

COVID-19 Projections: Sudan

Report Date: 26 Aug 2020

This report summarizes the COVID-19 model results for Sudan, 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 2020-08-26. The data is sourced from WHO and the 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 Messages¹²

Current Situation (as of 26 Aug 2020)

- A total of 12,974 cases and 819 deaths have been reported.
- New reported cases and deaths have declined by 12% and 32% respectively with respect to last week.

National Projections (in the next 4 weeks or by 23 Sep 2020)

- After a decrease in the number of new reported cases in early August, recent trends suggest that new cases are growing, making the situation in Sudan very concerning still.
- The case fatality rate is still significantly higher than expected (6.3%), suggesting a severe underreporting of COVID-19 cases. We estimate that only around 3% of the daily COVID-19 cases are reported by the authorities.
- Our projections suggest an increase in the cumulative number of cases between 13% and 18% and an increase in the cumulative number of deaths up to 24% in the next four weeks, assuming all current NPIs are maintained.
- Lifting of NPIs would lead to a larger increase (see sections 2 and 3 for details).
- The number of severe cases is expected to grow in the coming two weeks (see section 3).

Subnational Projections (in the next 2 weeks or by 09 Sep 2020)

- The number of active cases is expected to grow in all the States.
- Aj Jazirah, Khartoum, Gedaref, North Kordofan and Kassala are projected to have the highest increase in two weeks time, assuming all current NPIs are maintained.

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. Key Figures (as of 26 Aug 2020)

Current situation

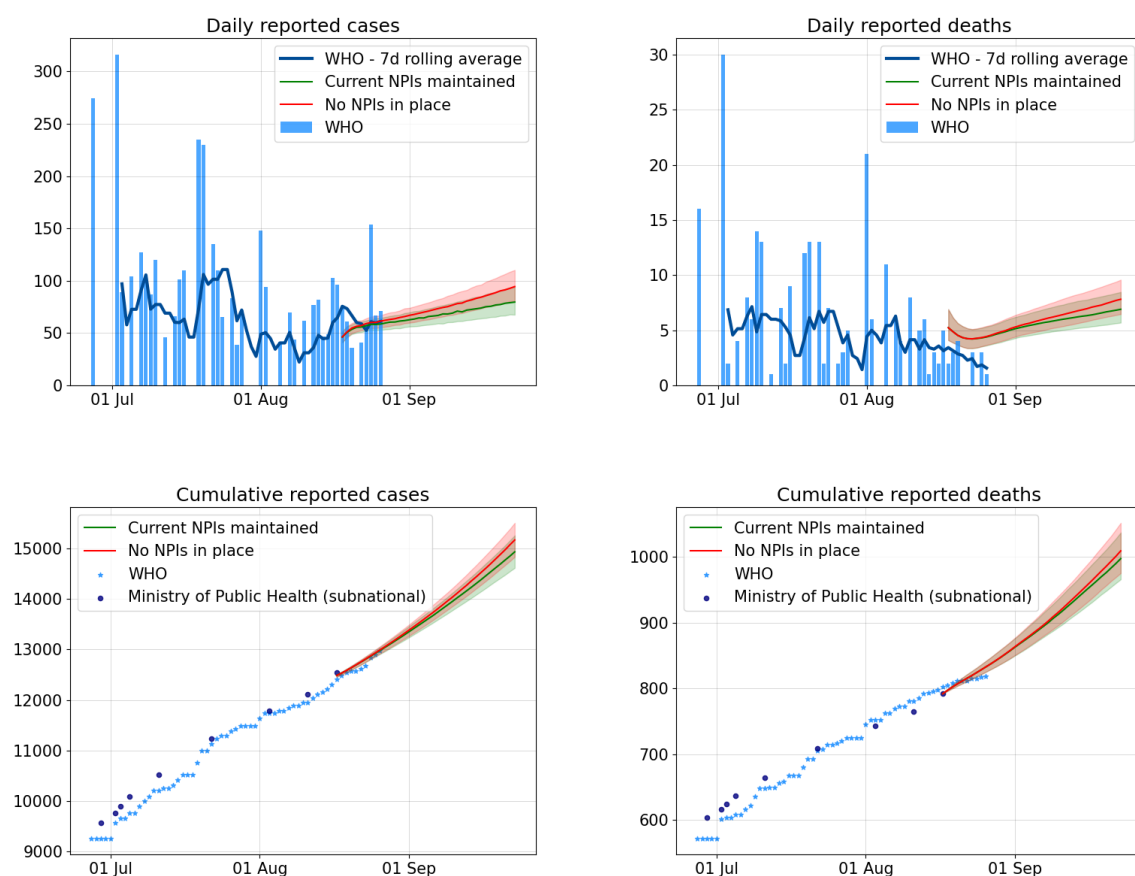
Reported Cases	Reported Deaths	Severe Cases Estimate
12,974	819	285 - 442
Case Fatality Rate: 6.3%		

Projected situation in the next 4 weeks or by 23 Sep 2020

	Projected Cases	Projected Deaths
With current NPIs maintained	14,615 - 15,257	966 - 1,037
With no NPIs	14,833 - 15,505	975 - 1,051

3. National Projections

Projected situation in the next 4 weeks or by 23 Sep 2020



The figures above show the comparison between the reported cases and 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) together with the projected trends. The two lines presented correspond to 'Current NPIs maintained' and 'No NPIs in place' scenarios.

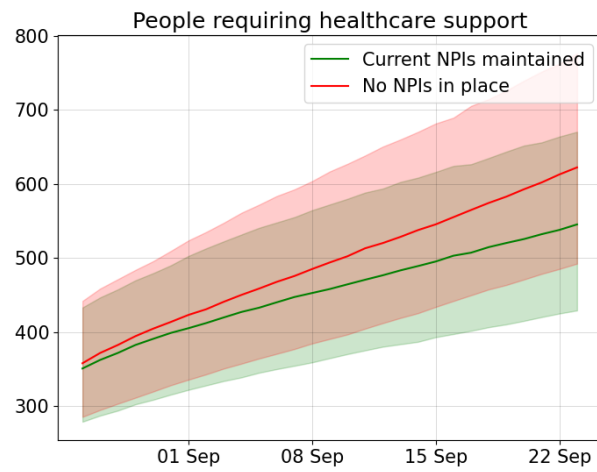
Severe Cases (Estimated)

With current NPIs maintained

429 - 670

With no NPIs

492 - 776



4. Subnational Projections

Projected situation in the next 2 weeks or by 09 Sep 2020 With current NPIs³ maintained

Cases per 100,000 people

Projected number of cases per 100,000 people



Legend:

Low  High

Largest Increases and Decreases In Cases

Highest Increases

Region	Change (%)
River Nile	2
Red Sea	3
Kassala	11
North Kordofan	15
Khartoum	16

Highest Decreases: No region showing a decrease in cases.

³**Non-pharmaceutical interventions - NPIs** are all measures implemented by different actors with the aim of reducing the spread and the impact of COVID-19. The NPIs currently in place are extracted from the [ACAPS database](#) and complemented with additional contextual information provided by our partners in the country.

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 (R_0), 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.



The key features of the model include:

- **Tuning on reported data** The estimation of the main parameters (mainly the reproduction rate R_0 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)
 - R_0 based NPIs, which reduce the overall reproduction rate (e.g. awareness campaigns, curfews)