



# COVID-19 Global Trends and Analyses

Volume 1:  
Myanmar  
Global Snapshots

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Professor Mike Toole AM, Professor  
Heidi Drummer, Scott Umali, Win Han Oo,  
Thin Mar Win, Dr Suman Majumdar,  
Dr Ben Coghlan

# SUMMARY

## COVID-19 GLOBAL TRENDS AND ANALYSES | 22 Oct - 10 Nov 2020

- The **global** total number of reported cases has surpassed 51 million and 1.27 million deaths as of 9 November.
- In Europe, **Spain, France and the UK** have each reported more than one million cases.
- In the **United States**, the number of cases has surpassed ten million (ten days after reaching nine million) and the death toll is more than 244,000. Over the past two weeks, only two of the 50 states have reported downward trends in new daily cases.
- **India's** epidemic has slowed over the past two weeks. Daily new cases have declined from a peak of almost 98,000 on 16 September to an average of around 45,000 in the past 14 days. The country has recorded more than 8.5 million cases and more than 126,000 deaths, the third highest in the world after the US and Brazil.
- **Indonesia** has reported more than 437,000 cases and 14,600 deaths. The country continues to report around 4,000 new cases daily.
- **Victoria** has reported zero new cases for 11 consecutive days. There are just four active cases. The 14-day rolling average of daily new cases is 0.2. Only one case of unknown origin has been reported in the past two weeks. There are currently no active cases among healthcare workers and no cases linked to residential aged care facilities. Restrictions continue to be gradually eased while masks remain mandatory at all times outside the home.
- **New South Wales** has recorded 18 locally acquired cases during the past two weeks, compared to six in Victoria, and 38 cases remain active (including those in hotel quarantine), compared with just four in Victoria. In the same period, NSW has reported two cases of unknown origin compared to one in Melbourne.

### Myanmar

- Since the first case was reported in **Myanmar** in March, the country has seen a small first wave and large second wave.
- The second wave was driven by community transmission following identification of a case in Rakhine State, which borders Bangladesh.
- Myanmar's minimal investment in their healthcare in the past 2 decades has resulted in a stressed healthcare system at the start of the second wave. As the wave developed, more hospital beds and rapid antigen test kits have been secured.
- The lockdowns and restrictions imposed throughout the year has led to severe social and economic impacts, especially in the sectors of **agriculture, construction and garment manufacturing**.

# Snapshot

## Prolonged COVID-19 symptoms

- A few formal studies have hinted at the lingering damage that COVID-19 can inflict on survivors. In an Italian study in April and May, **87 per cent of patients** discharged from a Rome hospital still had symptoms after two months.
- 55 per cent had three or more symptoms including fatigue (53 per cent), difficulty in breathing (43 per cent), joint pain (27 per cent), and chest pain (22 per cent) with 40 per cent saying it had reduced the quality of their life.
- A British study found that **74 per cent of hospitalised patients had symptoms** at 8-12 weeks after discharge.
- A German study, that included many patients who recovered at home, found that **78 per cent had heart abnormalities** after two or three months.
- A study by the US Centres for Disease Control and Prevention found that **one-third of 270 non-hospitalised patients** hadn't returned to their usual state of health after two weeks.

## SARS-CoV-2 antibody prevalence may be falling in the UK

- Preliminary results from the Real-time Assessment of Community Transmission (REACT) Study led by Imperial College London suggests that the antibody response to SARS-CoV-2 wanes over time (n=365,000).
- The latest report includes findings from three rounds of testing carried out over a three-month period. There were 17,576 positive results across all three rounds, around 30% of whom did not report any COVID-19 symptoms.
- The study found that **antibody prevalence declined from 6.0% to 4.8% and then 4.4%** over the three months analysis of finger-prick tests carried out at home between 20 June and 28 September.

## T-Cell responses to SARS-CoV-2 still present six months after initial infection

- A recent study, published in bioRxiv, demonstrates robust T-cell responses to SARS-CoV-2 viral peptides six months after initial infection in all participants following asymptomatic, mild or moderate COVID-19<sup>1</sup>.
- The study of 100 people showed that all had a cellular immune response against SARS-CoV-2 six months after infection although **the size of response was 50 per cent higher in those who had experienced symptomatic disease**.

## COVID-19 mitigation behaviours by age group — United States, April–June 2020

- **In April, 78 per cent of adults aged ≥18 years reported wearing a mask; this increased to 83 per cent in May and 89 per cent in June** (p<0.001) according to the COVID Impact Survey. All other reported mitigation behaviours decreased from April 20–26 to early June (p<0.05), except avoiding some or all restaurants, which did not change significantly.

- Across all survey waves, reported prevalences of mitigation behaviours were highest among adults aged  $\geq 60$  years and lowest among those aged 18–29 years.

### COVID-19 Infection Fatality Ratio (IFR) estimates from seroprevalence

- In a pre-release report, researchers at Imperial College reviewed ten studies reaching their selection criteria. They found that age-specific IFRs follow an approximately log-linear pattern, with the risk of death doubling approximately every eight years of age. Using these age-specific estimates, they estimate the overall IFR in a typical **low-income country**, with a population structure skewed towards younger individuals, to be **0.23 per cent** (0.14-0.42 95 per cent prediction interval range). In contrast, in a typical **high-income country**, with a greater concentration of elderly individuals, they estimate the overall IFR to be **1.15 per cent** (0.78-1.79 95 per cent prediction interval range).

## Vaccines against SARS-CoV-2

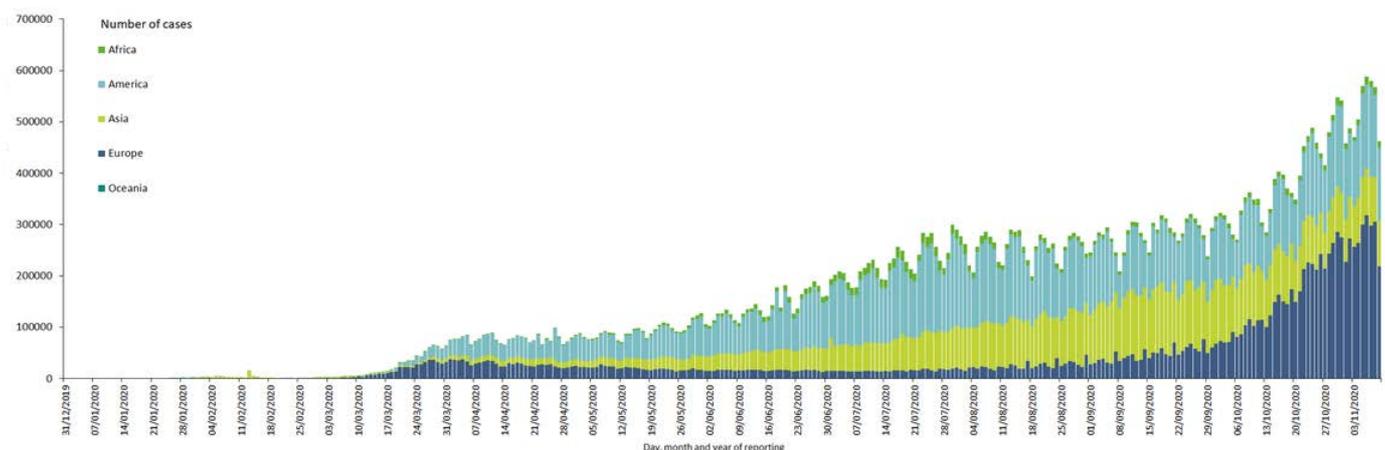
**Breaking News:** A coronavirus vaccine developed by the pharmaceutical company Pfizer and German biotechnology firm BioNTech was more than **90 per cent effective** at protecting people compared with a placebo injection, according to an interim analysis by an independent data monitoring committee that met 8 November. In Pfizer's 44,000-person trial, there have so far been 94 cases of COVID-19 in people who were not previously infected. Fewer than nine of those cases were among people who received two doses of the vaccine, a strong indication of efficacy. The data committee noted no serious safety concerns. The vaccine requires two doses, given three weeks apart. It may need to be stored at a temperature as low as minus 80° Celsius. The trial will continue until it reaches its endpoint of 164 cases of COVID-19.

**As of 18 October 2020 there were 46 vaccines in human trials, of which 11 are in Phase 3 studies** for the prevention of COVID-19. In preclinical studies testing immunogenicity and efficacy in animal challenge studies showed the vaccines were able to generate neutralizing antibodies and significantly reduce the amount of virus replicating in vaccinated animals. All of the publications of phase I study results to date show that SARS-CoV-2 vaccines are able to generate neutralising antibody (NAb) responses in vaccinated subjects with varying levels of cellular immune responses generated. Where one versus two doses were examined, 2 doses improved the development of NAb responses. Phase 3 efficacy data in humans has not been published. If the generation of NAb responses is a predictor of vaccine efficacy, referred to as a correlate of protection, then it is likely that a 2-dose regimen will be pursued in the first instance.

# GLOBAL EPIDEMIOLOGY AND TRENDS

The **global** total number of reported cases has surpassed 51 million and 1.27 million deaths as of 9 November<sup>1</sup>. The number of new daily cases has been trending around 500,000.

## Distribution of COVID-19 cases worldwide, as of 9 November 2020



## European Region

- In **Europe**, several countries reported single-day records for new cases on 5 November, including France with 58,046, Germany with 21,506 and Italy with 34,502<sup>2</sup>.
- Across the continent, hospitals and health care systems are stretched thin, prompting fresh lockdowns and restrictions. **France, Germany, the UK, Spain, Greece, Italy, the Netherlands, Belgium, the Czech Republic, Poland, Switzerland, Austria and Ireland** have all imposed national or partial lockdowns and curfews.
- **Portugal** declared a new state of emergency on 6 November. **Romania**, which passed 10,000 daily cases for the first time, announced that it would close schools and implement an overnight curfew. **Poland** reported a record 445 COVID-19 deaths on the same day and admitted the first patient to its new field hospital at a stadium in Warsaw.
- Two-thirds of **Slovakia's** population of 5.4 million people were tested for coronavirus over the weekend as part of a program aimed at making it one of the first countries to test its entire population<sup>3</sup>. Antigen tests were carried out on 3.625 million people – of whom 38,359, or 1.06%, were found to be positive.

<sup>1</sup> <https://www.worldometers.info/coronavirus/#countries>

<sup>2</sup> <https://www.nytimes.com/live/2020/11/06/world/covid-19-coronavirus-updates>

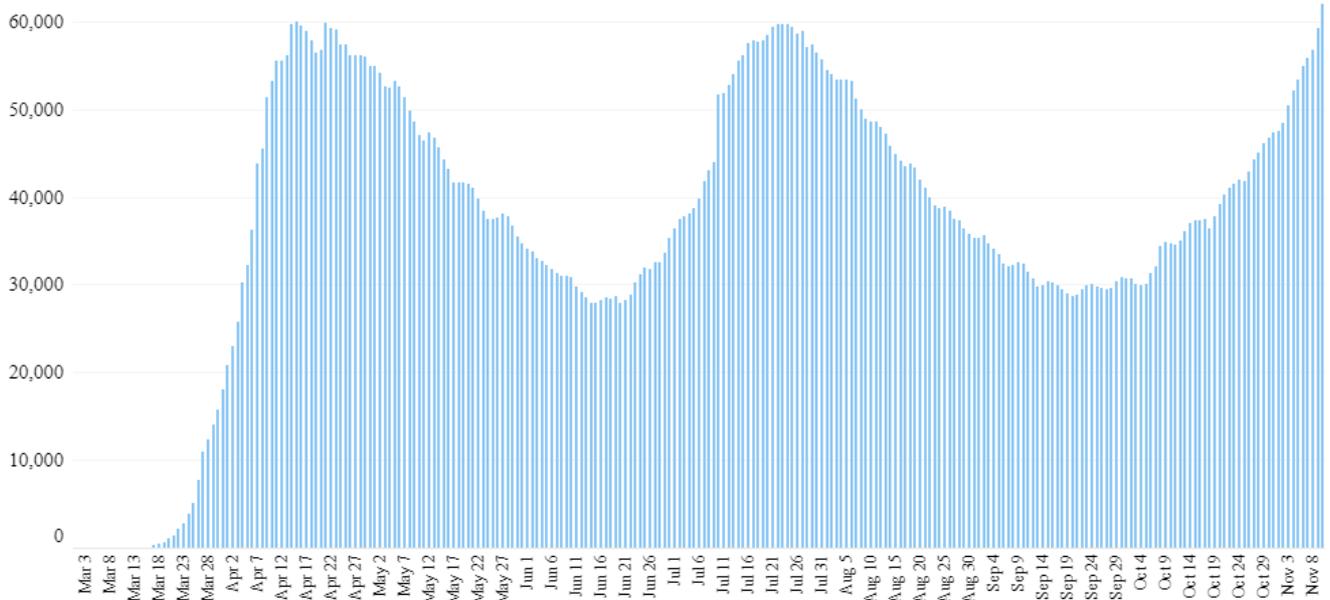
<sup>3</sup> [https://www.theguardian.com/world/2020/nov/02/slovakia-carries-out-covid-mass-testing-of-two-thirds-of-population?CMP=Share\\_AndroidApp\\_Other](https://www.theguardian.com/world/2020/nov/02/slovakia-carries-out-covid-mass-testing-of-two-thirds-of-population?CMP=Share_AndroidApp_Other)

- **Germany**, which had been lauded for its testing capacity early on, is tightening the rules governing who gets a test paid for by the public health system. Under new rules those with flu-like symptoms are only eligible if they also belong to a high-risk group, or can prove contact with someone either infected or at high risk of becoming infected.

## North America

- The **US** reached a grim milestone of ten million cases (ten days after the number reached nine million) and reported a new high of daily cases of 132,541 on 6 November; this was the fourth day in a row that records were broken. More than 1,000 deaths have been reported on each of the past four days, the first time this has happened since 25-28 August.
- **At least 16 states** have reported single day records for new cases on 6 November, and three states reported record deaths: Kansas, South Dakota and Utah.
- **Texas**, with a population of 30 million, is the first state to report one million cases.
- **In at least 24 states** there have been more cases announced in the past week than in any other seven-day stretch since the pandemic began. More than 54,800 people were hospitalised with the virus on 6 November, according to the COVID Tracking Project<sup>4</sup>.

### US CURRENTLY HOSPITALIZED WITH COVID-19



Note: Florida began reporting this figure on July 10.

<sup>4</sup> <https://covidtracking.com/data/charts/us-currently-hospitalized>

## Latin America and the Caribbean

While Europe plunges into a second wave of coronavirus infections, Latin America and the Caribbean do not seem to be overcoming their first outbreak.

- The region's death toll has surpassed 397,000 and more than 11 million people are known to have been infected amid an increase in cases in a number of countries including **Mexico, Argentina, Colombia and Uruguay**.
- **Brazil, Argentina and Colombia** have each reported more than one million cases.
- **Mexico** is the country with the fourth highest number of deaths in the world due to COVID-19 after the US, Brazil and India. It had 95,000 deaths as of 9 November.
- **Brazil** has recorded more than 5.7 million confirmed coronavirus cases and the official death toll from COVID-19 has risen to 162,628.
- **The Dominican Republic**, which has reported the highest number of cases in the Caribbean, is experiencing a slow decline but still recording around 500 cases per day,
- **Cuba, Jamaica** and most other Caribbean island countries have recorded major second waves.

## Middle East and North Africa

- In **North Africa**, Algeria, Tunisia, Morocco, and Libya are experiencing ongoing surges of cases -- Morocco and Libya have particularly severe second waves. Egypt has so far been spared a second wave.
- In the **Middle East**, Iran, Iraq, Lebanon, and Jordan have ongoing surges of cases. Daily cases are steadily declining in **Israel and the West Bank**. Among the Gulf Countries, only **UAE** has experienced a clear second wave while Qatar and Saudi Arabia have stabilised. However, **Kuwait** has never emerged from its first wave and continues to report high daily case numbers.
- Rates of new COVID-19 cases in **Jordan** have risen to among the highest in the world a few months after the kingdom appeared to have eliminated community transmission of the virus and relaxed most public health restrictions<sup>5</sup>.
- As recently as three months ago, **Jordan** was counted alongside New Zealand, Taiwan, Thailand and Vietnam as a coronavirus success story, after going weeks without detecting infections in the community and registering just over 1,100 cases and 11 deaths as of late July. On 2 November, the country of 10 million people announced it had detected a **daily record 5,877 cases** – one of the highest per capita rates in the world – with more than 80,000 detected overall. Nearly 970 people have died. The second wave was probably fuelled by imported cases from Israel and the West Bank.

## Asia-Pacific Region

- **India's** epidemic has slowed over the past two weeks. Daily new cases have declined from a peak of almost 98,000 on 16 September to an average of around 46,000 in the past 14 days. The country has recorded more than 8.5 million cases and more than 126,000 deaths, the third highest in the world after the US and Brazil.
- **Indonesia** has reported more than 437,000 cases and 14,600 deaths. The country continues to report around 4,000 new cases daily.
- **Nepal** has reported the highest 14 day incidence in Asia, more than 120 per 100,000. Daily new cases have declined since the peak of 5,743 on 21 October, but it is still reporting between 3,500 and 4,000 cases daily.
- The epidemics in **Pakistan, Bangladesh, Afghanistan and the Philippines** have stabilised.
- **Papua New Guinea** has reported 16 cases in the past two weeks.

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<sup>5</sup> <https://www.theguardian.com/world/2020/nov/04/jordan-suffers-covid-surge-after-early-success-against-virus>

- A testing blitz in **China's** far west region of Xinjiang uncovered the country's worst COVID-19 outbreak since the northern summer<sup>6</sup>. Xinjiang's tally since the outbreak began with the detection of an asymptomatic 17-year-old on 24 October stands at 57 symptomatic and 223 asymptomatic cases, Xinjiang's health commission reported. Nine people are in "severe condition," authorities said.

## Australia

- **Victoria** has reported zero new cases for ten consecutive days. There are just four active cases. The 14-day rolling average of daily new cases is 0.2. Only one case of unknown origin has been reported in the past two weeks. There are currently no active cases among healthcare workers and no cases linked to residential aged care facilities. Restrictions continue to be gradually eased while masks remain mandatory at all times outside the home.
- **New South Wales** has recorded 18 locally acquired cases during the past two weeks, compared to six in Victoria, and 38 cases remain active (including those in hotel quarantine), compared with just four in Victoria. In the same period, NSW has reported two cases of unknown origin compared to one in Melbourne.

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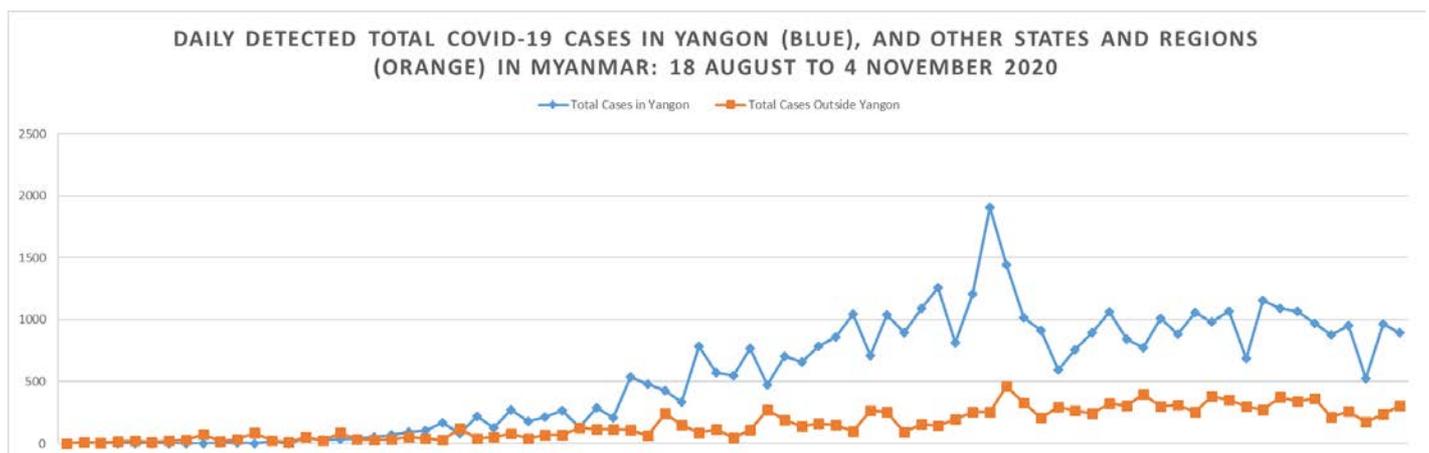
<sup>6</sup> [https://www.bloomberg.com/news/articles/2020-11-02/xinjiang-covid-outbreak-is-china-s-biggest-since-summer?cmpid=BBD110220\\_CORONAVIRUS&utm\\_medium=email&utm\\_source=url\\_link&utm\\_term=201102&utm\\_campaign=coronavirus](https://www.bloomberg.com/news/articles/2020-11-02/xinjiang-covid-outbreak-is-china-s-biggest-since-summer?cmpid=BBD110220_CORONAVIRUS&utm_medium=email&utm_source=url_link&utm_term=201102&utm_campaign=coronavirus)

# GLOBAL PERSPECTIVE | Myanmar

## How COVID-19 Spread | Myanmar

Myanmar is a developing country in Greater Mekong Subregion and is listed as a state of fragility in many sectors including health in 2020<sup>7</sup>. Myanmar identified its first COVID-19 case in March 2020; since then the number of COVID-19 cases gradually increased over April and May, with the majority of cases located in the Yangon Region. Nevertheless, Myanmar successfully contained COVID-19 in June and July after detecting a few hundred cases and six COVID-19-associated deaths in total. In August, a surge of COVID-19 cases was identified in Sittwe, Rakhine State. This state borders with Bangladesh, a country which had faced a peak of around 3,800 daily cases. Once these cases were reported in Sittwe, widespread community transmission was already underway, with hundreds of cases identified in the following days. The delayed discovery of cases meant that some infected individuals had travelled to Myanmar's most densely populated city: Yangon. In September, the Yangon region was identified as the epicentre of the epidemic. As of 5 November 2020, Myanmar has detected 56,940 laboratory-confirmed cases and 1,330 people had died due to COVID-19. Yangon has contributed 75.6 per cent (n = 43,044) of cases and 93 per cent (n=1,228) of deaths in Myanmar<sup>8</sup>.

## Daily detected total COVID-19 cases in Yangon, and other states and regions in Myanmar: Second wave - 18 August to 4 November 2020



<sup>7</sup> Organisation for Economic Co-operation and Development. States of Fragility 2020 [Online]. Paris: OECD Publishing; 2020 [cited 2020 05.11.2020]. Available from: [https://www.oecd-ilibrary.org/development/states-of-fragility-2020\\_ba7c22e7-en](https://www.oecd-ilibrary.org/development/states-of-fragility-2020_ba7c22e7-en).

<sup>8</sup> Myanmar Ministry of Health and Sports. Coronavirus Disease 2019 (COVID-19) Surveillance Dashboard (Myanmar) [MoHS website]. Online: Myanmar Ministry of Health and Sports; 2020 [updated 05.11.2020; cited 2020 05.11.2020]. MoHS website]. Available from: <https://www.mohs.gov.mm/Main/content/publication/2019-ncov>.

Before the very first case of COVID-19 was recorded in Myanmar, the Ministry of Health and Sports (MOHS) had put in place a series of prevention and containment measures including closing the arrival of international flights except for relief and cargo flights, closing restaurants, schools, other learning facilities, and non-essential businesses, imposing local travel restrictions and localised lockdowns in hard-hit areas, a nationwide curfew from 12 midnight to 4:00 am, and arrangement of quarantine facilities. As the cases went down during the middle of the year, many social restrictions were relaxed.

During the second wave, the MOHS increased the testing and treatment capacity for COVID-19 by expansion and upgrading of the testing and treatment facilities, and screening of temperatures during land and border crossings and in public places. The MOHS focused on strict containment strategy at the beginning; later it applied a mitigation strategy in order to be in line with the existing capacity of health system and not to overburden healthcare workers. Recent testing capacity (PCR tests and RDT) has also been increased from 4,350 (average) per day in September to 12,850 (average) per day in October. This increase in testing capacity can be attributed to the purchase and donation of at least 400,000 antigen rapid test kits from South Korea<sup>9</sup>. All patients that tested positive with COVID-19 are isolated in hospitals and designated facilities based on the severity of the disease. All primary contacts of the positive cases are put under home or facility quarantine strictly under the observation of the township health officers. As the epicentre of the second wave is in Yangon Region, MOHS mobilises many health care workers and resources in other states and regions to Yangon Region.

## **Pandemic Preparedness | Myanmar**

During the second wave, public spaces such as football stadiums, schools and monasteries were repurposed to quarantine facilities to lighten the load on the country's healthcare system. Prior to the pandemic, Myanmar's investment in healthcare has faced some scrutiny. In 2000, the WHO was ranked the worst healthcare system in the world by the WHO<sup>10</sup>. Between 2000 and 2010, less than 2 per cent of Myanmar's GDP was spent on healthcare, though this has improved to up to 5.1 per cent in 2016<sup>11</sup>.

One paper that assessed the risk of COVID-19 fatality in youth populations in south-east Asian and European countries found that Myanmar had mostly "medium-low" preparedness for the pandemic<sup>5</sup>. The weakest area was in the availability of hospital beds, where Myanmar had 383 ICU beds in a population of 51 million compared to the neighbouring Thailand, which has 6,000 beds in a population of 69 million. As of October, there have been reports that Yangon now has more than 10,000 hospital beds with more than 900 in intensive care units to prepare for any further case surges.

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<sup>9</sup> <https://www.mmtimes.com/news/400000-rapid-antigen-test-kits-be-distributed-myanmar-regions-and-states.html>

<sup>10</sup> <https://www.voanews.com/east-asia-pacific/soaring-myanmar-covid-19-cases-test-long-neglected-health-care-system>

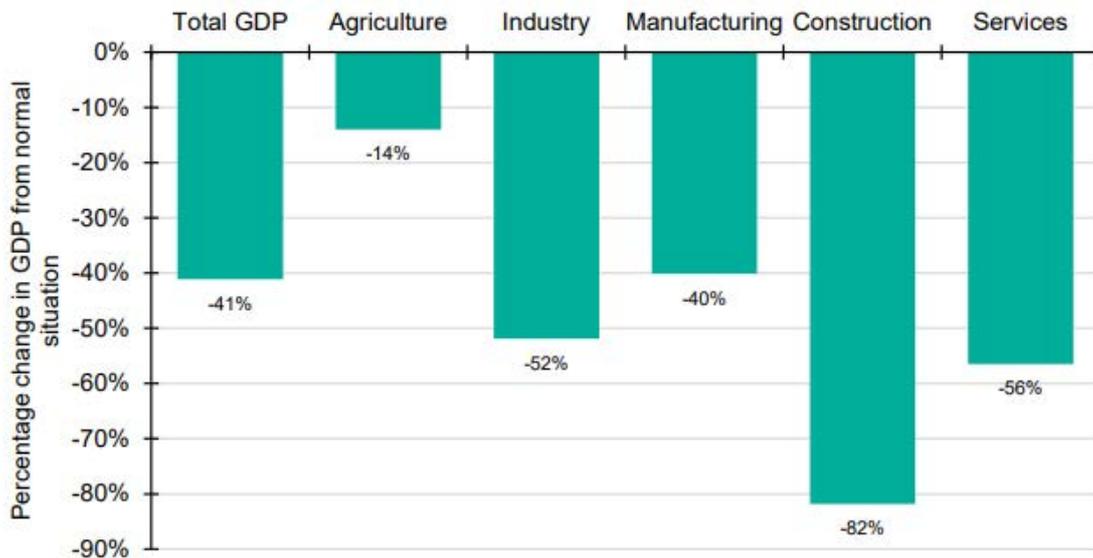
<sup>11</sup> <https://www.sciencedirect.com/science/article/pii/S0190740920315309>

## Pandemic Preparedness of Healthcare Systems in European and South-East Asian Countries

WHO's region	Countries	Human development index (HDI)	Physicians	Nurses and midwives	Hospital beds	Current health expenditure (% of GDP)
			(per 10,000 people)			
			2018	2010-2018	2010-2018	
<i>European region</i>	Germany	0.939	42.1	132	83	11.1
	Sweden	0.937	54	115	26	10.9
	United Kingdom	0.92	28.1	83	28	9.8
	Spain	0.893	40.7	55	30	9
	France	0.891	32.3	97	65	11.5
	Italy	0.883	40.9	59	34	8.9
	Russian Federation	0.824	40.1	86	82	5.3
	Belarus	0.817	40.8	114	110	6.3
	Kazakhstan	0.817	33	85	67	3.5
	Turkey	0.806	17.6	26	27	4.3
<i>South East Asian Region</i>	Sri Lanka	0.78	9.6	21	36	3.9
	Thailand	0.765	8.1	30	21	3.7
	Maldives	0.719	10.4	40	43	10.6
	Indonesia	0.707	3.8	21	12	3.1
	India	0.647	7.8	21	7	3.7
	Timor-Leste	0.626	7.2	17	59	4
	Bhutan	0.617	3.7	15	17	3.5
	Bangladesh	0.614	5.3	3	8	2.4
	Myanmar	0.584	8.6	10	9	5.1
	Nepal	0.579	6.5	27	3	6.3
Preparedness Level		<i>Low</i>	<i>Medium-low</i>	<i>Medium</i>	<i>Medium-high</i>	<i>High</i>

## Social and Economic Impacts | Myanmar

Myanmar's economy is heavily reliant on international trade and the tourism industry<sup>12</sup>. Exports and imports of goods and services make up about 50 per cent of the country's national GDP according to World Bank. The institution of a two-week lockdown in Myanmar had deep impacts on many of the country's sectors including **Agriculture, Industry, Manufacturing, Construction and Services**.



Source: Results from IFPRI's Myanmar SAM multiplier model.

Note: The percentage change is compared with a normal situation over the same period.

Within the agricultural sector, crop trading had decreased dramatically when compared to the previous year. Due to border closures and movement restrictions, demand had fallen in export and local markets. Transport was cited as one of the major drivers of decreased crop trade, as transport restrictions were not consistent within states, regions or townships<sup>13</sup>. As a result, transportation of crops from the villagers to the cities was disrupted.

Throughout the year, the garment industry has been hit extremely hard. A shortage of raw materials from China in February meant that between 10,000 and 15,000 jobs were lost<sup>14</sup>. In September, a regional minister reported that 223 factories had filed for closure, temporary closure, or redundancy. A large proportion of this labour force is informal and predominantly employs women. In Hlaing Thar Yar, the largest industrial zone in Myanmar, women make up 94 per cent of garment factory workers<sup>15</sup>. As such, the closure of garment factories exacerbated the gendered impacts of COVID-19.

<sup>12</sup> <https://www.ifpri.org/publication/assessing-impacts-covid-19-myanmars-economy-social-accounting-matrix-sam-multiplier-0>

<sup>13</sup> <https://myanmar.ifpri.info/2020/10/20/crop-trading-during-the-pandemic-lessons-learned-in-myanmar-late-june/>

<sup>14</sup> [https://www.theguardian.com/global-development/2020/oct/22/i-have-to-do-this-myanmar-garment-workers-forced-into-sex-work-by-covid?CMP=Share\\_AndroidApp\\_Other](https://www.theguardian.com/global-development/2020/oct/22/i-have-to-do-this-myanmar-garment-workers-forced-into-sex-work-by-covid?CMP=Share_AndroidApp_Other)

<sup>15</sup> <https://www.ifpri.org/node/23529>

Housing for factory working women is dependent on their employment, resulting in many evictions. The threat of homelessness was enough to force some women into illegal sex work<sup>14</sup>.

A decline in global remittances has also threatened the livelihoods of low income or poor rural families. The short-term economic shocks may push these households into extreme poverty or food insecurity. Analysis of remittances is not optimistic, as the sharp decline in remittance income may continue for at least a year if not longer<sup>16</sup>. Therefore, it is of the utmost importance that the government can provide targeted stimulus to keep families above the extreme poverty threshold.

## **Future Research | Myanmar**

Although MoHS puts the full effort into controlling COVID-19 epidemic based on available international and local evidences, context-specific evidence are yet to be produced to optimize COVID-19 management strategies in Myanmar. Priority and urgent research topics to be implemented in Myanmar are modelling of community-based COVID-19 control and prevention strategies and evidence-based optimizing Myanmar's COVID-19 management strategic framework, detecting COVID-19 protective immunity among recovered COVID-19 patients, and sequencing and visualizing the currently circulating SARS-CoV-2 strains in Myanmar. Furthermore, public health and epidemiologic studies such as the impact of COVID-19 on formal and informal health care providers and their service provision in Myanmar need to be explored. A formal assessment of health system preparedness on current and oncoming epidemics in Myanmar should also be performed.

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<sup>16</sup> <http://ebrary.ifpri.org/utills/getfile/collection/p15738coll2/id/133818/filename/134052.pdf>

# GLOBAL SNAPSHOTS

## PROLONGED SYMPTOMS IN COVID-19 SURVIVORS

A few formal studies have hinted at the lingering damage that COVID-19 can inflict on survivors. In an Italian study in April and May, **87 per cent of patients** discharged from a Rome hospital still had symptoms after two months<sup>17</sup>. 55 per cent had three or more symptoms including fatigue (53 per cent), difficulty in breathing (43 per cent), joint pain (27 per cent), and chest pain (22 per cent) with 40 per cent saying it had reduced the quality of their life. A British study found that **74 per cent of hospitalised patients had symptoms** at 8-12 weeks after discharge<sup>18</sup>. A German study that included many patients who recovered at home found that **78 per cent had heart abnormalities** after two or three months<sup>19</sup>. A study by the US Centres for Disease Control and Prevention found that **one-third of 270 non-hospitalised patients** hadn't returned to their usual state of health after two weeks<sup>20</sup>.

As yet there is **no diagnostic code** for 'Long COVID' meaning this experience is not captured in routine clinical datasets. 'Long COVID' is a term widely used on social media but is not a well-defined term and not a diagnosis used widely by clinical staff. A number of surveys reviewed by the UK National Institute for Health Research (NIHR) showed there are a wide range of recurring symptoms experienced by patients, regardless of whether they were hospitalised, affecting the respiratory system, the brain, cardiovascular system and heart, the kidneys, the gut, the liver, and the skin<sup>21</sup>.

Prolonged symptoms may actually constitute **several different syndromes**, according to this review and published in October by the BMJ -- Post-Intensive Care syndrome, Post-Viral Fatigue syndrome and Long-Term COVID syndrome. Some people may be suffering with more than one syndrome at the same time<sup>22</sup>. The NIHR found that the public perception of COVID-19 in the UK was perceived to be in binary terms, as either severe enough to need hospital admission or mild enough to recover quickly and not to require support. The failure to acknowledge a third path, together with the media focus on mortality rates, created anxiety in those with continuing symptoms who were left in an uncertain no man's land about the severity of their condition and uncertainty among medical practitioners.

One of the most feared long-term sequelae of acute COVID-19 is pulmonary fibrosis, which cannot be effectively treated. Both SARS and MERS left some patients with these long term effects in the lung. The **ADAPT study** run by St Vincent's Hospital is a prospective cohort study that aims to capture every COVID-19 case in the hospital's catchment area<sup>23</sup>. The hospitalised patients in the study will have chest CT scans and undergo complex lung-function testing, comprising spirometry, plethysmography and diffusing capacity at one month, four months and 12 months. The non-severe cohort will have the lung function assessments at four months. If they are abnormal they will be followed up with more testing and CT scans for a year.

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<sup>17</sup> <https://jamanetwork.com/journals/jama/fullarticle/2768351>

<sup>18</sup> <https://www.medrxiv.org/content/medrxiv/early/2020/08/14/2020.08.12.20173526.full.pdf>

<sup>19</sup> <https://jamanetwork.com/journals/jamacardiology/fullarticle/2768916>

<sup>20</sup> [https://www.cdc.gov/mmwr/volumes/69/wr/mm6930e1.htm?s\\_cid=mm6930e1\\_w](https://www.cdc.gov/mmwr/volumes/69/wr/mm6930e1.htm?s_cid=mm6930e1_w)

<sup>21</sup> <https://evidence.nihr.ac.uk/themedreview/living-with-covid19/>

<sup>22</sup> <https://www.bmj.com/content/371/bmj.m3981>

<sup>23</sup> <https://medicalrepublic.com.au/for-some-survivors-covid-19-may-outstay-its-welcome/29052>

# SARS-COV-2 ANTIBODY PREVALENCE MAY BE FALLING IN THE UK

Tests on more than 365,000 people in England have shown that the antibody response to SARS-CoV-2, the virus that causes COVID-19, wanes over time. These preliminary results come from the ongoing Real-time Assessment of Community Transmission (REACT) Study led by Imperial College London<sup>24</sup>. The latest report includes findings from three rounds of testing carried out over a three-month period. There were 17,576 positive results across all three rounds, **around 30 per cent of whom did not report any COVID-19 symptoms**. After accounting for the accuracy of the test, confirmed by laboratory evaluation, and the country's population characteristics, the study found that antibody prevalence declined from 6.0 per cent to 4.8 per cent and then 4.4 per cent over the three months analysis of finger-prick tests carried out at home between 20 June and 28 September<sup>25</sup>.

The downward trend was observed in all areas of the country and age groups, but not in health workers, which could indicate repeated or higher initial exposure to the virus, the authors suggest. The decline was largest in people aged 75 and above compared to younger people, and also in people with suspected rather than confirmed infection, indicating that the antibody response varies by age and with the severity of illness.

People in London had the highest proportion of positive tests across the country, at around twice the national average. Health and care workers, ethnic minority groups, and those living in deprived areas and large households also had the greatest burden of past infection.

A separate arm of the REACT study is using at-home swab tests to monitor levels of current infection, involving more than 150,000 people each month.

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<sup>24</sup> <https://www.imperial.ac.uk/medicine/research-and-impact/groups/react-study/>

<sup>25</sup> <https://www.imperial.ac.uk/news/207333/coronavirus-antibody-prevalence-falling-england-react/>

# T-CELL RESPONSES TO SARS-COV-2 STILL PRESENT SIX MONTHS AFTER INITIAL INFECTION

A recent study, published in bioRxiv, demonstrates robust T-cell responses to SARS-CoV-2 viral peptides six months after initial infection in all participants following asymptomatic, mild or moderate COVID-19<sup>26</sup>. The study of 100 people showed that all had a cellular immune response against SARS-CoV-2 six months after infection although **the size of response was 50 per cent higher in those who had experienced symptomatic disease.**

The study from the UK Coronavirus Immunology Consortium and Public Health England, which is published as a preprint and has not yet been peer reviewed, is believed to be the first in the world to show that a robust cellular memory against the virus persists for at least for six months.

The researchers collected serum and blood samples from a cohort of more than 2000 clinical and non-clinical healthcare workers, including 100 who tested seropositive for SARS-CoV-2 in March and April 2020. The average age of the donors was 41 (range 22 to 65 years old); 23 were men and 77 were women. None of them were hospitalised with COVID-19 - 56 people had mild or moderate symptoms and 44 were asymptomatic.

Serum samples were collected monthly to measure antibody levels and blood samples were taken after six months to measure the T cell response using an ELISPOT and ICS analysis. The study found that virus specific T cells were detectable in all donors at six months.

Antibody levels fell by around 50 per cent during the first two months after infection but then plateaued. The magnitude of the T cell response at six months was strongly correlated with the magnitude of the peak antibody response, the study found.

**The findings have implications for vaccine development.** The cellular response was directed against a range of proteins from the virus, including the spike protein that is being used as a target in most vaccine studies. The study authors suggested that as T cell responses were also directed against additional nucleoprotein and membrane proteins these could also be valuable targets for future vaccines strategies.

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<sup>26</sup> <https://www.bmj.com/content/bmj/371/bmj.m4257.full.pdf>

# COVID-19 MITIGATION BEHAVIOURS BY AGE GROUP - UNITED STATES, APRIL – JUNE 2020

The COVID Impact Survey collected data to provide national estimates of health, economic, and social well-being of U.S. adults, using a national probability sample covering approximately 97 per cent of the U.S. population of non-institutionalised adults with a home address<sup>27</sup>. Surveys were conducted in three waves (20-26 April, 4-10 May, and 30 May - 8 June), without significant resampling of persons across waves. Analyses included a total of 6,475 online or telephone surveys of adults aged  $\geq 18$  years.

Respondents were asked, “Which of the following measures, if any, are you taking in response to the coronavirus?” Of the 19 response options, three mitigation behaviours aligning with CDC recommendations were assessed: 1) “wore a face mask,” 2) “washed or sanitised hands,” and 3) “kept six feet distance from those outside my household.” Three social mitigation behaviours aligning with CDC guidelines from March and April 2020 also were selected for analysis: 1) “avoided public or crowded places,” 2) “cancelled or postponed social or recreational activities,” and 3) “avoided some or all restaurants.

**In April, 78 per cent of adults aged  $\geq 18$  years reported wearing a mask; this increased to 83 per cent in May and 89 per cent in June** ( $p < 0.001$ ). All other reported mitigation behaviours decreased from 20 – 26 April to early June ( $p < 0.05$ ), except avoiding some or all restaurants, which did not change significantly.

At each time point,  $>40\%$  of all adults aged  $\geq 18$  years reported all six assessed mitigation behaviours. Across all survey waves, reported prevalences of mitigation behaviours were highest among adults aged  $\geq 60$  years and lowest among those aged 18–29 years.

**Summary:** These findings suggest that lower engagement in social mitigation behaviours among younger adults might be one possible reason for the increased incidence of confirmed COVID-19 cases in this group, which began in June 2020 and preceded increases among persons aged  $\geq 60$  years by 4–15 days. Better understanding of barriers and motivators associated with participation in mitigation behaviours is needed to effectively employ strategies that promote engagement of younger adults and others who are not currently engaging in mitigation behaviours.

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<sup>27</sup> <https://www.cdc.gov/mmwr/volumes/69/wr/mm6943e4.htm>

# COVID-19 INFECTION FATALITY RATIO (IFR) ESTIMATES FROM SEROPREVALENCE

In a pre-release report, researchers at Imperial College London said that previous IFR estimates had relied on data early in the epidemic, or had not fully accounted for uncertainty in serological test characteristics and delays from onset of infection to seroconversion, death, and antibody waning<sup>28</sup>. After screening 175 studies, they identified 10 representative antibody surveys to obtain updated estimates of the IFR using a modelling framework that addresses the limitations listed above.

They found that age-specific IFRs follow an approximately log-linear pattern, with the risk of death doubling approximately every eight years of age. Using these age-specific estimates, they estimate the overall IFR in a typical **low-income country**, with a population structure skewed towards younger individuals, to be **0.23 per cent** (0.14-0.42 95 per cent prediction interval range). In contrast, in a typical **high income country**, with a greater concentration of elderly individuals, they estimate the overall IFR to be **1.15 per cent** (0.78-1.79 95 per cent prediction interval range).

They claim that accounting for seroreversion, the waning of antibodies leading to a negative serological result, can slightly reduce the IFR among serosurveys conducted several months after the first wave of the outbreak, such as in Italy. In contrast, uncertainty in test false positive rates combined with low seroprevalence in some surveys can reconcile apparently low crude fatality ratios with the IFR in other countries. **Unbiased estimates of the IFR continue to be critical to policymakers to inform key response decisions.** It will be important to continue to monitor the IFR as new treatments are introduced.

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<sup>28</sup> <https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-34-IFR/>



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85 Commercial Road  
Melbourne, Australia, 3004

t +61 3 9282 2111

e [knowc19@burnet.edu.au](mailto:knowc19@burnet.edu.au)

[burnet.edu.au](http://burnet.edu.au)

@BurnetInstitute

@KnowC19\_Burnet

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