COVID-19 Results Briefing

Pakistan

April 7, 2022

This document contains summary information on the latest projections from the IHME model on COVID-19 in Pakistan. The model was run on April 7, 2022, with data through April 4, 2022.

Current situation

Reported cases, hospital admissions, and deaths continue to decline in Pakistan. Some countries in Europe have seen a rise in cases due to the spread of BA.2, waning immunity, and behavioral changes. Our models do not suggest a BA.2 surge in Pakistan, but even if one occurs, the European experience suggests it will last approximately 3 weeks. However, the situation may change due to Ramadan gatherings.

Looking ahead to the emergence of new variants that may be more severe than Omicron, there are several strategies for Pakistan to pursue. First, maintain surveillance with a focus on early detection of new variants and monitoring of when any new variant may arrive in a country. Second, ensure that there is widespread access to effective antivirals in advance of a new and potentially more severe variant. To date, there appears to be more policy discussion of vaccination and boosters than there is of antivirals; this imbalance should be corrected. Third, time the delivery of boosters for the elderly and those with comorbidities to have maximum impact on the next new variant. There is not sufficient evidence at this time that BA.2 spread warrants a broader push on a fourth booster except in those at high risk. Fourth, when and if transmission begins increasing substantially, individuals at risk should consider wearing a mask and socially distancing. Finally, special efforts and messaging should be used for prayers and break-fast during Ramadan to help people to celebrate this month safely and avoid COVID infections.

- Daily infections in the last week decreased to 88,000 per day on average compared to 99,000 the week before (Figure 1.1). Daily hospital census in the last week (through April 4) decreased to 970 per day on average compared to 1,200 the week before.
- Daily reported cases in the last week decreased to 230 per day on average compared to 300 the week before (Figure 2.1).
- Reported deaths due to COVID-19 in the last week remained the same at two per day on average compared to the week before (Figure 3.1).
- Total deaths due to COVID-19 in the last week increased to 50 per day on average compared to 49 the week before (Figure 3.1). This makes COVID-19 the number 17 cause of death in Pakistan this week (Table 1). Estimated total daily deaths due to COVID-19 in the past week were 21.7 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 79% of people in Pakistan have been infected at least once as of April 4 (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 April 4 (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 63% higher than the pre-COVID-19 baseline (Figure 11.1). Mobility was lower than 15% of baseline in no provinces and territories.
- As of April 4, in the COVID-19 Trends and Impact Survey, 24% of people self-report that they always wore a mask when leaving their home compared to 26% last week (Figure 13.1).
- There were 17 diagnostic tests per 100,000 people on April 4 (Figure 15.1).
- As of April 4, 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 (Figure 17.1). 60% of people in Pakistan have received at least one vaccine dose, and 53% are fully vaccinated.
- In Pakistan, 90.9% of the population that is 12 years and older say they would accept a vaccine for COVID-19. Note that vaccine acceptance is calculated using survey data from the 18+ population. This is up by 0.2 percentage points from last week. The proportion of the population who are open to receiving a COVID-19 vaccine ranges from 89% in Sindh to 99% in Islamabad Capital Territory (Figure 19.1).
- In our current reference scenario, we expect that 136.2 million people will be vaccinated with at least one dose by August 1 (Figure 20.1). We expect that 57% of the population will be fully vaccinated by August 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 rise to 98,310 by June 15, 2022 (Figure 22.1).
- Daily estimated infections in the **80% mask use scenario** will decline to 4,640 by August 1, 2022 (Figure 22.1).
- Daily estimated infections in the **third dose scenario** will decline to 46,910 by August 1, 2022 (Figure 22.1).

Cases

- Daily estimated cases in the **reference scenario** will rise to 410 by June 30, 2022 (Figure 22.2).
- Daily estimated cases in the **80% mask use scenario** will decline to 20 by August 1, 2022 (Figure 22.2).
- Daily estimated cases in the **third dose scenario** will rise to 280 by June 11, 2022 (Figure 22.2).

Hospitalizations

- Daily hospital census in the **reference scenario** will rise to 1,070 by July 7, 2022 (Figure 22.3).
- Daily hospital census in the **80% mask use scenario** will decline to 60 by August 1, 2022 (Figure 22.3).
- Daily hospital census in the **third dose scenario** will decline to 590 by August 1, 2022 (Figure 22.3).

Deaths

- In our **reference scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on August 1. This represents 230 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **reference scenario** will reach zero by July 24, 2022 (Figure 22.4).
- Under our **reference scenario**, our model projects 605,000 cumulative total deaths due to COVID-19 on August 1. This represents 5,100 additional deaths from April 4 to August 1 (Figure 22.5).
- In our **80% mask use scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on August 1. This represents 69 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **80% mask use scenario** will decline to zero by August 1, 2022 (Figure 22.4).
- In our **third dose scenario**, our model projects 31,000 cumulative reported deaths due to COVID-19 on August 1. This represents 180 additional deaths from April 4 to August 1. Daily reported COVID-19 deaths in the **third dose scenario** will decline to zero by May 8, 2022 (Figure 22.4).
- Figure 23.1 compares our reference scenario forecasts to other publicly archived models. Forecasts are widely divergent.
- At some point from April through August 1, no provinces and territories will have high or extreme stress on hospital beds (Figure 24.1). At some point from April through August 1, no provinces and territories will have high or extreme stress on intensive care unit (ICU) capacity (Figure 25.1).

Model updates

Vaccine confidence data are from The Delphi Group at Carnegie Mellon University and University of Maryland COVID-19 Trends and Impact Surveys, in partnership with Facebook. In our previous estimates of the proportion of the population that is 12 years and older who would receive the COVID-19 vaccine if available, we included survey responses of "yes, probably" and "yes, definitely" when asked "If a vaccine to prevent COVID-19 were offered to you today, would you choose to get vaccinated?" In our analysis of vaccine uptake, we have seen that vaccination rates have largely plateaued at the level implied by the "yes, definitely" response level. Therefore, we have updated our estimates of willingness to accept the vaccine to include only survey responses of "yes, definitely."

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

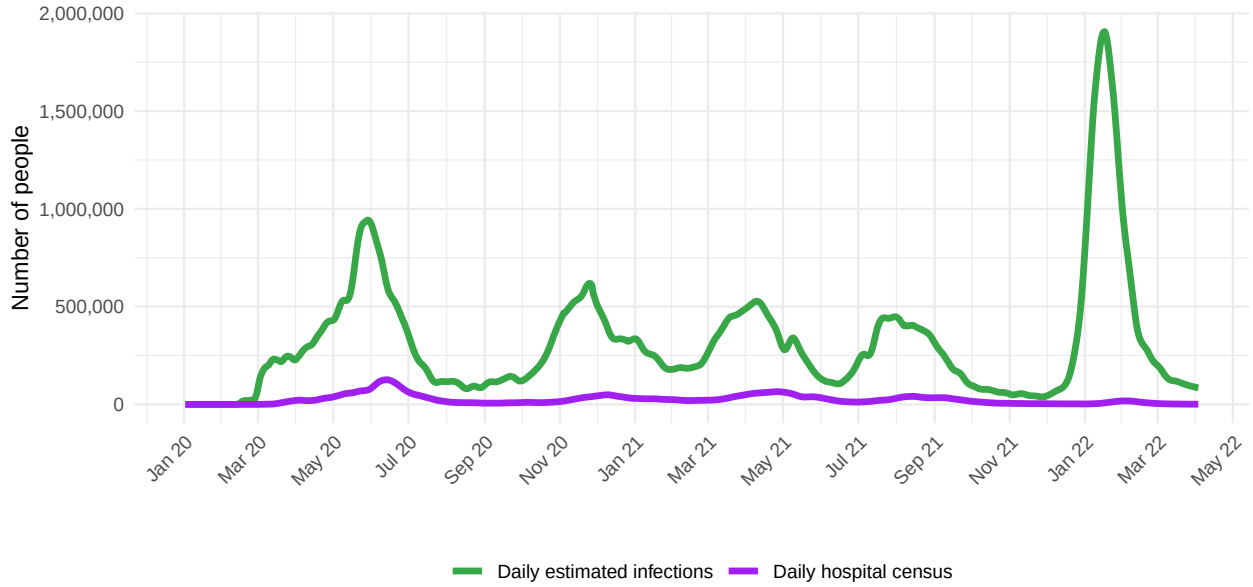


Figure 2.1: Reported daily COVID-19 cases, moving average

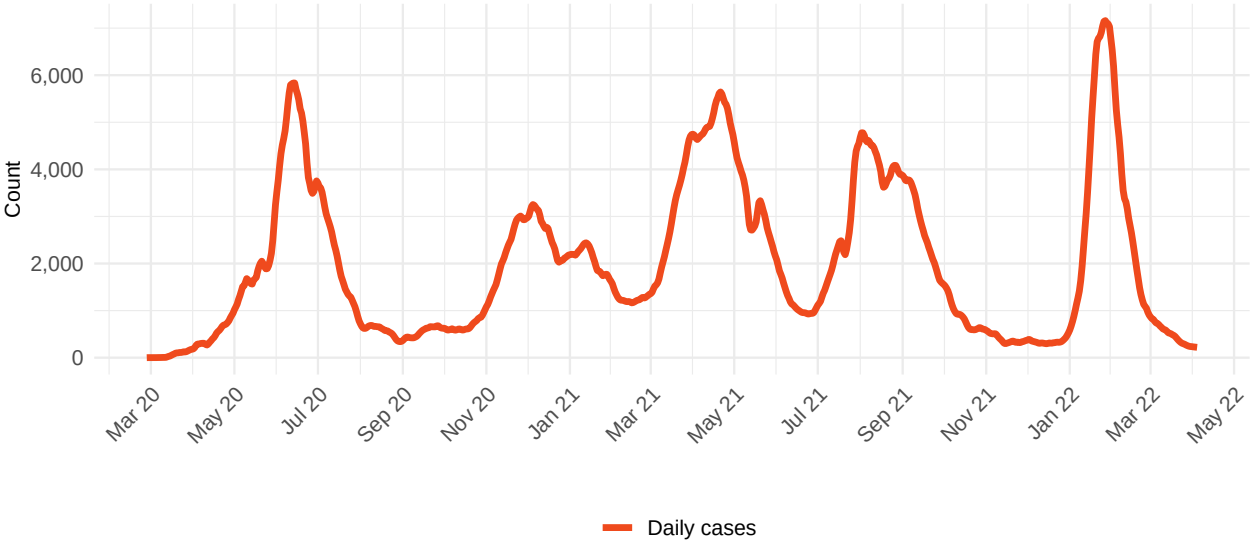
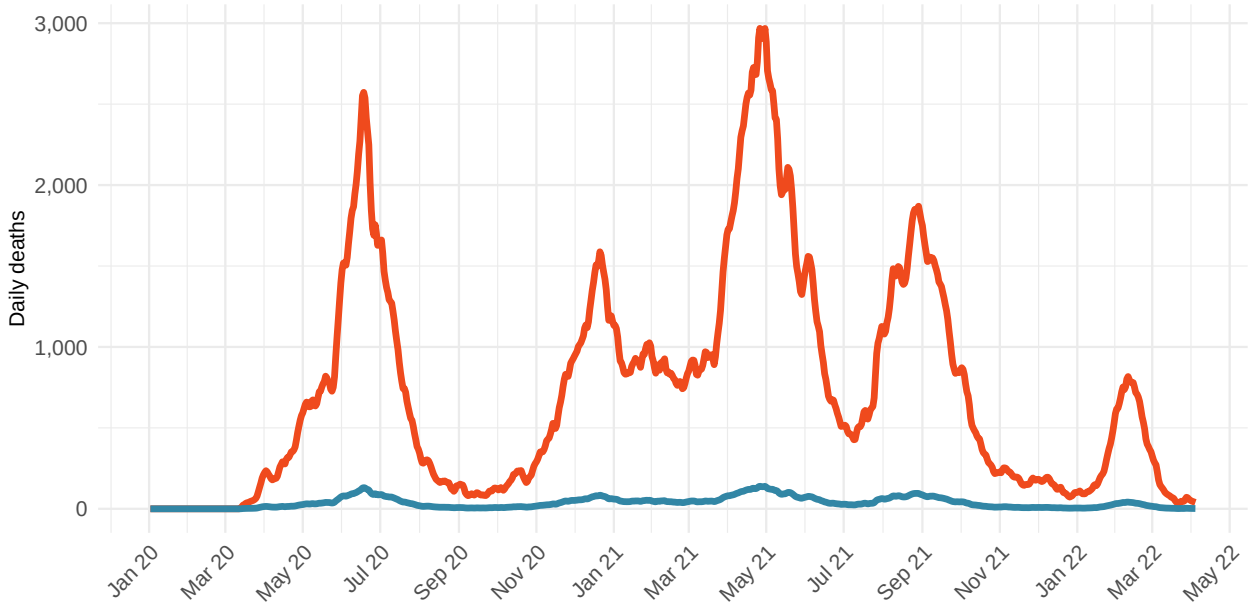


Table 1: Ranking of total deaths due to COVID-19 among the leading causes of mortality this week, assuming uniform deaths of non-COVID causes throughout the year

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	353	17

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 April 4, 2022

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

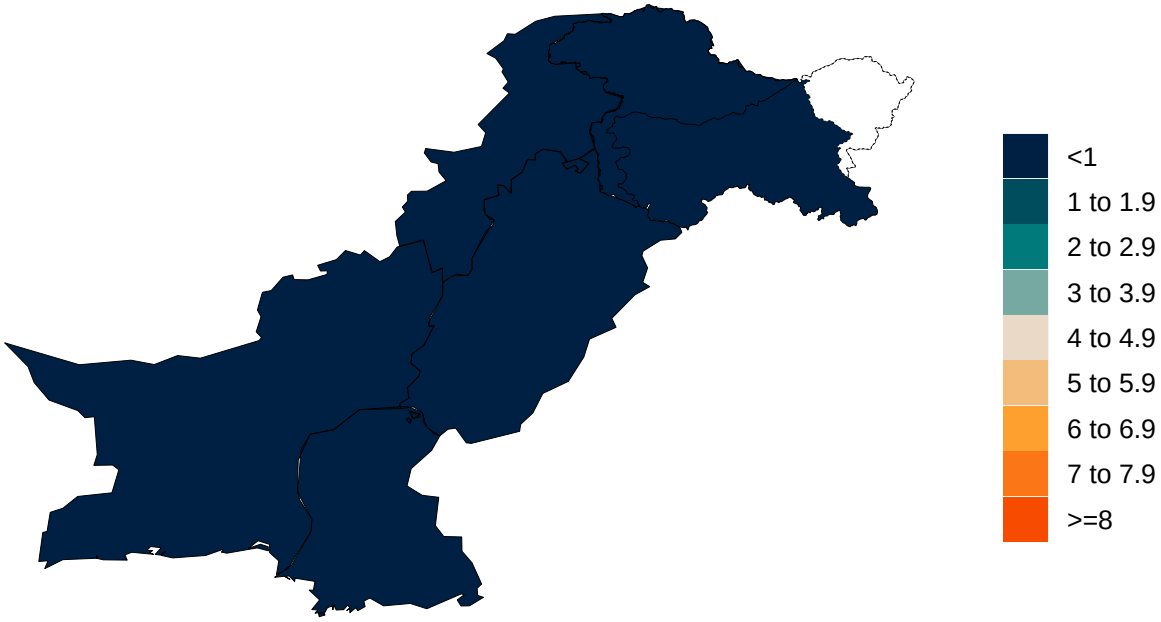
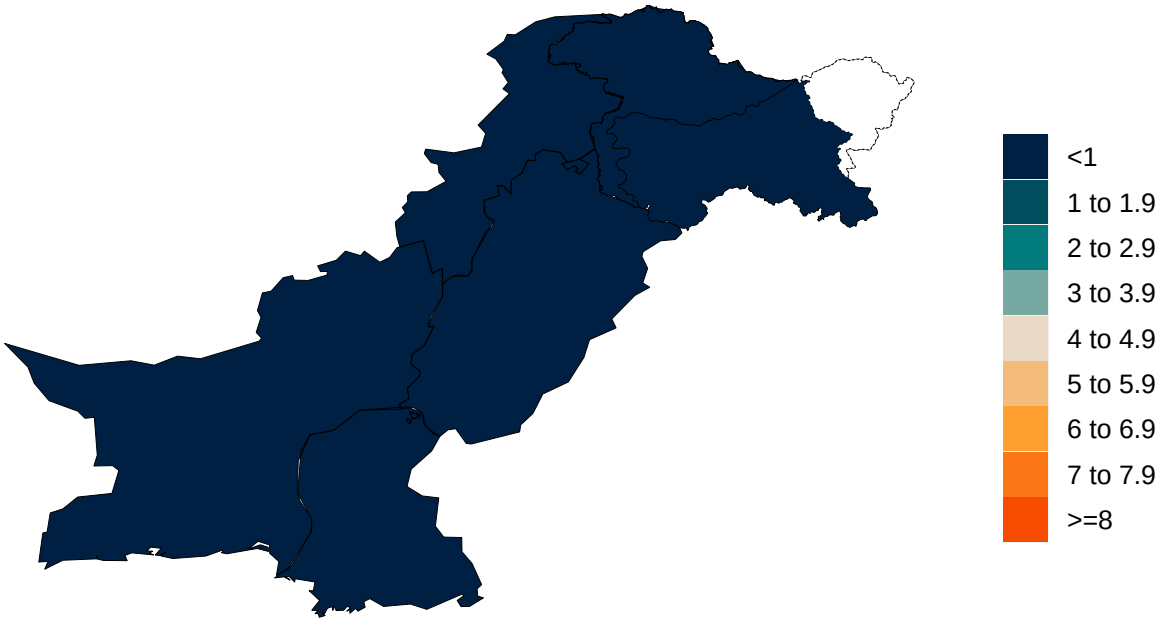


Figure 4.2: Daily total COVID-19 death rate per 1 million



Cumulative COVID-19 deaths per 100,000 on April 4, 2022

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

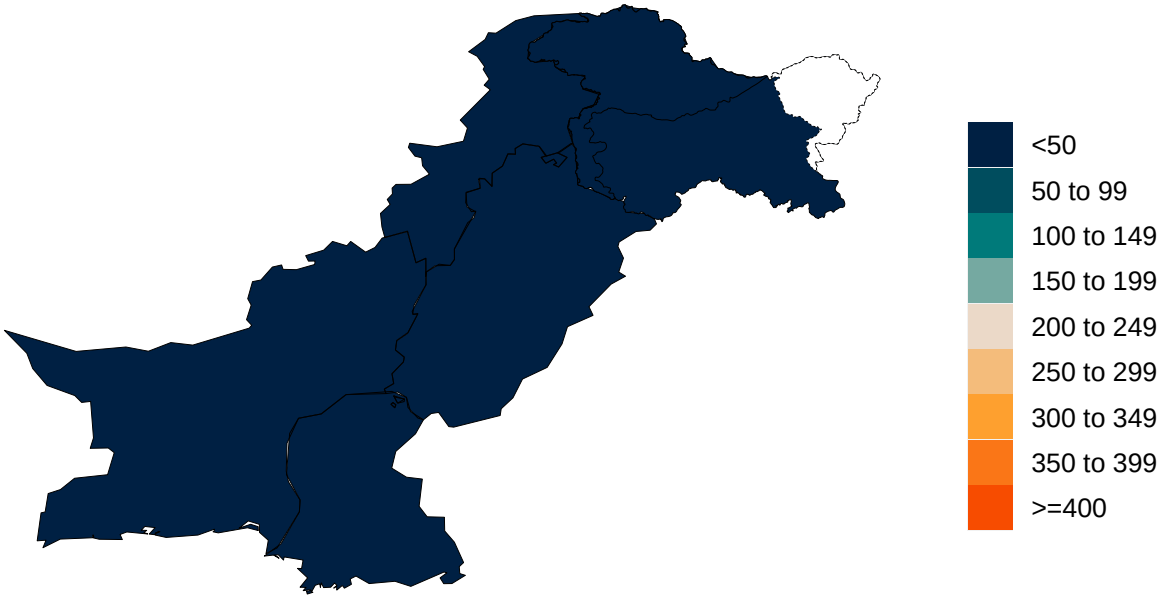


Figure 5.2: Total cumulative COVID-19 deaths per 100,000

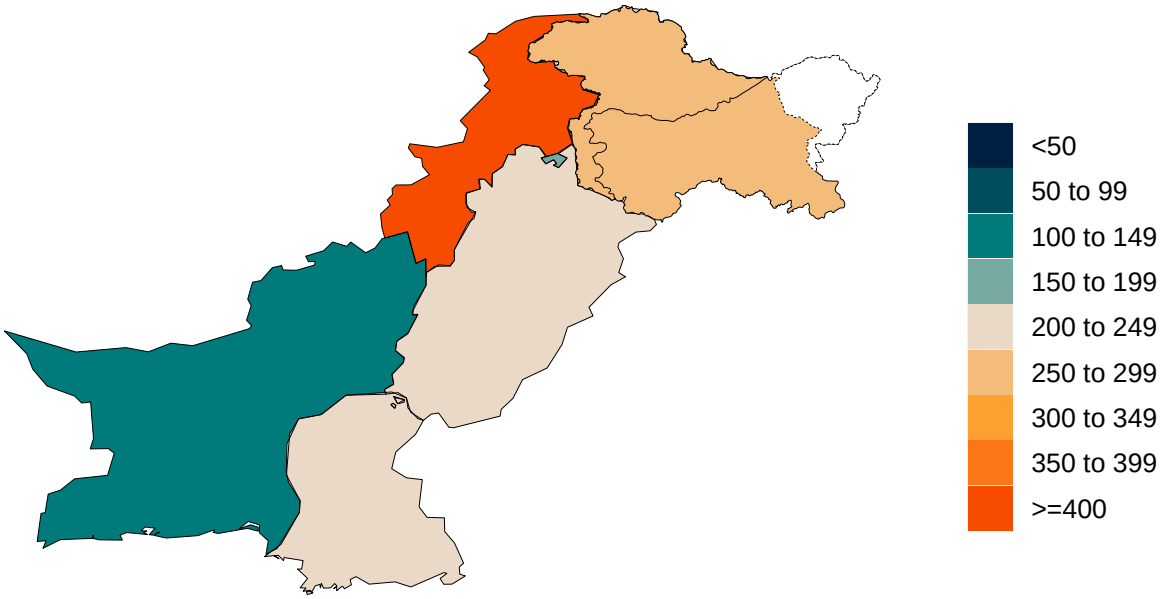


Figure 6.1: Estimated percent of the population infected with COVID-19 on April 4, 2022

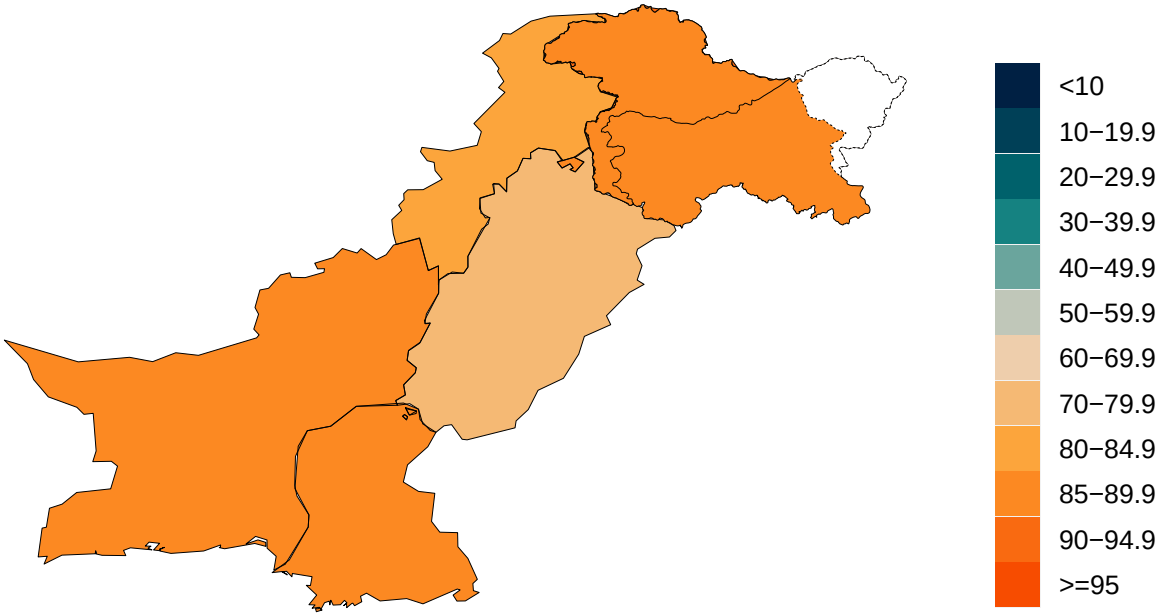


Figure 7.1: Mean effective R on March 24, 2022. Effective R less than 1 means that transmission should decline, all other things being held the same. The estimate of effective R is based on the combined analysis of deaths, case reporting, and hospitalizations where available. Current reported cases reflect infections 11-13 days prior, so estimates of effective R can only be made for the recent past.

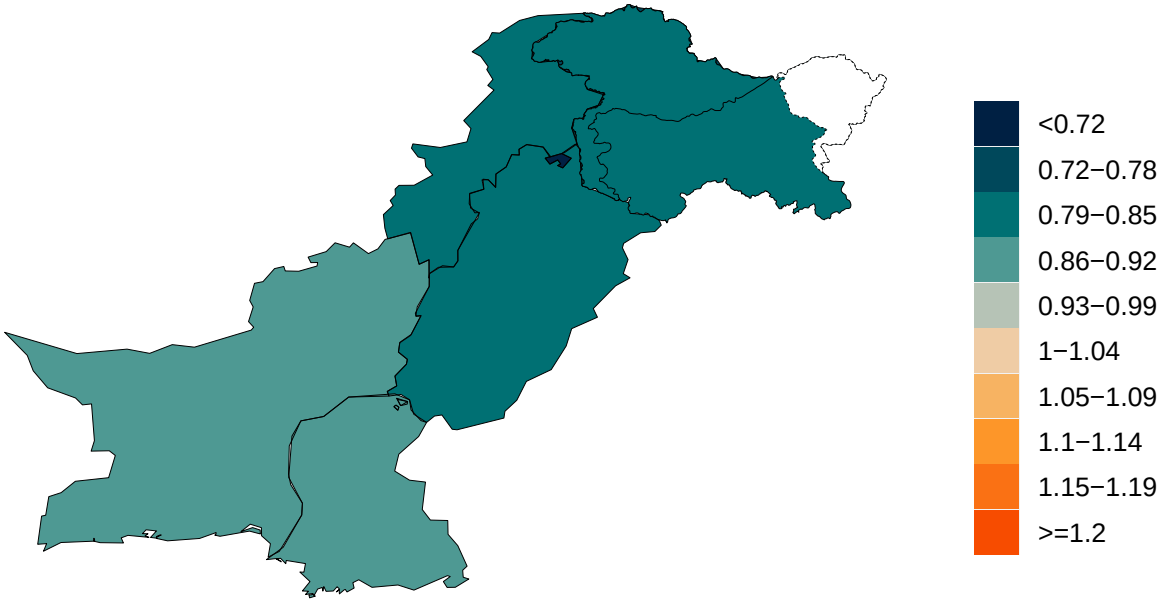
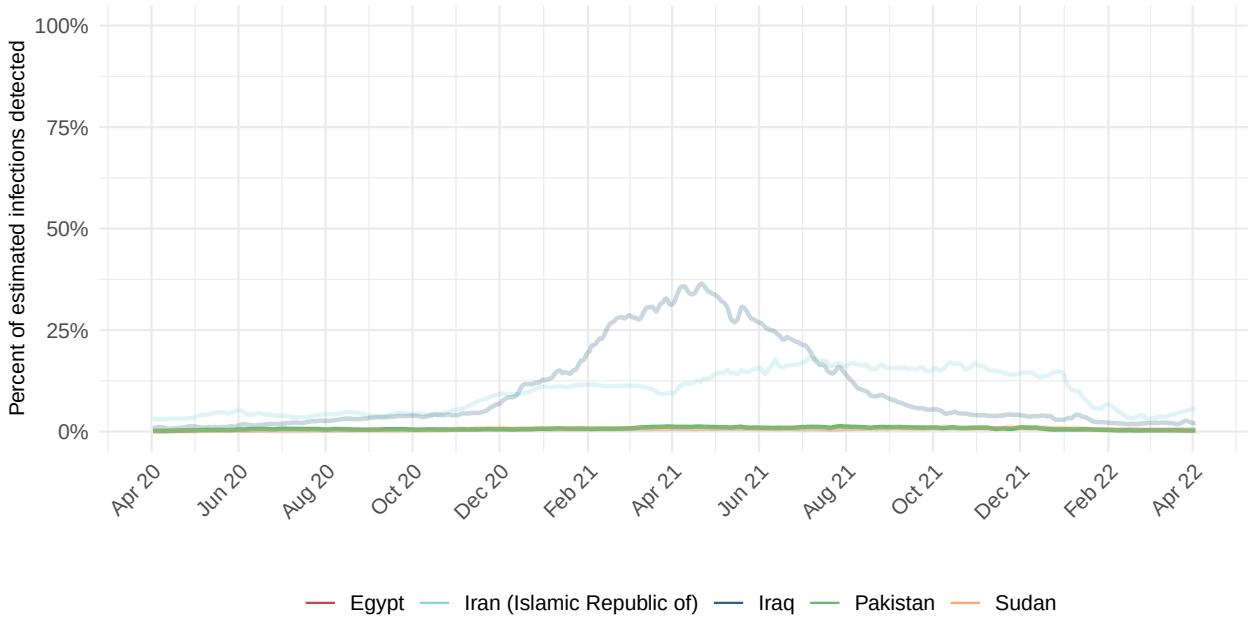


Figure 8.1: Percent of estimated COVID-19 infections detected. This is estimated as the ratio of reported daily COVID-19 cases to estimated daily COVID-19 infections based on the SEIR disease transmission model. Due to measurement errors in cases and testing rates, the infection-detection rate can exceed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



Estimated percent of circulating SARS-CoV-2 for primary variant families on April 4, 2022

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

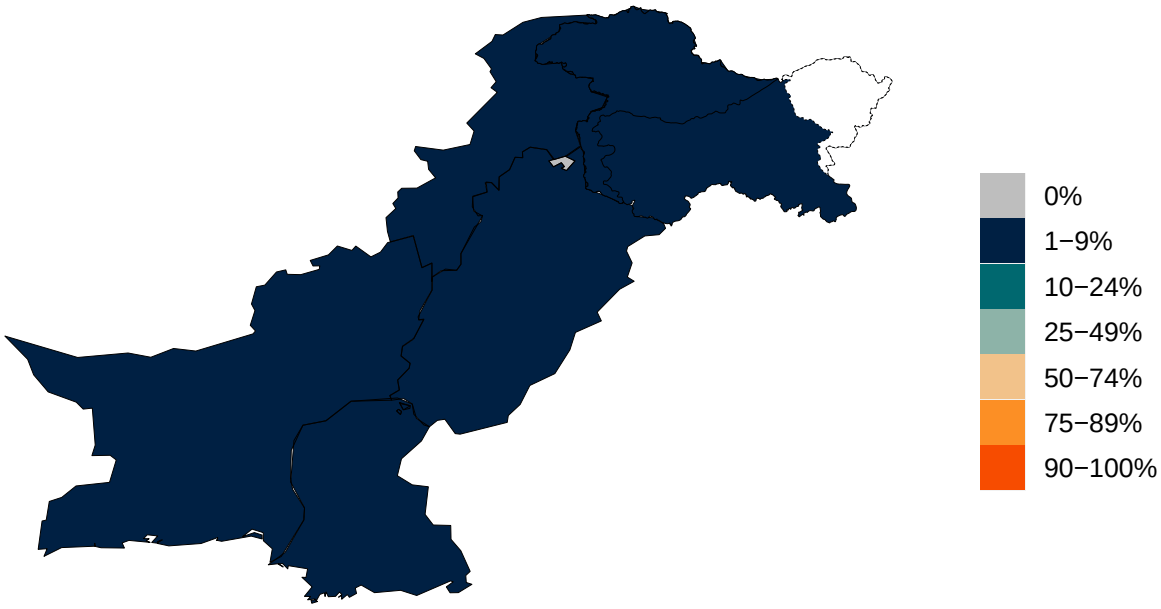


Figure 9.2: Estimated percent of new infections that are Beta variant

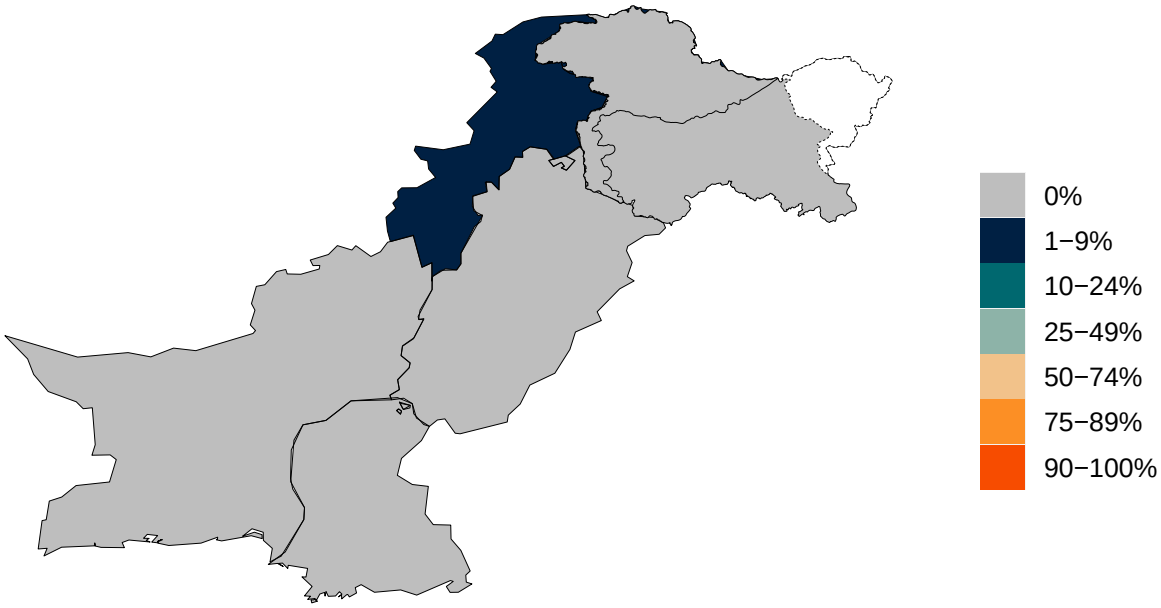


Figure 9.3: Estimated percent of new infections that are Delta variant

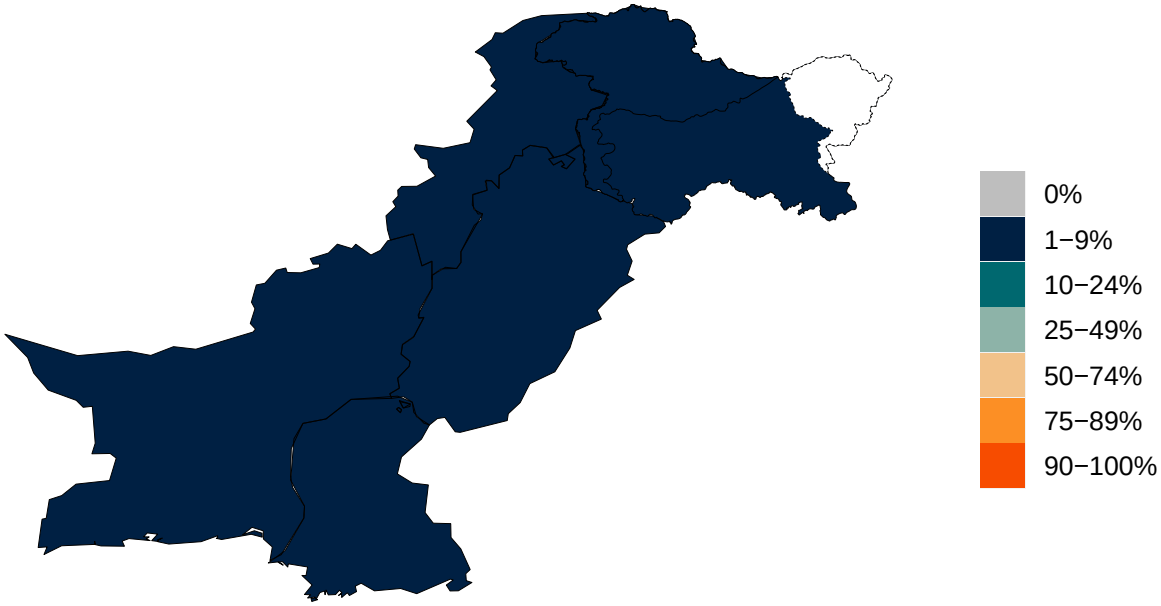


Figure 9.4: Estimated percent of new infections that are Gamma variant

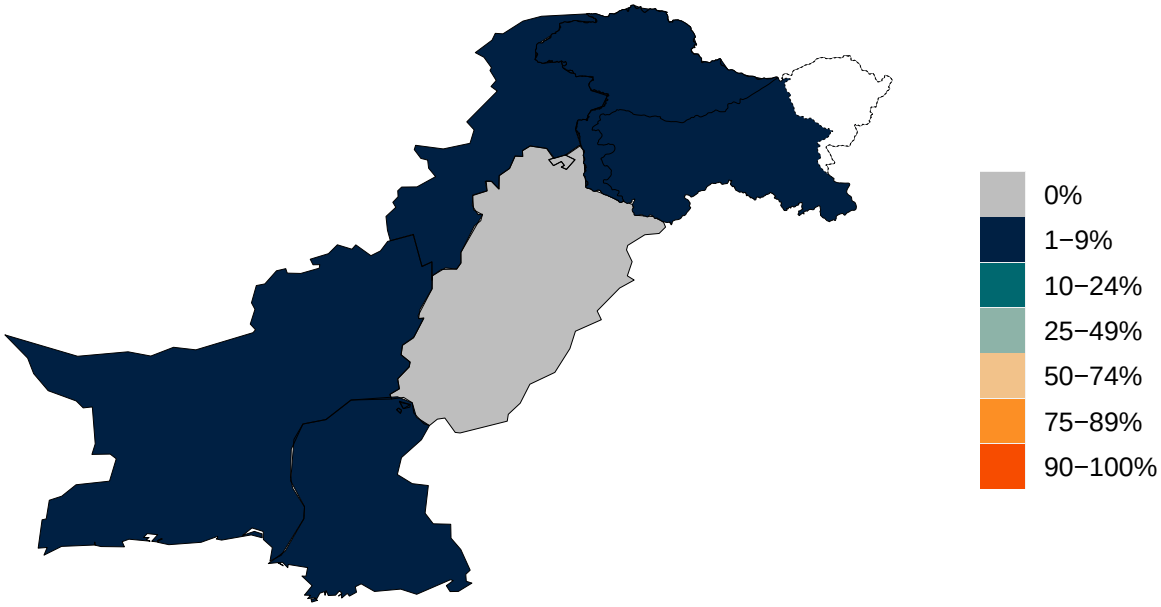


Figure 9.5: Estimated percent of new infections that are Omicron variant

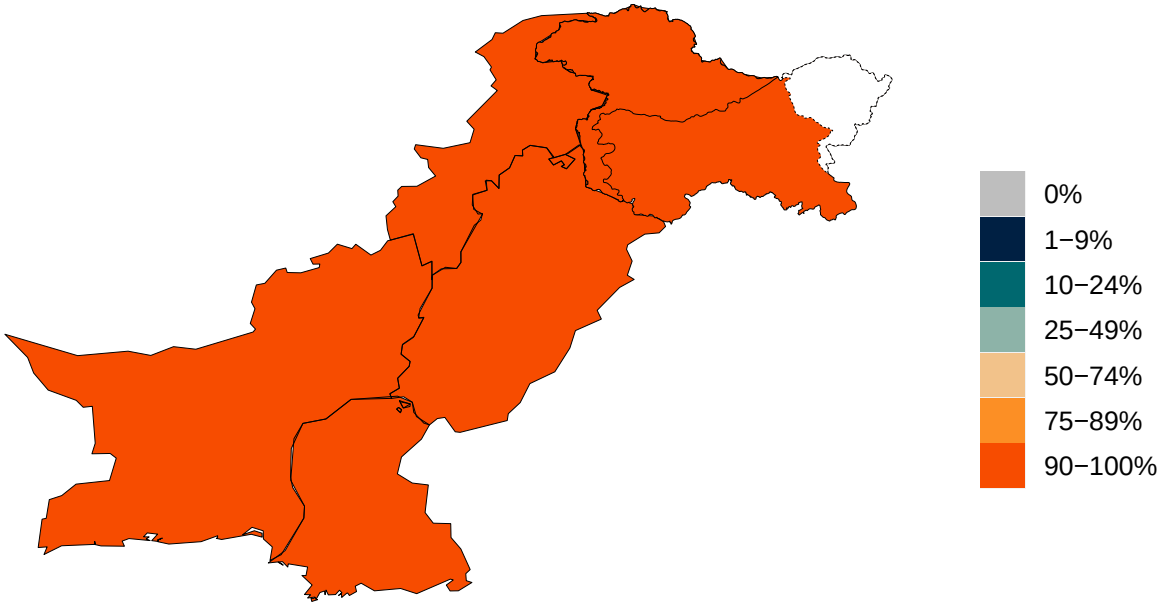
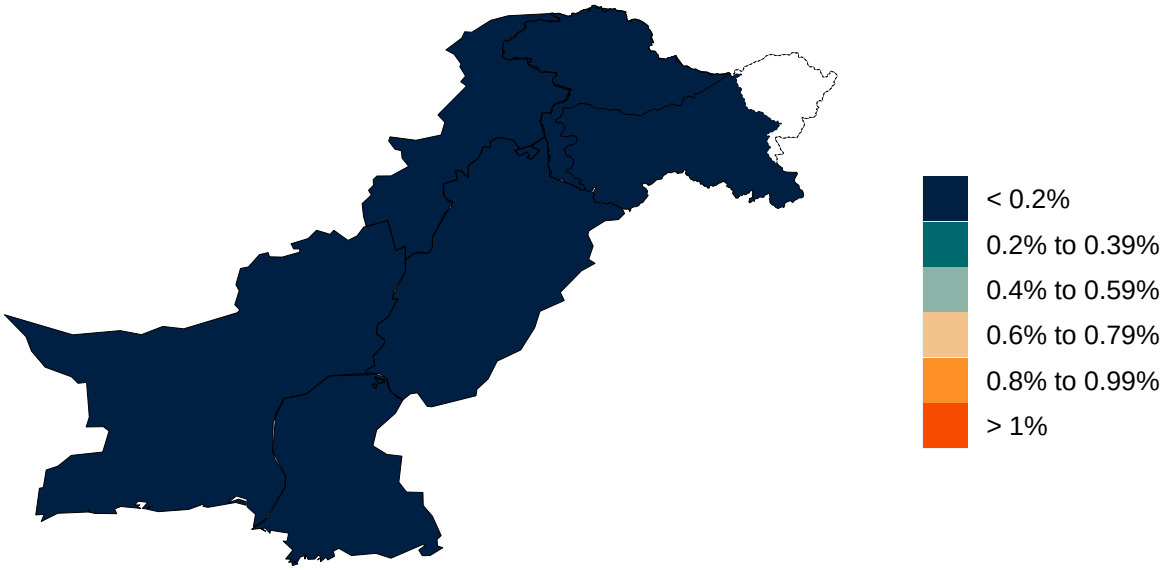


Figure 10.1: Infection-fatality rate on April 4, 2022. This is estimated as the ratio of COVID-19 deaths to estimated daily COVID-19 infections.



Critical drivers

Table 2: Current mandate implementation

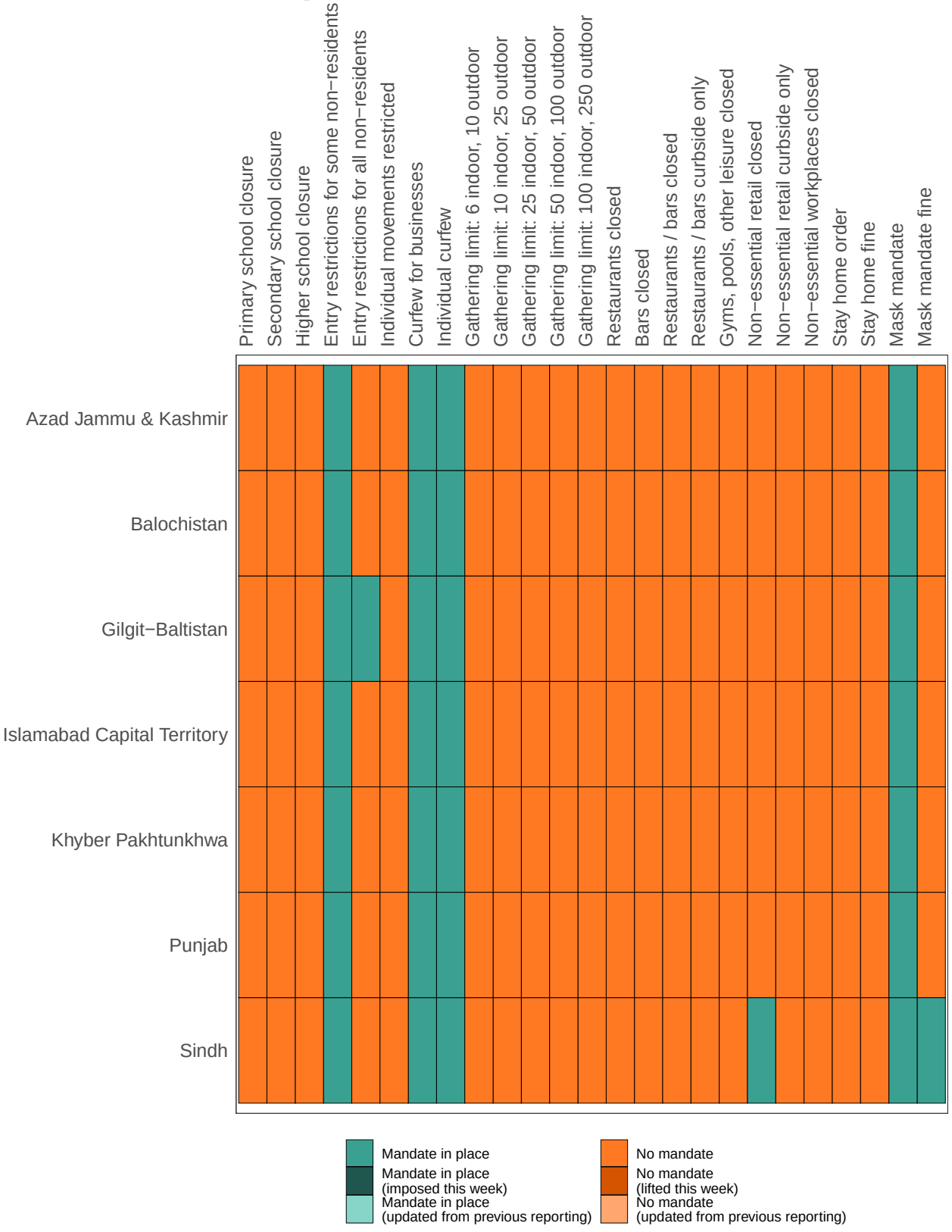


Figure 11.1: Trend in mobility as measured through smartphone app use, compared to January 2020 baseline

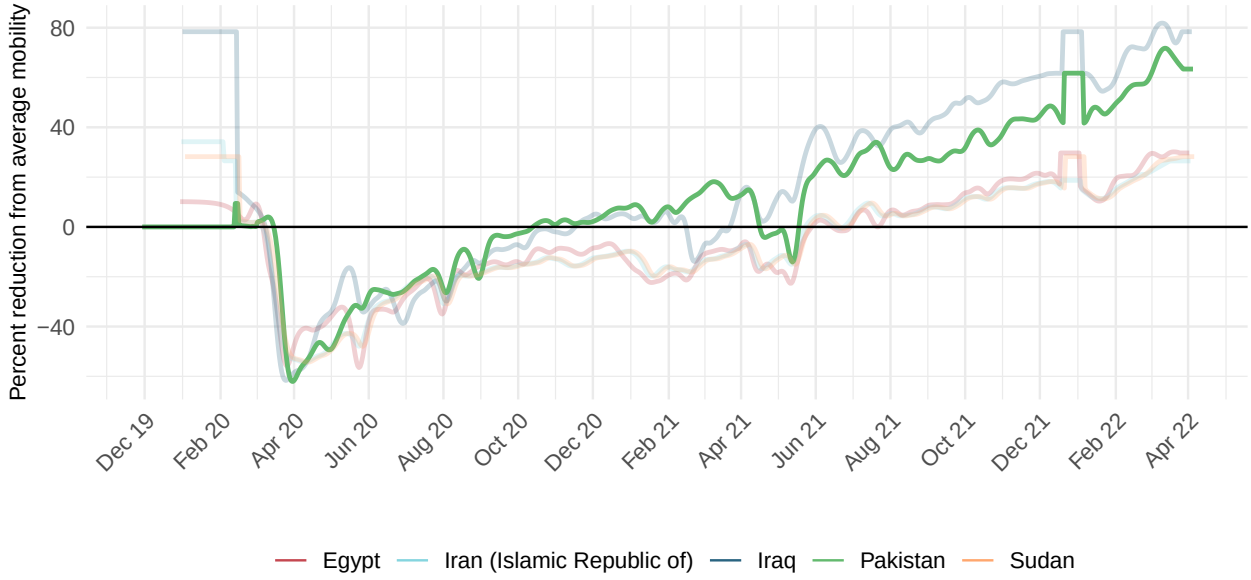


Figure 12.1: Mobility level as measured through smartphone app use, compared to January 2020 baseline (percent) on April 4, 2022

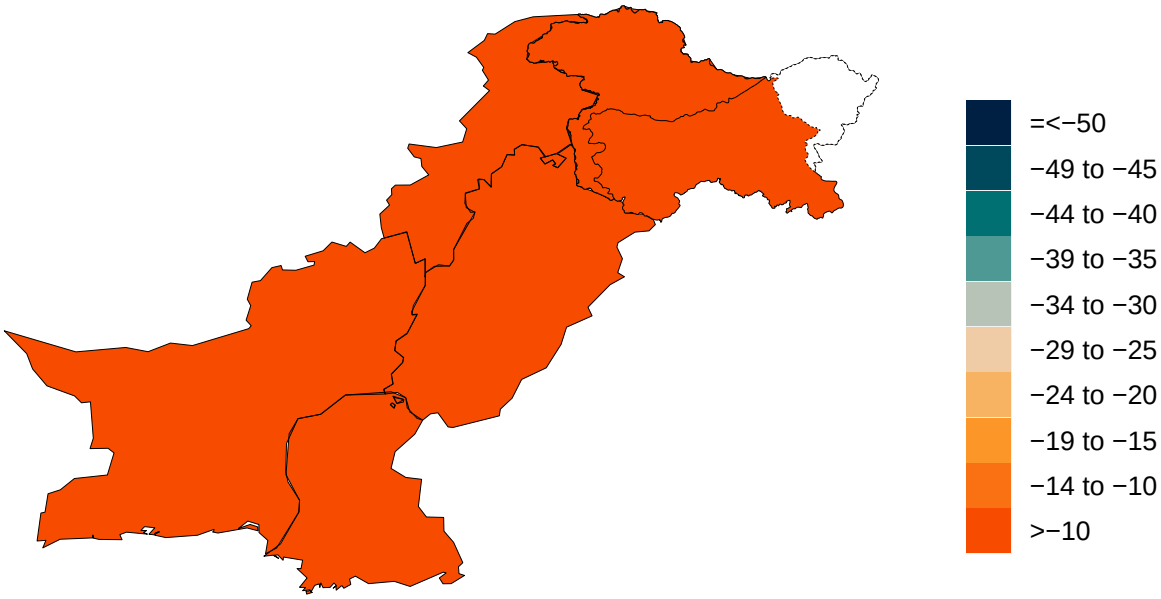


Figure 13.1: Trend in the proportion of the population reporting always wearing a mask when leaving home

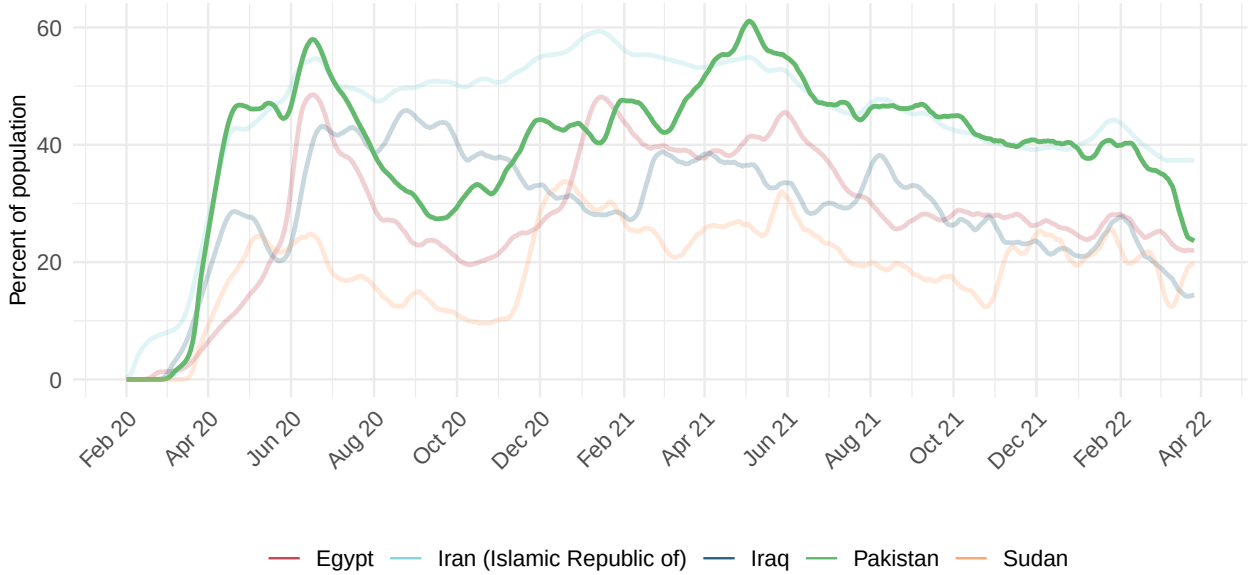


Figure 14.1: Proportion of the population reporting always wearing a mask when leaving home on April 4, 2022

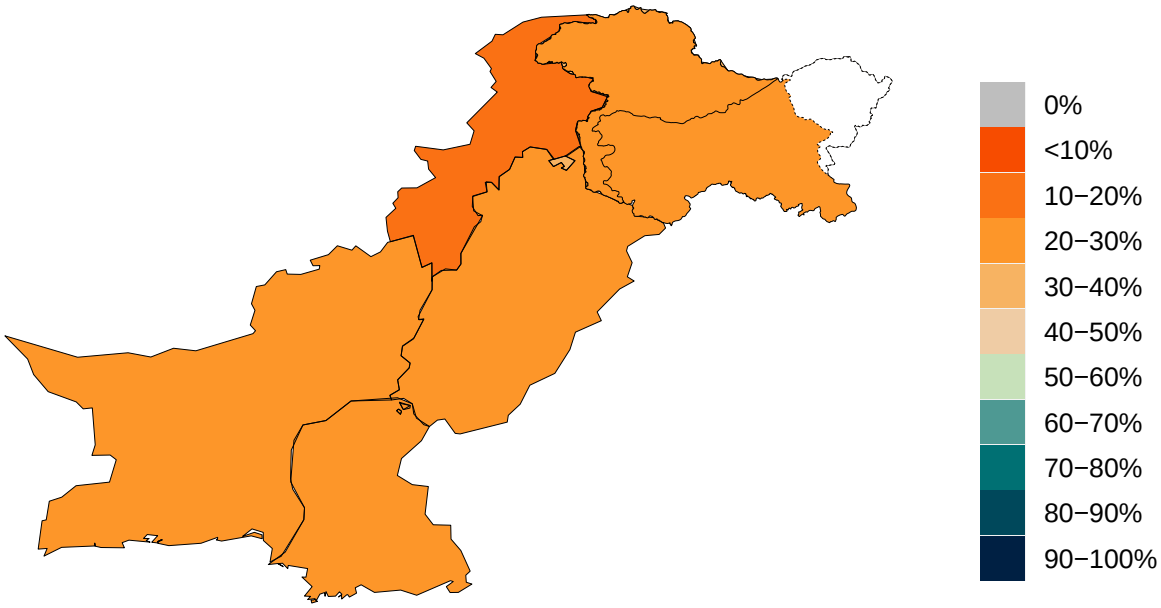


Figure 15.1: Trend in COVID-19 diagnostic tests per 100,000 people

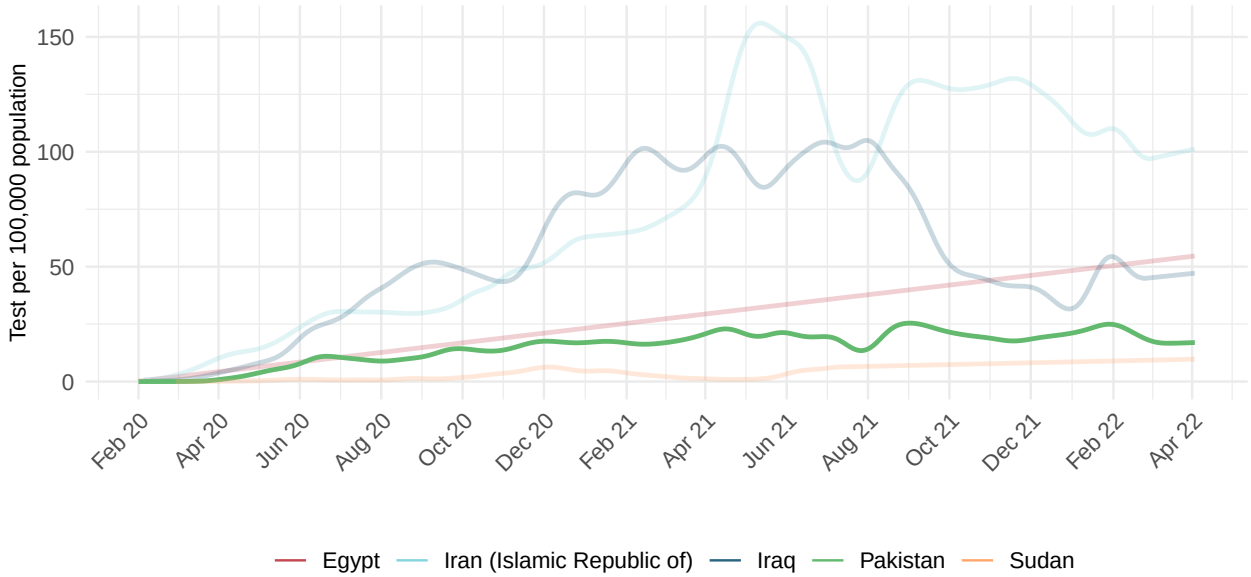


Figure 16.1: COVID-19 diagnostic tests per 100,000 people on April 4, 2022

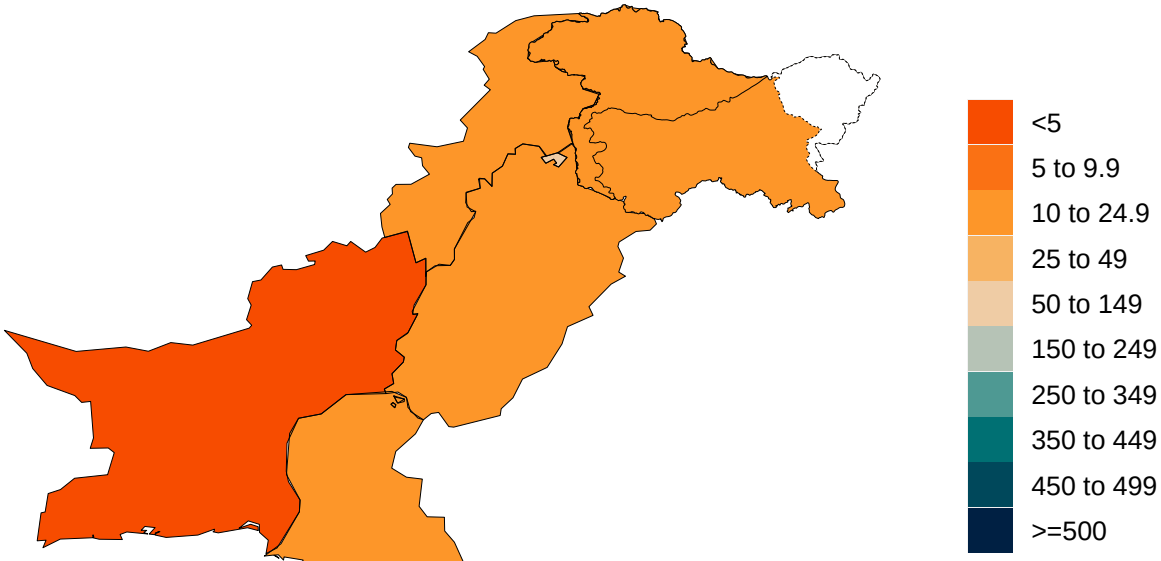


Table 3: Estimates of vaccine effectiveness for specific vaccines used in the model at preventing severe disease and infection. We use data from clinical trials directly, where available, and make estimates otherwise. More information can be found on our website.

	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 April 4, 2022

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

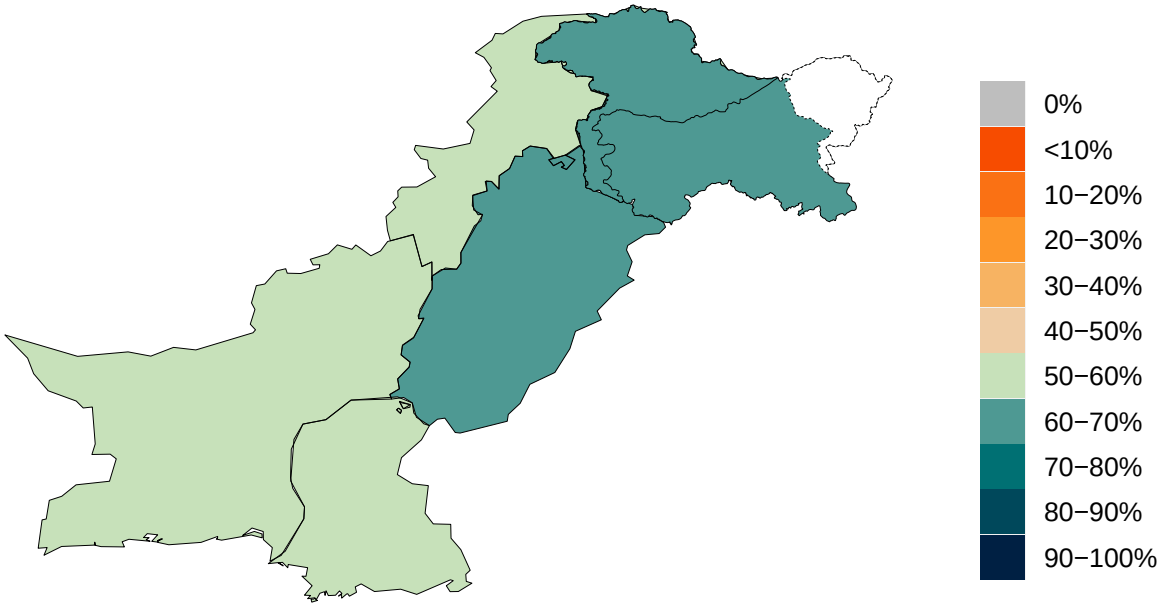


Figure 17.2: Percent of the population fully vaccinated against SARS-CoV-2

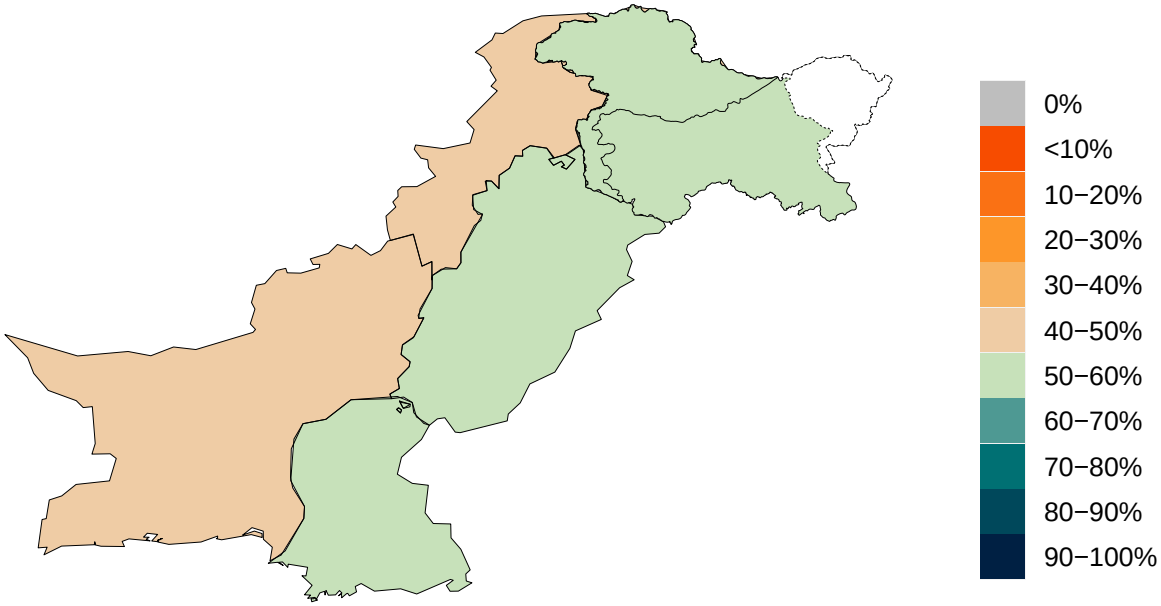


Figure 18.1: Trend in the estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

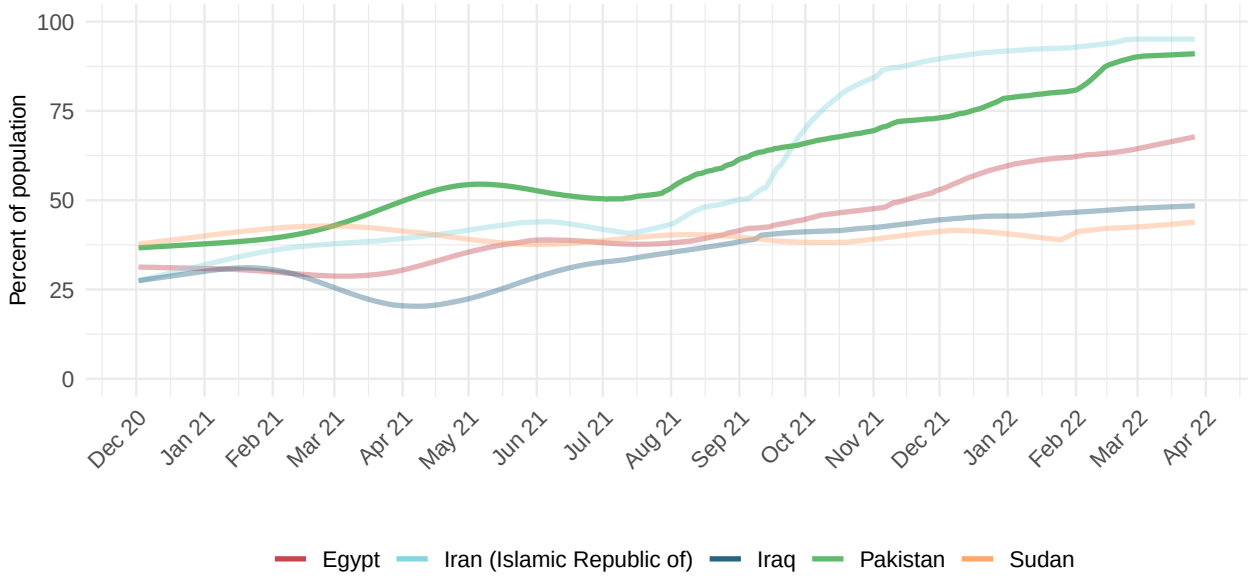


Figure 19.1: Estimated proportion of the population that is 12 years and older that has been vaccinated or would definitely receive the COVID-19 vaccine if available. Note that vaccine acceptance is calculated using survey data from the 18+ population.

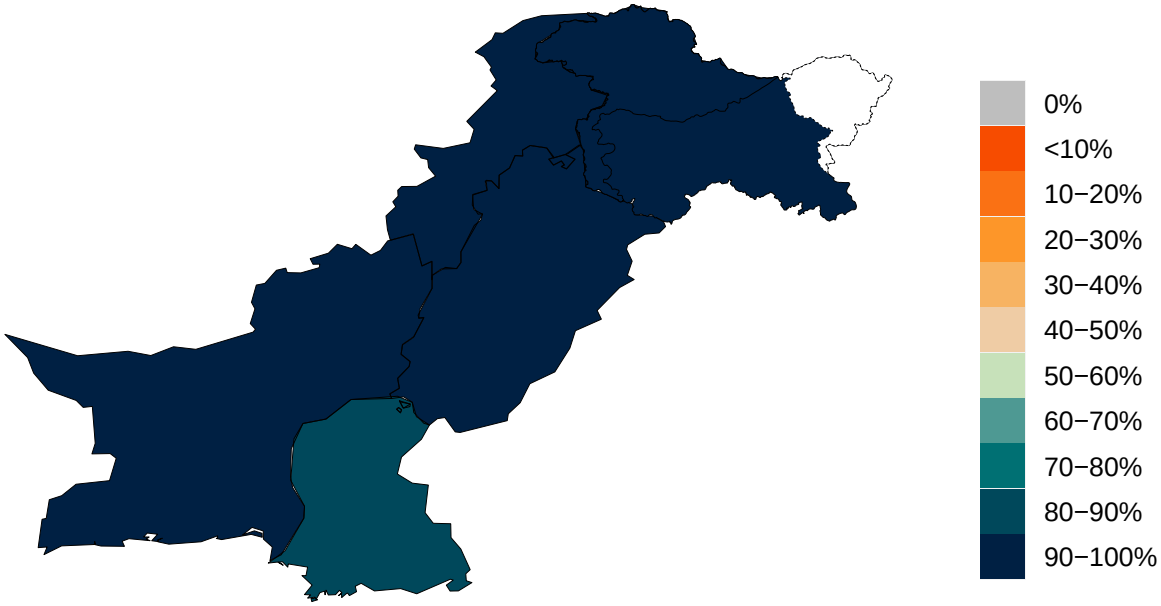


Figure 20.1: Percent of people who receive at least one dose of a COVID-19 vaccine and those who are fully vaccinated

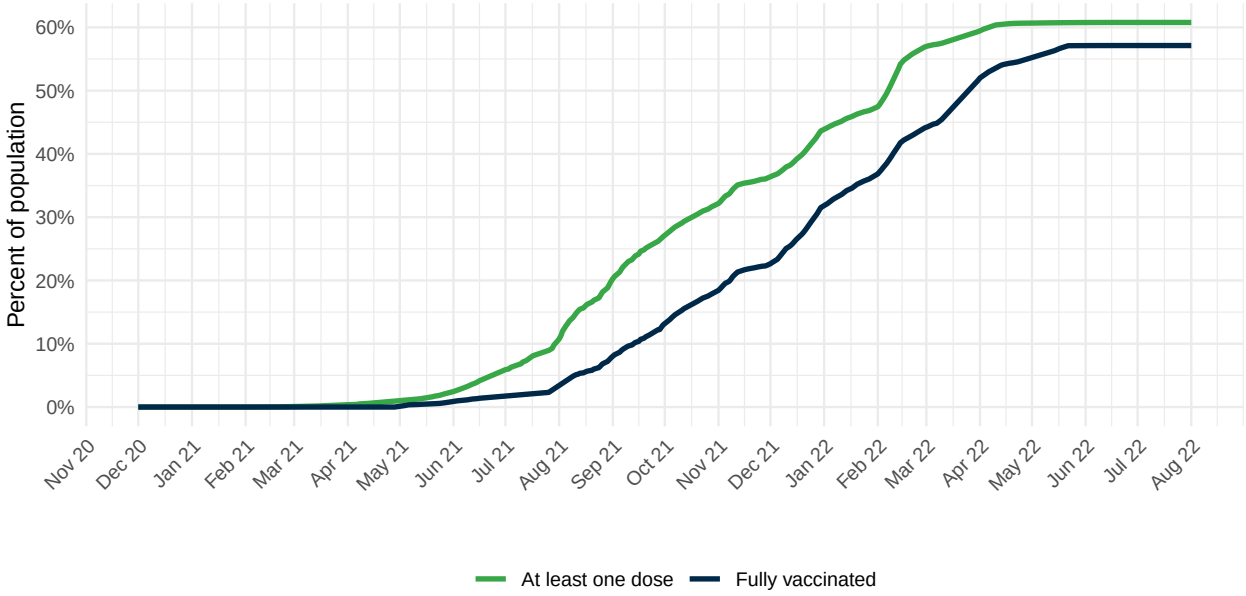
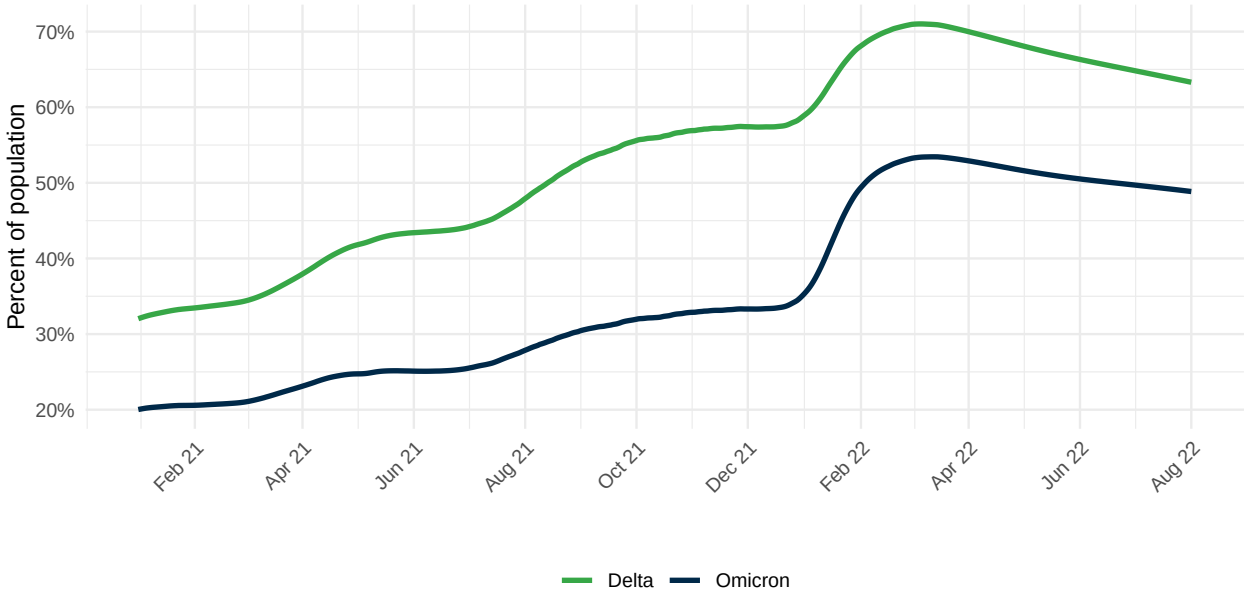


Figure 21.1: Percent of people who are immune to Delta or Omicron. Immunity is based on protection due to prior vaccination and infection(s). Moreover, variant-specific immunity is also based on variant-variant specific protection.



Projections and scenarios

Figure 22.1: Daily COVID-19 infections until August 01, 2022 for three scenarios

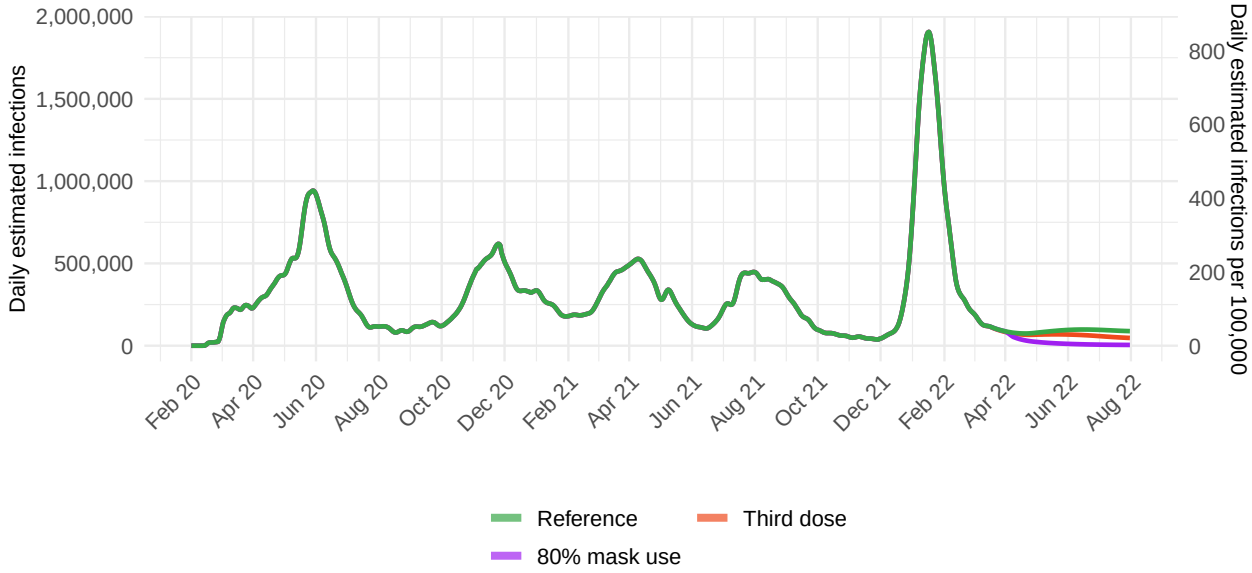


Figure 22.2: Daily COVID-19 reported cases until August 01, 2022 for three scenarios

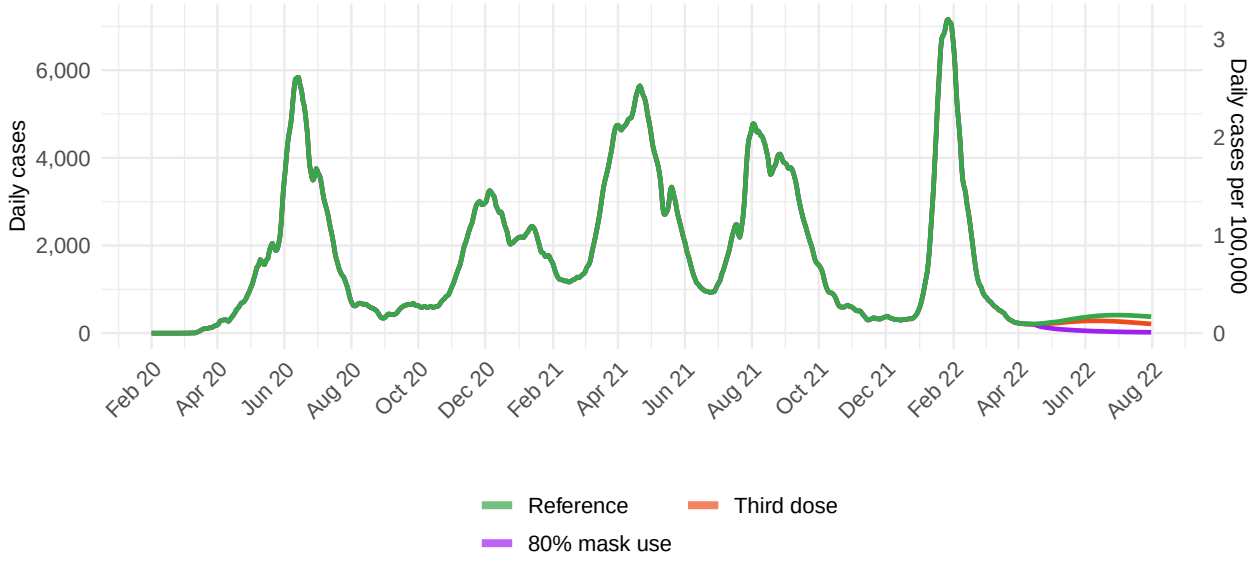


Figure 22.3: Daily COVID-19 hospital census until August 01, 2022 for three scenarios

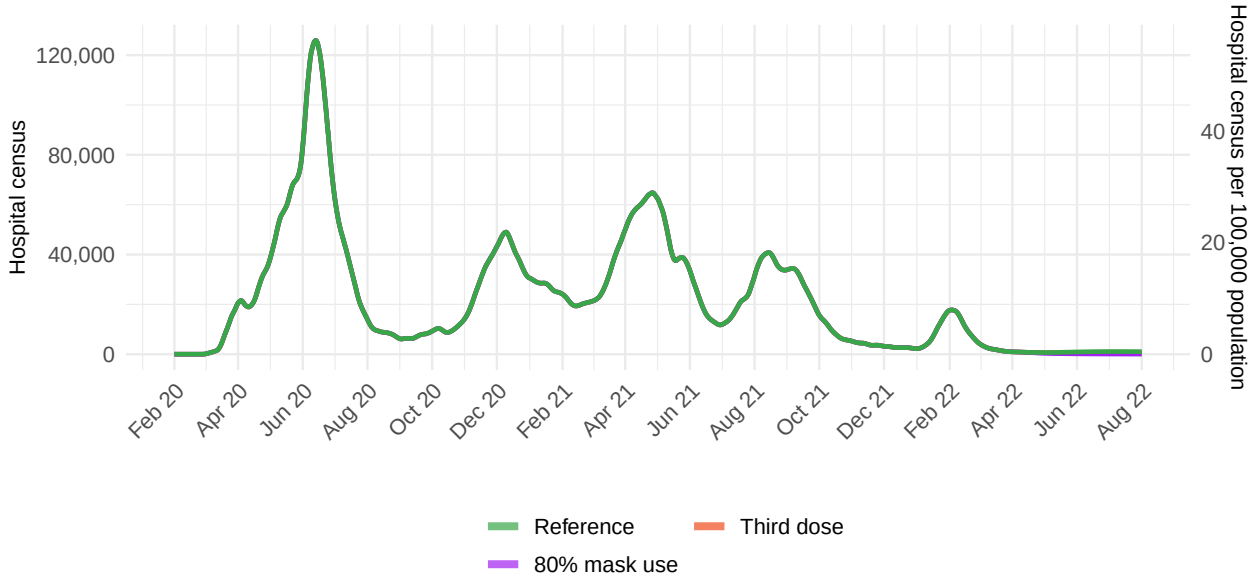


Figure 22.4: Reported daily COVID-19 deaths per 100,000

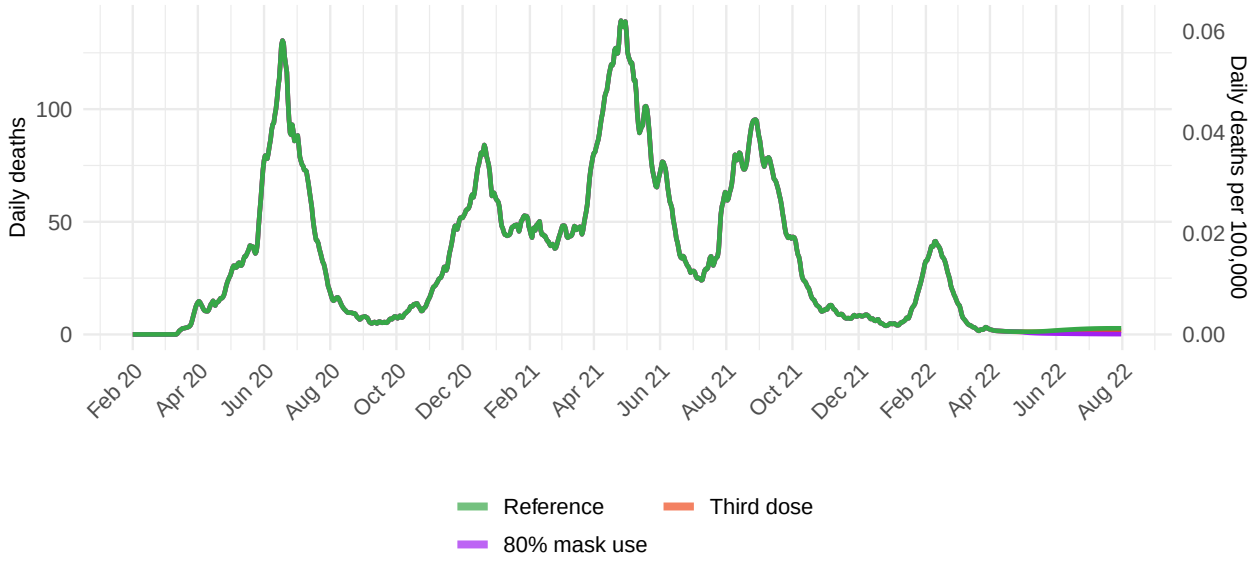


Figure 22.5: Total daily COVID-19 deaths per 100,000

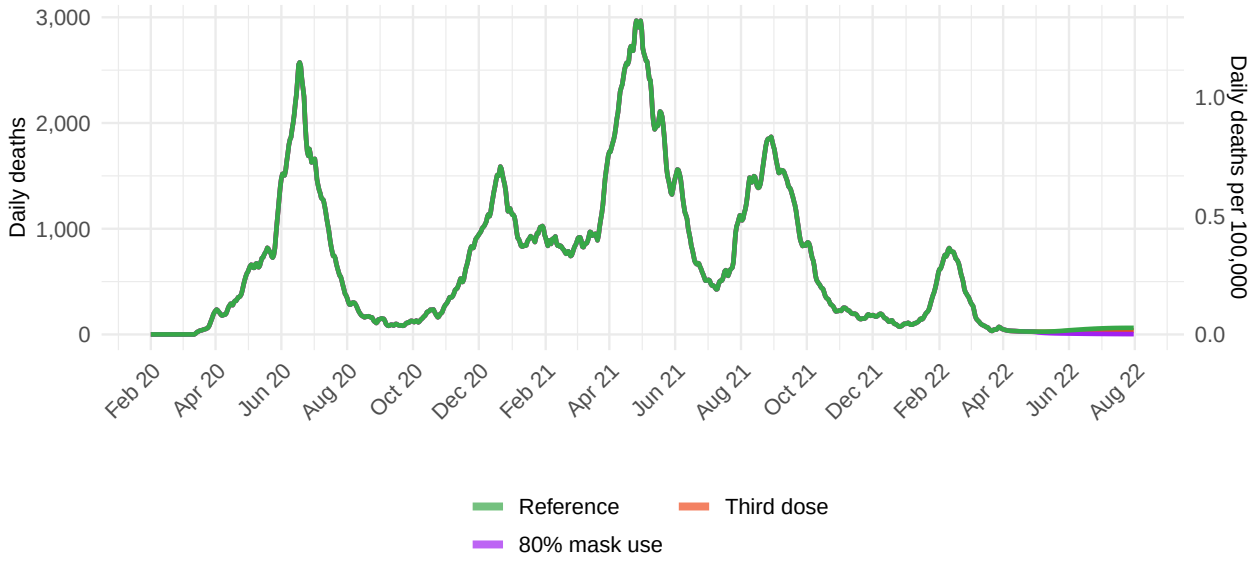


Figure 23.1: Comparison of reference model projections with other COVID modeling groups. For this comparison, we are including projections of daily COVID-19 deaths from other modeling groups when available, last model update in brackets: Delphi from the Massachusetts Institute of Technology (Delphi) [April 7, 2022], the SI-KJalpha model from the University of Southern California (SIKJalpha) [April 7, 2022]. Daily deaths from other modeling groups are smoothed to remove inconsistencies with rounding. Regional values are aggregates from available locations in that region.

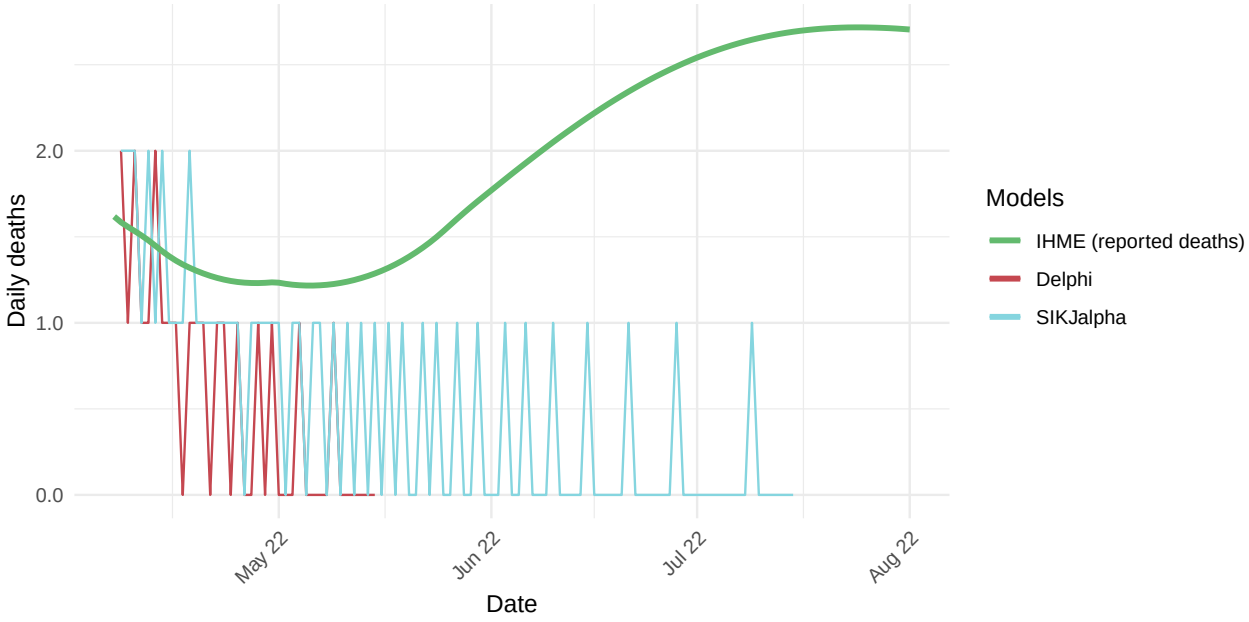


Figure 24.1: The estimated inpatient hospital usage is shown over time. The percent of hospital beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of beds occupied by COVID-19 patients. Less than 5% is considered *low stress*, 5-9% is considered *moderate stress*, 10-19% is considered *high stress*, and 20% or greater is considered *extreme stress*.

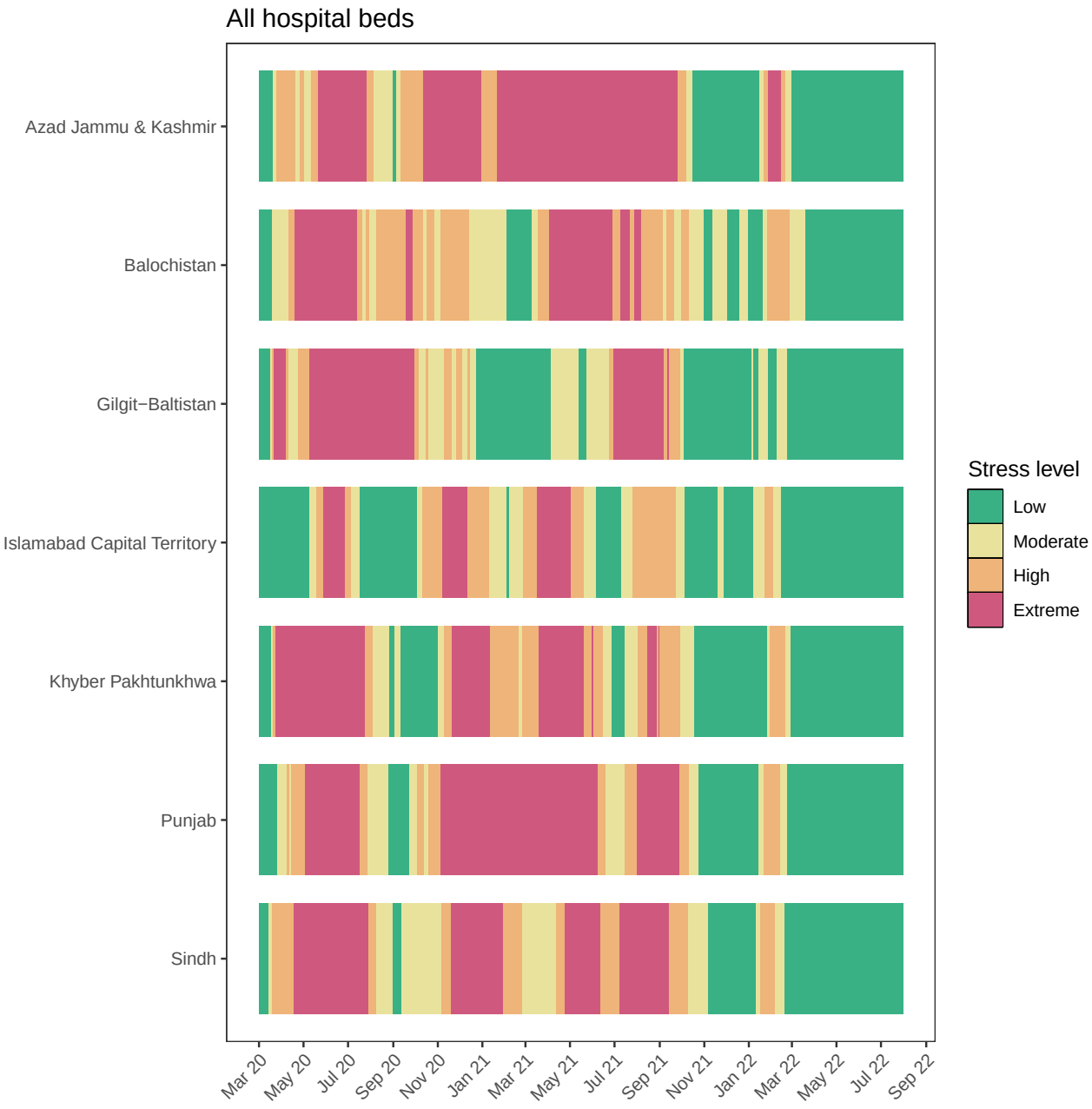
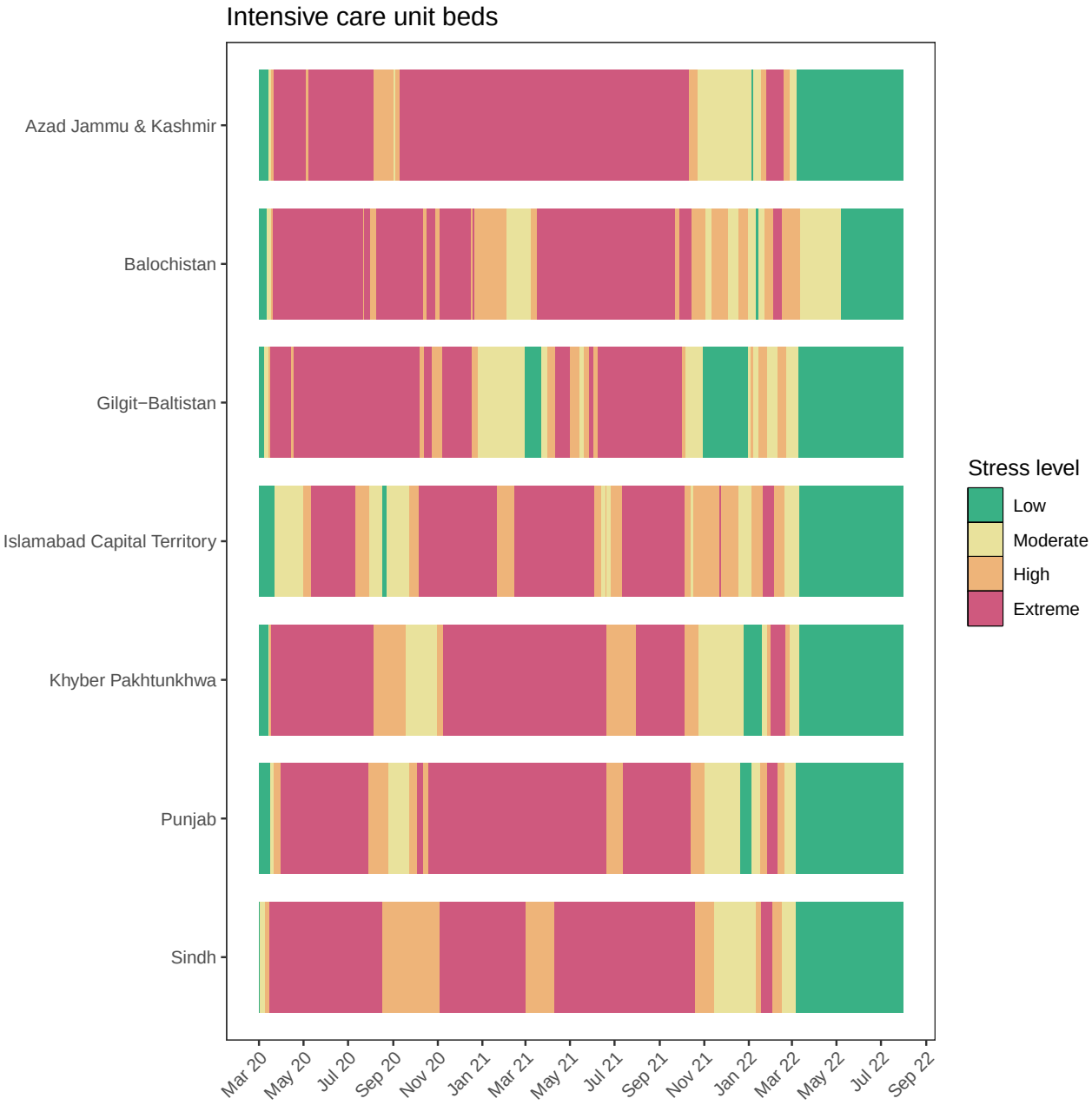


Figure 25.1: The estimated intensive care unit (ICU) usage is shown over time. The percent of ICU beds occupied by COVID-19 patients is color-coded based on observed quantiles of the maximum proportion of ICU beds occupied by COVID-19 patients. Less than 10% is considered *low stress*, 10-29% is considered *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.