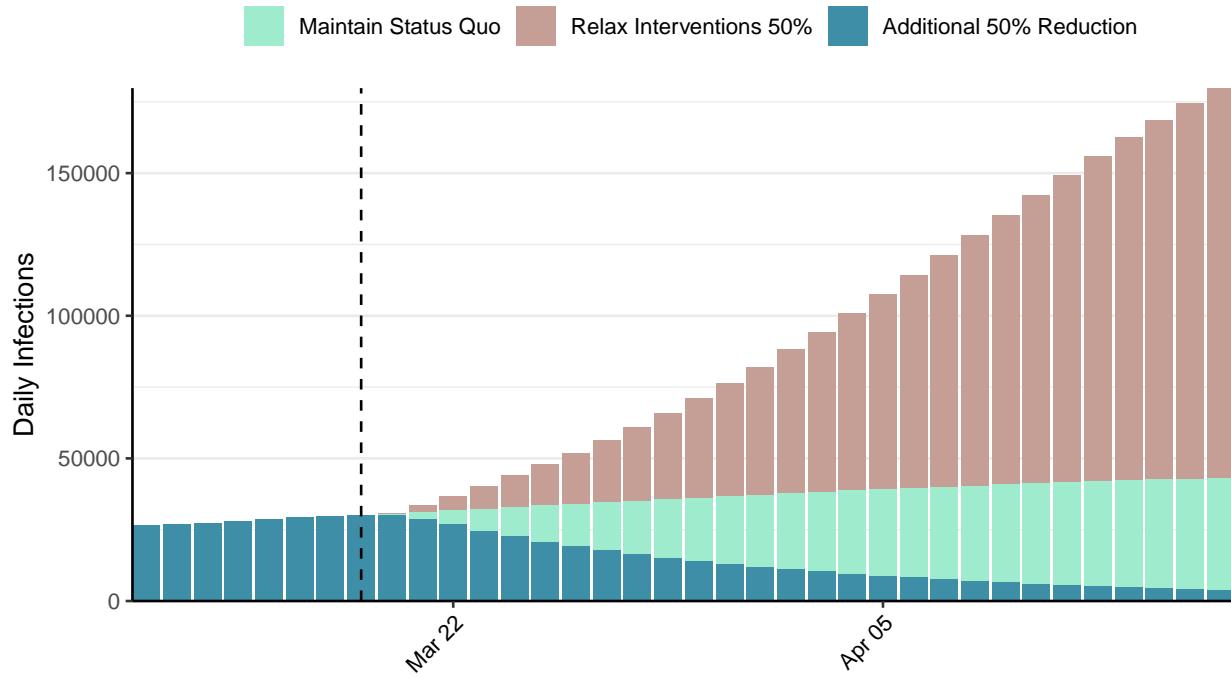


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Russia, 2021-03-19

[Download the report for Russia, 2021-03-19 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}
4,388,268	9,612	92,704	438	0.84 (95% CI: 0.71-0.99)

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.

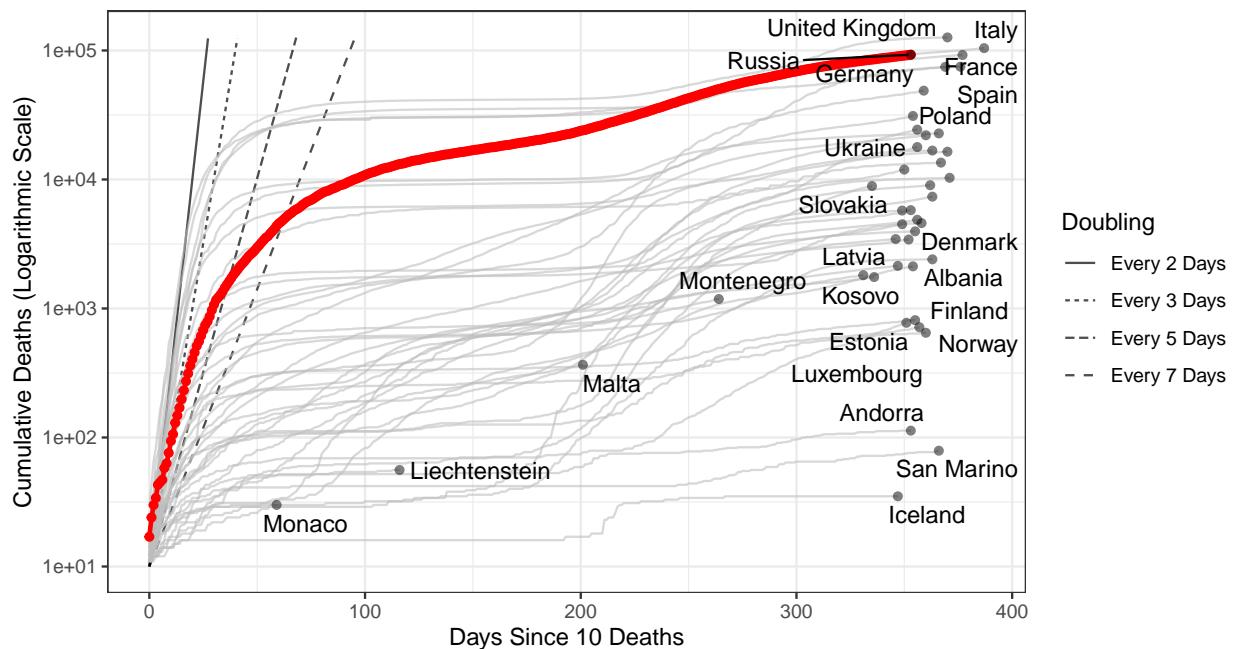


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 2,787,685 (95% CI: 2,679,755–2,895,615) 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).

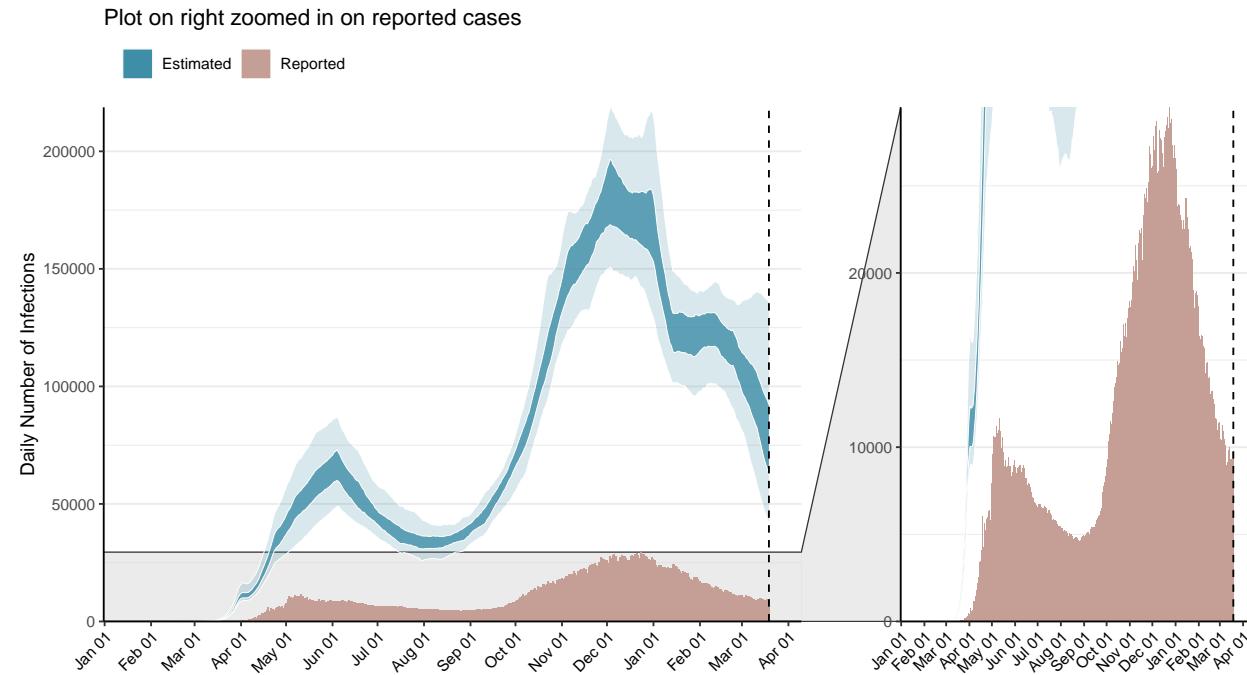


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

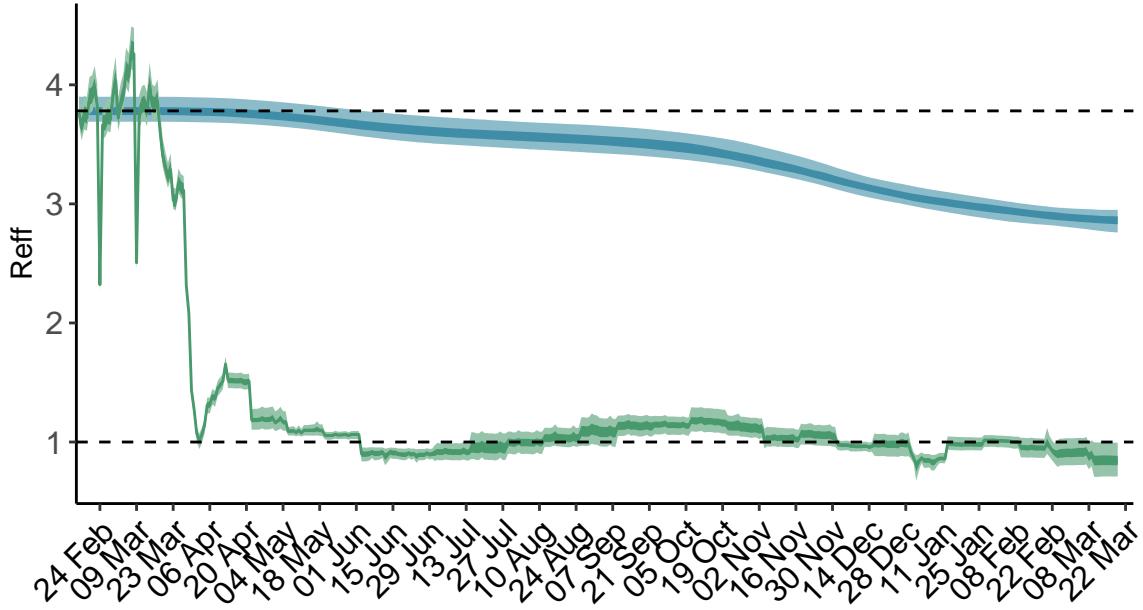


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

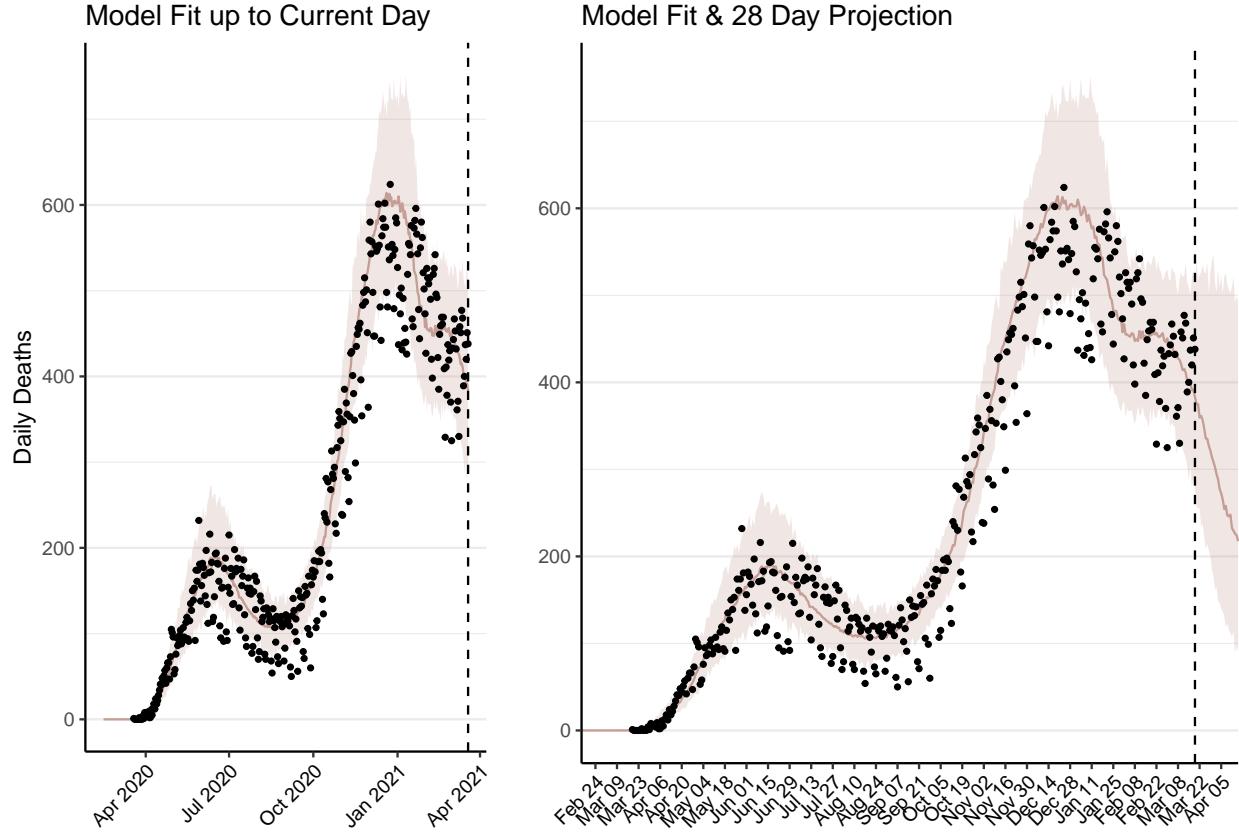


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 13,237 (95% CI: 12,674-13,800) patients requiring treatment with high-pressure oxygen at the current date to 7,945 (95% CI: 7,091-8,798) hospital beds being required on 2021-04-16 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 5,124 (95% CI: 4,925-5,323) patients requiring treatment with mechanical ventilation at the current date to 3,147 (95% CI: 2,838-3,457) by 2021-04-16. 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.

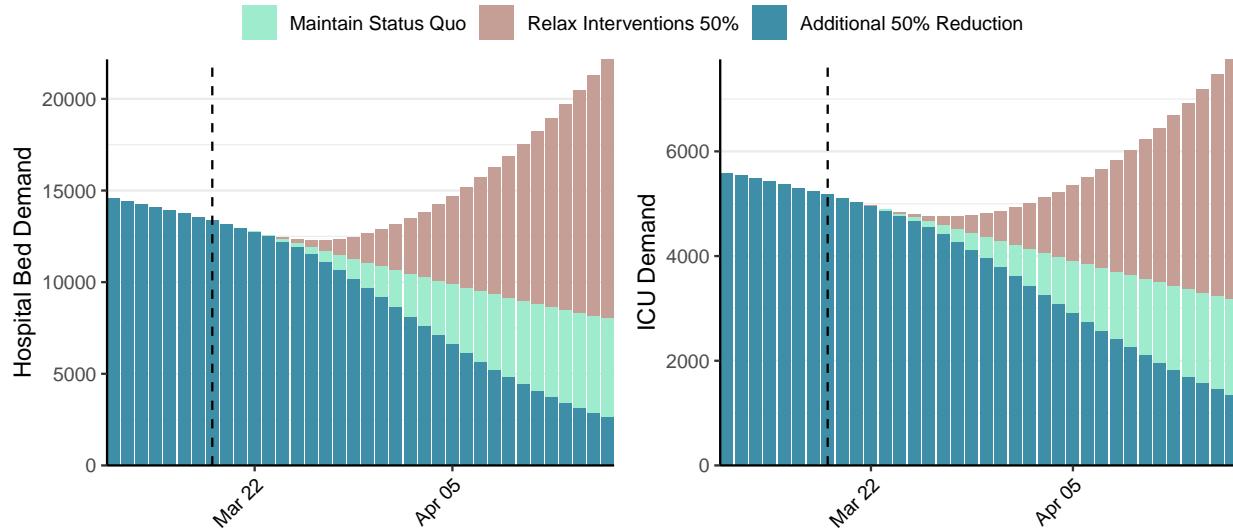


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 78,831 (95% CI: 73,648-84,015) at the current date to 4,335 (95% CI: 3,786-4,885) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 78,831 (95% CI: 73,648-84,015) at the current date to 233,290 (95% CI: 200,803-265,778) by 2021-04-16.

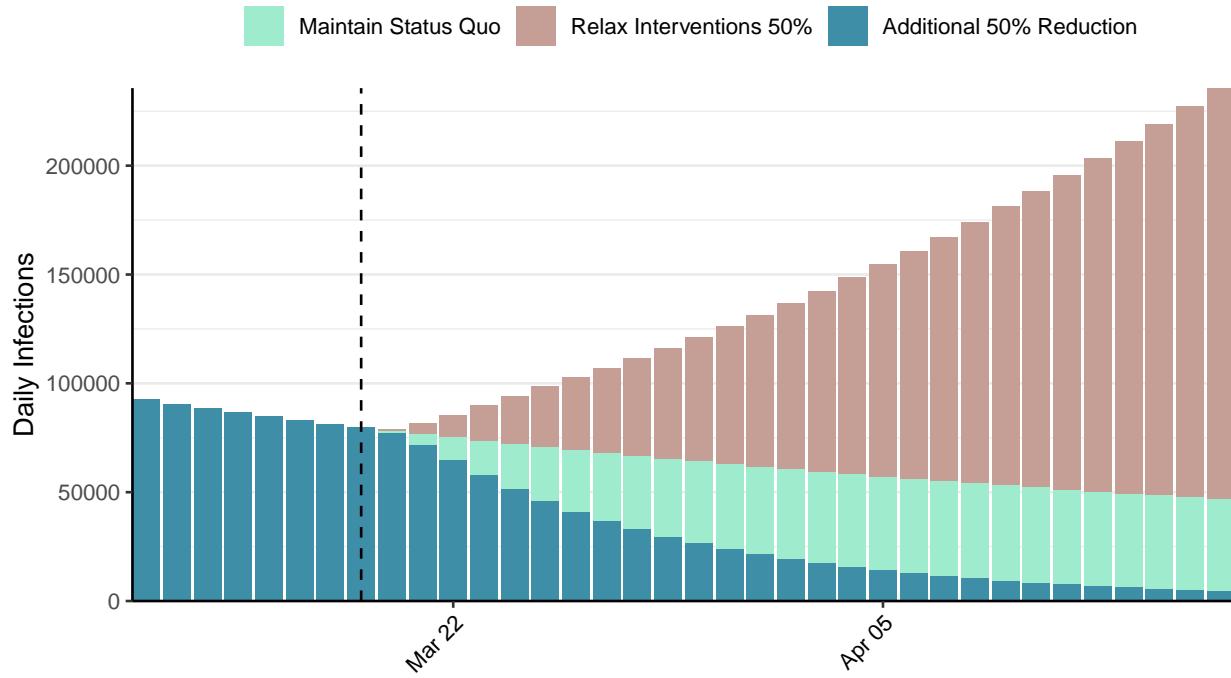


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Rwanda, 2021-03-19

[Download the report for Rwanda, 2021-03-19 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}
20,681	130	287	3	0.83 (95% CI: 0.71-0.97)

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.

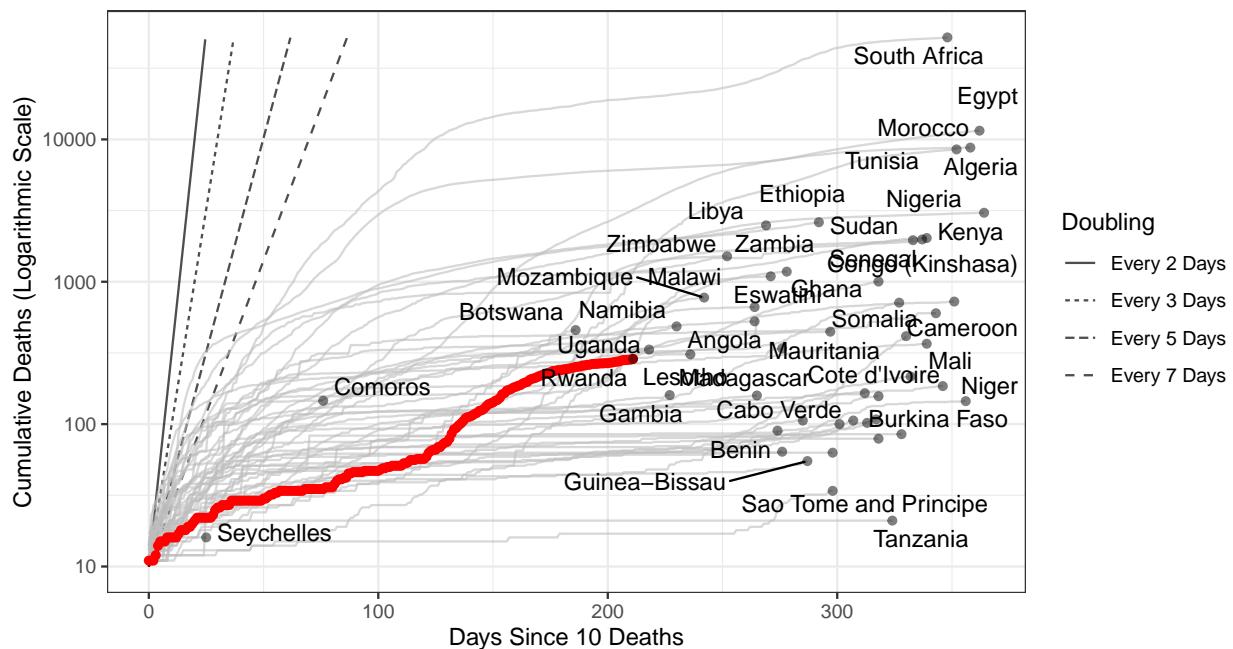


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 27,067 (95% CI: 24,760-29,374) 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).

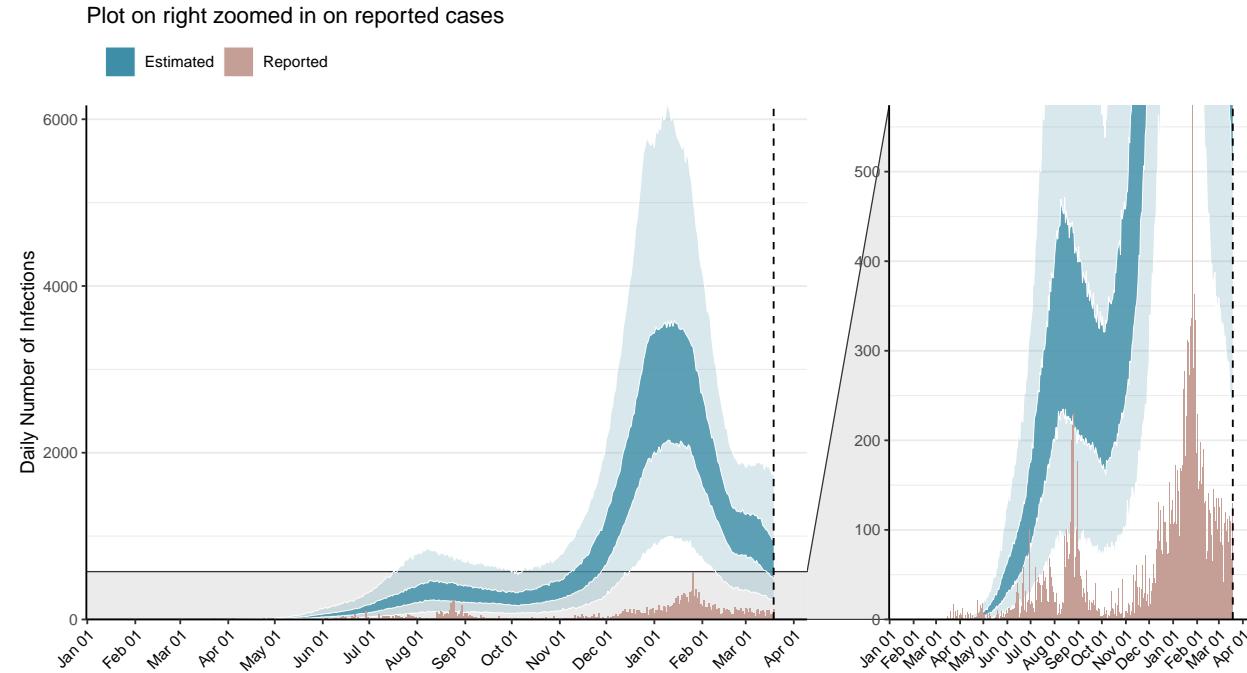


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

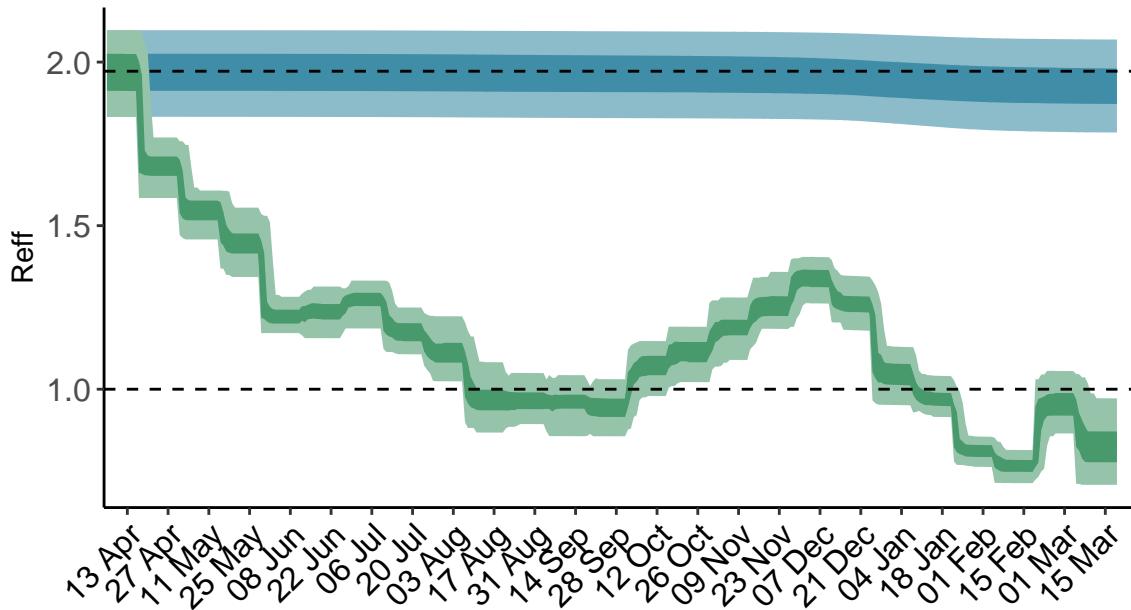


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

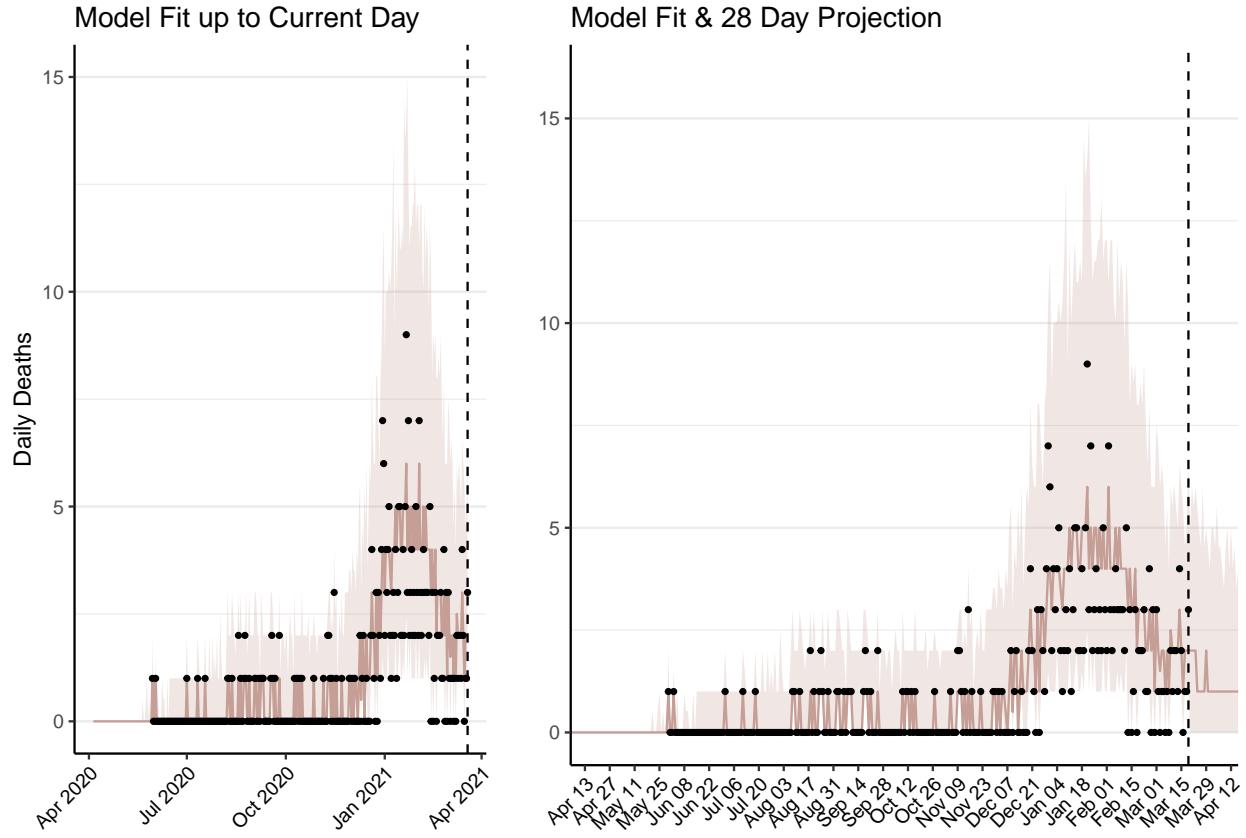


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 77 (95% CI: 70-84) patients requiring treatment with high-pressure oxygen at the current date to 43 (95% CI: 37-49) hospital beds being required on 2021-04-16 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 18 (95% CI: 16-21) by 2021-04-16. 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.**

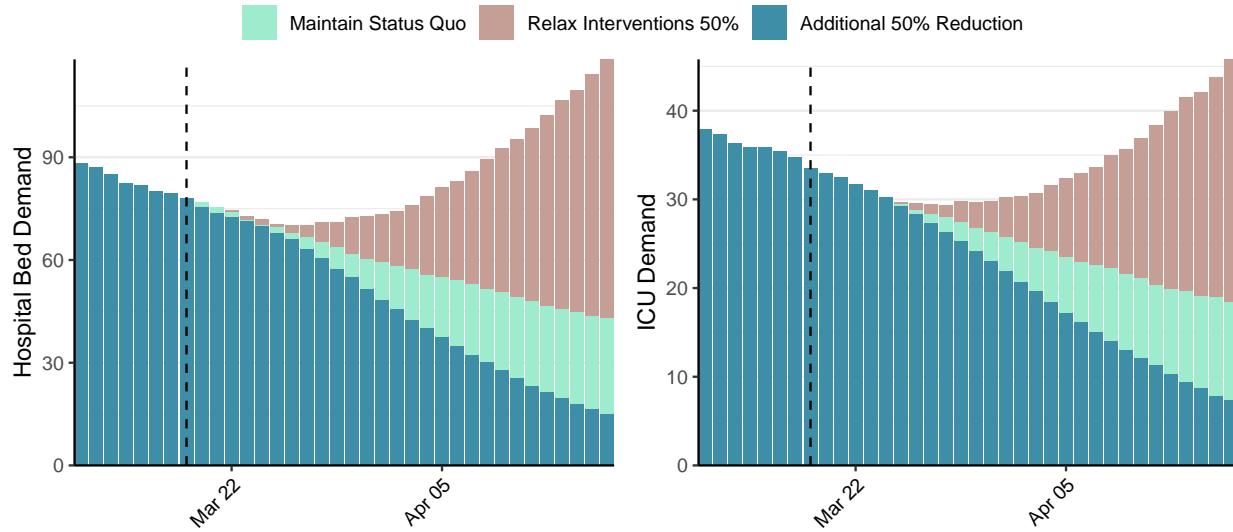


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 753 (95% CI: 675-832) at the current date to 39 (95% CI: 33-45) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 753 (95% CI: 675-832) at the current date to 2,261 (95% CI: 1,865-2,657) by 2021-04-16.

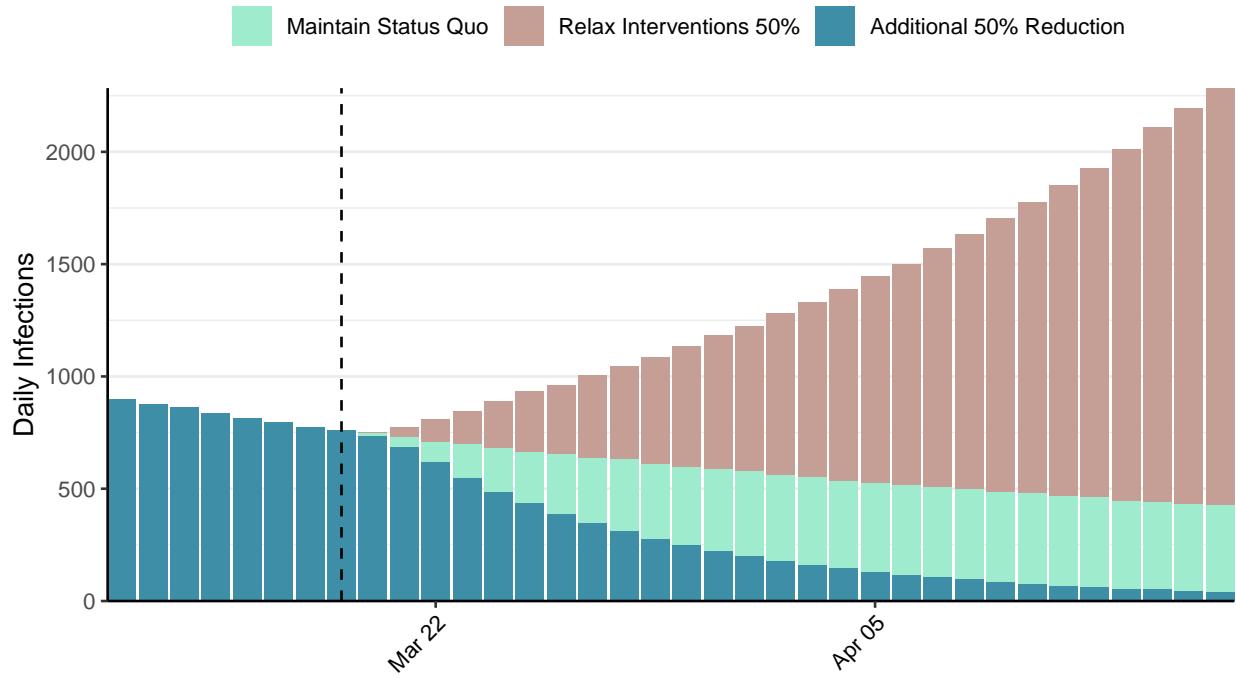


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Sudan, 2021-03-19

[Download the report for Sudan, 2021-03-19 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}
29,134	0	1,959	0	1.14 (95% CI: 0.91-1.33)

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.

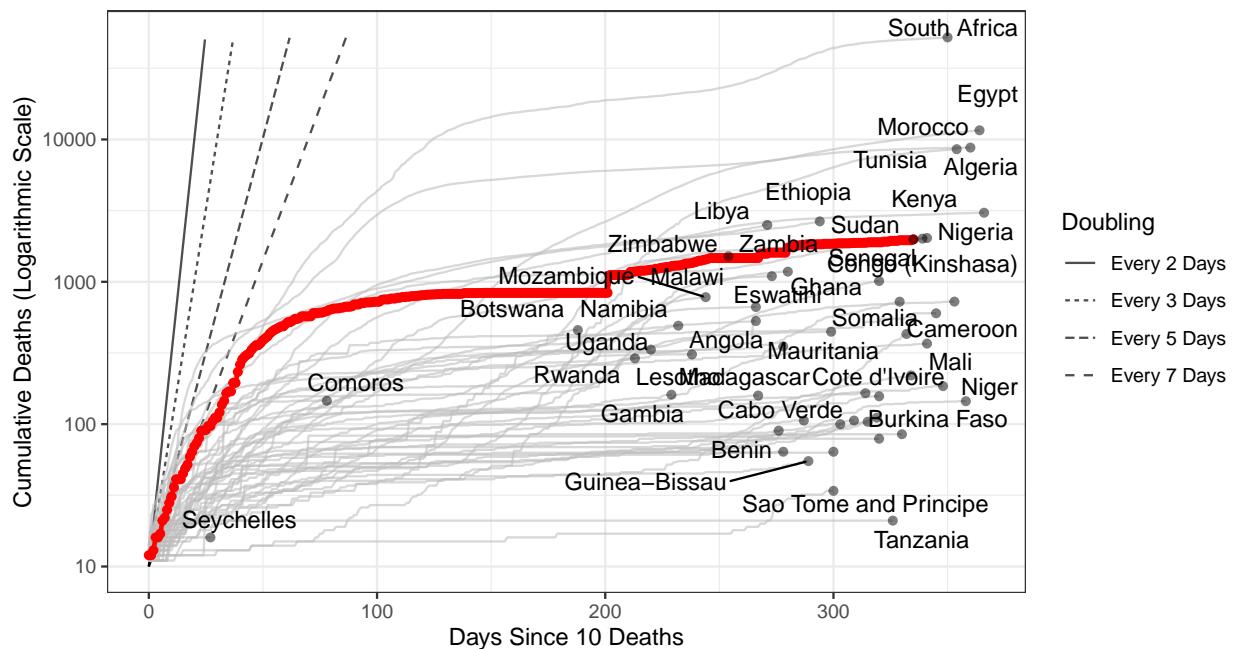


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 70,844 (95% CI: 66,497-75,191) 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

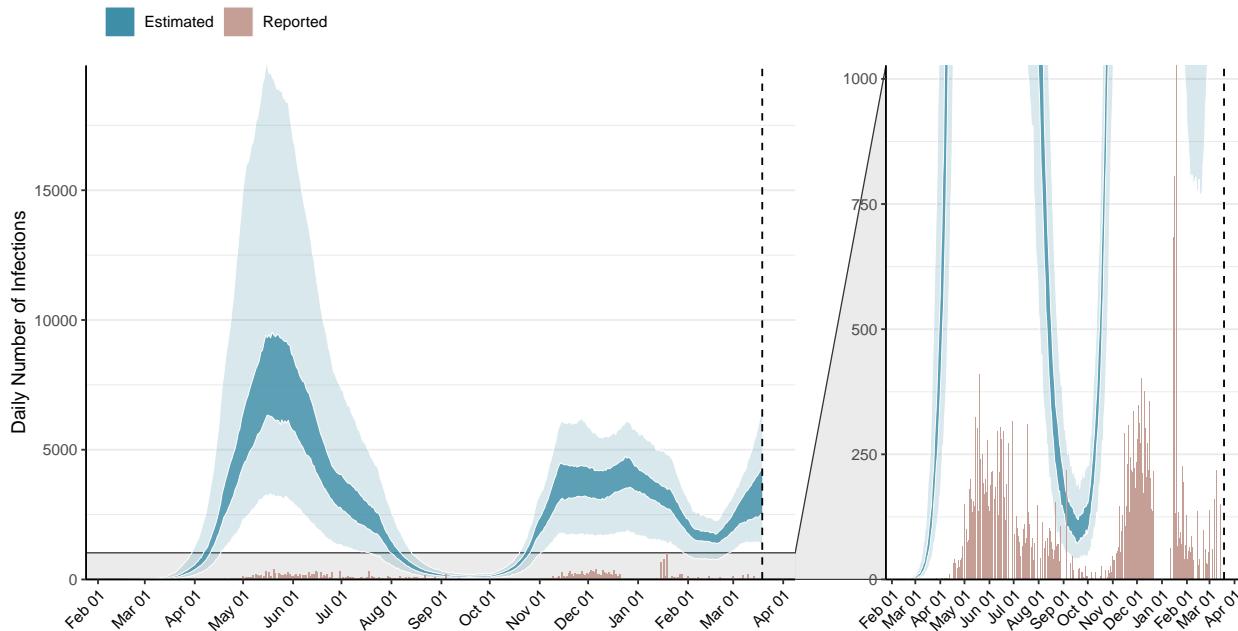


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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](#)

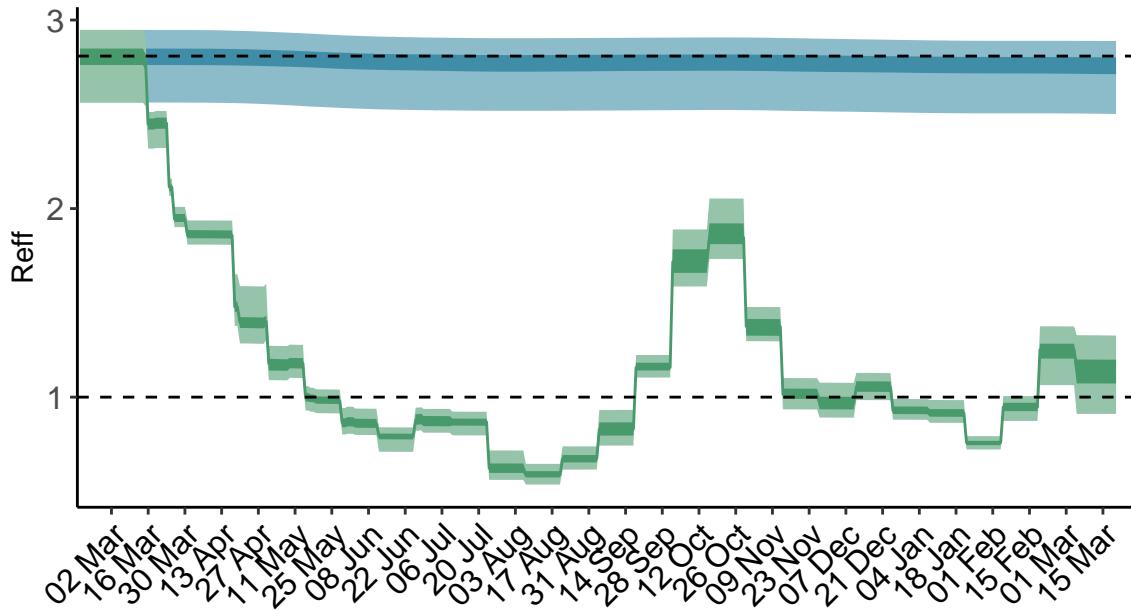


Figure 3: **Time-varying effective reproduction number, R_{eff} .** R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

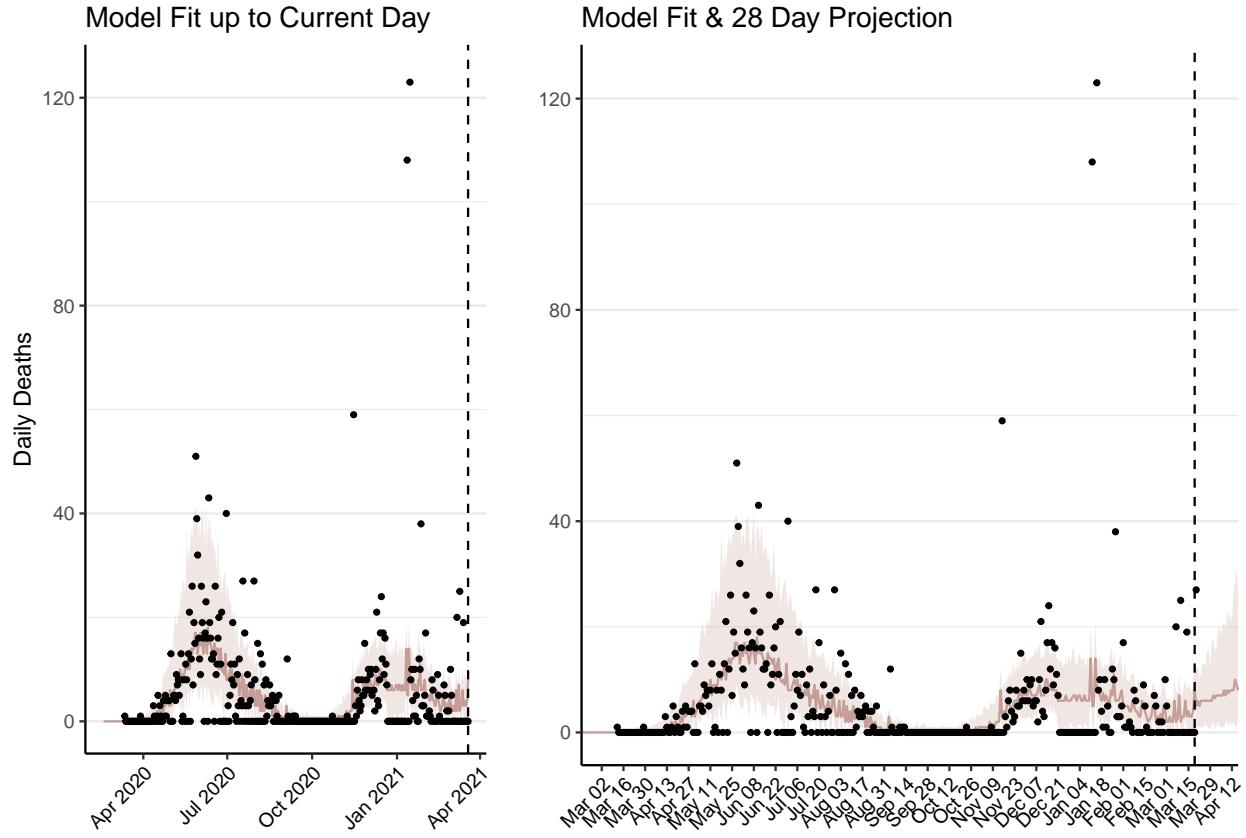


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 227 (95% CI: 212-242) patients requiring treatment with high-pressure oxygen at the current date to 466 (95% CI: 407-525) hospital beds being required on 2021-04-16 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 85 (95% CI: 79-90) patients requiring treatment with mechanical ventilation at the current date to 170 (95% CI: 149-191) by 2021-04-16. 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.**

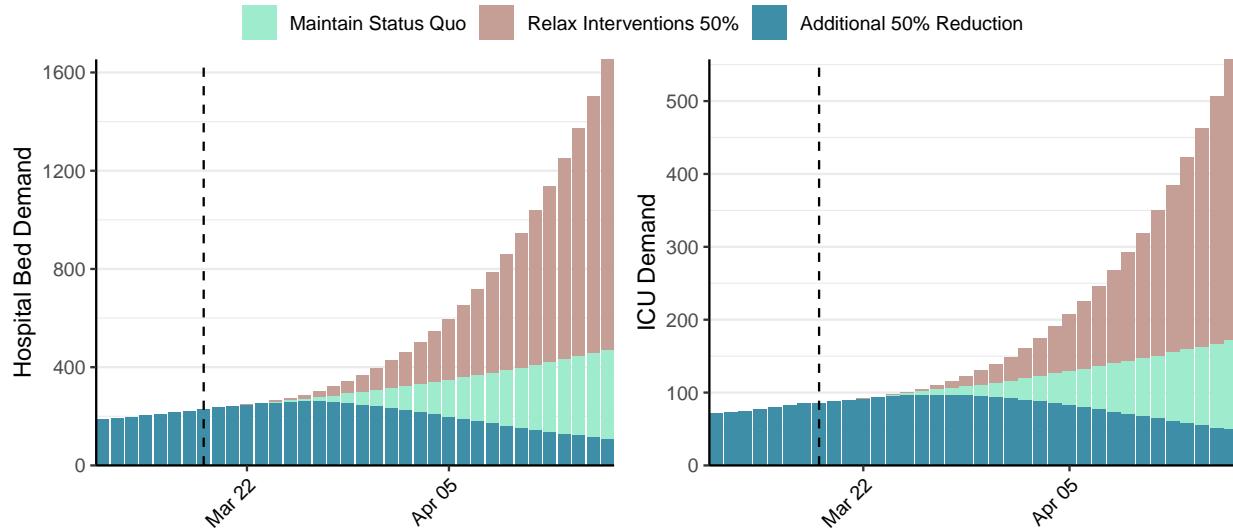


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 3,510 (95% CI: 3,219-3,801) at the current date to 528 (95% CI: 455-601) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,510 (95% CI: 3,219-3,801) at the current date to 47,165 (95% CI: 39,648-54,681) by 2021-04-16.

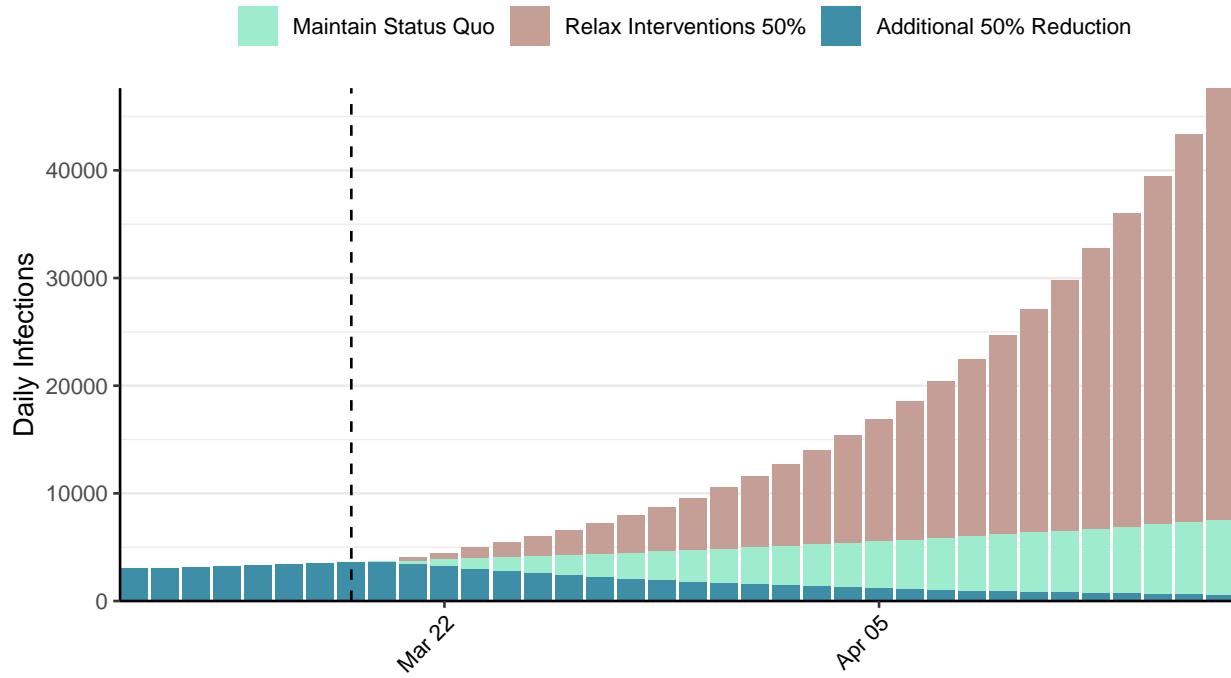


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Senegal, 2021-03-19

[Download the report for Senegal, 2021-03-19 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}
37,541	113	1,003	8	0.78 (95% CI: 0.67-0.89)

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.

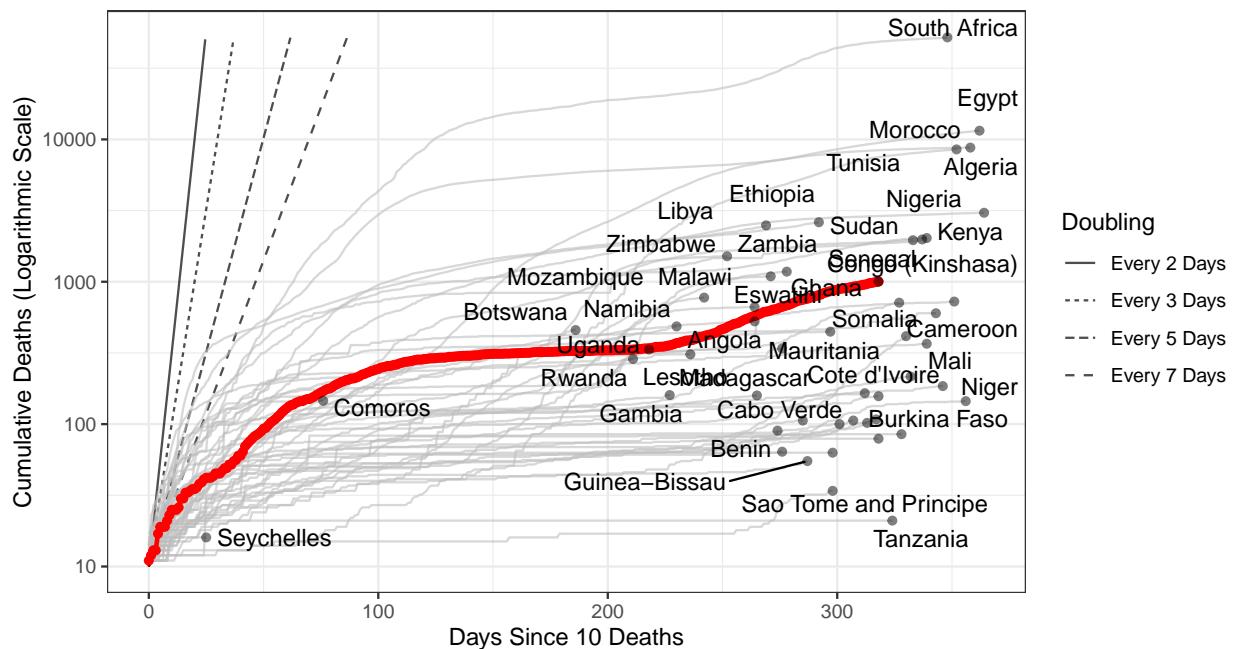


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 105,012 (95% CI: 100,156-109,867) 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).

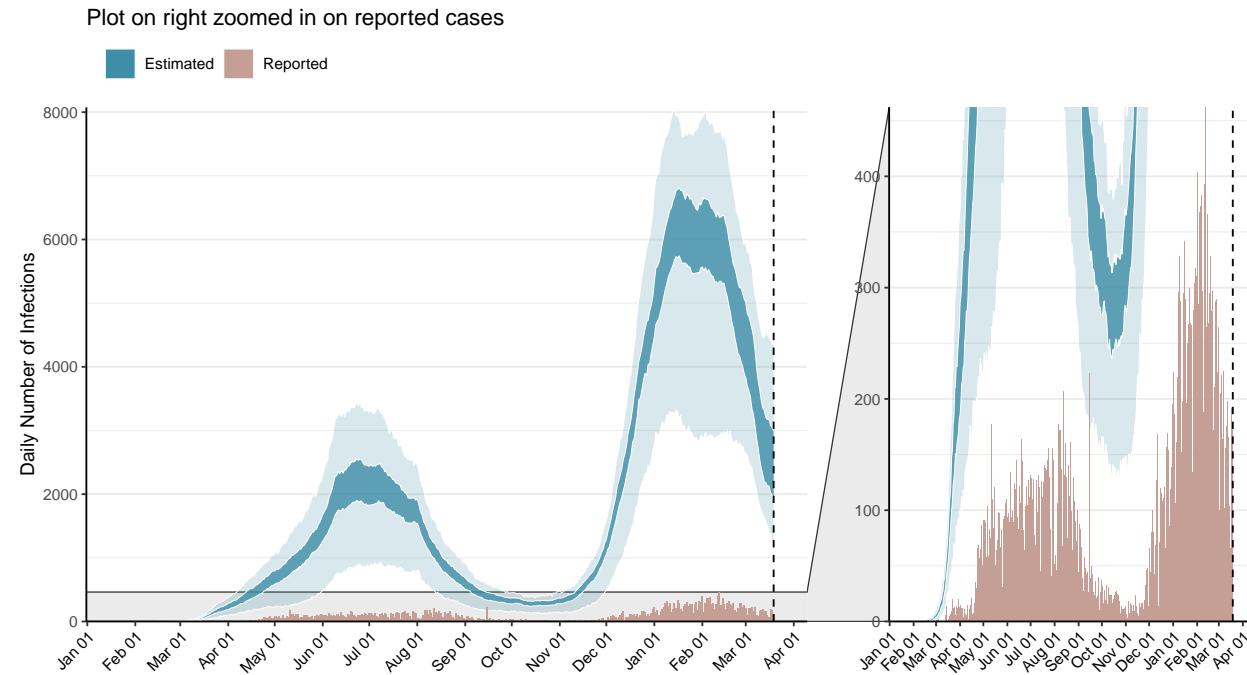


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

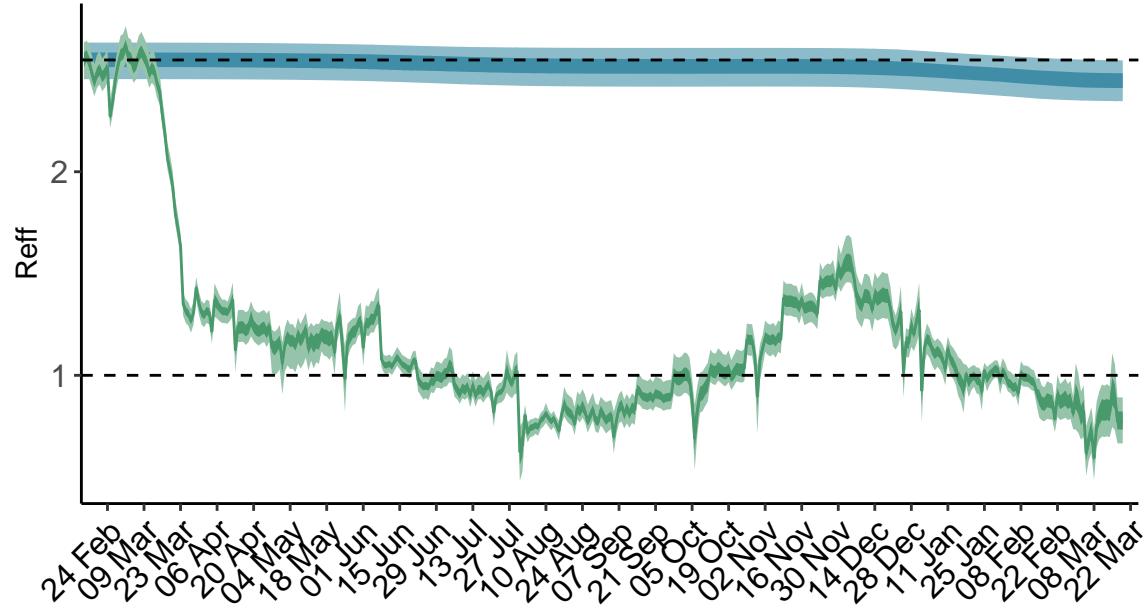


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

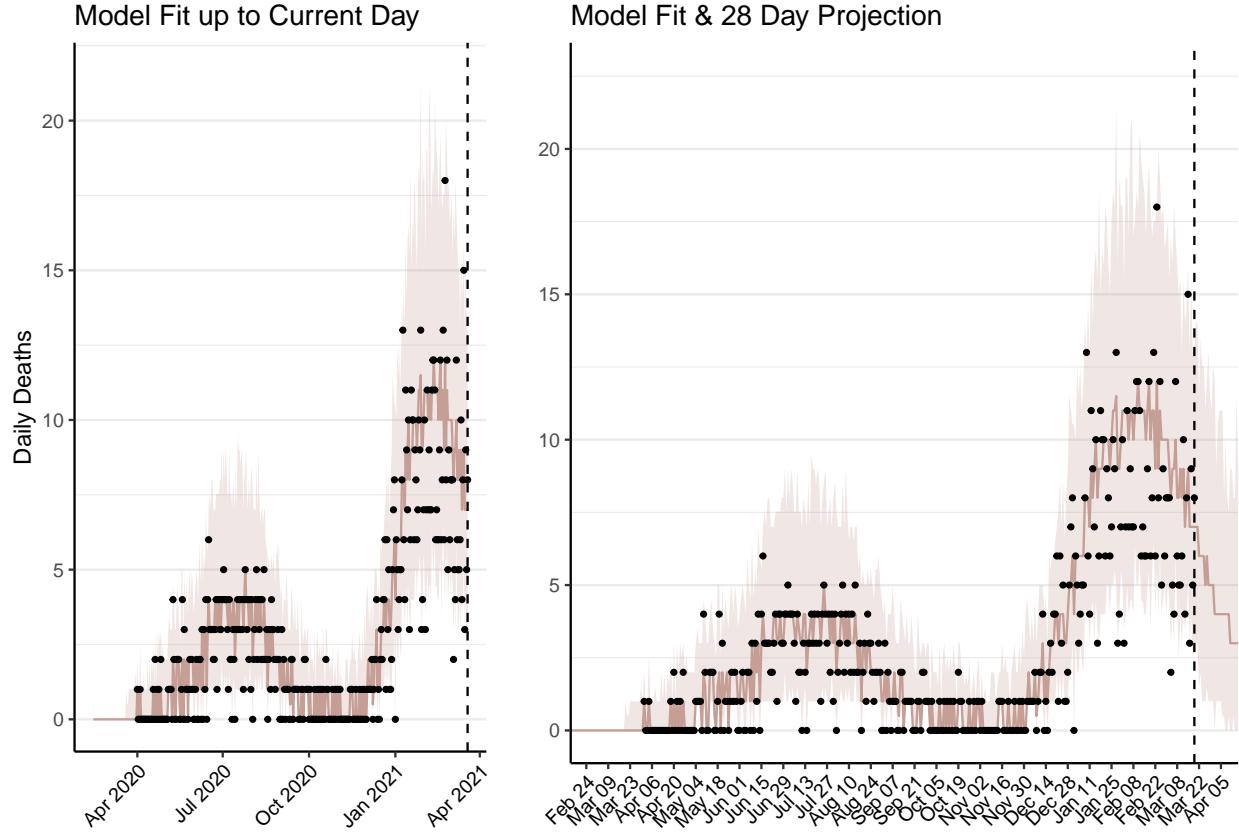


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 274 (95% CI: 260-288) patients requiring treatment with high-pressure oxygen at the current date to 118 (95% CI: 106-130) hospital beds being required on 2021-04-16 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 115 (95% CI: 109-121) patients requiring treatment with mechanical ventilation at the current date to 52 (95% CI: 47-57) by 2021-04-16. 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.**

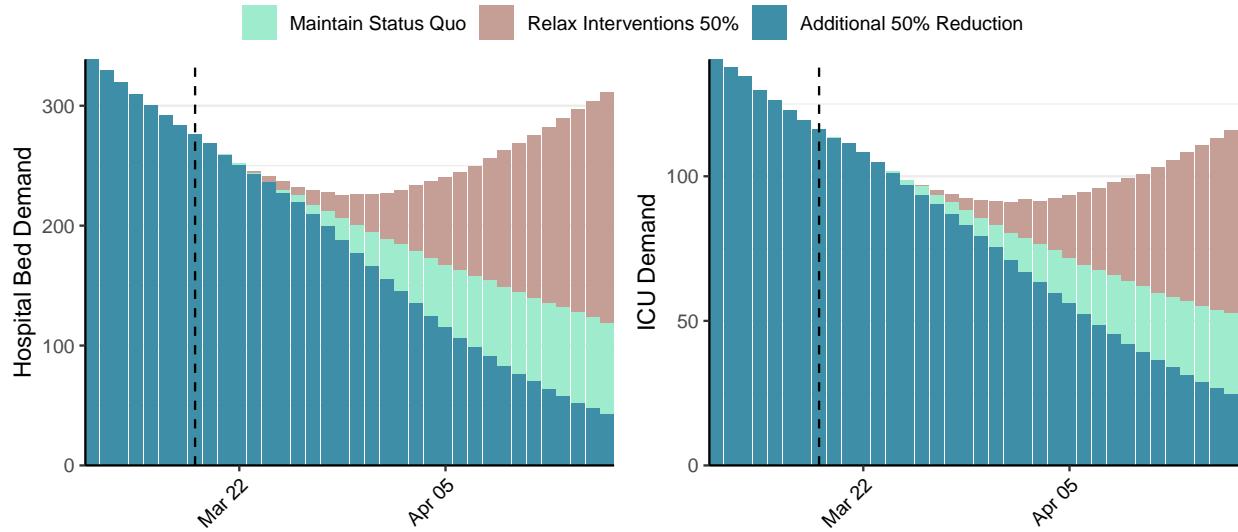


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,487 (95% CI: 2,314-2,659) at the current date to 102 (95% CI: 90-114) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,487 (95% CI: 2,314-2,659) at the current date to 5,302 (95% CI: 4,590-6,013) by 2021-04-16.

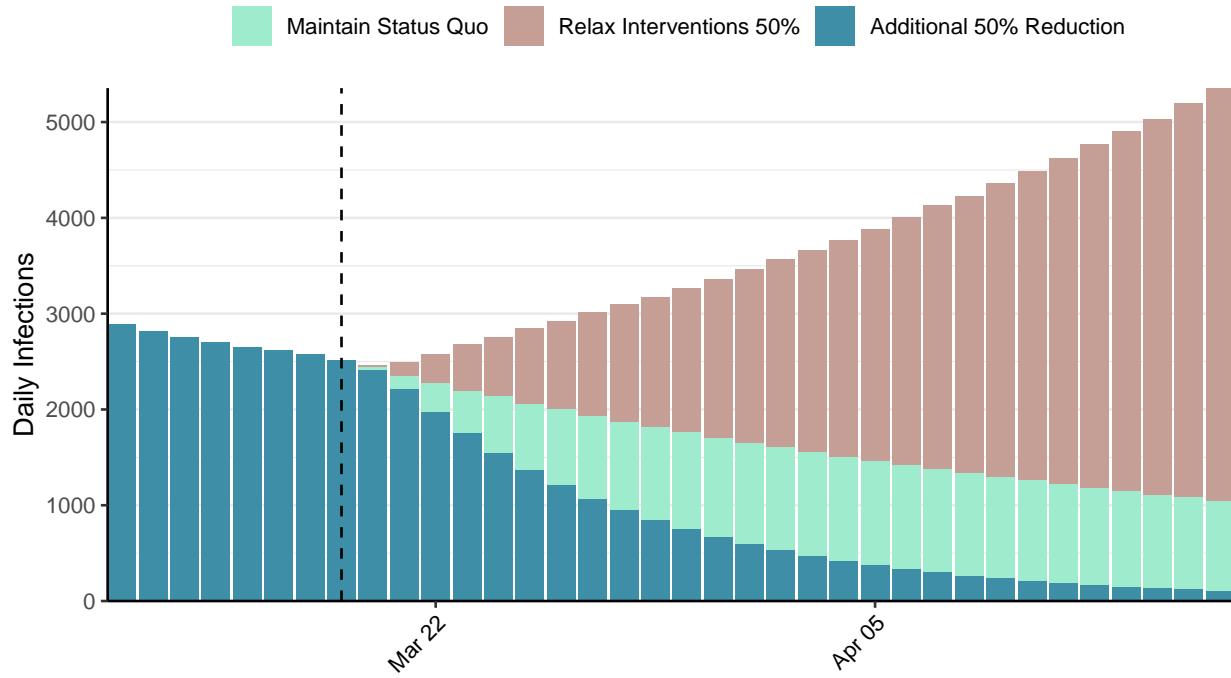


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Sierra Leone, 2021-03-19

[Download the report for Sierra Leone, 2021-03-19 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}
3,947	0	79	0	0.89 (95% CI: 0.65-1.18)

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.

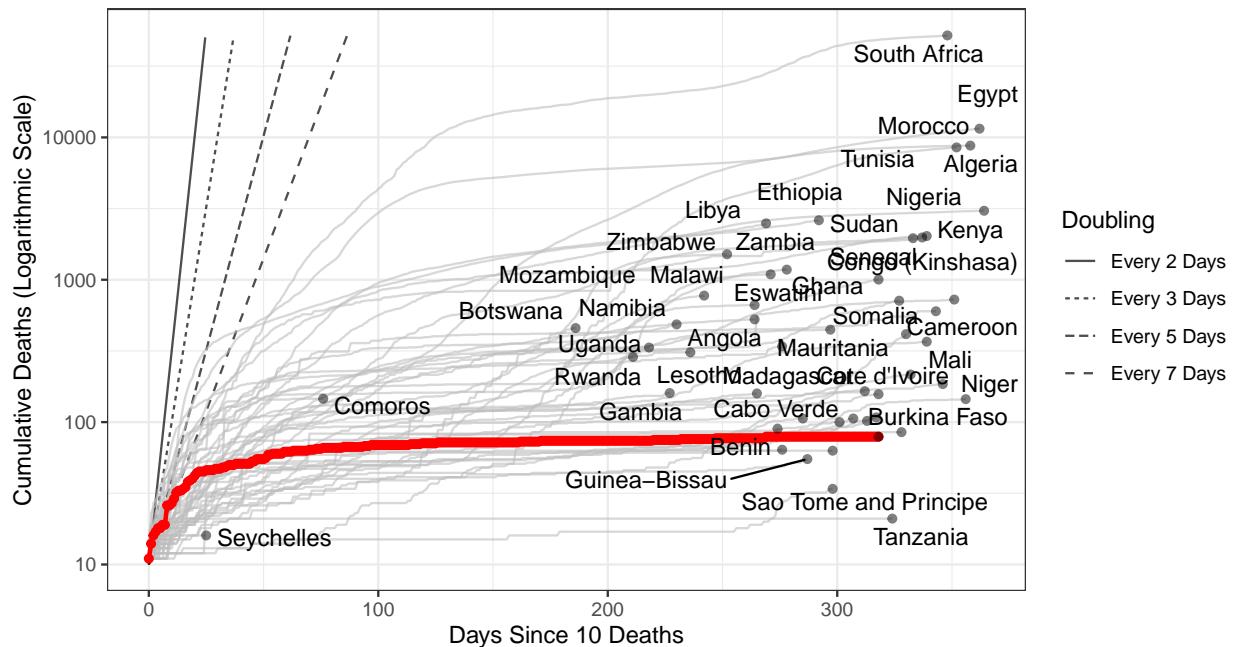


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 198 (95% CI: 149-247) 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).

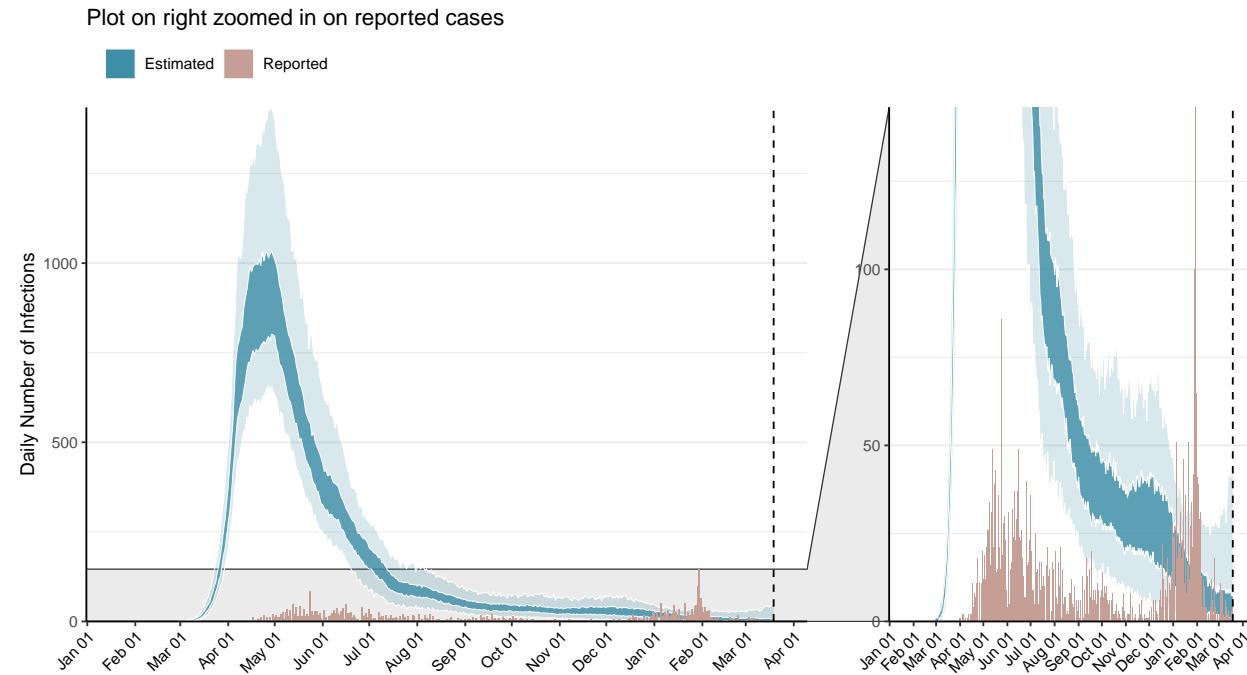


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

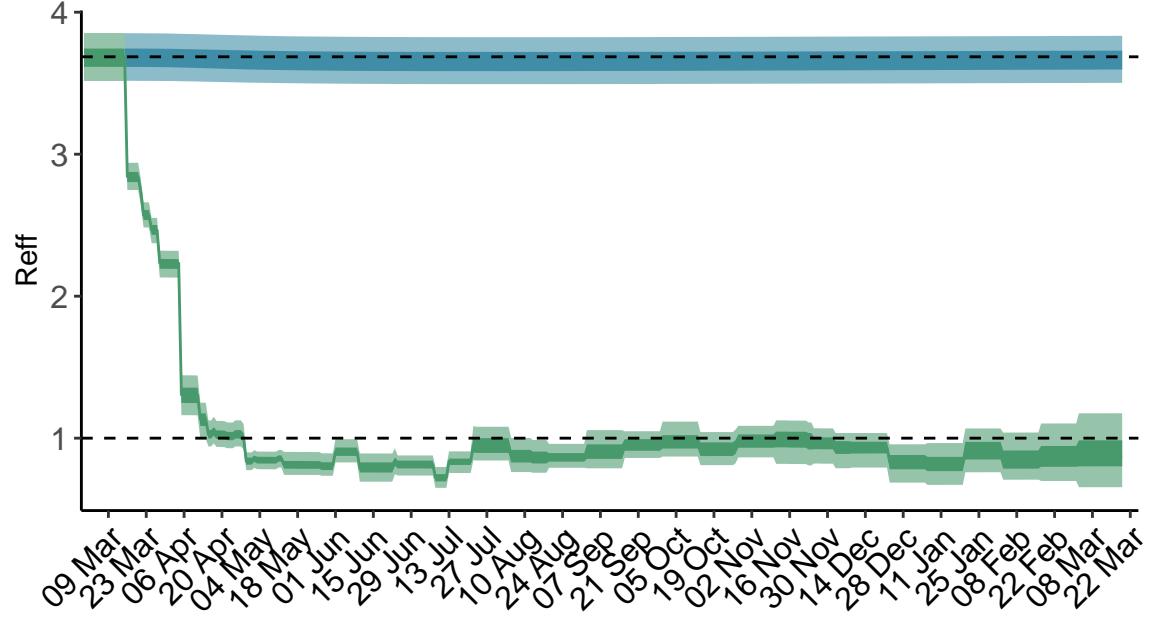


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

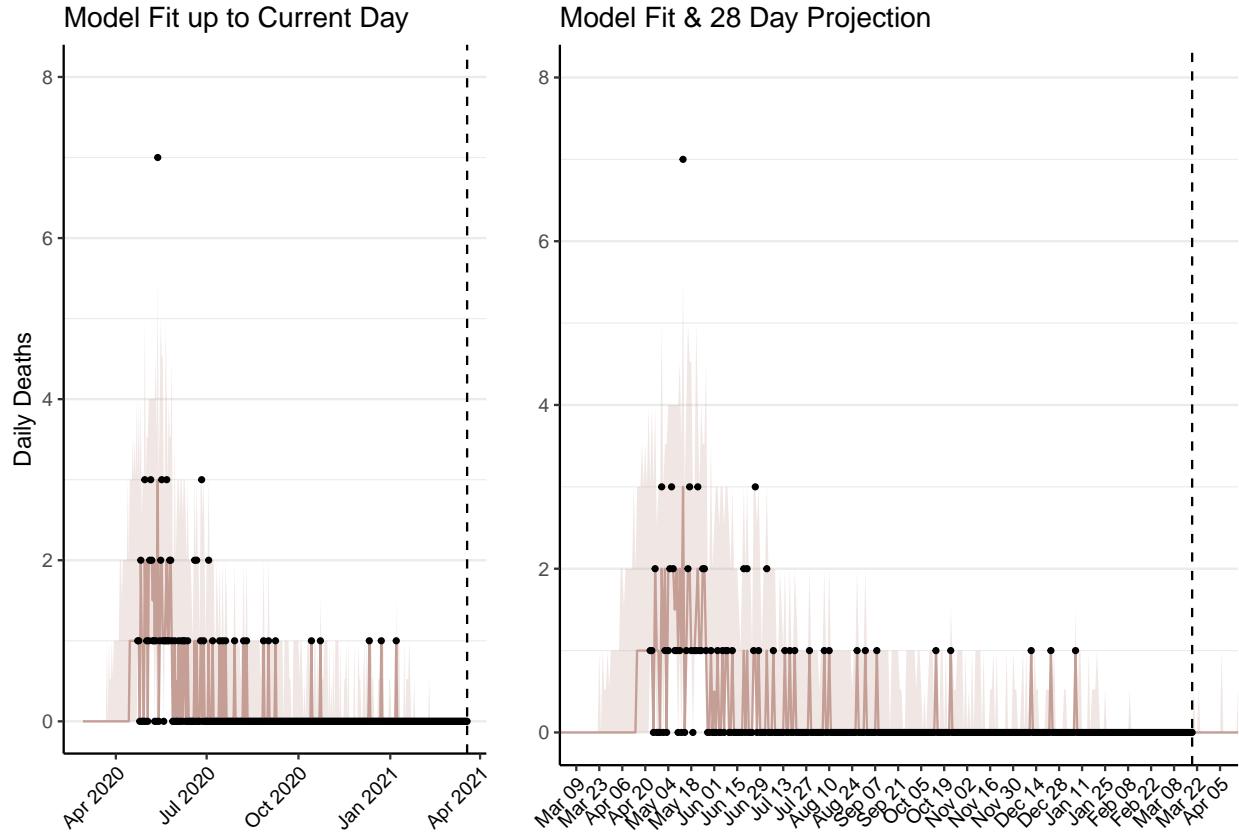


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 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 2021-04-16 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 2021-04-16. 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.**

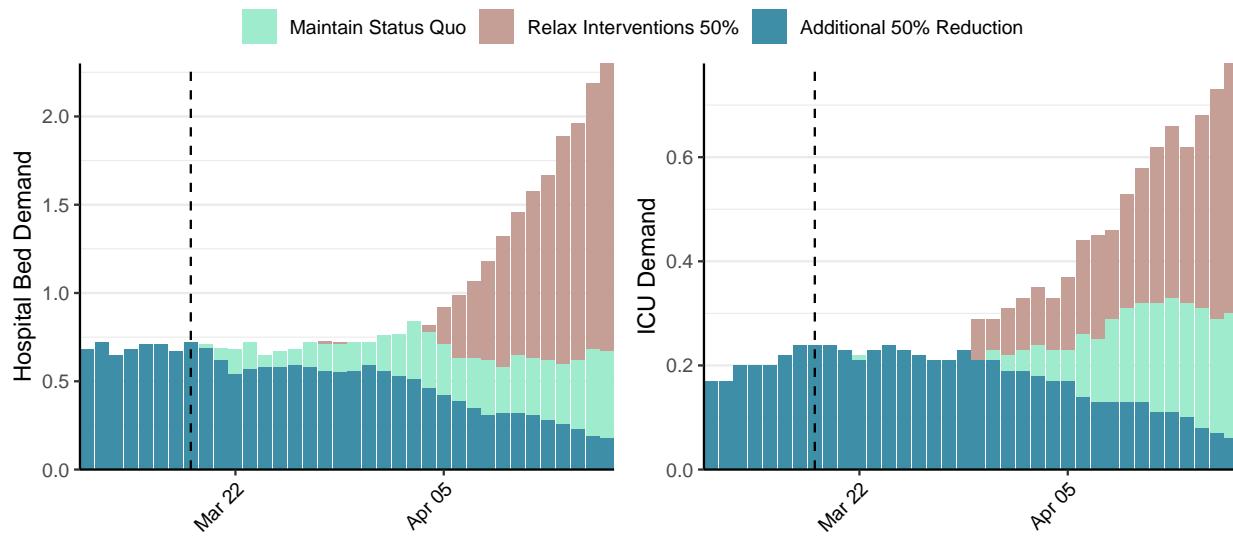


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 5-10) at the current date to 1 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7 (95% CI: 5-10) at the current date to 60 (95% CI: 28-93) by 2021-04-16.

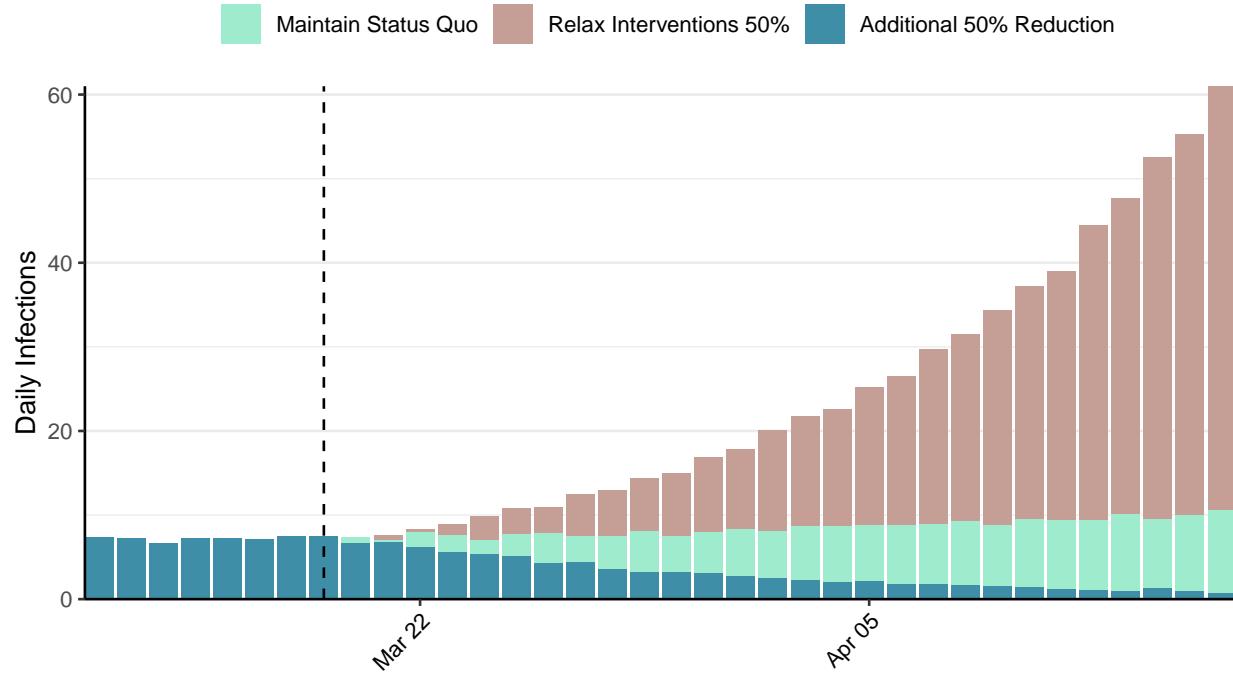


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: El Salvador, 2021-03-19

[Download the report for El Salvador, 2021-03-19 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}
62,531	0	1,971	9	0.75 (95% CI: 0.67-0.86)

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.

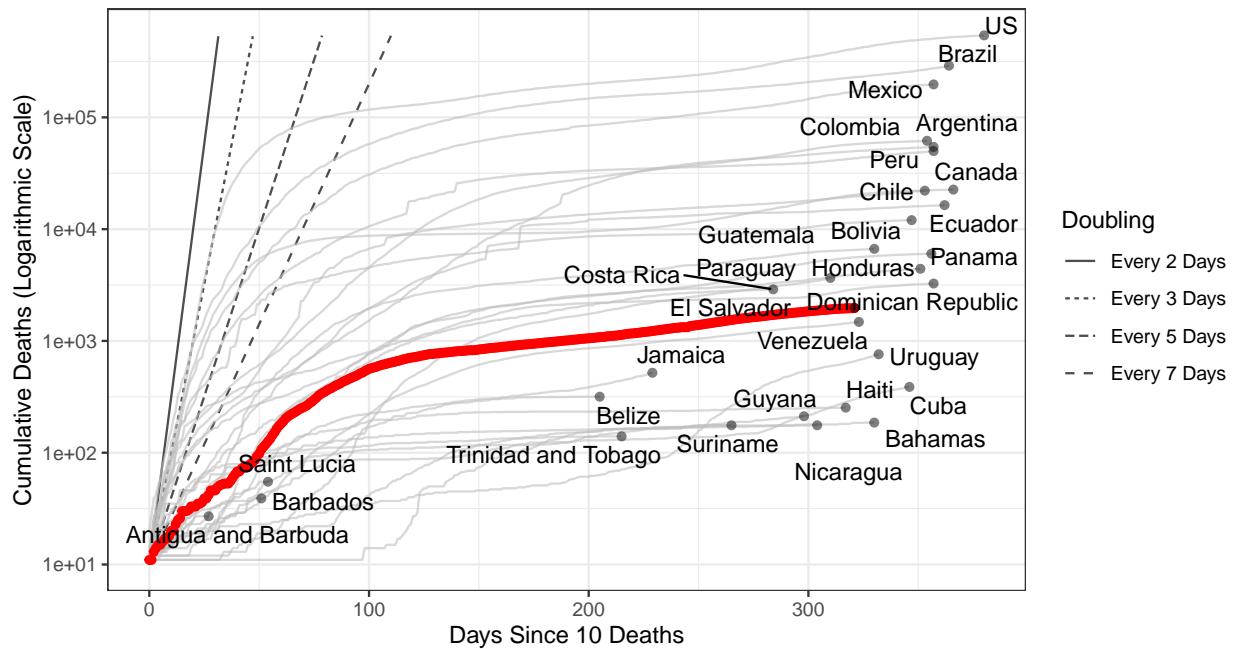


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 42,208 (95% CI: 39,732-44,683) 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).

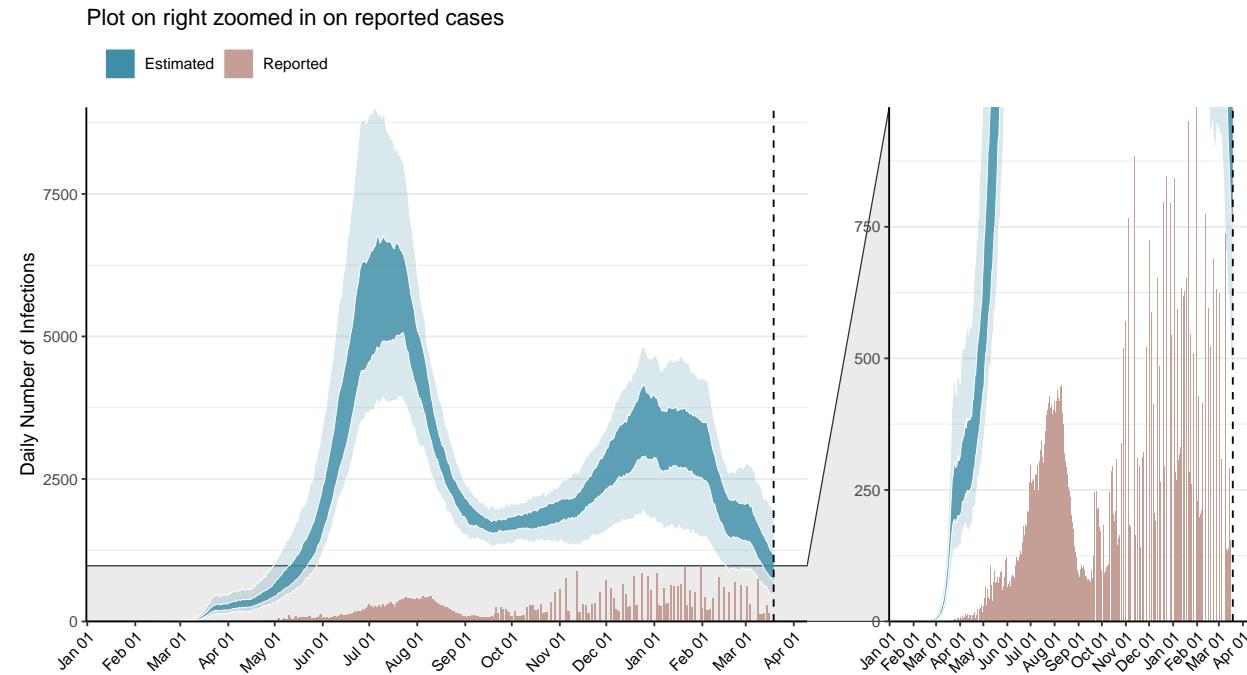


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

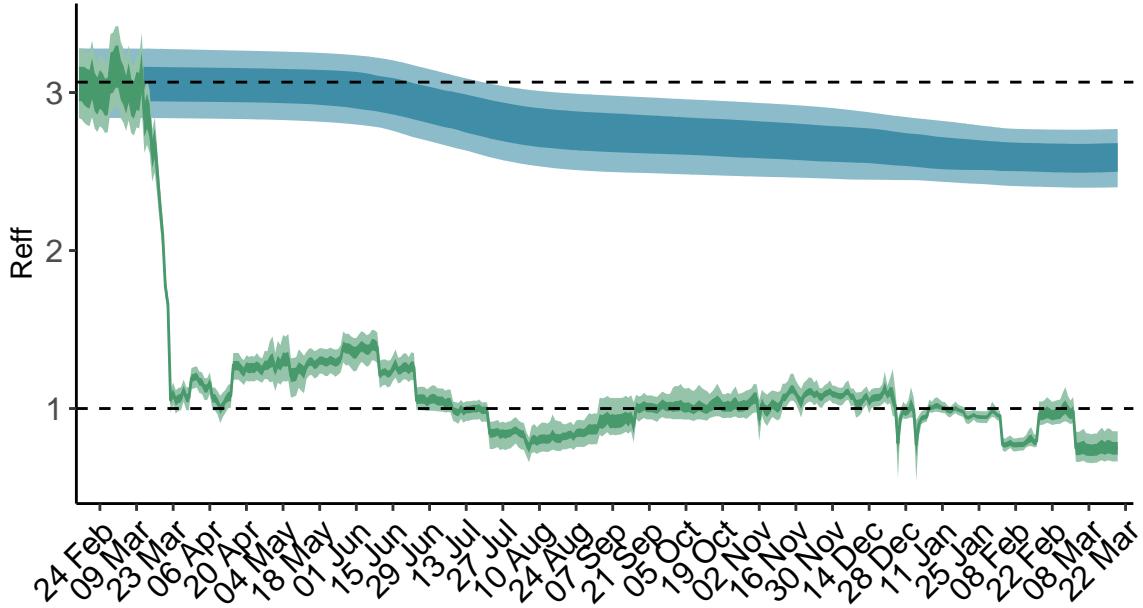


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

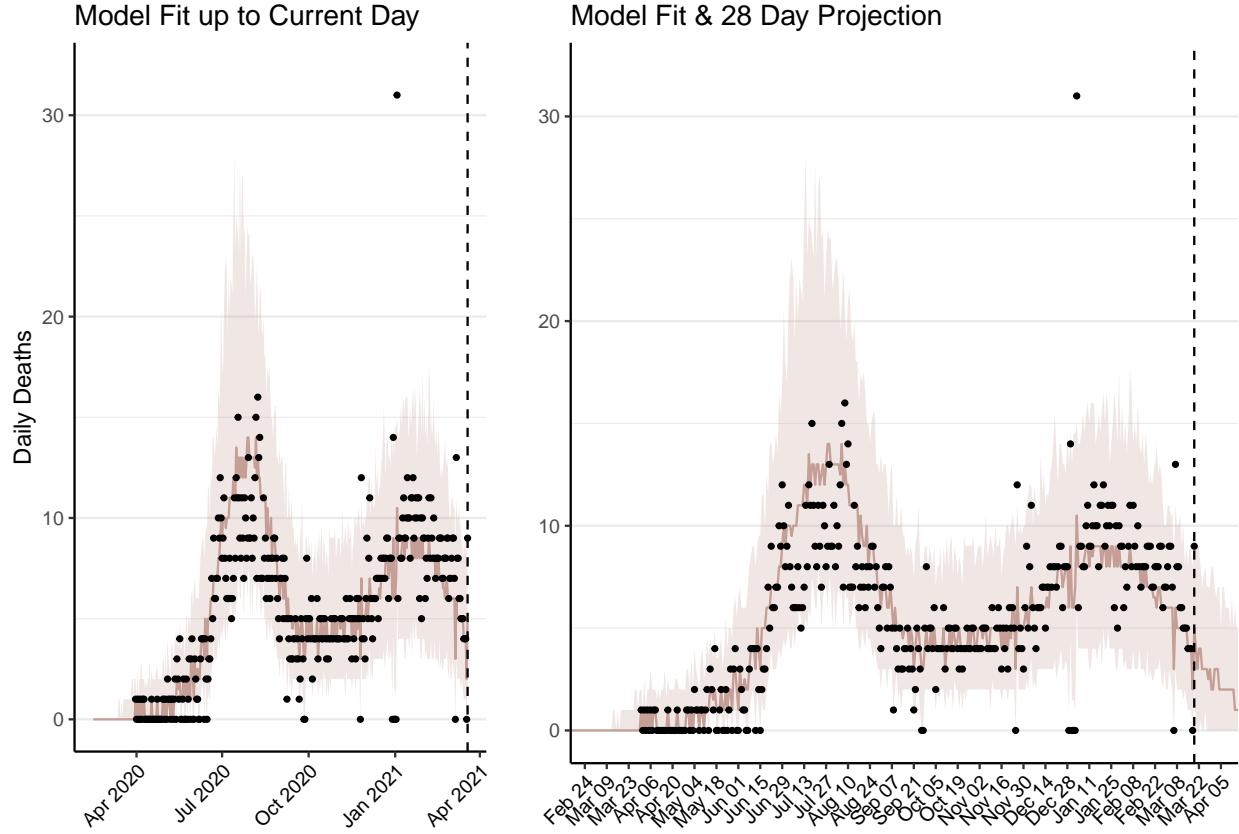


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 138 (95% CI: 129-146) patients requiring treatment with high-pressure oxygen at the current date to 51 (95% CI: 46-56) hospital beds being required on 2021-04-16 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 52 (95% CI: 49-56) patients requiring treatment with mechanical ventilation at the current date to 21 (95% CI: 18-23) by 2021-04-16. 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.**

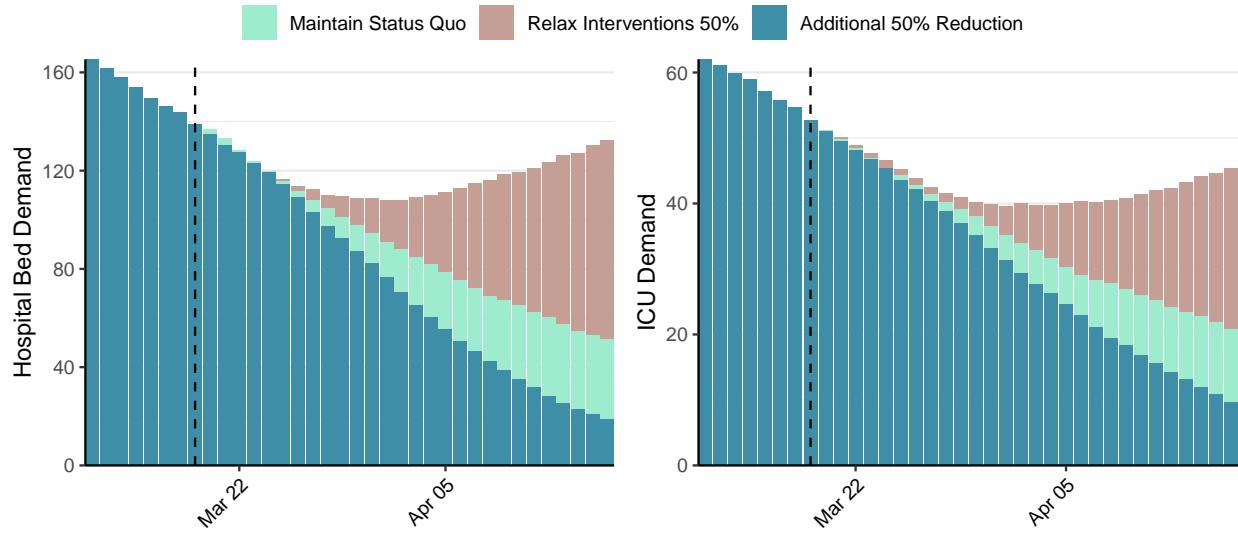


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 964 (95% CI: 892-1,036) at the current date to 36 (95% CI: 32-40) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 964 (95% CI: 892-1,036) at the current date to 1,719 (95% CI: 1,490-1,948) by 2021-04-16.

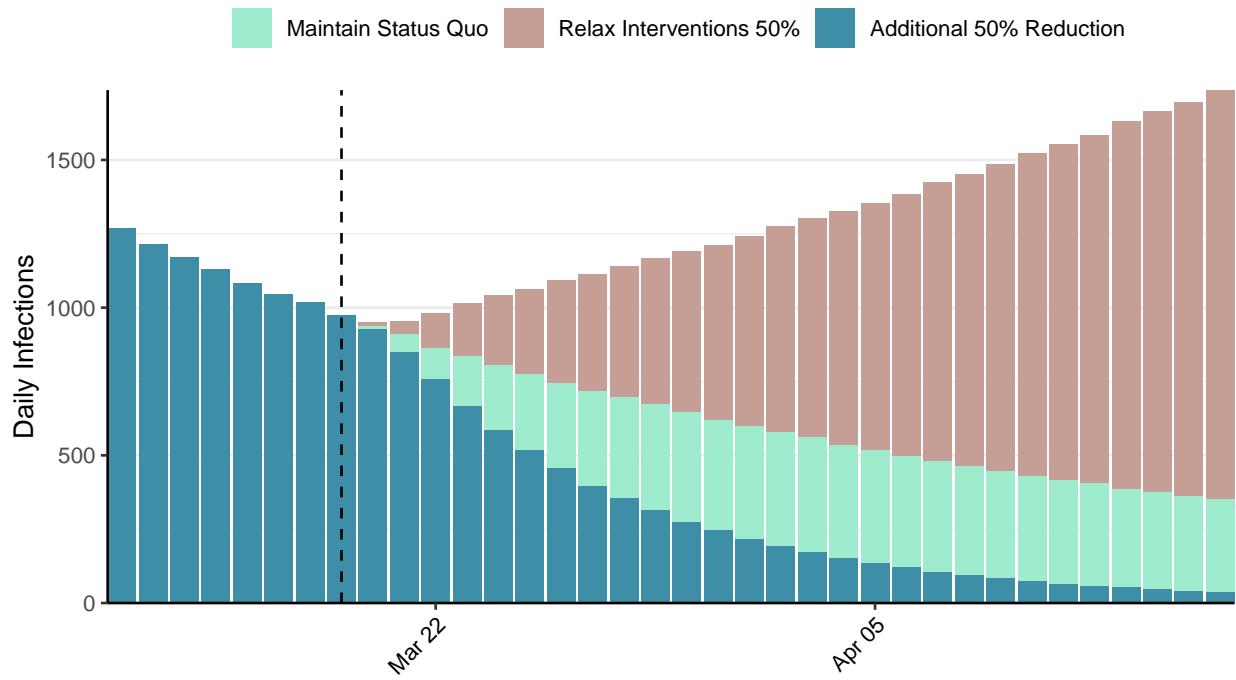


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Somalia, 2021-03-19

[Download the report for Somalia, 2021-03-19 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}
9,925	325	415	22	0.92 (95% CI: 0.81-1.06)

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.

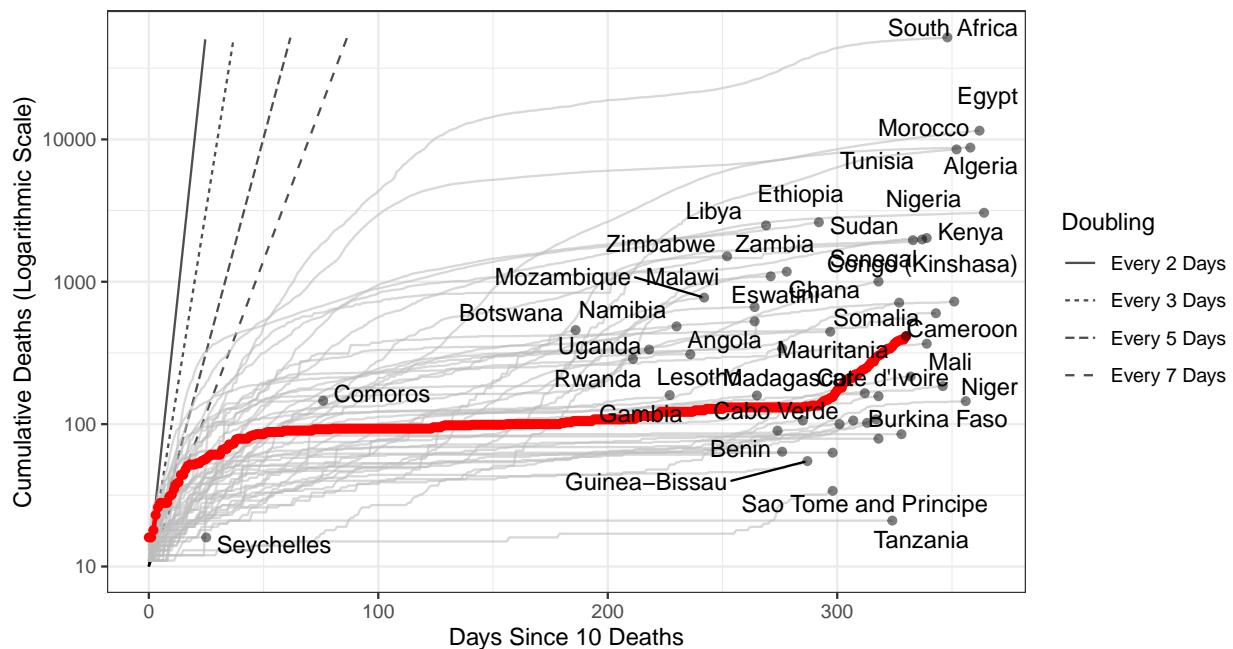


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 244,555 (95% CI: 229,307-259,803) 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

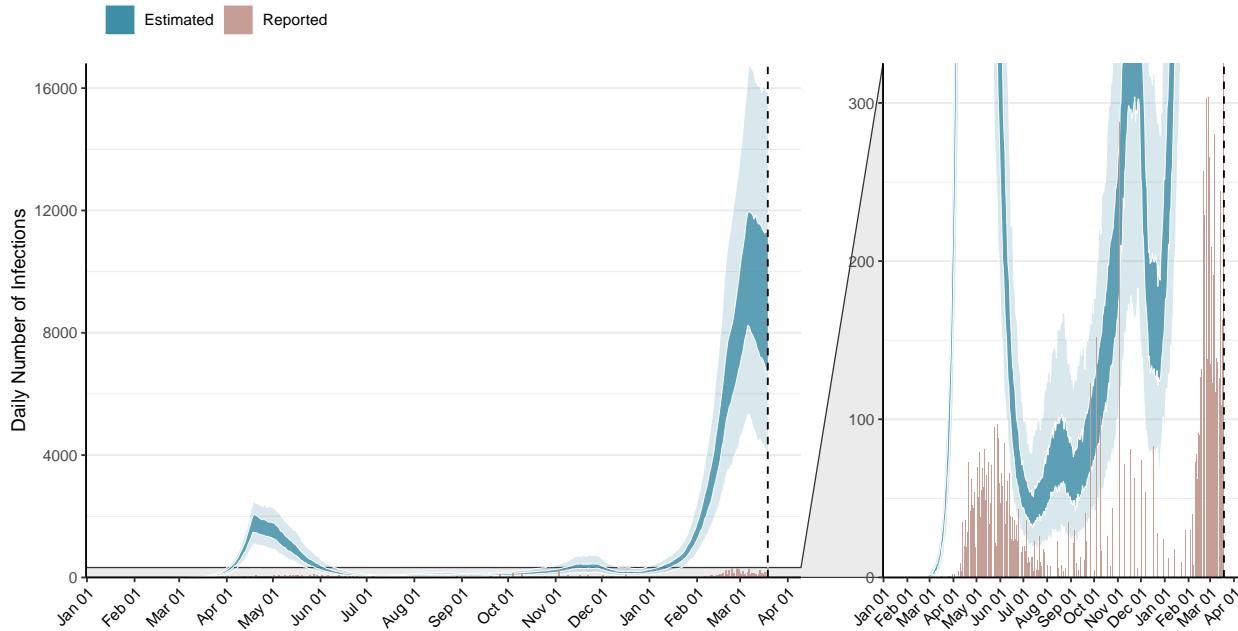


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

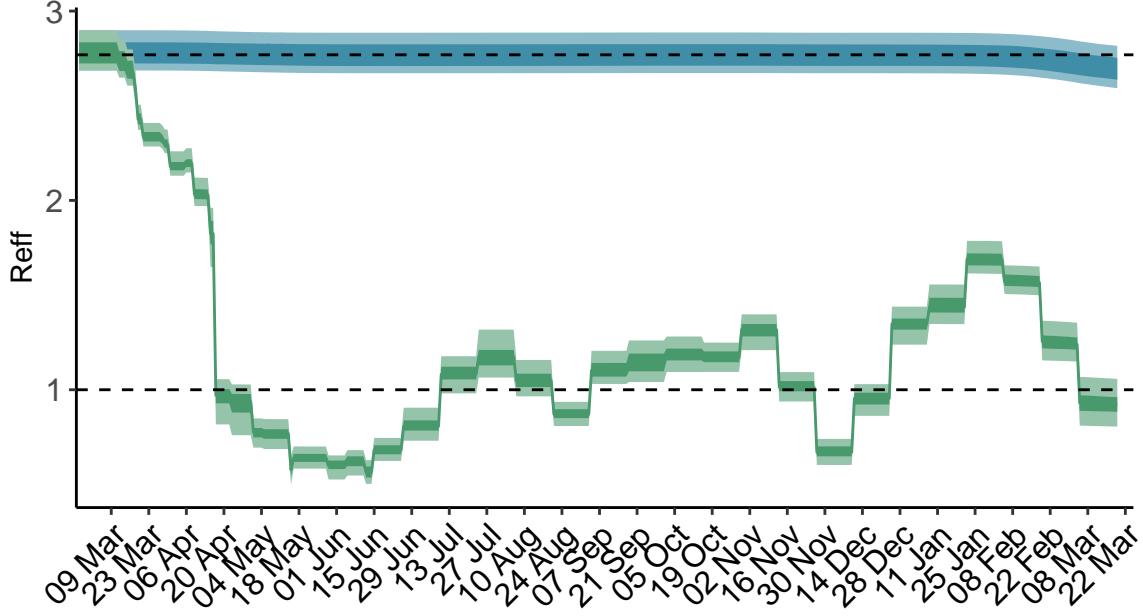


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

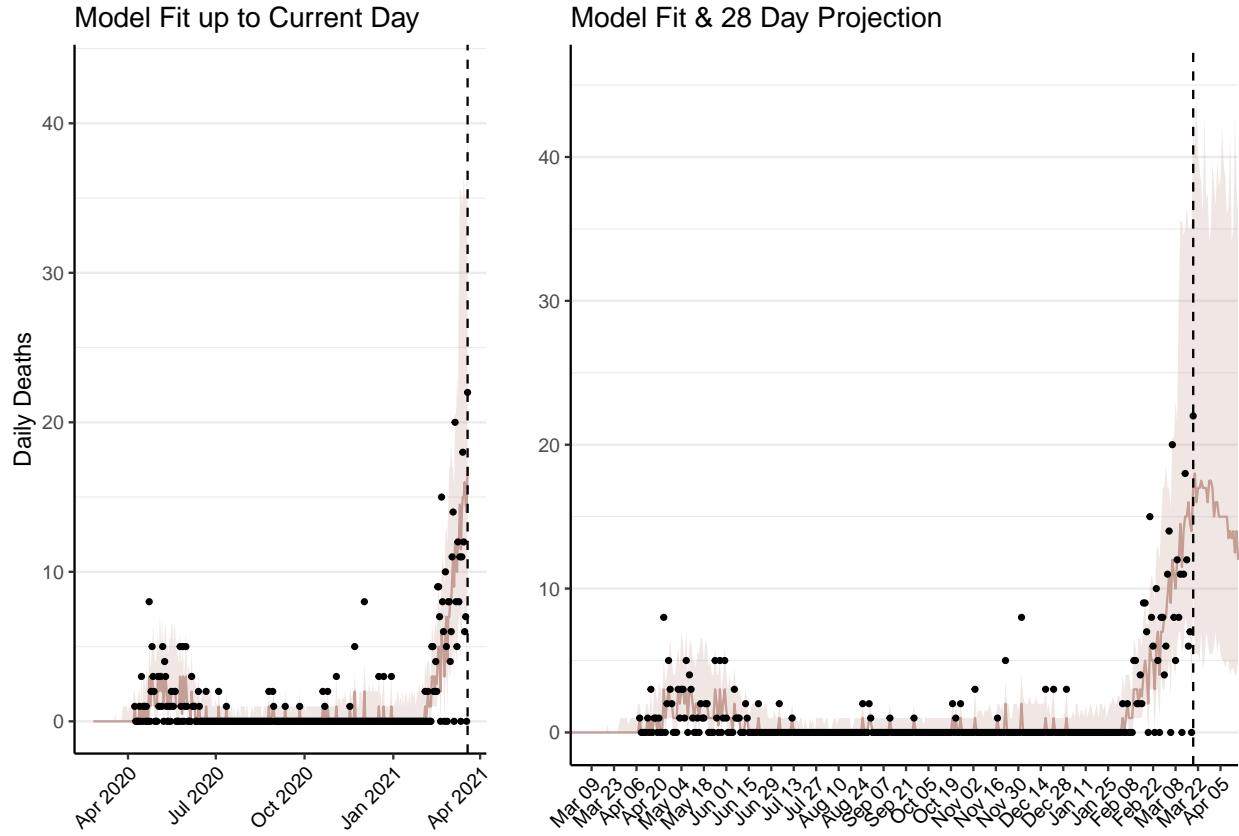


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 693 (95% CI: 649-737) patients requiring treatment with high-pressure oxygen at the current date to 579 (95% CI: 524-635) hospital beds being required on 2021-04-16 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 247 (95% CI: 235-260) patients requiring treatment with mechanical ventilation at the current date to 214 (95% CI: 199-229) by 2021-04-16. 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.**

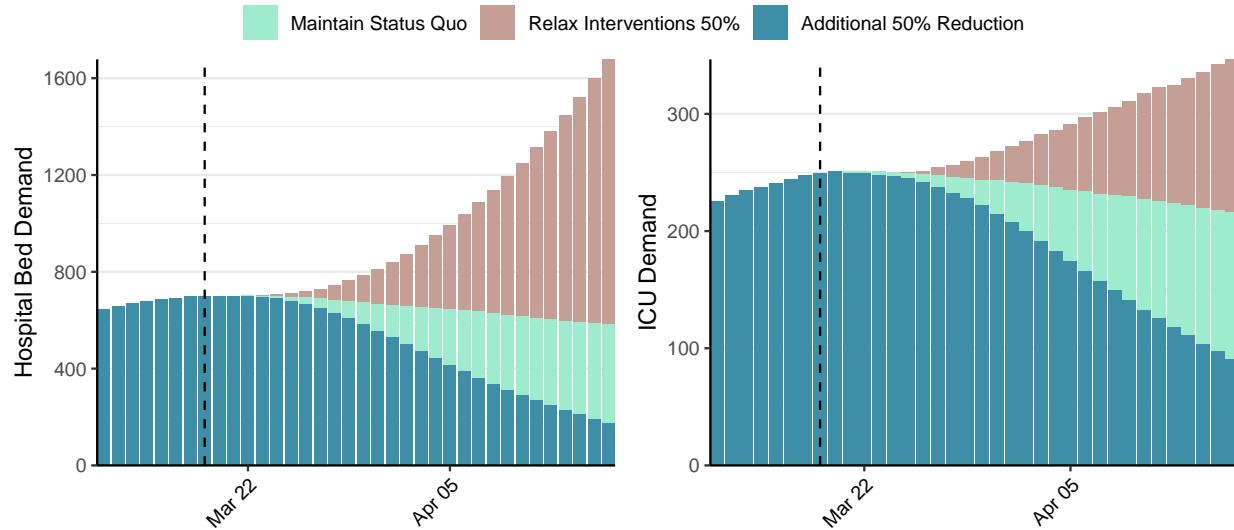


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 8,947 (95% CI: 8,283-9,612) at the current date to 613 (95% CI: 547-679) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 8,947 (95% CI: 8,283-9,612) at the current date to 36,580 (95% CI: 32,383-40,777) by 2021-04-16.

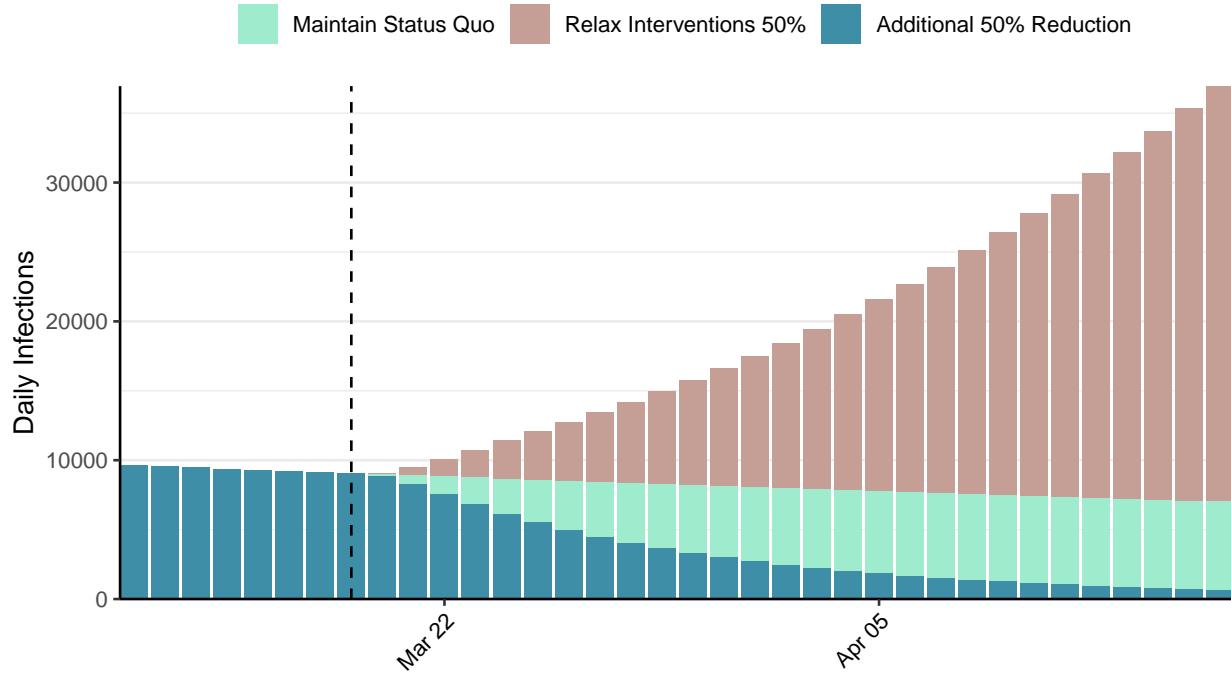


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Serbia, 2021-03-19

[Download the report for Serbia, 2021-03-19 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}
542,209	5,305	4,872	29	0.98 (95% CI: 0.88-1.11)

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.

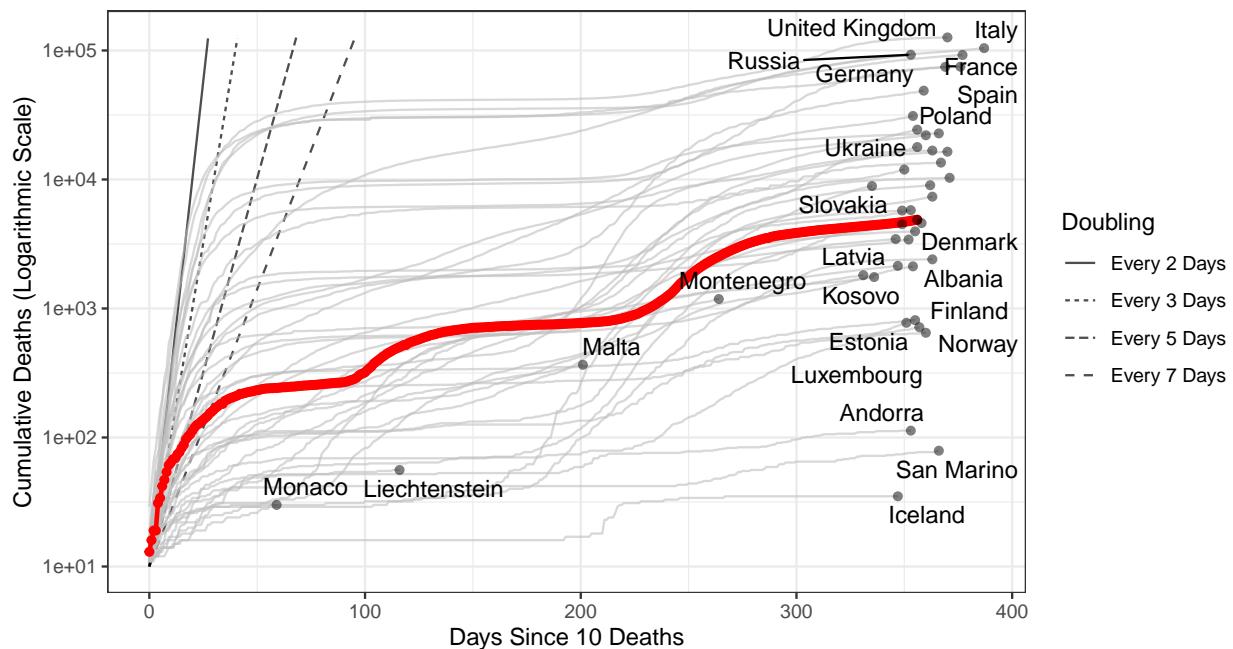


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 193,496 (95% CI: 186,110-200,881) 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).

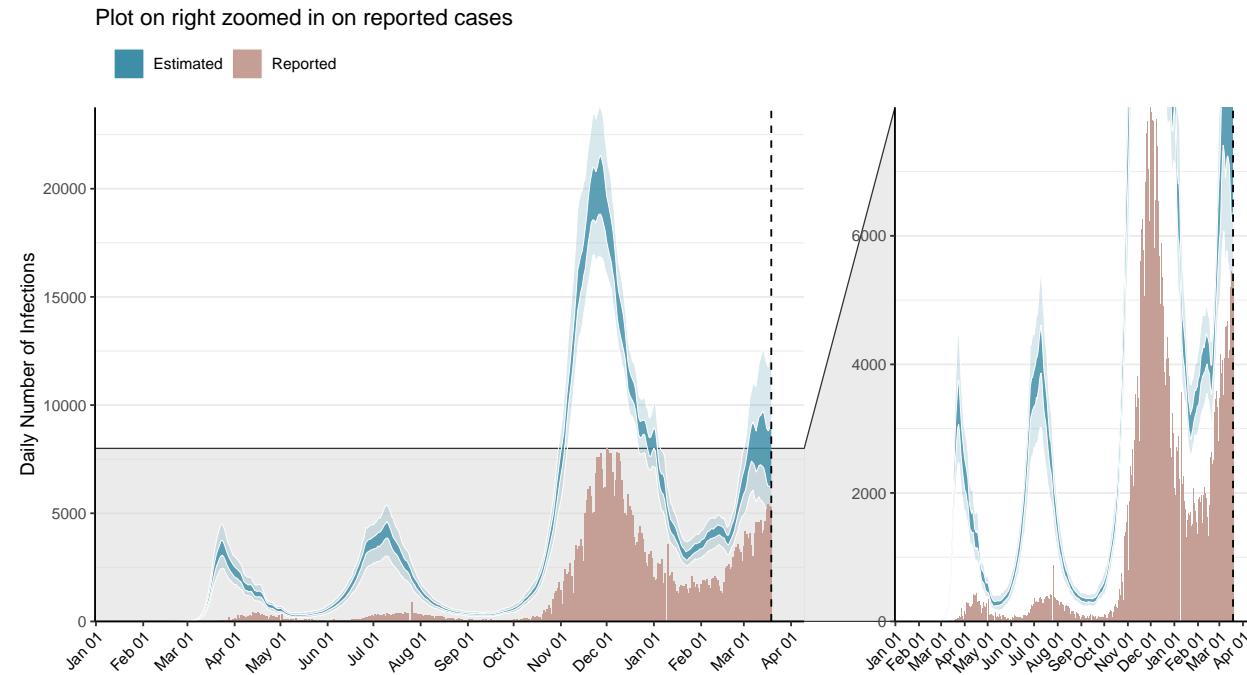


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

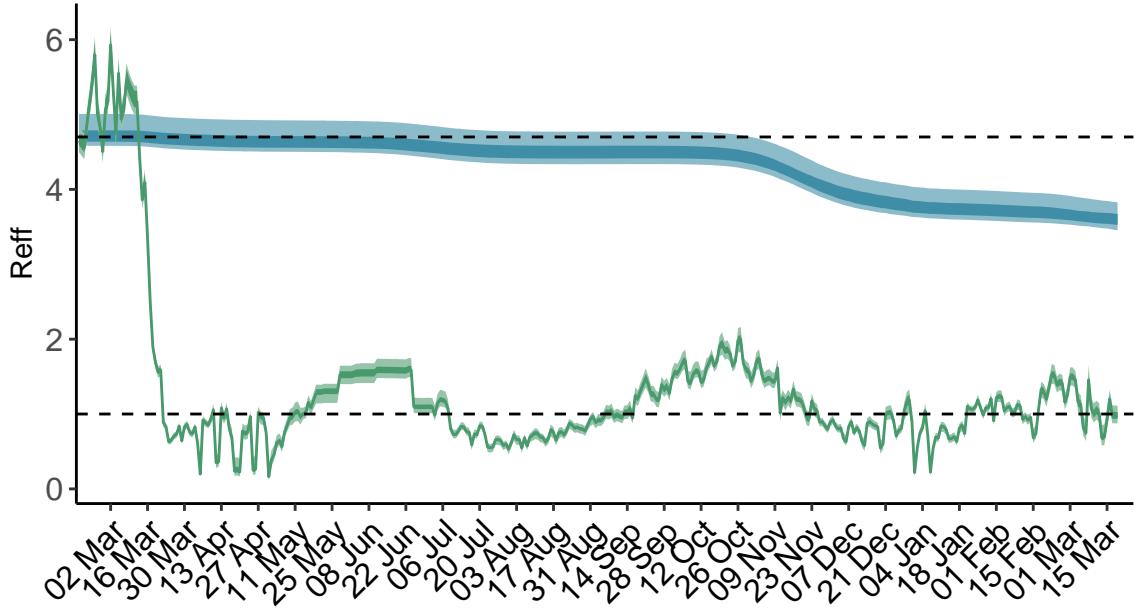


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

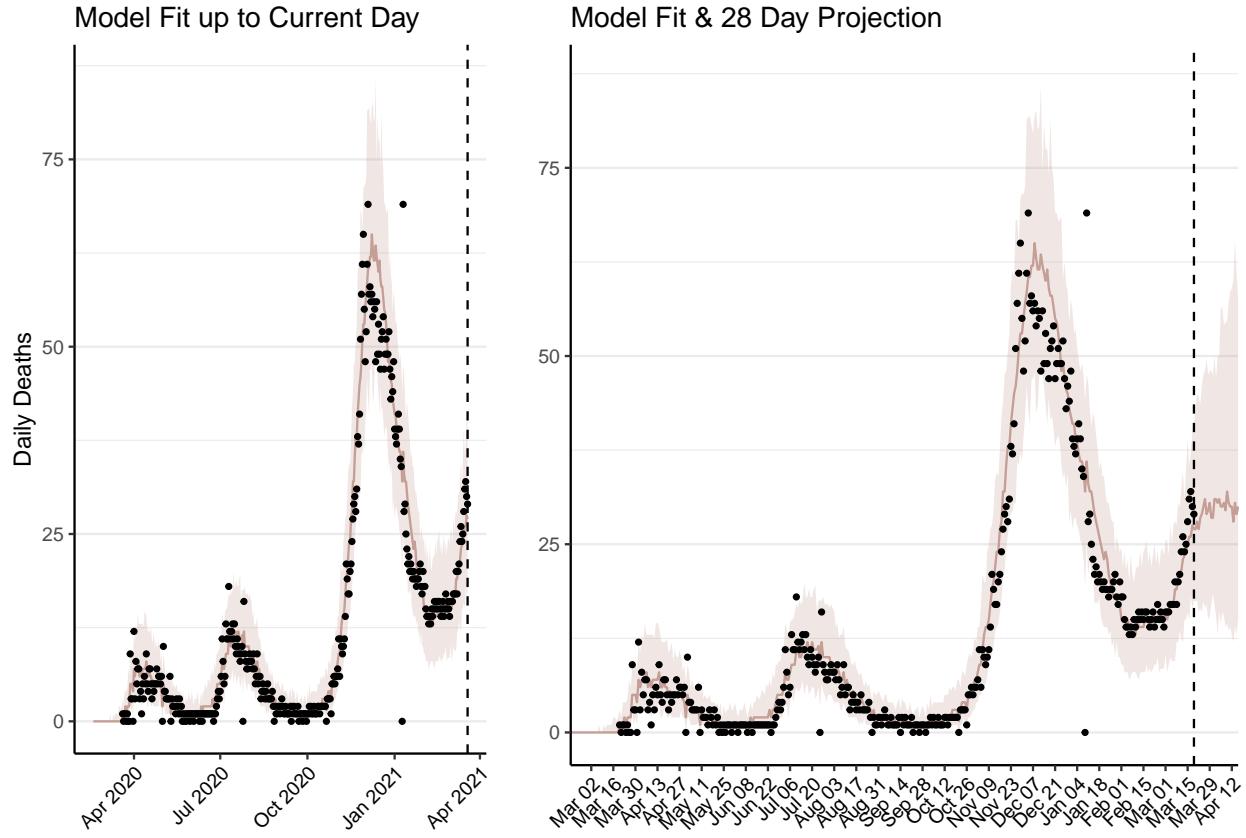


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1,079 (95% CI: 1,034-1,123) patients requiring treatment with high-pressure oxygen at the current date to 1,147 (95% CI: 1,052-1,242) hospital beds being required on 2021-04-16 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 380 (95% CI: 365-395) patients requiring treatment with mechanical ventilation at the current date to 425 (95% CI: 392-458) by 2021-04-16. 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.**

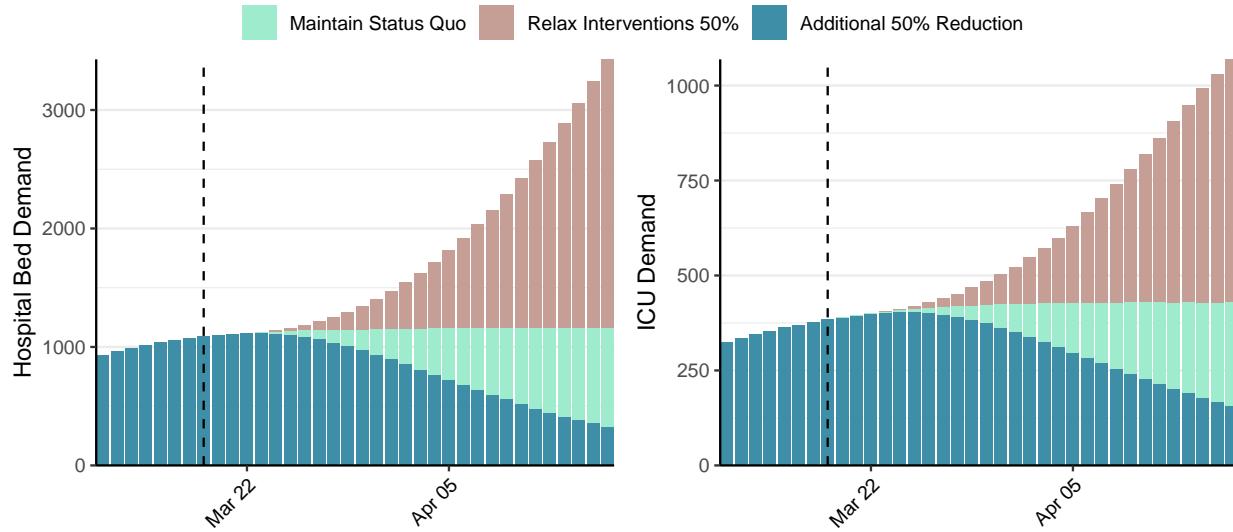


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 7,931 (95% CI: 7,491-8,370) at the current date to 674 (95% CI: 611-737) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 7,931 (95% CI: 7,491-8,370) at the current date to 37,860 (95% CI: 34,453-41,268) by 2021-04-16.

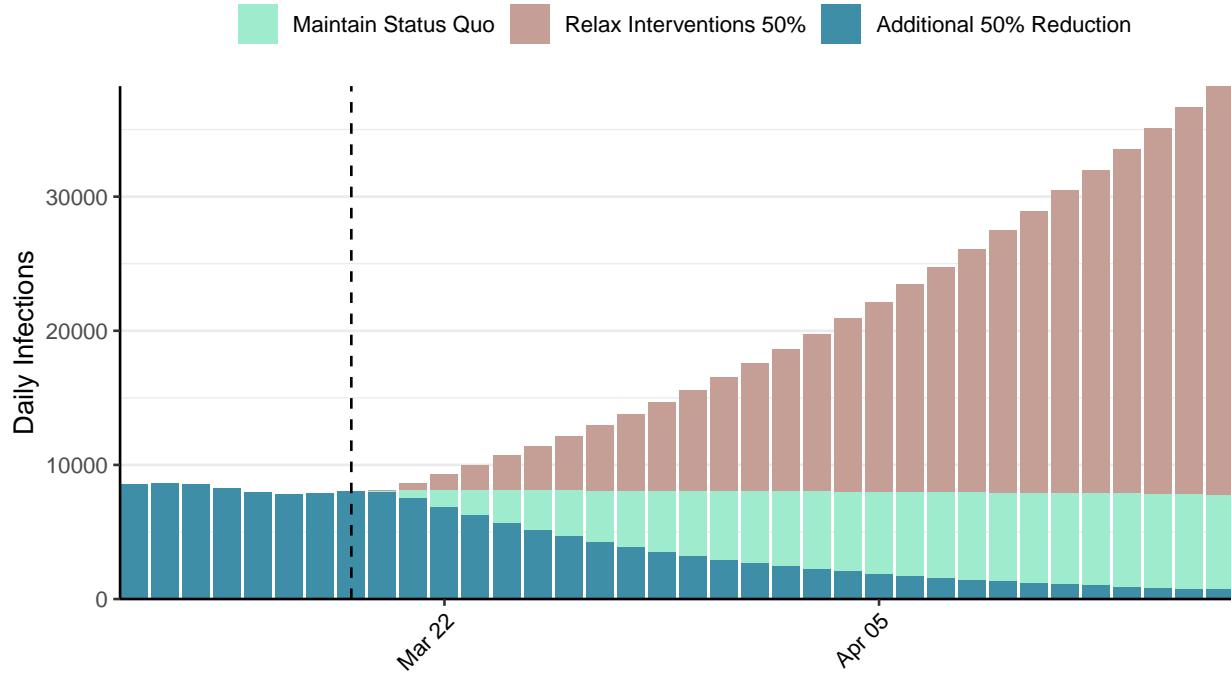


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: South Sudan, 2021-03-19

[Download the report for South Sudan, 2021-03-19 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}
9,809	41	106	0	0.66 (95% CI: 0.54-0.81)

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.

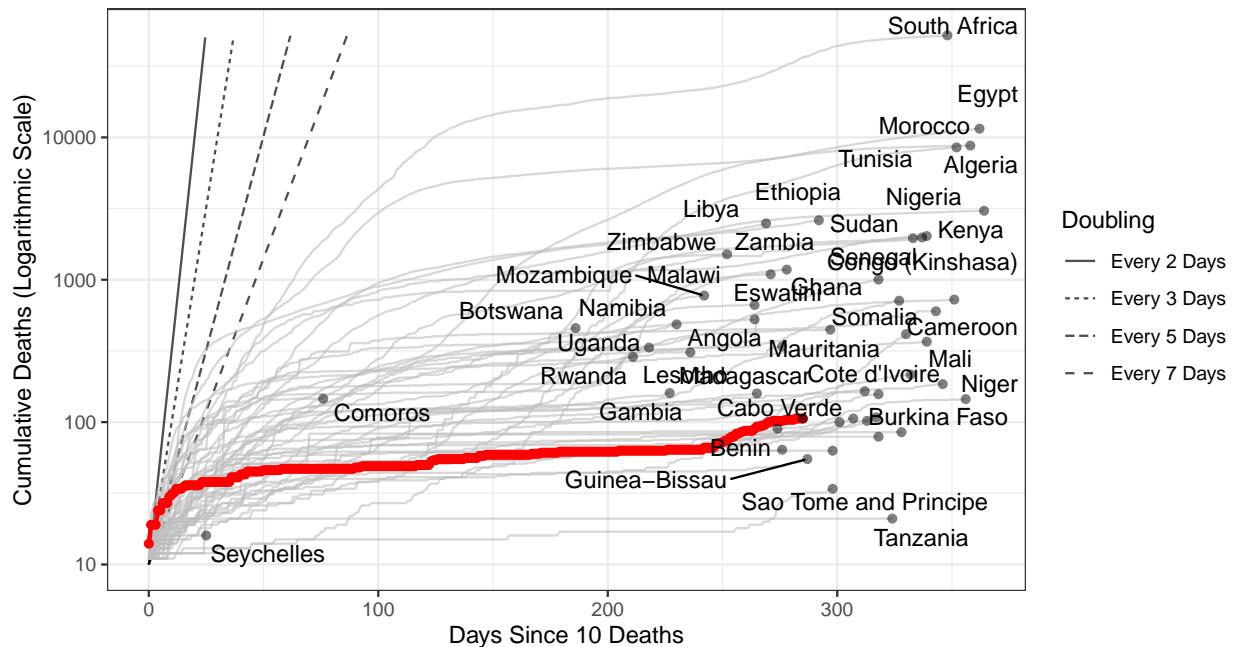


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 14,871 (95% CI: 13,573-16,168) 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).

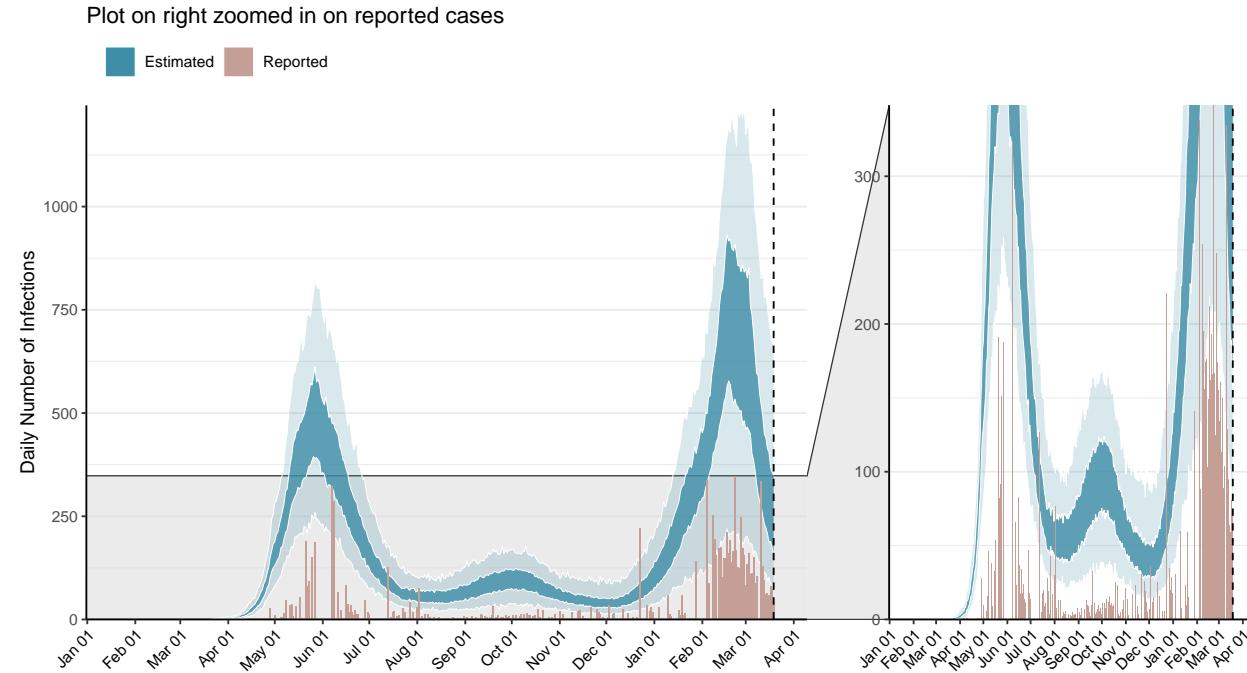


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

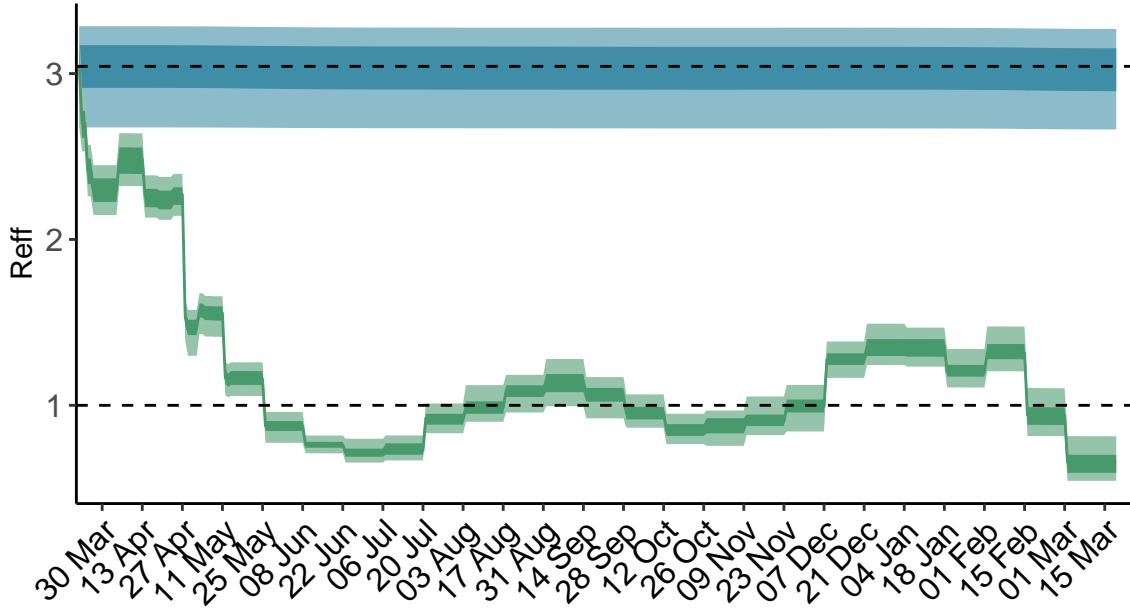


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

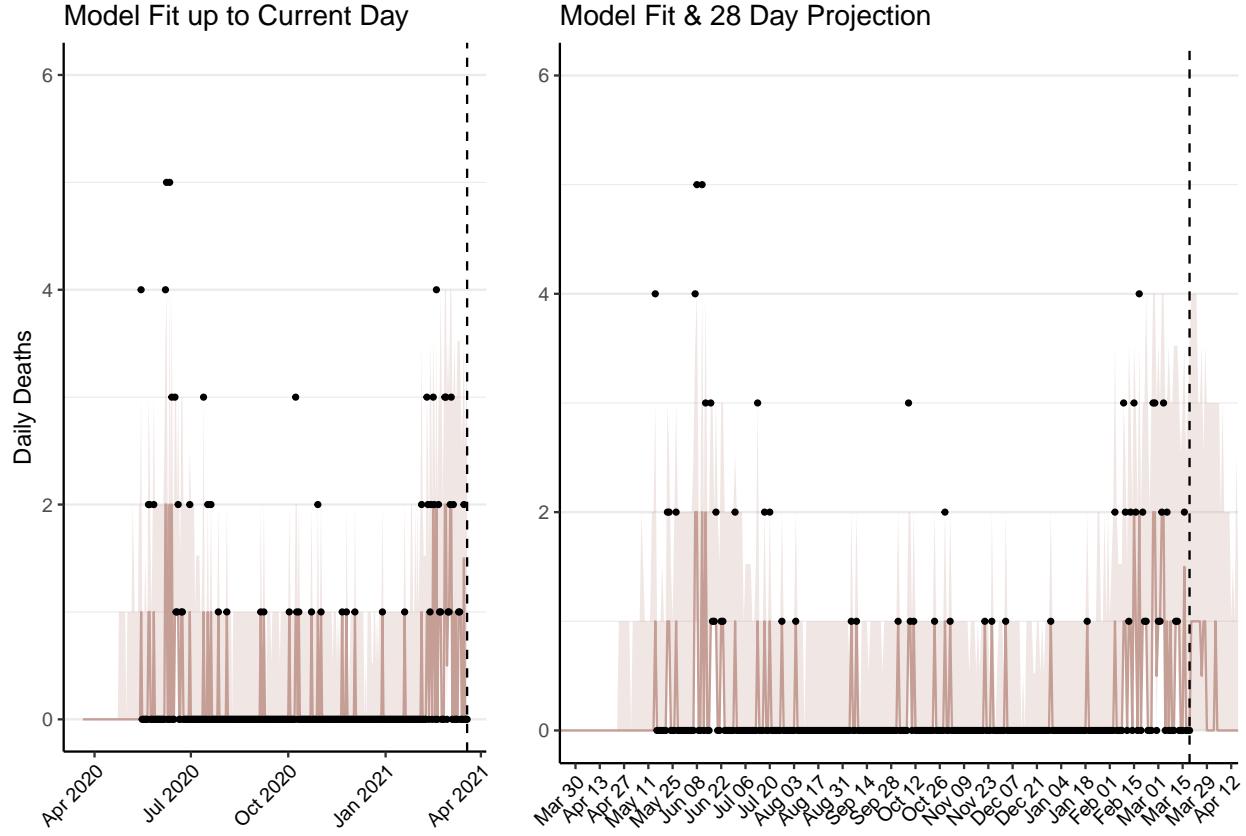


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 40 (95% CI: 36-44) patients requiring treatment with high-pressure oxygen at the current date to 10 (95% CI: 8-12) hospital beds being required on 2021-04-16 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 16 (95% CI: 15-18) patients requiring treatment with mechanical ventilation at the current date to 5 (95% CI: 4-6) by 2021-04-16. 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.**

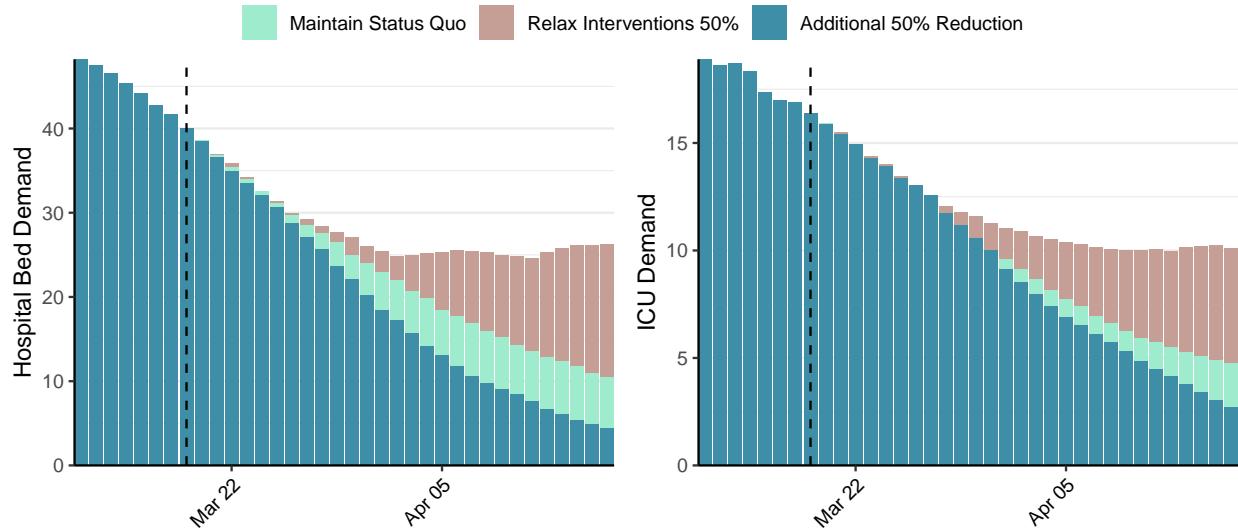


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 274 (95% CI: 239-310) at the current date to 8 (95% CI: 6-10) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 274 (95% CI: 239-310) at the current date to 357 (95% CI: 259-455) by 2021-04-16.

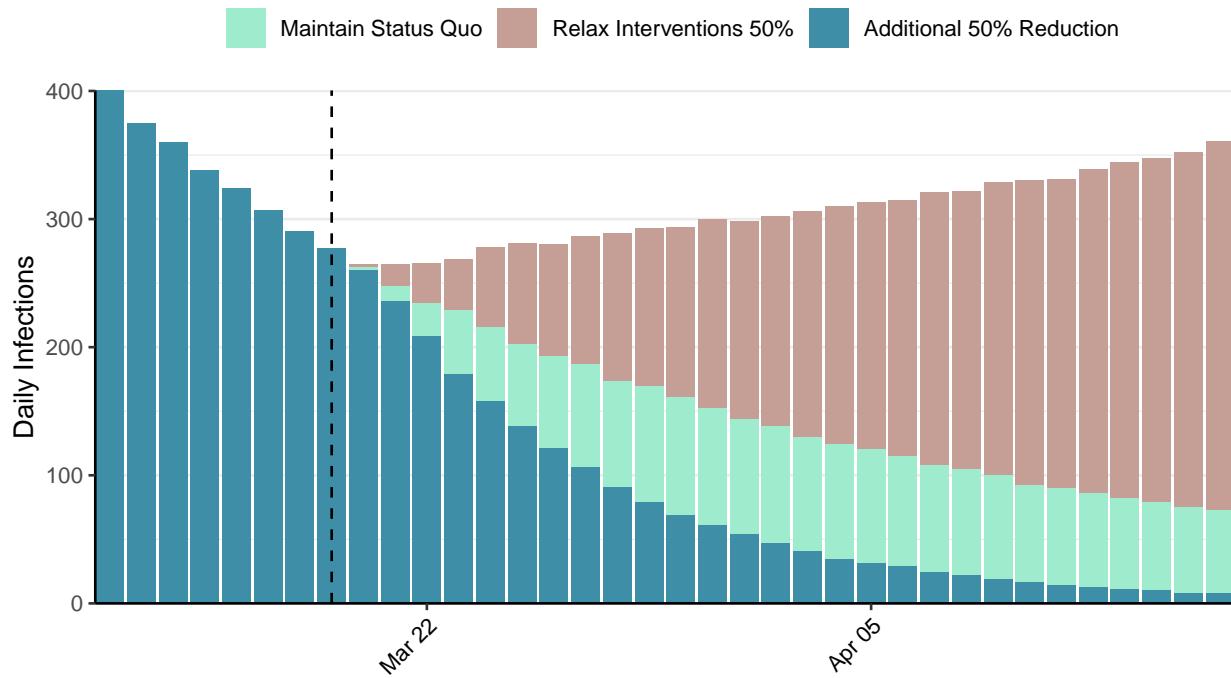


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Sao Tome and Principe, 2021-03-19

[Download the report for Sao Tome and Principe, 2021-03-19 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}
2,123	9	34	0	0.74 (95% CI: 0.6-0.93)

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.

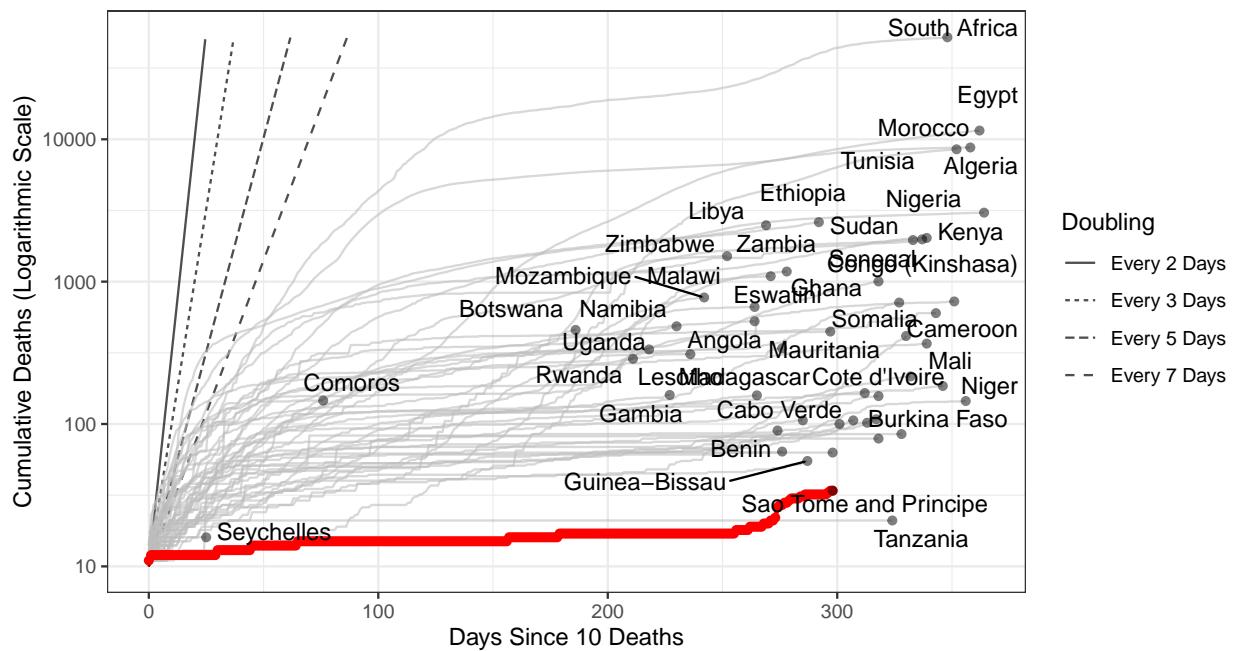


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 5,081 (95% CI: 4,558-5,603) 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).

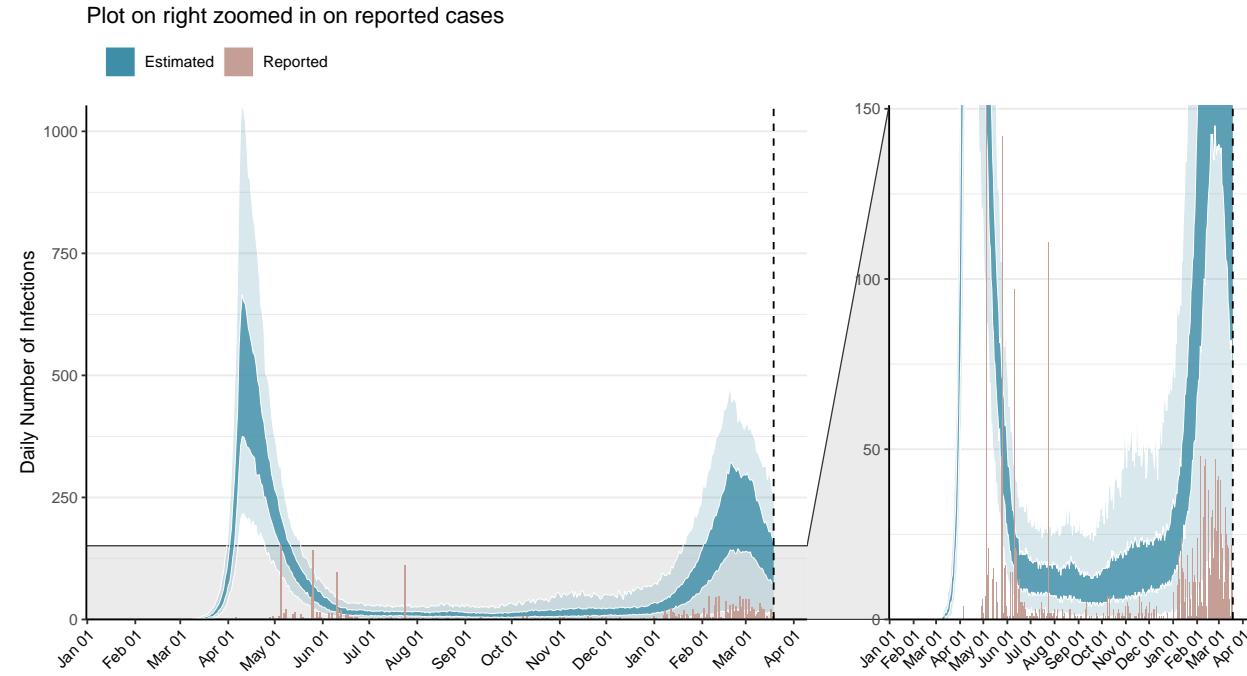


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

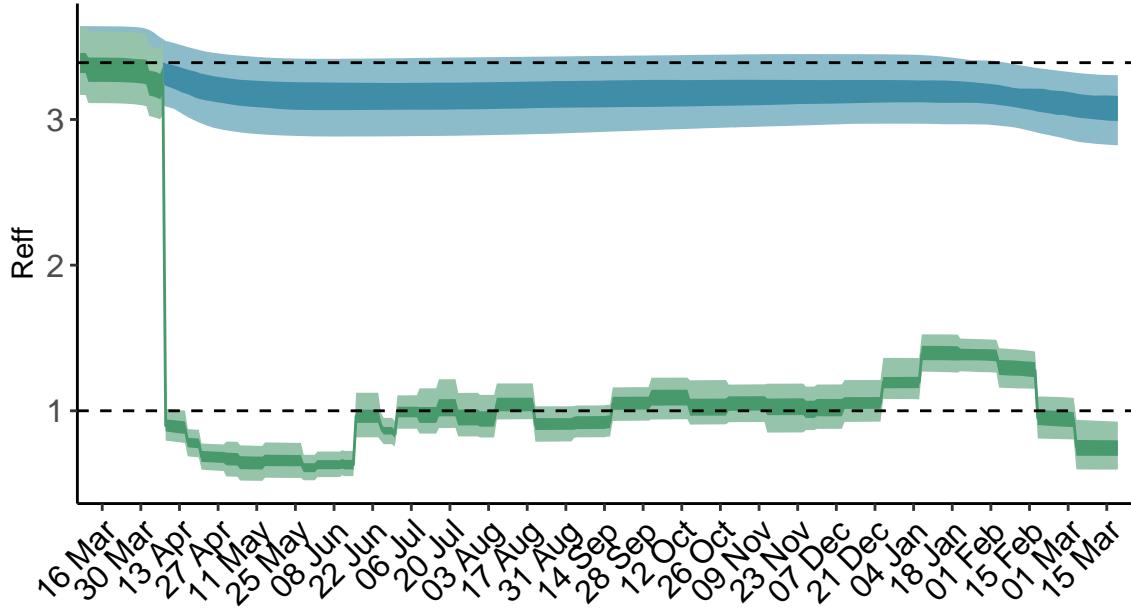


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

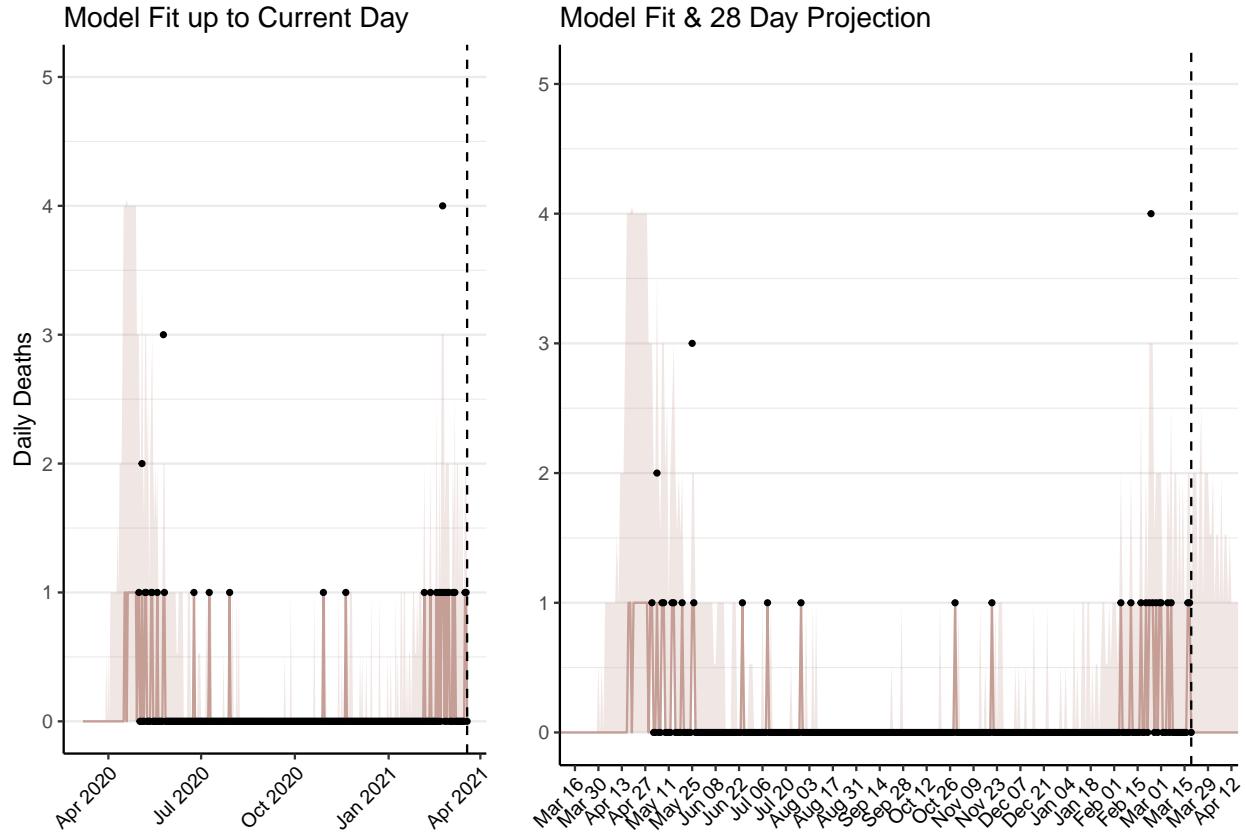


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 12-15) patients requiring treatment with high-pressure oxygen at the current date to 5 (95% CI: 4-6) hospital beds being required on 2021-04-16 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 2 (95% CI: 2-3) by 2021-04-16. 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.**

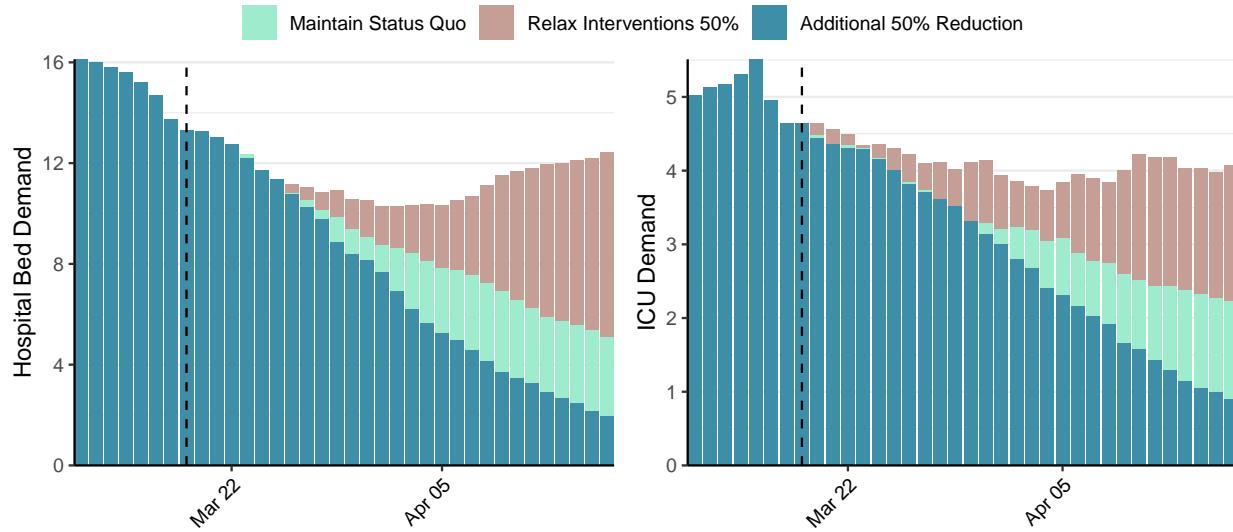


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 114 (95% CI: 101-127) at the current date to 4 (95% CI: 3-5) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 114 (95% CI: 101-127) at the current date to 208 (95% CI: 172-244) by 2021-04-16.

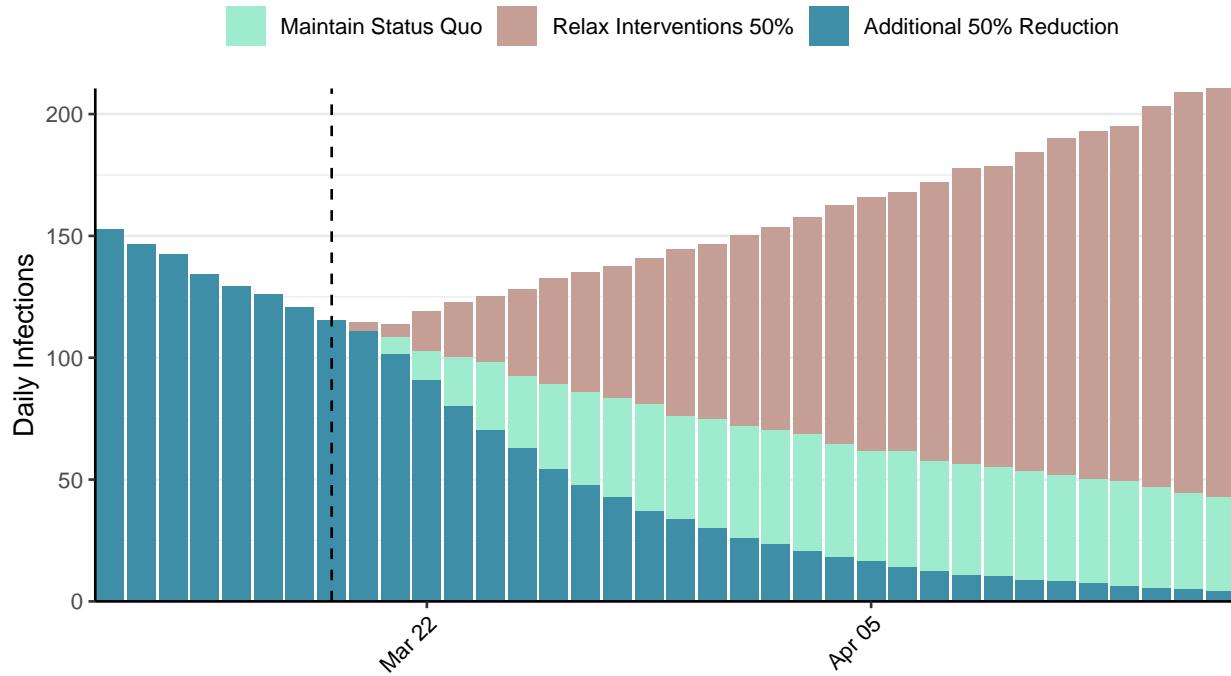


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Suriname, 2021-03-19

[Download the report for Suriname, 2021-03-19 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}
9,055	6	176	0	0.74 (95% CI: 0.61-0.91)

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.

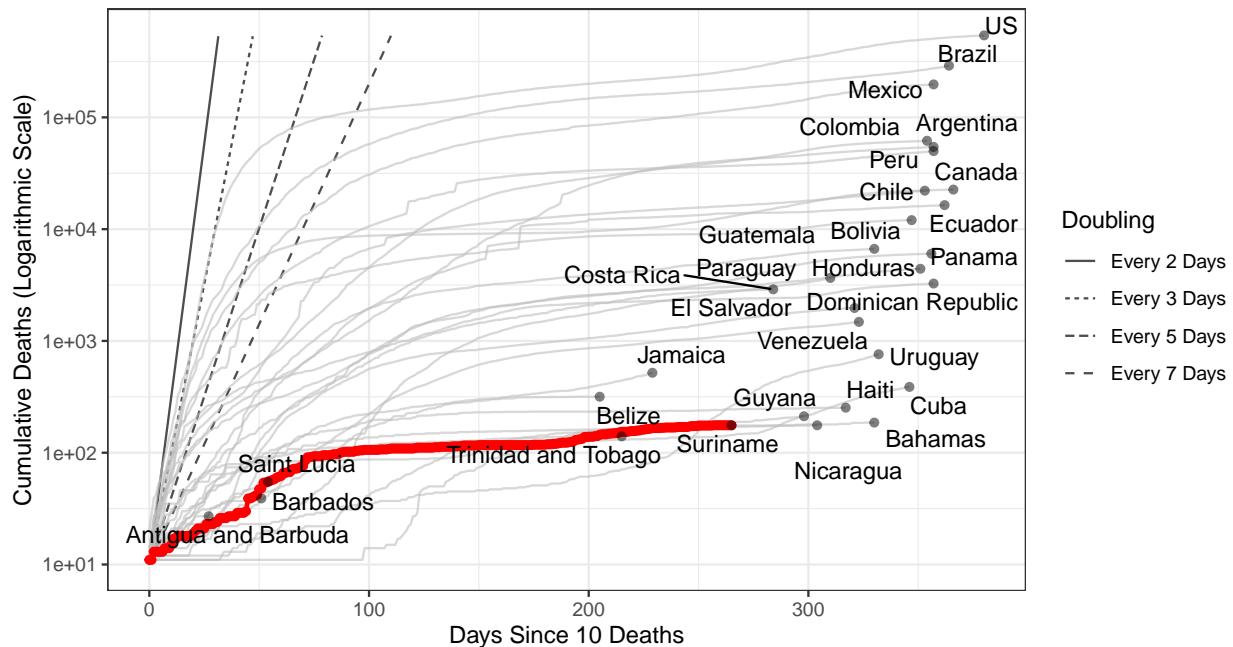


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 1,878 (95% CI: 1,599-2,158) 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).

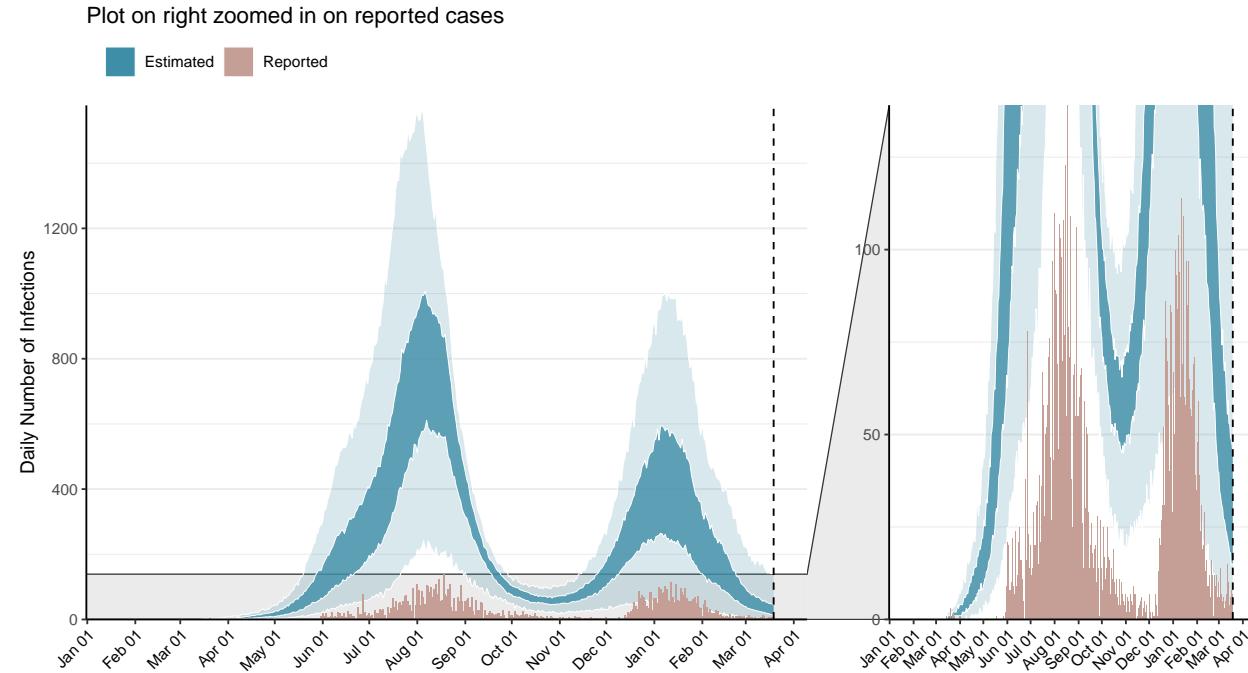


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

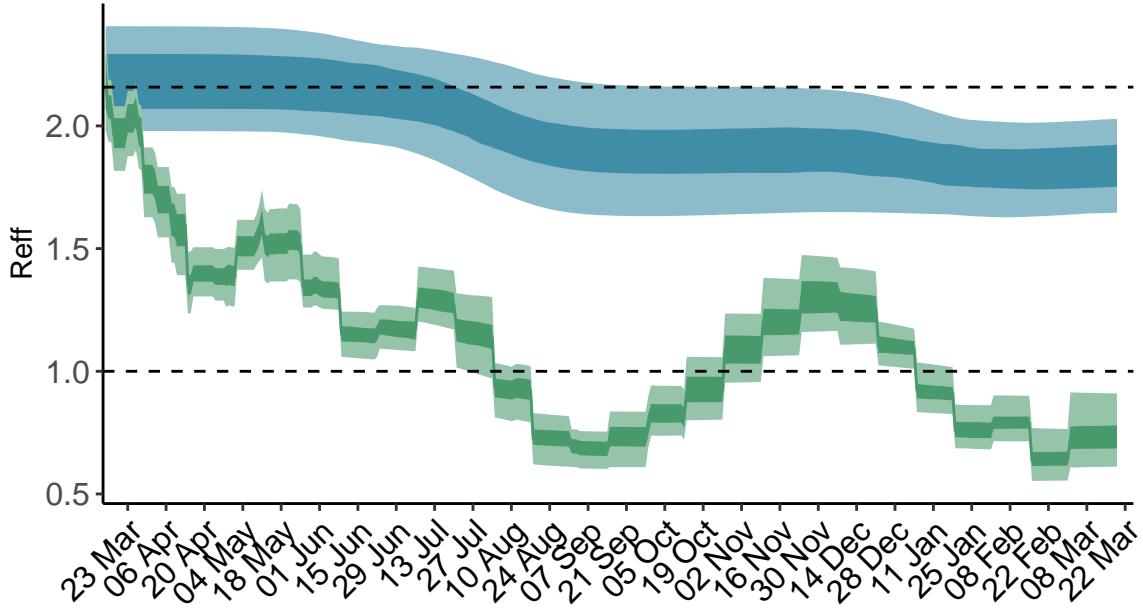


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

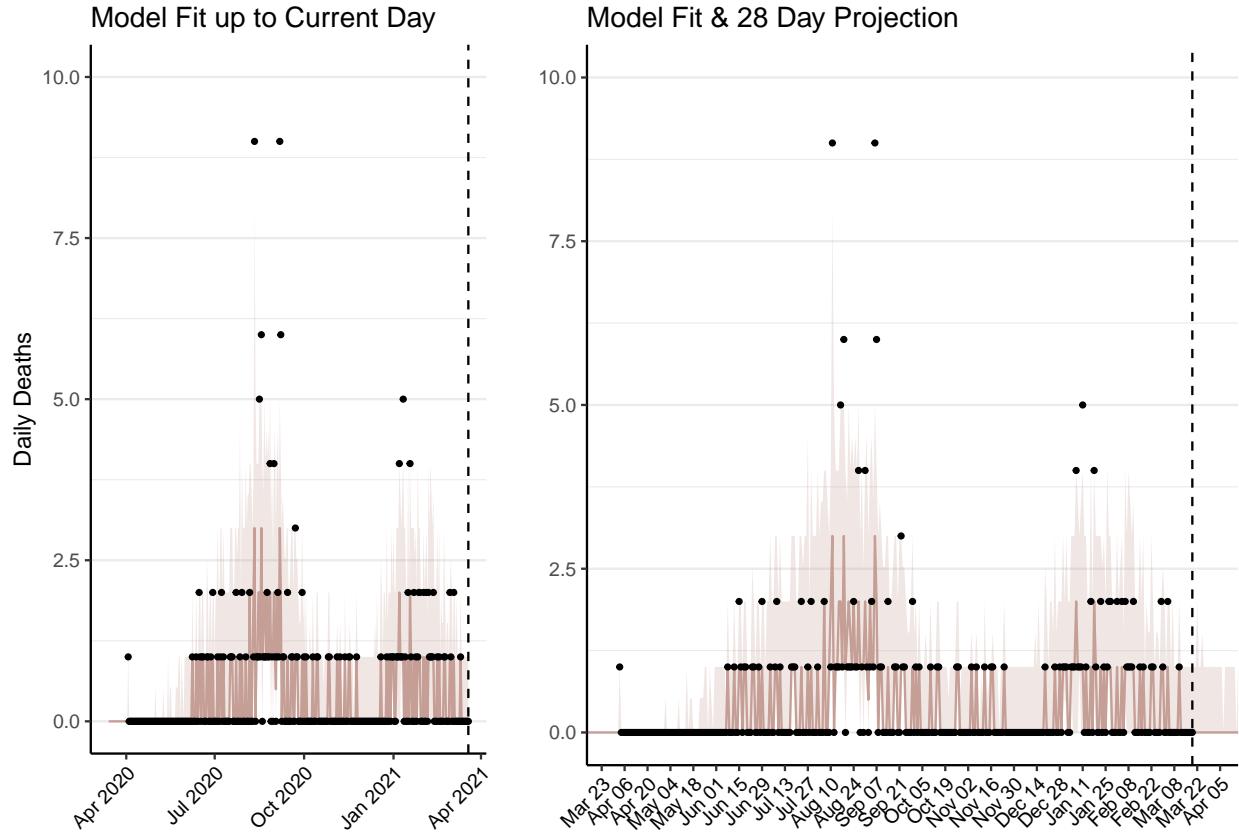


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 4-6) patients requiring treatment with high-pressure oxygen at the current date to 2 (95% CI: 2-3) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

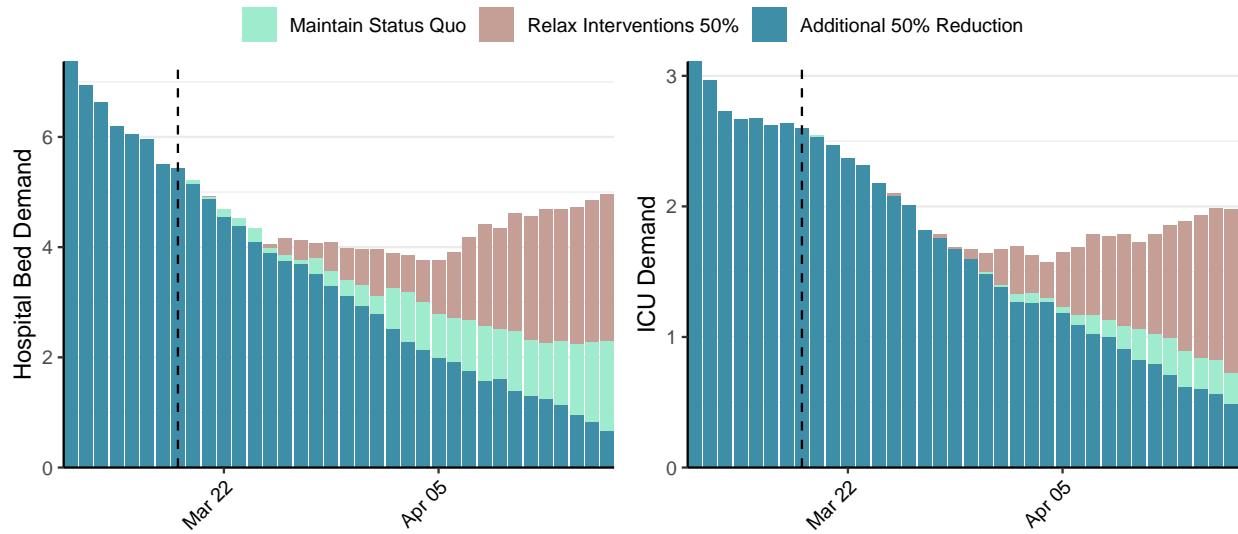


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 38 (95% CI: 30-45) at the current date to 1 (95% CI: 1-2) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 38 (95% CI: 30-45) at the current date to 76 (95% CI: 52-100) by 2021-04-16.

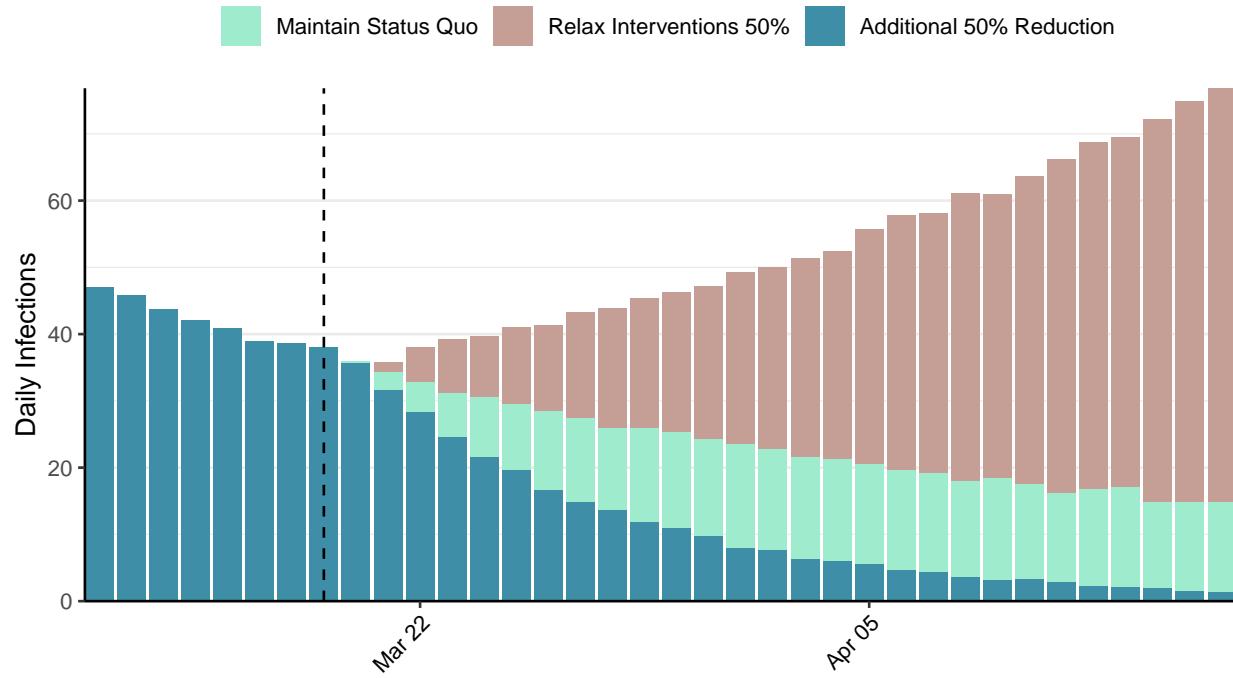


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Eswatini, 2021-03-19

[Download the report for Eswatini, 2021-03-19 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}
17,274	7	664	0	0.51 (95% CI: 0.39-0.66)

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.

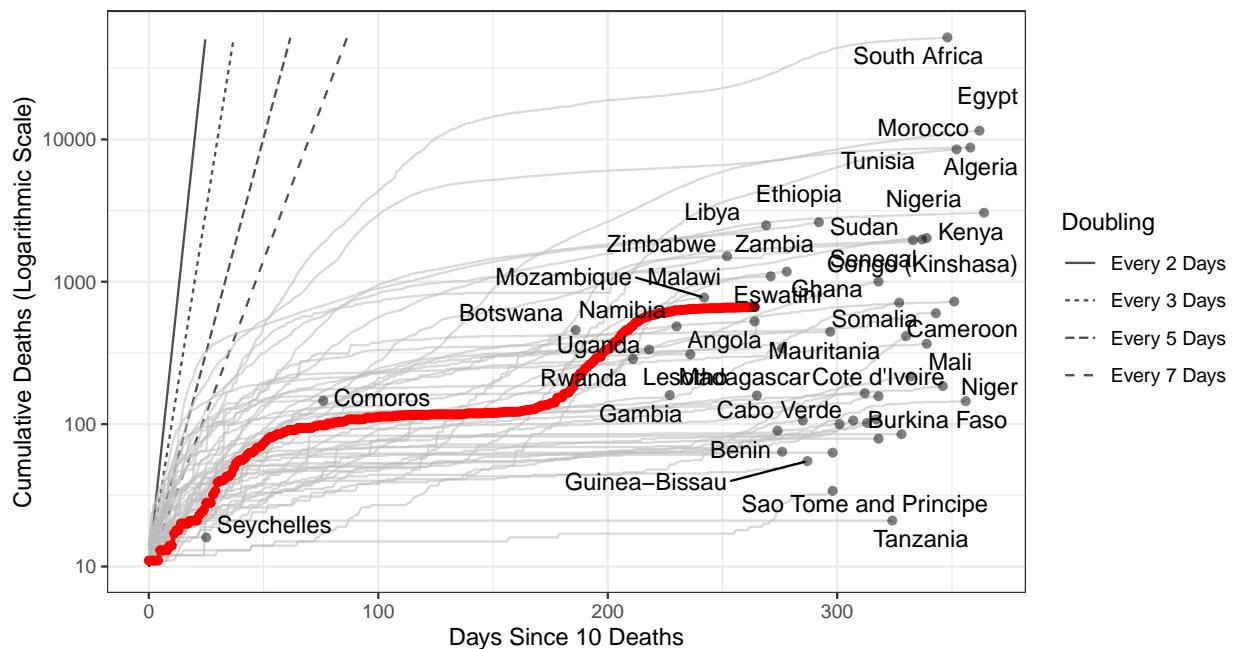


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 2,636 (95% CI: 2,470-2,801) 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).

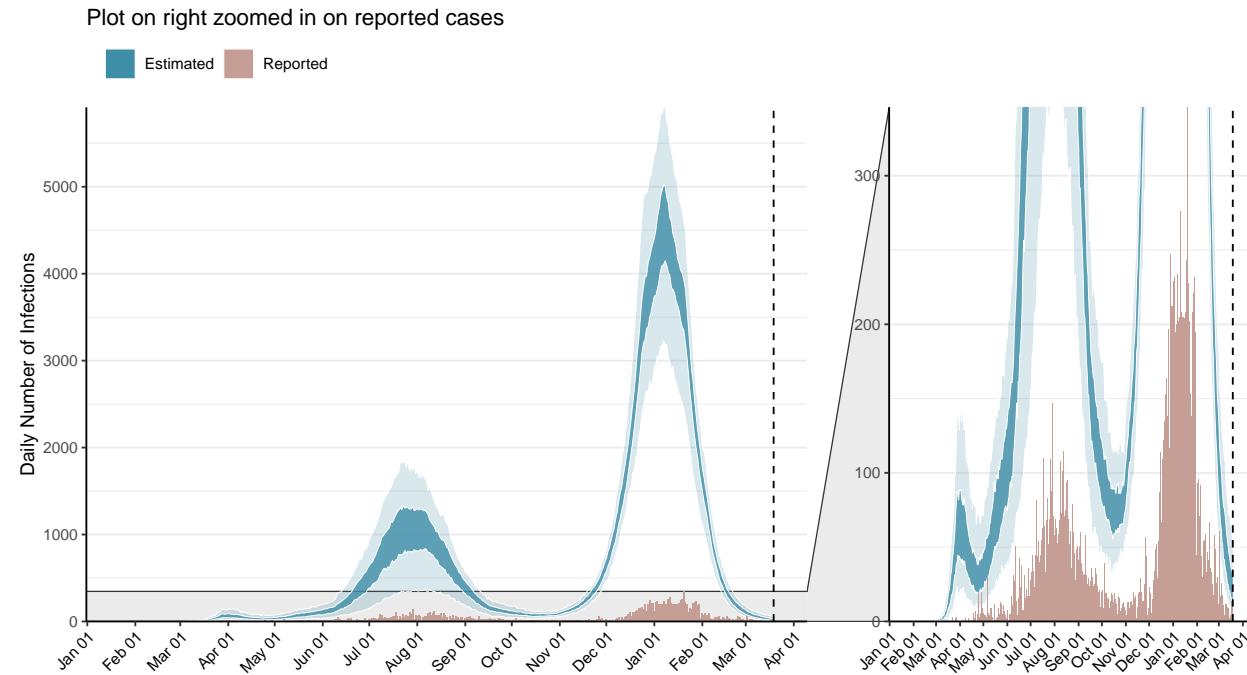


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

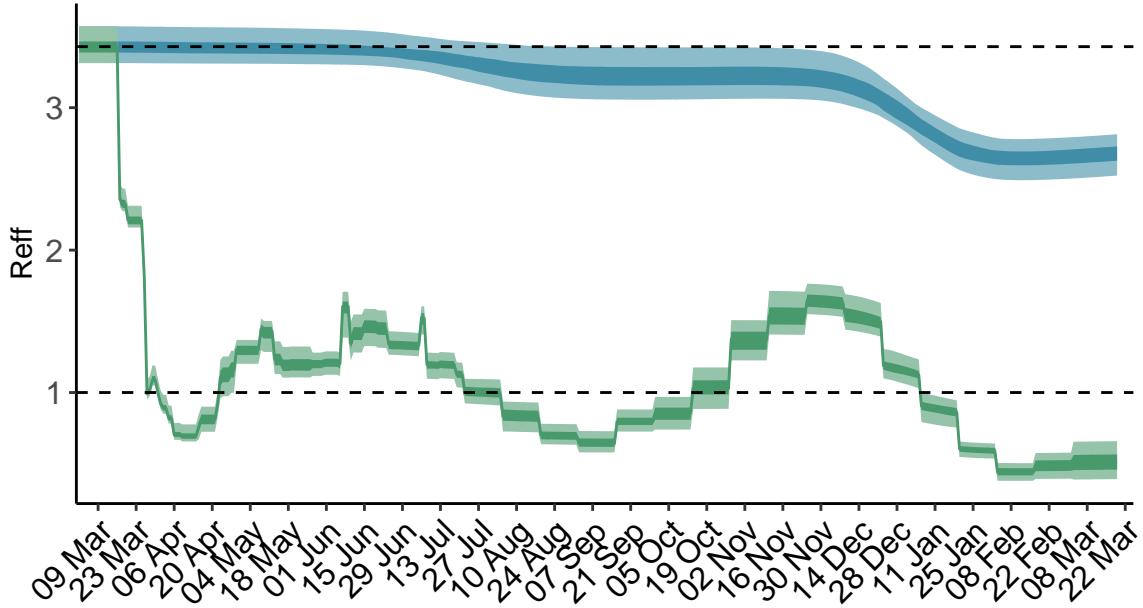


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

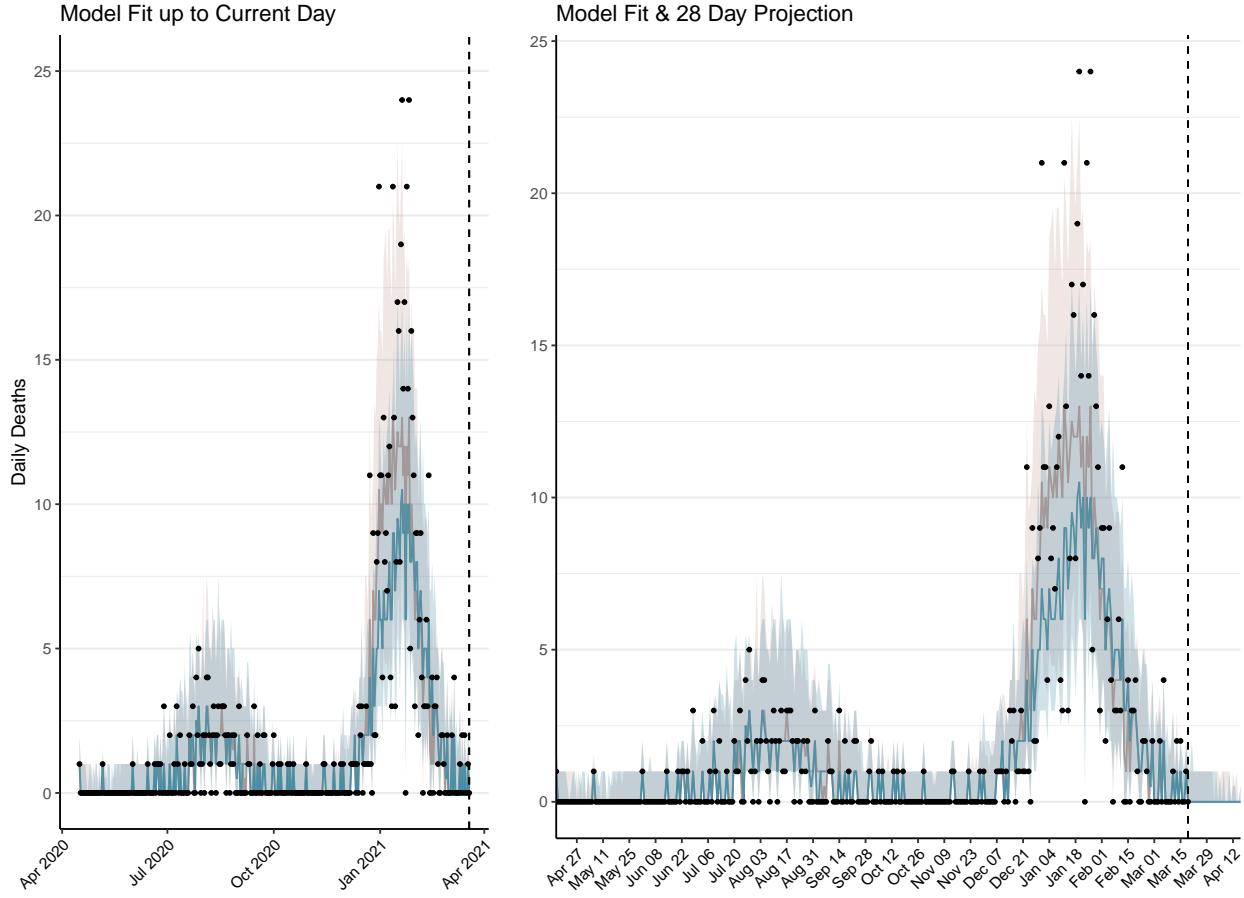


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 7 (95% CI: 6-7) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 1-1) hospital beds being required on 2021-04-16 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: 3-4) patients requiring treatment with mechanical ventilation at the current date to 0 (95% CI: 0-1) by 2021-04-16. 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.**

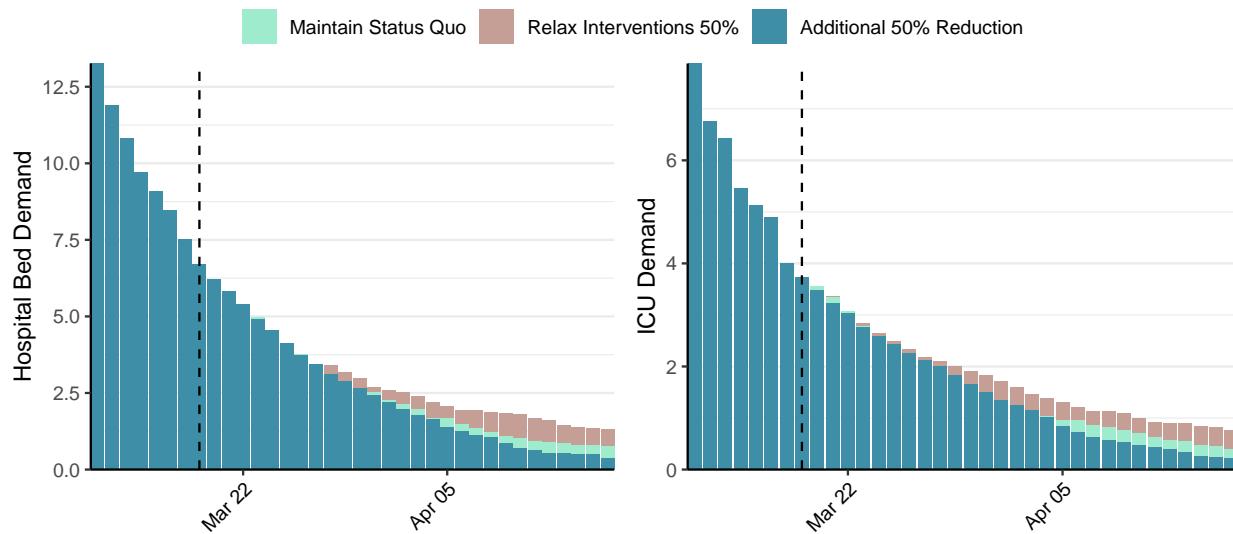


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 24 (95% CI: 21-27) at the current date to 0 (95% CI: 0-1) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 24 (95% CI: 21-27) at the current date to 13 (95% CI: 9-16) by 2021-04-16.

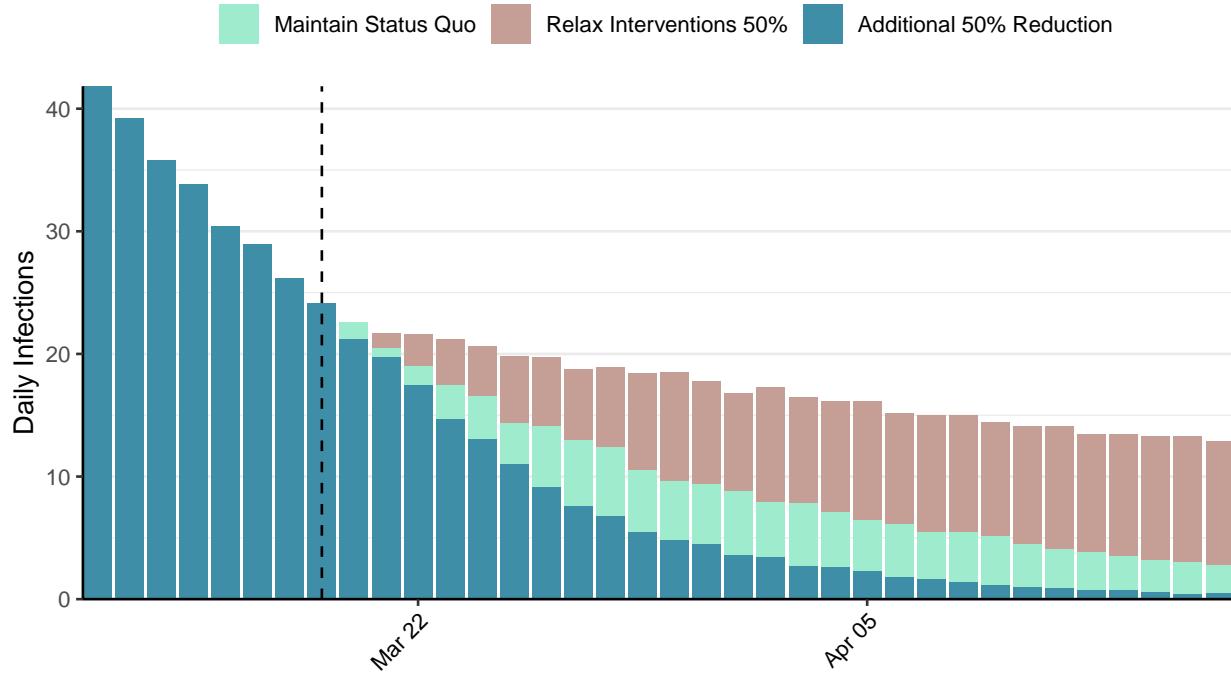


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for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

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Situation Report for COVID-19: Syria, 2021-03-19

[Download the report for Syria, 2021-03-19 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}
17,077	152	1,141	11	1.18 (95% CI: 1.03-1.32)

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.

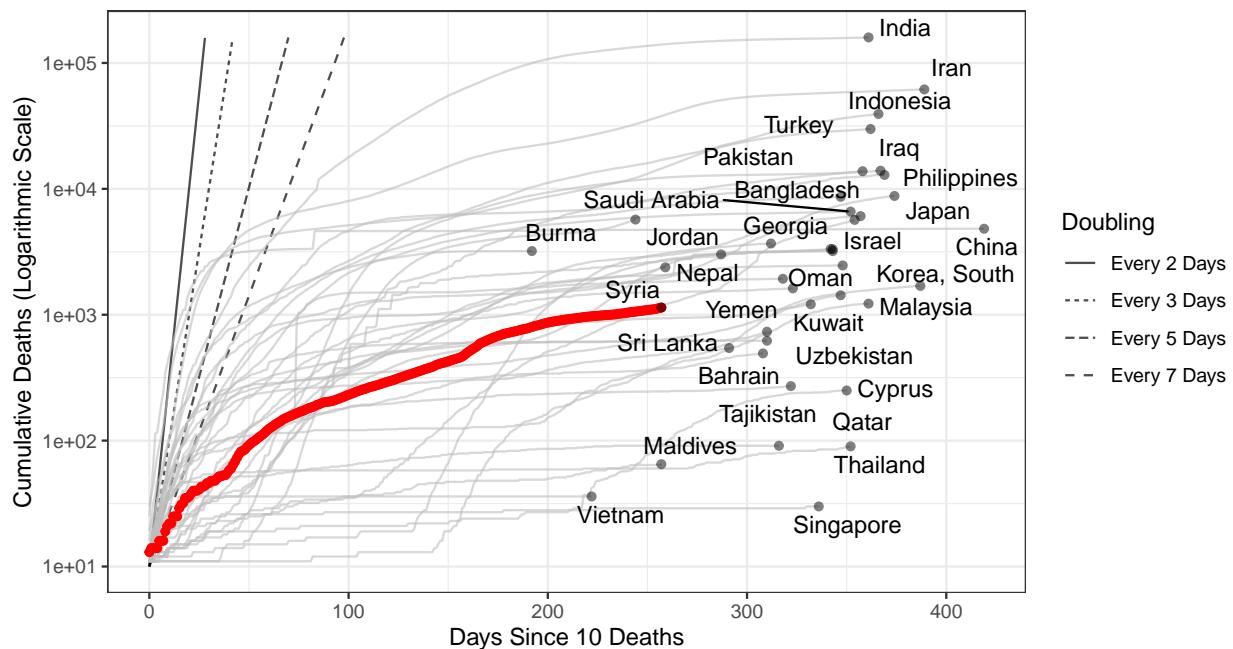


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 95,598 (95% CI: 90,507-100,689) 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).

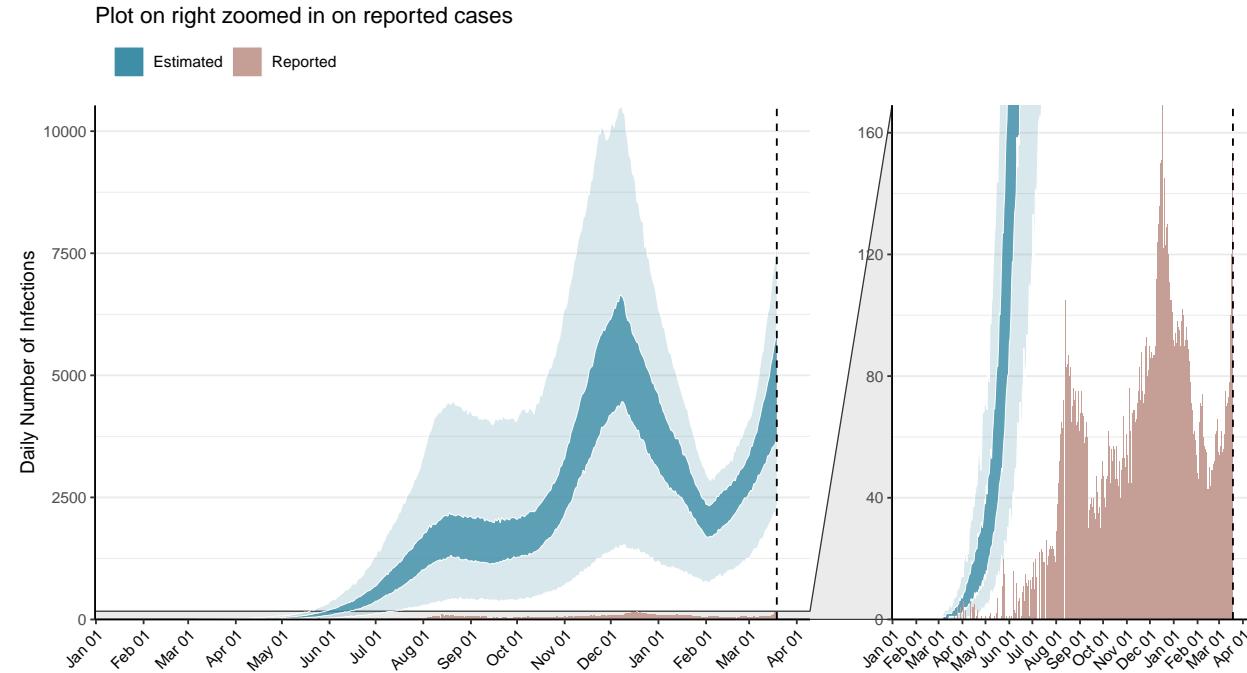


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

We are aware of under-reporting of deaths in Damascus, Syria. This is not represented in this report, but please see [Report 31](#)

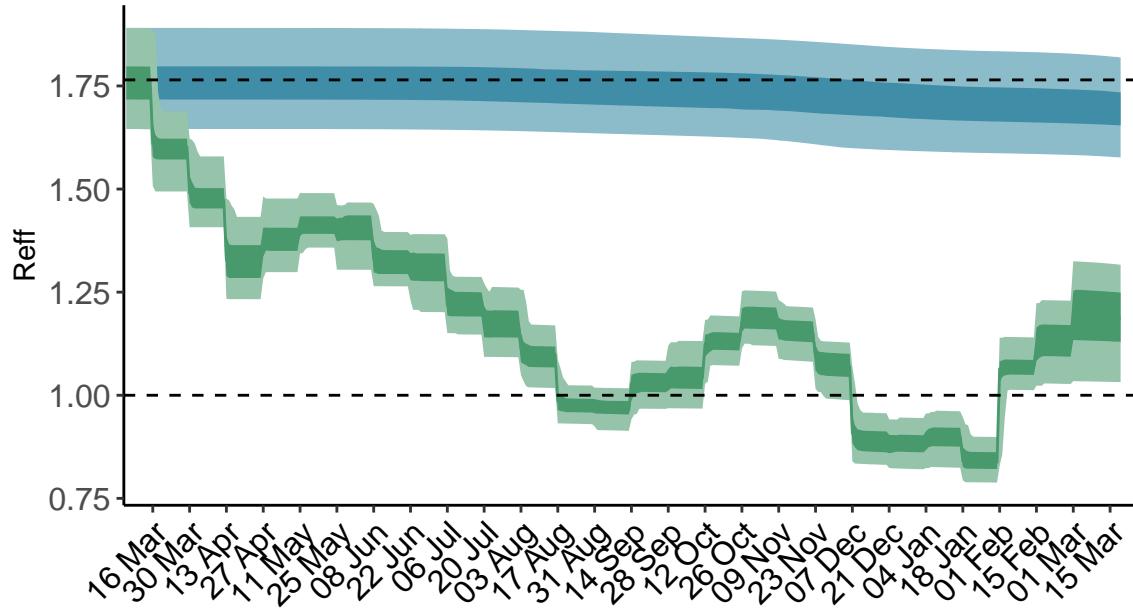


Figure 3: **Time-varying effective reproduction number, R_{eff} .** R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. **N.B. Syria 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.](#)

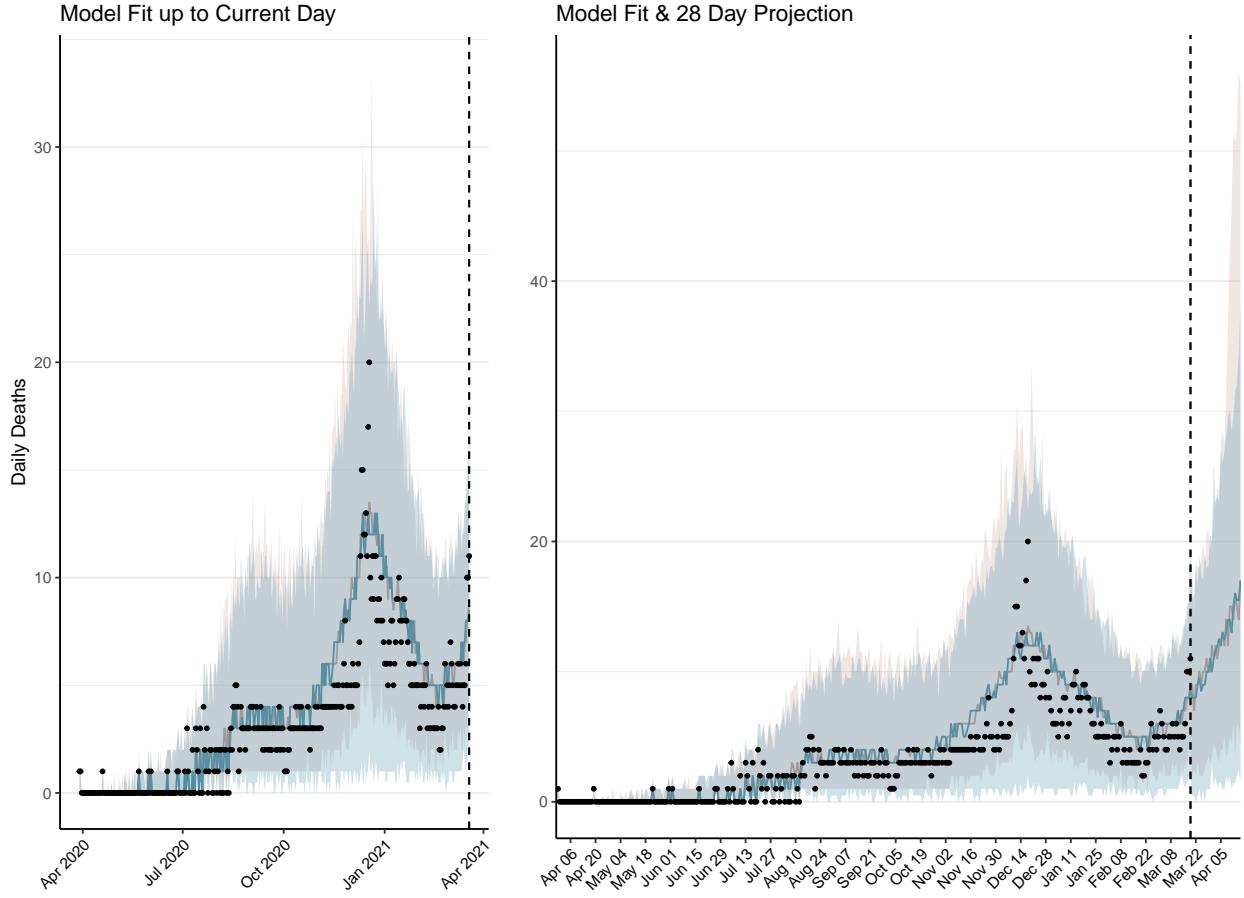


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 344 (95% CI: 325-363) patients requiring treatment with high-pressure oxygen at the current date to 754 (95% CI: 684-825) hospital beds being required on 2021-04-16 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 126 (95% CI: 119-133) patients requiring treatment with mechanical ventilation at the current date to 256 (95% CI: 237-275) by 2021-04-16. 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.**

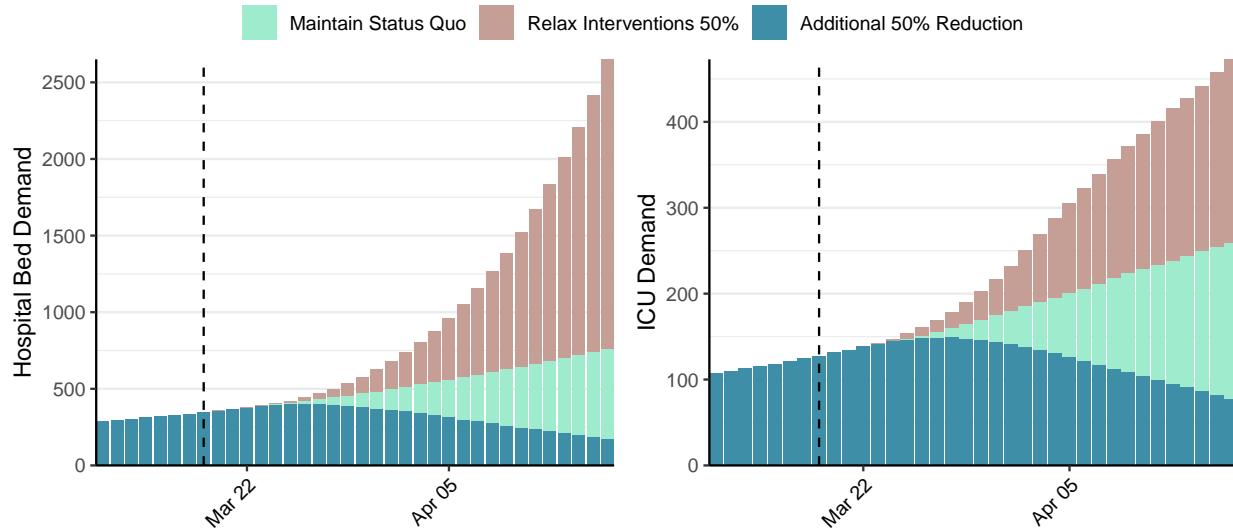


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 4,790 (95% CI: 4,475-5,105) at the current date to 762 (95% CI: 685-839) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,790 (95% CI: 4,475-5,105) at the current date to 64,822 (95% CI: 57,810-71,834) by 2021-04-16.

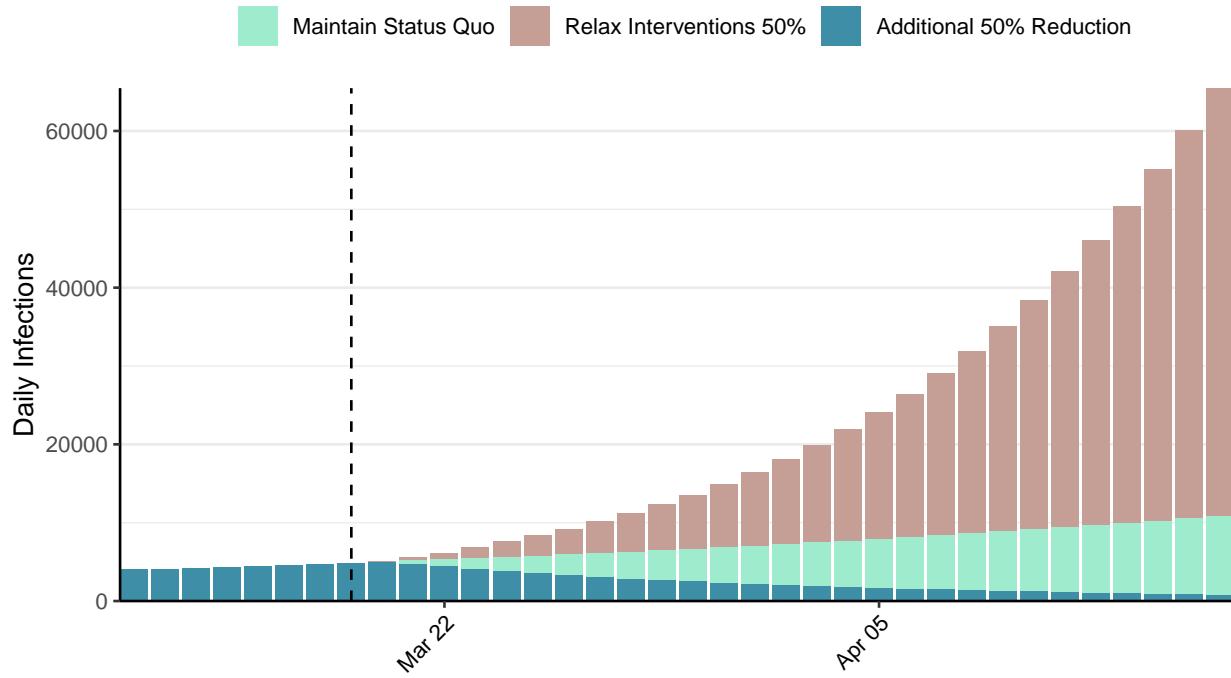


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Chad, 2021-03-19

[Download the report for Chad, 2021-03-19 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}
4,395	15	157	0	0.93 (95% CI: 0.72-1.16)

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.

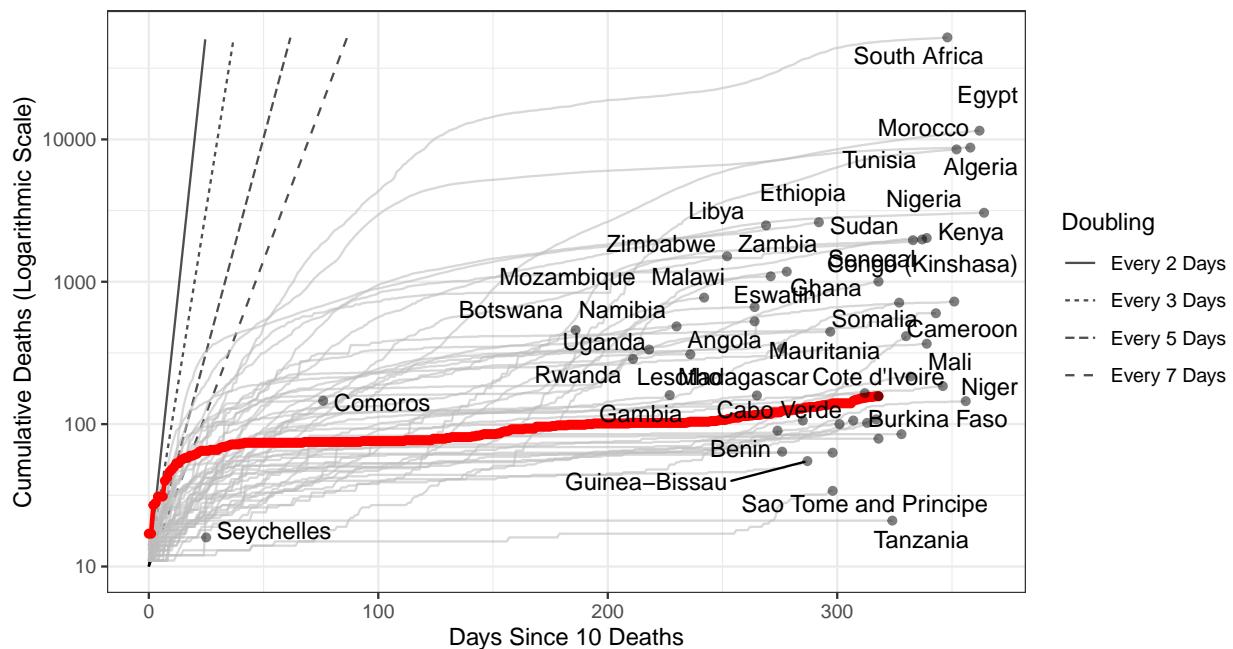


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 23,199 (95% CI: 21,358-25,040) 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).

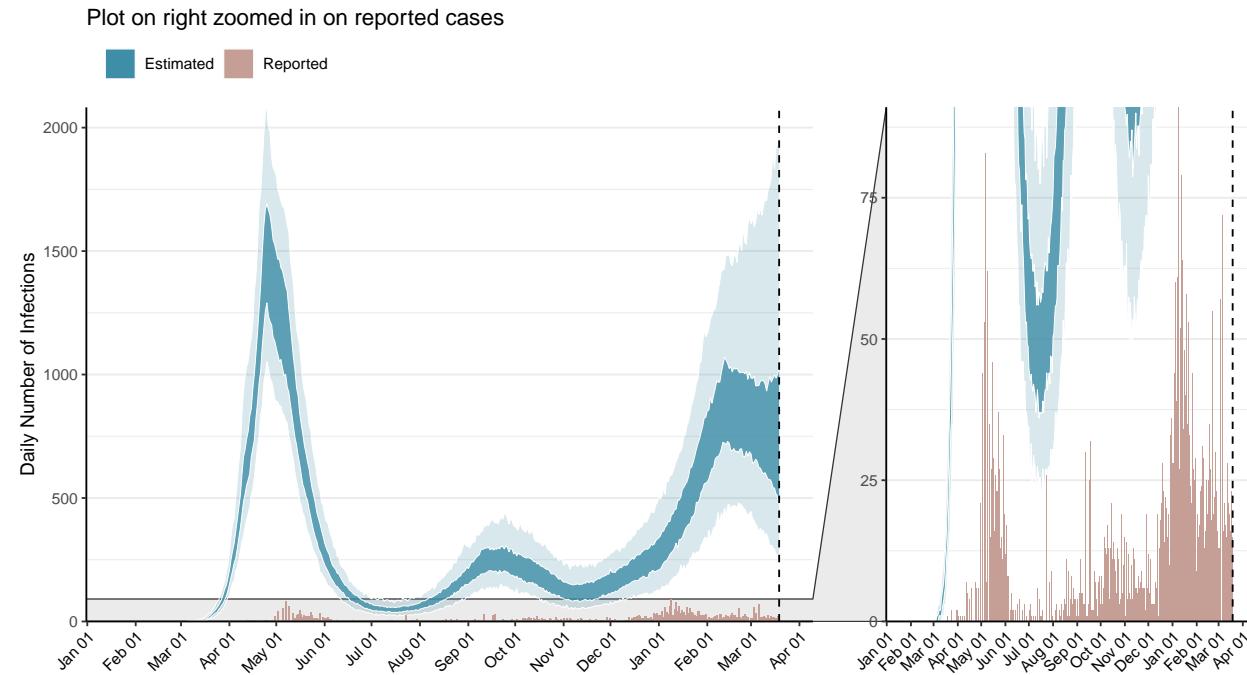


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

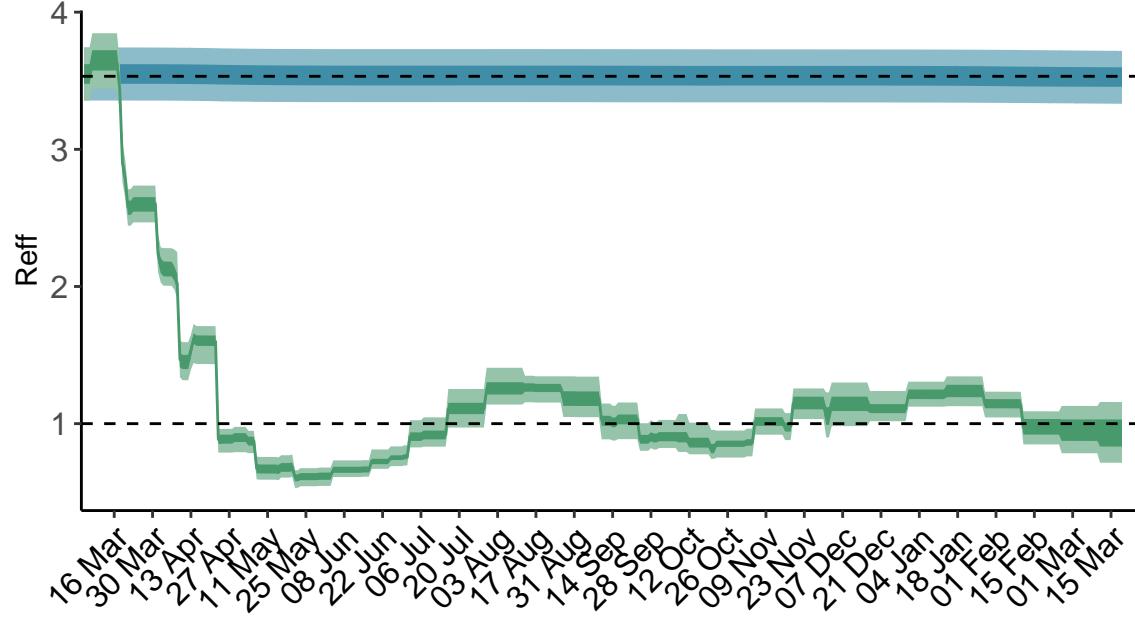


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

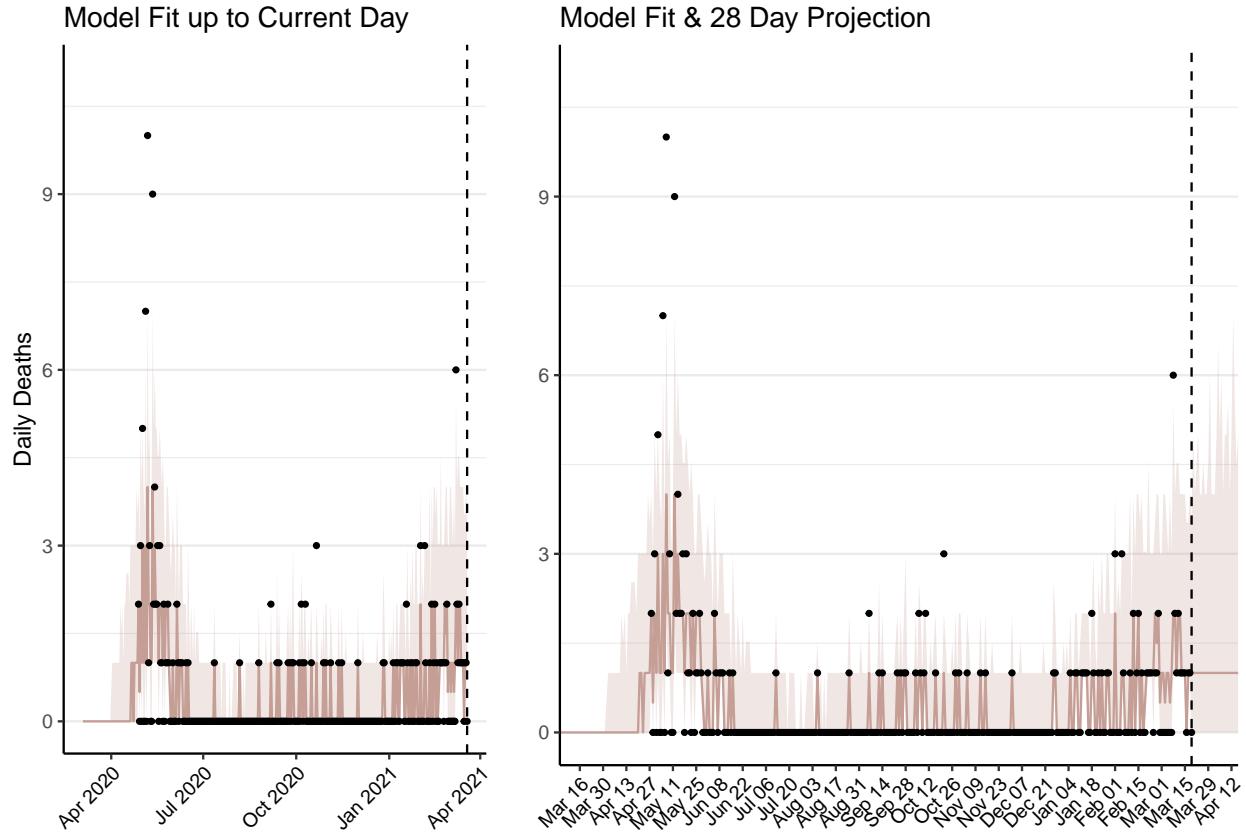


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 61 (95% CI: 55-66) patients requiring treatment with high-pressure oxygen at the current date to 59 (95% CI: 48-69) hospital beds being required on 2021-04-16 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 23 (95% CI: 21-26) patients requiring treatment with mechanical ventilation at the current date to 24 (95% CI: 20-27) by 2021-04-16. 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.**

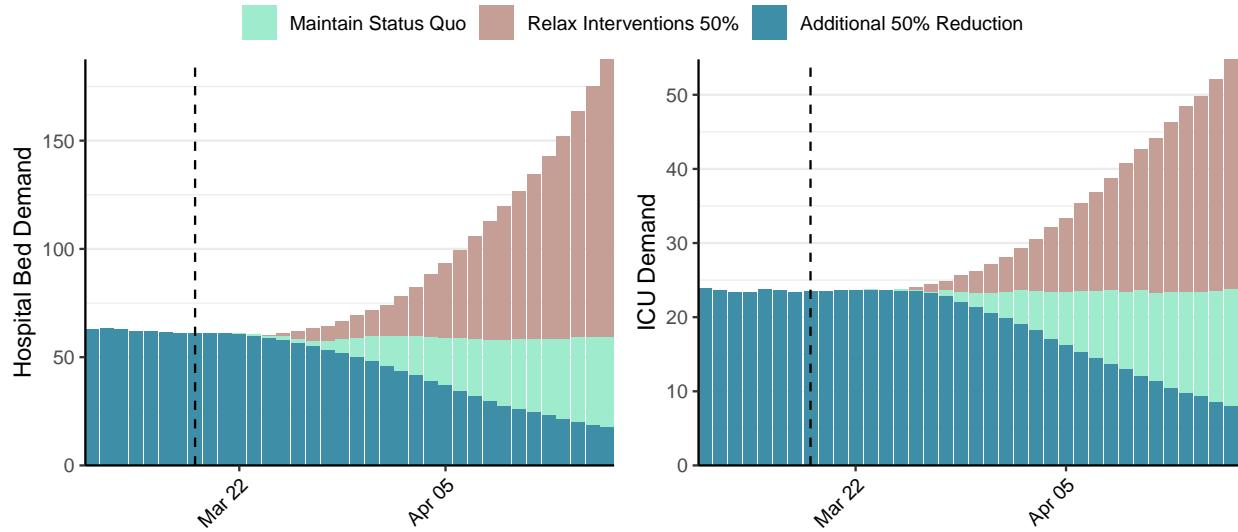


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 794 (95% CI: 705-882) at the current date to 69 (95% CI: 55-82) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 794 (95% CI: 705-882) at the current date to 4,994 (95% CI: 3,837-6,152) by 2021-04-16.

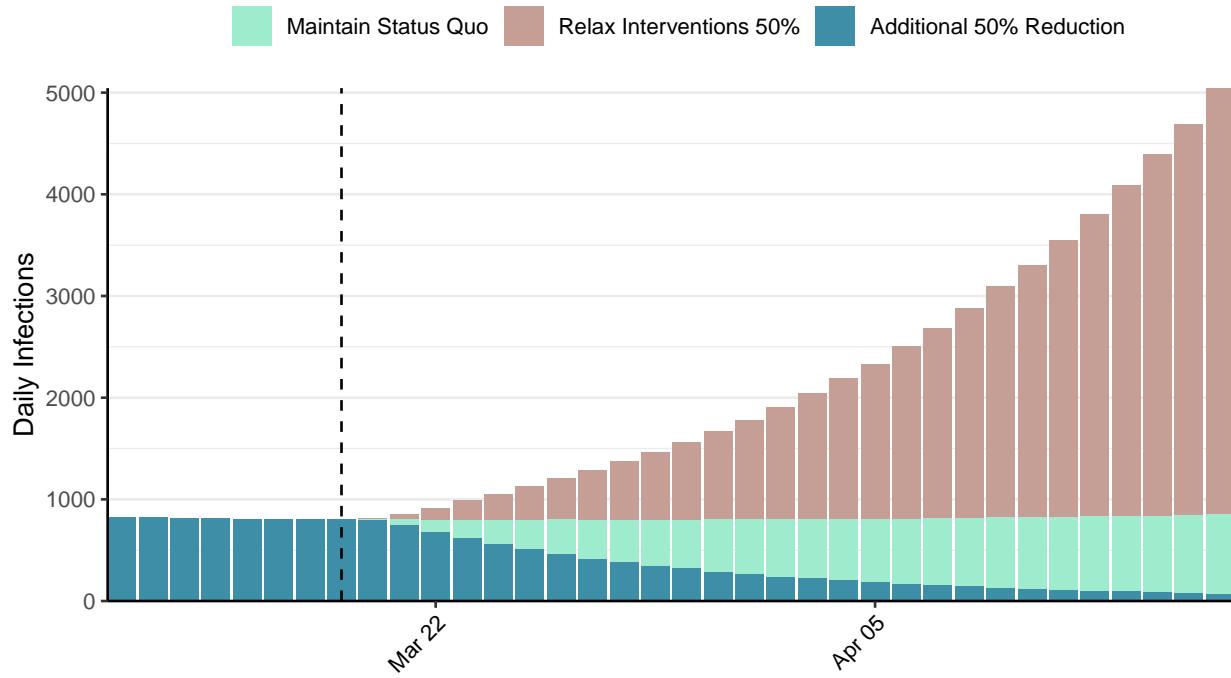


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Togo, 2021-03-19

[Download the report for Togo, 2021-03-19 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}
8,695	113	102	0	1.19 (95% CI: 0.99-1.45)

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.

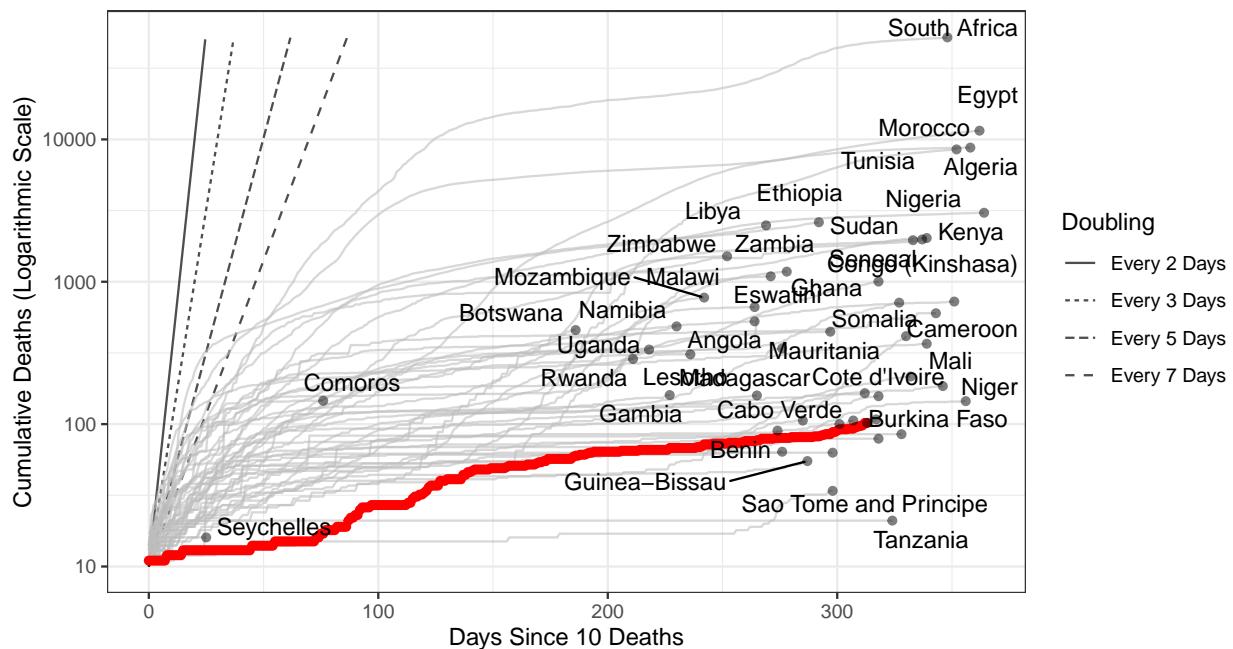


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 28,456 (95% CI: 26,246-30,666) 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).

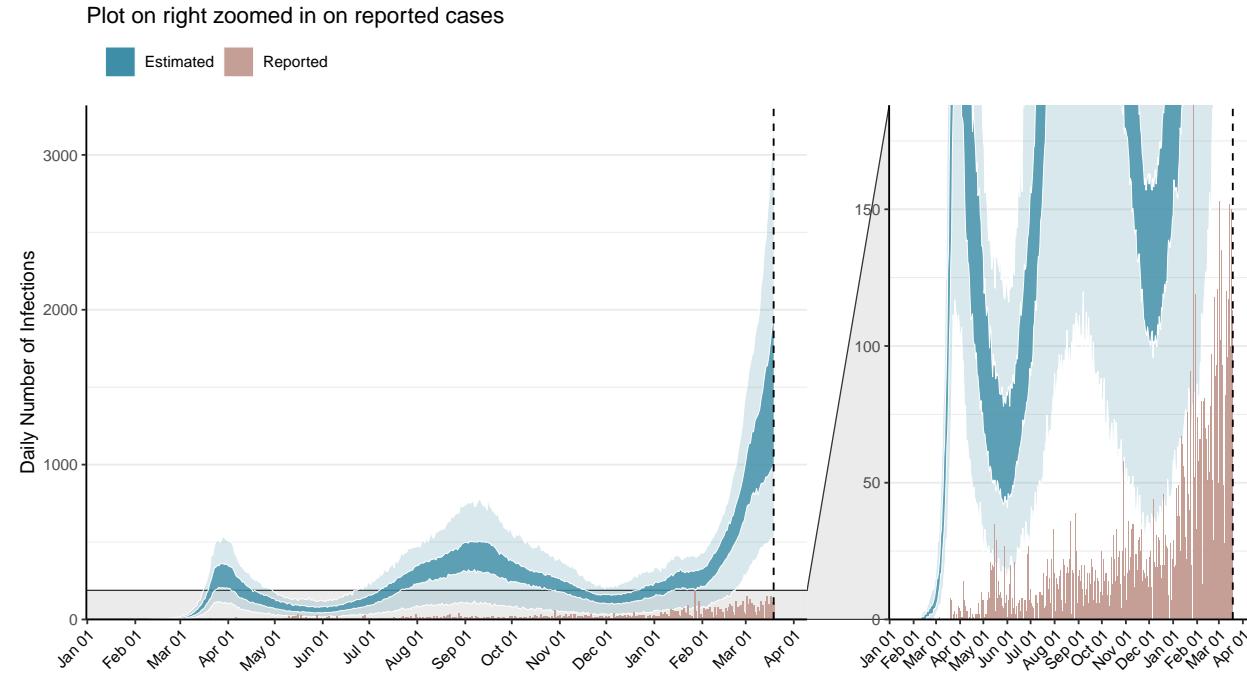


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

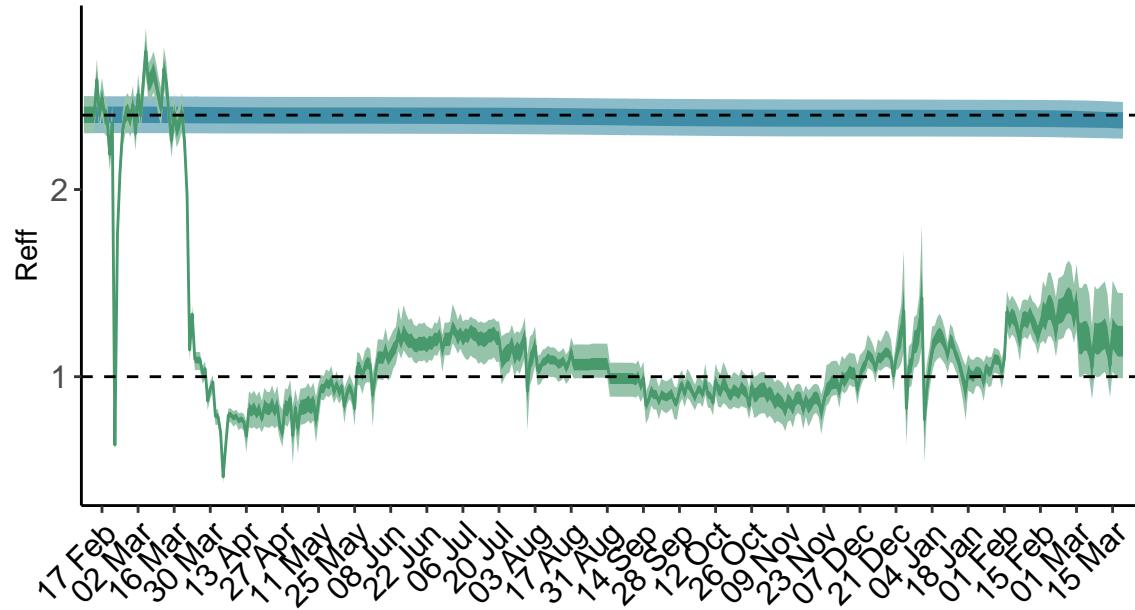


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.](#)

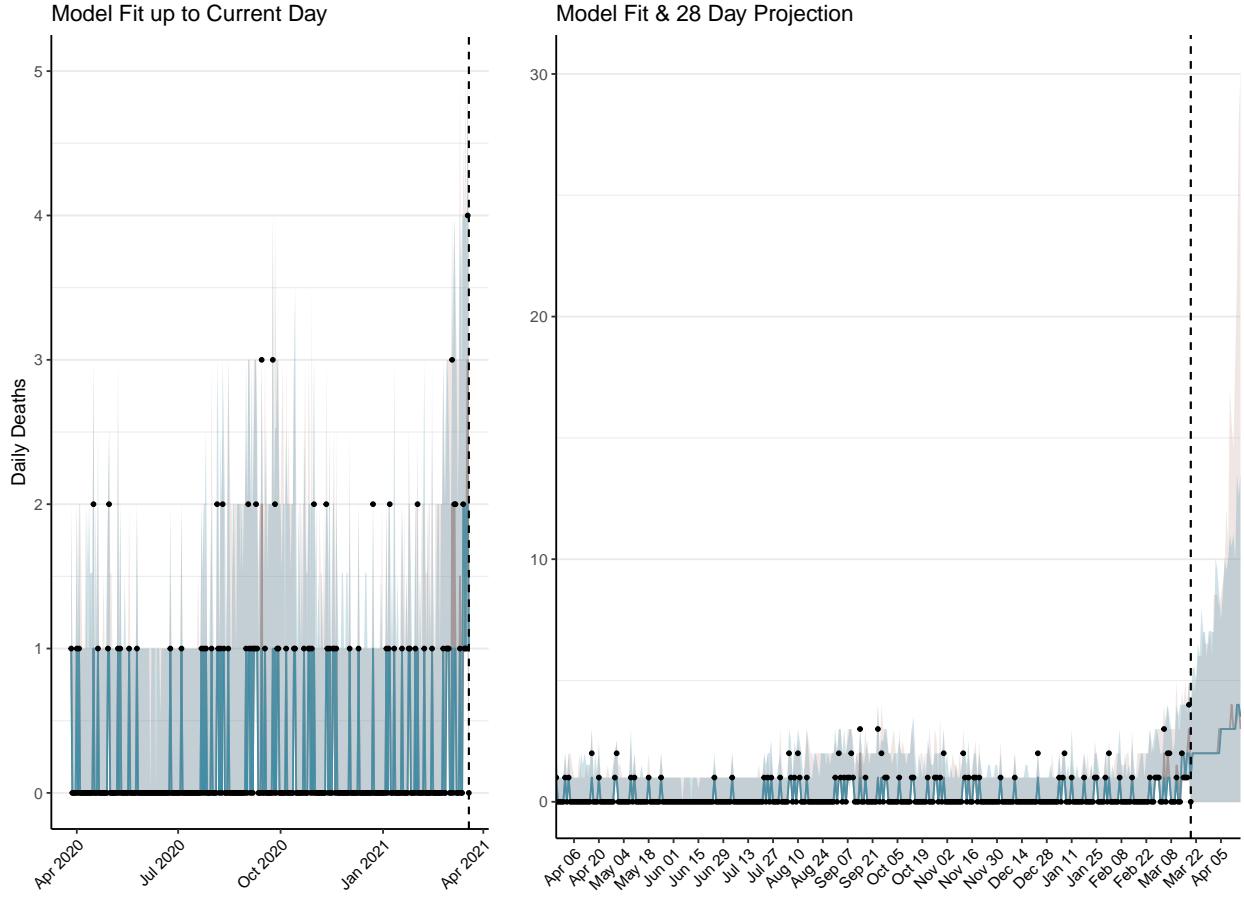


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 85 (95% CI: 78-92) patients requiring treatment with high-pressure oxygen at the current date to 218 (95% CI: 183-252) hospital beds being required on 2021-04-16 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 32 (95% CI: 29-34) patients requiring treatment with mechanical ventilation at the current date to 75 (95% CI: 66-84) by 2021-04-16. 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.**

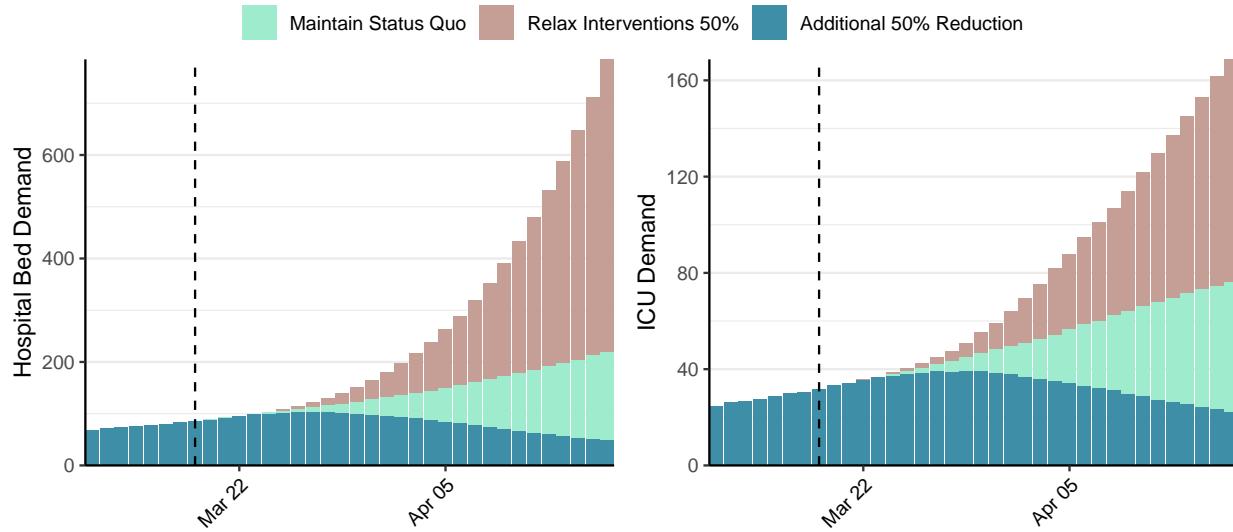


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,540 (95% CI: 1,381-1,700) at the current date to 273 (95% CI: 225-322) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,540 (95% CI: 1,381-1,700) at the current date to 24,801 (95% CI: 20,202-29,399) by 2021-04-16.

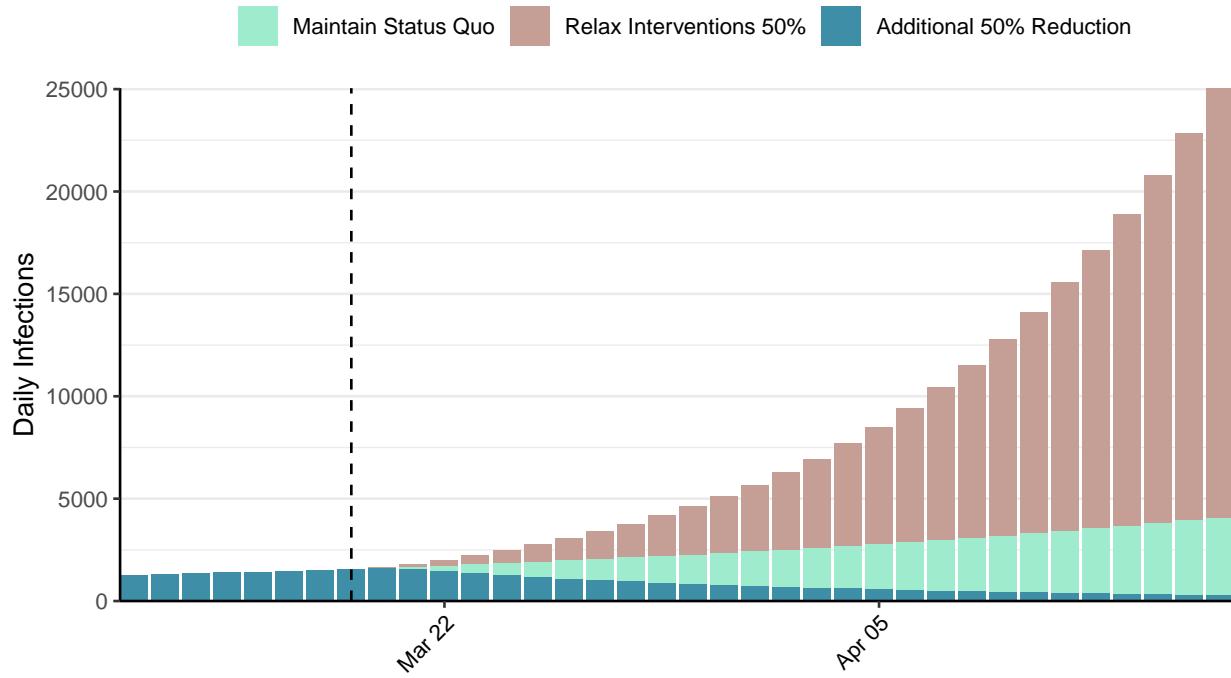


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Thailand, 2021-03-19

[Download the report for Thailand, 2021-03-19 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}
27,590	100	90	1	0.96 (95% CI: 0.75-1.17)

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.

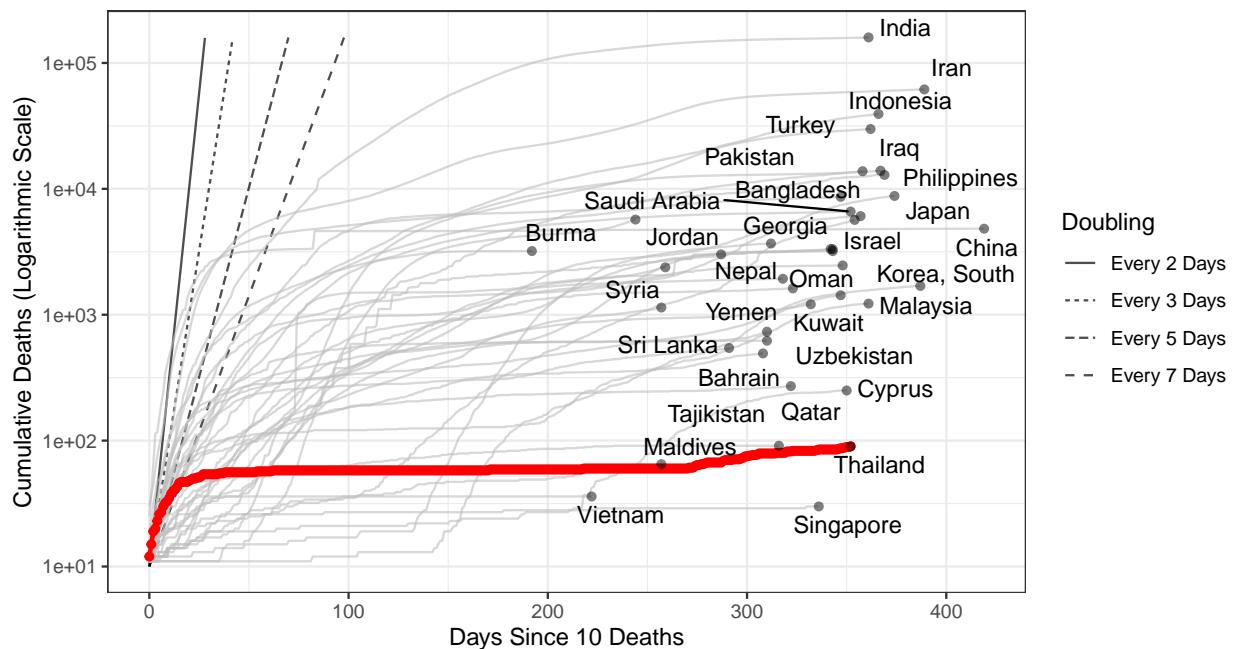


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 4,398 (95% CI: 2,966-5,830) 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.**

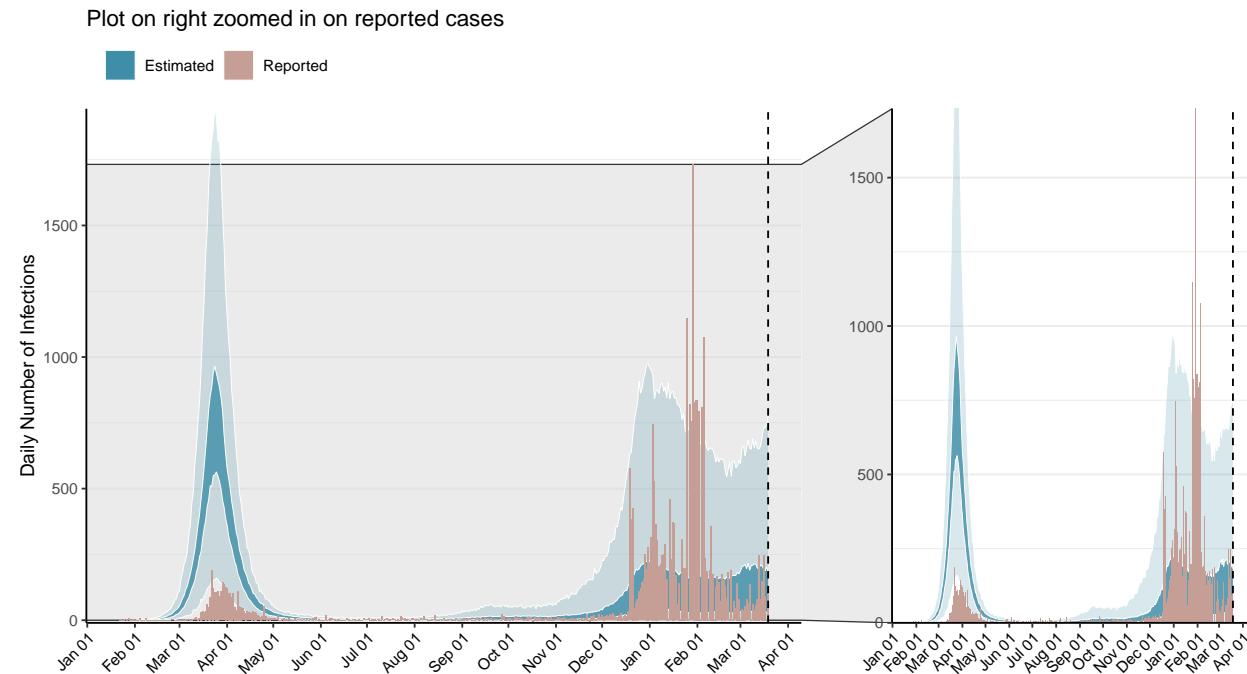


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

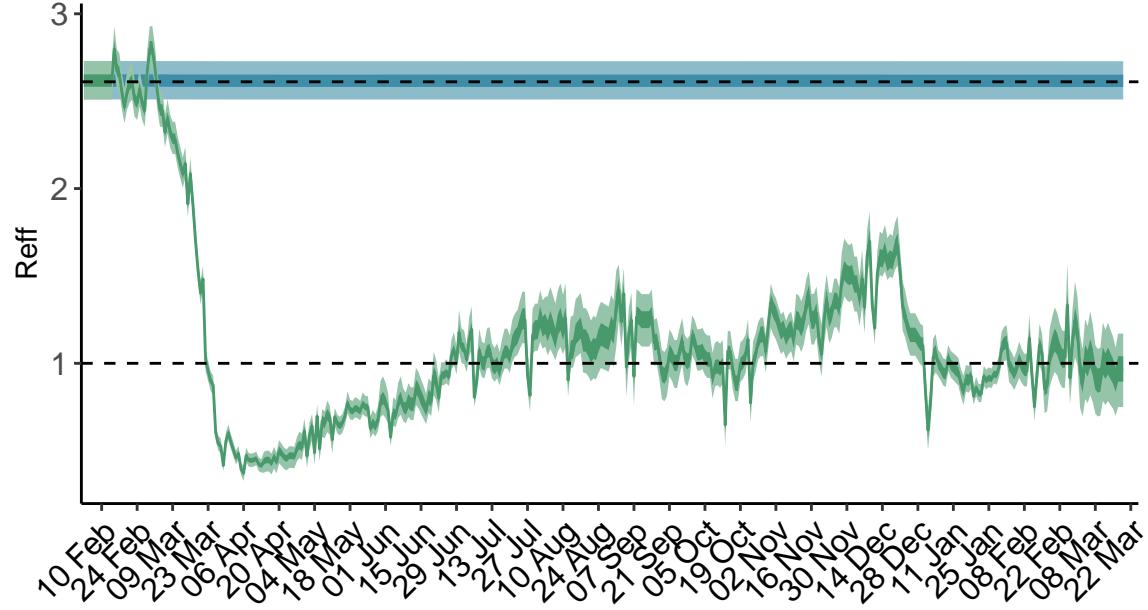


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

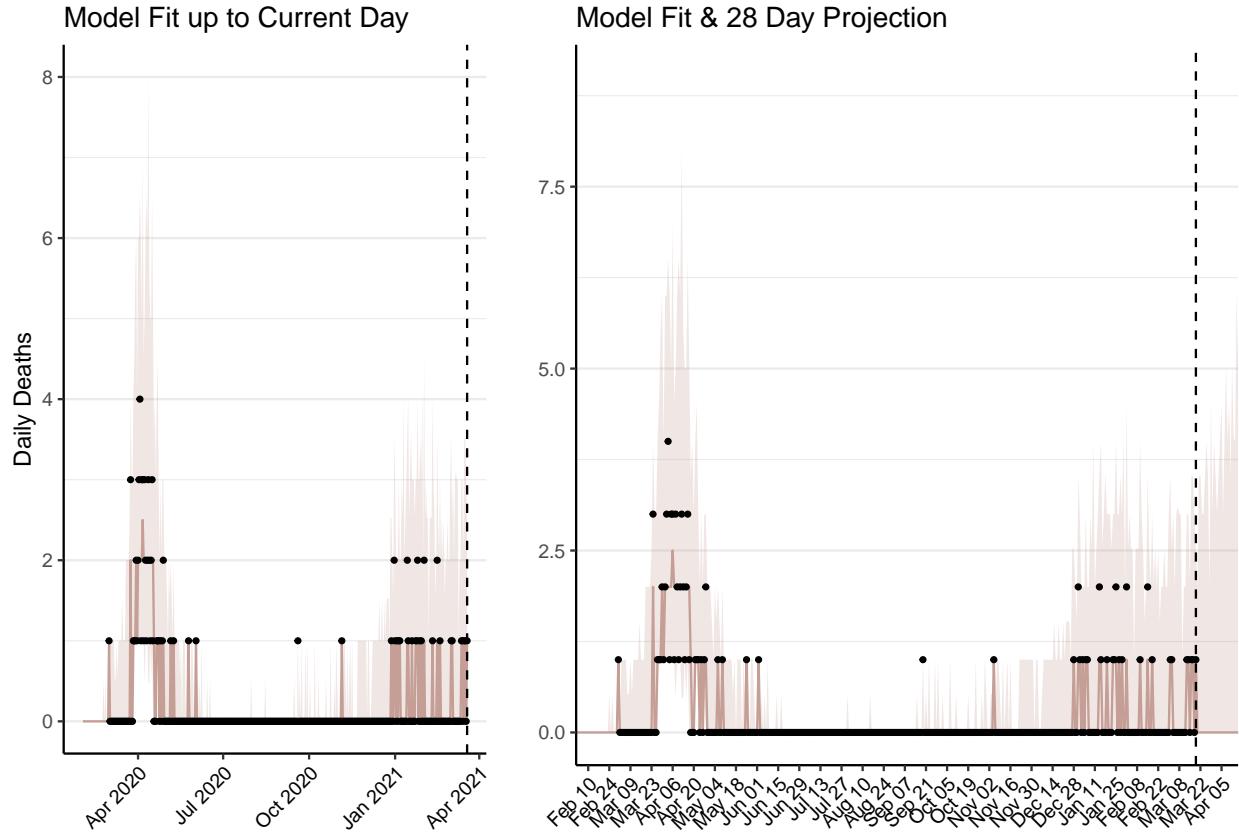


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 16-30) patients requiring treatment with high-pressure oxygen at the current date to 30 (95% CI: 18-42) hospital beds being required on 2021-04-16 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: 6-12) patients requiring treatment with mechanical ventilation at the current date to 11 (95% CI: 7-15) by 2021-04-16. 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.**

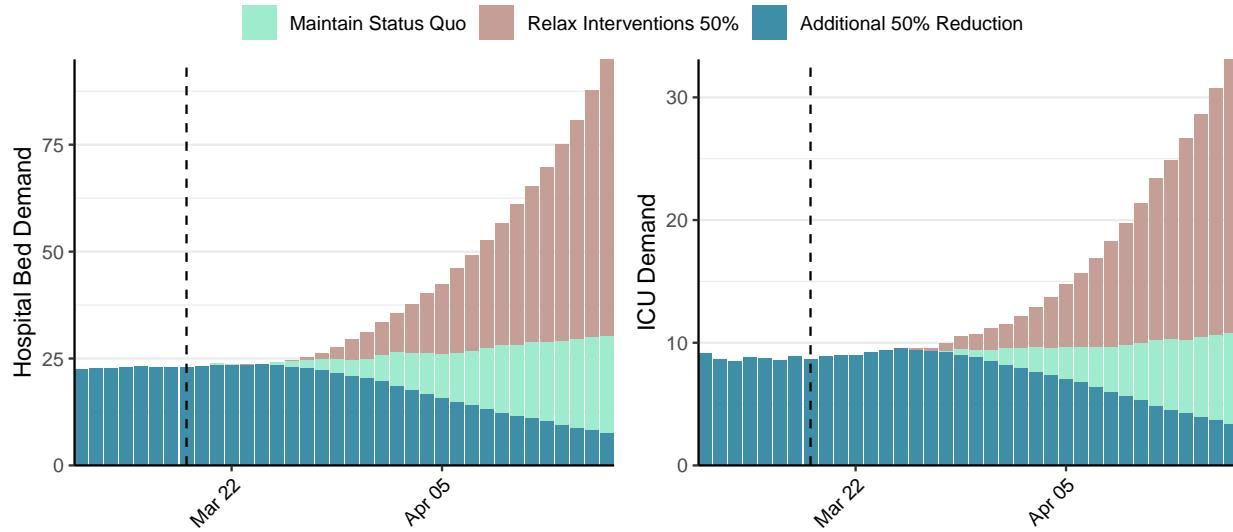


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 172 (95% CI: 110-233) at the current date to 18 (95% CI: 10-25) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 172 (95% CI: 110-233) at the current date to 1,430 (95% CI: 762-2,099) by 2021-04-16.

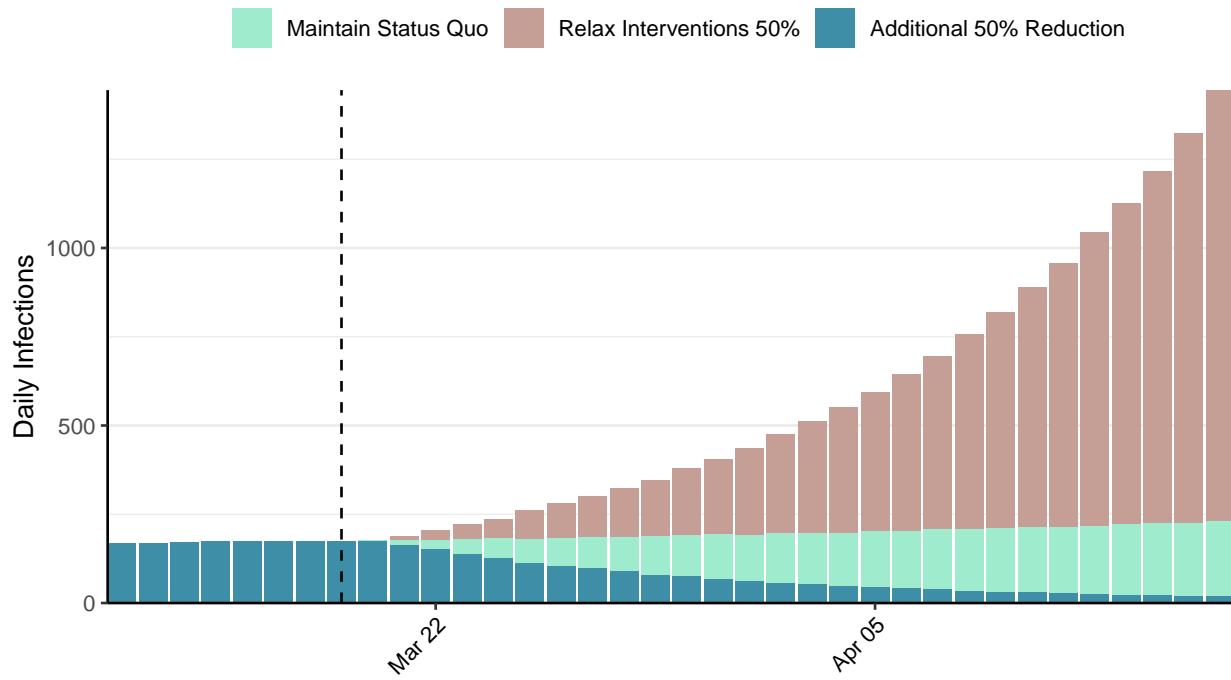


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Tajikistan, 2021-03-19

[Download the report for Tajikistan, 2021-03-19 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}
13,308	0	91	0	0.72 (95% CI: 0.46-1.05)

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.

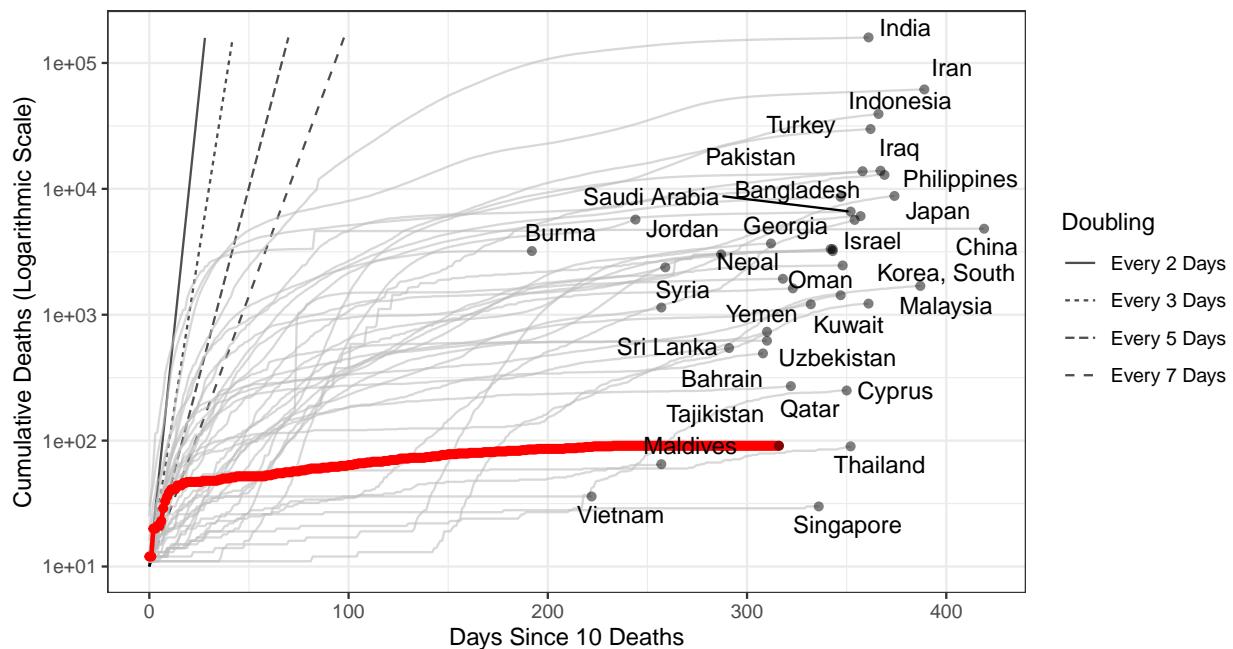


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 18 (95% CI: 10-25) 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).

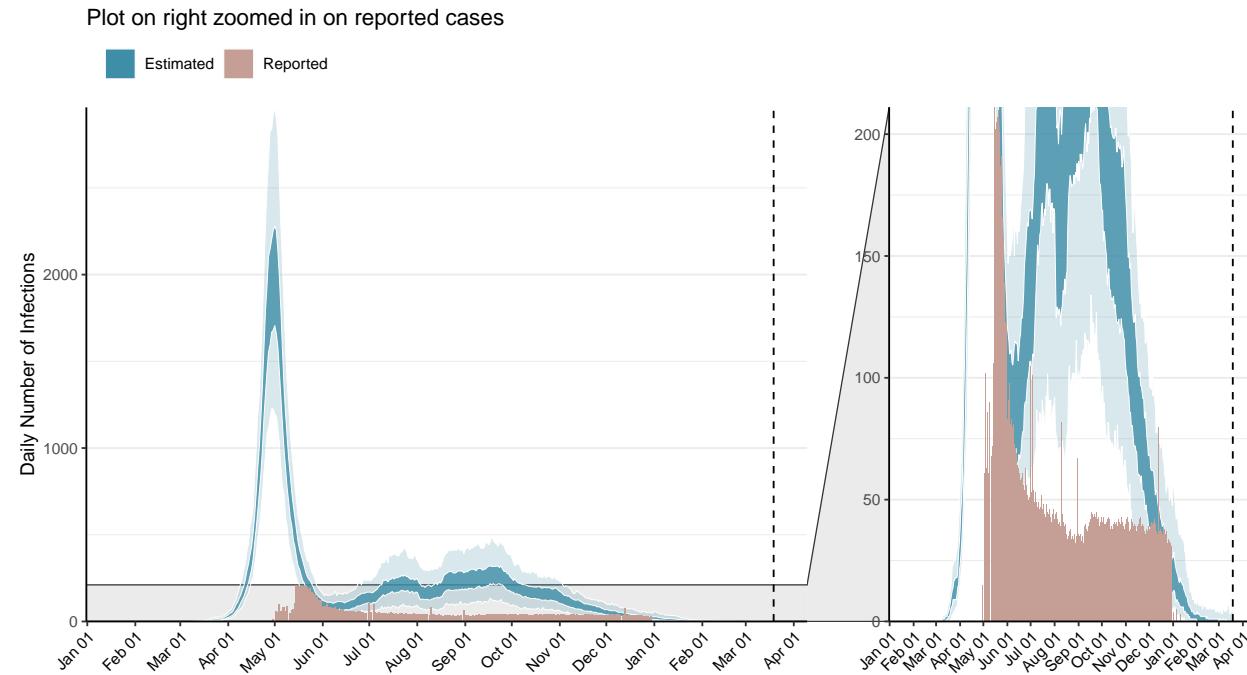


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

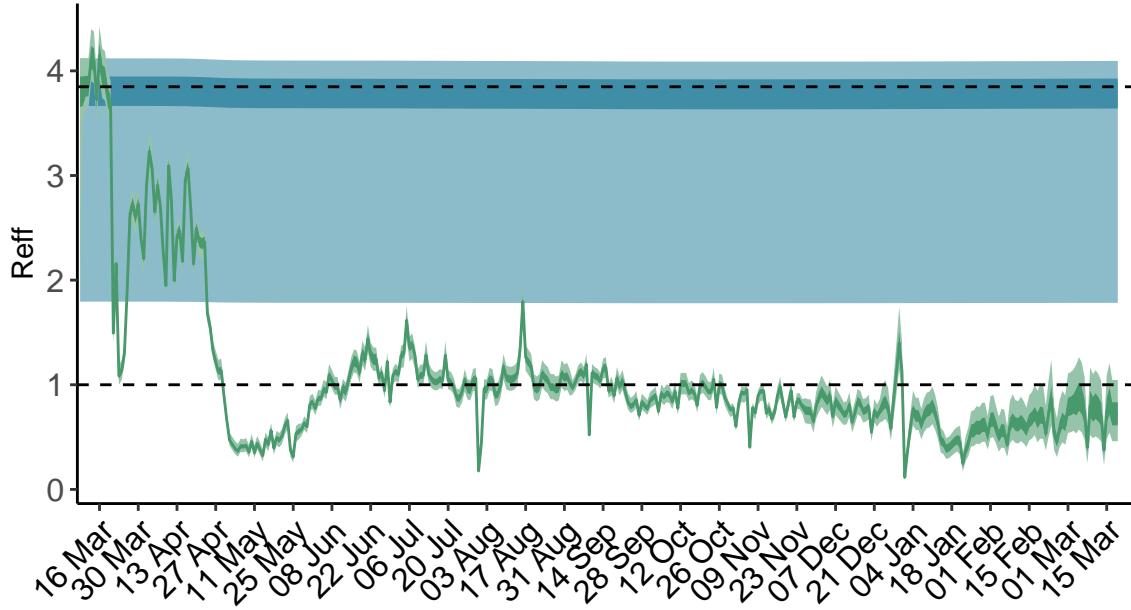


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

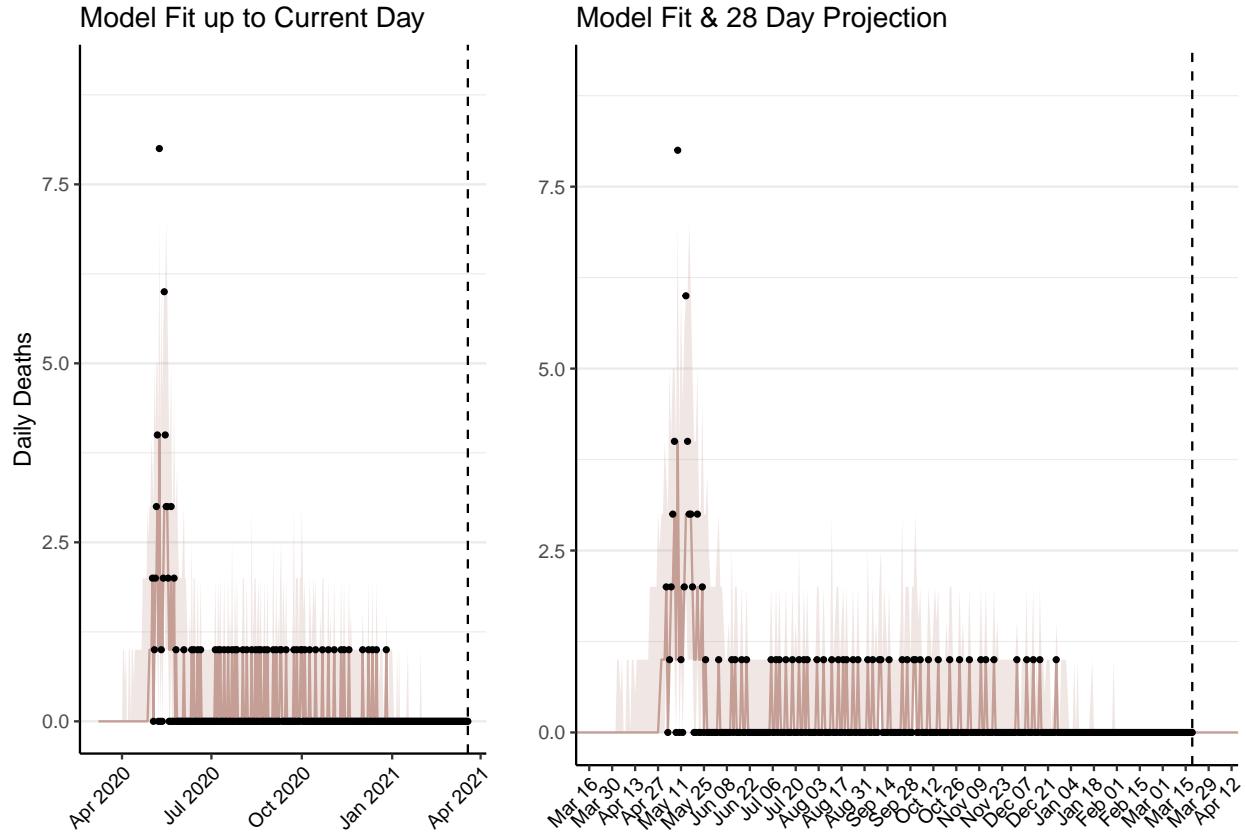


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

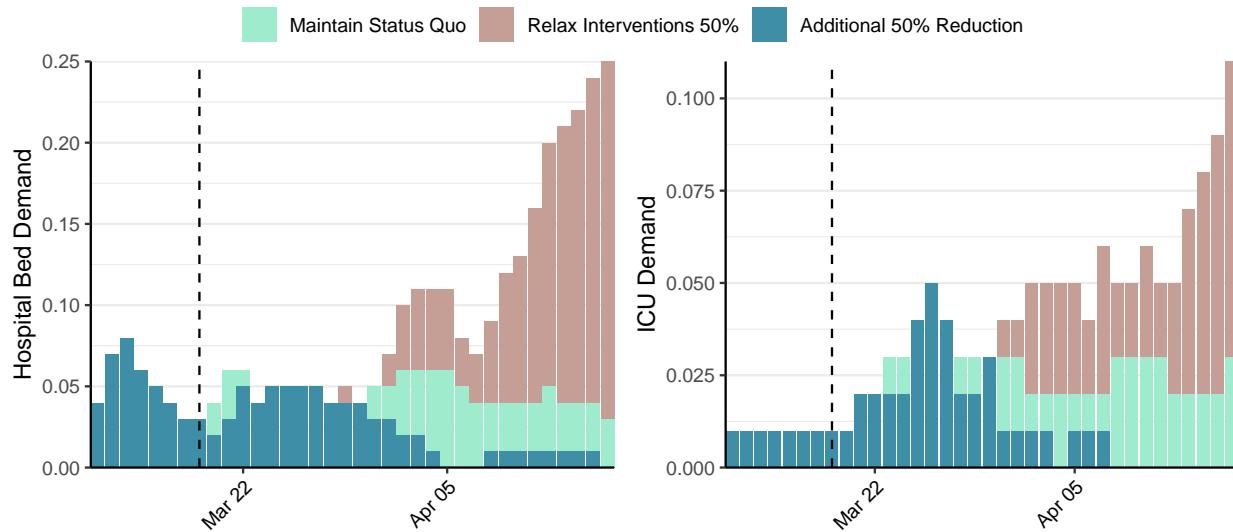


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 0-1) at the current date to 0 (95% CI: 0-0) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1 (95% CI: 0-1) at the current date to 6 (95% CI: -1-13) by 2021-04-16.

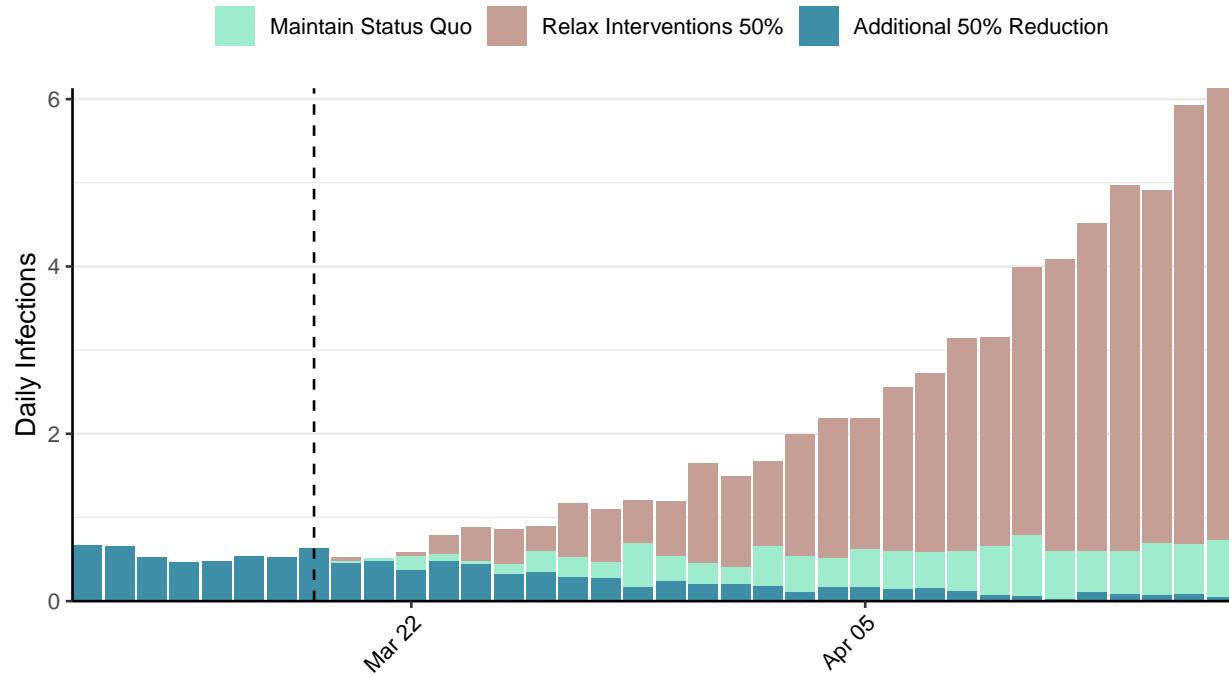


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Tunisia, 2021-03-19

[Download the report for Tunisia, 2021-03-19 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}
244,776	841	8,506	16	0.89 (95% CI: 0.79-1.02)

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.

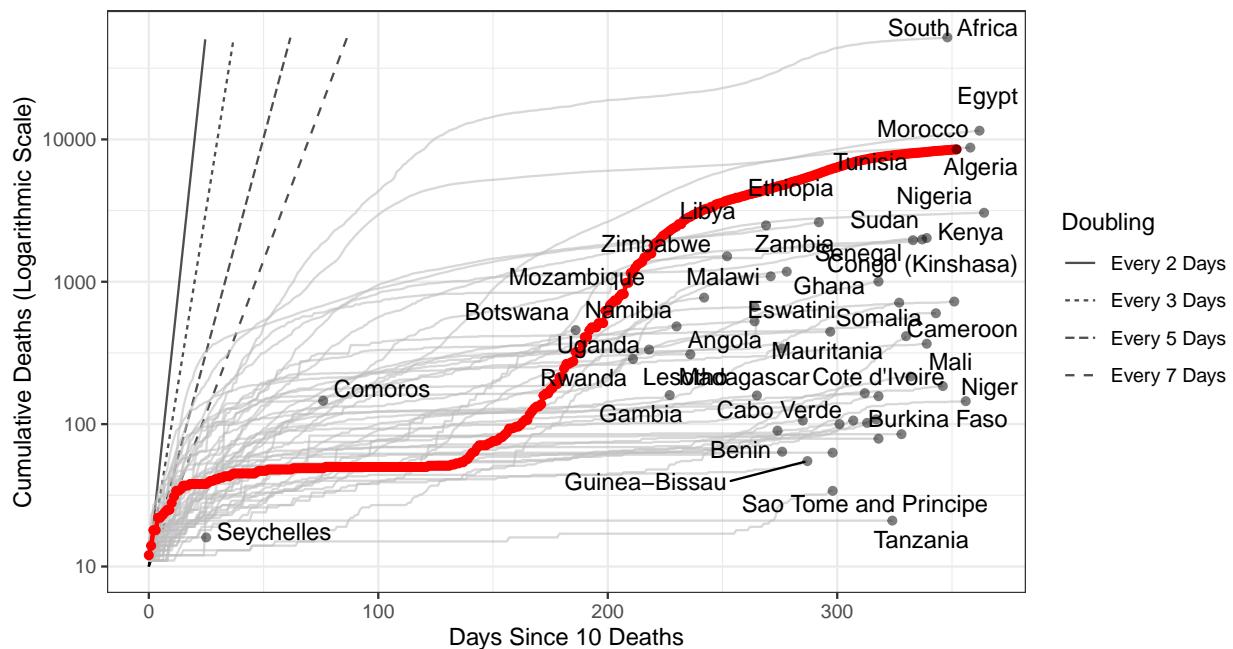


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 142,702 (95% CI: 135,167-150,237) 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).

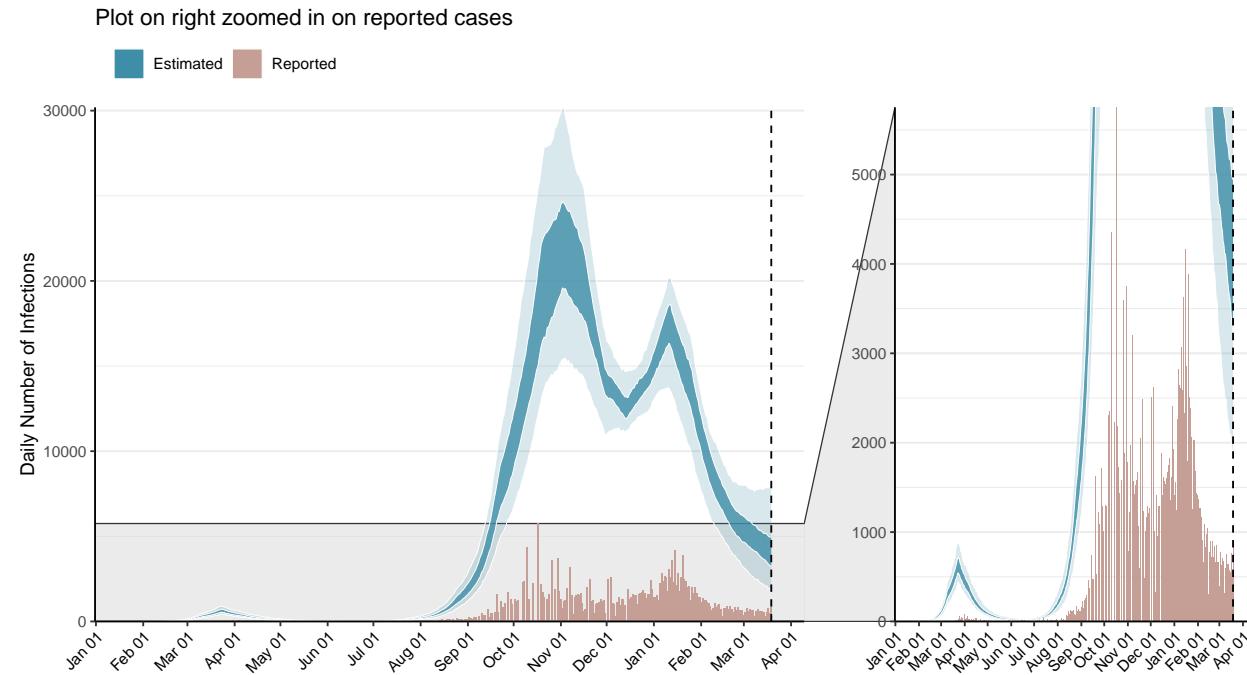


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

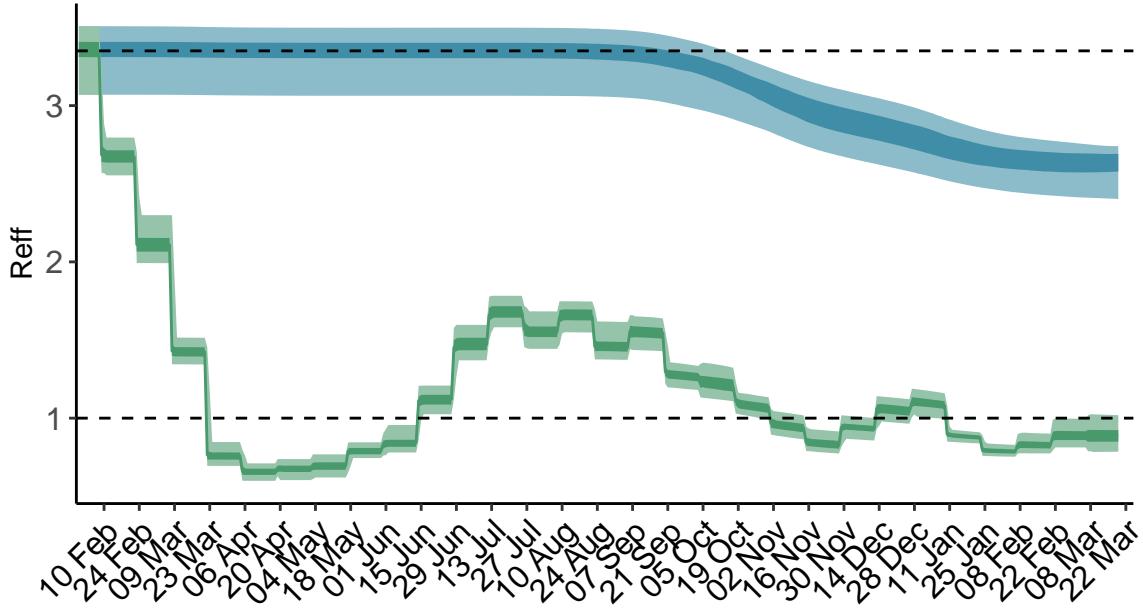


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

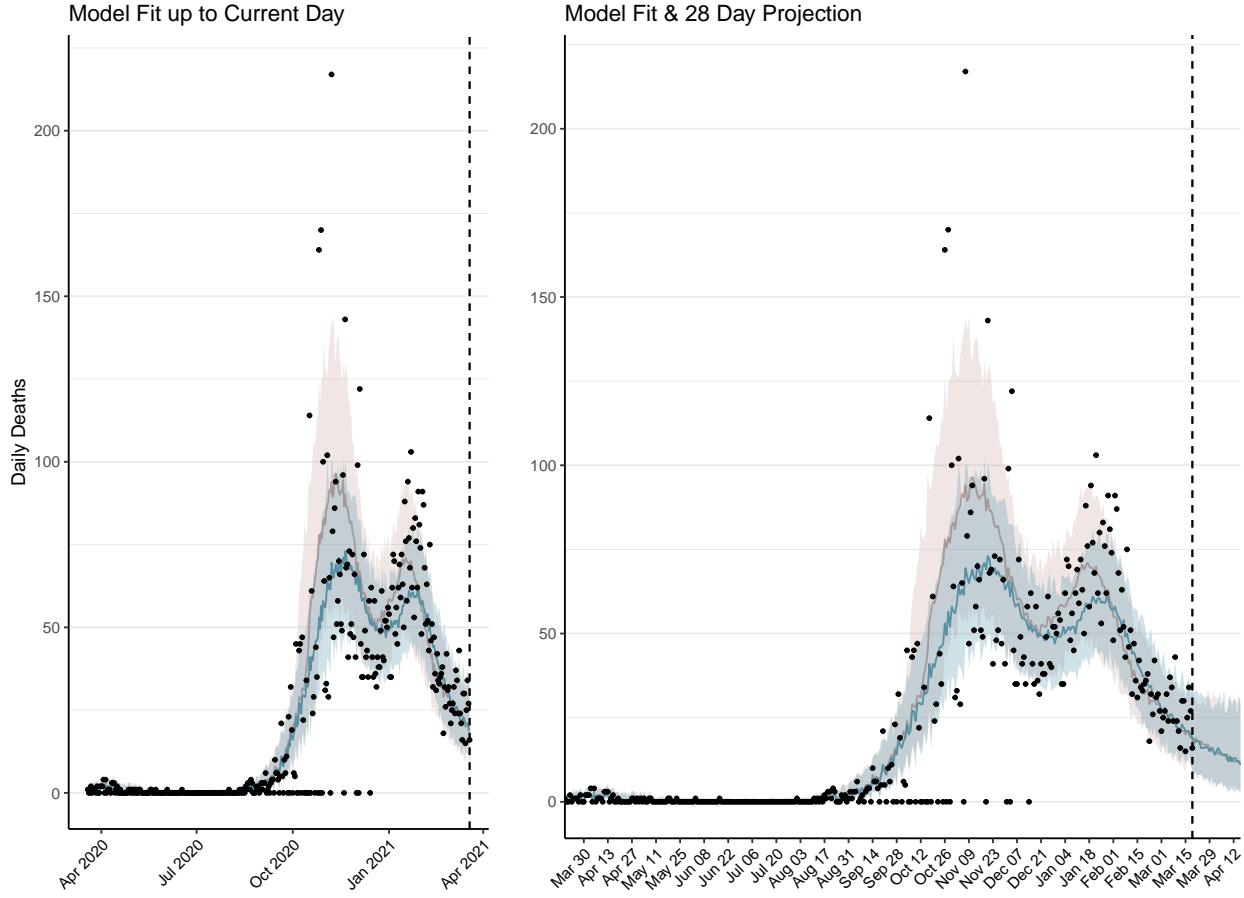


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 654 (95% CI: 618-691) patients requiring treatment with high-pressure oxygen at the current date to 446 (95% CI: 399-493) hospital beds being required on 2021-04-16 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 263 (95% CI: 249-276) patients requiring treatment with mechanical ventilation at the current date to 179 (95% CI: 162-197) by 2021-04-16. 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.**

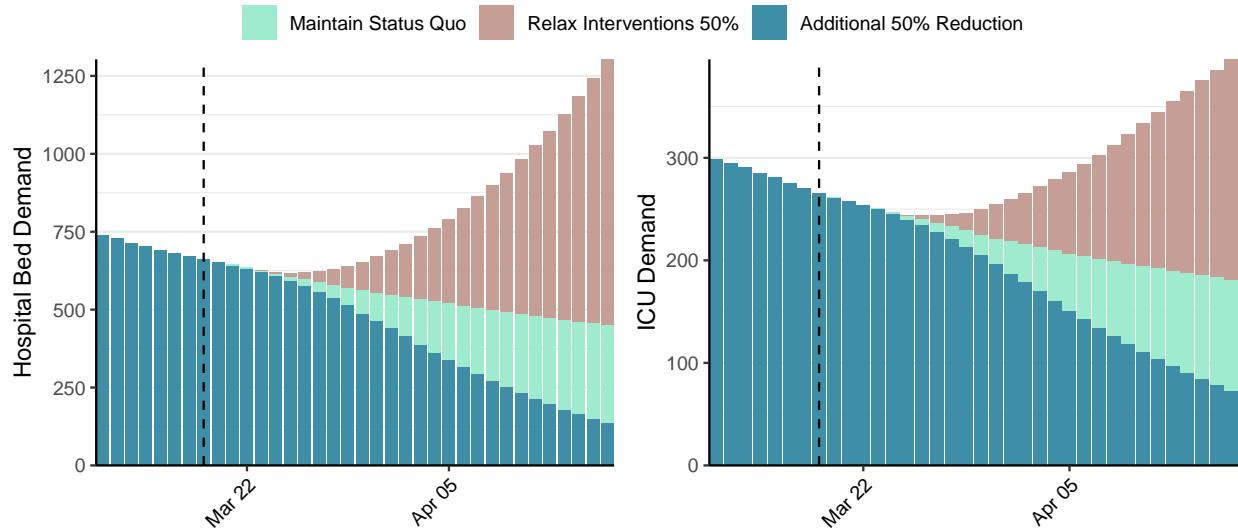


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 4,157 (95% CI: 3,850-4,464) at the current date to 265 (95% CI: 234-296) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 4,157 (95% CI: 3,850-4,464) at the current date to 15,668 (95% CI: 13,636-17,700) by 2021-04-16.

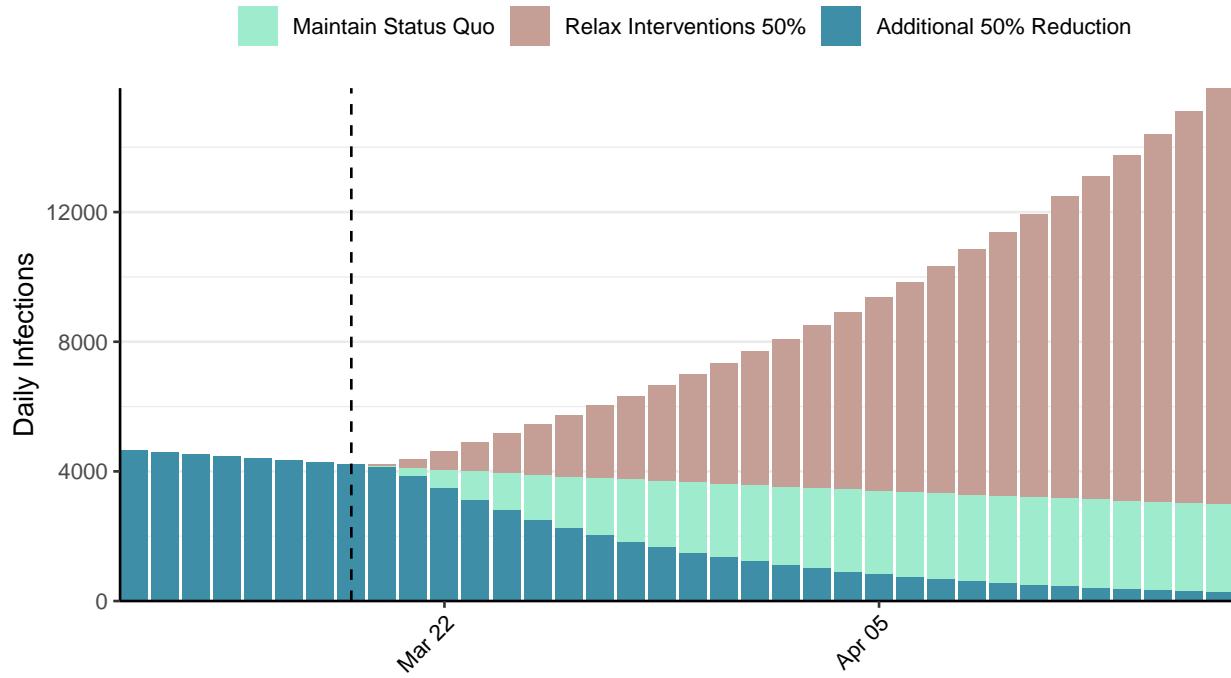


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Turkey, 2021-03-19

[Download the report for Turkey, 2021-03-19 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}
2,992,691	21,061	29,959	95	1.25 (95% CI: 1.08-1.41)

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.

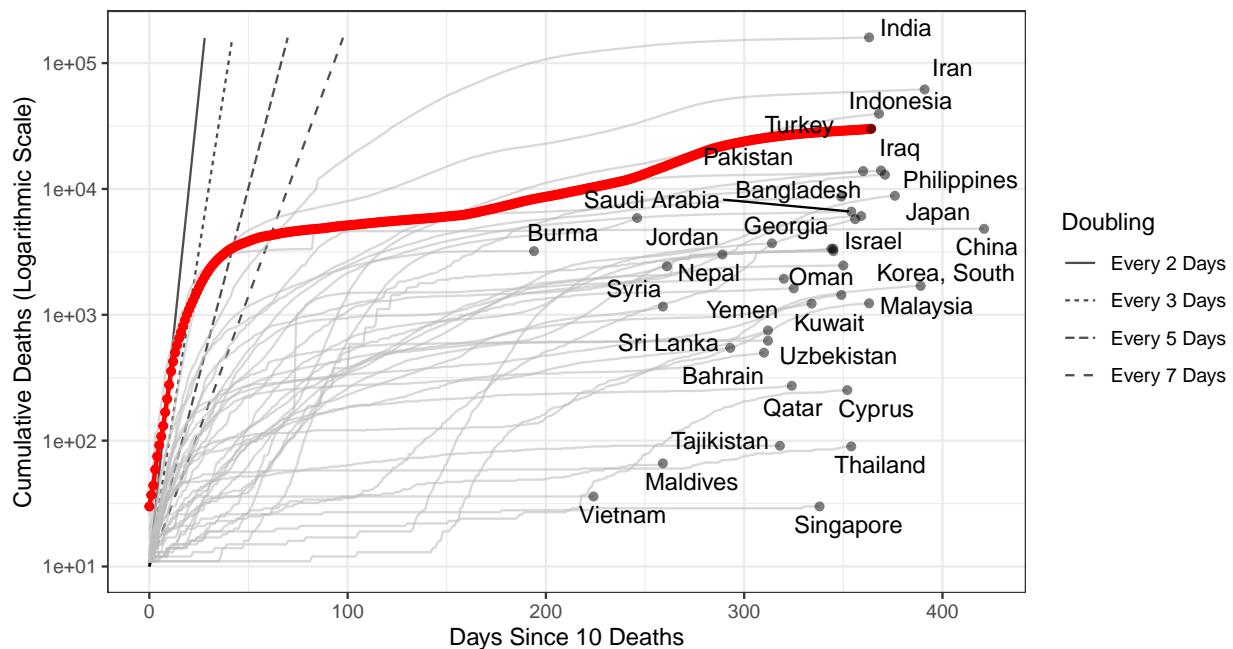


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,085,620 (95% CI: 1,035,311–1,135,928) 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

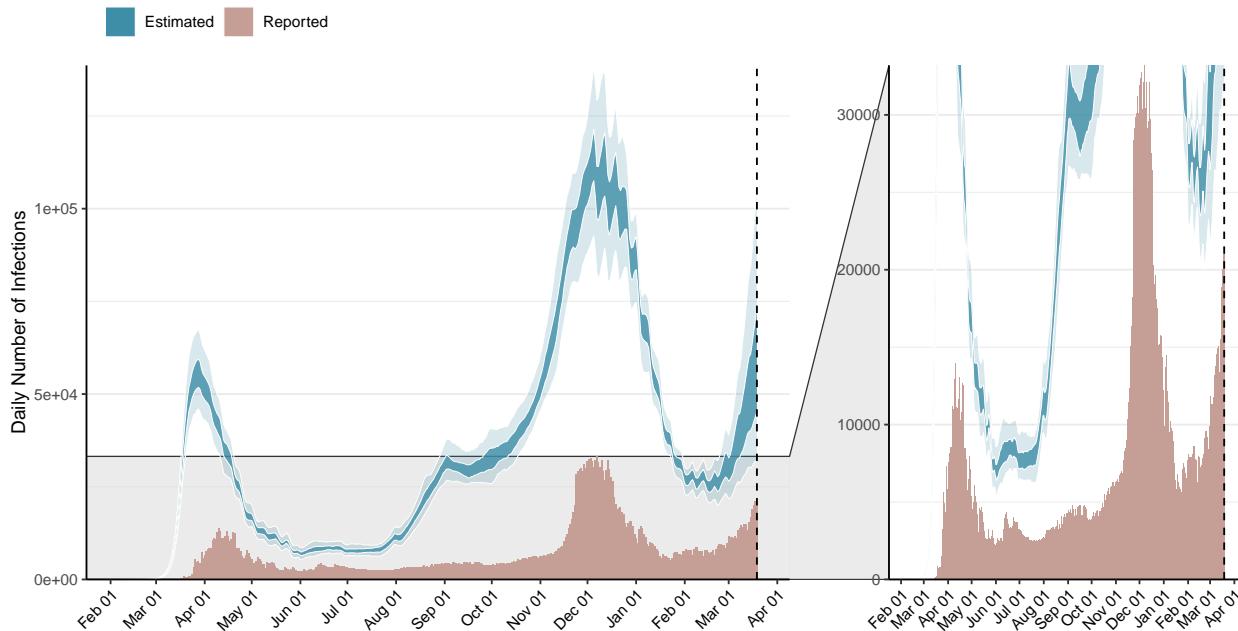


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

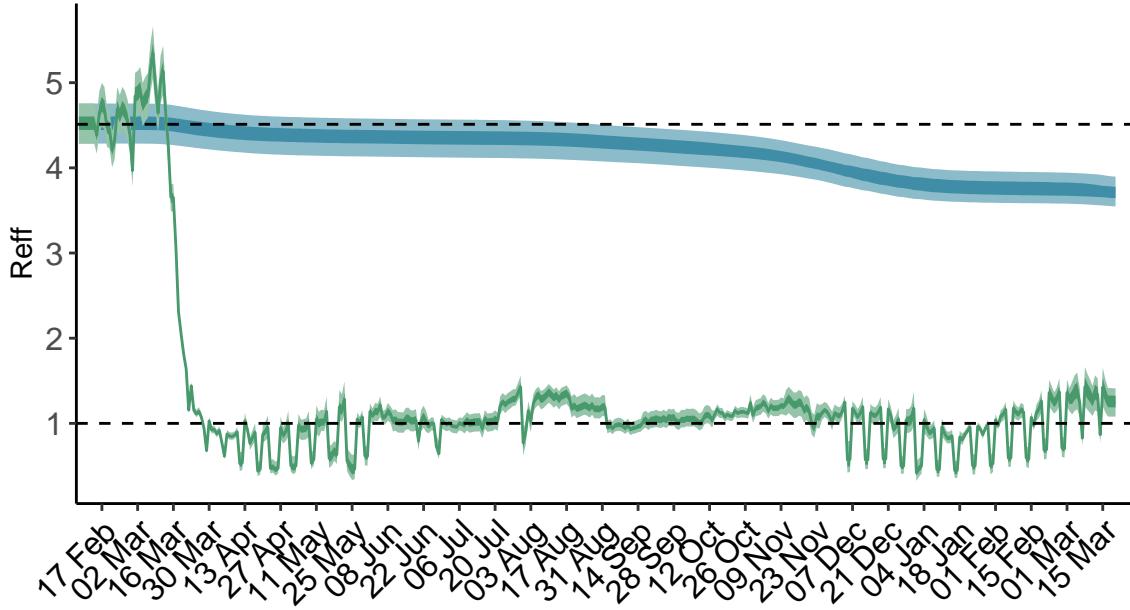


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

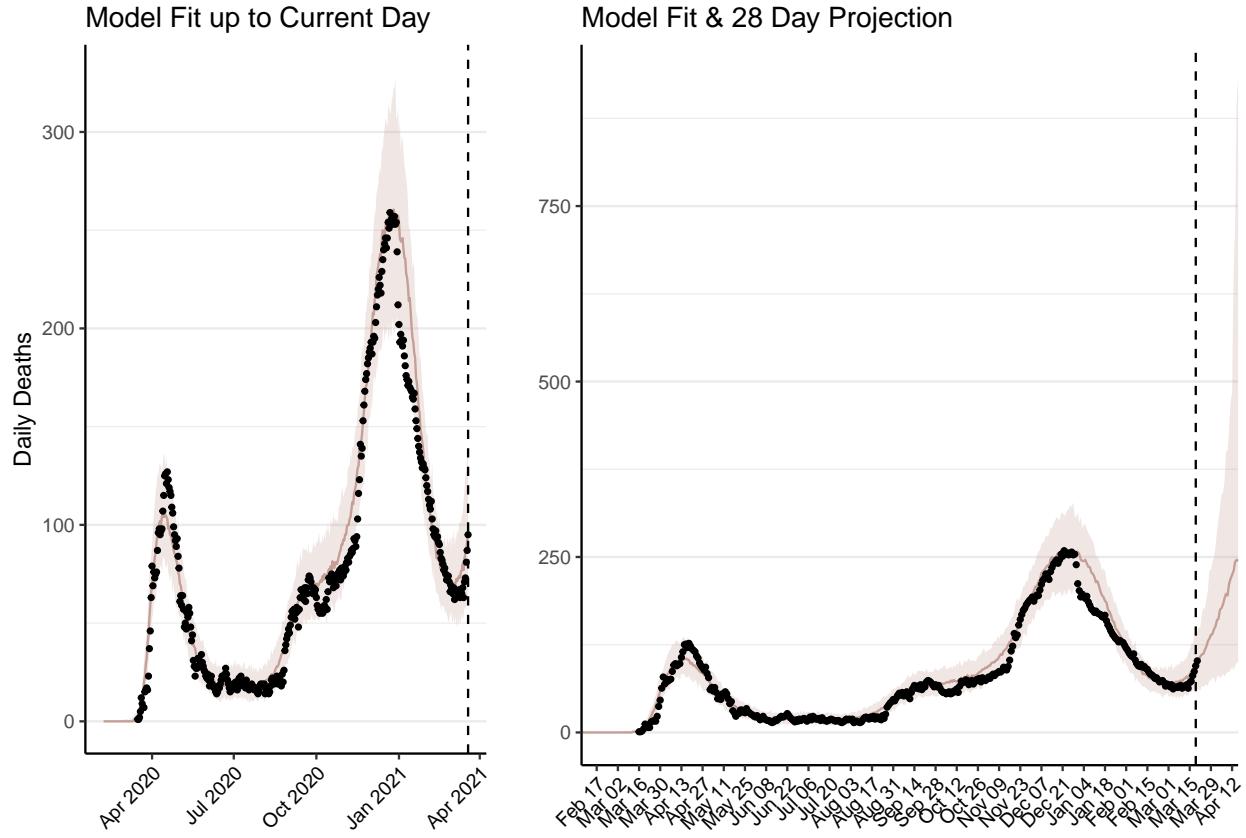


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 4,219 (95% CI: 4,012-4,426) patients requiring treatment with high-pressure oxygen at the current date to 12,215 (95% CI: 10,991-13,439) hospital beds being required on 2021-04-16 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 1,527 (95% CI: 1,458-1,597) patients requiring treatment with mechanical ventilation at the current date to 4,277 (95% CI: 3,882-4,671) by 2021-04-16. 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.**

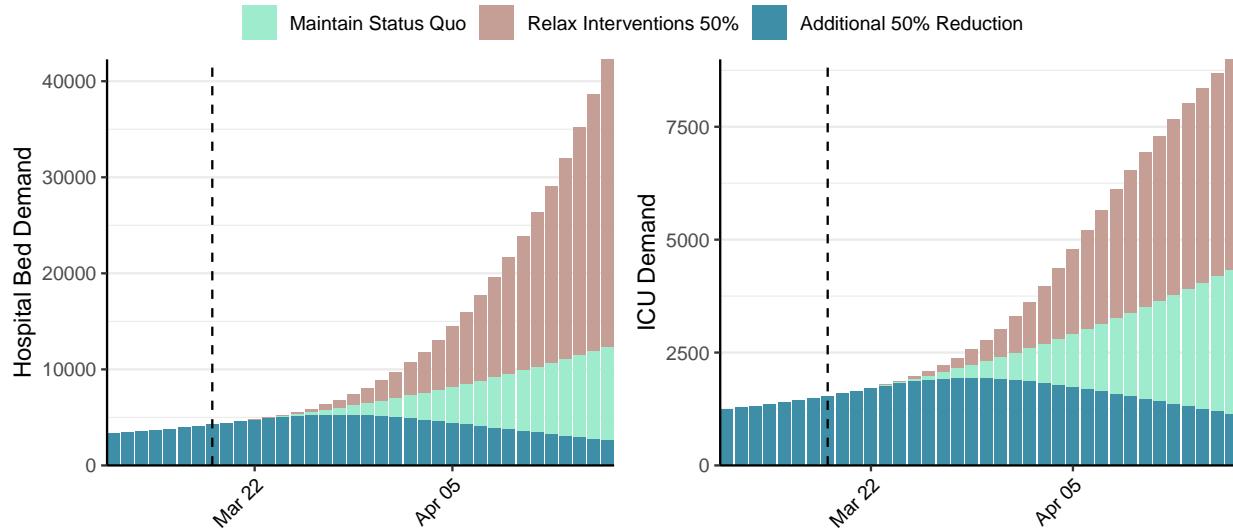


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 61,402 (95% CI: 57,291-65,514) at the current date to 12,303 (95% CI: 10,961-13,644) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 61,402 (95% CI: 57,291-65,514) at the current date to 847,584 (95% CI: 768,828-926,341) by 2021-04-16.

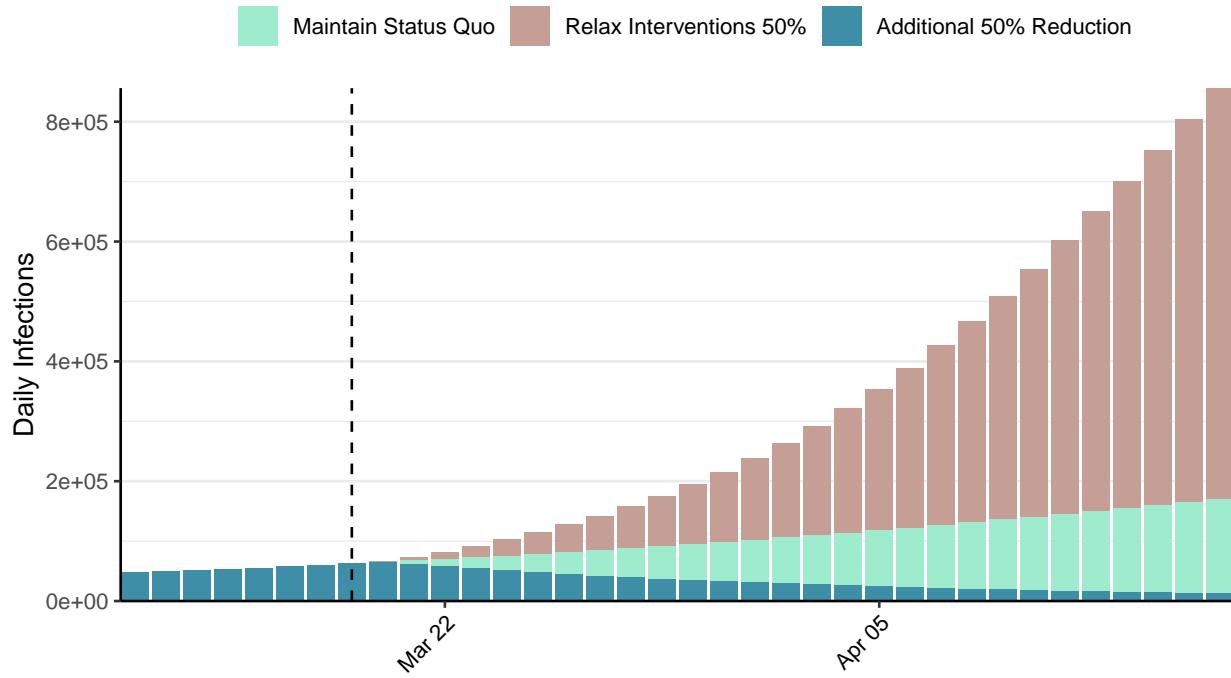


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Tanzania, 2021-03-19

[Download the report for Tanzania, 2021-03-19 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}
509	0	21	0	0.55 (95% CI: 0.29-0.88)

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.

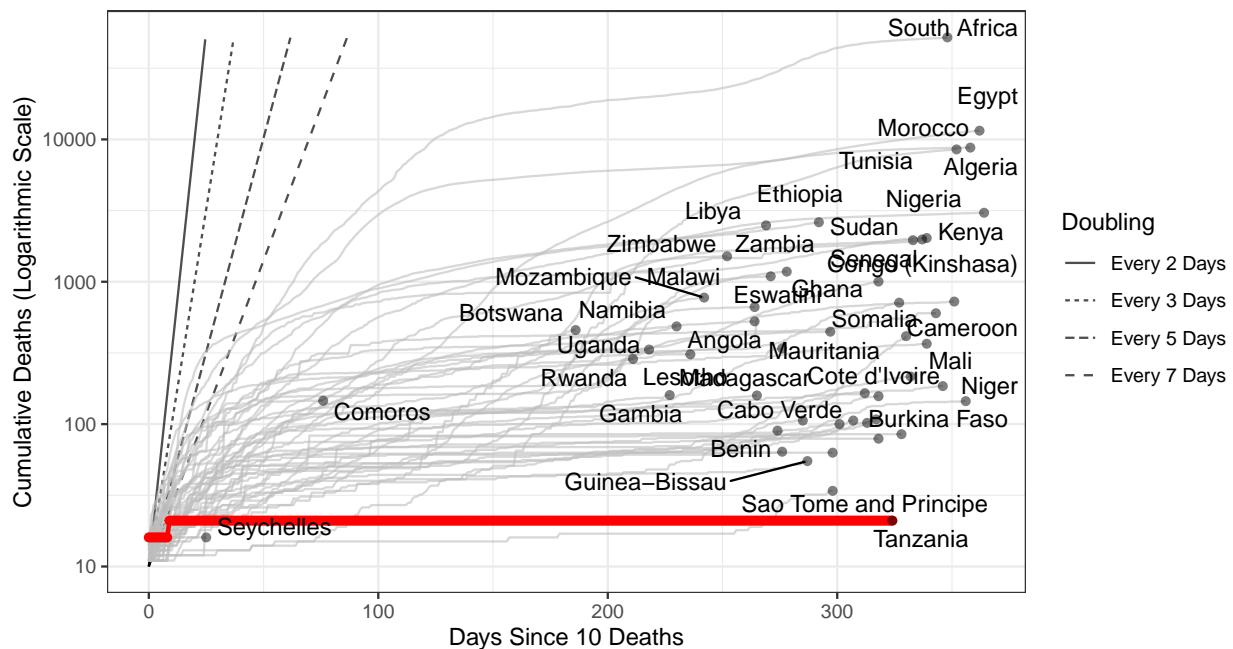


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 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).

Plot on right zoomed in on reported cases

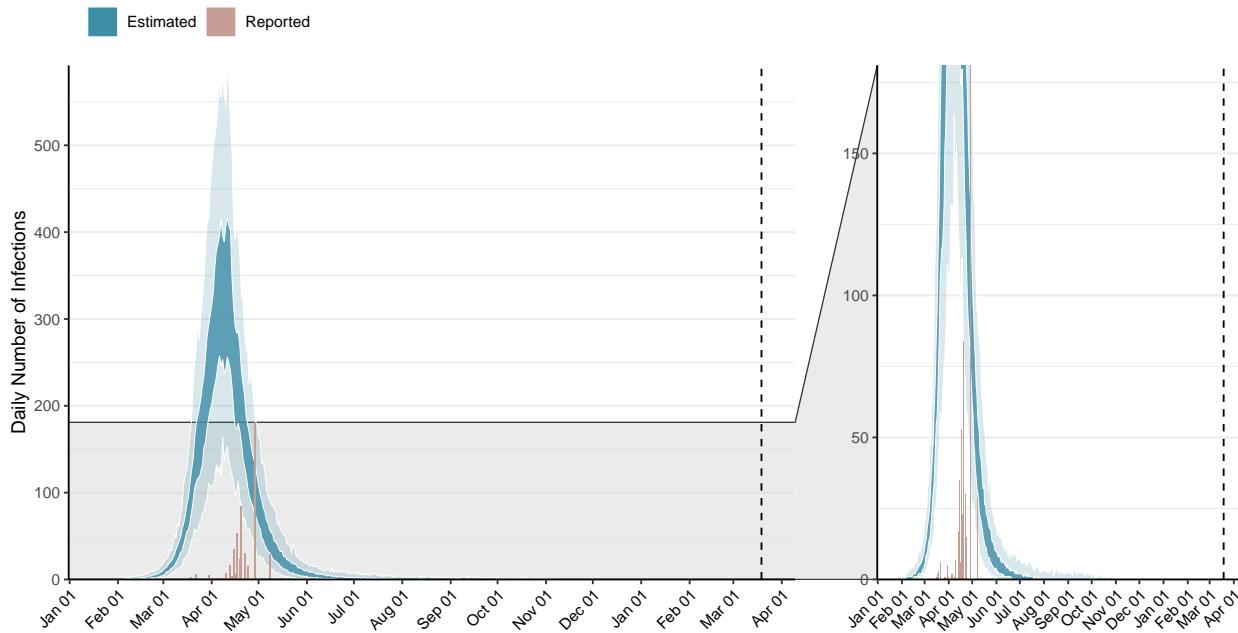


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

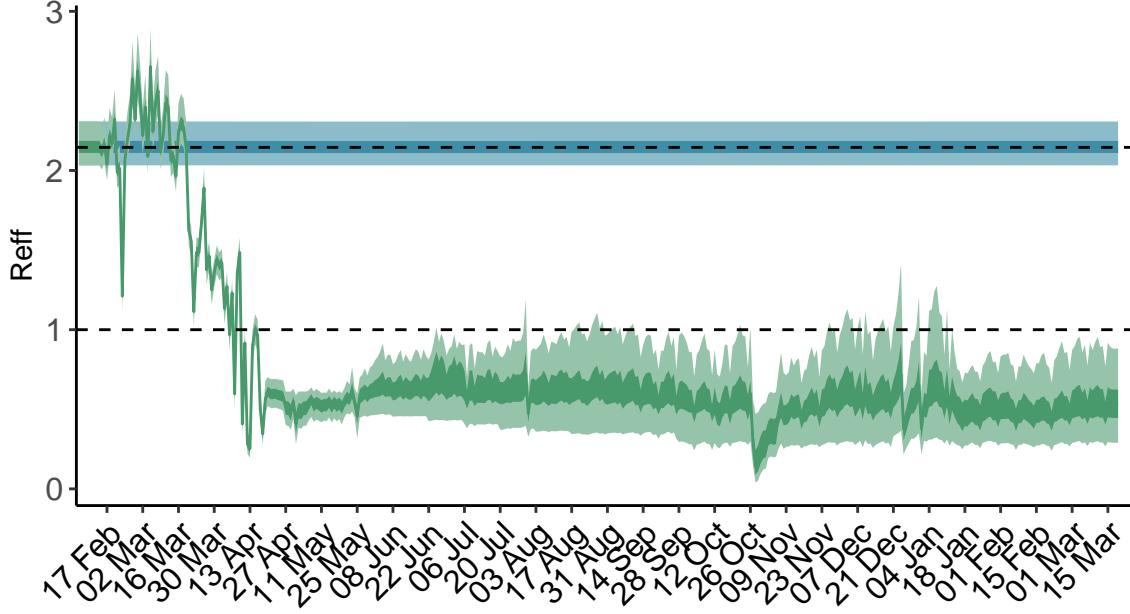


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

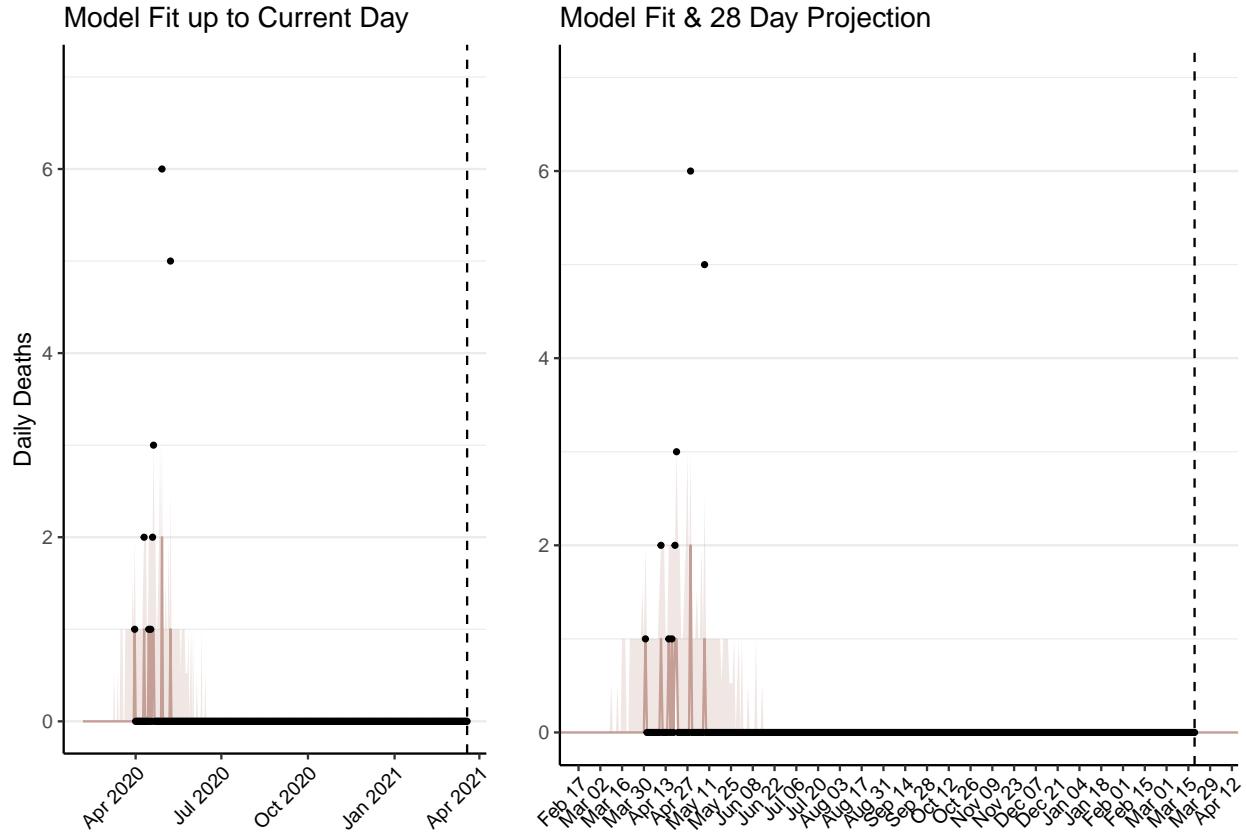


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 2021-04-16 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 2021-04-16. 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.**

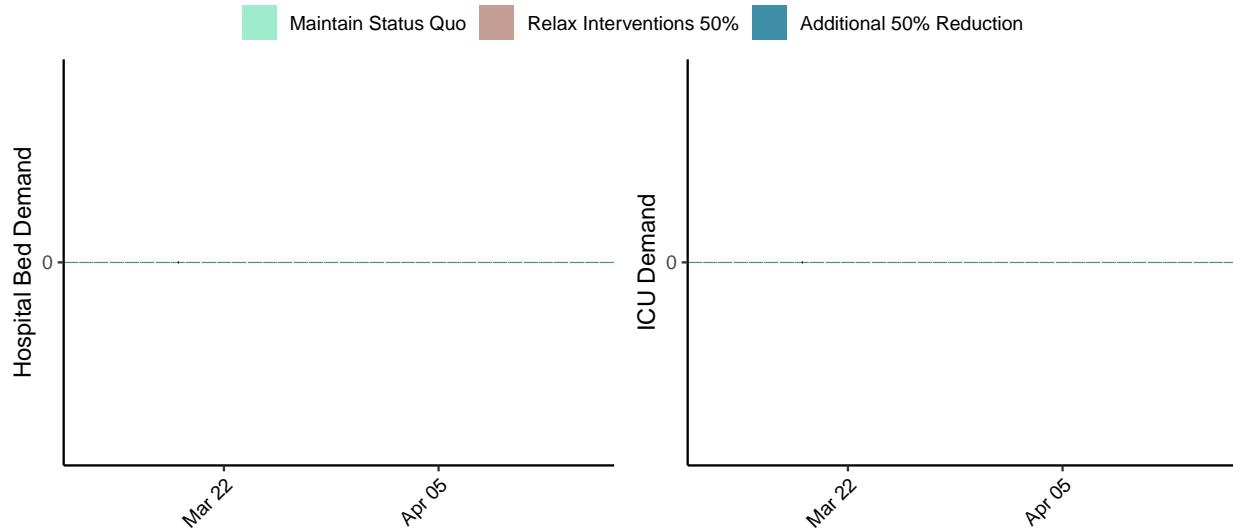


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2021-04-16. 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 2021-04-16.

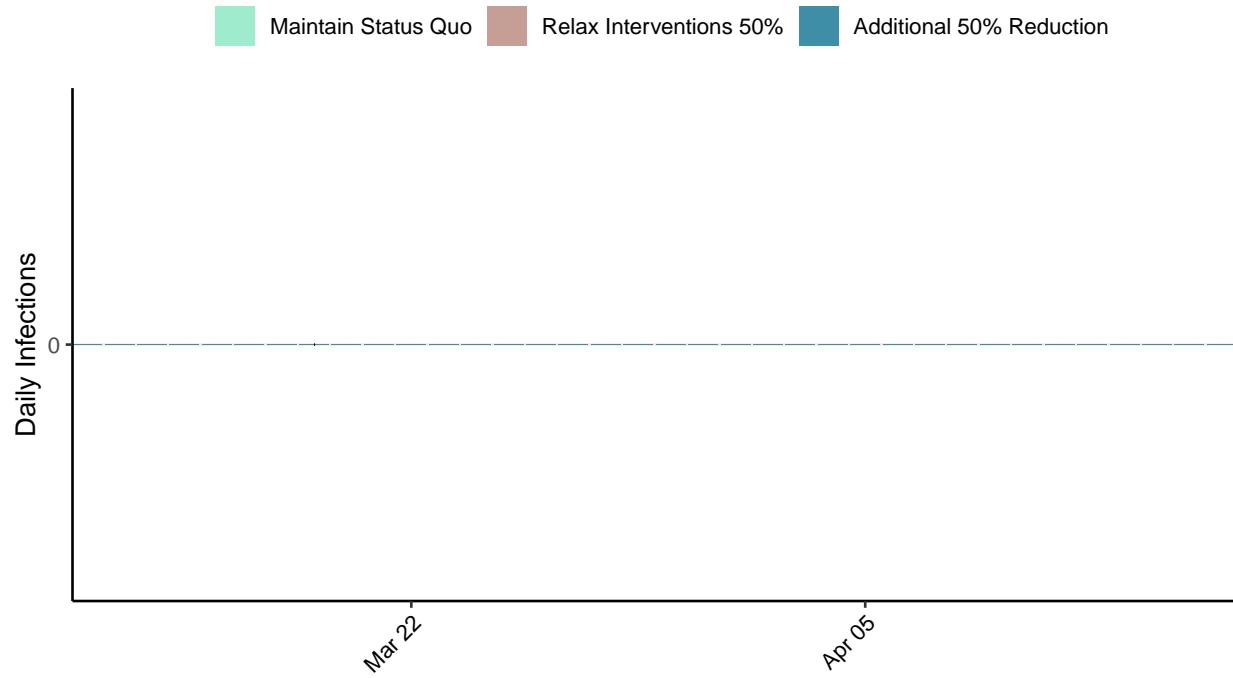


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Uganda, 2021-03-19

[Download the report for Uganda, 2021-03-19 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}
40,651	26	334	0	0.74 (95% CI: 0.55-0.92)

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.

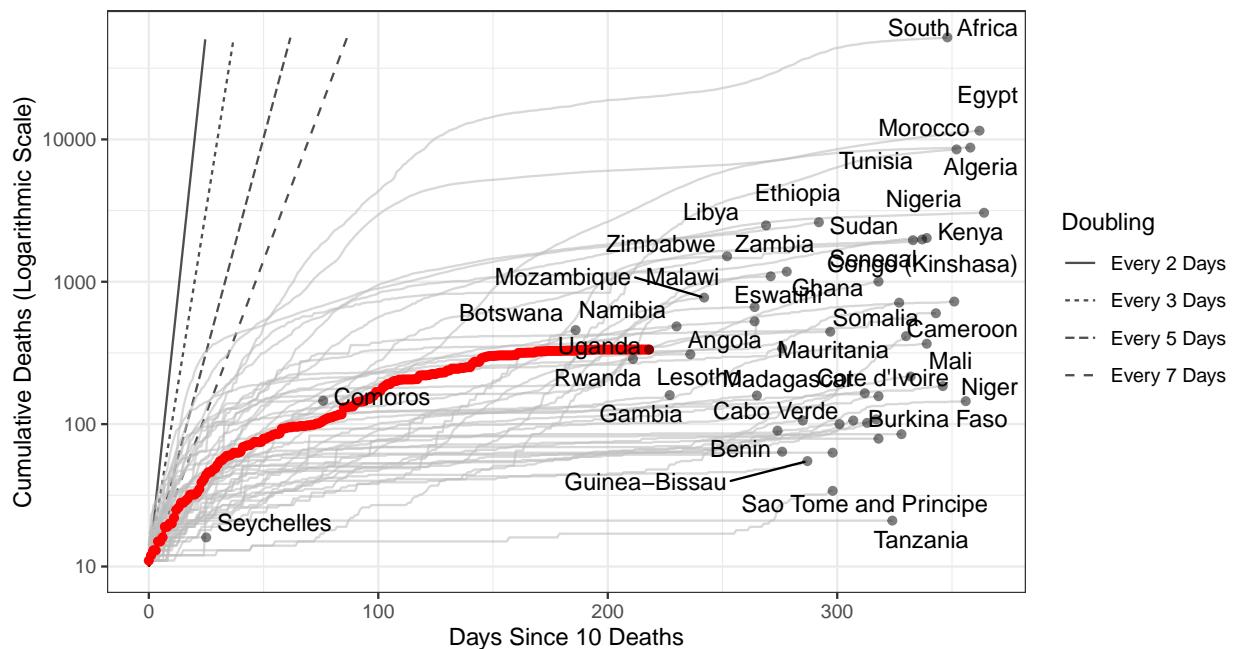


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 1,461 (95% CI: 1,314-1,608) 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.**

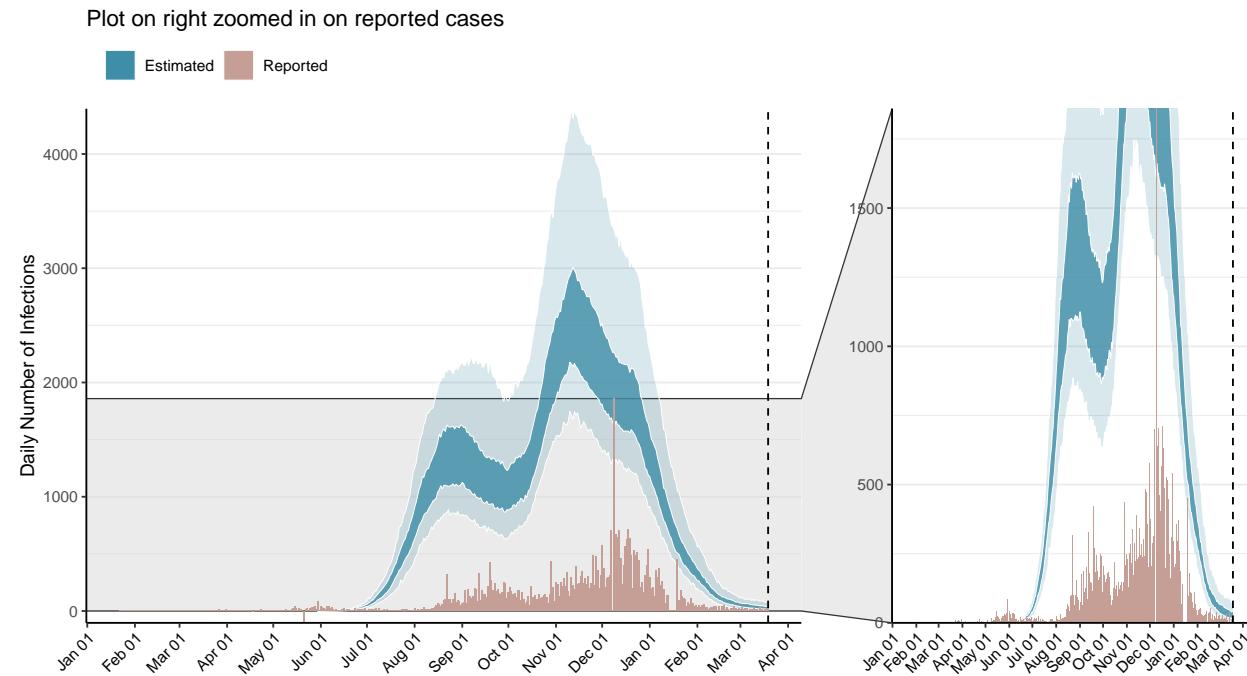


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

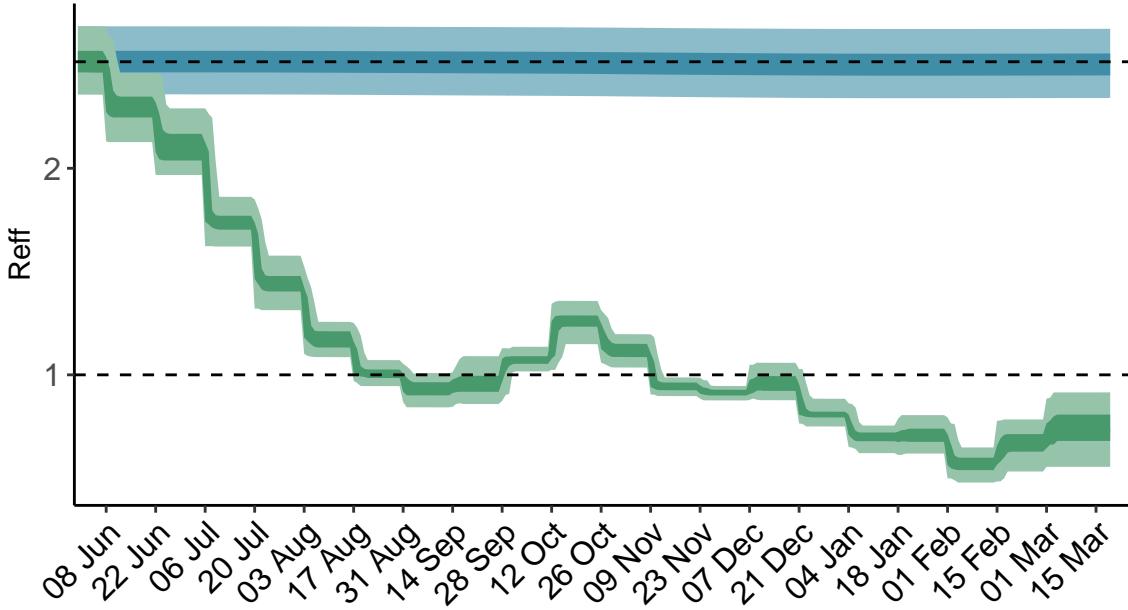


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

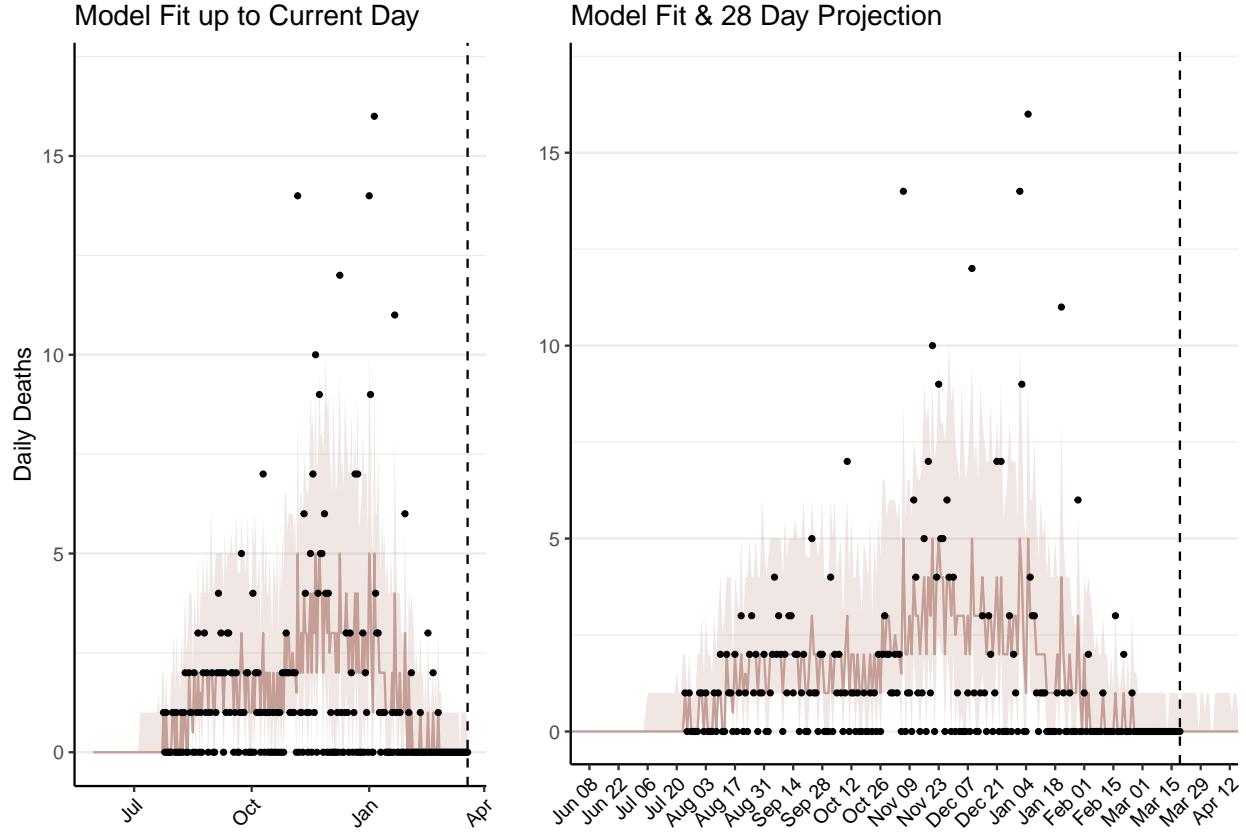


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1 (95% CI: 1-2) hospital beds being required on 2021-04-16 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: 0-1) by 2021-04-16. 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.**

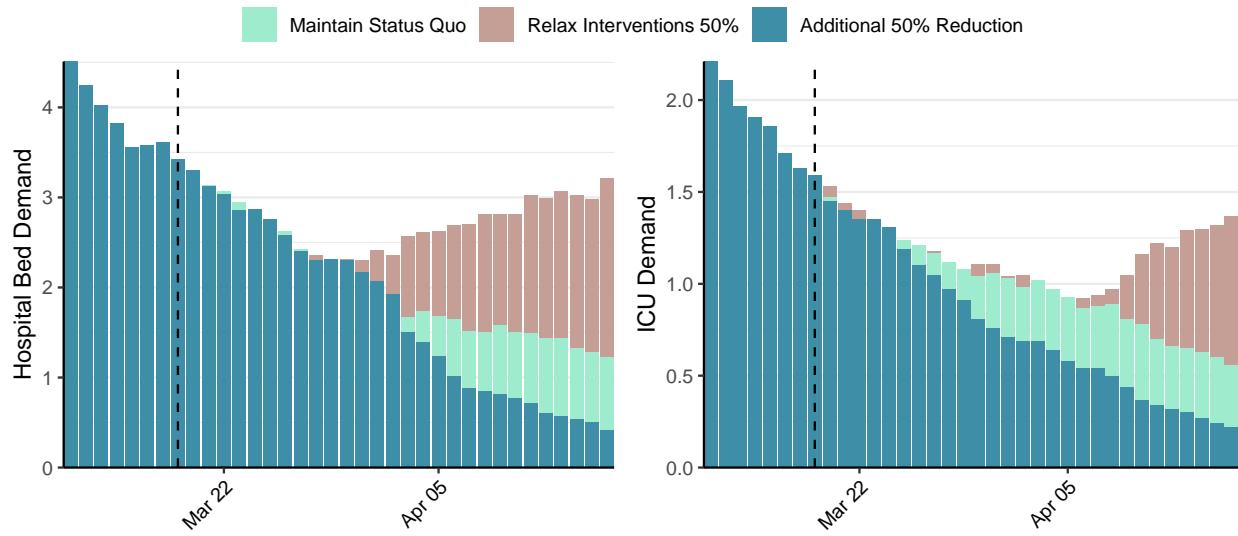


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 30 (95% CI: 26-35) at the current date to 1 (95% CI: 1-2) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 30 (95% CI: 26-35) at the current date to 70 (95% CI: 52-87) by 2021-04-16.

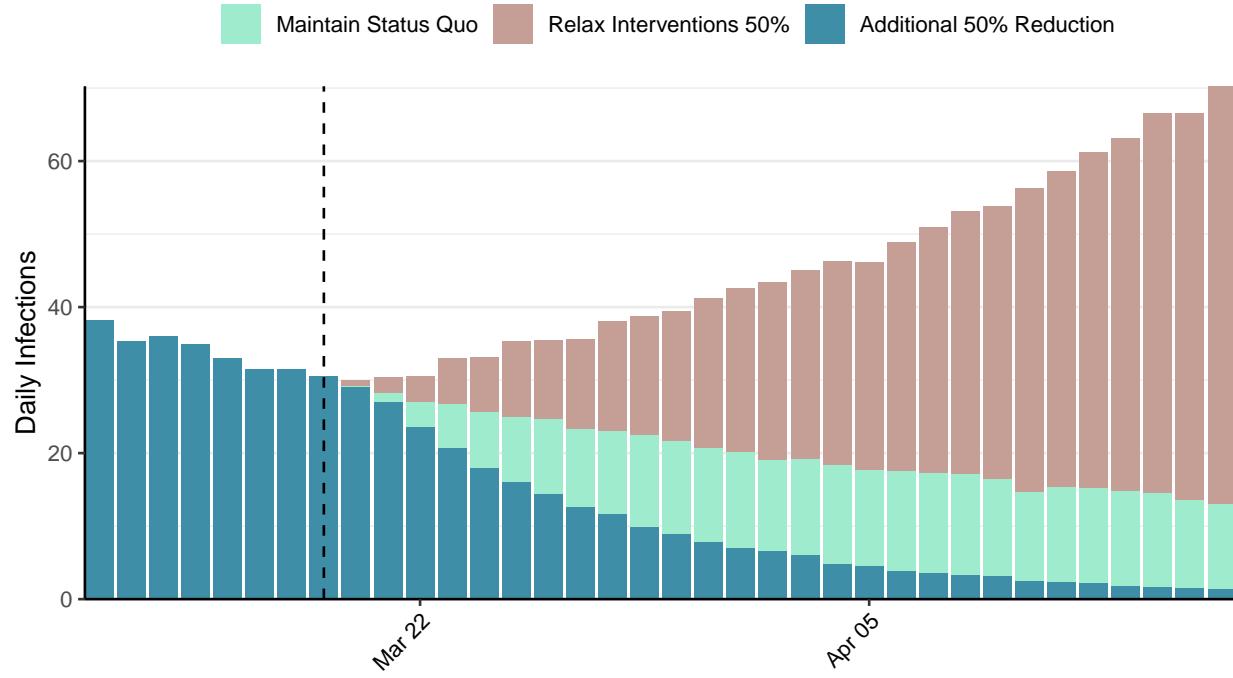


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Ukraine, 2021-03-19

[Download the report for Ukraine, 2021-03-19 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}
1,569,596	15,937	31,078	267	1.02 (95% CI: 0.87-1.14)

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.

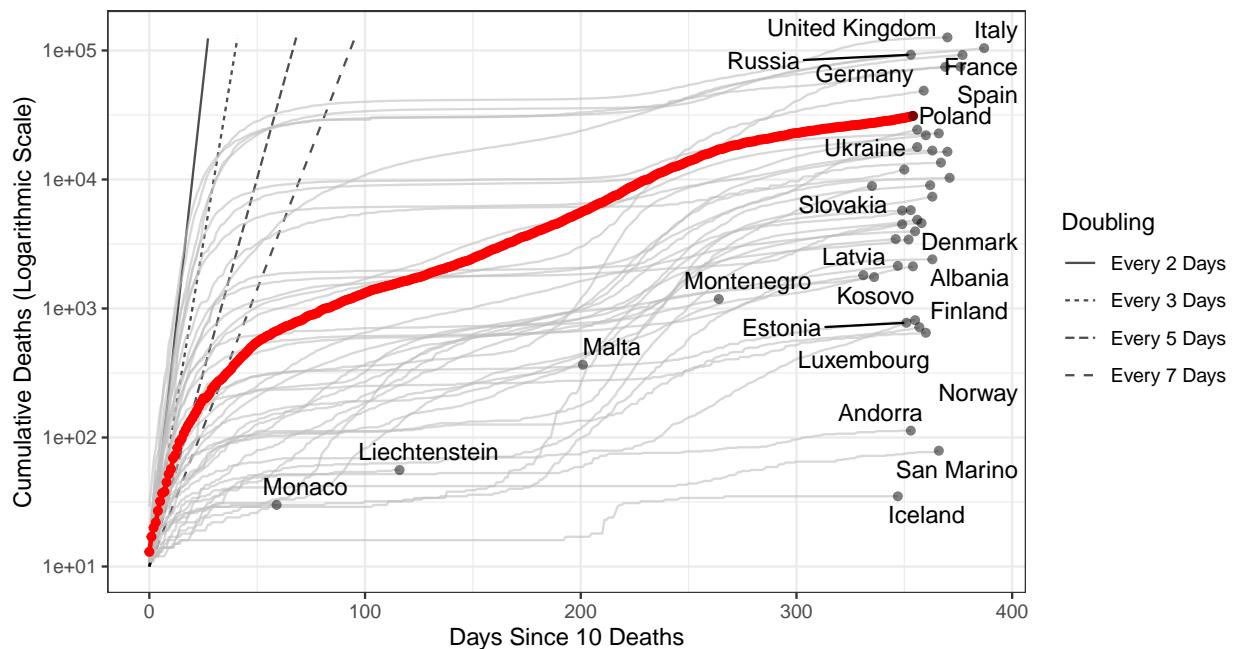


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 1,605,371 (95% CI: 1,515,186–1,695,557) 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).

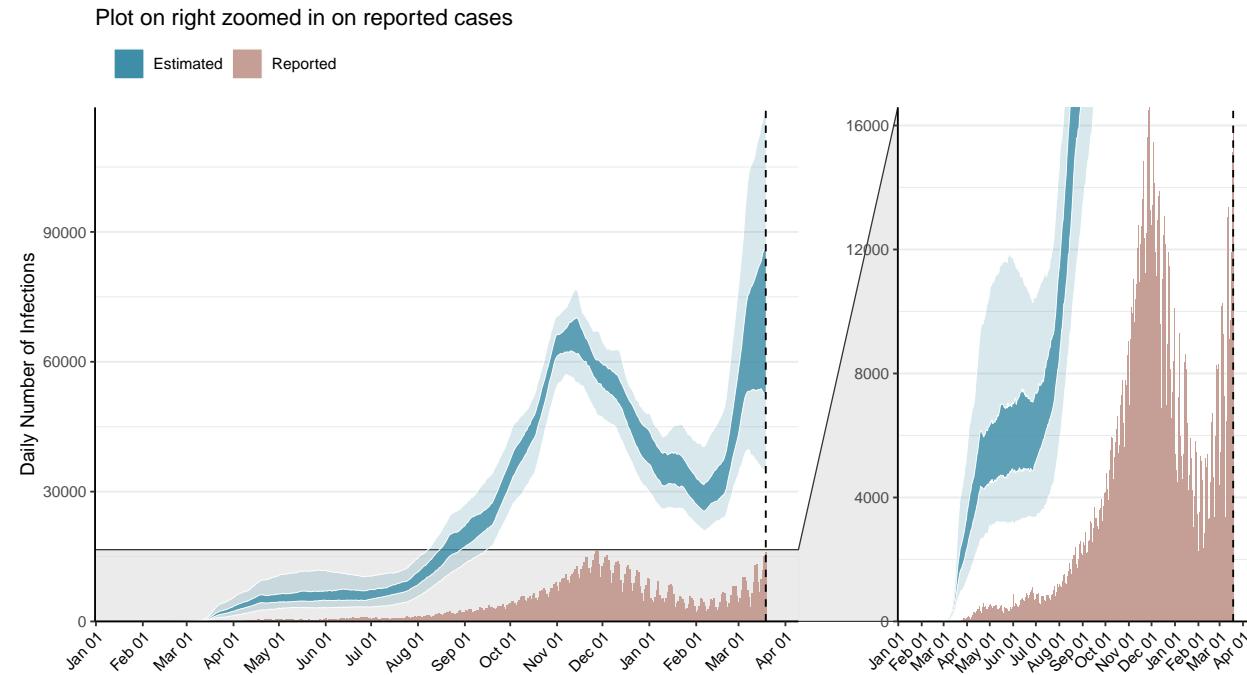


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

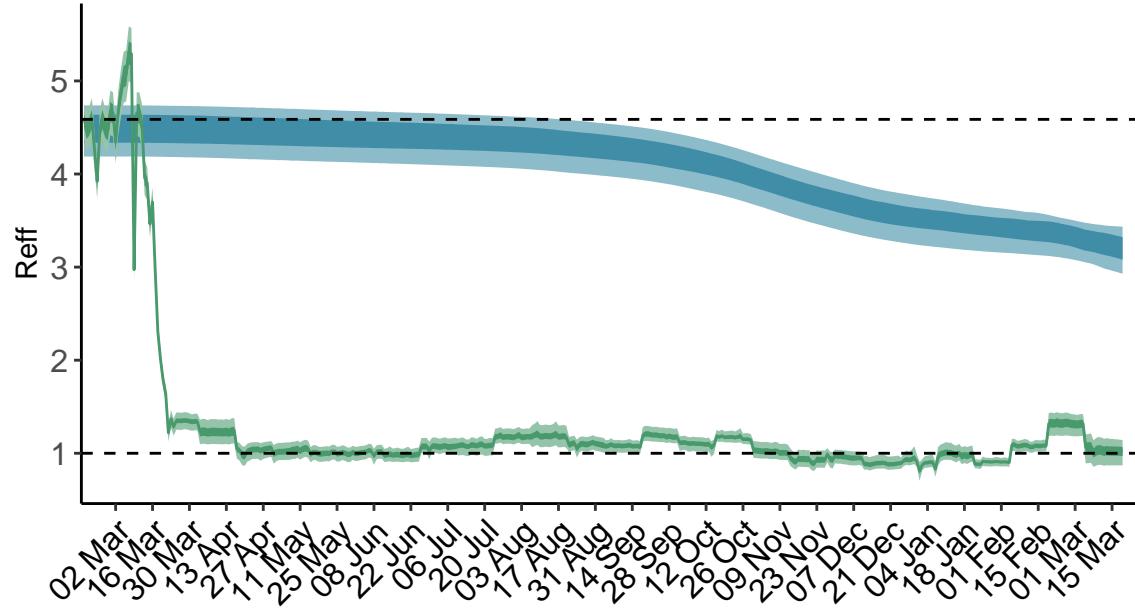


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

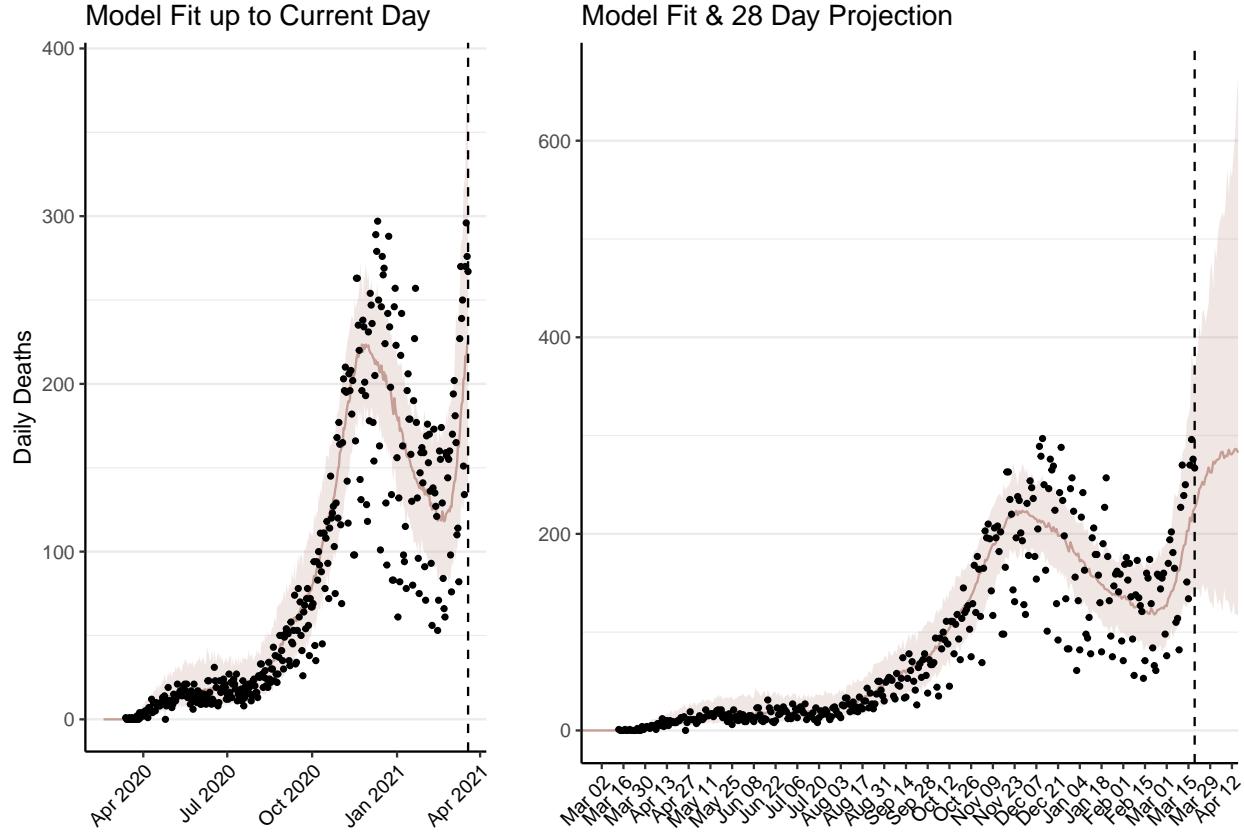


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 9,018 (95% CI: 8,485-9,551) patients requiring treatment with high-pressure oxygen at the current date to 11,210 (95% CI: 10,144-12,276) hospital beds being required on 2021-04-16 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 3,171 (95% CI: 2,990-3,353) patients requiring treatment with mechanical ventilation at the current date to 4,063 (95% CI: 3,725-4,400) by 2021-04-16. 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.**

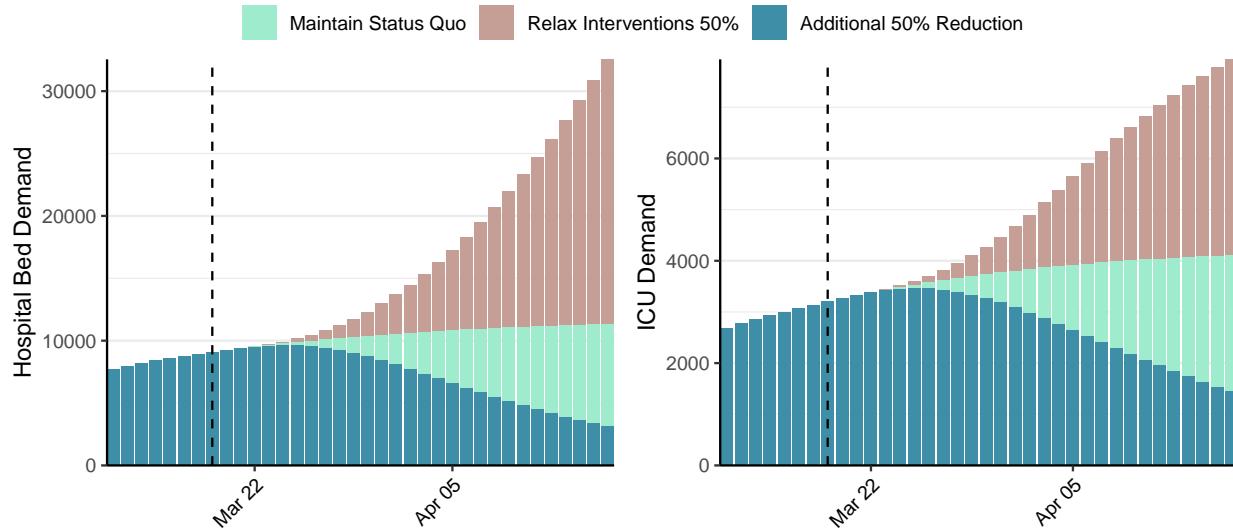


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 70,428 (95% CI: 65,412-75,444) at the current date to 6,663 (95% CI: 5,970-7,357) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 70,428 (95% CI: 65,412-75,444) at the current date to 313,098 (95% CI: 288,991-337,205) by 2021-04-16.

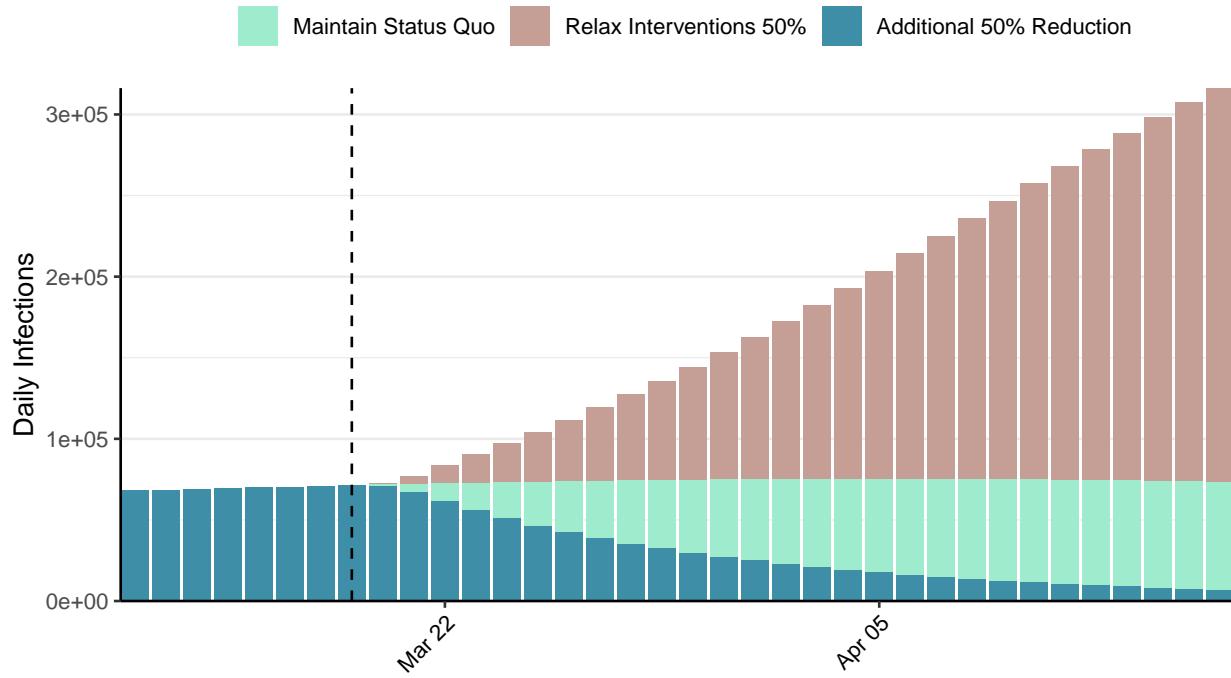


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Uruguay, 2021-03-19

[Download the report for Uruguay, 2021-03-19 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}
78,401	1,585	760	11	1.19 (95% CI: 1.05-1.34)

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.

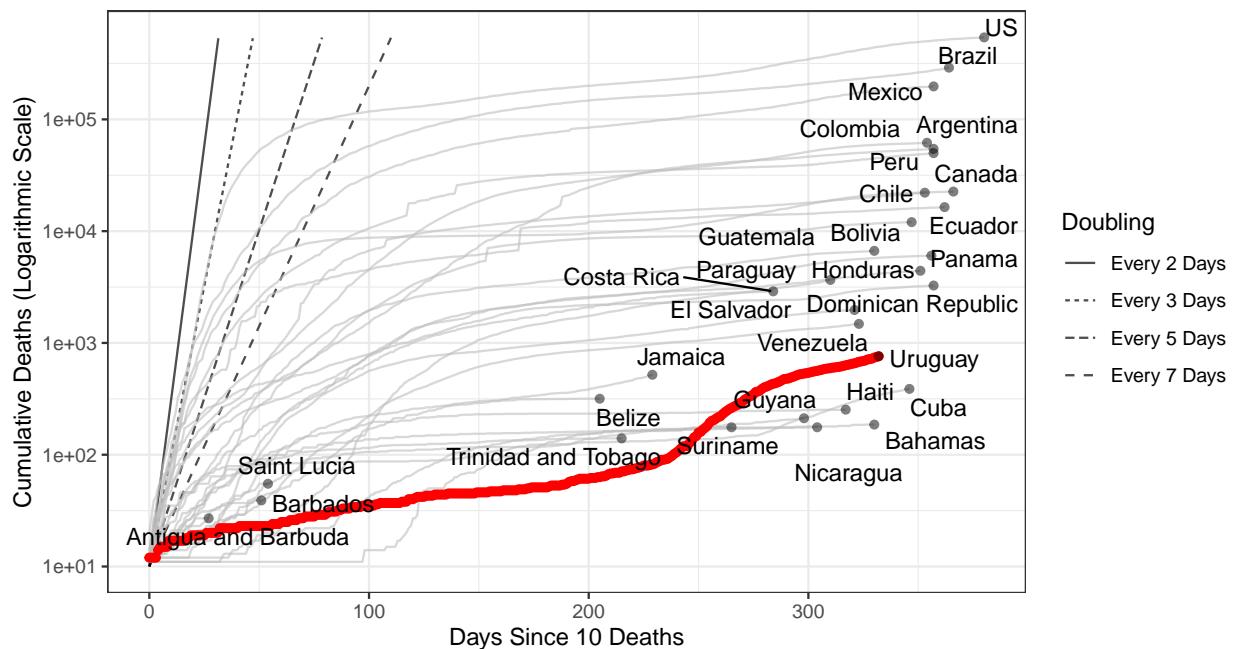


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 67,967 (95% CI: 65,451-70,483) 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.**

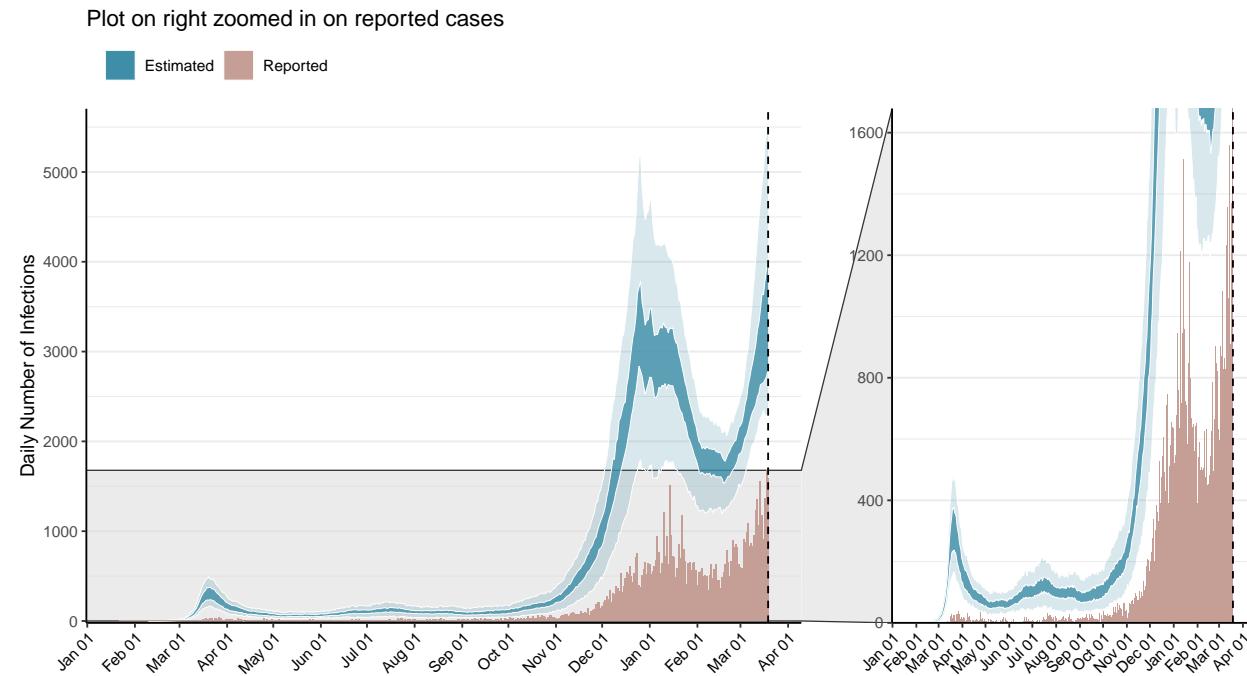


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

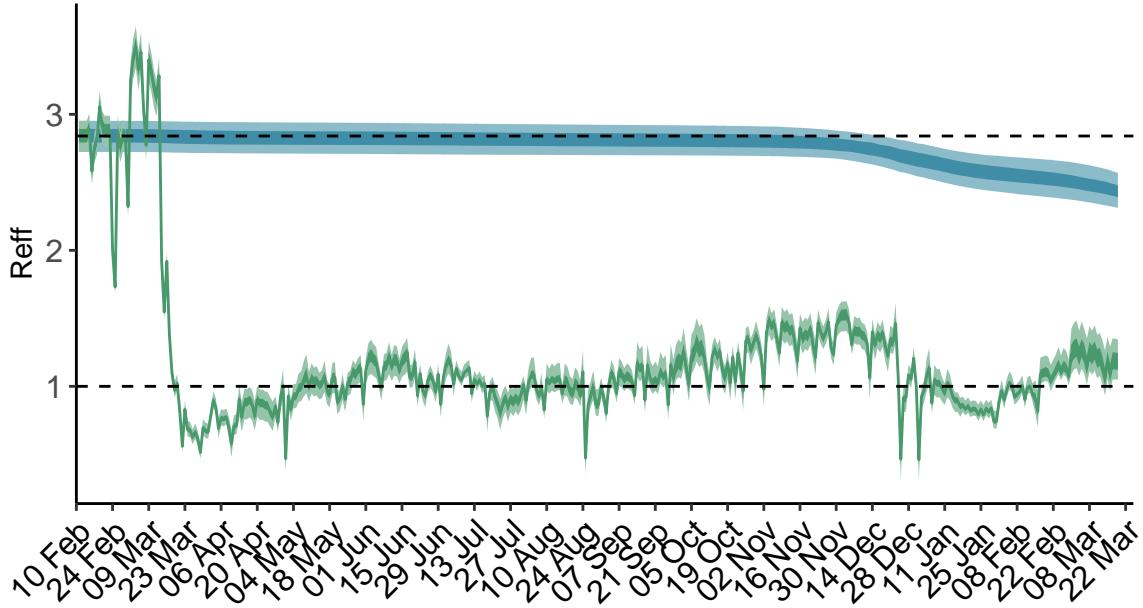


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Uruguay 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.](#)

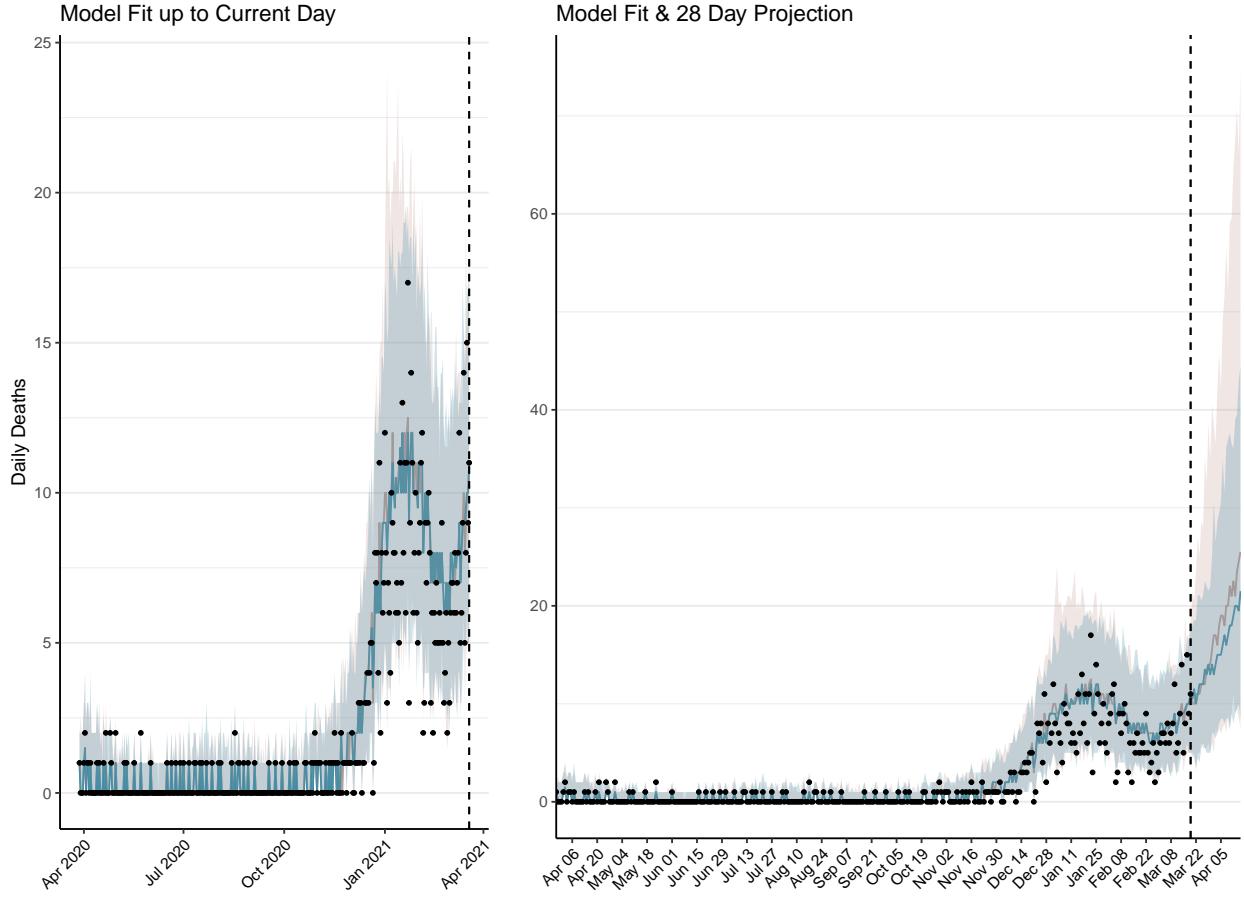


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 343 (95% CI: 329-357) patients requiring treatment with high-pressure oxygen at the current date to 757 (95% CI: 690-825) hospital beds being required on 2021-04-16 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: 102-111) patients requiring treatment with mechanical ventilation at the current date to 148 (95% CI: 143-153) by 2021-04-16. 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.**

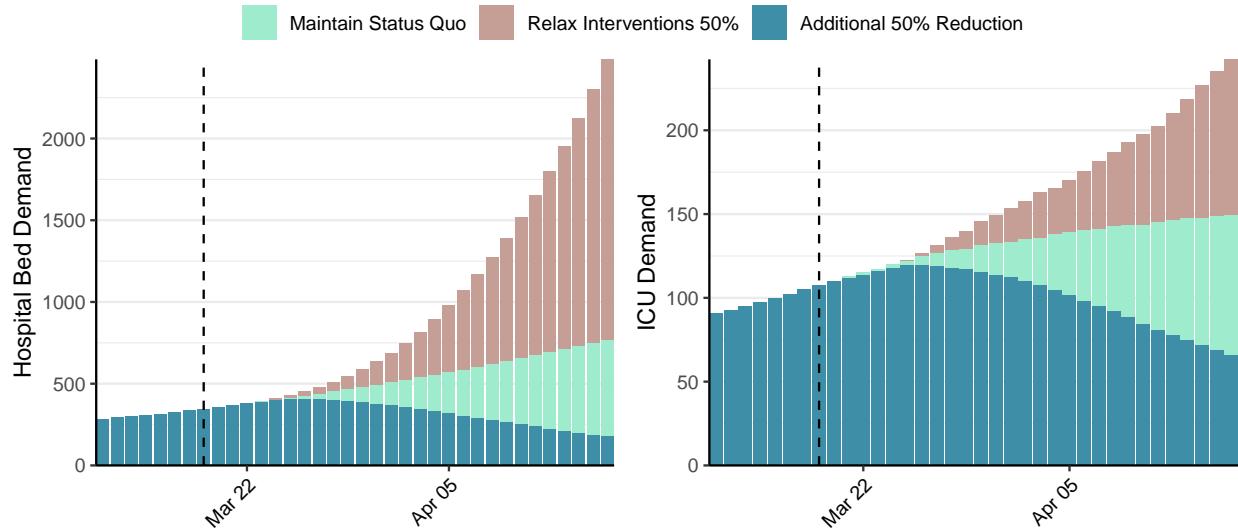


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 3,472 (95% CI: 3,277-3,668) at the current date to 560 (95% CI: 504-617) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,472 (95% CI: 3,277-3,668) at the current date to 32,439 (95% CI: 29,830-35,048) by 2021-04-16.

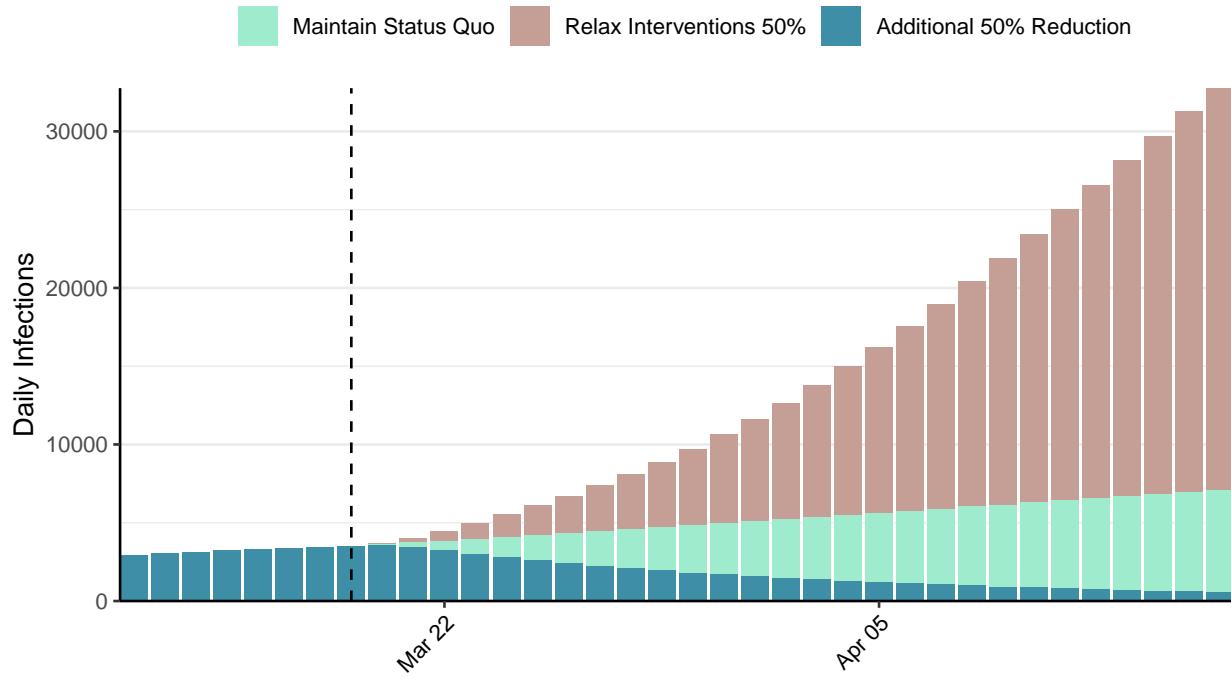


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Uzbekistan, 2021-03-19

[Download the report for Uzbekistan, 2021-03-19 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}
81,095	124	622	0	0.92 (95% CI: 0.71-1.19)

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.

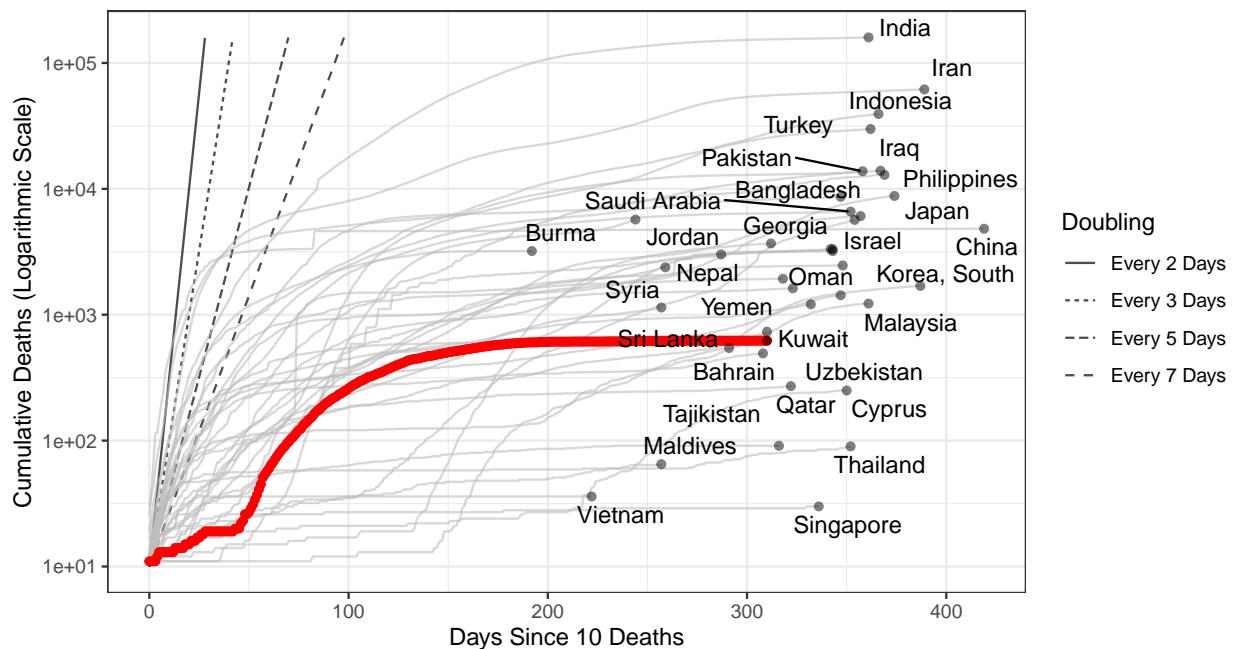


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 398 (95% CI: 334-462) 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).

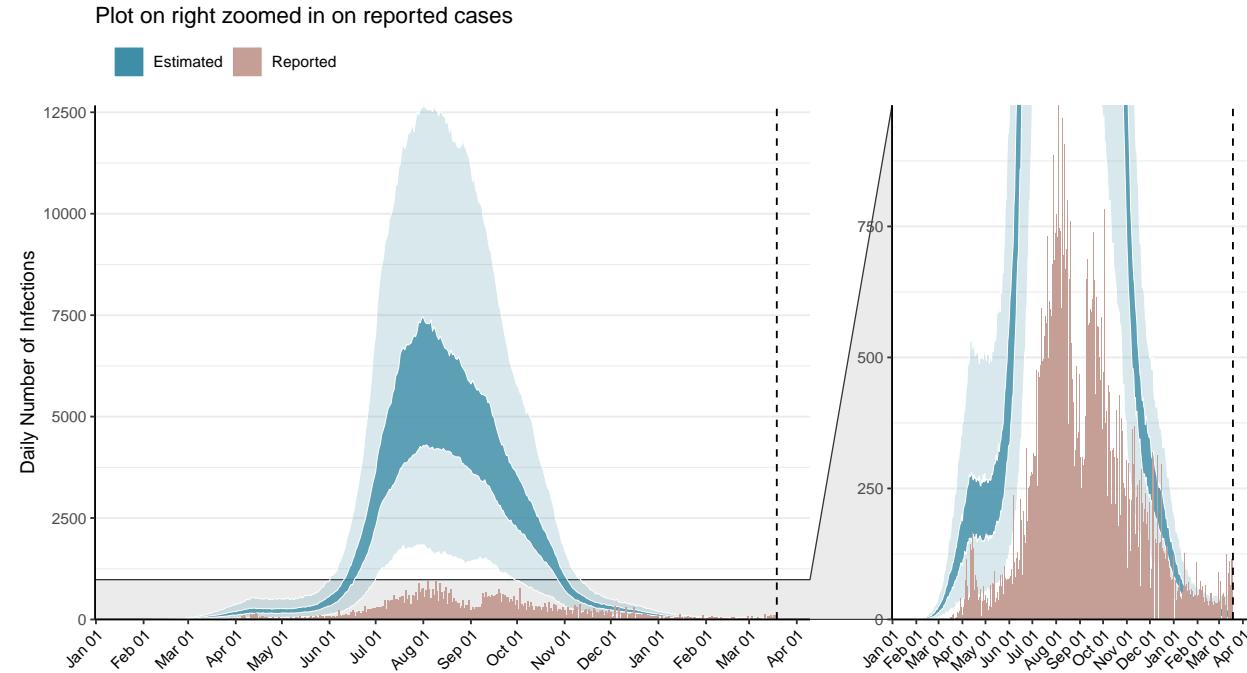


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

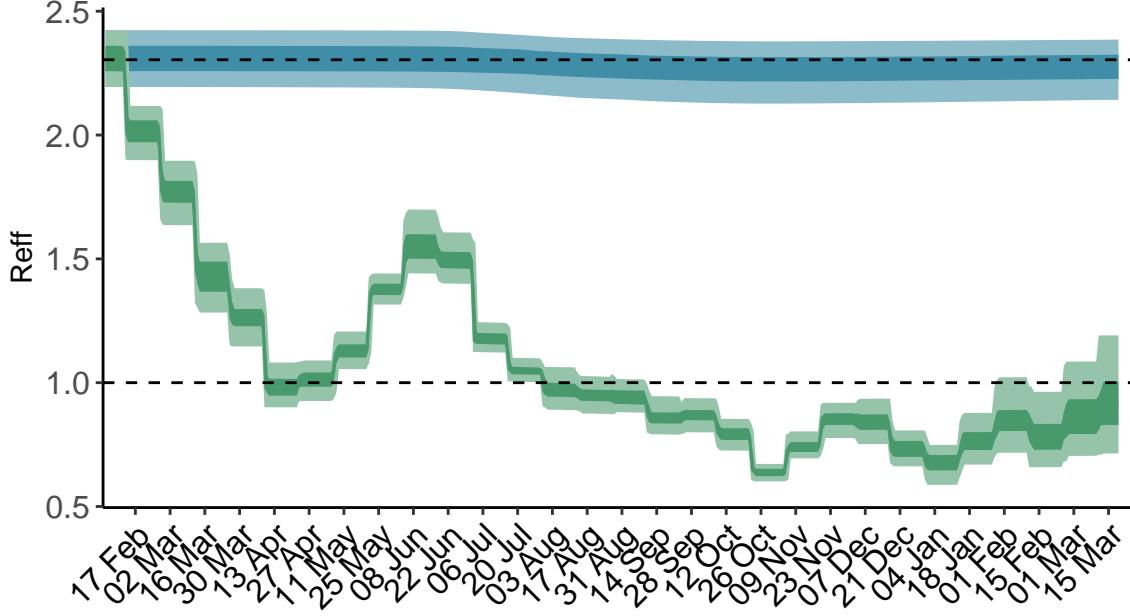


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

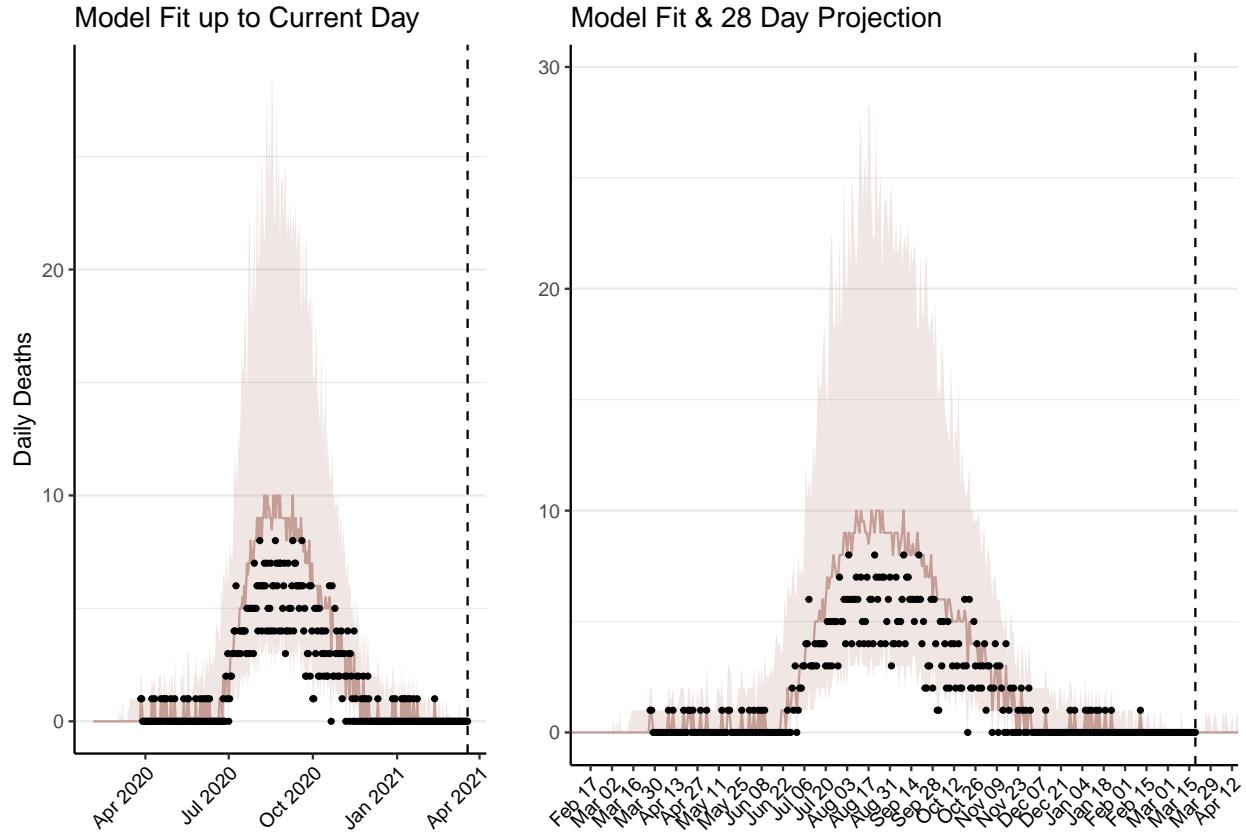


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 1 (95% CI: 1-1) patients requiring treatment with high-pressure oxygen at the current date to 1 (95% CI: 1-1) hospital beds being required on 2021-04-16 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 0 (95% CI: 0-1) by 2021-04-16. 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.**

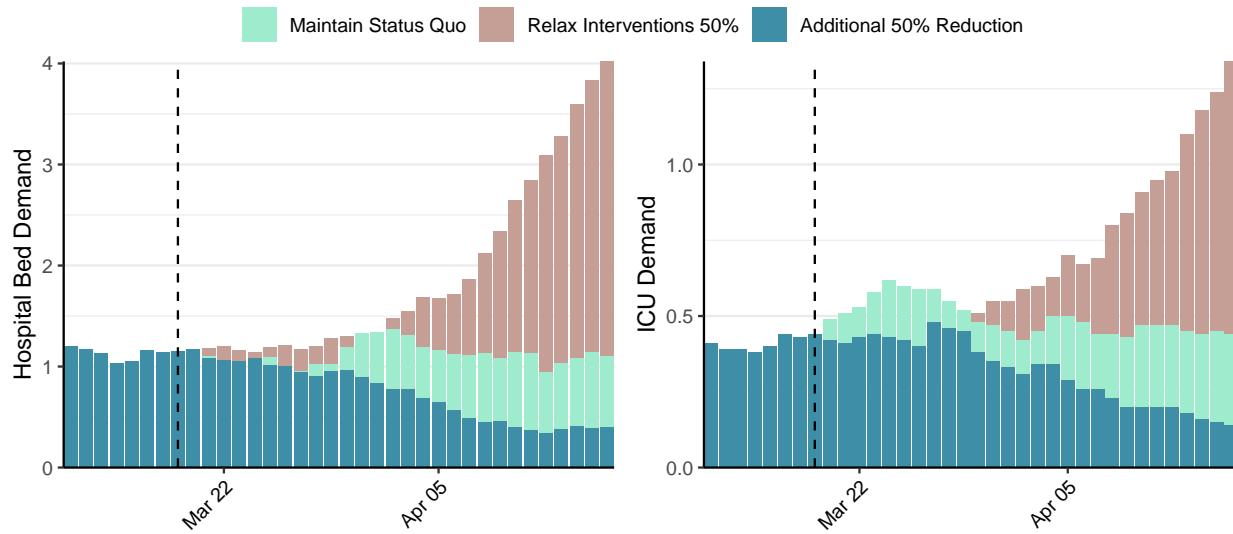


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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: 10-16) at the current date to 1 (95% CI: 1-2) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 13 (95% CI: 10-16) at the current date to 100 (95% CI: 54-147) by 2021-04-16.

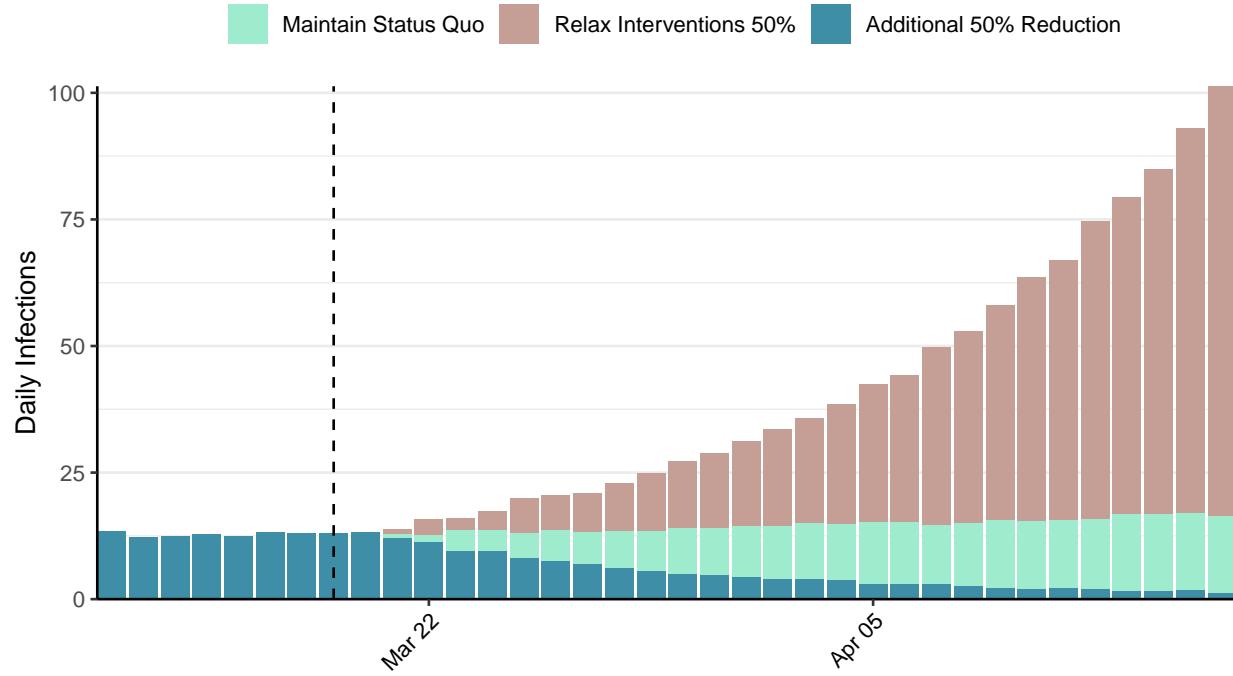


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: St. Vincent and the Grenadines, 2021-03-19

[Download the report for St. Vincent and the Grenadines, 2021-03-19 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}
1,692	8	9	0	1.11 (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. Vincent and the Grenadines is not shown in the following plot as only 9 deaths have been reported to date

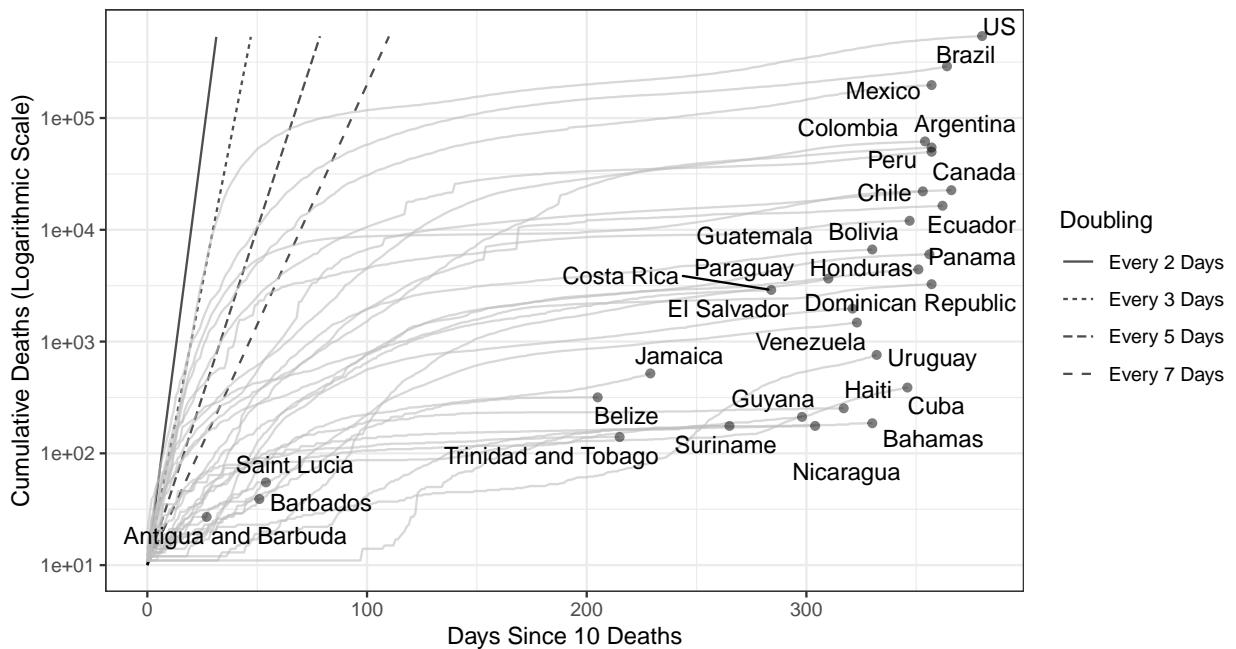


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 3,856 (95% CI: 3,427-4,285) 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

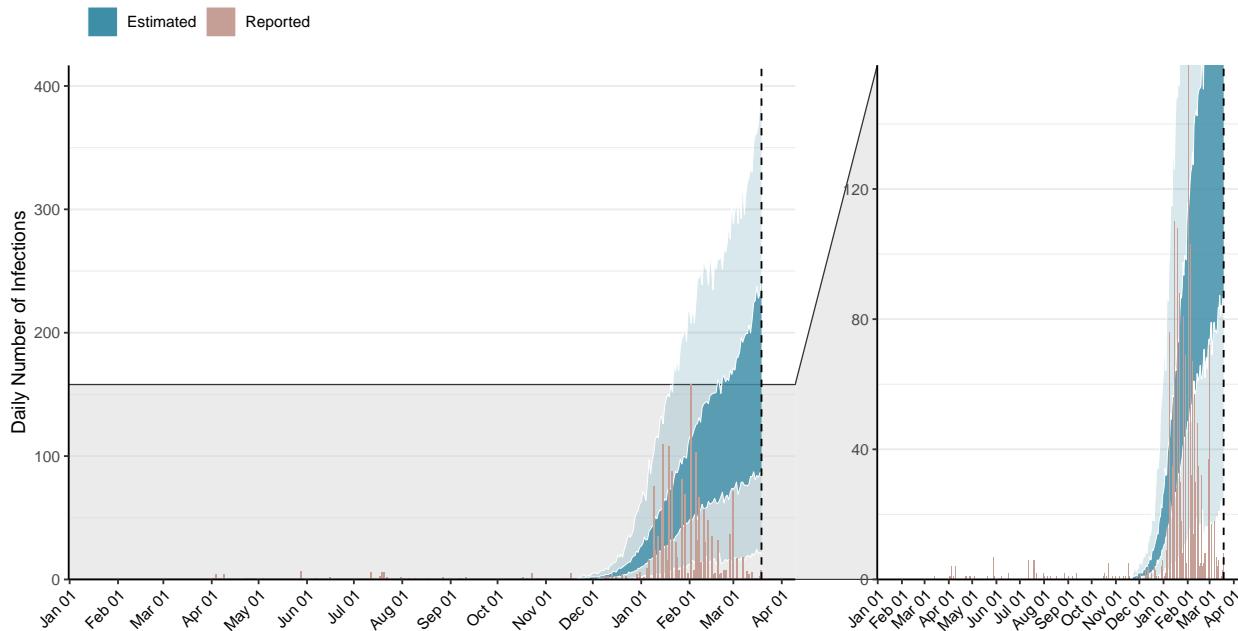


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

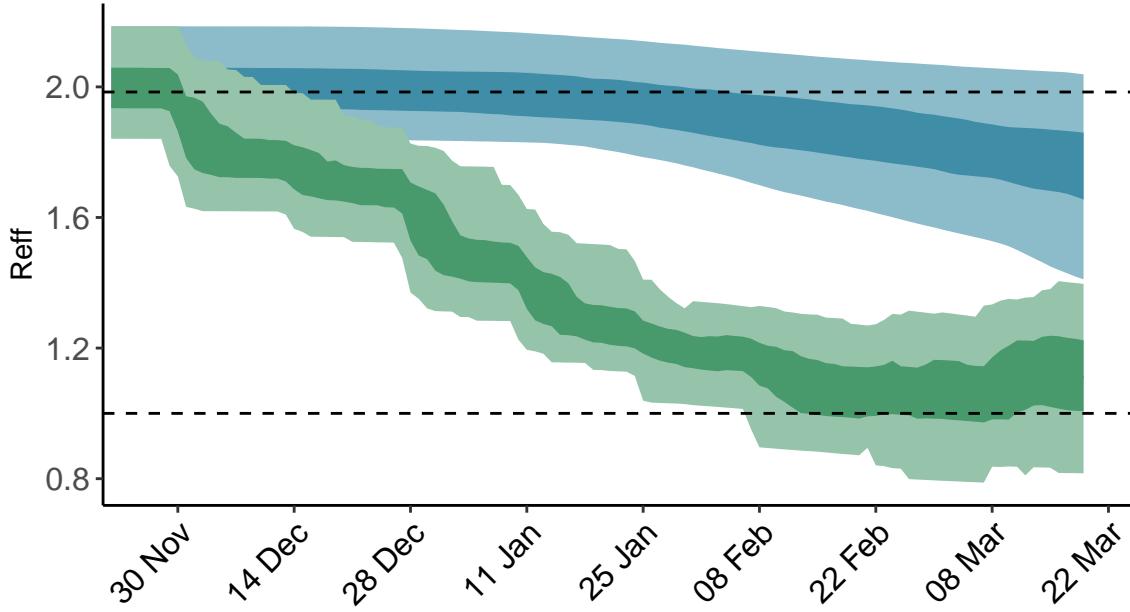


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

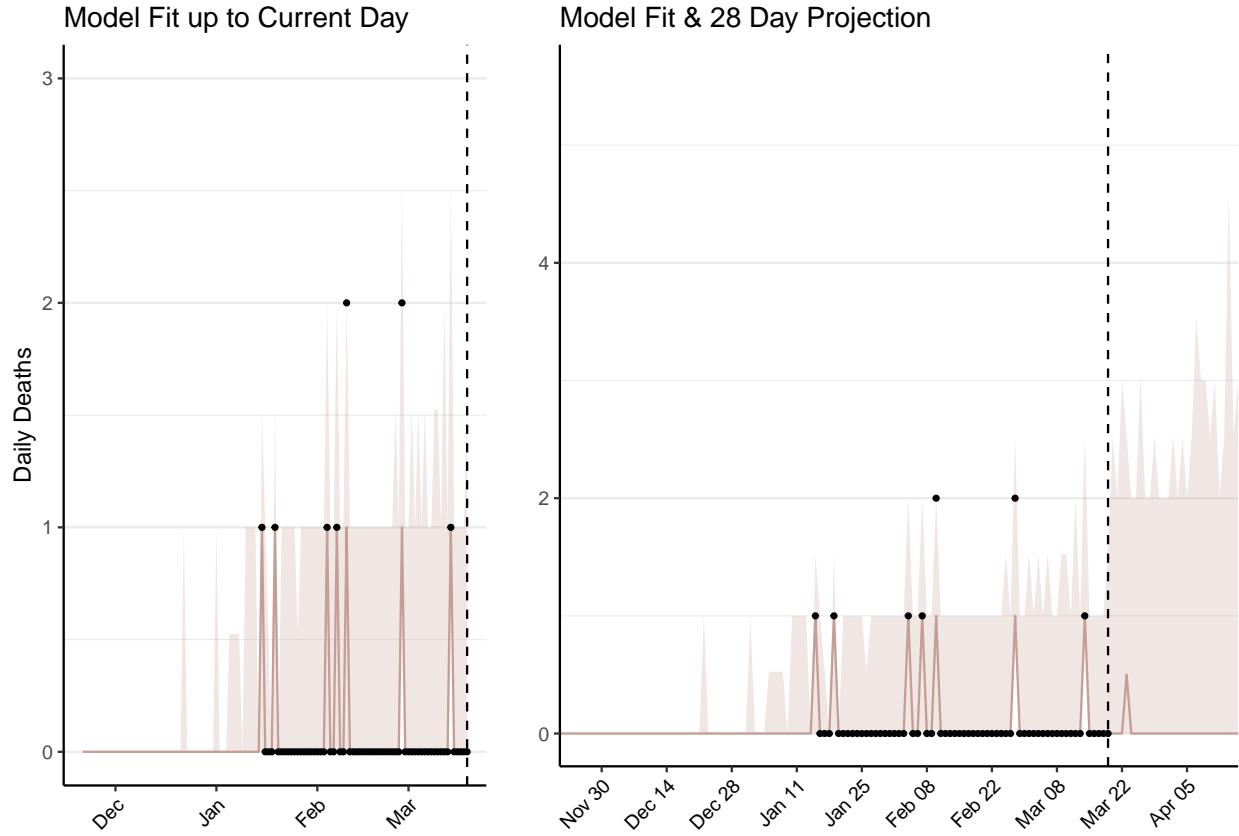


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 15 (95% CI: 13-17) patients requiring treatment with high-pressure oxygen at the current date to 14 (95% CI: 11-17) hospital beds being required on 2021-04-16 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 4 (95% CI: 3-5) by 2021-04-16. 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.**

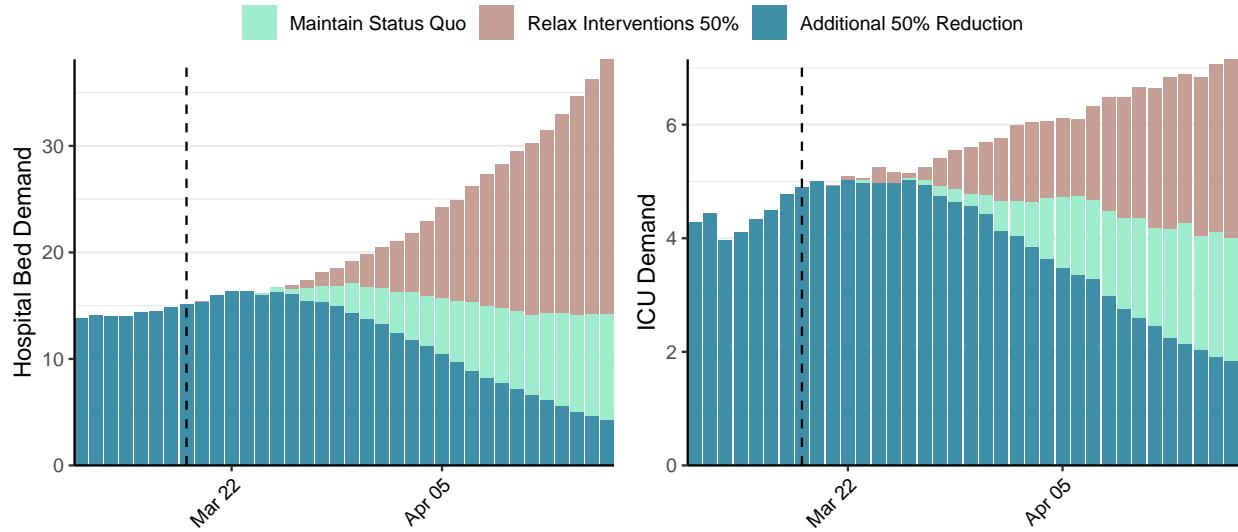


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 170 (95% CI: 148-192) at the current date to 11 (95% CI: 7-14) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 170 (95% CI: 148-192) at the current date to 448 (95% CI: 332-565) by 2021-04-16.

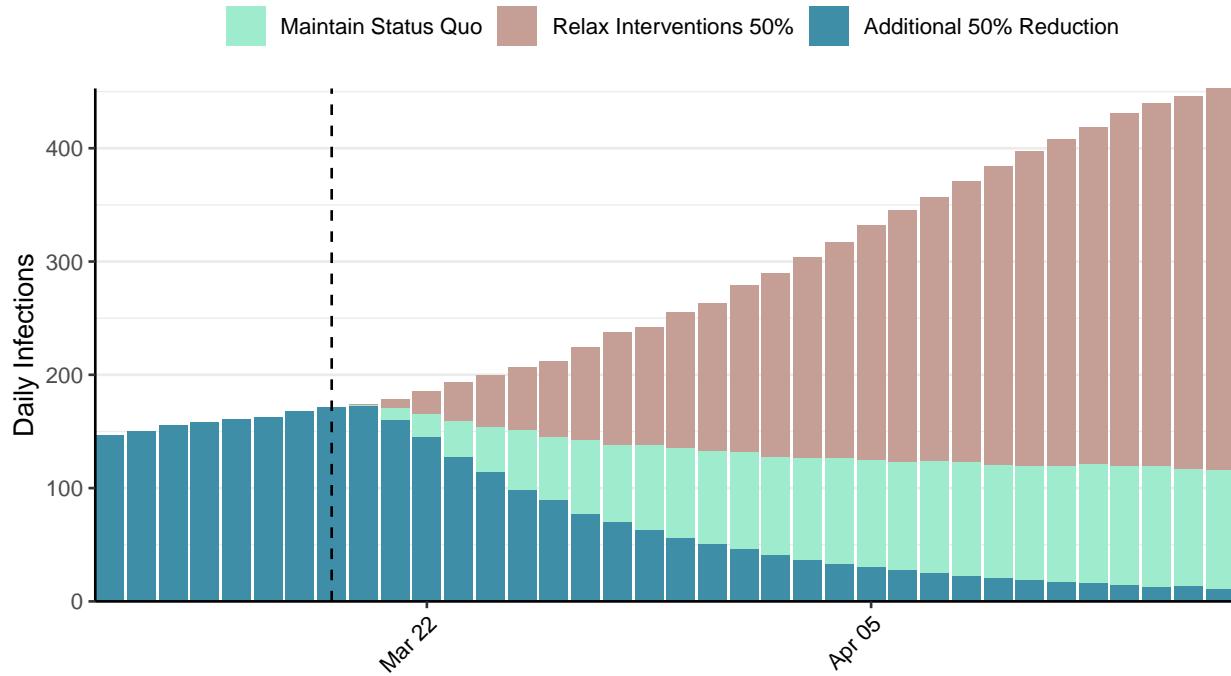


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Venezuela, 2021-03-19

[Download the report for Venezuela, 2021-03-19 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}
149,145	937	1,481	8	0.96 (95% CI: 0.85-1.07)

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.

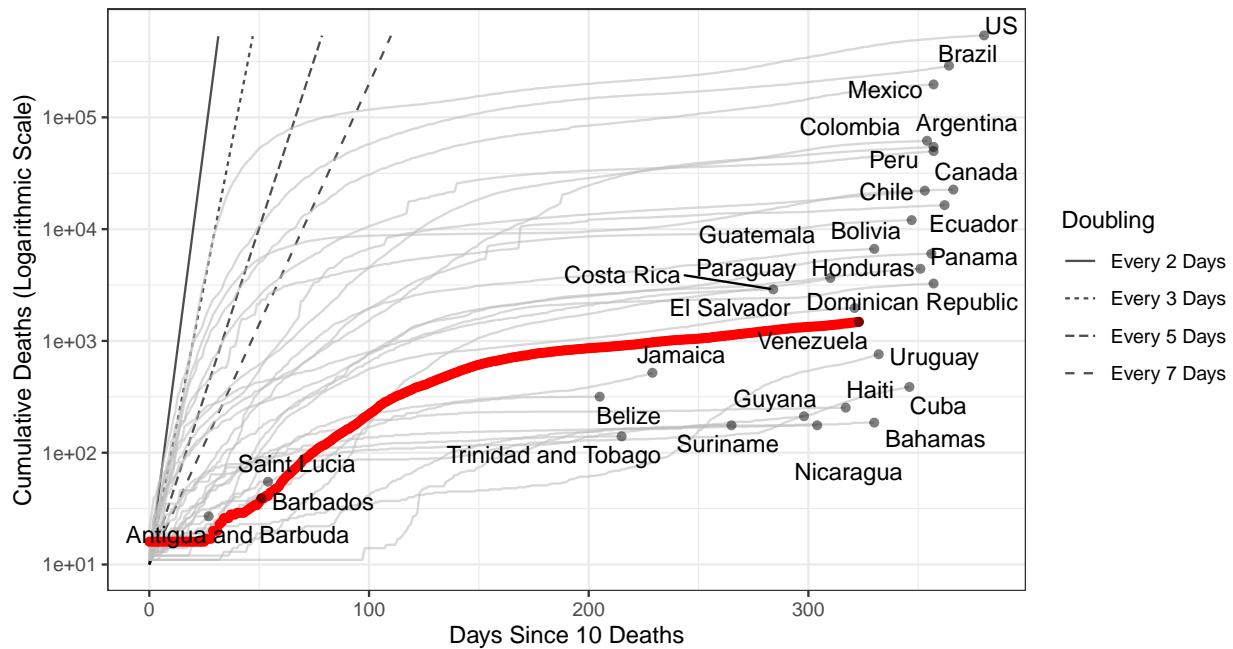


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 109,197 (95% CI: 105,055-113,339) 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).

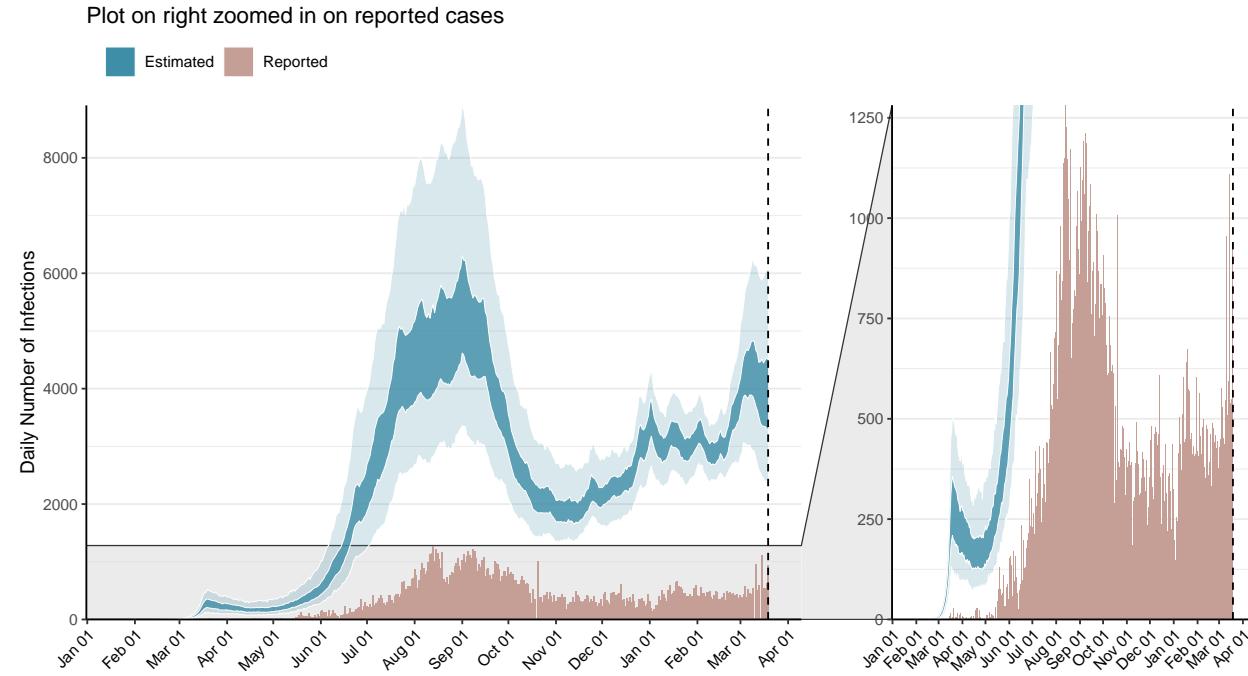


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

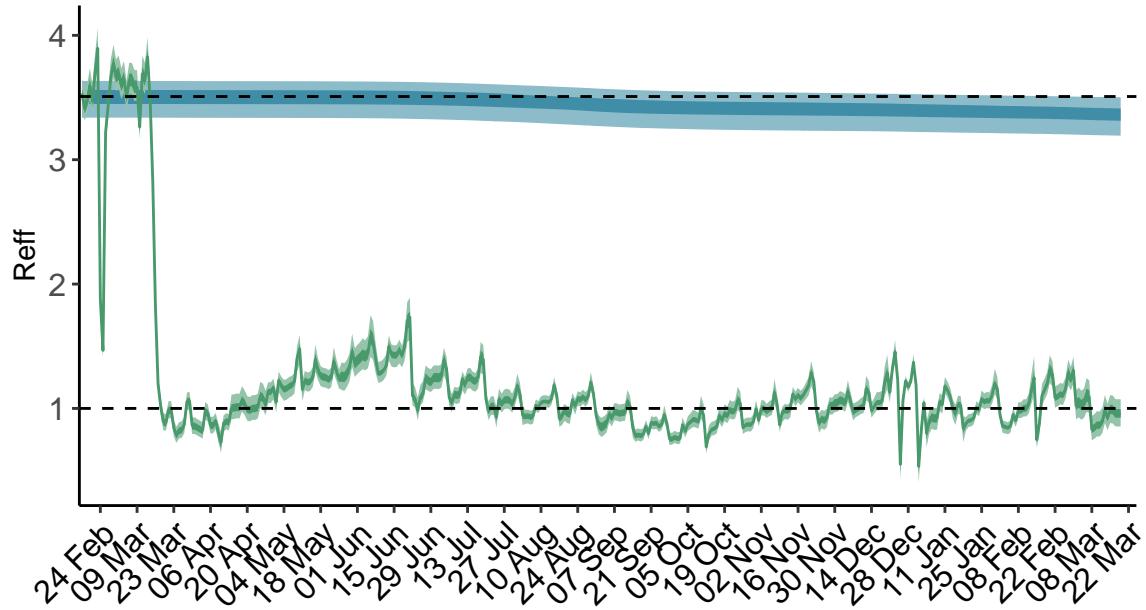


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

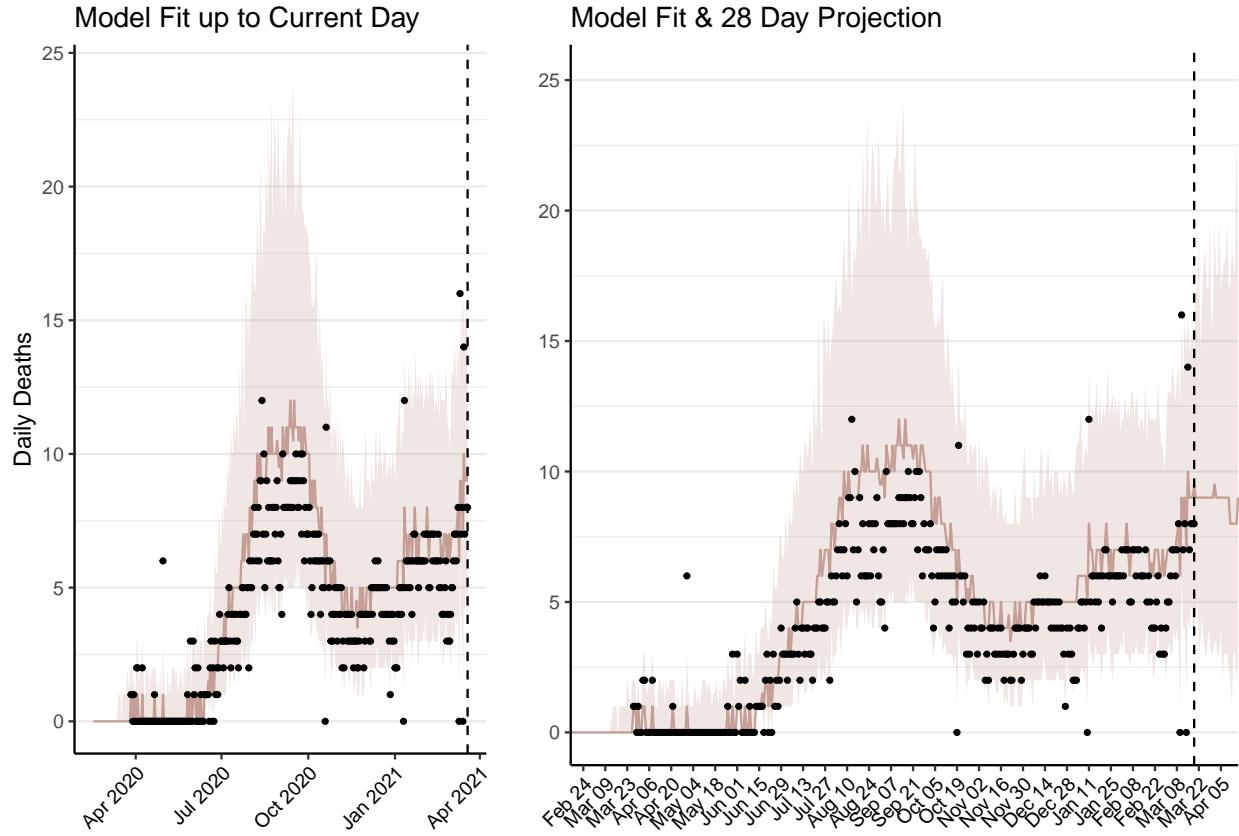


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 353 (95% CI: 338-368) patients requiring treatment with high-pressure oxygen at the current date to 332 (95% CI: 306-359) hospital beds being required on 2021-04-16 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 129 (95% CI: 124-134) patients requiring treatment with mechanical ventilation at the current date to 125 (95% CI: 116-135) by 2021-04-16. 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.**

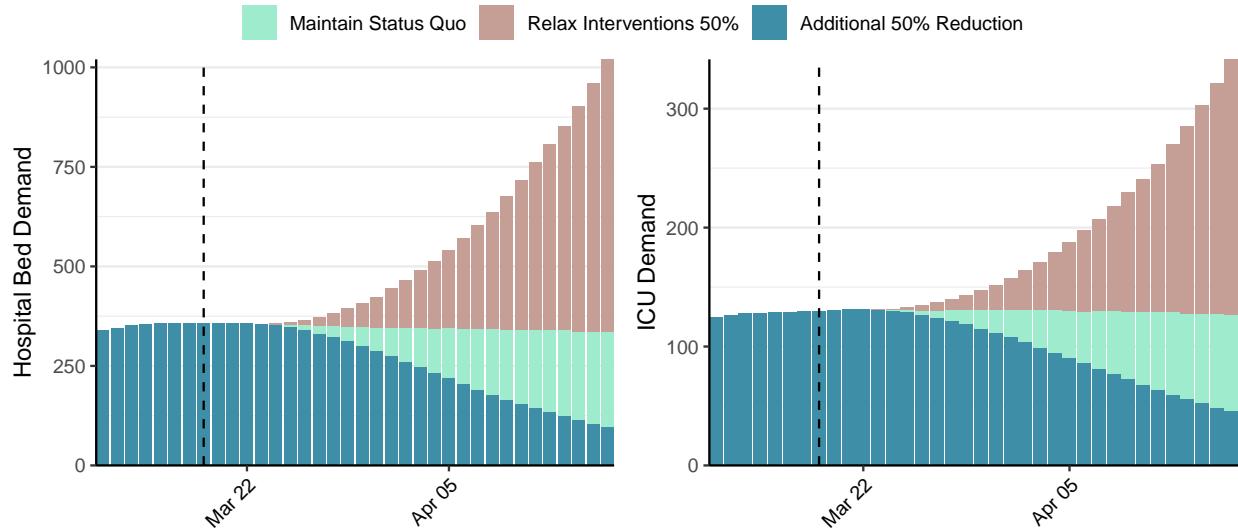


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 3,957 (95% CI: 3,744-4,170) at the current date to 309 (95% CI: 282-336) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 3,957 (95% CI: 3,744-4,170) at the current date to 20,714 (95% CI: 18,618-22,811) by 2021-04-16.

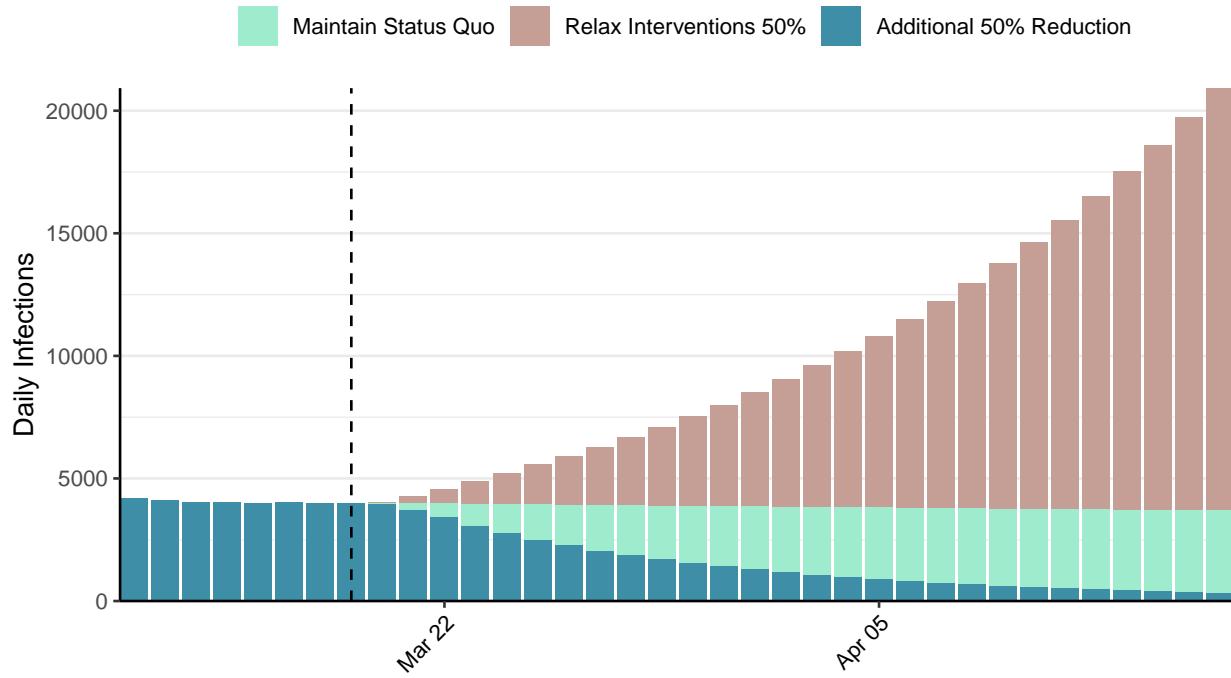


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Vietnam, 2021-03-19

[Download the report for Vietnam, 2021-03-19 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}
2,571	1	36	0	0.69 (95% CI: 0.41-1.14)

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.

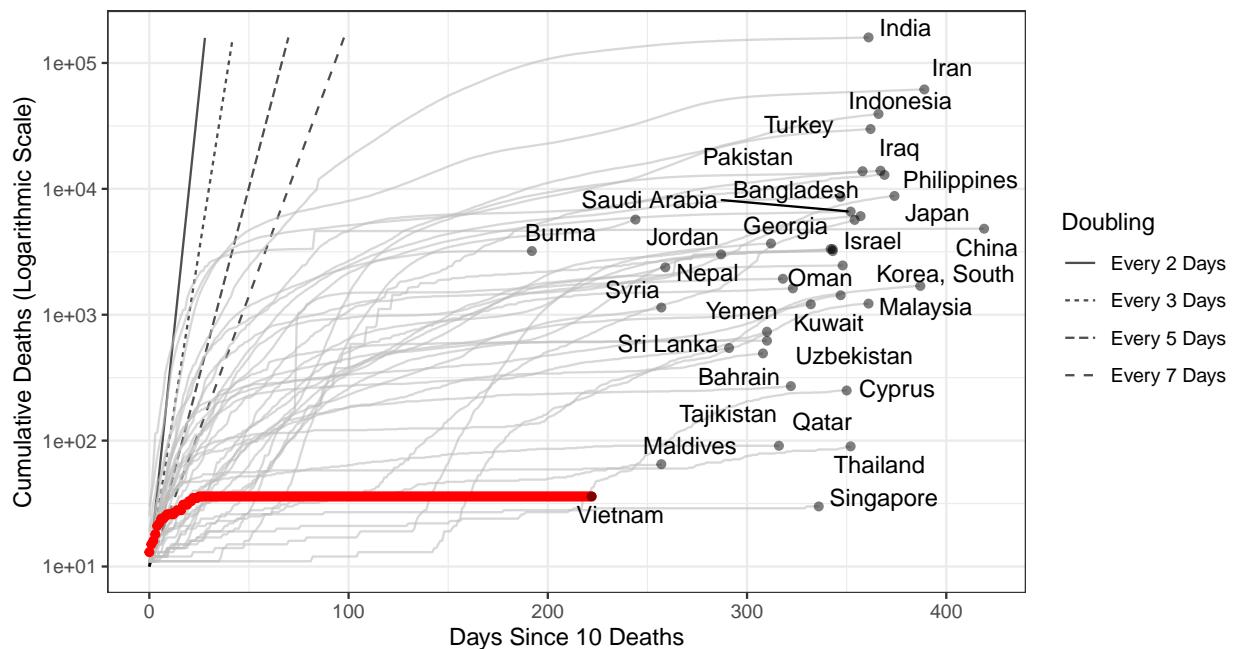


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 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).

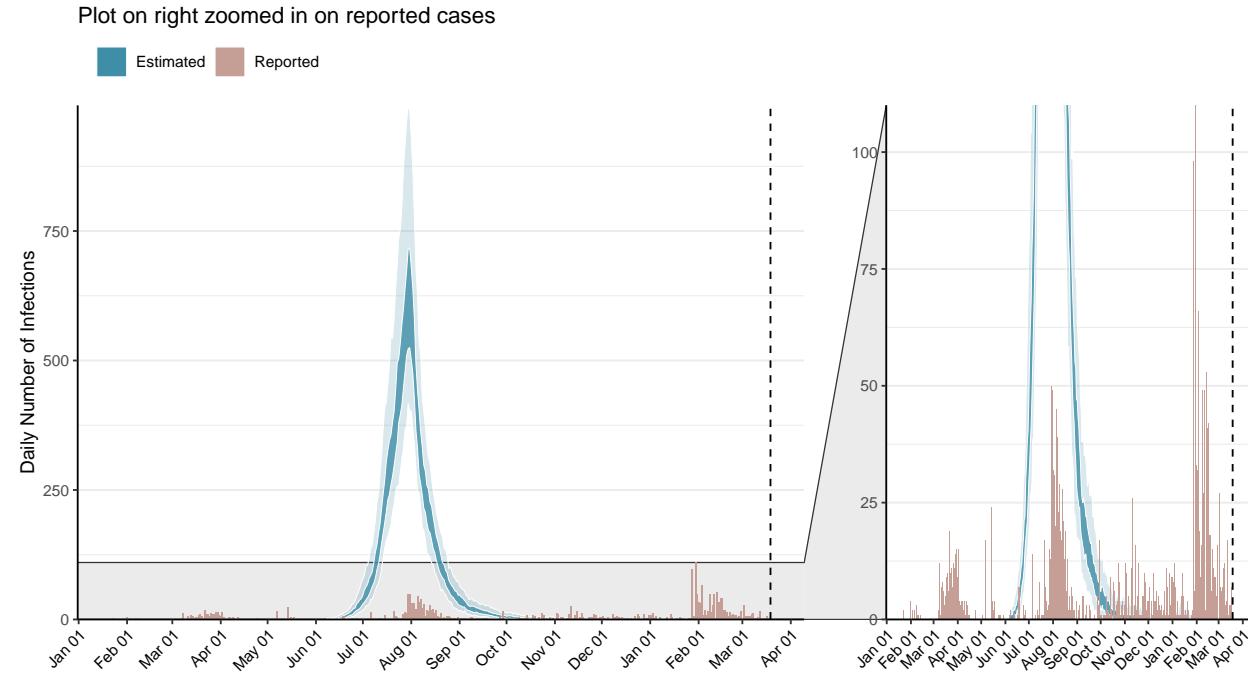


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

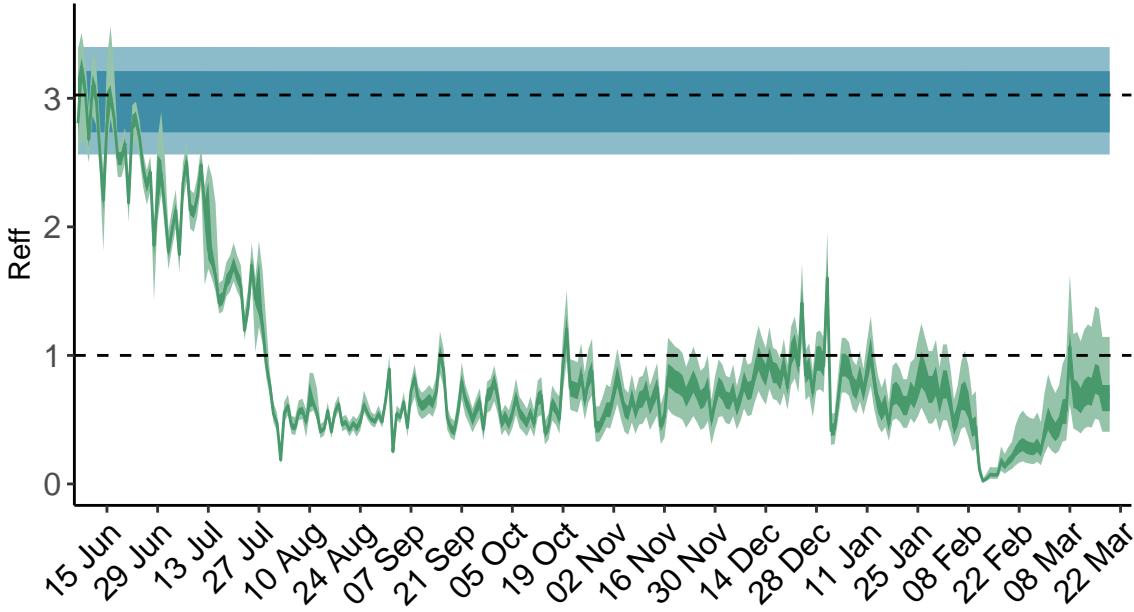


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

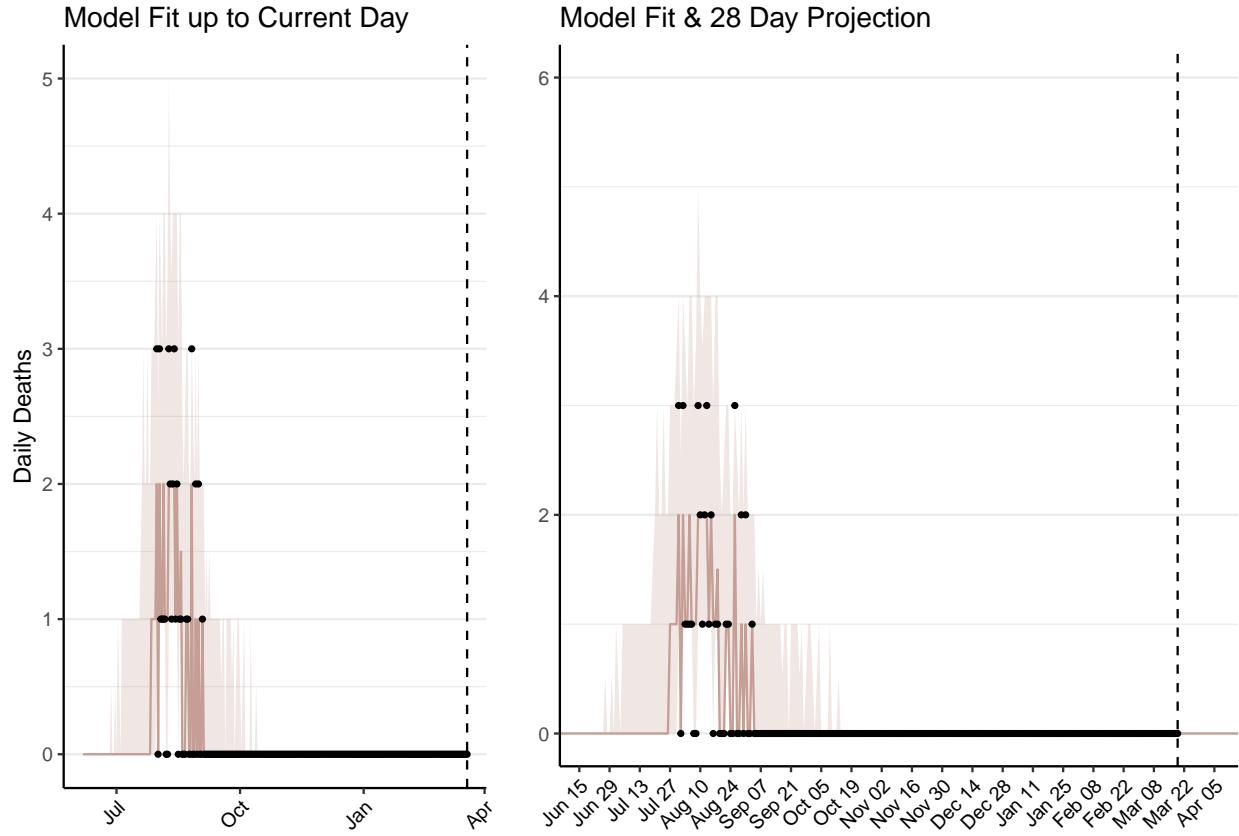


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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: 0-0) hospital beds being required on 2021-04-16 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 2021-04-16. 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.**

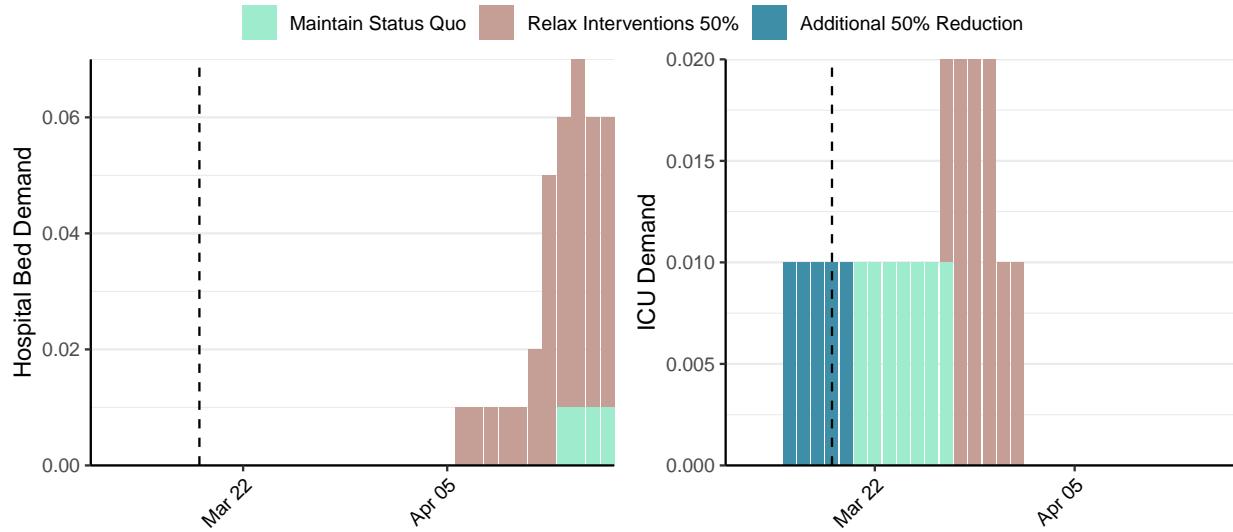


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2021-04-16. 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 1 (95% CI: -1-2) by 2021-04-16.

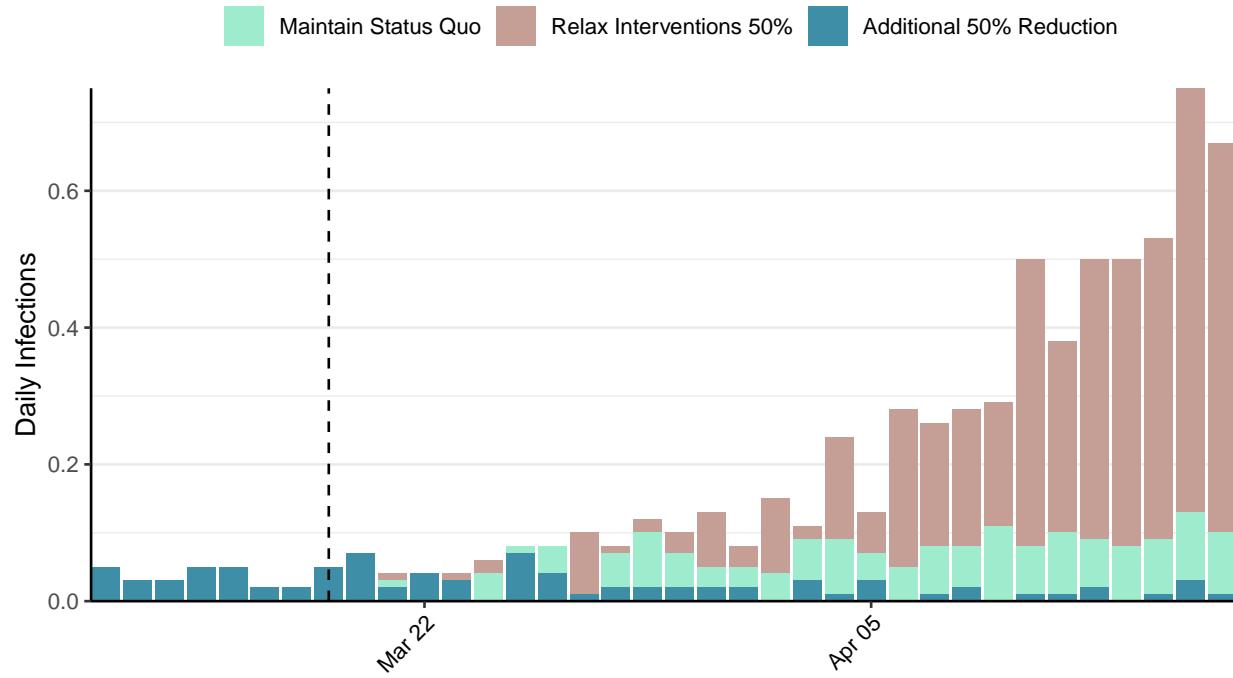


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: Yemen, 2021-03-19

[Download the report for Yemen, 2021-03-19 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}
3,217	91	733	10	1.68 (95% CI: 1.49-1.9)

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.

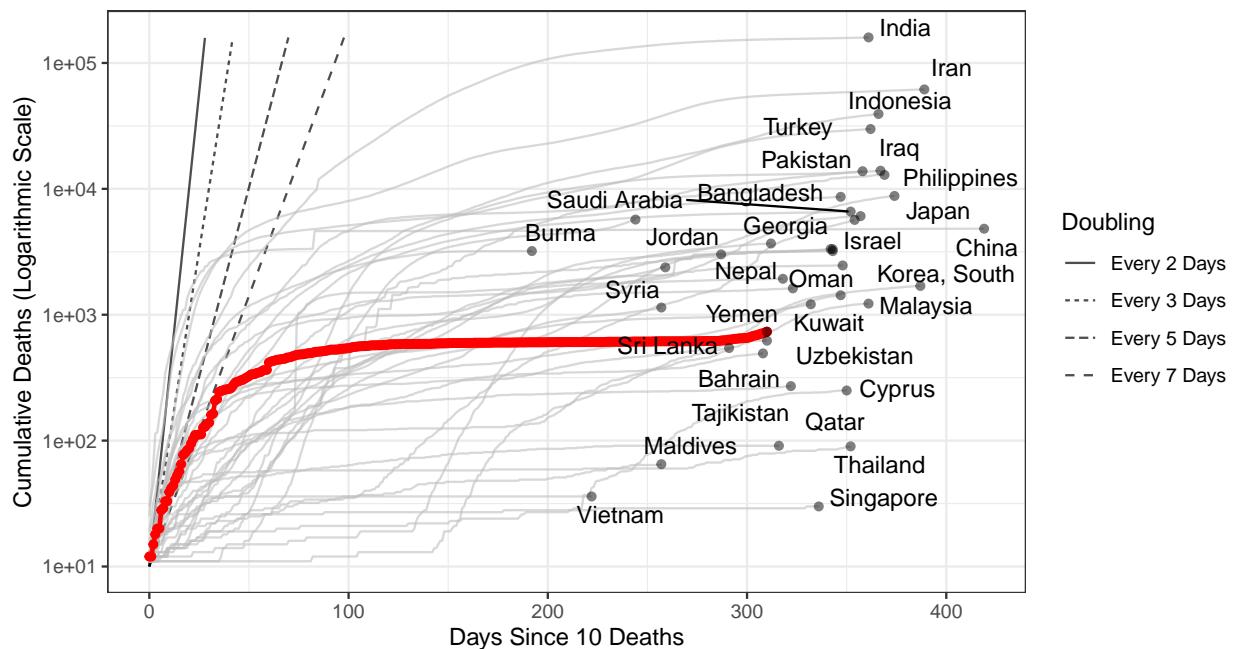


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 219,949 (95% CI: 207,461-232,437) 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.**

Plot on right zoomed in on reported cases

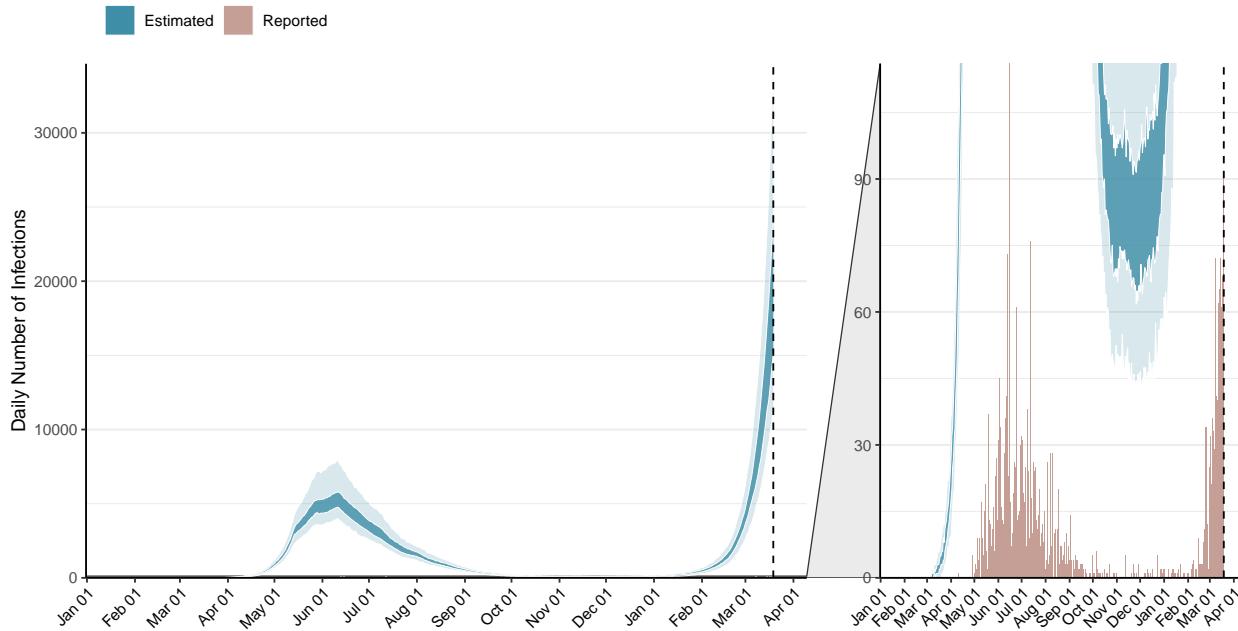


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

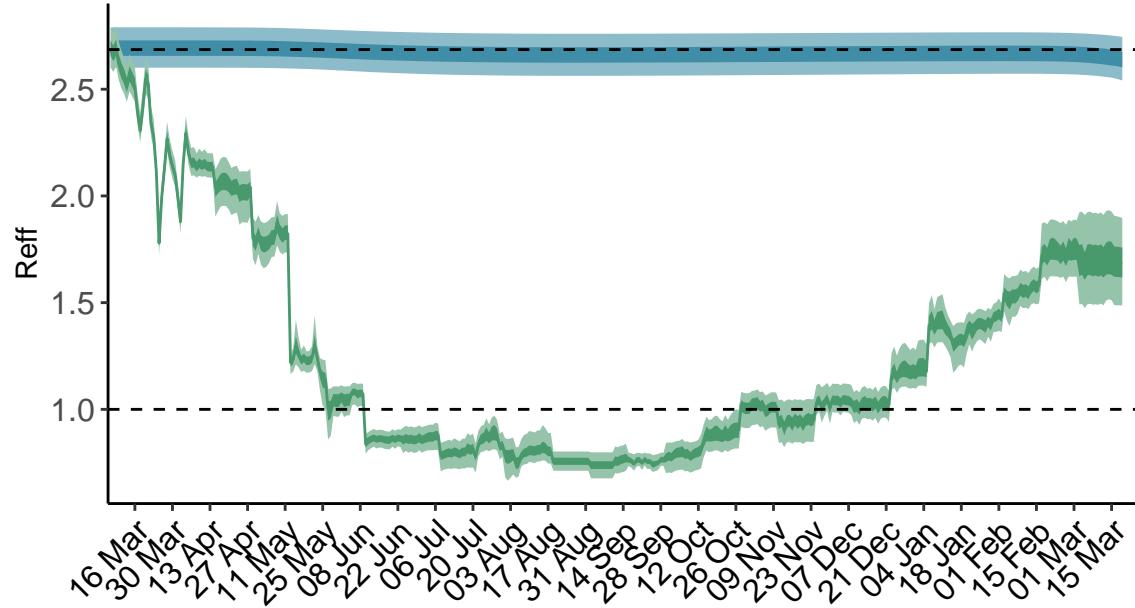


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. Yemen 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](#).

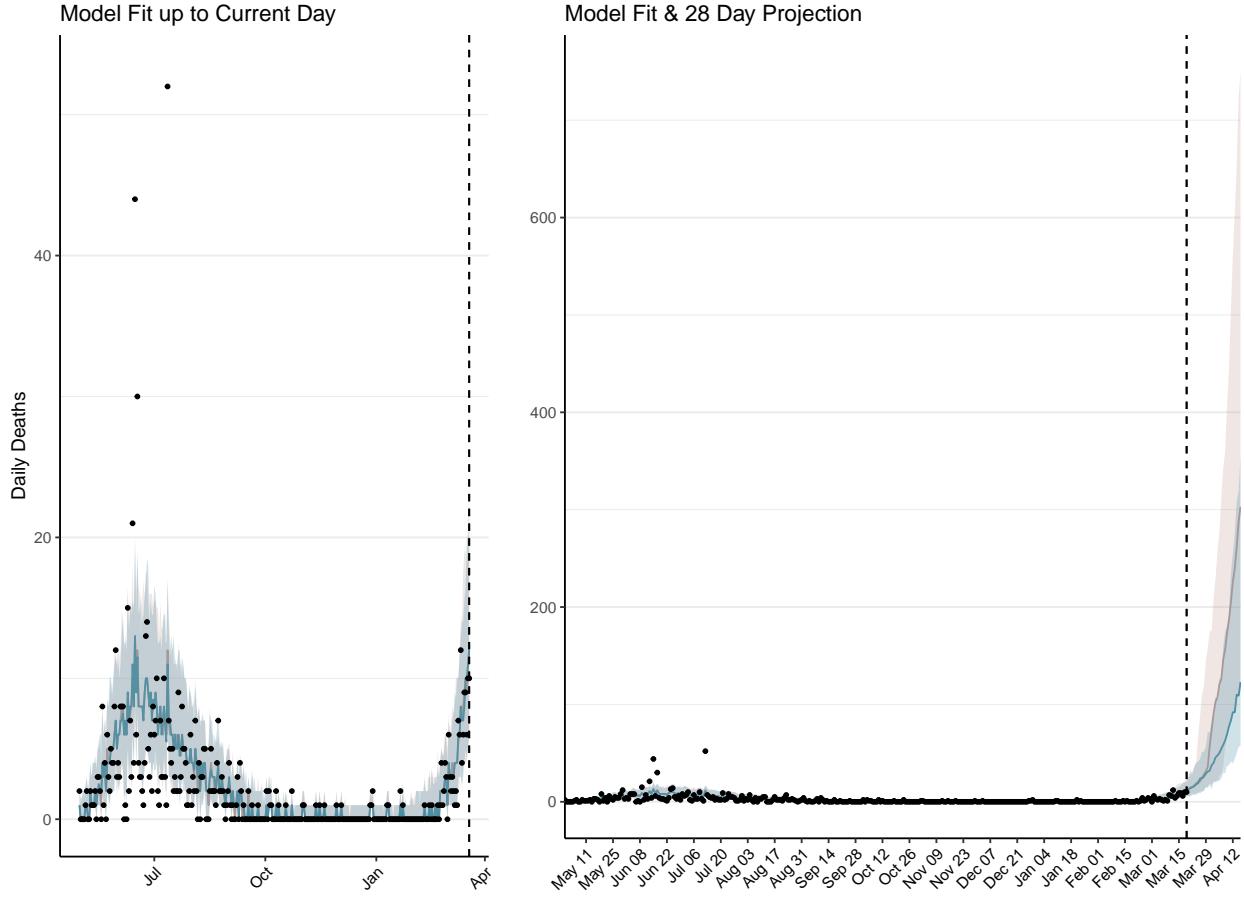


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 693 (95% CI: 654-732) patients requiring treatment with high-pressure oxygen at the current date to 7,226 (95% CI: 6,525-7,928) hospital beds being required on 2021-04-16 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: 220-247) patients requiring treatment with mechanical ventilation at the current date to 906 (95% CI: 861-950) by 2021-04-16. 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.**

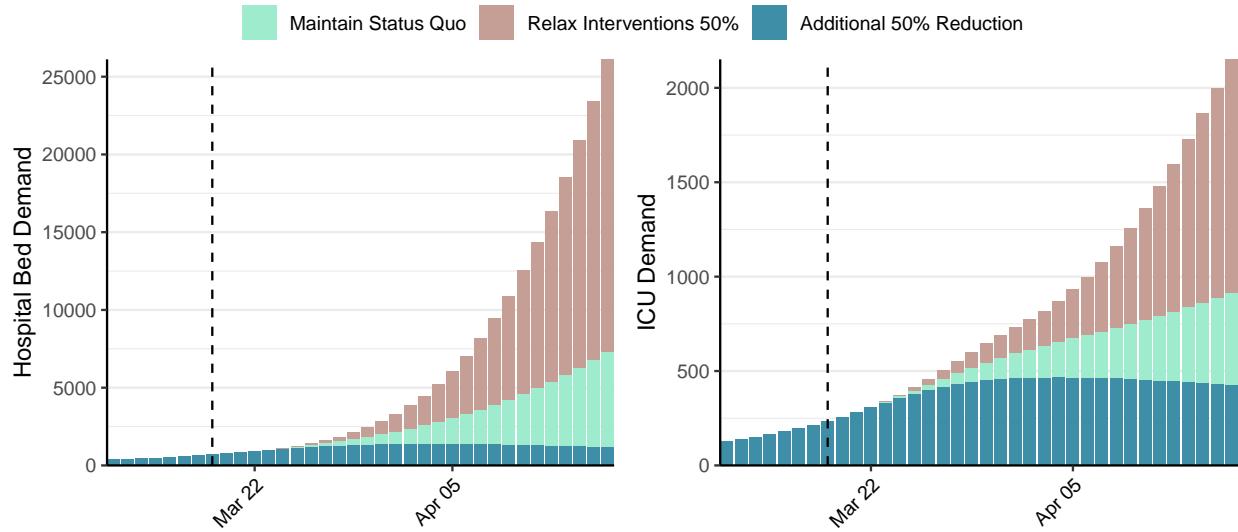


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 20,291 (95% CI: 18,893-21,688) at the current date to 11,732 (95% CI: 10,413-13,051) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 20,291 (95% CI: 18,893-21,688) at the current date to 827,878 (95% CI: 780,478-875,277) by 2021-04-16.

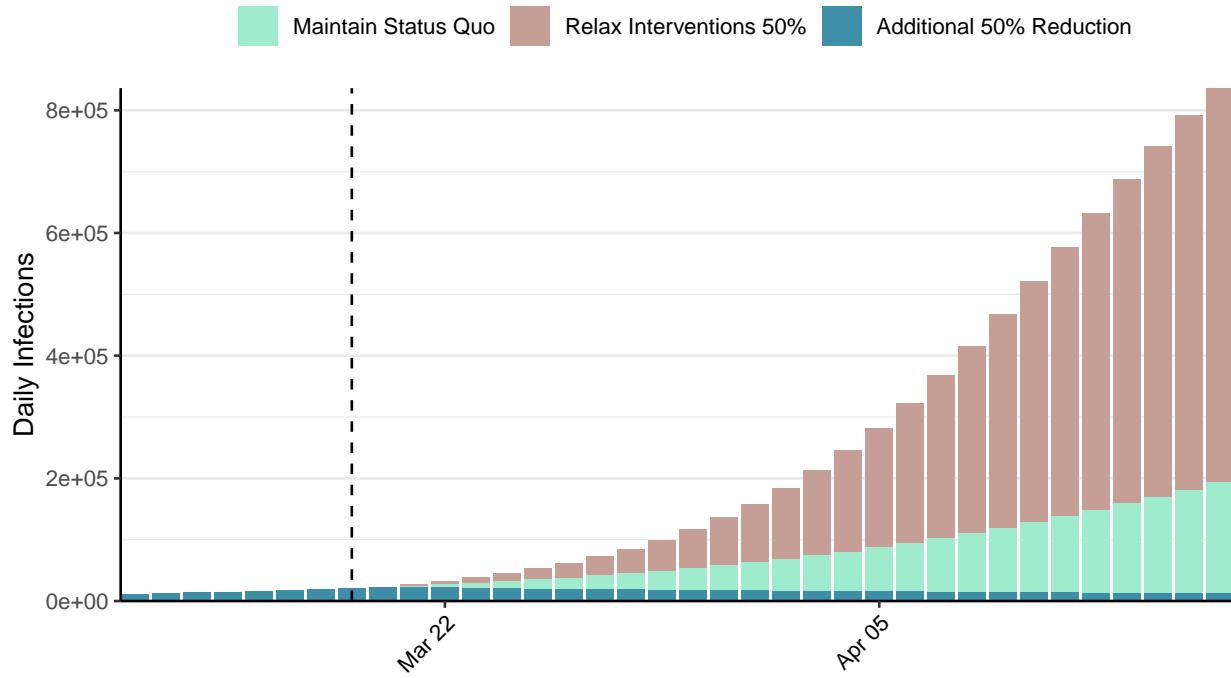


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections 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: South Africa, 2021-03-19

[Download the report for South Africa, 2021-03-19 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}
1,535,423	1,462	52,035	311	1.03 (95% CI: 0.87-1.22)

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.

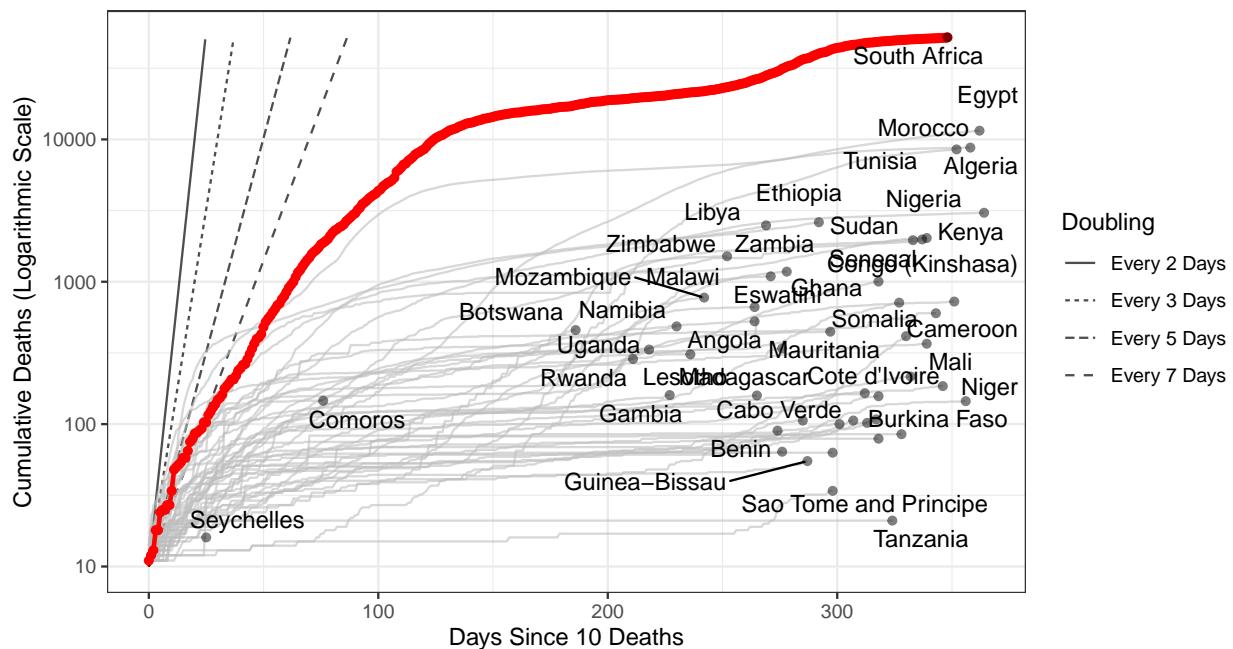


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 802,845 (95% CI: 767,377-838,313) 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).

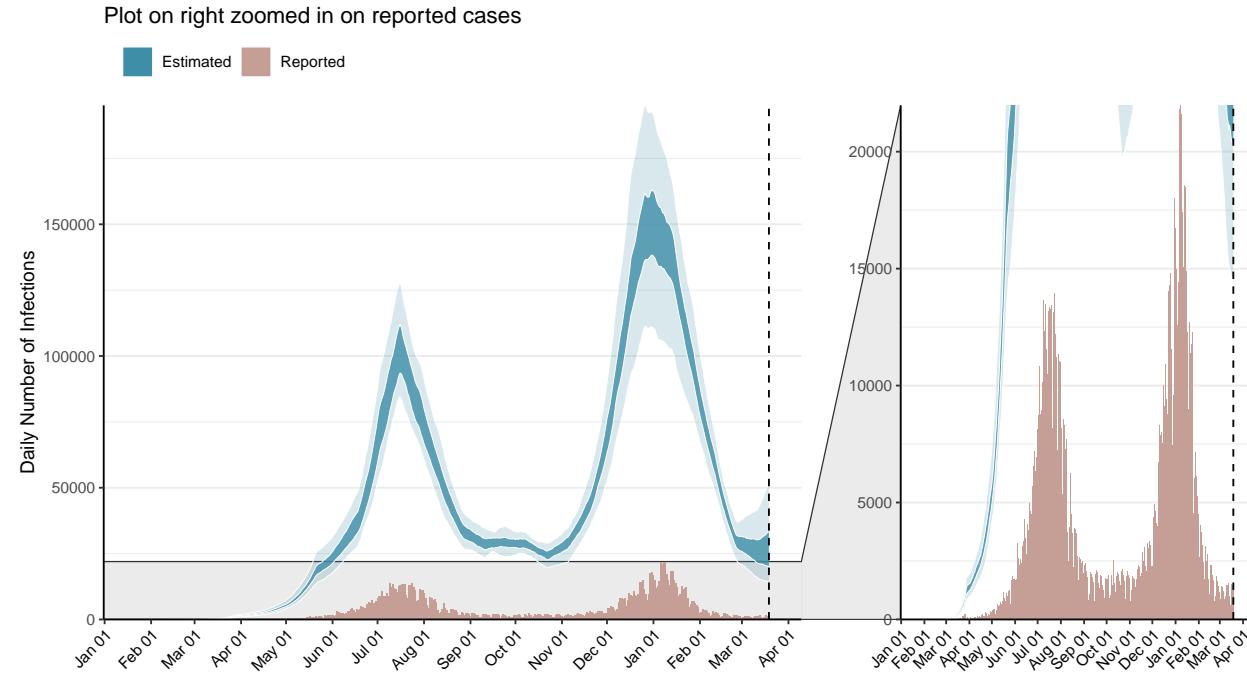


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

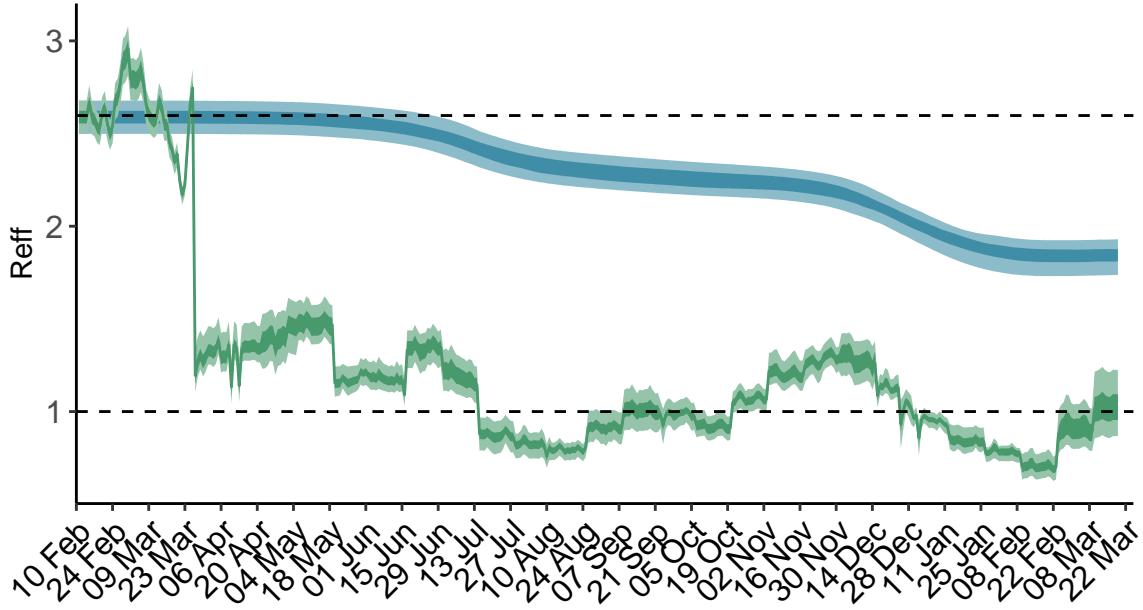


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. 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.](#)

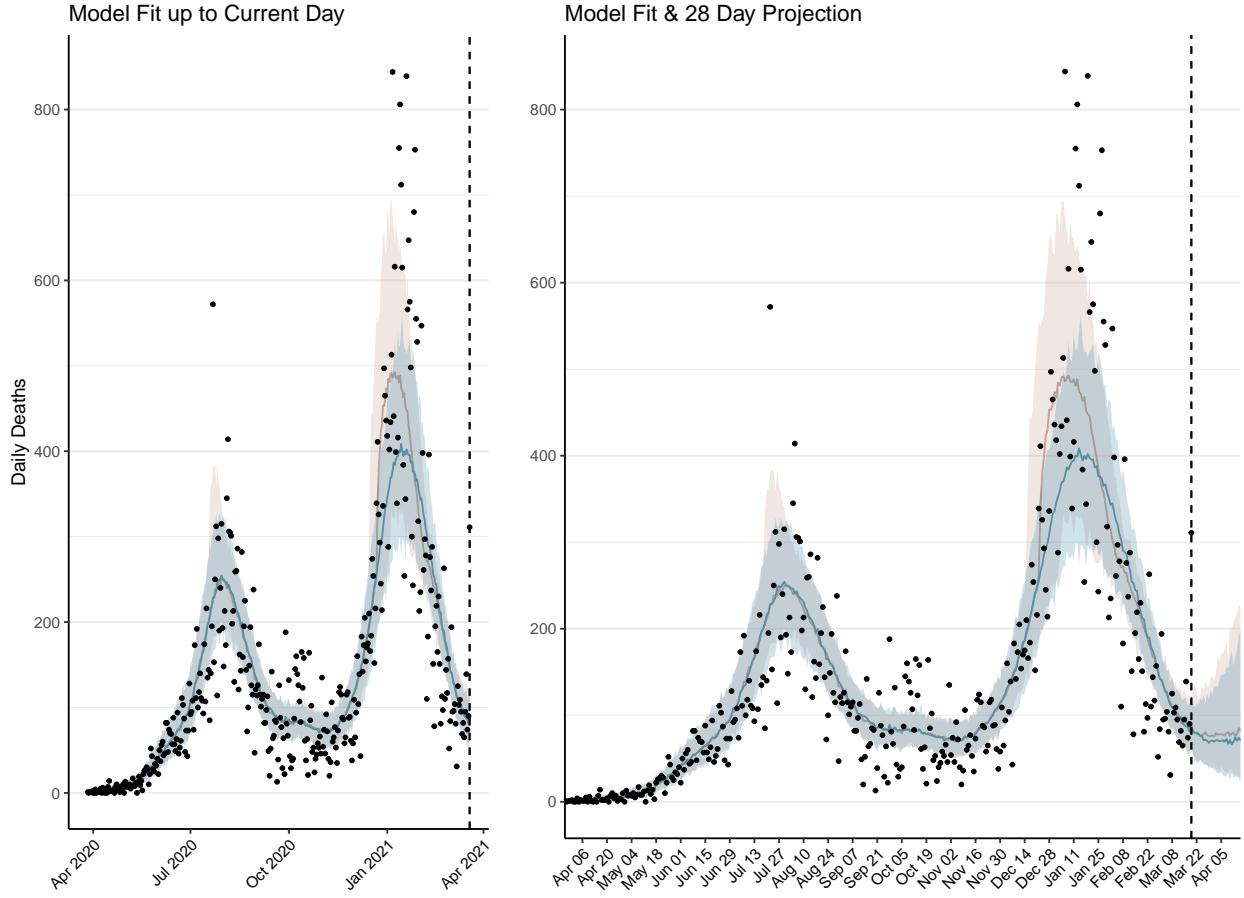


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 3,200 (95% CI: 3,046-3,353) patients requiring treatment with high-pressure oxygen at the current date to 3,765 (95% CI: 3,295-4,235) hospital beds being required on 2021-04-16 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 1,364 (95% CI: 1,306-1,421) patients requiring treatment with mechanical ventilation at the current date to 1,452 (95% CI: 1,290-1,613) by 2021-04-16. 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.**

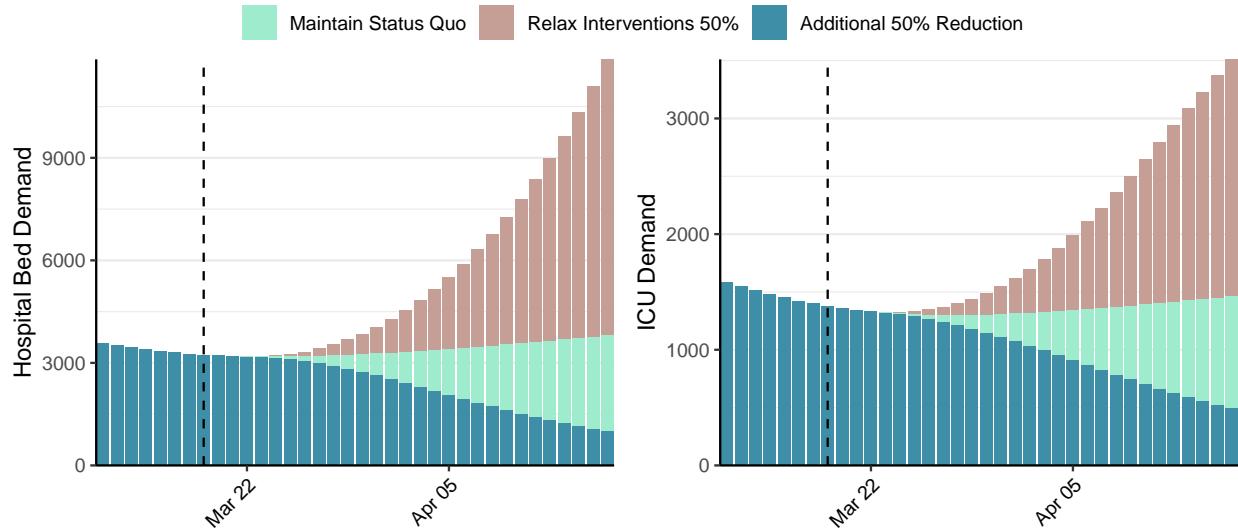


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 27,622 (95% CI: 25,532-29,712) at the current date to 3,036 (95% CI: 2,597-3,475) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 27,622 (95% CI: 25,532-29,712) at the current date to 200,921 (95% CI: 172,576-229,267) by 2021-04-16.

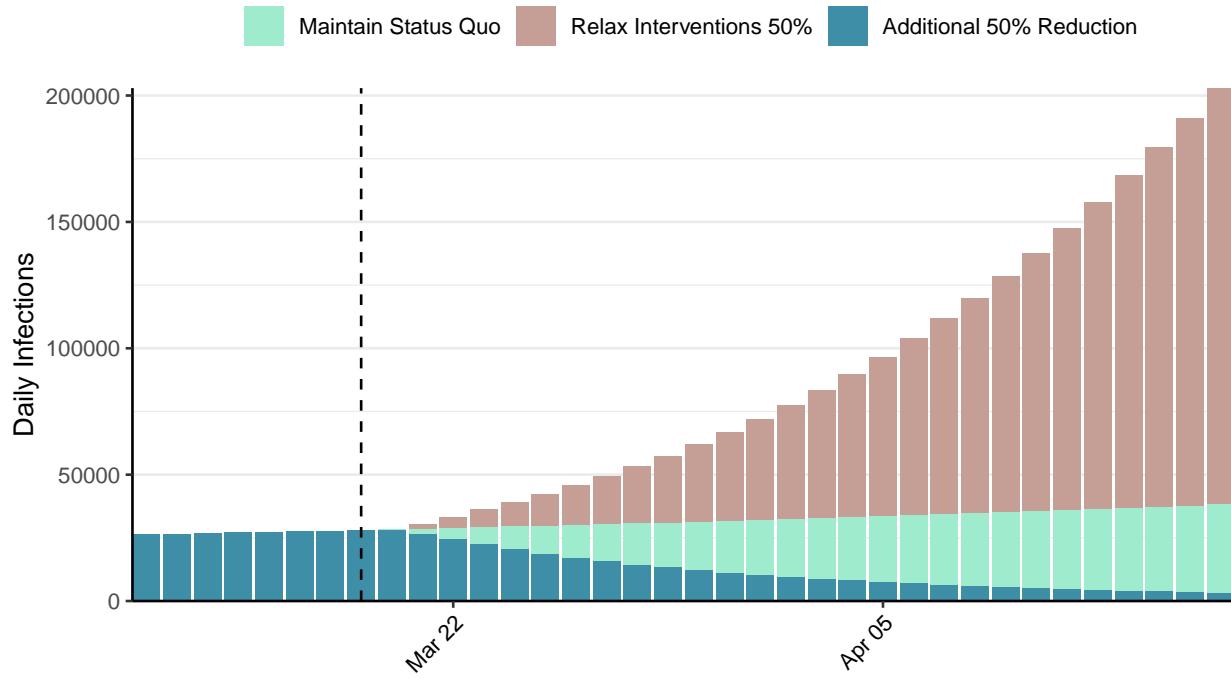


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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

Situation Report for COVID-19: Zambia, 2021-03-19

[Download the report for Zambia, 2021-03-19 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}
86,059	170	1,178	3	0.78 (95% CI: 0.63-0.98)

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.

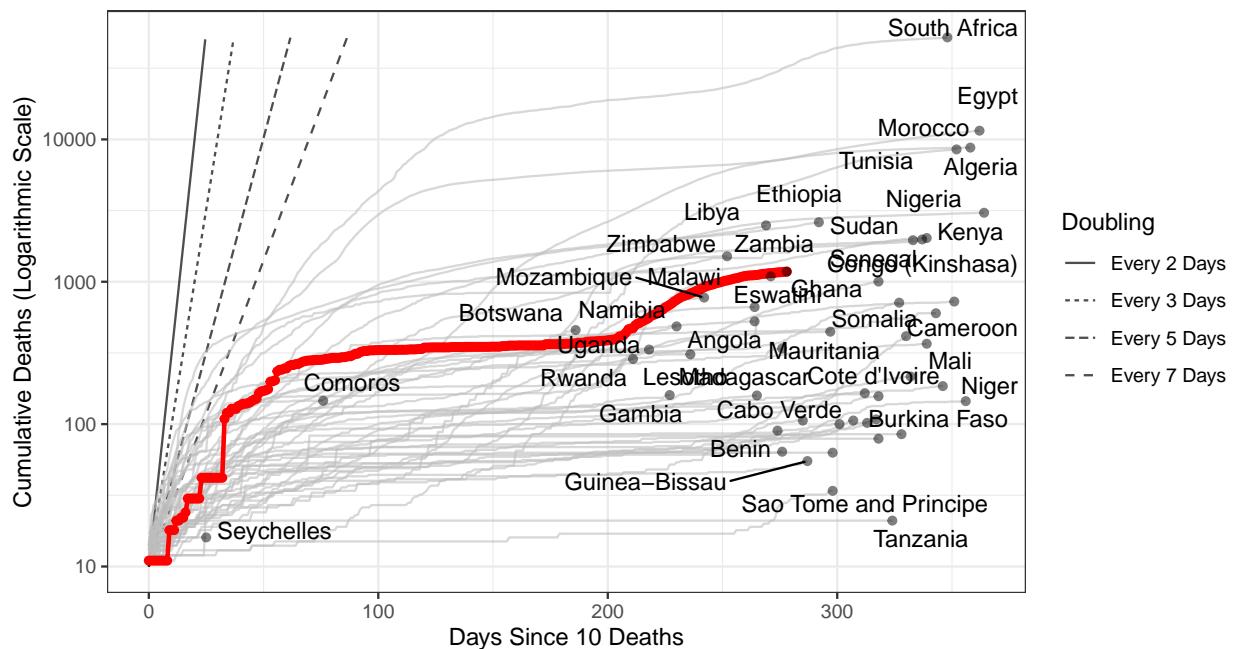


Figure 1: Cumulative Deaths since 10 deaths. Country not shown if fewer than 10 deaths.

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 88,179 (95% CI: 83,568-92,790) 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).

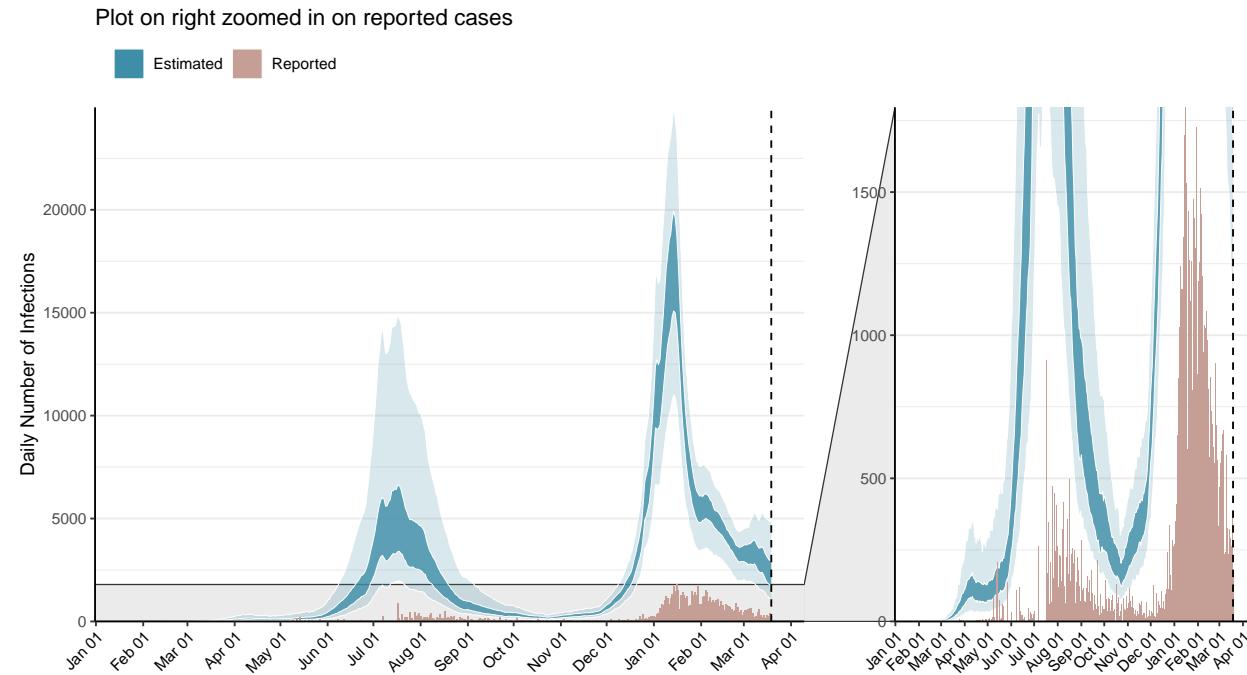


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

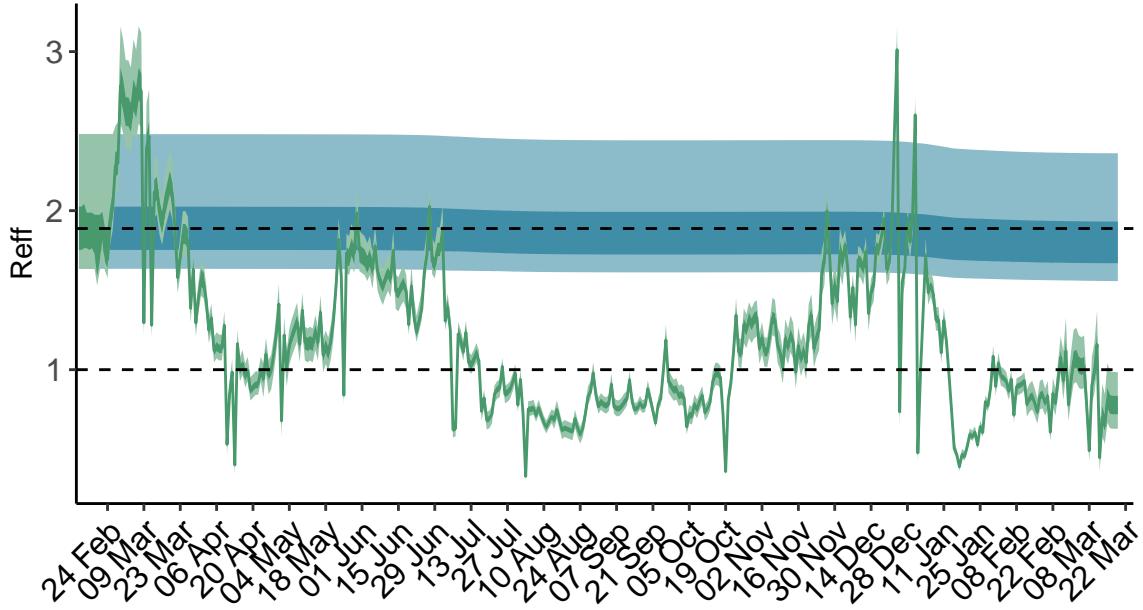


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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.

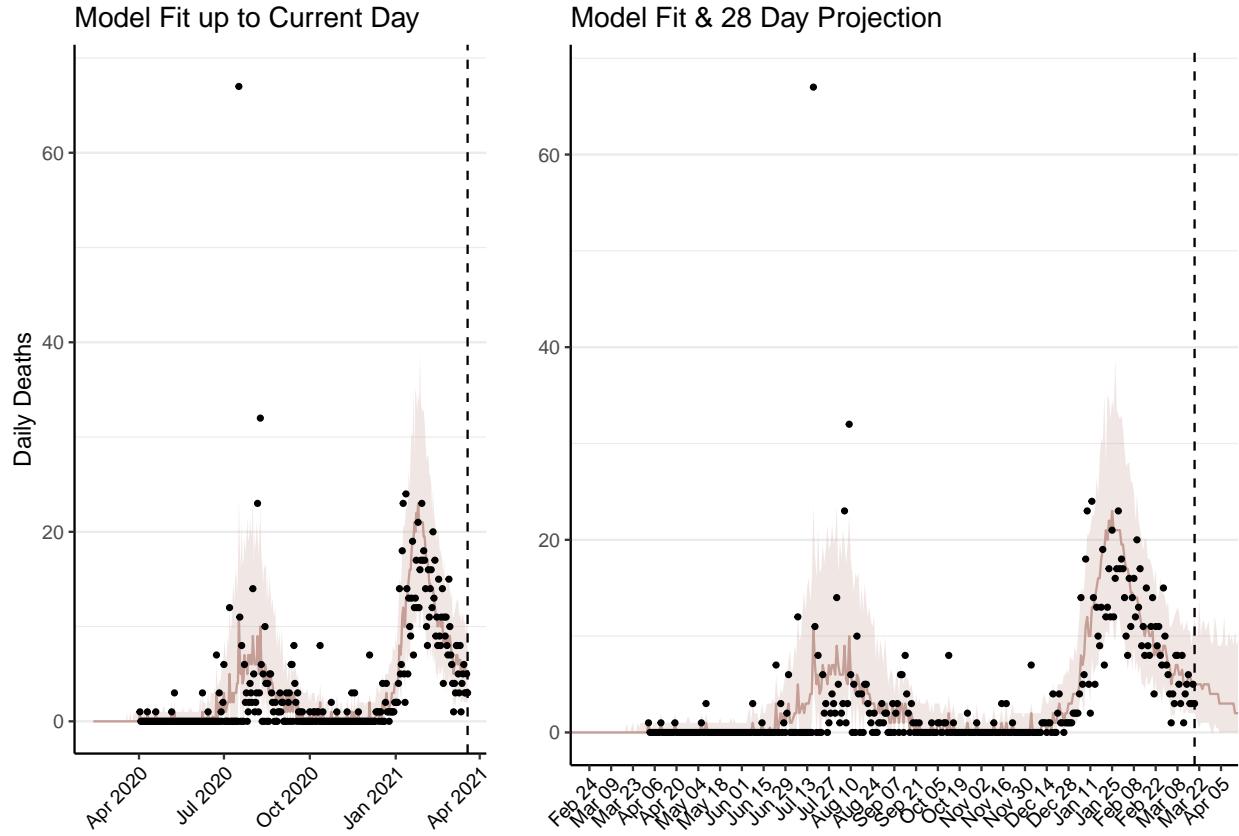


Figure 4: **Estimated daily deaths.** Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the 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 225 (95% CI: 213-238) patients requiring treatment with high-pressure oxygen at the current date to 113 (95% CI: 96-130) hospital beds being required on 2021-04-16 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 92 (95% CI: 87-97) patients requiring treatment with mechanical ventilation at the current date to 47 (95% CI: 41-54) by 2021-04-16. 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.**

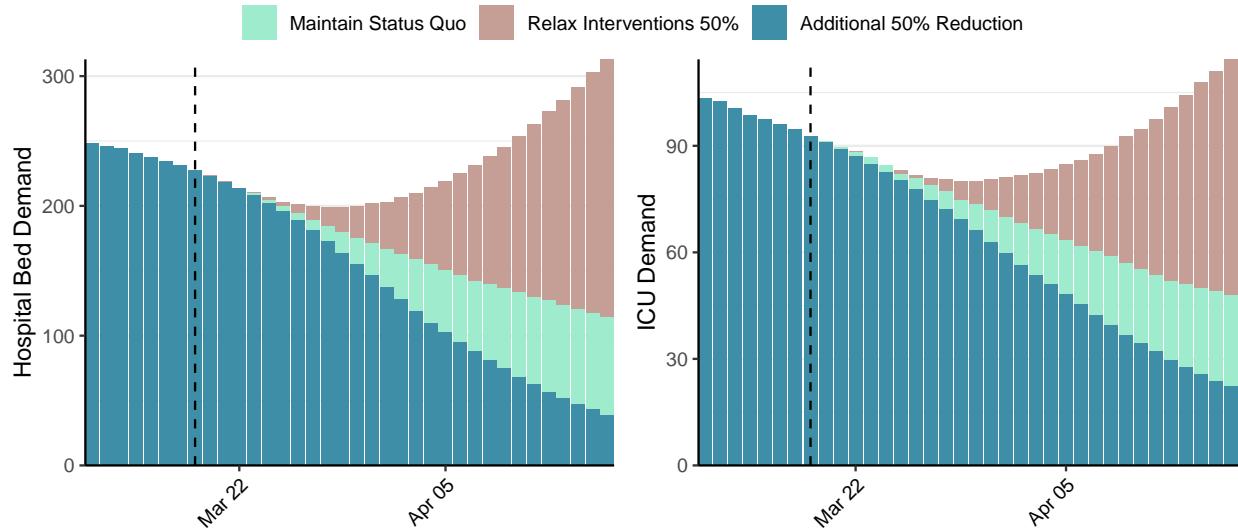


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 2,379 (95% CI: 2,170-2,587) at the current date to 113 (95% CI: 93-134) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 2,379 (95% CI: 2,170-2,587) at the current date to 6,400 (95% CI: 4,991-7,809) by 2021-04-16.

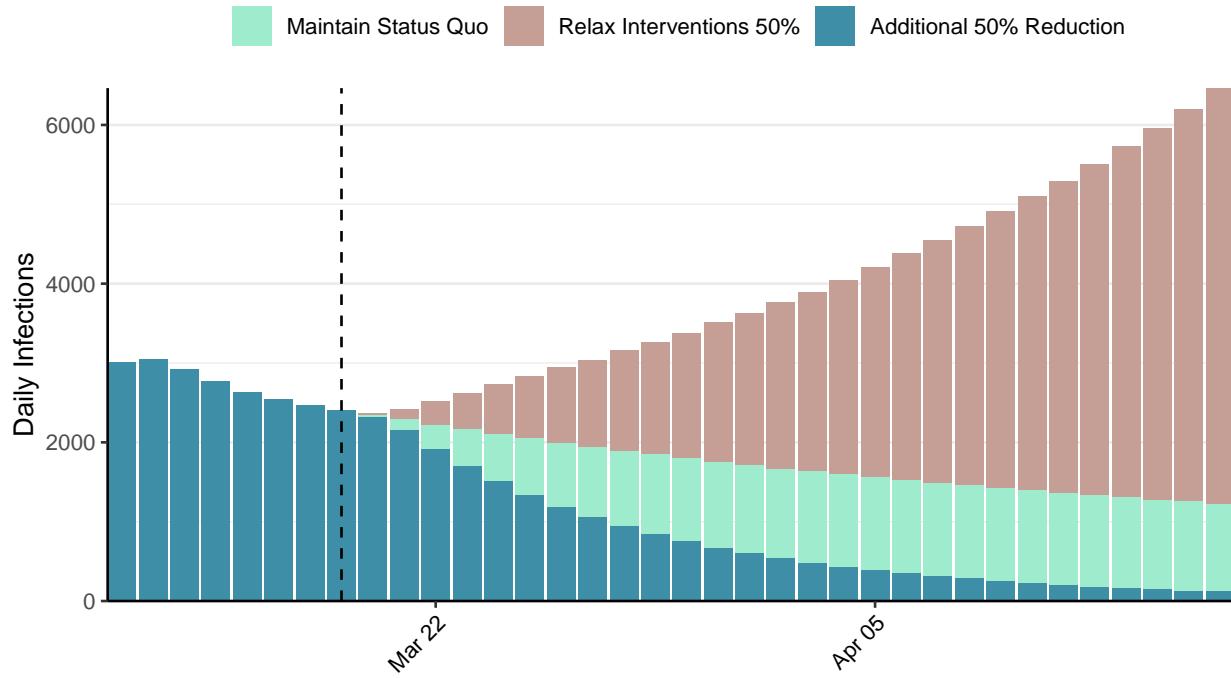


Figure 6: Daily number of infections estimated by fitting to deaths. Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections for 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: Zimbabwe, 2021-03-19

[Download the report for Zimbabwe, 2021-03-19 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}
36,652	41	1,510	1	1.29 (95% CI: 1.06-1.48)

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.

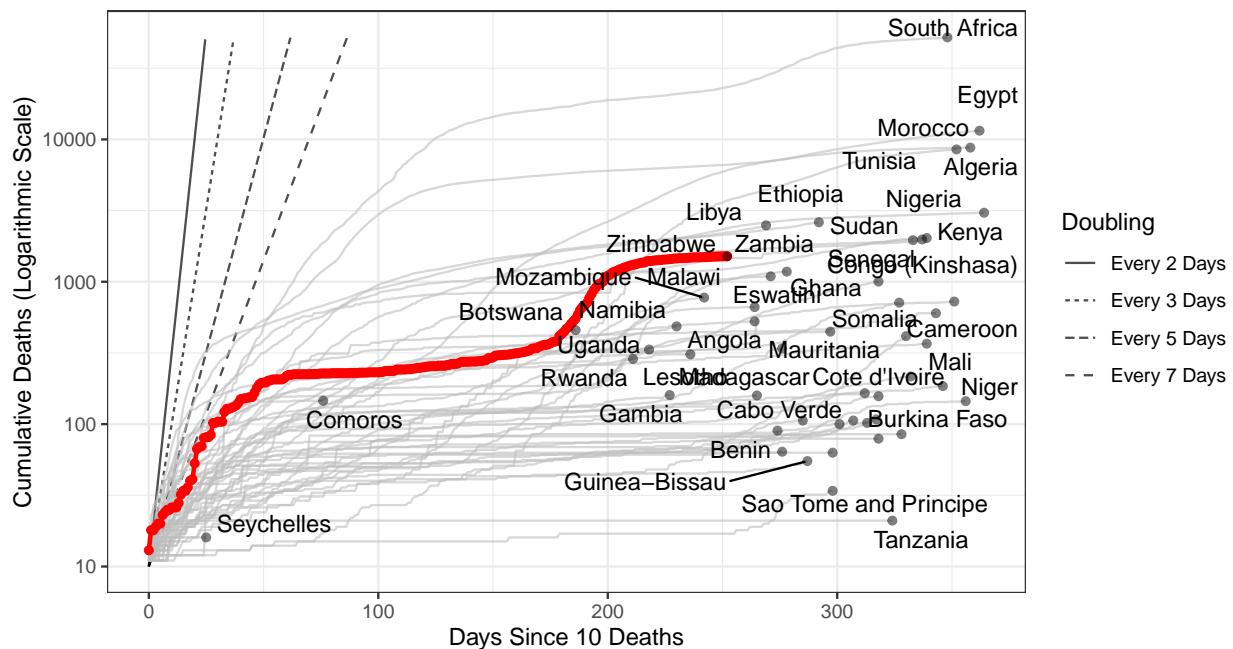


Figure 1: **Cumulative Deaths since 10 deaths.** Country not shown if fewer than 10 deaths.

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 32,075 (95% CI: 30,370-33,780) 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

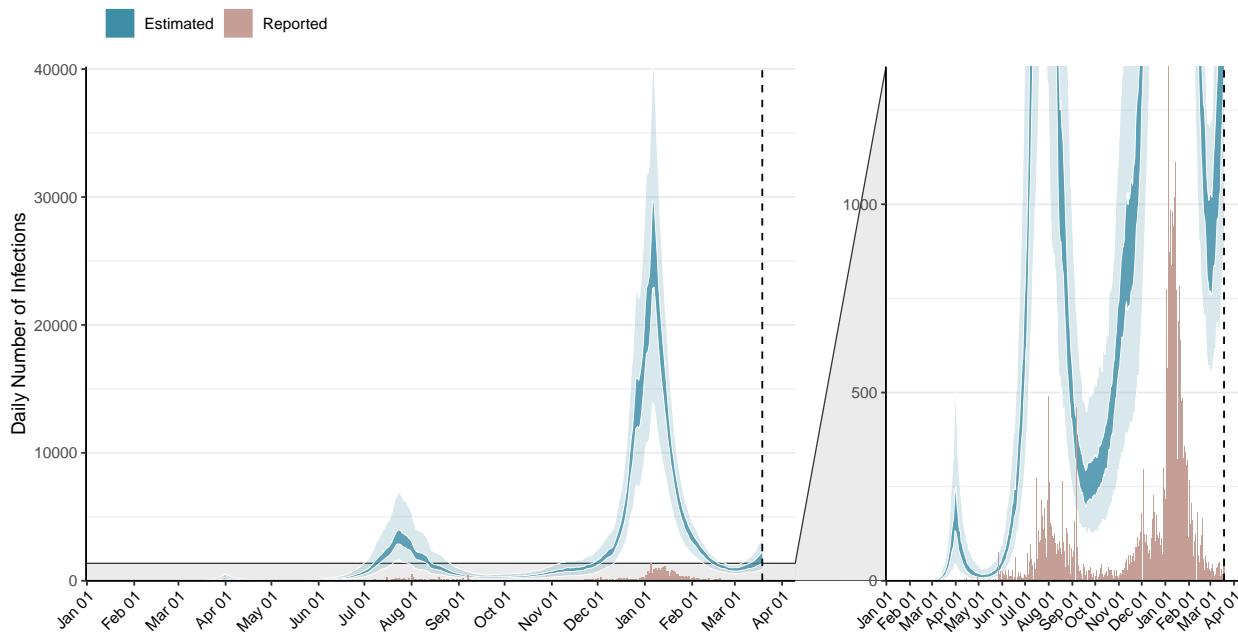


Figure 2: **Daily number of infections estimated by fitting to the current total of deaths.** Reported cases are shown in red. Model estimated infections are shown in blue (dark blue 50% interquartile range, light blue 95% quantile). The dashed line shows the current day.

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.

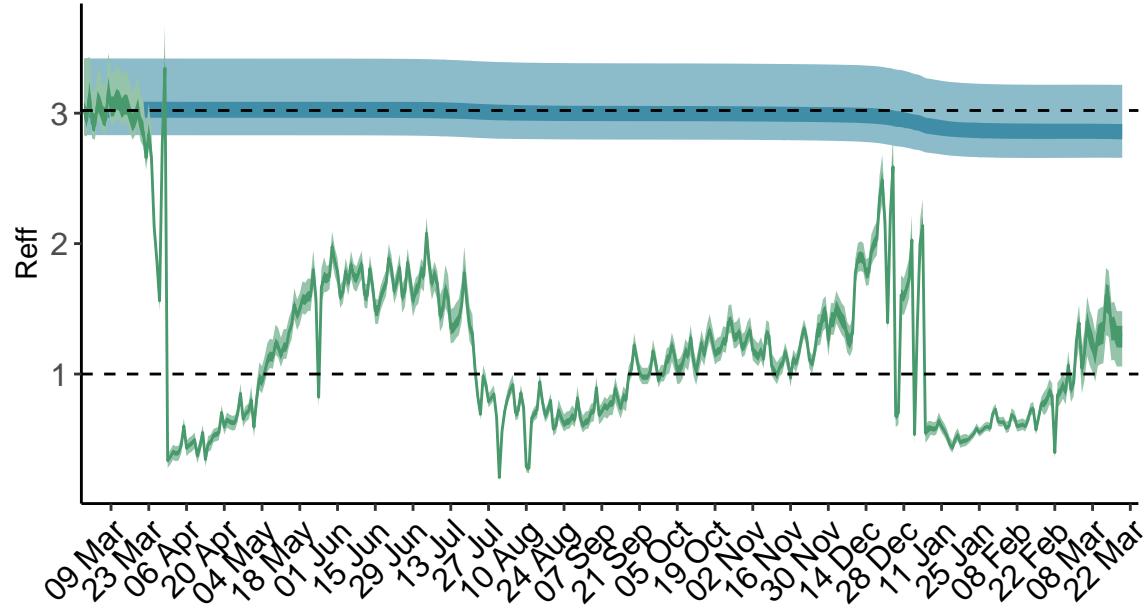


Figure 3: Time-varying effective reproduction number, R_{eff} . R_{eff} (green) is the average number of secondary infections caused by a single infected person at time equal to t . A horizontal dashed line is shown at $R_{eff} = 1$. $R_{eff} < 1$ indicates a slowing epidemic in which new infections 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. **N.B. Zimbabwe 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.](#)

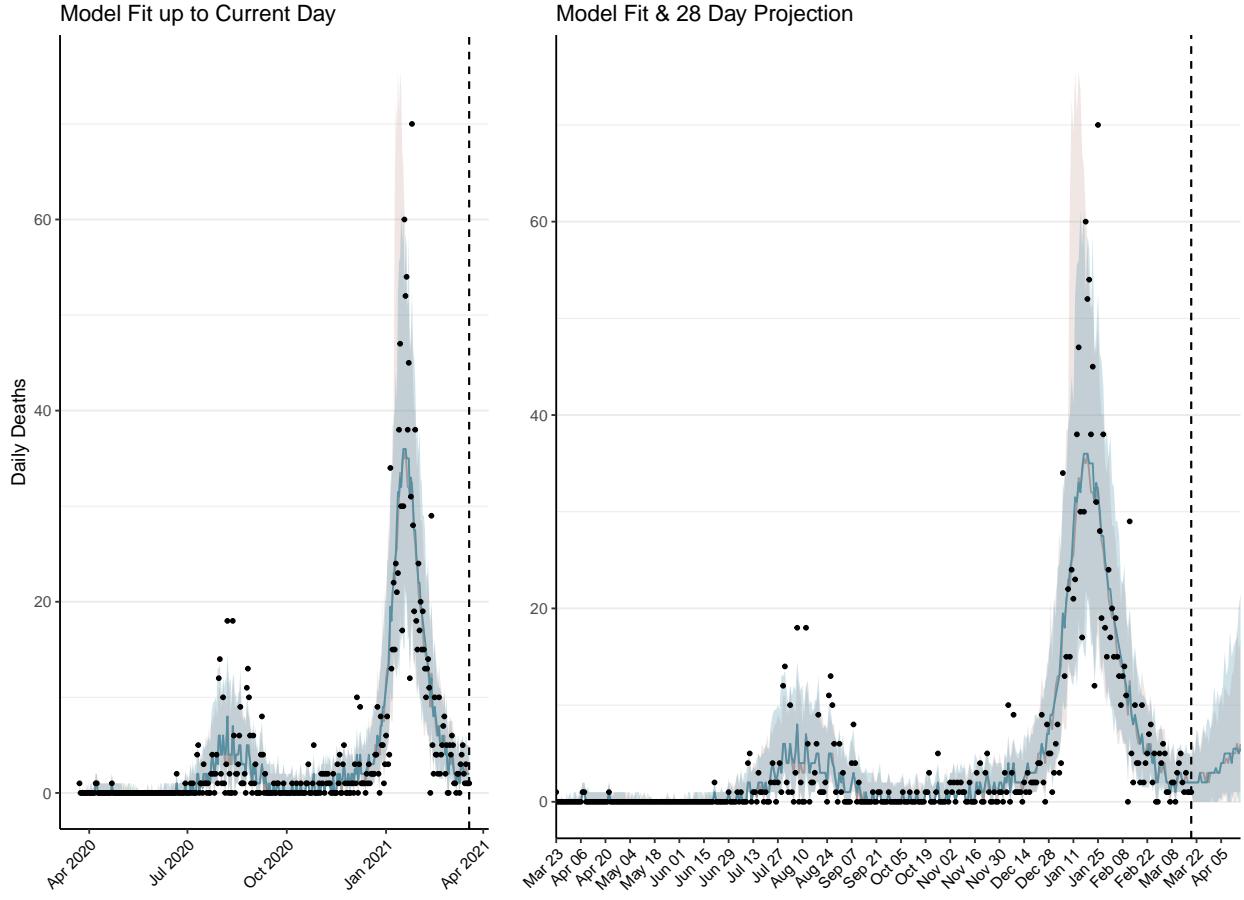


Figure 4: Estimated daily deaths. Projected deaths assuming the current level of interventions are maintained are shown in red (median and 95% quantile). Reported deaths are plotted in black. The plot on the left is focussed on the model fit prior to today, while the plot on the right forecasts the next 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 95 (95% CI: 89-100) patients requiring treatment with high-pressure oxygen at the current date to 325 (95% CI: 286-364) hospital beds being required on 2021-04-16 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 37 (95% CI: 35-39) patients requiring treatment with mechanical ventilation at the current date to 113 (95% CI: 100-127) by 2021-04-16. 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.**

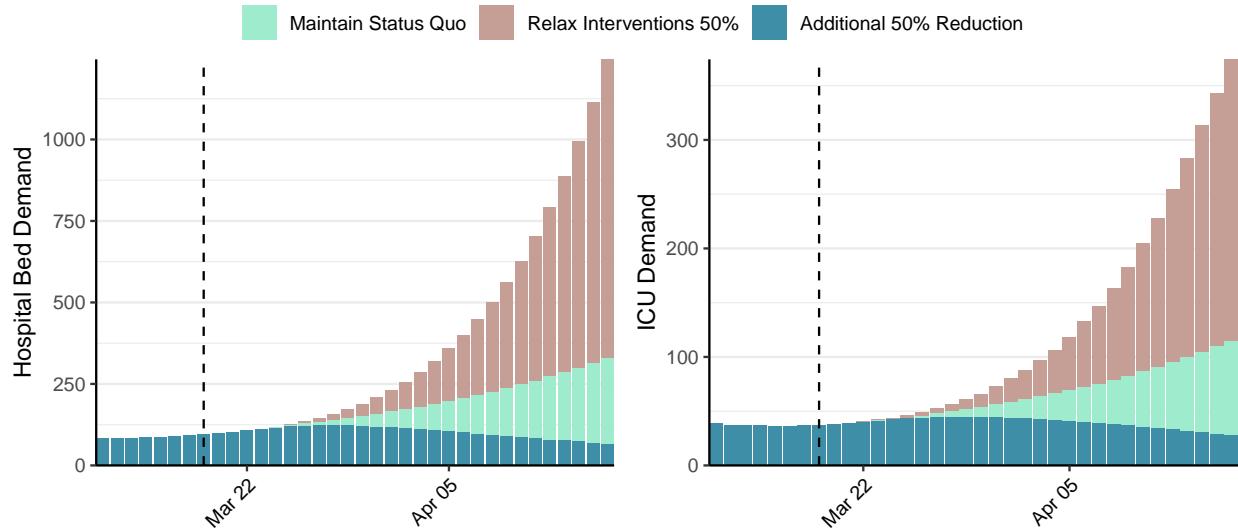


Figure 5: **Healthcare demands in the next 28 days.** Individuals needing an ICU bed are assumed to need mechanical ventilation. Projected demand for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction 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 1,848 (95% CI: 1,708-1,988) at the current date to 425 (95% CI: 369-481) by 2021-04-16. If current interventions were relaxed by 50%, we estimate the daily number of infections will change from 1,848 (95% CI: 1,708-1,988) at the current date to 43,673 (95% CI: 37,418-49,928) by 2021-04-16.

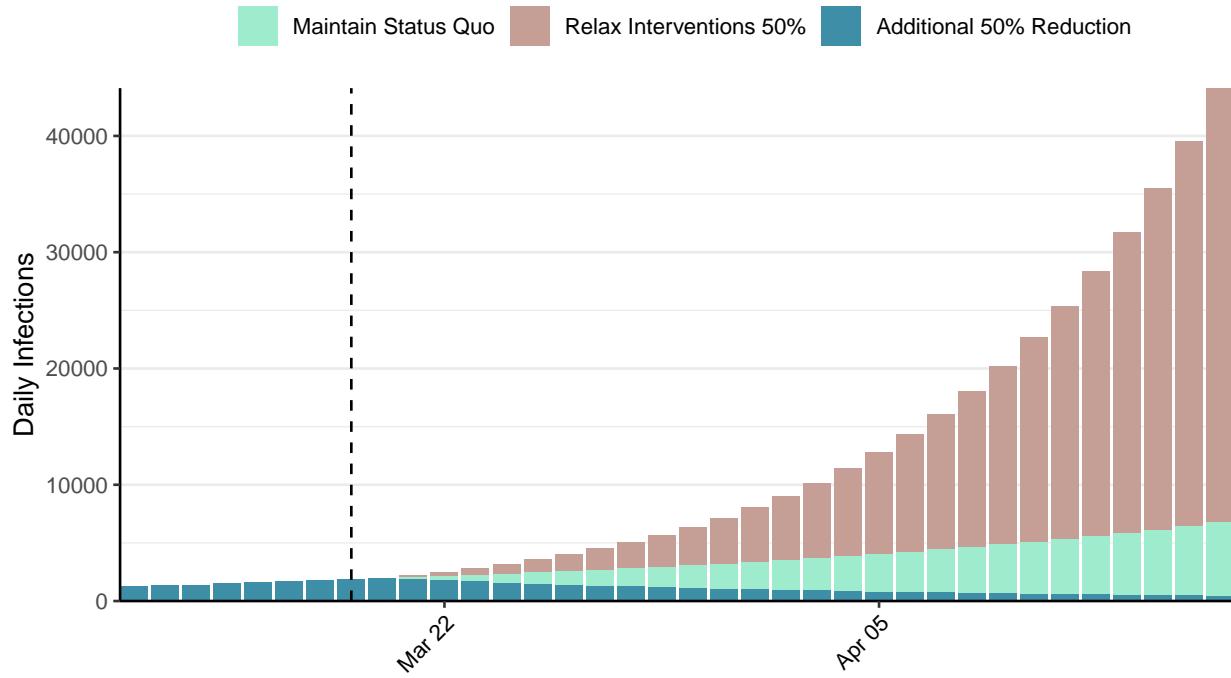


Figure 6: **Daily number of infections estimated by fitting to deaths.** Projected infections for Scenario 1 (the epidemic continues to grow at the current rate) are shown in green (Maintain status quo). Projections for Scenario 2 (a further 50% reduction in transmission) are shown in blue. Projections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