COVID-19 Projections: South Sudan

Report Date: 07 Oct 2020

This report summarizes the COVID-19 model results for Afghanistan, developed by the OCHA Centre for Humanitarian Data in partnership with the Johns Hopkins University Applied Physics Laboratory. These projections are based on COVID-19 cases and deaths data up to 07 October 2020. The data is sourced from World Health Organization (WHO) and the country's Ministry of Public Health (MOPH). For dynamic updates to this data and more, see the HDX COVID-19 Map Explorer. For additional information, please contact Leonardo Milano at: leonardo.milano@un.org.

1. Key Messages[1][2]

Current Situation (as of 07 Oct 2020)

- A total of 2,748 cases and 50 deaths have been reported by the WHO.
- The current number of severe cases requiring healthcare support is estimated at 4 - 6 basedon available data.
- Progress towards containment is insufficient in multiple areas Regions vary in the intensity of control effort needed to achieve containment (see section 2).
- Cases had a peak of cases around June.
- We note concerning data gaps and data quality issues that limit visibility into the current situation and affect the ability to make projections.
- Few COVID-related deaths have been documented, which likely reflects limitations in reporting.
- The number of cases reported provided by the MOPH at the subnational level tends to be at the moment higher that the cases reported by the WHO at the national level.

National Projections (in the next 4 weeks or by 04 Nov 2020)

- In the next 4 weeks, the total number of cases could reach up to 2,771 if current NPIs are lifted.
- The number of severe cases requiring healthcare is to increase more sharply if NPIs are lifted (see section 3).

Subnational Projections (in the next 2 weeks or by 21 Oct 2020)

Data gaps and inconsistencies in the reported number of cases and deaths in South Sudan represent major challenges. For this reason no subnational projections are available yet.

[1] **Reported cases** refers to the number of infections expected to be reported. It takes into account the **case reporting rate** which corresponds to the estimated number of COVID-19 infections that are actually tested, confirmed and reported. The case reporting rate is calculated based on the reported number of deaths and cases in the last 30 days.

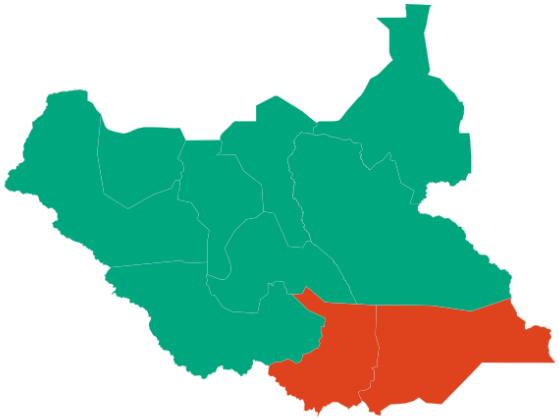
[2] **Severe cases** refers to the number of people which will have severe symptoms and may require healthcare support. It is calculated as a proportion of the reported cases, and is based on planning parameters for case severity and the vulnerability of a given region.

2. Current Situation (as of 07 Oct 2020)

Containment Progress

The key performance indicators below can be used to evaluate how effective the response has been in containing the spread of the virus. The map on the left illustrates risk levels to help decision-makers and community members know where they are. The levels communicate whether a region is on track for containment and what intensity of effort is needed to control COVID at varying levels of community spread. The map on the right represents the current need for healthcare support.

Current Estimated Daily New Cases Per 100,000 People



Risk Level	Case Incidence*	Intensity of Control Effort Needed
Red	25+	Stay-at-home orders necessary
Orange	10-25	Strategic choices must be made about which package of non-pharmaceutical interventions to use for control. Stay-at-home orders are advised, unless viral testing and contact tracing capacity are implementable at levels meeting surge indicator standards.
Yellow	1-10	Strategic choices must be made about which package of non-pharmaceutical interventions to use for control
Green	<1	On track for containment, conditional on continuing use of viral testing and contact tracing for surveillance and to contain spikes and outbreaks.

*Daily new cases per 100,000 people as reported by WHO
See Key Metrics for COVID Suppression for additional guidance on control effort needed.

Key Figures: Cumulative Cases and Deaths

	Cumulative Cases	Cumulative Deaths
Based on WHO reports	2,748	50
Based on MOPH data	2,458	44

Case Fatality Rate: 1.8%

Most recent data from MOPH dated: 2020-10-06

Key Figures: Current Severe Cases

	Current Hospitalizations
Estimate	4 - 6

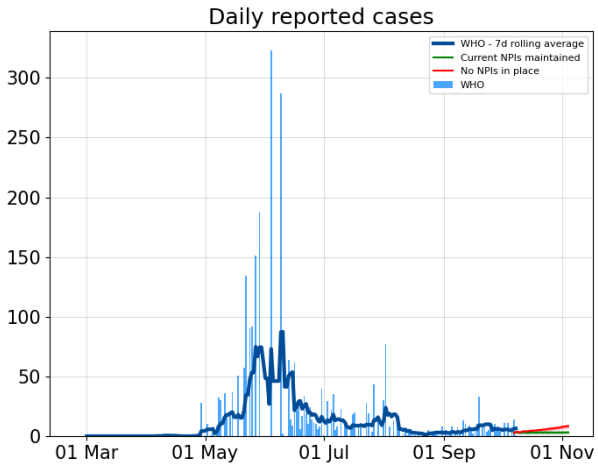
3. National Projections (for the next 4 weeks or by 04 Nov 2020)

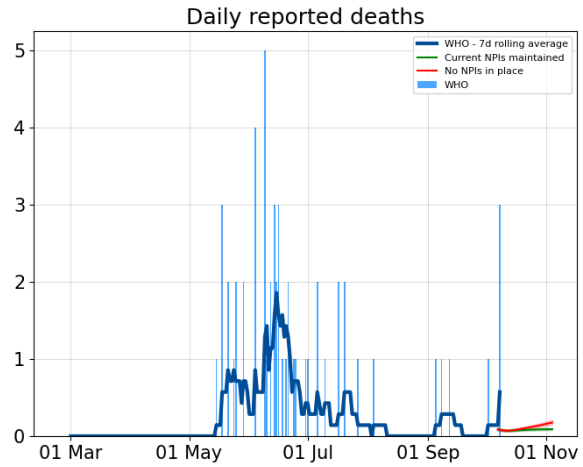
The regional data provided by the Ministry of Public Health was used to generate projections at the subnational level, which were then aggregated to the national level.

Projected Cases and Deaths

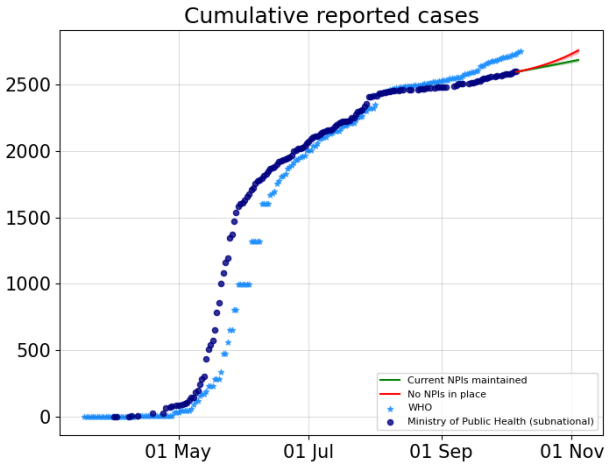
	Projected Cases	Projected Deaths
With current NPIs maintained	2,674 - 2,693	49 - 50
With no NPIs	2,738 - 2,771	50 - 51

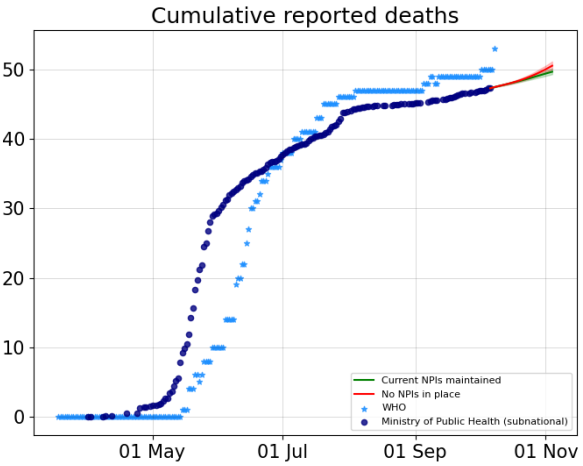
The figures below present the historical data on daily counts of cases and deaths, and their projected trends. Trends are represented by a green line for the “Current NPIs maintained” scenario and a red line for the “No NPIs in place” scenario. Note that deaths typically lag reported cases by 2-8 weeks.





The figures below furthermore show the comparison between the reported data from two different sources: national level data from WHO in light blue and subnational data from the Ministry of Public Health in dark blue.

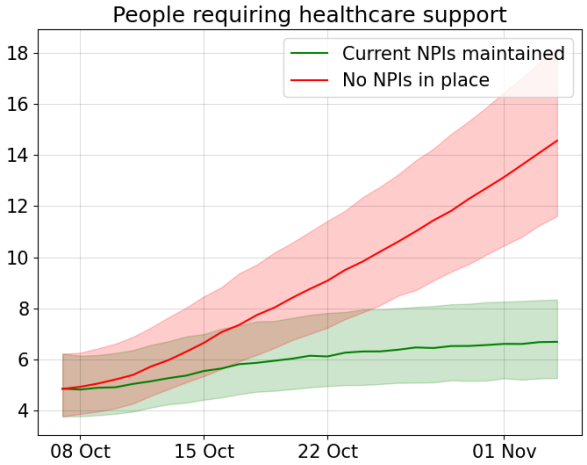




Projected Severe Cases

The figures below show the projected trends for severe cases requiring hospitalizations. In green are the projections under the “Current NPIs maintained” scenario while in red are the projections under “No NPIs in place” scenario.

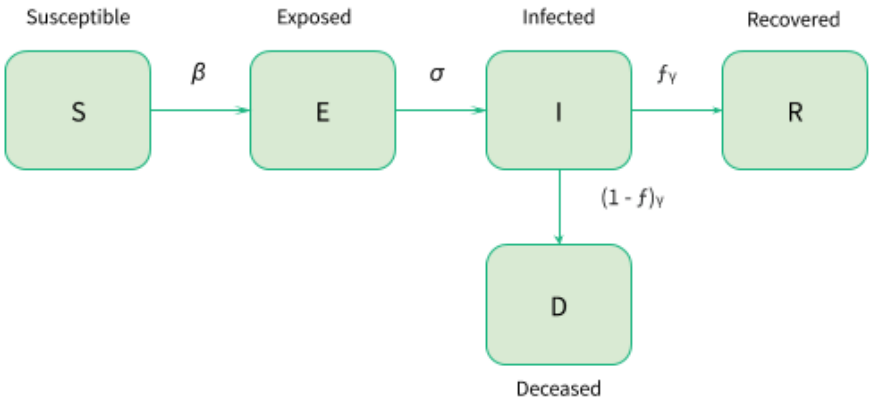
	Severe Cases
With current NPIs maintained	5 - 8
With no NPIs	12 - 18



Background on Model Methodology

The Centre established a partnership with the Johns Hopkins University Applied Physics Laboratory to develop a COVID-19 model which provides projections and insights related to the **scale** of the crisis, the **duration** of the crisis in a specific location, and how different response **interventions** are expected to impact the epidemic curve.

The team is using an **SEIR (Susceptible, Exposed, Infectious, Recovered)** model of infectious disease dynamics which is considered the simplest and most effective technique used in the literature. The model is based on a progression from susceptible to either recovered or dead. Inputs include the reproduction rate (Ro), case fatality rate (CFR), and estimated probabilities that an individual person may contract COVID-19. The model then simulates an outbreak and provides estimates for cases, hospitalizations, and deaths.



Parameters
R_0 (β/γ) = Basic reproduction number
β = Transmission rate
1/γ = Infectious period
f = Probability of recovery
(1-f) = Case Fatality Ratio (CFR)
1/σ = Latent period after exposure

Limitations
- Multi-strain systems
- Time-varying infectivity
- Heterogeneous population
- Capturing pockets of an outbreak

The key features of the model include:

- **Tuning on reported data** The estimation of the main parameters (mainly the reproduction rate R0 and the case reporting rate) is tuned according to the observed recent trends in reported COVID-19 cases.
- **Subnational** The model provides COVID-19 projections at the subnational level, matching the administrative level at which COVID-19 cases are reported.
- **Spatial spread** The density of roads is used to estimate the expected mobility patterns and to simulate the spread of COVID-19 between administrative units.
- **Population stratification** The model fidelity is increased by taking into consideration:
  - The age structure of the population at the subnational level
  - The expected probability of contact between populations of different age groups, including contacts expected to happen at work, school, home and everywhere else (social mixing)
  - Vulnerability factors such as food insecurity, household air pollution and access to handwashing facilities.
- **Non-pharmaceutical interventions (NPIs)** The model simulates the expected impact of NPIs at the subnational level, and also how the outbreaks is influenced by changing NPIs implemented over time. The NPIs currently implemented can be categorised in three main groups:
  - Mobility based NPIs, which would limit the spread of disease between administrative units (e.g. border closures)
  - Contact based NPIs, which reduce the probability of contact between specific groups (e.g. shielding of the elderly, closing schools)
  - R0 based NPIs, which reduce the overall reproduction rate (e.g. awareness campaigns, curfews)