COVID-19 Results Briefing

Pakistan

May 5, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in Pakistan. The model was run on May 5, 2022, with data through May 3, 2022.

Estimated infections, reported cases, and reported hospital admissions have been decreasing in Pakistan. Pakistan has a low vaccination rate, mobility has increased, and mask wearing is very low. We do not forecast a rise in cases in the coming months in the country. However, with all the increased activities and travel for Eid El-Fitr, it is possible that the rate of decline will slow down.

At the global level, COVID deaths are at the lowest level since April 2020. The global trend is dominated by events in East Asia. Taiwan is undergoing a huge Omicron surge. China continues to pursue a zero-COVID strategy through multiple strict lockdowns, with marked reductions in mobility throughout most of the country. Secondary Omicron waves in many parts of Europe and Canada have largely peaked or are peaking. Some US states are entering a period of rising transmission, most likely linked to behavioral relaxation. Cases, hospitalizations, and deaths are increasing in the US as well. The increase in reported cases in South Africa in a population with high levels of prior Omicron infection, which coincides with a shift to the BA.4 and BA.5 subvariants, has raised questions about cross-variant immunity between BA.1 or BA.2 and BA.4 or BA.5. It is too early to tell if the increase is driven by lower cross-variant immunity within Omicron subvariants or waning of infection-acquired immunity. In our models, we do not yet model BA.4 and BA.5 as separate variants with differential cross-variant immunity. So, our forecasts of a peak at the global level in May and then declines over the summer could be revised if evidence on BA.4 and BA.5 becomes clearer.

Based on vaccination rates and reported willingness to get vaccinated, we estimate that 3.1% of the world population are willing to be vaccinated but have not yet been vaccinated. This 3.1% is heavily concentrated in sub-Saharan Africa. Among the 3.1% who want to be vaccinated, it is likely that three-quarters have some immunity through prior infection. Given the potential for a new variant that is more transmissible and more severe than Omicron to emerge at any time, given that vaccination rates are unlikely to increase much, and given the strong likelihood of further behavioral relaxation across the region, controlling COVID-19 over the next months should focus on three factors. First, continued surveillance, even as interest in the pandemic fades in some policy circles. Identifying new variants and whether they have increased severity or not will be critical to titrating the policy response.

Second, the world needs greater focus on expanding production and access to Paxlovid and other antivirals as they become available. The randomized clinical trial suggests that Paxlovid can dramatically reduce the infection-fatality rate; increased access globally can greatly reduce the future risk of harm of new variants. Third, the use of other strategies such as encouraging mask use may be needed if evidence on reduced cross-variant immunity for BA.4 and BA.5 becomes clearer and these subvariants have a higher infection-fatality rate than BA.1 and BA.2.

Current situation

- Daily infections in the last week decreased to 16,000 per day on average compared to 18,000 the week before (Figure 1.1). Daily hospital census in the last week (through May 3) decreased to 270 per day on average compared to 380 the week before.
- Daily reported cases in the last week decreased to 51 per day on average compared to 130 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week decreased to zero per day on average compared to 1 the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week decreased to eight per day on average compared to 11 the week before (Figure 3.1). This makes COVID-19 the number 66 cause of death in Pakistan this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 23.7 times larger than the reported number of deaths.
- The daily rate of reported deaths due to COVID-19 is greater than 4 per million in no provinces and territories (Figure 4.1).
- The daily rate of total deaths due to COVID-19 is greater than 4 per million in no provinces and territories (Figure 4.2).
- We estimate that 83% of people in Pakistan have been infected at least once as of May 2 (Figure 6.1). Effective R, computed using cases, hospitalizations, and deaths, is greater than 1 in no provinces and territories (Figure 7.1).
- The infection-detection rate in Pakistan was close to 0% on May 2 (Figure 8.1).
- Based on the GISAID and various national databases, combined with our variant spread model, we estimate the current prevalence of variants of concern (Figures 9.1–9.5). We estimate that the Alpha variant is circulating in six provinces and territories, that the Beta variant is circulating in two provinces and territories, that the Delta variant is circulating in seven provinces and territories, that the Gamma variant is circulating in five provinces and territories, and that the Omicron variant is circulating in seven provinces and territories.

Trends in drivers of transmission

- Mobility last week was 51% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in no provinces and territories (Figure 12.1).
- As of April 24, in the COVID-19 Trends and Impact Survey, 24% of people self-reported that they always wore a mask when leaving their home compared to 26% the previous week (Figure 13.1).
- There were 12 diagnostic tests per 100,000 people on May 2 (Figure 15.1).
- As of May 2, no provinces and territories have reached 70% or more of the population who have received at least one vaccine dose, and no provinces and territories have reached 70% or more of the population who are fully vaccinated (Figures 17.1 and 17.2). 60% of people in Pakistan have received at least one vaccine dose, and 55% are fully vaccinated.
- In Pakistan, 93.2% of the population that is 12 years and older say they would accept a vaccine for COVID-19 (Figure 18.1). This is up by 0.1 percentage points from last week. Note that vaccine acceptance is calculated using survey data from the 18+ population. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 92% in Sindh to 100% in Islamabad Capital Territory (Figure 19.1).
- As of April 25, 2022, 2% of the population in Pakistan say they would accept a vaccine for COVID-19 but have not yet been vaccinated.
- In our current reference scenario, we expect that 134.5 million people will be vaccinated with at least one dose by September 1 (Figure 21.1). We expect that 56% of the population will be fully vaccinated by September 1.

Projections and scenarios

We produce three scenarios when projecting COVID-19. The **reference scenario** is our forecast of what we think is most likely to happen:

- Vaccines are distributed at the expected pace. Brand- and variant-specific vaccine efficacy is updated using the latest available information from peer-reviewed publications and other reports.
- Future mask use is the mean of mask use over the last seven days.
- Mobility increases as vaccine coverage increases.
- Omicron variant spreads according to our flight and local spread model.
- 80% of those who have had two doses of vaccine (or one dose for Johnson & Johnson) receive a third dose at six months after their second dose.

The **80% mask use scenario** makes all the same assumptions as the reference scenario but assumes all locations reach 80% mask use within seven days. If a location currently has higher than 80% use, mask use remains at the current level.

The **third dose scenario** is the same as the reference scenario but assumes that 100% of those who have received two doses of vaccine will get a third dose at six months.

Projections

Infections

- Daily estimated infections in the **reference scenario** will decline to 8,380 by July 16, 2022 (Figure 23.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 760 by August 20, 2022 (Figure 23.1).
- Daily estimated infections in the **third dose scenario** will decline to 7,920 by July 20, 2022 (Figure 23.1).

Cases

- Daily estimated cases in the **reference scenario** will decline to 20 by July 20, 2022 (Figure 23.2).
- Daily estimated cases in the **80% mask use scenario** will decline to zero by September 1, 2022 (Figure 23.2).
- Daily estimated cases in the **third dose scenario** will decline to 20 by July 28, 2022 (Figure 23.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will decline to 70 by July 26, 2022 (Figure 23.3).
- Daily hospital census in the **80% mask use scenario** will decline to 10 by September 1, 2022 (Figure 23.3).
- Daily hospital census in the **third dose scenario** will decline to 70 by July 31, 2022 (Figure 23.3).

Deaths

- In our **reference scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on September 1. This represents 12 additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **reference scenario** will decline to zero by June 16, 2022 (Figure 23.4).
- Under our **reference scenario**, our model projects 600,000 cumulative total deaths due to COVID-19 on September 1. This represents 290 additional deaths from May 2 to September 1 (Figure 23.5).
- In our **80% mask use scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on September 1. This represents six additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to zero by September 1, 2022 (Figure 23.4).

- In our **third dose scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on September 1. This represents 12 additional deaths from May 2 to September 1. Daily reported COVID-19 deaths in the **third dose scenario** will decline to zero by June 16, 2022 (Figure 23.4).
- Figure 24.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.
- At some point from May through September 1, no provinces and territories will have high or extreme stress on hospital beds (Figure 25.1). At some point from May through September 1, no provinces and territories will have high or extreme stress on intensive care unit (ICU) capacity (Figure 26.1).

Model updates

No model updates.

Figure 1.1: Daily COVID-19 hospital census and estimated infections

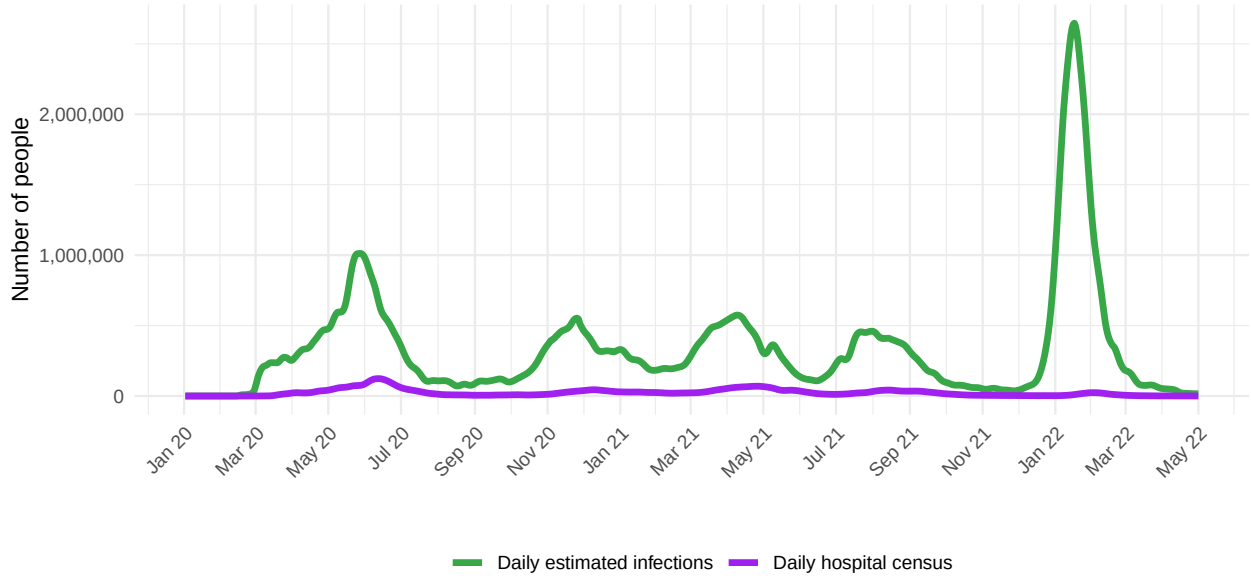


Figure 2.1: Reported daily COVID-19 cases, moving average

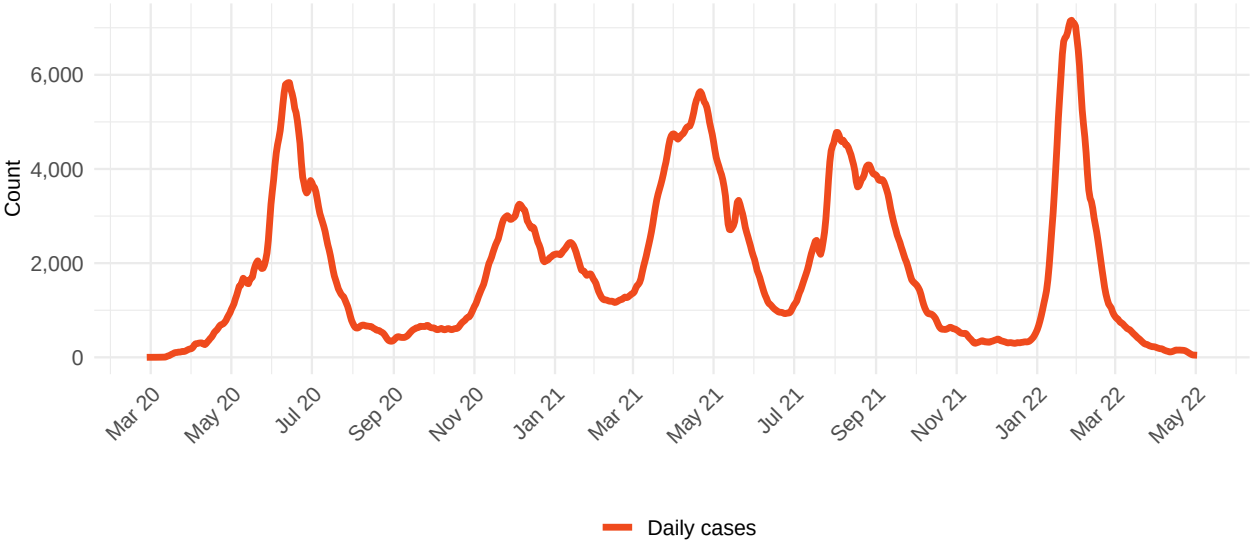
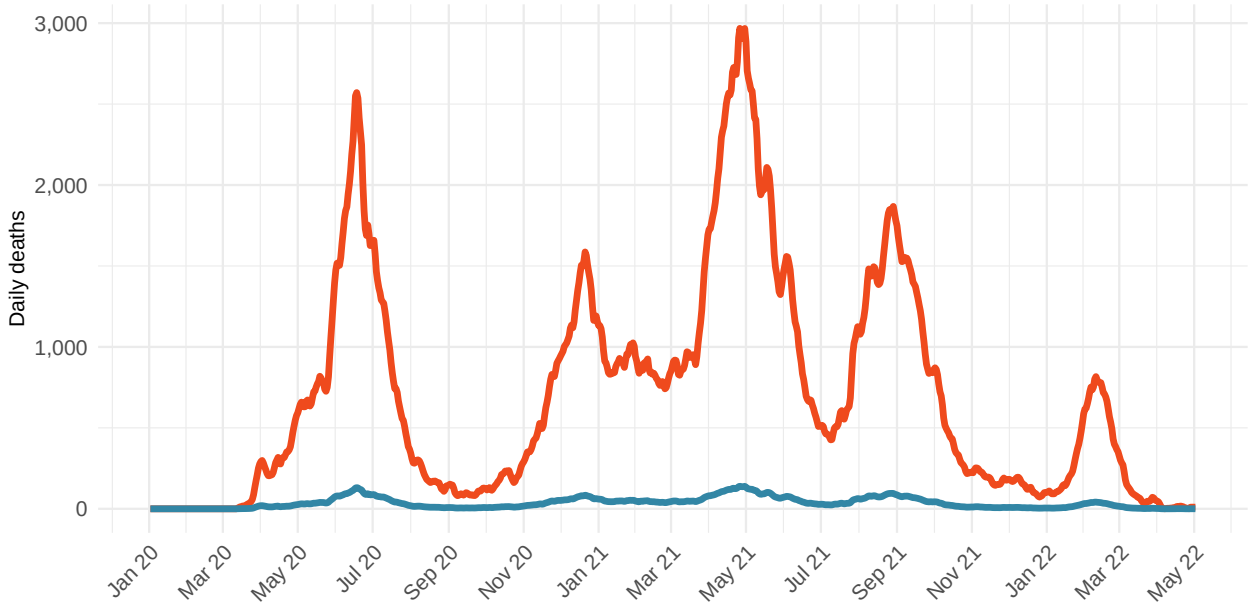


Table 1: Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

Cause name	Weekly deaths	Ranking
Neonatal disorders	4,804	1
Ischemic heart disease	3,527	2
Stroke	2,028	3
Diarrheal diseases	1,481	4
Lower respiratory infections	1,311	5
Tuberculosis	1,207	6
Chronic obstructive pulmonary disease	1,205	7
Diabetes mellitus	917	8
Chronic kidney disease	854	9
Cirrhosis and other chronic liver diseases	848	10
COVID-19	53	66

Figure 3.1: Smoothed trend estimate of reported daily COVID-19 deaths (blue) and total daily deaths due to COVID-19 (orange)



Daily COVID-19 death rate per 1 million on May 2, 2022

Figure 4.1: Daily reported COVID-19 death rate per 1 million

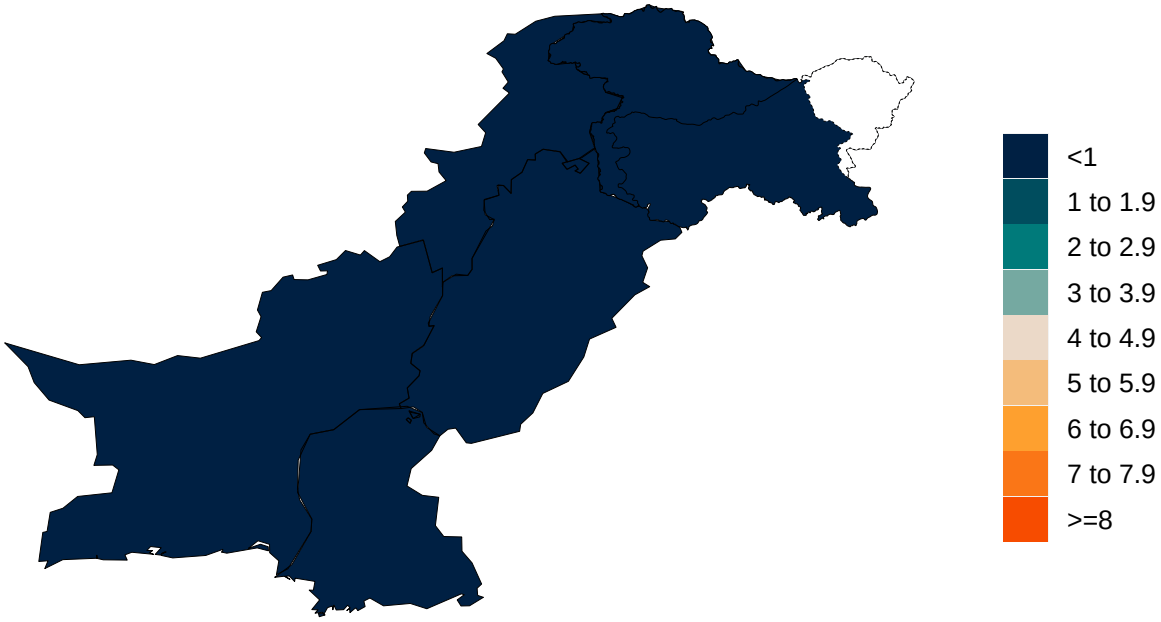
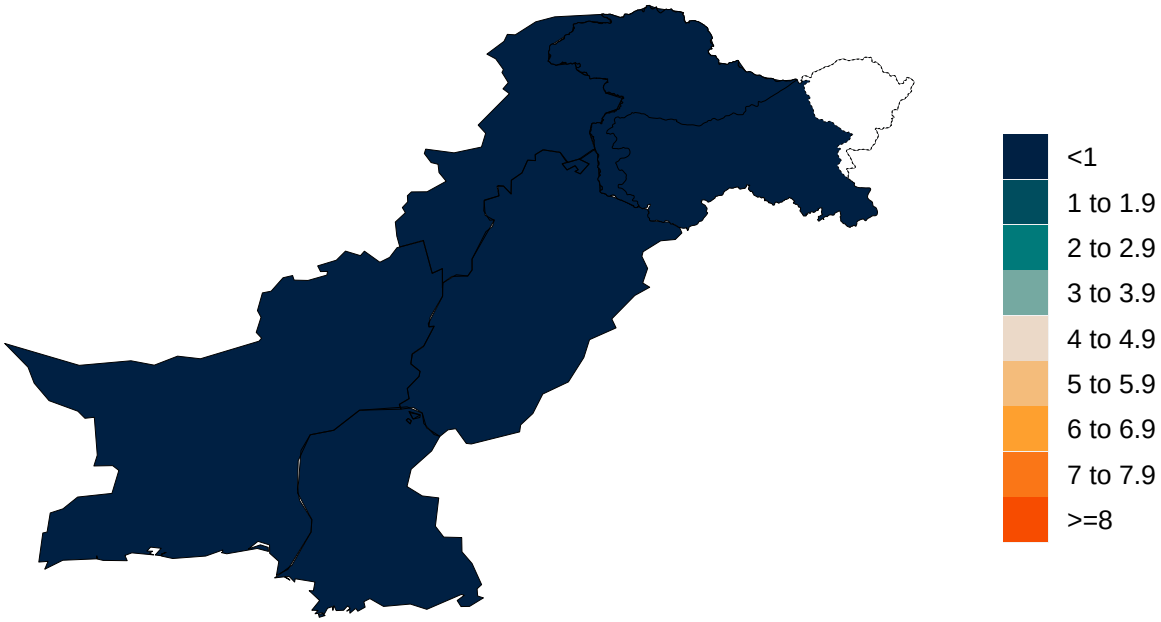


Figure 4.2: Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on May 2, 2022

Figure 5.1: Reported cumulative COVID-19 deaths per 100,000

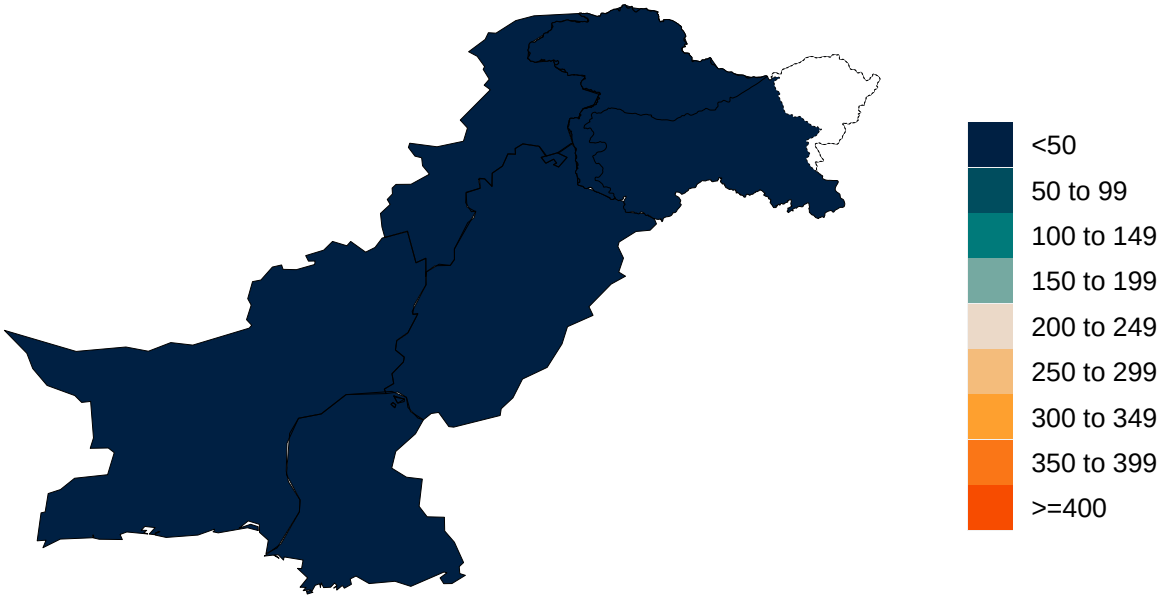


Figure 5.2: Total cumulative COVID-19 deaths per 100,000

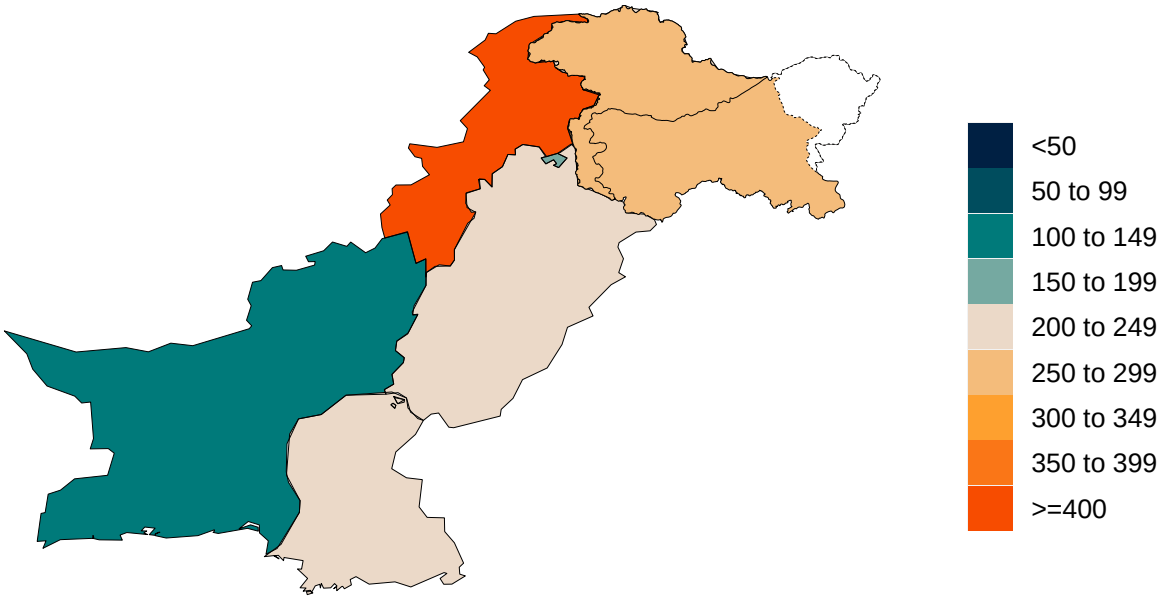


Figure 6.1: Estimated percent of the population infected with COVID-19 on May 2, 2022

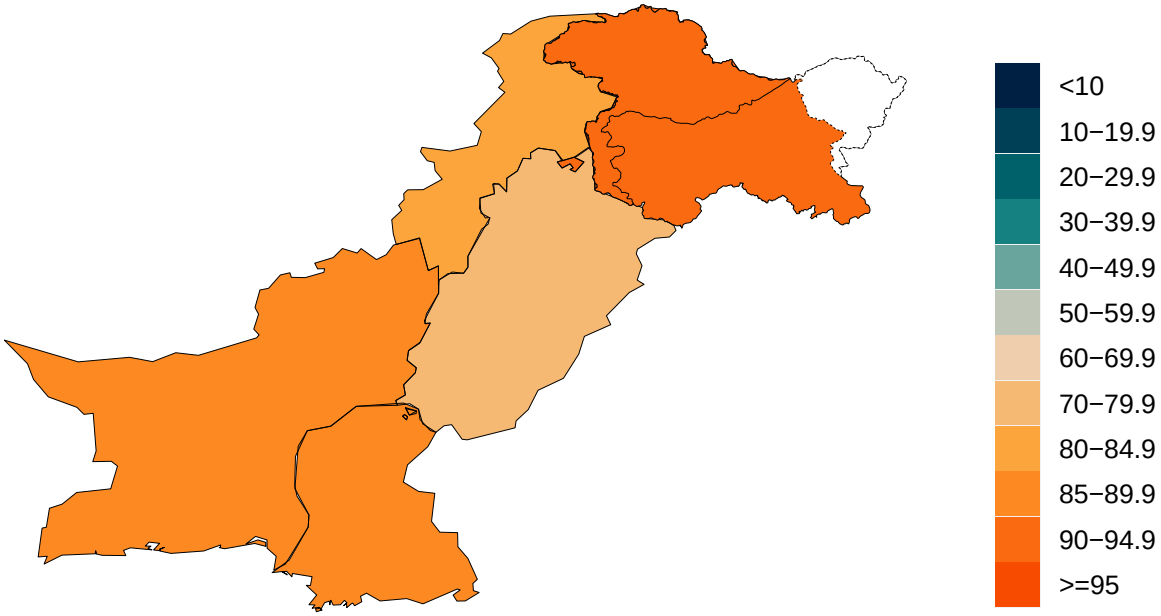


Figure 7.1: Mean effective R on April 21, 2022. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

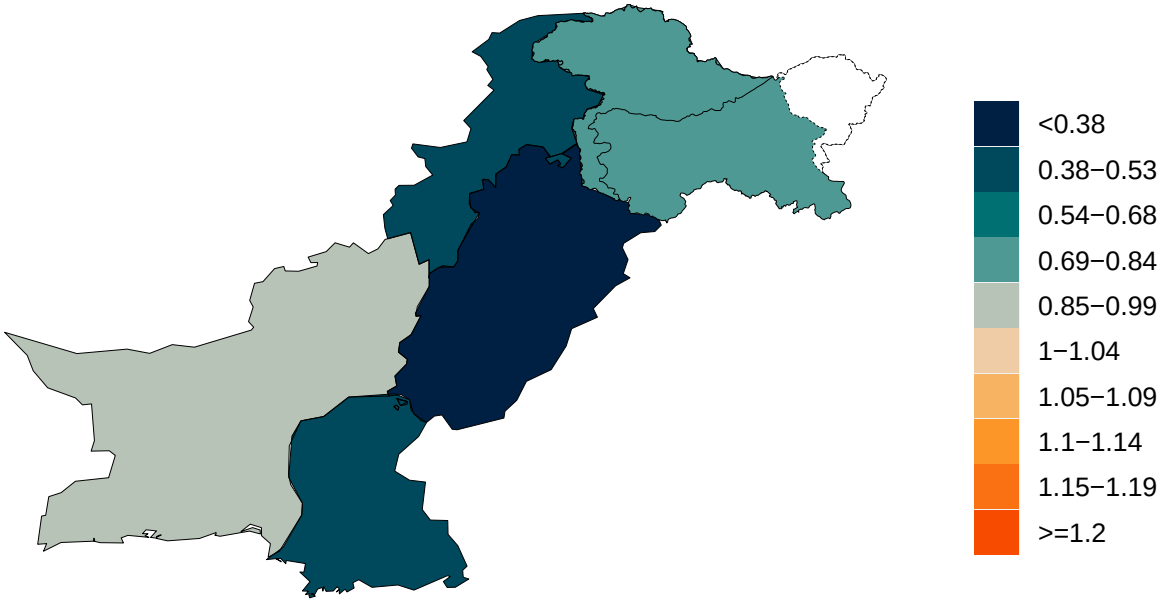
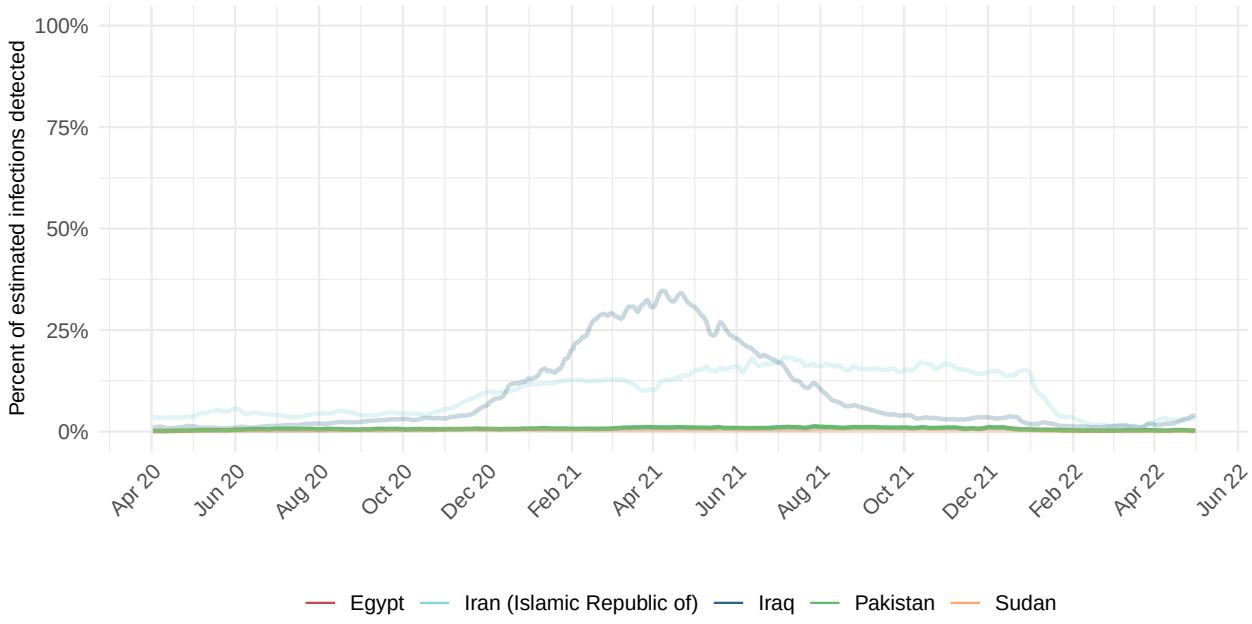


Figure 8.1: Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed 100% at particular points in time.



Estimated percent of circulating SARS-CoV-2 for primary variant families on May 2, 2022

Figure 9.1: Estimated percent of new infections that are Alpha variant

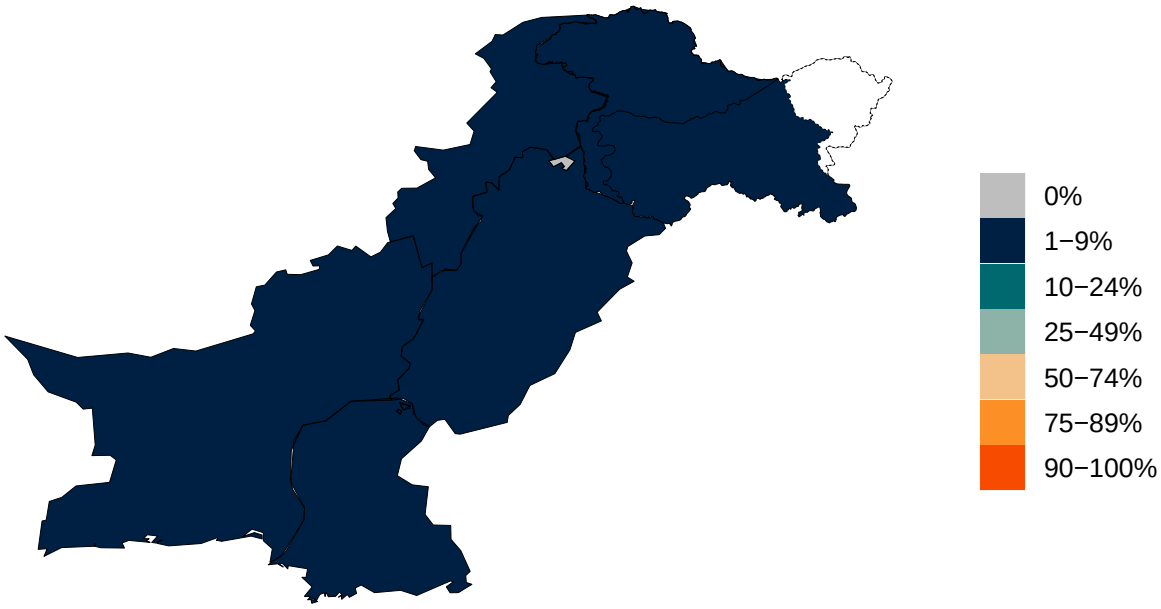


Figure 9.2: Estimated percent of new infections that are Beta variant

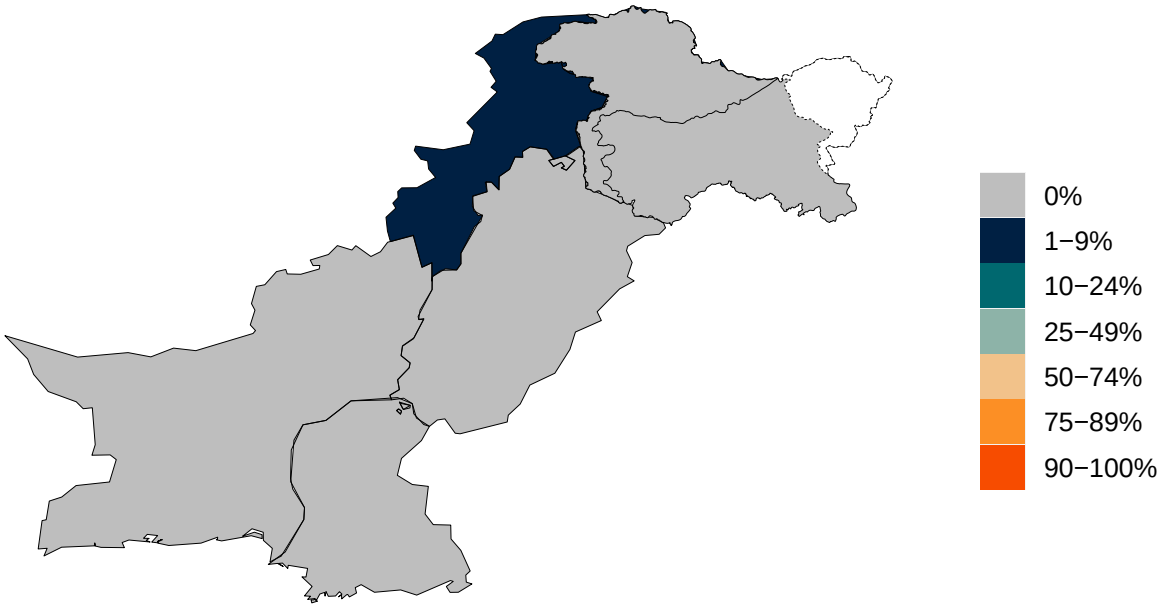


Figure 9.3: Estimated percent of new infections that are Delta variant

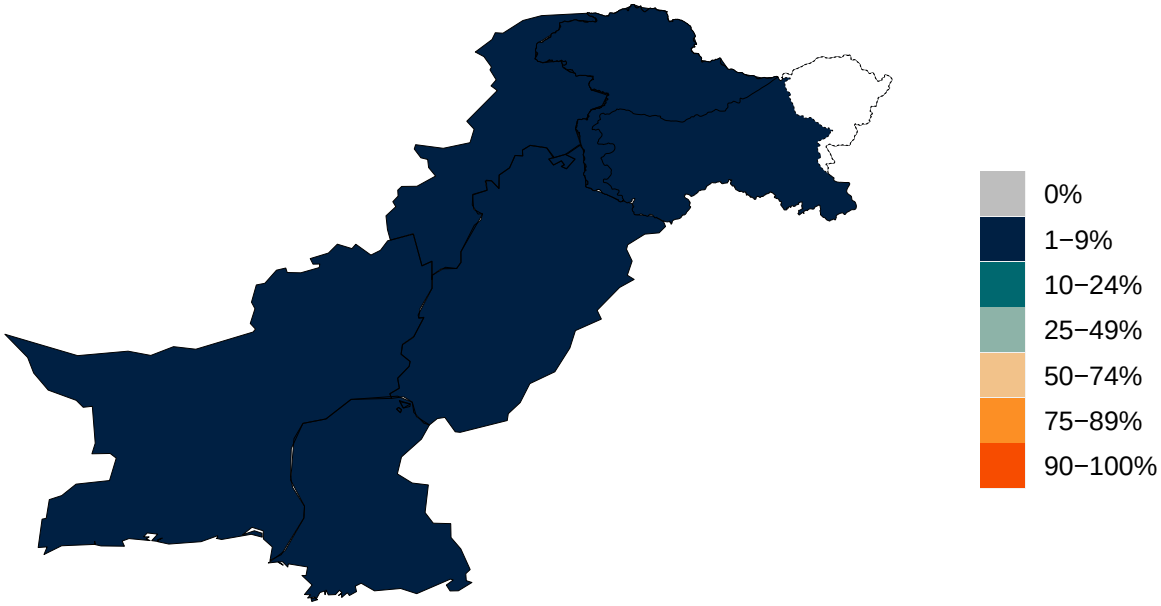


Figure 9.4: Estimated percent of new infections that are Gamma variant

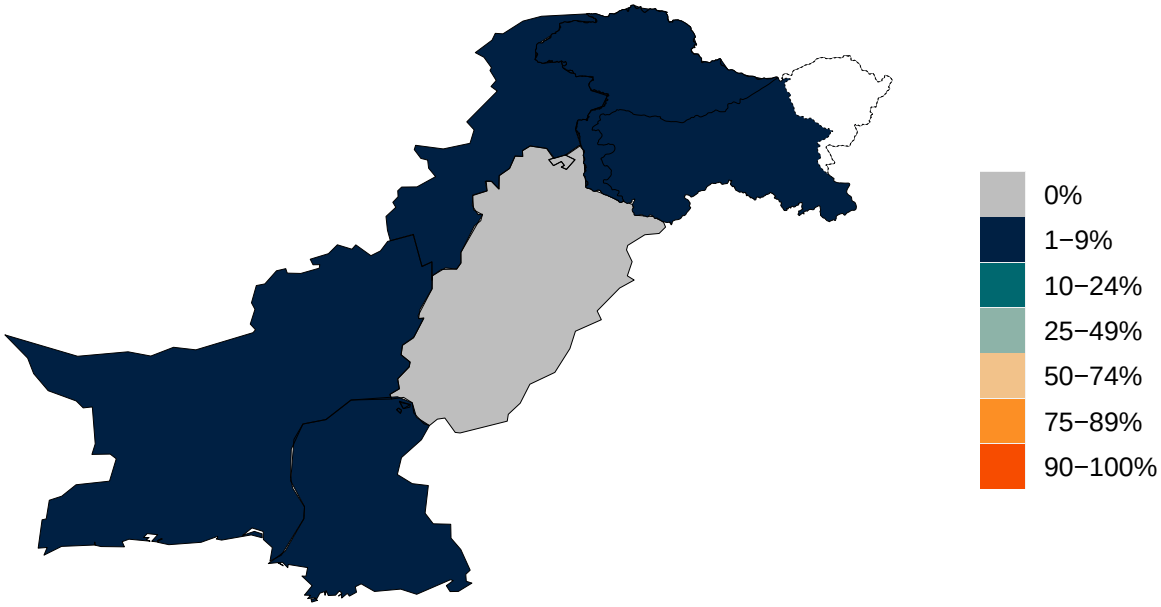


Figure 9.5: Estimated percent of new infections that are Omicron variant

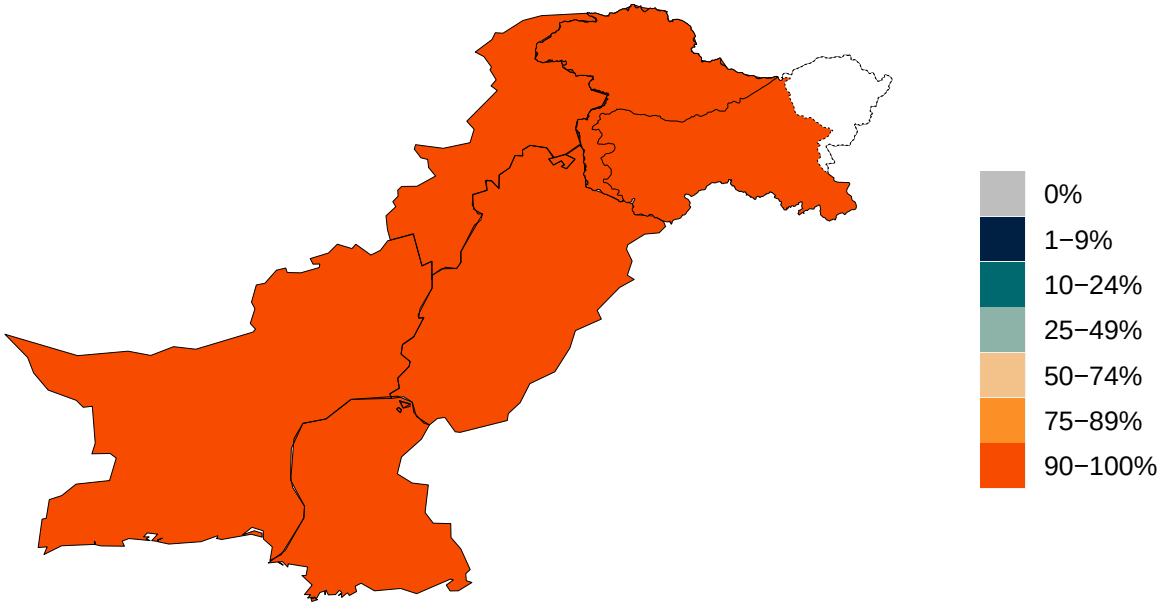
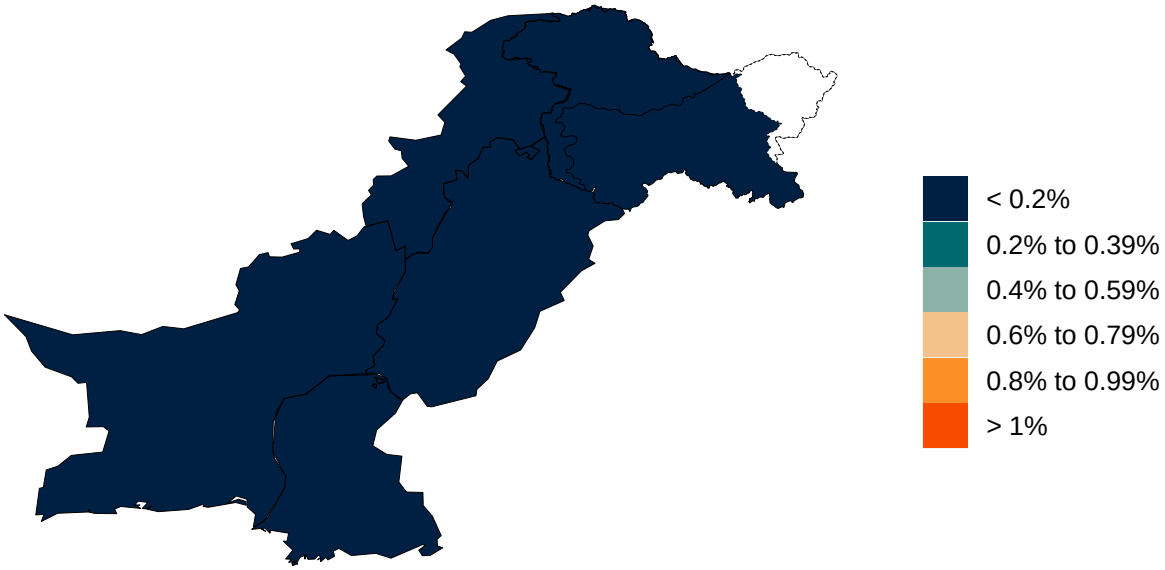


Figure 10.1: Infection-fatality rate on May 2, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2: Current mandate implementation

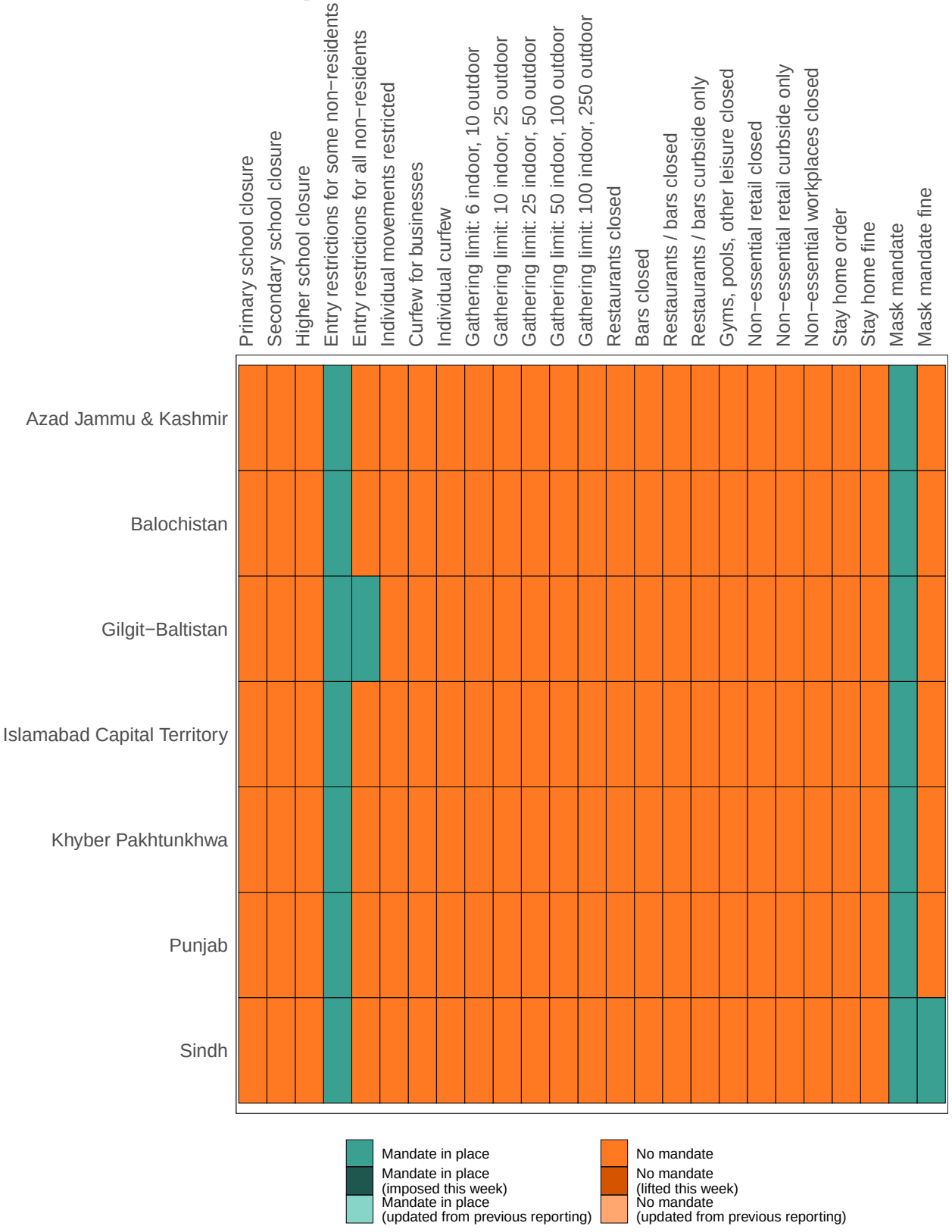


Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

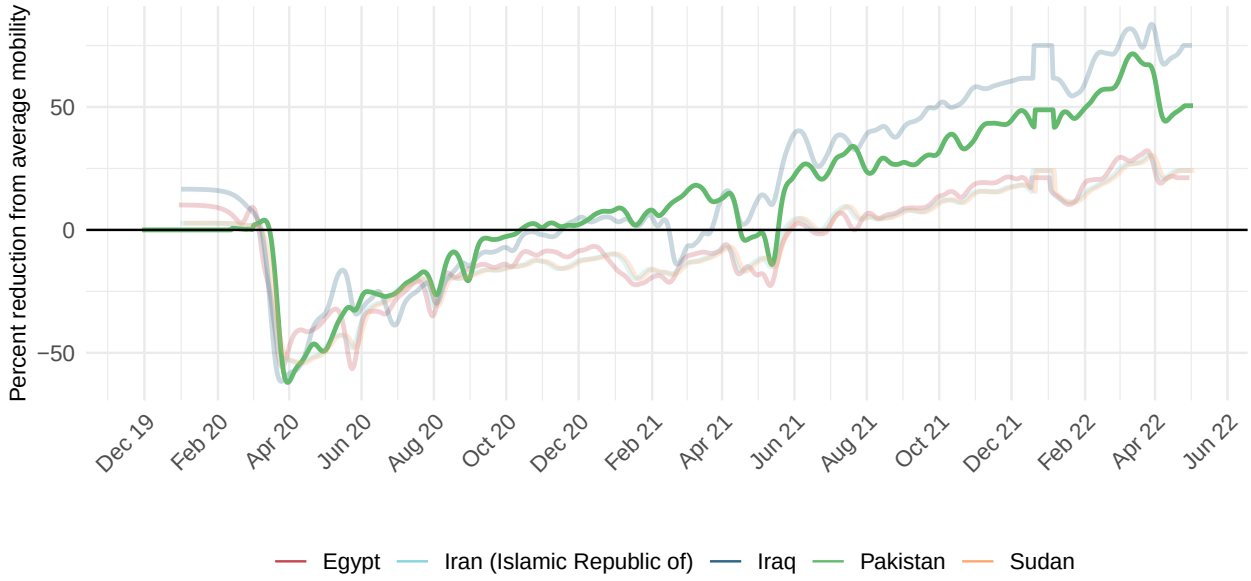


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on May 2, 2022

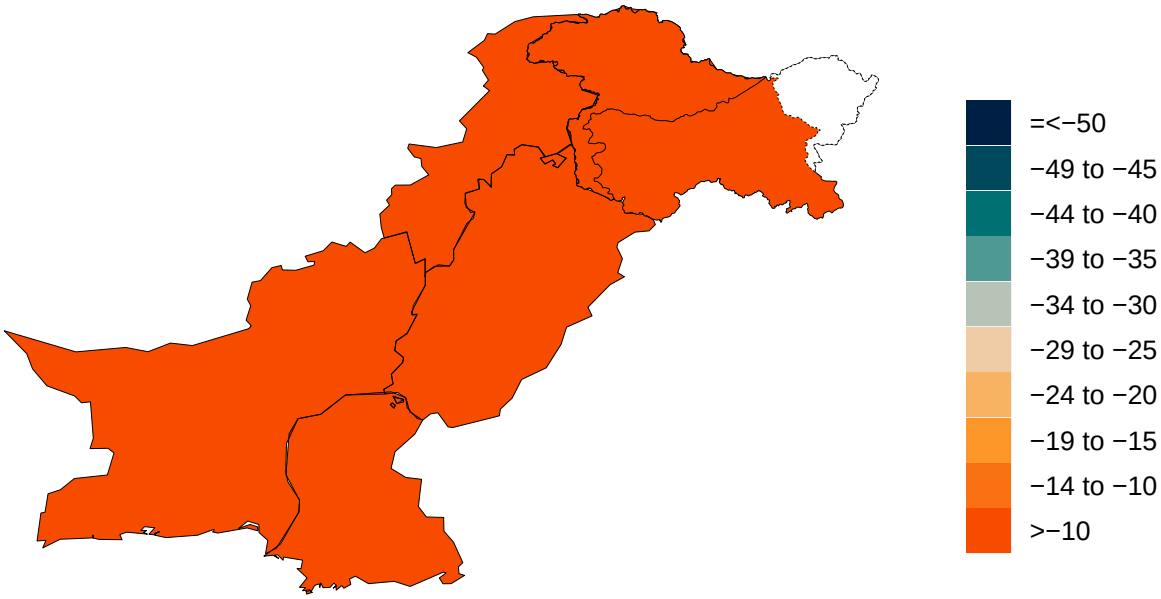


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

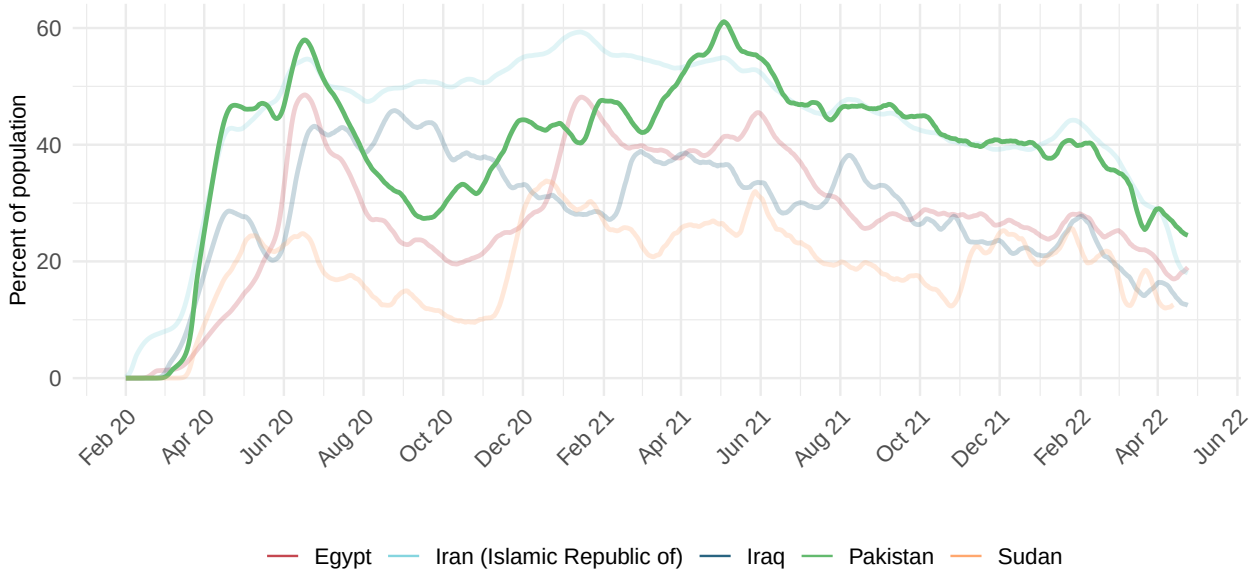


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on May 2, 2022

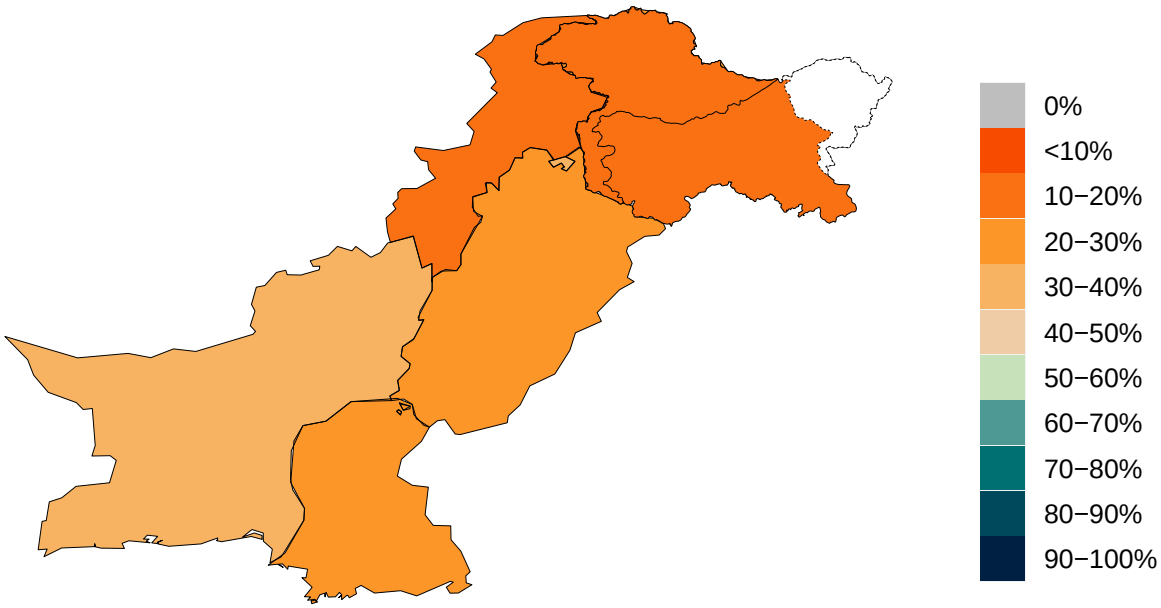


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

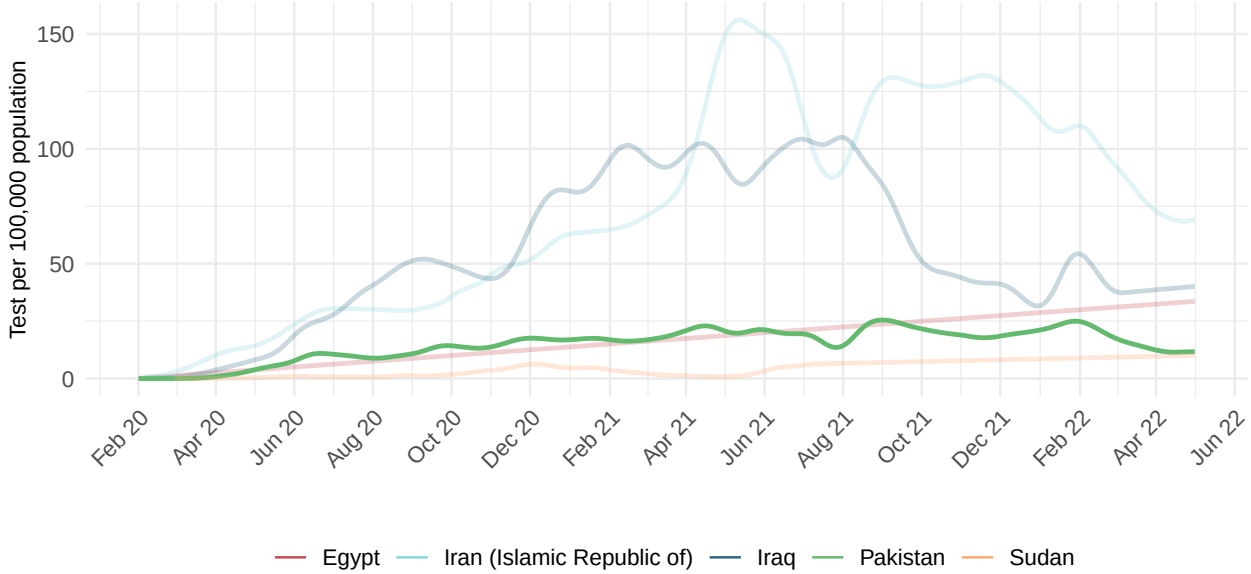


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on May 2, 2022

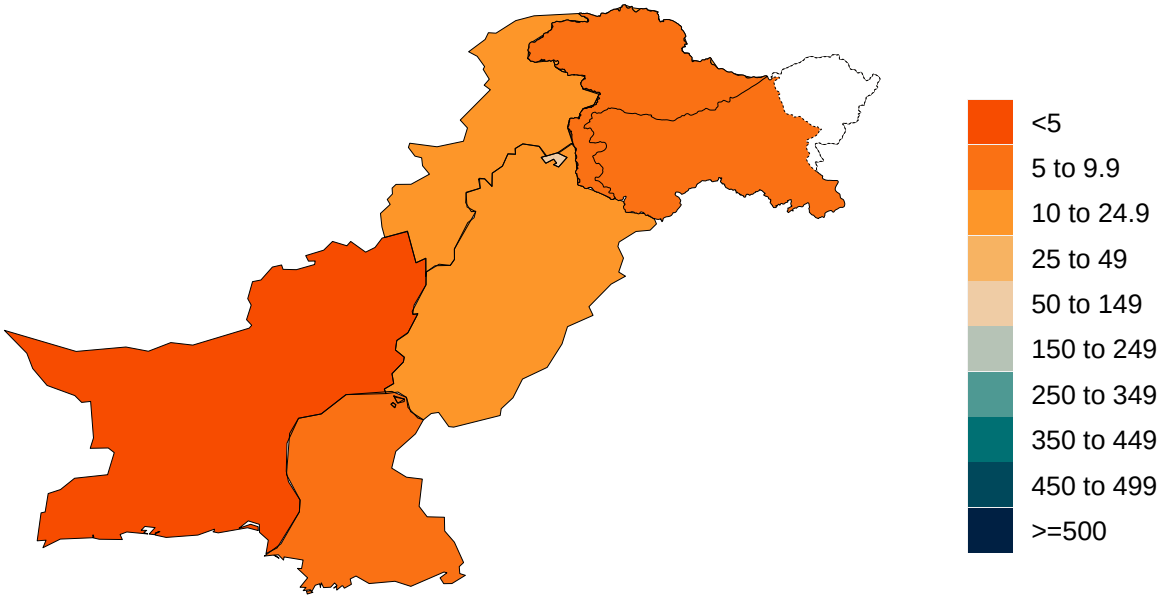


Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	Effectiveness at preventing											
	Ancestral		Alpha		Beta		Gamma		Delta		Omicron	
Vaccine	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection	Severe disease	Infection
AstraZeneca	94%	63%	94%	63%	94%	69%	94%	69%	94%	69%	71%	36%
CanSino	66%	62%	66%	62%	64%	61%	64%	61%	64%	61%	48%	32%
CoronaVac	50%	47%	50%	47%	49%	46%	49%	46%	49%	46%	37%	24%
Covaxin	78%	73%	78%	73%	76%	72%	76%	72%	76%	72%	57%	38%
Johnson & Johnson	86%	72%	86%	72%	76%	64%	76%	64%	76%	64%	57%	33%
Moderna	97%	92%	97%	92%	97%	91%	97%	91%	97%	91%	73%	48%
Novavax	89%	83%	89%	83%	86%	82%	86%	82%	86%	82%	65%	43%
Pfizer/BioNTech	95%	86%	95%	86%	95%	84%	95%	84%	95%	84%	72%	44%
Sinopharm	73%	68%	73%	68%	71%	67%	71%	67%	71%	67%	53%	35%
Sputnik-V	92%	86%	92%	86%	89%	85%	89%	85%	89%	85%	67%	44%
Other vaccines	75%	70%	75%	70%	73%	69%	73%	69%	73%	69%	55%	36%
Other vaccines (mRNA)	91%	86%	91%	86%	88%	85%	88%	85%	88%	85%	67%	45%

Percent of the population having received at least one dose (17.1) and fully vaccinated against SARS-CoV-2 (17.2) by May 2, 2022

Figure 17.1: Percent of the population having received one dose of a COVID-19 vaccine

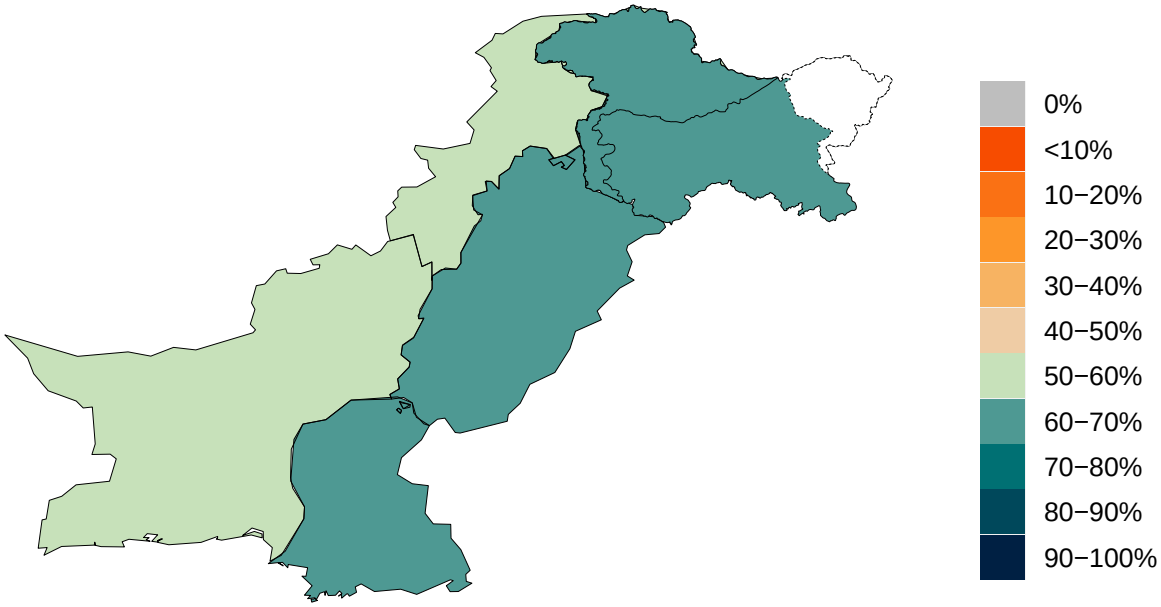


Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2

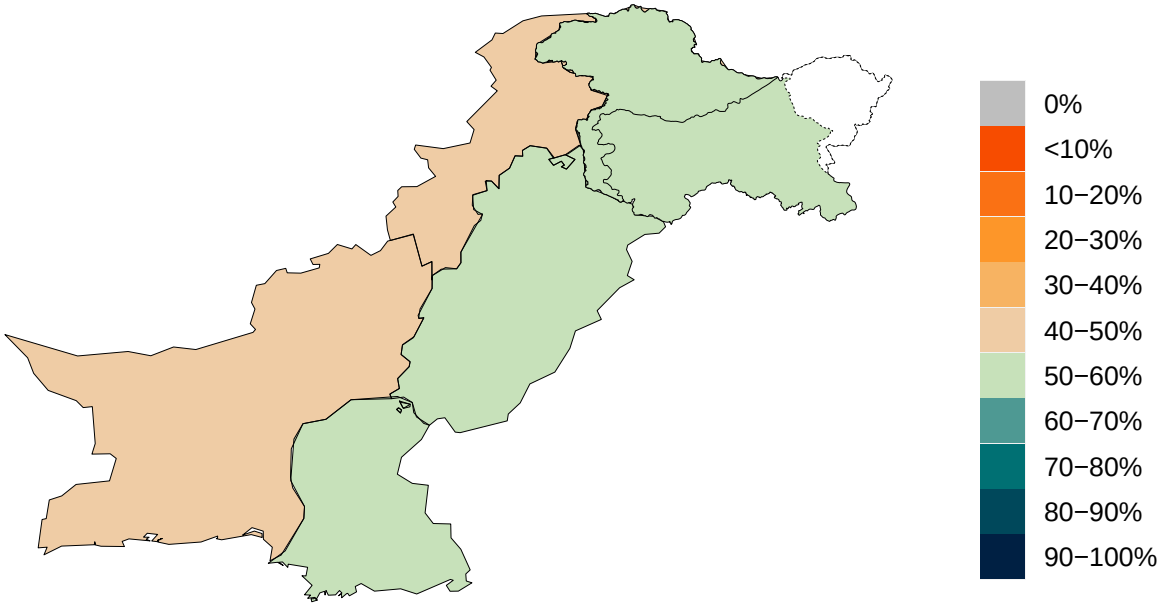


Figure 18.1: Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

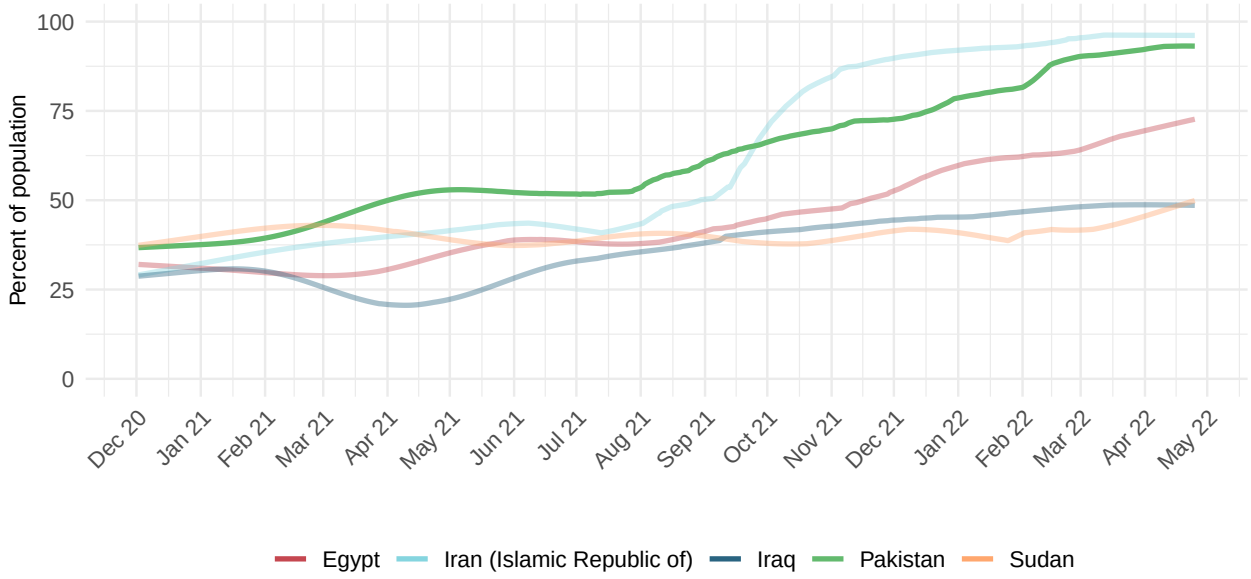


Figure 19.1: Estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

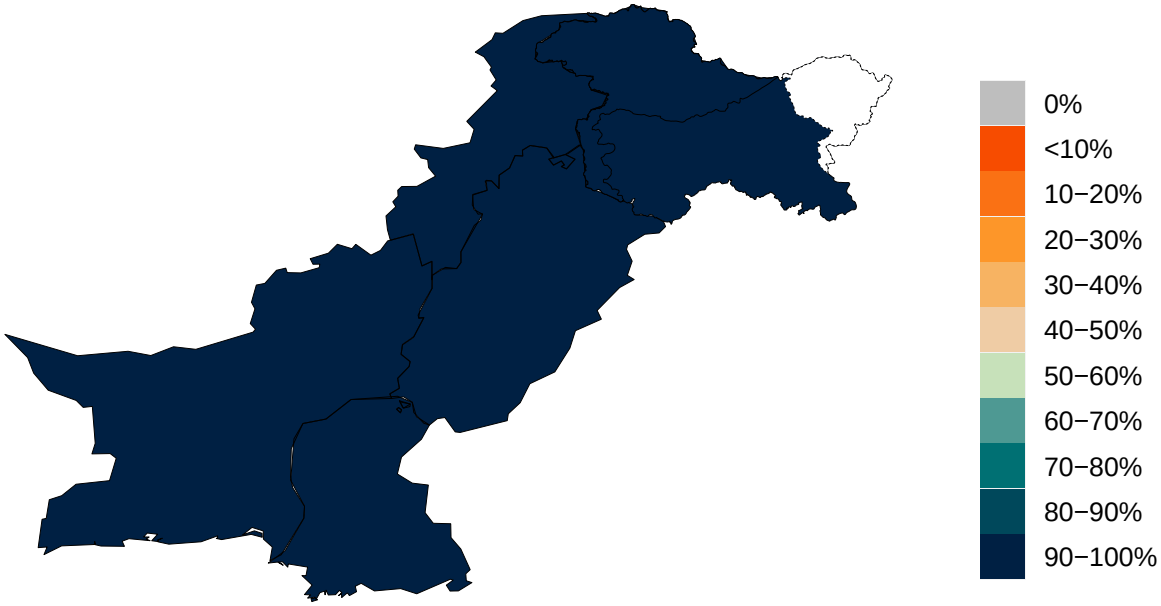


Figure 20.1: Estimated proportion of the total population that is not vaccinated but willing to be vaccinated as of April 25, 2022

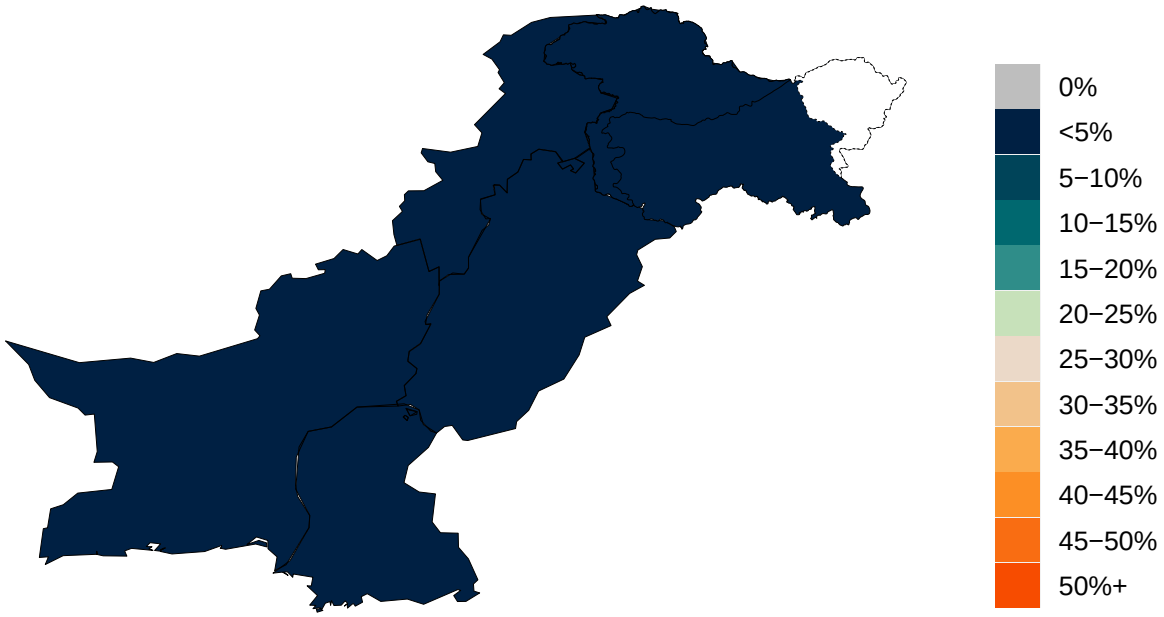


Figure 21.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

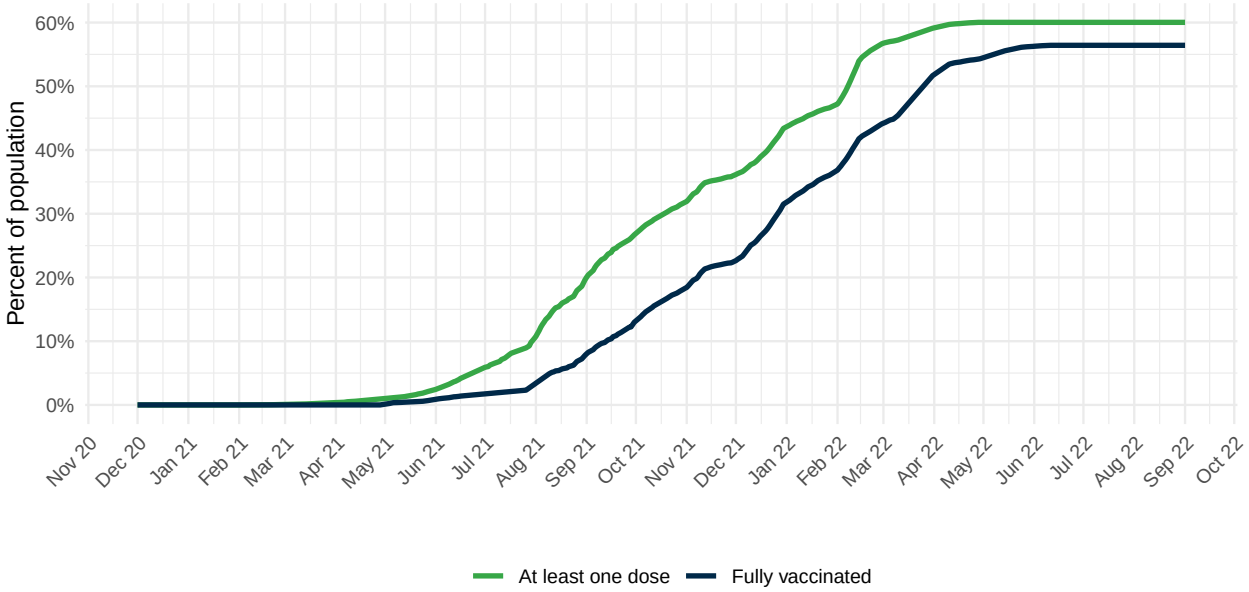
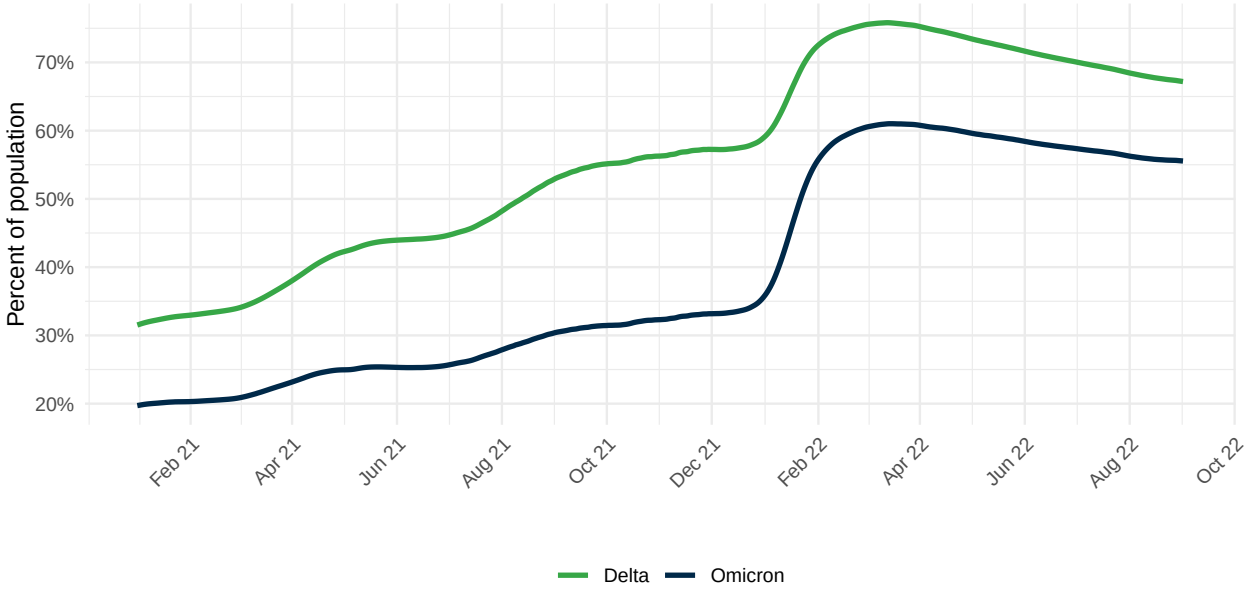


Figure 22.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



Projections and scenarios

Figure 23.1: Daily COVID-19 infections until September 01, 2022 for three scenarios

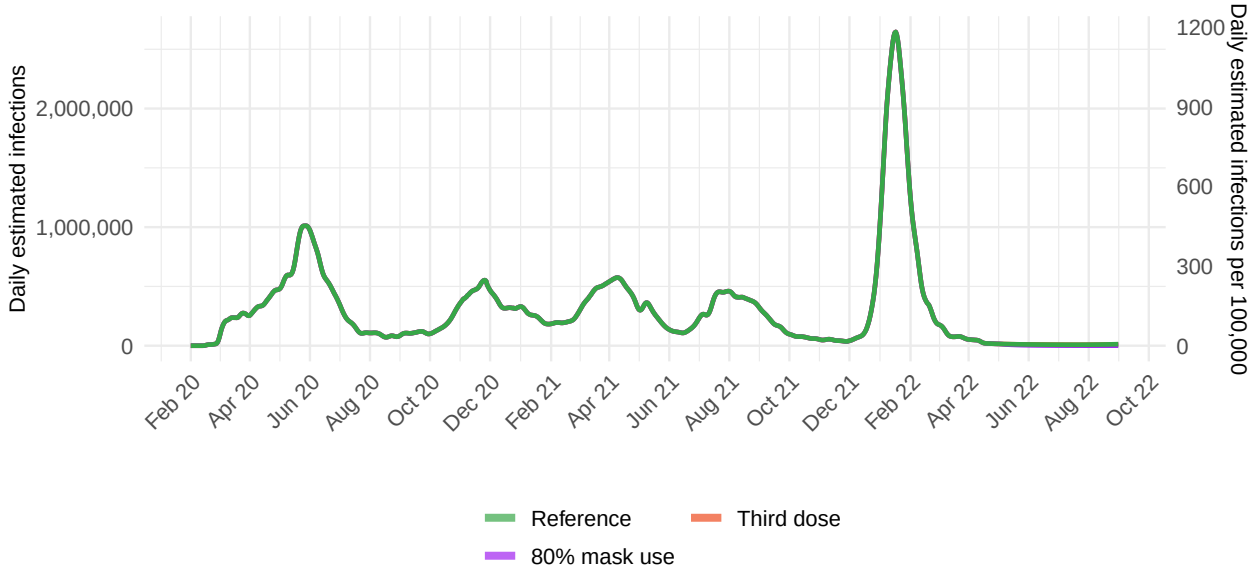


Figure 23.2: Daily COVID-19 reported cases until September 01, 2022 for three scenarios

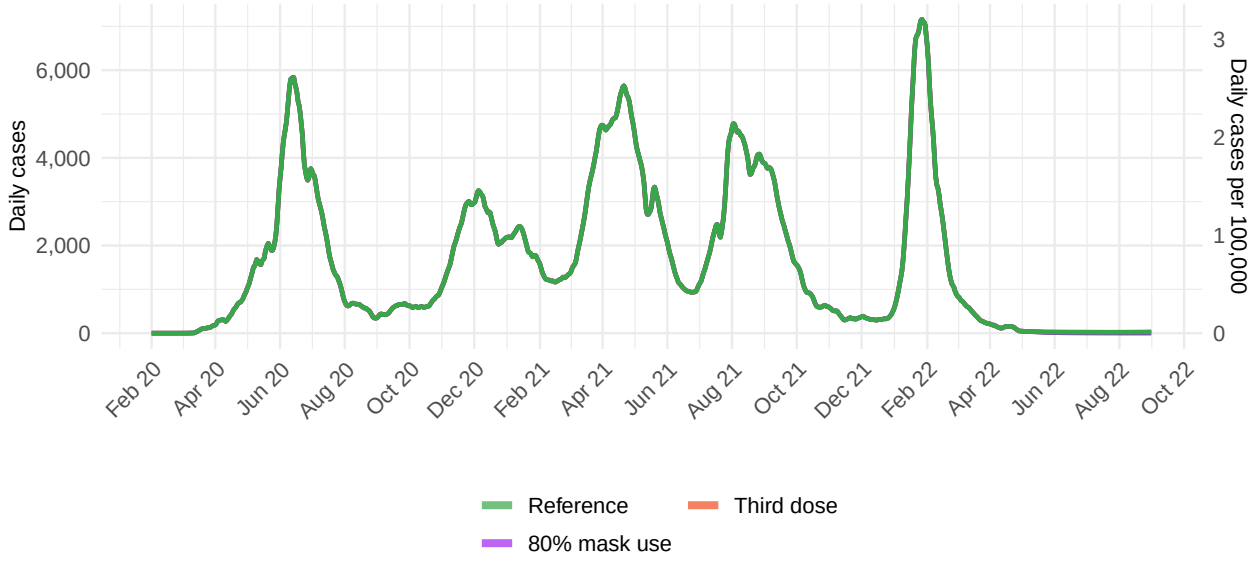


Figure 23.3: Daily COVID-19 hospital census until September 01, 2022 for three scenarios

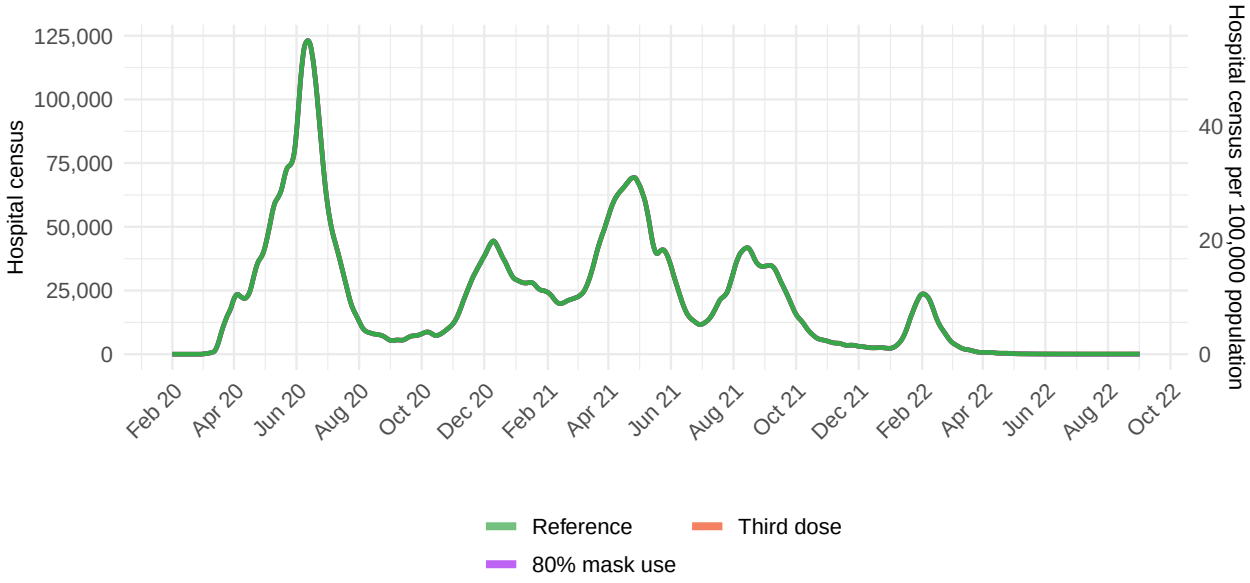


Figure 23.4: Reported daily COVID-19 deaths per 100,000

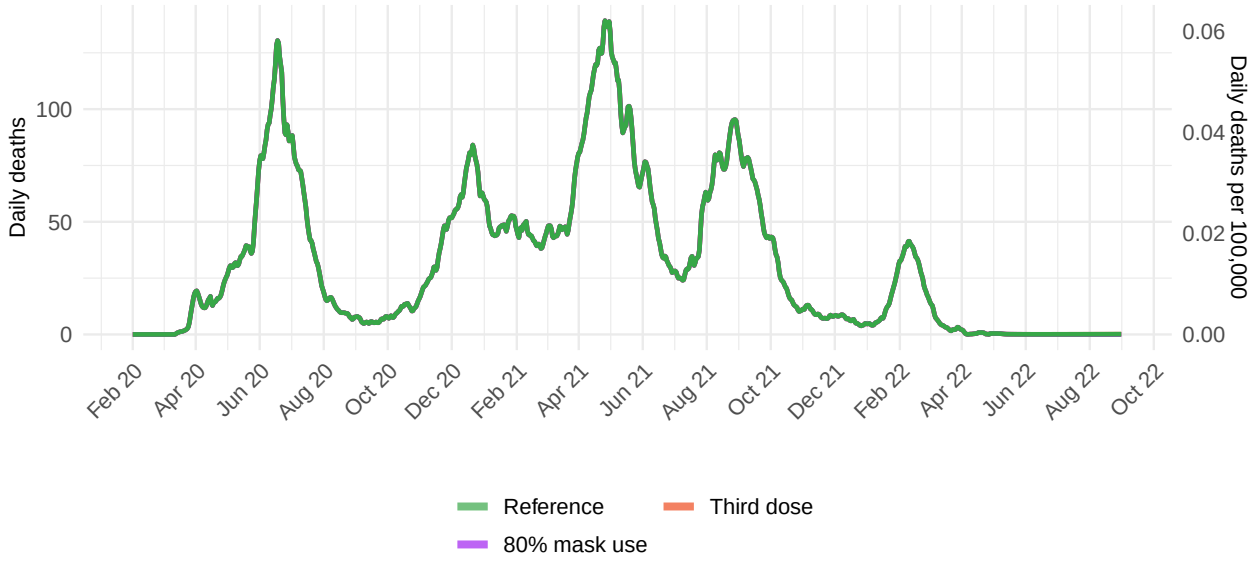


Figure 23.5: Total daily COVID-19 deaths per 100,000

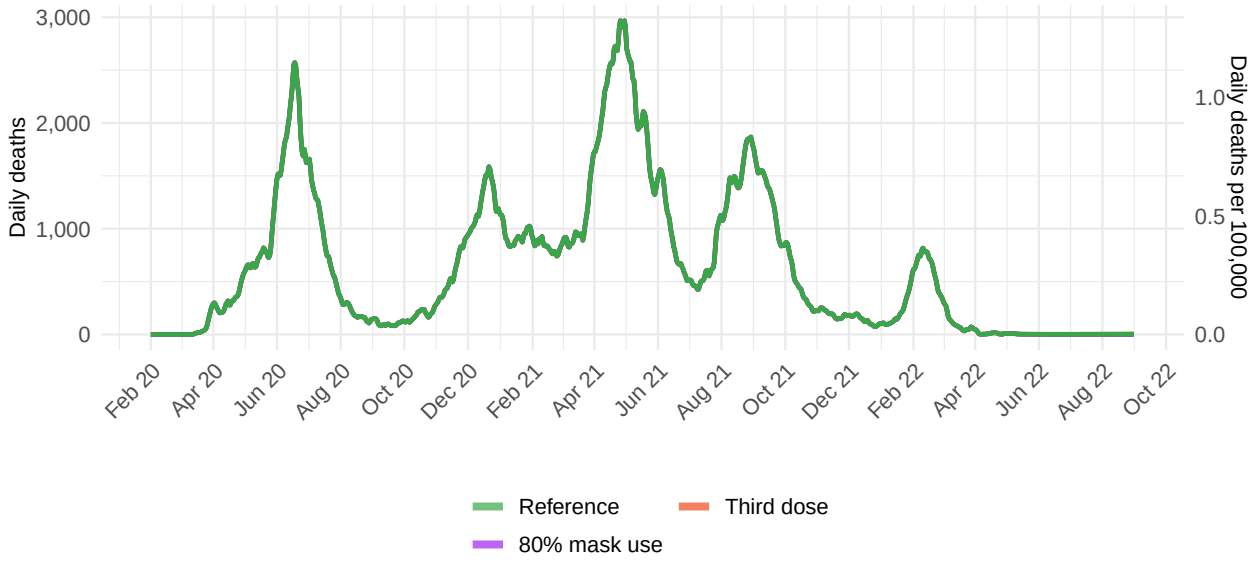


Figure 24.1: Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [May 2, 2022], and the SI-KJalpha model from the University of Southern California (SIKJalpha) [May 2, 2022]. Regional values are aggregates from available locations in that region.

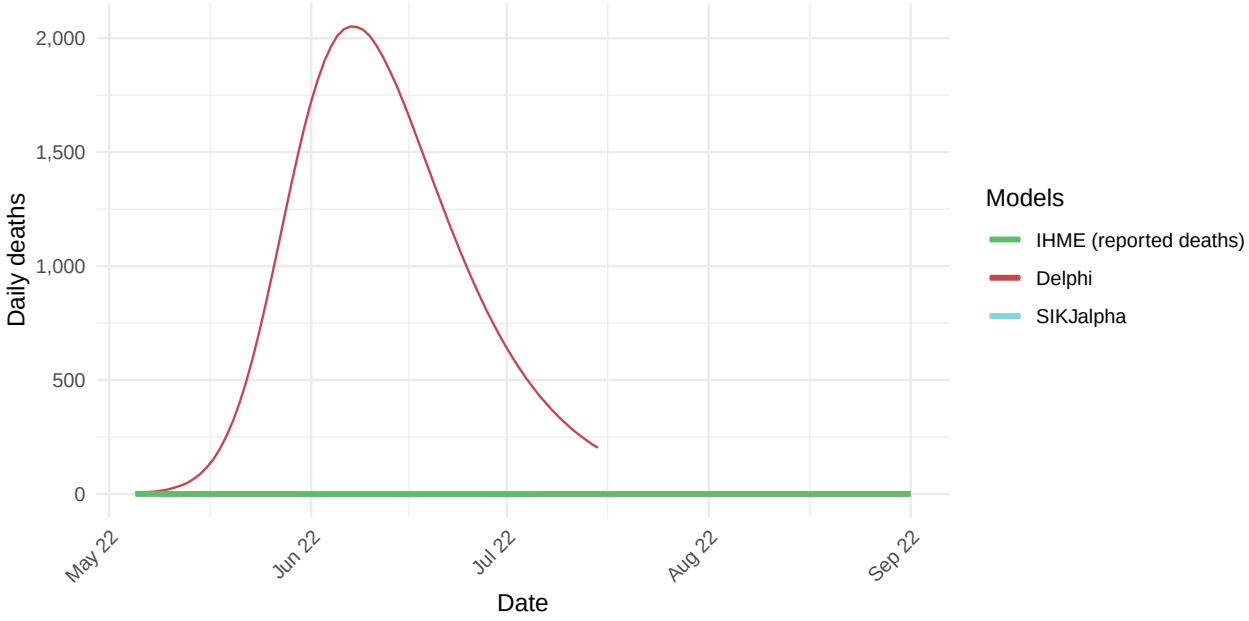


Figure 25.1: The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

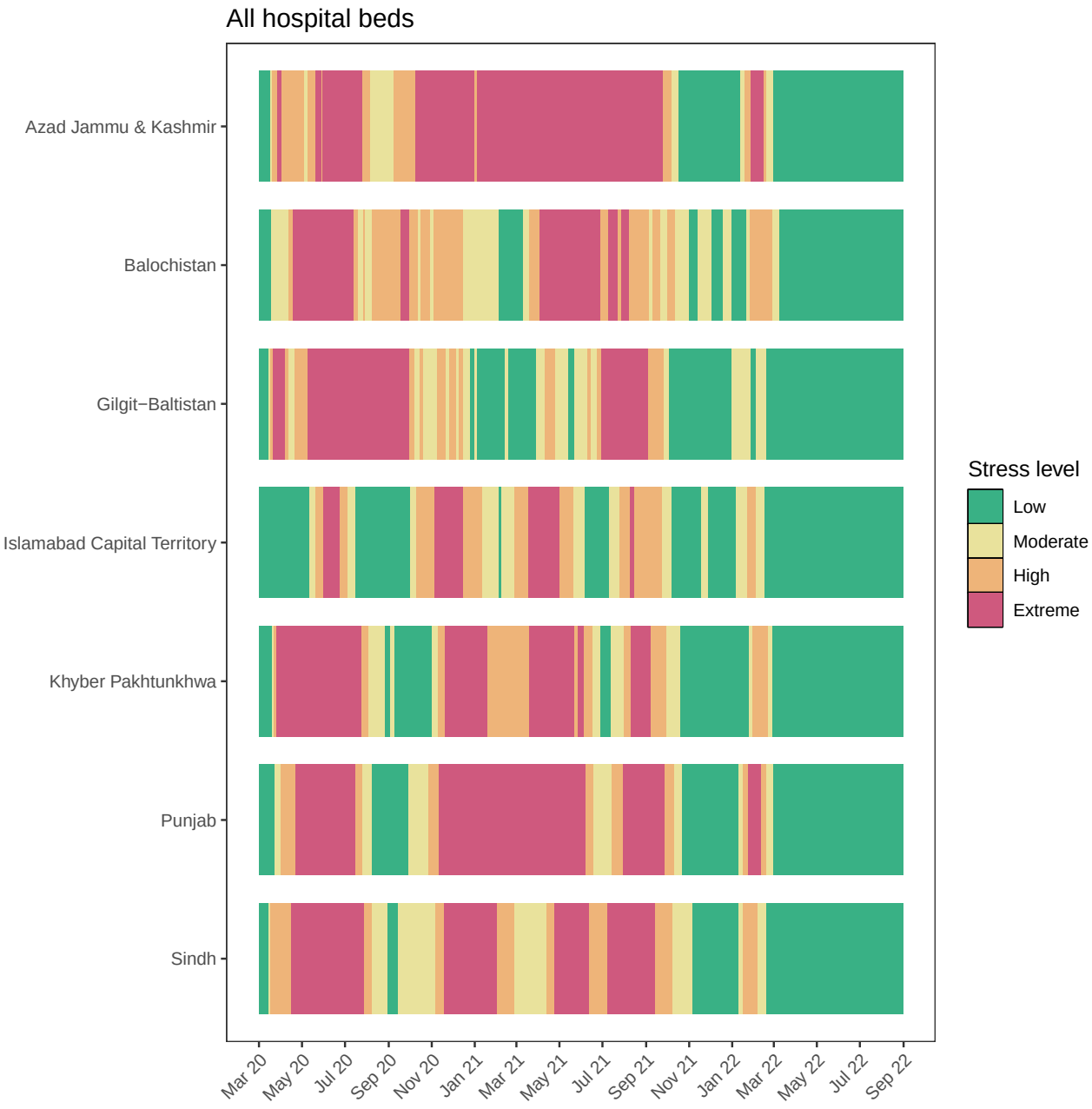
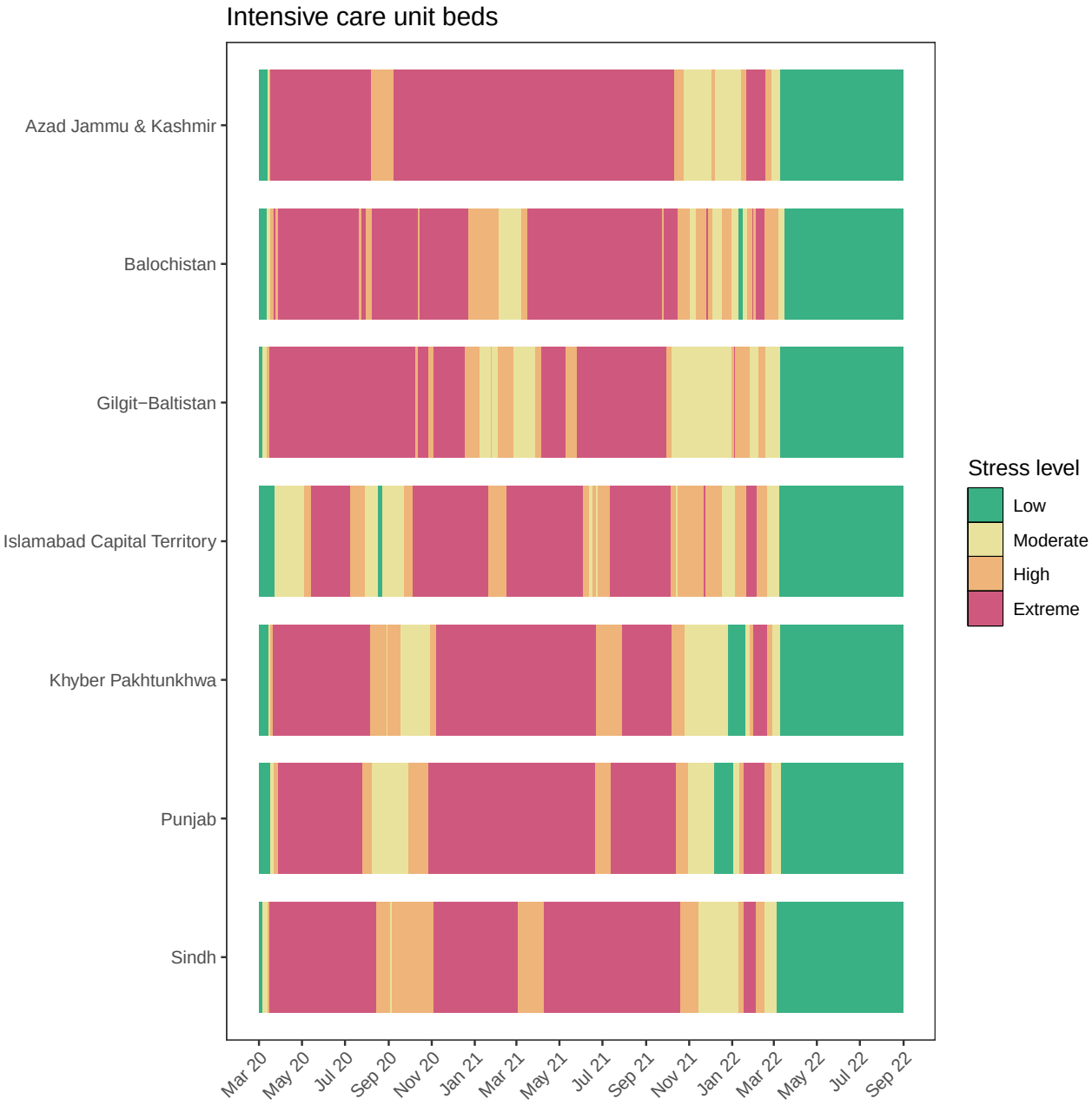


Figure 26.1: The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *moderate stress*, 30-59% is considered *high stress*, and 60% or greater is considered *extreme stress*.



More information

Data sources:

Mask use and vaccine confidence data are from the The Delphi Group at Carnegie Mellon University and University of Maryland COVID-19 Trends and Impact Surveys, in partnership with Facebook. Mask use data are also from Premise, the Kaiser Family Foundation, and the YouGov COVID-19 Behaviour Tracker survey.

Genetic sequence and metadata are primarily from the GISAID Initiative. Further details available on the COVID-19 model FAQ page.

A note of thanks:

We wish to warmly acknowledge the support of these and others who have made our COVID-19 estimation efforts possible.

More information:

For all COVID-19 resources at IHME, visit http://www.healthdata.org/covid.

To download our most recent results, visit our Data downloads page.

Questions? Requests? Feedback? Please contact us at https://www.healthdata.org/covid/contact-us.