Executive Summary: COVID-19
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The Executive Summary is produced weekly and contains in-depth analysis.
International SOS publishes a COVID-19 Daily Case Summary.

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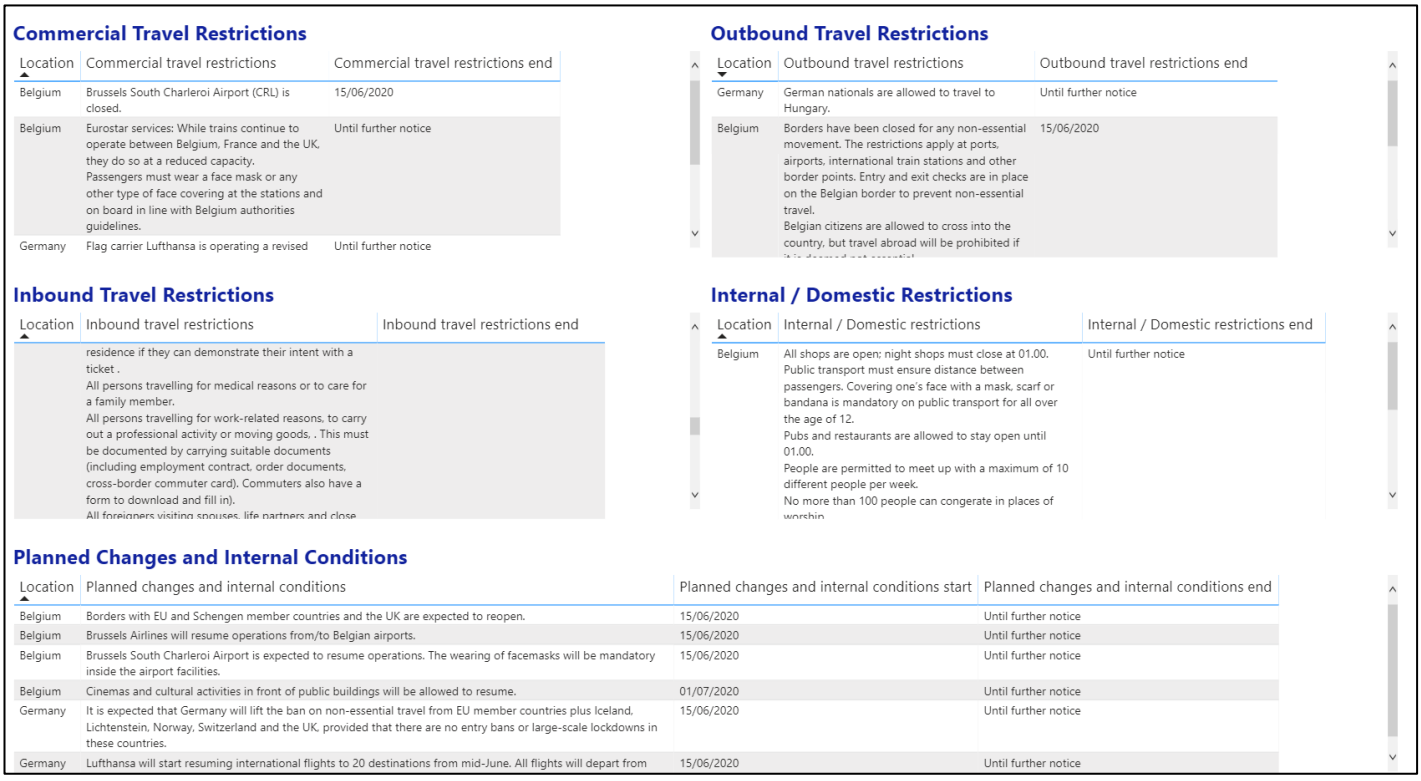
INTERNATIONAL SOS:
COVID-19 RELATED TRAVEL RESTRICTIONS, FLIGHT OPERATIONS, AND SCREENING INFORMATION

International SOS is the leading source of information related to the COVID-related complexities of travel. Our Members only information is organised into five distinct categories:

- Commercial Travel Restrictions
- Outbound Travel Restrictions
- Inbound Travel Restrictions
- Internal / Domestic Restrictions
- Planned Changes and Internal Conditions

You can scroll through each category country by country OR select a country and see its information in all categories. Here we have selected Germany and Belgium.



Commercial Travel Restrictions

Location	Commercial travel restrictions	Commercial travel restrictions end
Belgium	Brussels South Charleroi Airport (CRL) is closed.	15/06/2020
Belgium	Eurostar services: While trains continue to operate between Belgium, France and the UK, they do so at a reduced capacity. Passengers must wear a face mask or any other type of face covering at the stations and on board in line with Belgium authorities guidelines.	Until further notice
Germany	Flag carrier Lufthansa is operating a revised	Until further notice

Outbound Travel Restrictions

Location	Outbound travel restrictions	Outbound travel restrictions end
Germany	German nationals are allowed to travel to Hungary.	Until further notice
Belgium	Borders have been closed for any non-essential movement. The restrictions apply at ports, airports, international train stations and other border points. Entry and exit checks are in place on the Belgian border to prevent non-essential travel. Belgian citizens are allowed to cross into the country, but travel abroad will be prohibited if	15/06/2020

Inbound Travel Restrictions

Location	Inbound travel restrictions	Inbound travel restrictions end
	residence if they can demonstrate their intent with a ticket . All persons travelling for medical reasons or to care for a family member. All persons travelling for work-related reasons, to carry out a professional activity or moving goods, . This must be documented by carrying suitable documents (including employment contract, order documents, cross-border commuter card). Commuters also have a form to download and fill in). All foreigners visiting spouses, life partners and close	

Internal / Domestic Restrictions

Location	Internal / Domestic restrictions	Internal / Domestic restrictions end
Belgium	All shops are open; night shops must close at 01.00. Public transport must ensure distance between passengers. Covering one's face with a mask, scarf or bandana is mandatory on public transport for all over the age of 12. Pubs and restaurants are allowed to stay open until 01.00. People are permitted to meet up with a maximum of 10 different people per week. No more than 100 people can congerate in places of worship	Until further notice

Planned Changes and Internal Conditions

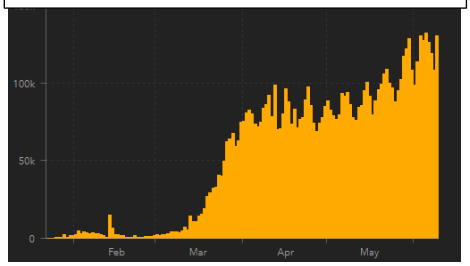
Location	Planned changes and internal conditions	Planned changes and internal conditions start	Planned changes and internal conditions end
Belgium	Borders with EU and Schengen member countries and the UK are expected to reopen.	15/06/2020	Until further notice
Belgium	Brussels Airlines will resume operations from/to Belgian airports.	15/06/2020	Until further notice
Belgium	Brussels South Charleroi Airport is expected to resume operations. The wearing of facemasks will be mandatory inside the airport facilities.	15/06/2020	Until further notice
Belgium	Cinemas and cultural activities in front of public buildings will be allowed to resume.	01/07/2020	Until further notice
Germany	It is expected that Germany will lift the ban on non-essential travel from EU member countries plus Iceland, Lichtenstein, Norway, Switzerland and the UK, provided that there are no entry bans or large-scale lockdowns in these countries.	15/06/2020	Until further notice
Germany	Lufthansa will start resuming international flights to 20 destinations from mid-June. All flights will depart from	15/06/2020	Until further notice

COVID-19 EPI UPDATE

THE WORLD HEALTH ORGANIZATION WARNS THE HEALTH CRISIS IS "WORSENING" WORLDWIDE.

- Director-General Tedros Adhanom Ghebreyesus said 136,000 cases had been reported in the past 24 hours, "the most in a single day so far," with the majority of them in the Americas and South Asia. "Although the situation in Europe is improving, globally it is worsening," he told reporters. COVID-19 deaths have passed 404,000 worldwide, with a total of more than seven million infections.

GLOBAL: NEW CASES PER DAY
Graph: Johns Hopkins University.



CORONAVIRUS INFECTIONS HAVE NOT SPIKED SINCE EUROPE LOOSENED THE LOCKDOWNS

- Across most of Europe, countries have restarted their economies, resumed a degree of socializing, and sent children back to school without a spike in cases, so far at least. There is discussion about what is limiting the spread in Europe. Is the virus more seasonal than we thought? Are the behavioral changes, from handwashing to wearing masks, part of the reason? Europeans, heeding warnings that the virus is more transmissible indoors, have adapted their lives accordingly — something easier to do in warmer months. In Rome, the parks and alfresco restaurant tables are full; the tables indoors are empty. In Germany, confined indoor gatherings have led to small outbreaks, while outdoor mass demonstrations against the lockdown in several cities — some drawing thousands of people — have not led to obvious consequences.

OVER RELIANCE ON PCR TESTING TO MEASURE INFECTIVITY?

- The case of a mother who tested positive for COVID-19 when her baby was born, and then tested positive for another 55 days during which she was not allowed to see her baby, has highlighted a possible over-reliance on PCR tests to determine infectivity. A study published last week in Clinical Infectious Diseases looked at the period of infectiousness and found that no live virus could be found from throat swabs eight or more days after the onset of symptoms. The 90 samples ranged from day 0 of symptom onset to day 21. Positive viral culture was most likely in the first 5 days after symptom onset and this aligns with epidemiological evidence that suggests most transmission occurs with 5 days of symptom onset. We know from previous studies that the PCR test can remain positive for many weeks after symptom onset.

WHO: DATA SUGGESTS IT'S "VERY RARE" FOR CORONAVIRUS TO SPREAD THROUGH ASYMPTOMATICS – THEN CLARIFIES THE STATEMENT

- Maria Van Kerkhove, Head of the Emerging Diseases and Zoonosis Unit said at a press conference, "We have a number of reports from countries who are doing very detailed contact tracing. They're following asymptomatic cases. They're following contacts. And they're not finding secondary transmission onward. It's very rare."

- However, this statement caused controversy and so, in a clarification broadcast, Van Kerkhove stressed the following points:

    - Of COVID-19 cases, many develop symptoms, and some do not
    - The majority of the transmission that we know about is from people with symptoms transmitting the virus via infective droplets
    - There is a subset of people who don't develop symptoms. Estimates vary from 6% to 41% with a "point estimate" of 16%
    - Some people who are asymptomatic can transmit the virus
    - What we need to know is:
        - How many don't have symptoms?
        - How many of those go on and transmit to others?

LOCKDOWNS WORKED, NEW RESEARCH SHOWS: 60 MILLION INFECTIONS WERE PREVENTED IN THE US, AND EUROPE SAVED 3.1 MILLION LIVES

- New research from the University of California, Berkeley found that the US's coronavirus lockdowns prevented around 60 million infections from 3 March to 6 April. China's lockdowns avoided around 285 million infections. Restrictions in Italy kept nearly 50 million people from getting sick, and in Europe overall, lockdowns averted 3.1 million deaths from March to May, according to researchers at Imperial College London.

AUSTRALIA TO BEGIN SCREENING BLOOD TESTS FOR SARS-CoV-2 ANTIBODIES

- A project being led by the Kirby Institute in Australia will be begin screening blood tests ordered by family doctors for SARS-CoV-2 antibodies. In the short term, the findings would provide more accurate estimates of the rate of asymptomatic infections. It could also provide a "denominator" in various age groups allowing more accurate mortality rates to be calculated. In the longer term, it is hoped that the study will provide information on Australia's herd immunity…we're going to have to find out in 10-14 days what really happened".

WILL BLACK LIVES MATTER MARCHES CAUSE SPIKES OF INFECTION?

- Dr. Michael Osterholm, Director of the Center for Infectious Disease Research and Policy (CIDRAP) at the University of Minnesota, interviewed on MSNBC, said that that US is "undergoing a very unfortunate experiment ….and we don't know what that's going to do. The good news is that it was outdoors largely, and that we have seen typically that the virus just floats into the air and doesn't become a problem and so from that standpoint the risk is lower. On the other hand, we had people who experienced tear gas, smoke and yelling, all of these things would cause coughing or projecting the virus out of one's throat, and so that enhances transmission. Then we have the people who were detained by law enforcement, put into buses, and held in local jail cells, which also could enhance transmission".

THE ROLE OF SUPER-SPREADERS

- In an interview, Elizabeth McGraw, the Director of the Center for Infectious Disease Dynamics at Pennsylvania State University, explains the evidence and why superspreaders can be crucial to a disease's transmission. Whether someone is a super-spreader depends on some combination of the pathogen, the patient, the environment and behavior. Some infected individuals might shed more virus into the environment than others if their immune system has trouble subduing the invader. Public protests – where it's challenging to keep social distance and people might be raising their voices or coughing from tear gas – are conducive to superspreading (often called super-spreading events).

- Researchers in Hong Kong examined a number of disease clusters by using contact tracing to track down everyone with whom individual COVID-19 patients had interacted. In the process, they identified multiple situations where a single person was responsible for as many as six or eight new infections. The researchers estimated that only 20% of all those infected with SARS-CoV-2 were responsible for 80% of all local transmission.

- Another study by researchers in Israel took a different approach. They compared the genetic sequences of coronavirus samples from patients inside the country to those from other places. Based on how different the genomes were, they could identify each time SARS-CoV-2 entered Israel and then follow how it spread domestically. These scientists estimated that 80% of community transmission events – one person spreading the coronavirus to another – could be tracked back to just 1-10% of sick individuals.

EVIDENCE OF SIGNIFICANT NATURAL SELECTION IN THE EVOLUTION OF SARS-COV-2 IN BATS, NOT HUMANS

- A non-peer reviewed article suggests that the non-human precursor of SARS-CoV-2 was capable of human to human transmission due to its natural evolution in bats.

AS WE START TO TRAVEL

ESSENTIAL BUSINESS TRAVEL FROM SINGAPORE TO CHINA TO START: NO QUARANTINE BUT PCR TESTS REQUIRED

Singapore and China have agreed on the rules to allow essential business travel to re-start between the two countries. In essence, travellers in both directions will be exempt from the 14-day quarantine periods applying to all international arrivals. This "fast-lane" travel to six provinces in China will begin on Monday 8 June.

However, there are some quite strict rules. The trips must be approved by authorities. Travellers must submit an itinerary that must be adhered to. Travellers from China must have a PCR test for COVID-19 48 hours prior to travel, another at Changi airport on arrival, and must remain in quarantine at a known address until the result is known. They also cannot catch buses or the MTR and must use taxis. No recreational travel will be allowed. Similar rules apply for Singaporean travellers into China.

In addition, any traveller who is found to be COVID-19 positive will be hospitalised and must pay for their own treatment.

TRAVEL BUBBLES

In countries that have largely brought their outbreak under control, travel corridors, or bubbles might be the way that travel starts up. Here are some corridors / bubbles that have been opened or are being contemplated:

- Australia and New Zealand:
- South Korea, Japan and Singapore
- Estonia, Lithuania and Latvia
- Denmark and Norway (without Sweden)
- Germany, Czech Republic and Austria.

A report in the Guardian says that the EU will be advising European countries to open borders to countries with similar coronavirus risk profiles under a plan to bolster the ailing tourist industry being discussed in Brussels. **By the peak summer season, travellers across the EU will be able to check an interactive map drawn up by the European Commission's science service that will provide information on the latest border controls and travel conditions, under the commission plans.**

ICAO COVID-19 COMPREHENSIVE GUIDANCE FOR AIR TRAVEL

The International Civil Aviation Organization (ICAO), a UN specialized agency, has published guidelines (CART Take-off) to facilitate air travel during the pandemic while minimising the health risk to passengers and all aviation workers. A risk-based approach has been designed with five scenarios of air travel where Stage 0 is one with travel restrictions and minimal travel and Stage 4 would be with residual travel restrictions and some pharmaceutical intervention available. It consists of "...a core set of measures to form a baseline aviation health safety protocol".

The public health risk mitigation measures have been divided into:

A) Generally applicable measures meant for all phases of air passenger and cargo transport

B) Specific modules that target different aspects of air transport

General measures comprise recommendations of public education, physical distancing, use of face covering and mask, routine sanitation, health screening, contact tracing, health declarations and testing. Specific modules of mitigation measures address aspects of airport, aircraft, crew and cargo.

UPDATE ON TEXAS

This is our sixth weekly report on the number of cases per day in Texas since “re-opening” in stages began on 1 May.

- Cases per day are increasing
- COVID-related hospitalizations are increasing
- COVID-related ICU admissions are increasing however
- ICUs currently have excess capacity

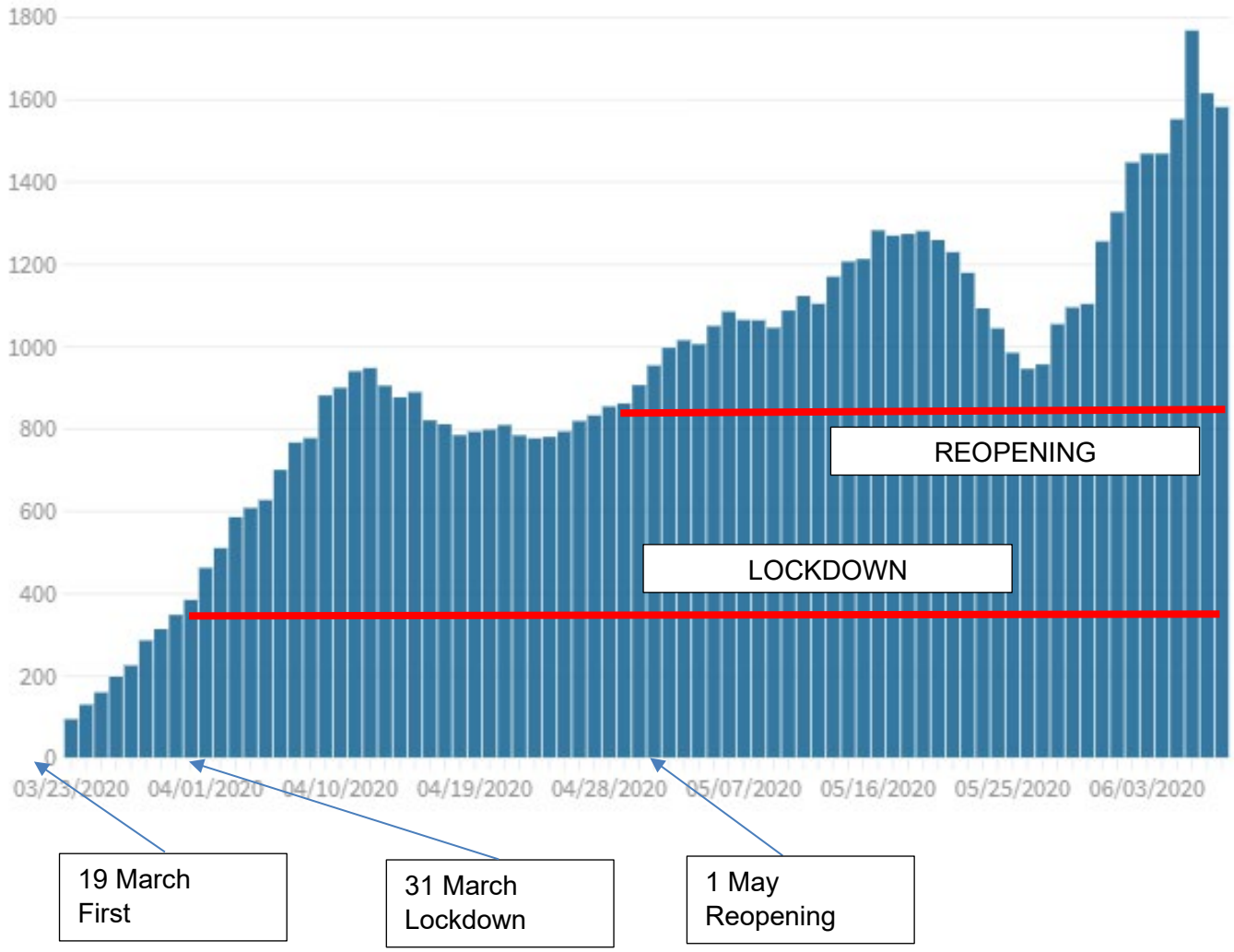
NEW CASES PER DAY

The graph below from the Houston Chronicle shows a sharp increase in new coronavirus cases. The rate remains higher both when lockdown occurred and when re-opening began on 1 May.

Cases per day

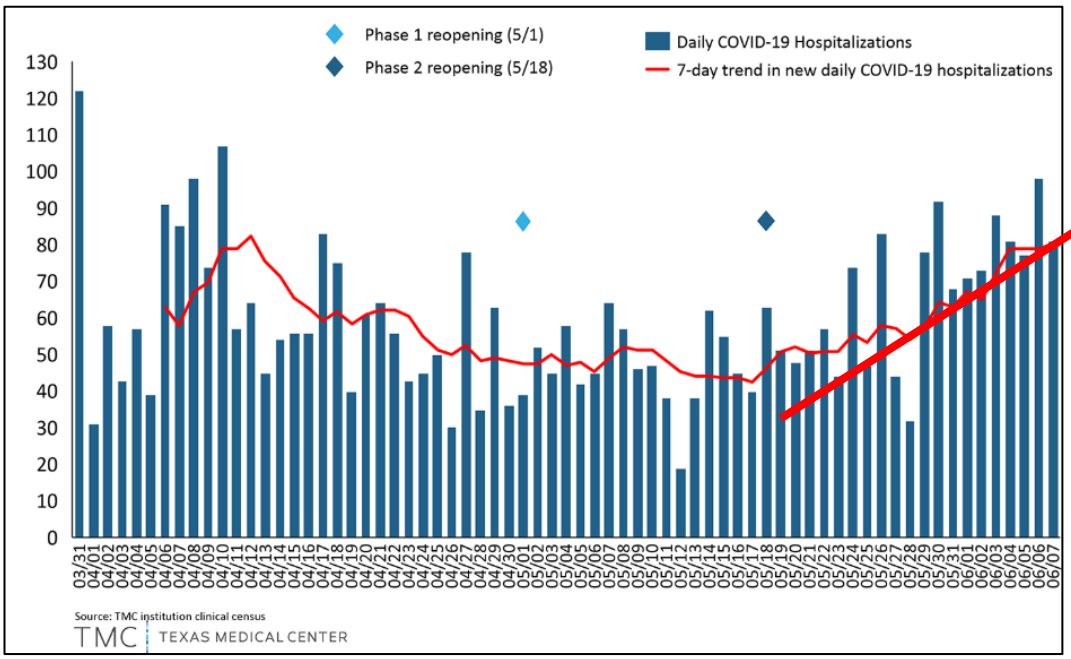
Lockdown	31 March 2020	325 cases per day
Re-opening	1 May 2020	785 cases per day
Now	10 June 2020	1575 cases per day

Texas: Seven day rolling average of new confirmed cases: Houston Chronicle



HOSPITALIZATIONS IN TEXAS

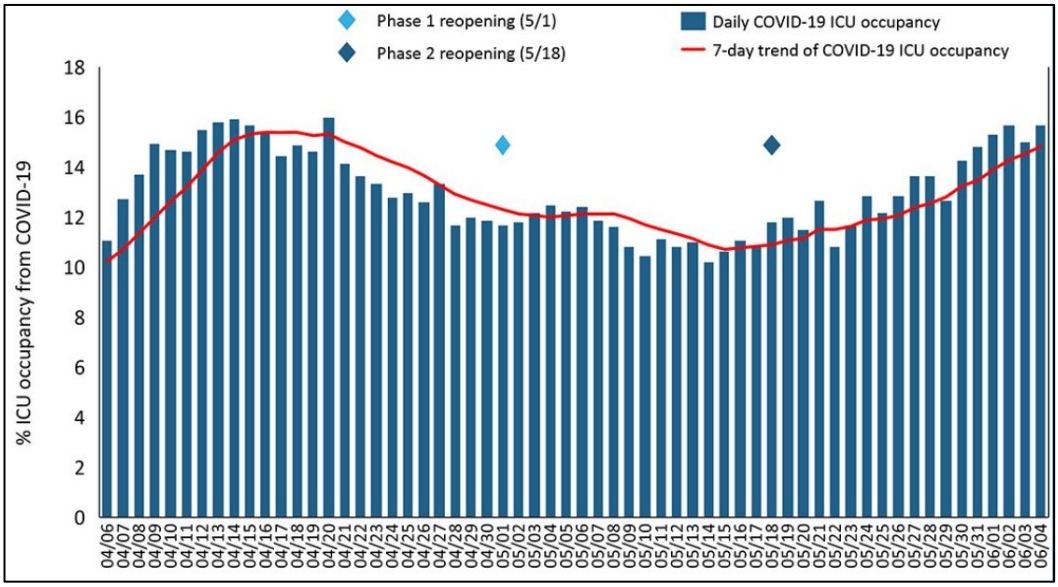
The State of Texas does not report daily state-level hospitalizations, however Texas Medical Centre (Houston) does. The graph shows a continued increase in new COVID hospitalizations in recent weeks. **This week there is a 3.5% growth in daily COVID-19 hospitalizations. Last week it was a 2.1% growth.**



Graph: Texas Medical Centre

COVID-19 ICU OCCUPANCY TREND AT TEXAS MEDICAL CENTRE

- **2.4% average growth in the COVID-19 ICU occupancy trend**



Graph: [Texas Medical Centre]

VENTILATOR CAPACITY AT TEXAS MEDICAL CENTRE

- **80-90% of COVID-19 patients in ICU typically require a ventilator**
- **At present, COVID-19 cases are accounting for 6% of TMC ventilators**

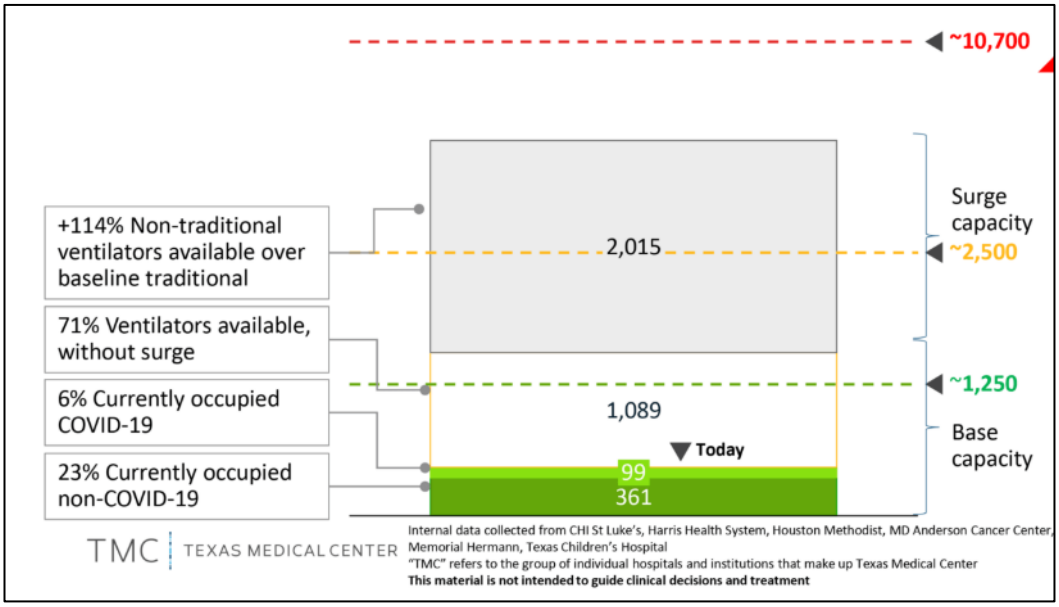


Chart: [Texas Medical Centre]

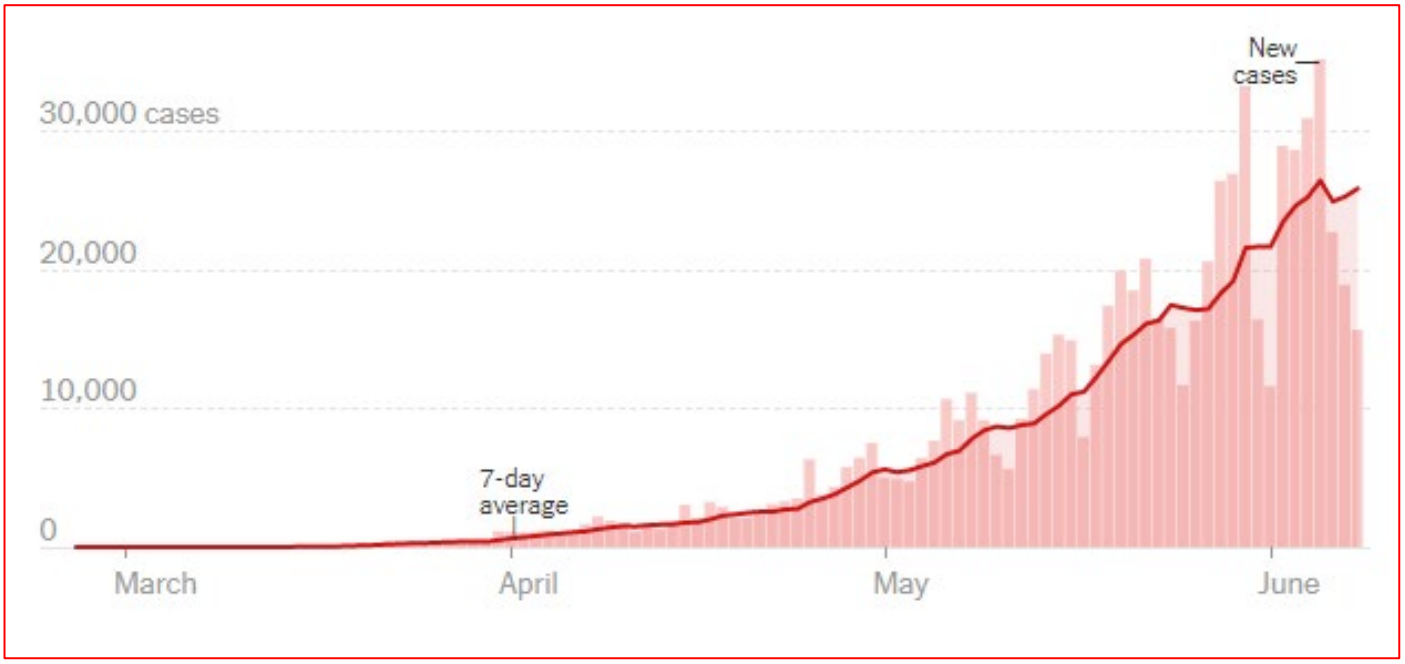
POSTSCRIPT: The [Washington Post] reports that since the start of June, 14 US states and Puerto Rico have recorded their highest-ever seven-day average of coronavirus cases since the pandemic began.

BRAZIL: EPIDEMIC NOT CONTROLLED

- The Brazilian Government last week stopped publishing case numbers and deaths**.** Brazilian President Jair Bolsonaro tweeted Saturday that disease totals are "not representative" of the country's current situation.
- However, this morning a Brazilian Supreme Court judge has ordered the government of President Jair Bolsonaro to resume publication of full COVID-19 data, including the cumulative death toll.

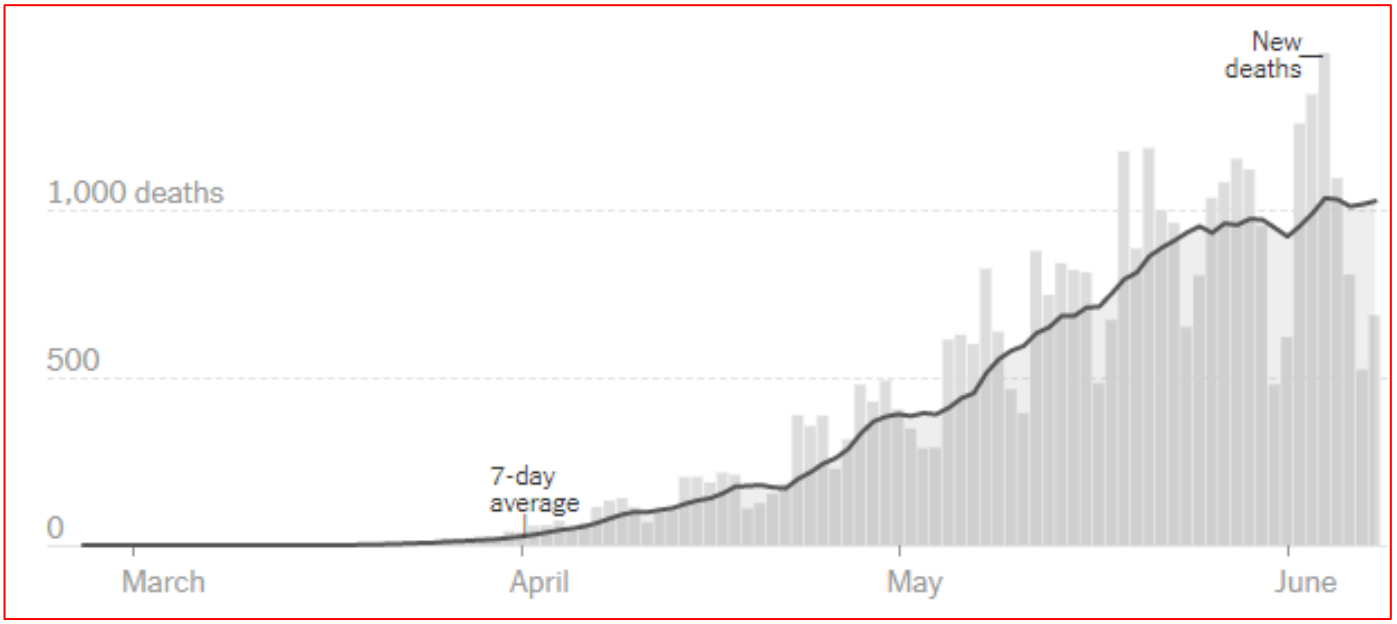
NEW REPORTED CASES BY DAY IN BRAZIL

Graph: New York Times



NEW REPORTED DEATHS BY DAY IN BRAZIL

Graph: New York Times



REPORTED CASES IN BRAZIL

Map: New York Times

Note that the northern states are far more heavily affected than the southern and capital city states:

	Share of pop'n with a reported case	Deaths
Amazonas	1 in 79	2,315
Sao Paulo	1 in 302	9,522
Rio de Janeiro	1 in 234	6,928

A VIEW FROM THE LABORATORY: PROFESSOR JOHN OXFORD

Scientists return to the laboratory

Nature News in Focus reports that all over the world countries are lifting lockdown and scientists are donning masks, with their lab coats and working in shifts with shared instruments. In some countries, universities have made plans of their own. In the USA, the CDC clashed with the current political administration over plans. One of my own grandchildren recently graduated from the University of California. Here, at least in San Diego, they have drafted and organised screening for all staff and students, and campus labs themselves will process the samples. It reminded me of an institute in the UK where, recently, because of political lack of planning, there had been a drastic shortage of PPE and even a crisis of distribution. Some hospitals have been making their own, as have some staff, especially visors.

The USA has threatened to split from the WHO and set up their own plan for world preparedness. This has been described as building a plane while flying. Like "removing the window while the plane is airborne".

Social networks or bubbles

Dr Per Block in a study published a Nature Human Behaviour suggests we could reduce social contact strategically rather than by distance *per se*. It is a modelling analysis. Simple changes within an individual social network can alter the rate and spread of the virus. "Home splitting" is interacting with people living nearby. This can be repeated and so a micro-community is built up. This latter strategy turned out to be the most effective. In essence, this is the "social bubble" idea. They suggest that complete isolation leads to lower adherence.

Dr Christian Drosten – source of coronavirus knowledge

Interviewed by the German magazine Der Spigel, he noted that in the beginning we needed the \ whole wide range of measures, because we did not know what exactly would help. Now we know the virus better, we know better how it spreads. The incubation period and the time in which you are contagious are all much shorter than originally thought. He advises Angela Merkel's Government in Germany and I wish we could borrow him in England! **He is hinting at shortening quarantine from 2 weeks to even 1 week.**

The G value is the new R_o?

A corollary piece of data for studying spread of viruses in the community is the Generation Time, sometimes called "G". This is the time between infection of a person and their ability to infect another person. This can be short: 2 days for influenza, or as long as 8-9 days with smallpox. A combination of high R_o and short generation time can spell

trouble in the community (e.g. influenza), whereas a long generation time alongside a low R_o gives time for use of quarantine. Examples here are smallpox, SARS-CoV, MERS Cov and Ebola. And where does COVID-19 sit? Unfortunately, while R_o stays reasonably steady, we do appreciate (see Drosten above piece), that G can be shorter than one thinks. We might view this as helpful to people in quarantine, but it does give the virus an extra "zip".

Medical Commercial masks versus 'homemade' masks as in 1918

I make no excuse for returning again to the theme of transmission of COVID-19. Alongside the unravelling of the clinical disease itself and the pathology, the pathway of infection and its blocking is central to the new disease. The abstract of this "Science Perspective" on 27 May is to the point:

(1) Masks and testing are necessary to combat asymptomatic spread in aerosols and droplets. The authors are a very interesting mixture from the famous Scripp Institute in California and the nearby School of Medicine in San Diego, a chemist from China and an aerobiologist. The review starts by declaring that a large proportion of people infected with COVID-19 is through aerosols from asymptomatic patients. Since, by definition, such a patient is not coughing and sneezing, then the source of infection must be breathing *per se*. They note that such aerosols can accumulate and remain infectious for hours indoors.
(2) Aerosols can reach deeply into the lungs.
(3) Such asymptomatic individuals can be highly contagious for several days before symptoms arrive and hence become "silent shedders or drivers". They suggest in Wuhan that nearly four-fifths of infections originated from this group. But how can the infection be contained? One minute of loud talking could generate 1000 virions ranging upwards to 100,000 virions per minute. They deduce that WHO recommendations of 1.5m distance is not enough to avoid aerosols in the indoors. Outdoors such virus containing aerosols can be diluted and also inactivated by UV light. Another outdoor factor is attachment to dust and population particles. The descriptive example they use is one I am fond of myself – exhaled cigarette smoke!

In conclusion a properly fitted mask indoors is essential for indoor use.
Note. The WHO is considering a 2m distance. In the UK masks will now be obligatory on public transport from 15 June.

Aerosol filtration efficiency of common fabrics used in respiratory cloth masks – Kanda *et al* (American Chemical Society Nano)

Up until a few days ago very few people in the UK wore masks (at least in public) except for healthcare workers (HCWs). The HCWs wore the white medical masks, like N95, well sealed, to the skin and of proven ability to filter and hold viruses. Now many masks are homemade as they were during the Spanish Influenza pandemic of 1918. But do they actually block infection? The public are certainly being encouraged to make them at home.

Kanda *et al* working in the USA tested 15 fabrics including cotton, cotton quilt, synthetic silk, natural silk, satin, chiffon and blends. They did not test the materials against viruses *per se* but used an NAC1 aerosol. Each material was tested seven times. They used different flow rates. They found that cotton, natural silk and chiffon provided good protection above 50% for the particle range 10nm to 6µm provided the material had a tight weave. They considered that silk and chiffon were effective. A four-layer silk and chiffon were 85% effective. They concluded that the combined materials provided electrostatic and physical filtering but noted that leakage could significantly reduce efficiency. The next stage is to test COVID-19 aerosols in a high security Cat 4 laboratory.

PS. WHO has changed its approach to the use of masks following the recent publication of detailed scientific papers. It now recommends use on public transport and indoors when social distancing (the 2 metre rule) cannot be achieved. It recommends a layered material mask for the general population (see above).

Is rapid publication of Covid-19 papers too rapid for everyone's good?

Scientists have flooded pre-print servers with manuscripts before they have been peer reviewed. For coronavirus research the popular servers are BioRxiv and MedRxiv. They are favoured for fast dissemination, but the problem can be quality. These two platforms are now enhancing their normal pre-publication screening techniques. Computational models have now been banned and authors go through peer review procedures. It was reported in Nature (581, p130, 20 May 2020), that most have quality control systems and often there is a two-tiered process and submitted papers are checked for plagiarism, For example, reviewing can be complete in 48 days. There is a feeling that MedRxiv papers are more scrutinised because of their relevance to health content. Submitted papers contravening accepted public health advice might be flagged.

Peer review journals are also being flooded with COVID-19 submissions and turnaround has been reduced from 117 to 60 days. It is likely that low quality submissions are circulating, and many established scientists and medical journals have experienced a 50% rise in the first few months of this year. A possible compromise solution is to have special expedited volumes for COVID-19 papers which have been reviewed quickly by a group of "Rapid Reviewers".

In my own recent experience, many scientists publish in popular newspapers and their papers in established journals are embargoed for 24 hours before publication, so that journalists can be contacted to give extra publicity. I must say I am looking forward to a less frenetic situation in the next six months. I believe that properly, quietly and consistently reviewed papers by experts is at the heart of virological science.

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