Institute for Health Metrics and Evaluation
UNIVERSITY of WASHINGTON

KNOWLEDGE TO ACTION phfi
PUBLIC HEALTH FOUNDATION OF INDIA

INDIAN ACADEMY OF PEDIATRICS
Indian Academy of Pediatrics

Foundation for People-centric Health Systems

WEBINAR

School re-openings in India: How confident can we be? Insights from COVID-19 data globally

Monday, November 15, 2021; 19:30-21:00 IST

Keynote Speaker: Dr. Chris Murray, MD, DPhil

Director, Institute for Health Metrics and Evaluation (IHME) & Professor and Chair of Health Metrics Sciences, University of Washington, USA

Followed by a moderated panel discussion

Dr. Madhuri Kanitkar, Vice Chancellor, Maharashtra University of Health Sciences, Nashik

DR. Swati Ghate, Indian Academy of Pediatrics

Moderator: Ms. Rishika Baruah, Associate Editor, NDTV 24x7

Audience: Ministries of Health and Education staff at national and state levels, education leaders, academics, health care professionals, affected communities, NGOs, civil society, and COVID groups and staff of various entities

AQUITY Global Inc.
Access and Quality through Innovations and Technology

OSU OKLAHOMA STATE UNIVERSITY CENTER FOR HEALTH SCIENCES

rishihood university

COMHAD

IHME
Measuring what matters

COVID-19 Risks to Children

Christopher Murray
November 15, 2021

UNIVERSITY of WASHINGTON
Institute for Health Metrics and Evaluation

Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

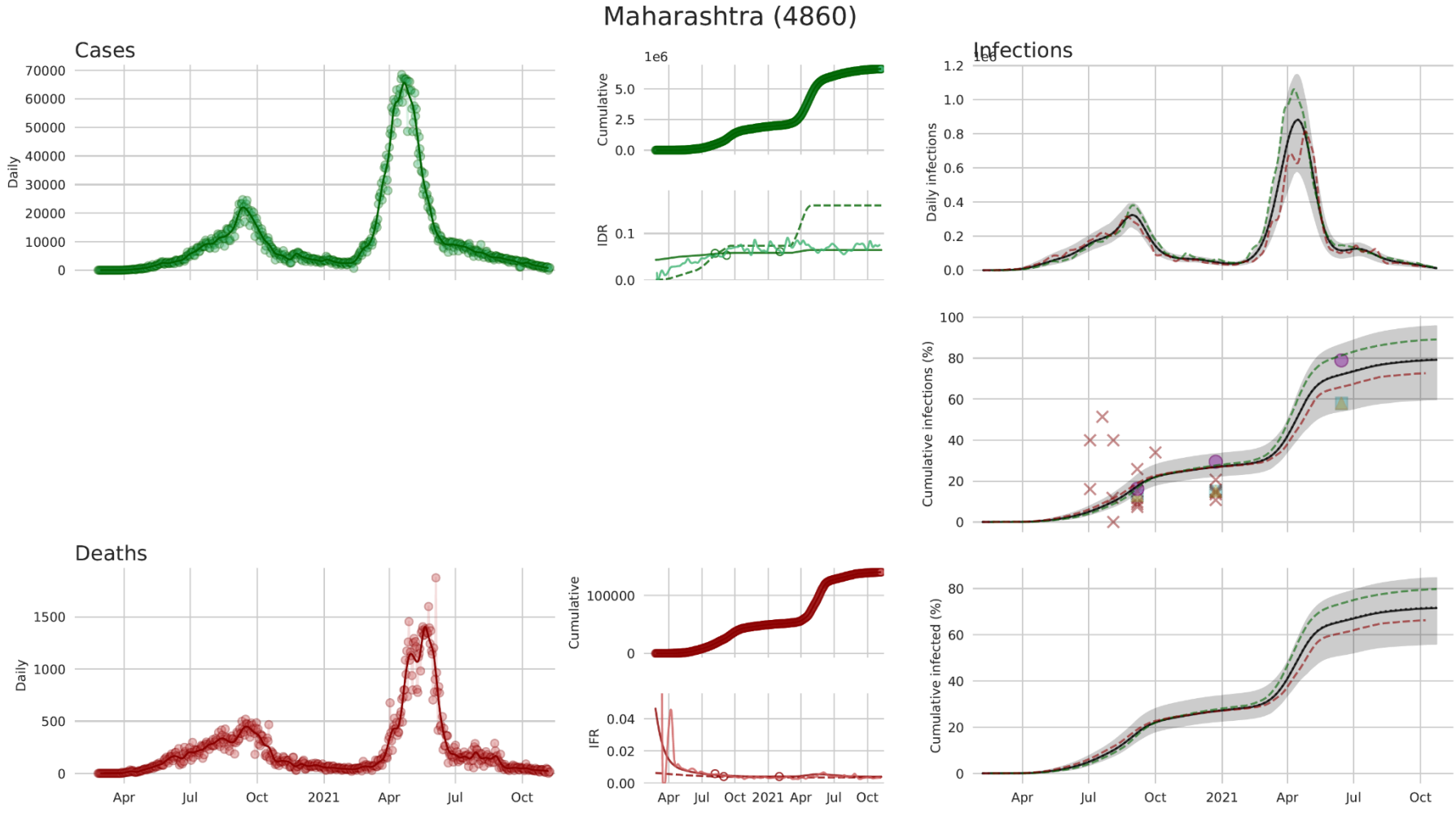
Long COVID

Mental health in the pandemic

Impact of school opening in India

Waning immunity and long-term prospects

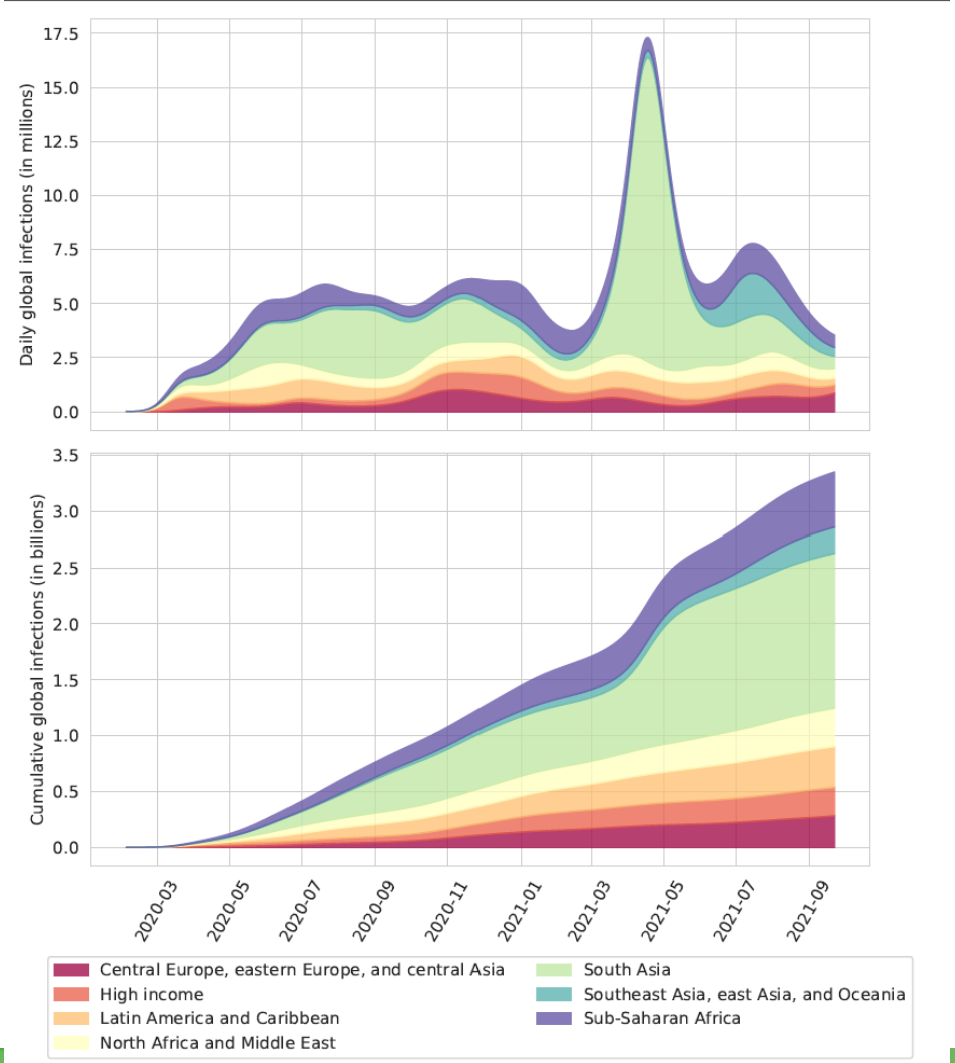
Triangulating on the data to estimate past infections



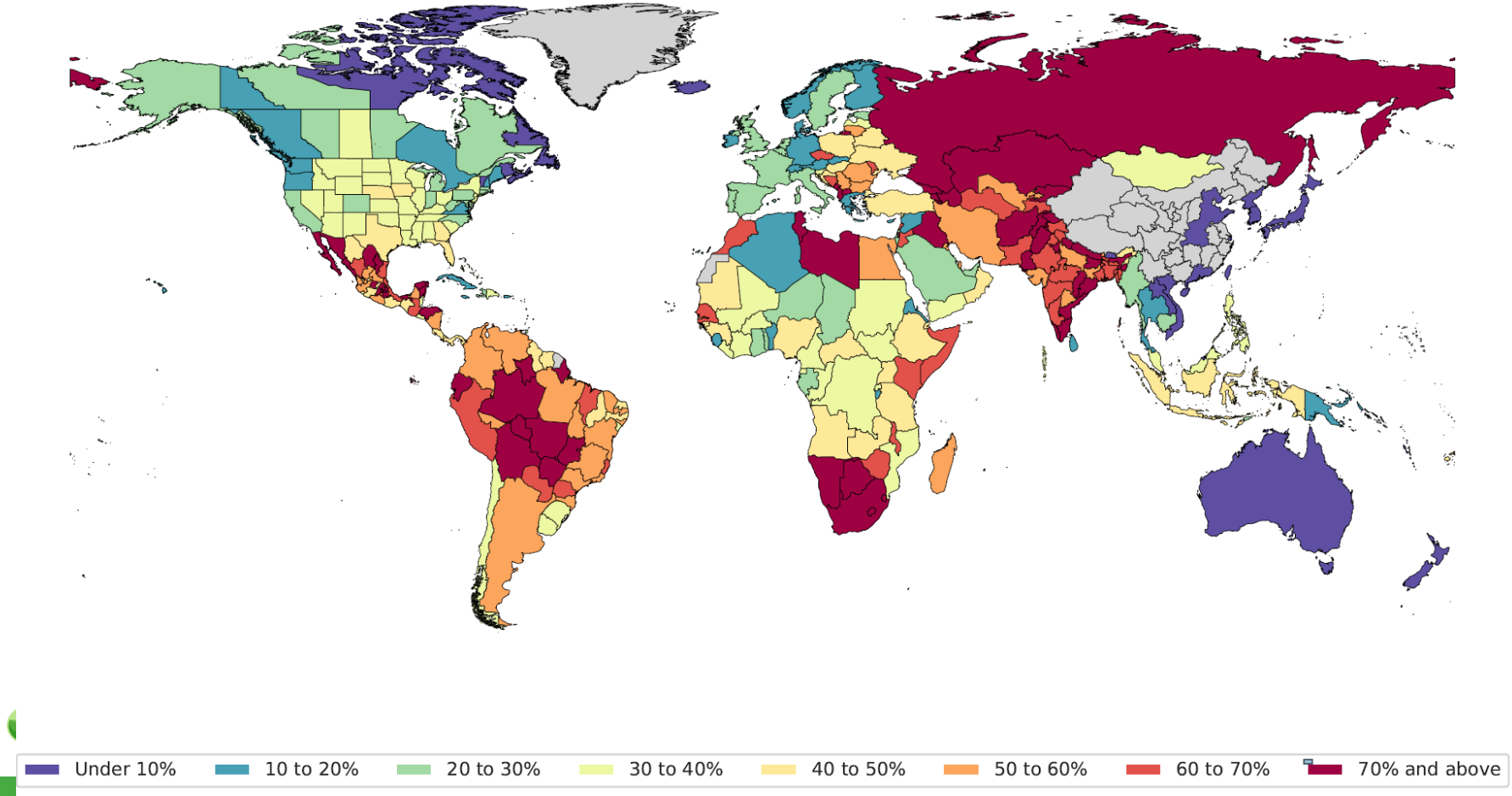
Global daily COVID-19 infections

Peak transmission in April 2021 with 16 million infections per day.

Nearly 3.5 billion cumulative infections.



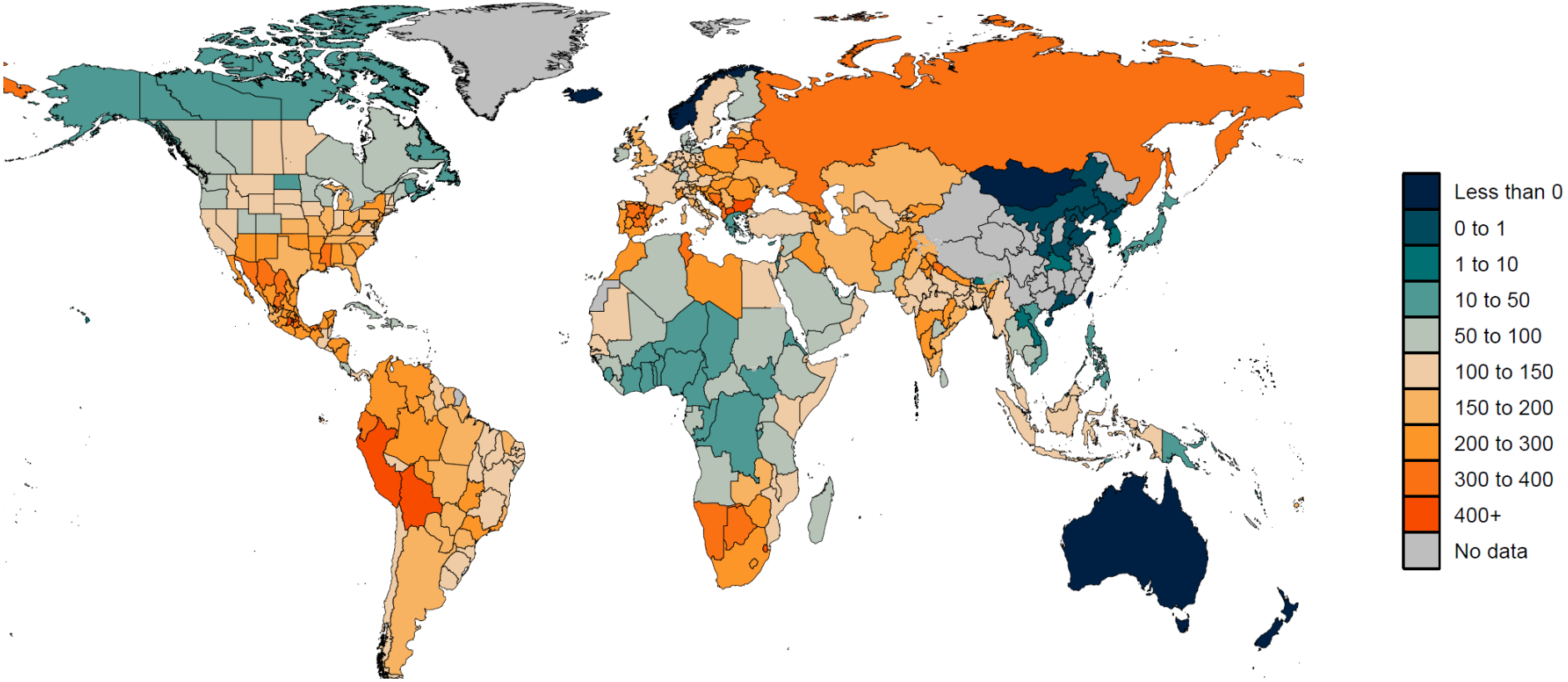
Percent of the population infected with COVID-19



Excess mortality from the pandemic

- For 69 countries and a further 266 states or provinces in these countries, we have weekly or monthly mortality data in 2021, 2020, and for up to 10 years prior.
- Excess mortality is the observed death rates in the pandemic minus expected mortality based on the weekly/monthly pattern and trends in the last 10 years.
- For other countries, we estimate using a statistical model driven by COVID-19 seroprevalence, reported COVID-19 deaths, prevalence of a range of comorbidities, and the infection-detection rate.
- Model validated using out-of-sample predictive validity.
- 5.1 million reported COVID-19 deaths, 14.8 million estimated excess deaths due to the pandemic as of September 26th, 2021.

COVID-19 excess death rate per 100,000 through September 26th, 2021



Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

Long COVID

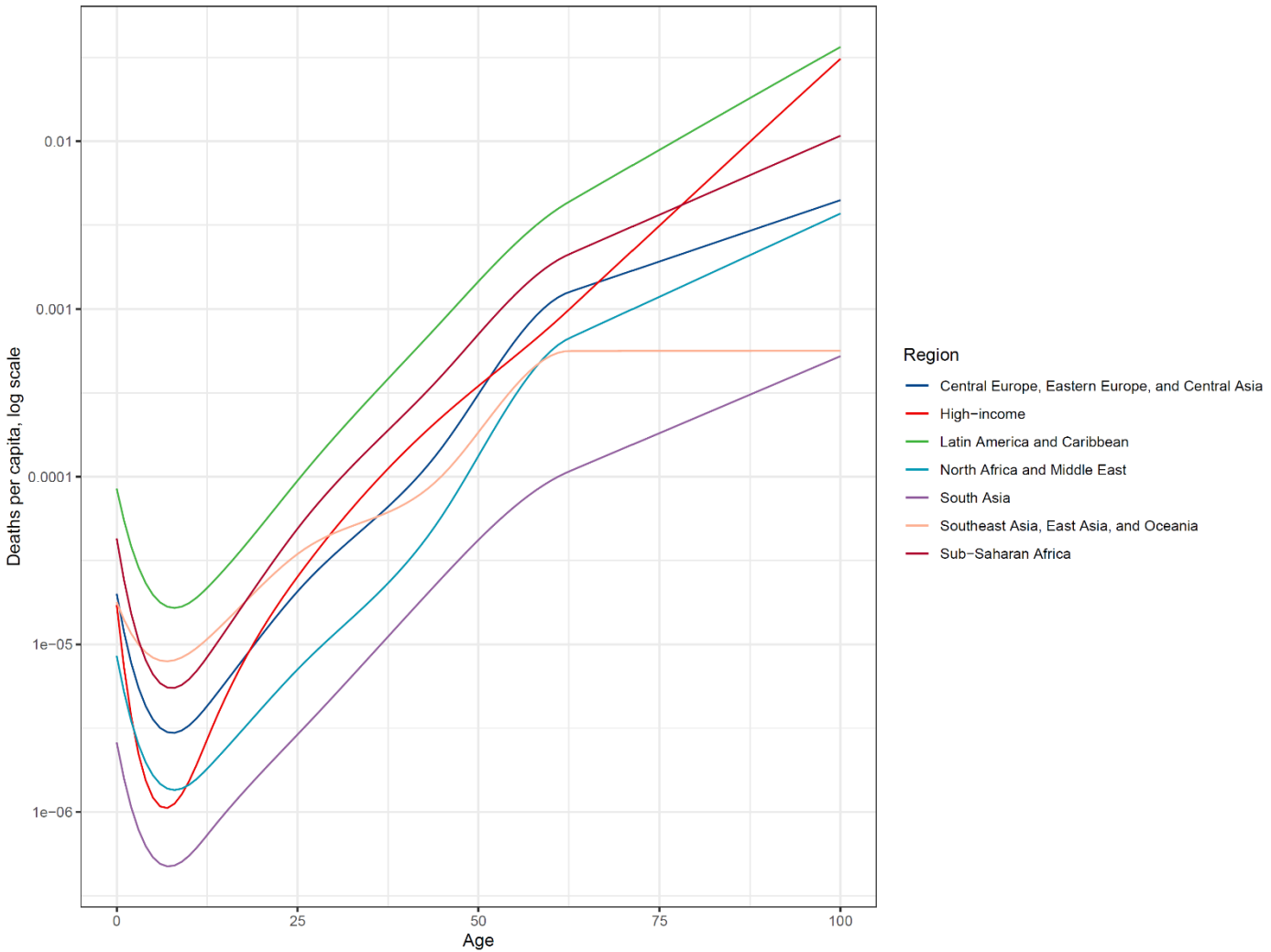
Mental health in the pandemic

Impact of school opening in India

Waning immunity and long-term prospects

Age pattern of COVID-19 death rates

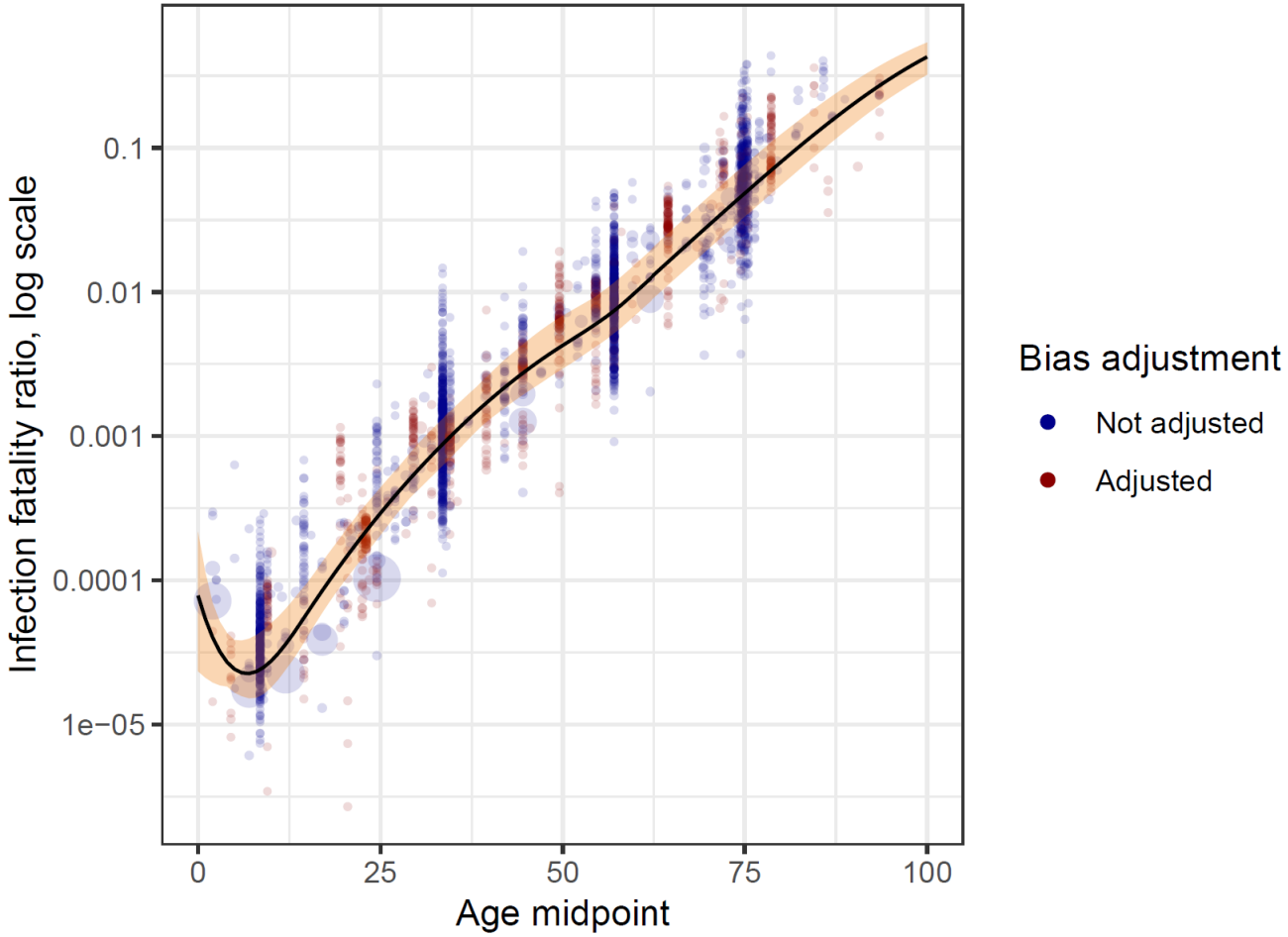
Figure 2. Age patterns of COVID-19 mortality by GBD super-region



IHME | UNIVERSITY of

Figure 3a. COVID-19 infection-fatality ratio by age

Point sizes are proportional to inverse variance



IHME

Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

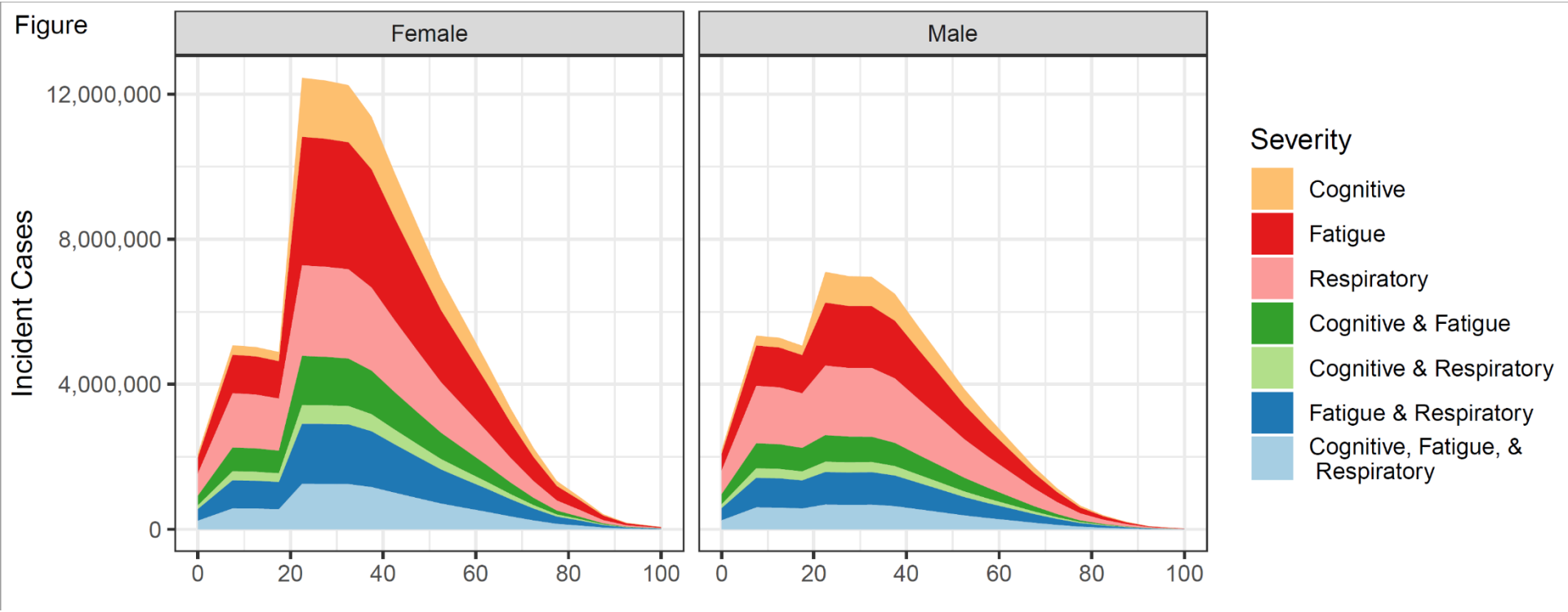
Long COVID

Mental health in the pandemic

Impact of school opening in India

Waning immunity and long-term prospects

Global Long Covid



Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

Long COVID

Mental health in the pandemic

Impact of school opening in India

Waning immunity and long-term prospects

Santomauro et al Lancet 2021

Systematic review of published studies on anxiety and depression combined with a statistical analysis of predictors

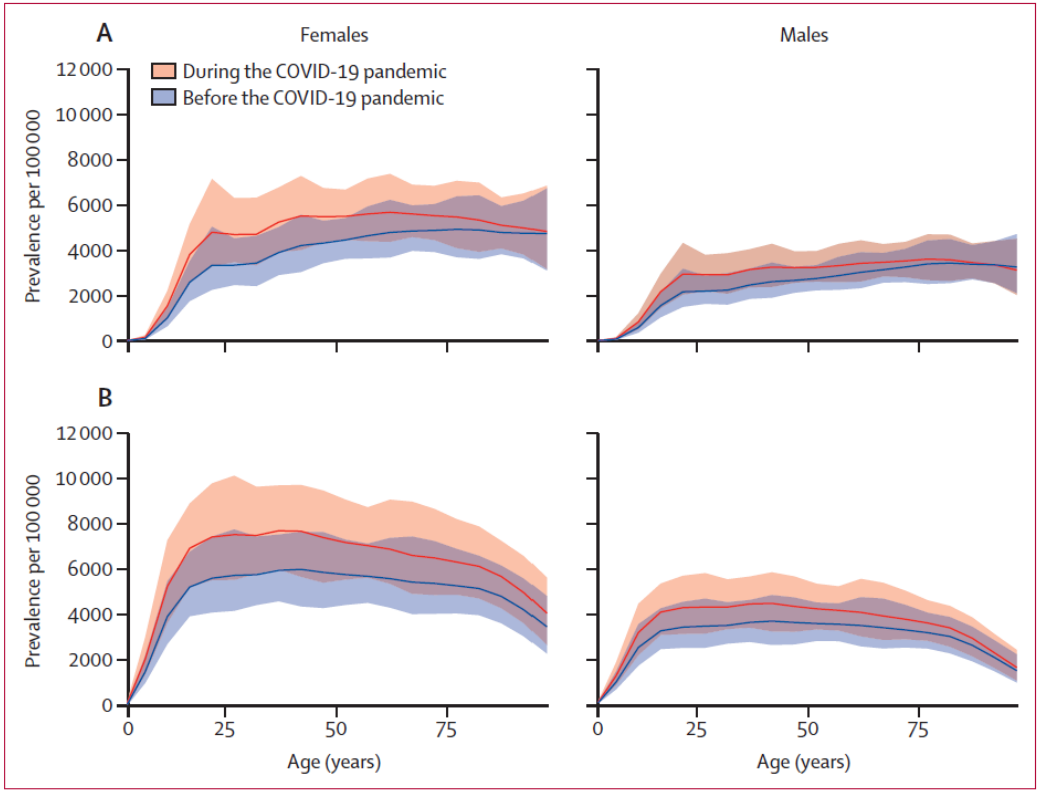


Figure 1: Global prevalence of major depressive disorder (A) and anxiety disorders (B) before and after adjustment for (ie, during) the COVID-19 pandemic, 2020, by age and sex

Age and sex distribution of depression and anxiety

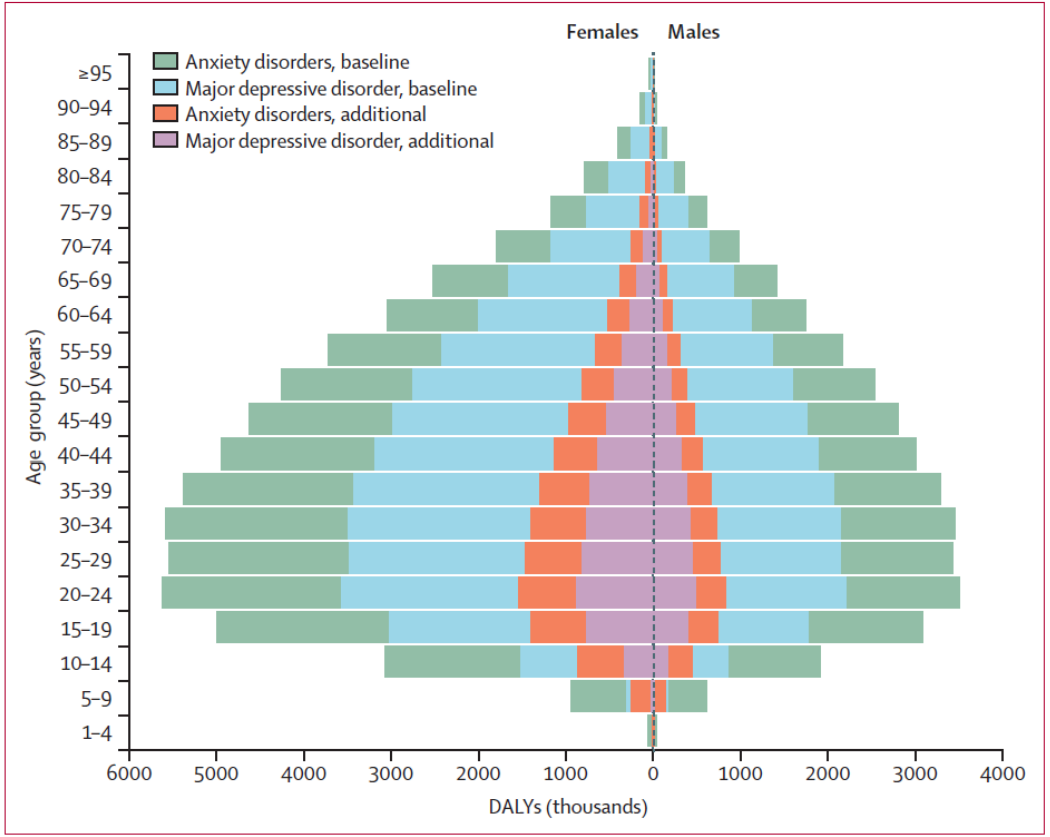


Figure 4: **Global burden of major depressive disorder and anxiety disorders by age and sex, 2020**
Baseline refers to pre-pandemic DALYs and additional refers to additional burden due to the COVID–19 pandemic. DALYs=disability-adjusted life-years.

Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

Long COVID

Mental health in the pandemic

Impact of school opening in India

Waning immunity and long-term prospects

Multiple generations of IHME COVID-19 models

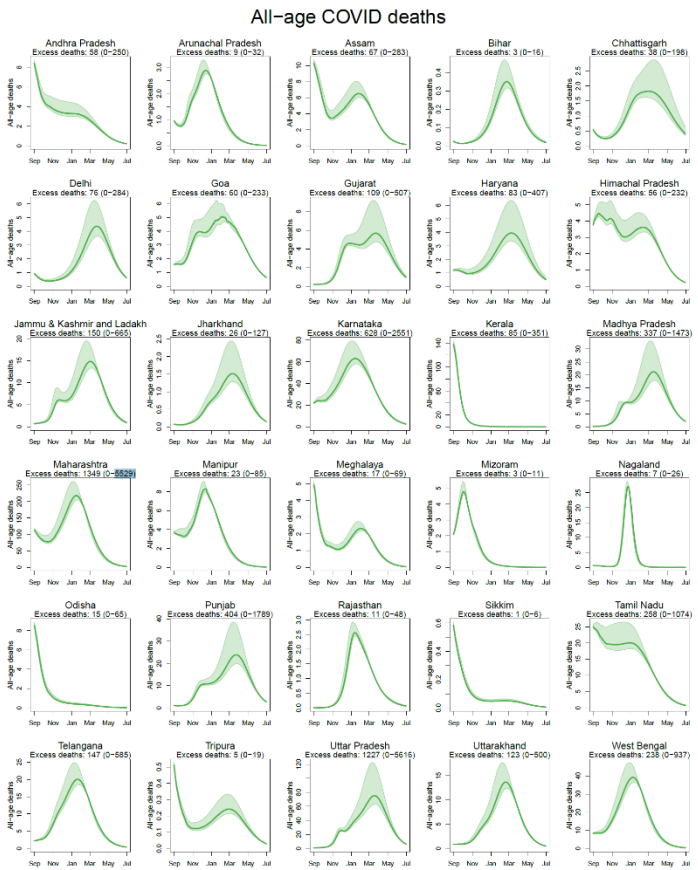
- March 2020 – statistical model of epidemic development with lockdowns
- May 2020 – SEIR model with predicted drivers of transmission intensity including seasonality, mask use, testing, mobility and social distancing mandates
- December 2020 – vaccination included in the model including vaccine supply, delivery and demand sub-models
- January 2020 – Alpha variant included in the model
- February 2020 – Escape variants (Beta and Gamma eventually Delta in May) added to the model
- Now – transitioning to model that incorporates waning immunity and boosters

Impact of primary school reopenings

- We estimate primary school closures reduce transmission intensity by 1.3% (95% CI: 0% - 6.2%)
- By comparing our reference forecast to a scenario where primary schools were reopened on September 1st, we predicted 5,613 more deaths would occur across India due to school opening (95% CI: 0 – 23,960).
- Of these deaths, 42 were predicted to occur in children under the age of 14 (95% CI: 0 – 183).
- The most deaths were predicted to occur in:
  - Maharashtra: 1,349 all-age (0 – 5,529), 8 under-18 (0 – 31)
  - Uttar Pradesh: 1,227 all-age (0 – 5,616), 8 under-18 (0 – 64)

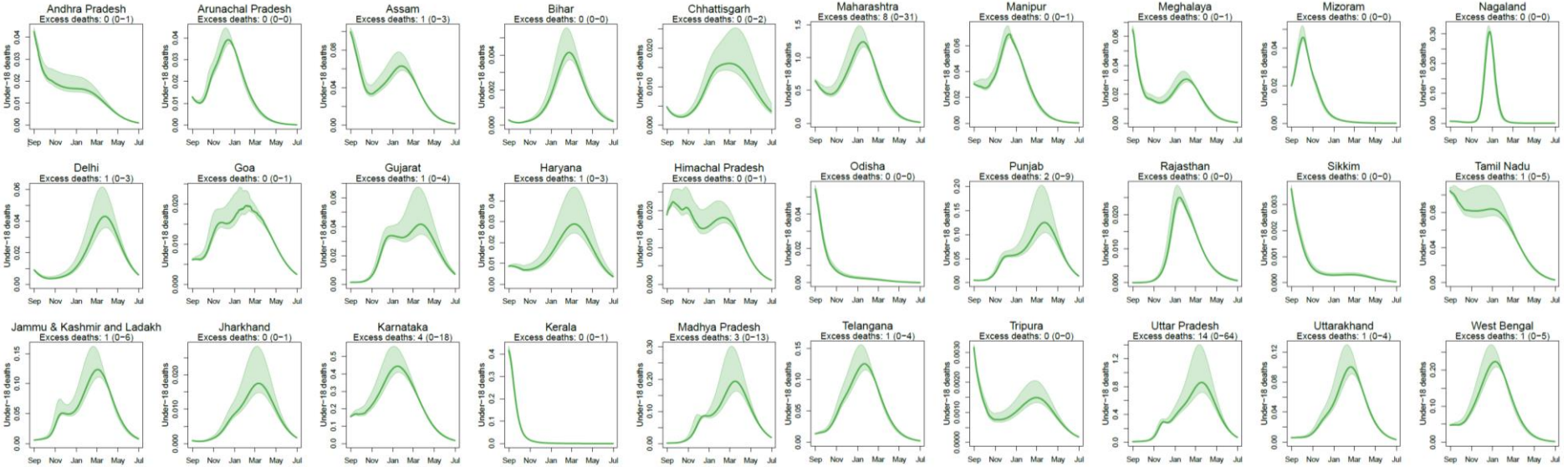
Impact of primary school re-openings

	Mean scenario		Upper bound scenario	
State	All-age deaths	Under-18 deaths	All-age deaths	Under-18 deaths
Andhra Pradesh	57.7	0.3	250.4	1.3
Arunachal Pradesh	8.6	0.1	32.0	0.4
Assam	67.3	0.7	283.4	2.7
Bihar	3.5	0.0	15.8	0.2
Chhattisgarh	37.8	0.3	197.6	1.7
Delhi	76.4	0.8	284.3	2.8
Goa	60.1	0.2	232.7	0.9
Gujarat	108.8	0.8	506.8	3.7
Haryana	82.5	0.6	406.7	3.0
Himachal Pradesh	56.3	0.3	231.6	1.2
Jammu & Kashmir and Ladakh	150.2	1.3	665.4	5.5
Jharkhand	25.6	0.3	126.6	1.5
Karnataka	628.2	4.4	2550.5	18.0
Kerala	85.0	0.3	350.6	1.1
Madhya Pradesh	336.6	3.1	1473.4	13.4
Maharashtra	1349.2	7.7	5528.8	31.5
Manipur	22.9	0.2	85.4	0.7
Meghalaya	17.5	0.2	68.8	0.9
Mizoram	2.6	0.0	10.6	0.1
Nagaland	7.0	0.1	26.0	0.3
Odisha	14.8	0.1	64.6	0.4
Punjab	404.2	2.1	1788.9	9.4
Rajasthan	10.9	0.1	47.5	0.5
Sikkim	1.4	0.0	5.7	0.0
Tamil Nadu	258.3	1.1	1073.6	4.5
Telangana	147.2	0.9	585.1	3.7
Tripura	4.6	0.0	18.5	0.1
Uttar Pradesh	1226.7	14.0	5616.1	64.1
Uttarakhand	122.8	0.9	500.5	3.7
West Bengal	238.1	1.4	936.5	5.3



Impact of primary school re-openings

Excess deaths in under-18



Outline

True impact of COVID-19

COVID-19 age-specific infection-fatality rate

Long COVID

Mental health in the pandemic

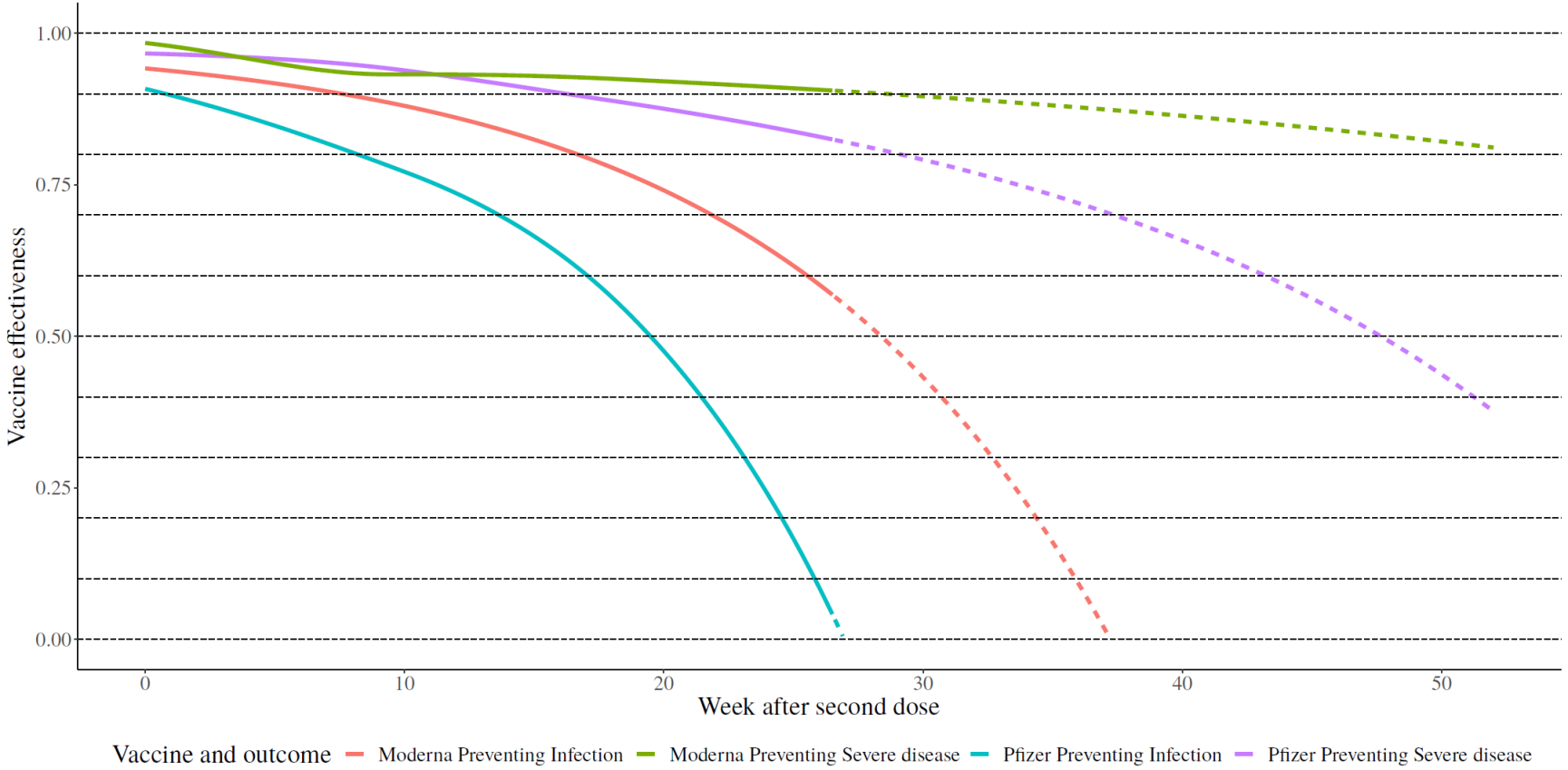
Impact of school opening in India

Waning immunity and long-term prospects

Challenge of waning immunity

- The biggest challenge now is the rate at which vaccine derived immunity for infection and for severe disease (hospitalization and death) wane and the rate at which natural immunity wanes.
- Entering Northern Hemisphere winter at the time that vaccine derived immunity against infection has waned considerably.
- Considerable uncertainty about natural immunity: does it wane faster or slower than vaccine derived immunity.

Meta-analysis of Qatar, Israel, UK and Us data: Waning immunity for infection and severe disease for Pfizer and



Infection

Brand	ancestral	delta	alpha	beta	gamma
AZD1222	0.52	0.49	0.52	0.49	0.49
BNT-162	0.86	0.78	0.86	0.78	0.78
CNBG Wuhan	0.65	0.56	0.65	0.56	0.56
CoronaVac	0.44	0.38	0.44	0.38	0.38
Covaxin	0.69	0.6	0.69	0.6	0.6
Janssen	0.72	0.56	0.72	0.56	0.56
Moderna	0.89	0.8	0.89	0.8	0.8
Novavax	0.79	0.69	0.79	0.69	0.69
Other	0.66	0.57	0.66	0.57	0.57
Sputnik V	0.81	0.7	0.81	0.7	0.7
Tianjin CanSino	0.58	0.5	0.58	0.5	0.5
mRNA Vaccine	0.86	0.78	0.86	0.78	0.78

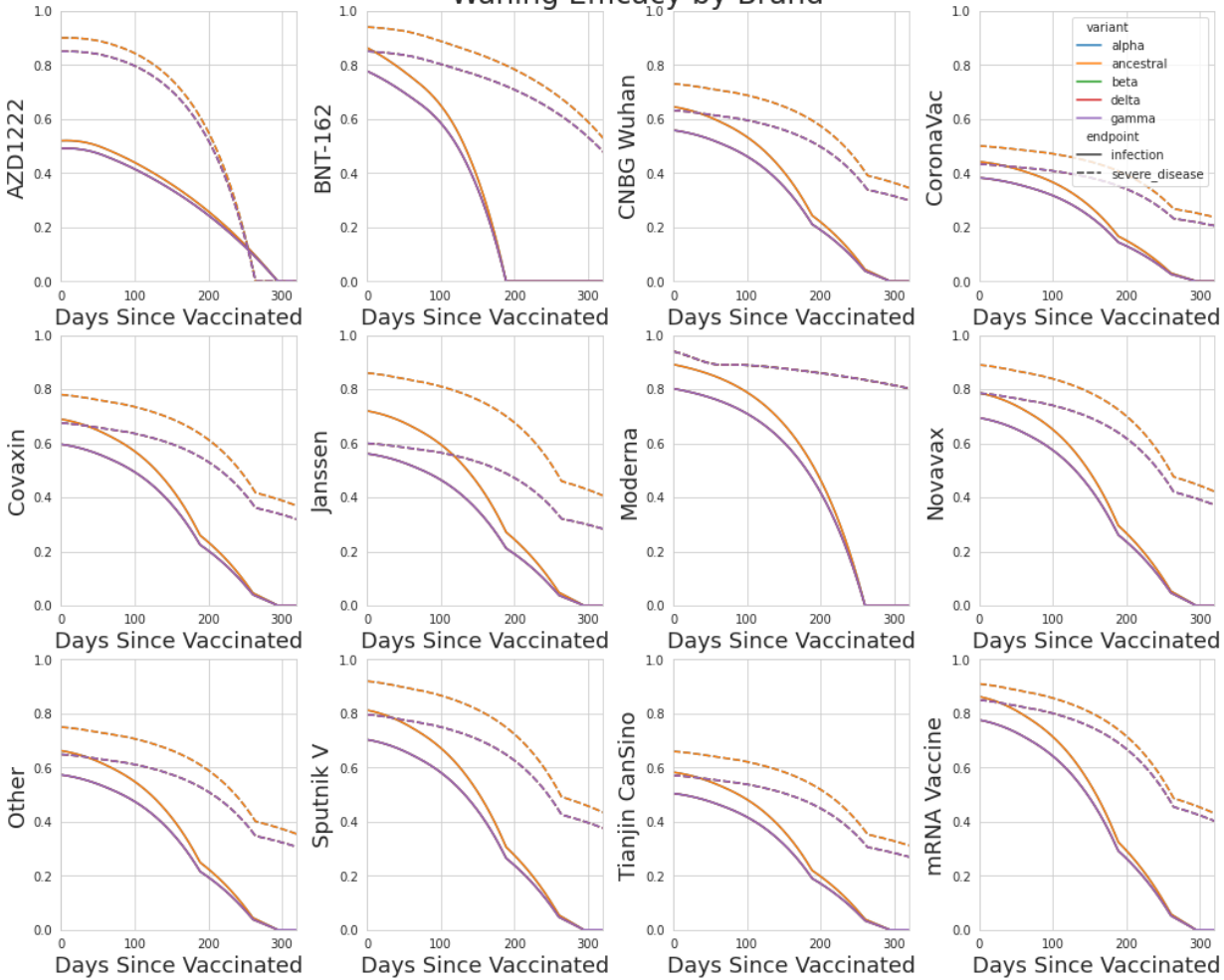
Variant

Severe Disease

Brand	ancestral	delta	alpha	beta	gamma
AZD1222	0.9	0.85	0.9	0.85	0.85
BNT-162	0.94	0.85	0.94	0.85	0.85
CNBG Wuhan	0.73	0.63	0.73	0.63	0.63
CoronaVac	0.5	0.43	0.5	0.43	0.43
Covaxin	0.78	0.68	0.78	0.68	0.68
Janssen	0.86	0.6	0.86	0.6	0.6
Moderna	0.94	0.94	0.94	0.94	0.94
Novavax	0.89	0.79	0.89	0.79	0.79
Other	0.75	0.65	0.75	0.65	0.65
Sputnik V	0.92	0.8	0.92	0.8	0.8
Tianjin CanSino	0.66	0.57	0.66	0.57	0.57
mRNA Vaccine	0.91	0.85	0.91	0.85	0.85

Variant

Waning Efficacy by Brand



Forecast uncertainties

- Emergence of new variants with immune escape
- Waning immunity from natural infection
- Individual and government behavioral response as pandemic goes on – declining mask use and caution
- Uptake of boosters
- Vaccine donationsg

Acknowledgments

The Webinar organizers want to thank the following:

Dr. Chris Murray

Dr. Swati Ghate (Panelist)

Dr. Madhuri Kantitkar (Panelist)

Ms. Rishika Barua (Moderator)

In addition, we want to acknowledge support of the following who designed the webinar over the past two months:

- Dr. Sunil Khaparde
- Dr. Chandrakant Laharia
- Dr. Anil Kaul
- Dr. Uday Bodhankar
- Dr. Yashwant Patil
- Dr. Piyush Gupta
- Dr. Dileep Mavalankar

Without their active support this webinar would not have been possible. In addition, we want to thank the following co-hosting organizations:

- Foundation for People-centric Health System
- The Institute of Health Metrics and Evaluation and University of Washington
- Indian Institute of Public Health
- Indian Academy of Pediatrics
- COMHAD
- Oklahoma State University
- Rishi University
- AQUITY Global