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The Executive Summary is produced weekly and contains in-depth analysis. International SOS publishes a COVID-19 [Daily Case Summary](#).

### INTRODUCTION

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In this week's edition of the International SOS COVID-19 Executive Summary we explore:

1. Focus on Texas
2. Focus on Houston
3. Contact tracing: Humans vs Apps
4. Focus on Peru
5. A View from the Lab: Professor John Oxford
  - Caution about reopening schools
  - A new diagnostic test to detect early host gene activity in pre-symptomatics
  - Medium term clinical effects of the virus
  - Virus in saliva changes Chinese eating habits
  - Remdesivir to be further investigated
  - Postscript: personal non-virological observations
  - A social divide of risk in the UK

### FOCUS ON TEXAS

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*Contributing authors: Dr. Salwan Ibrahim and Melonie Allen MPH from International SOS Houston.*

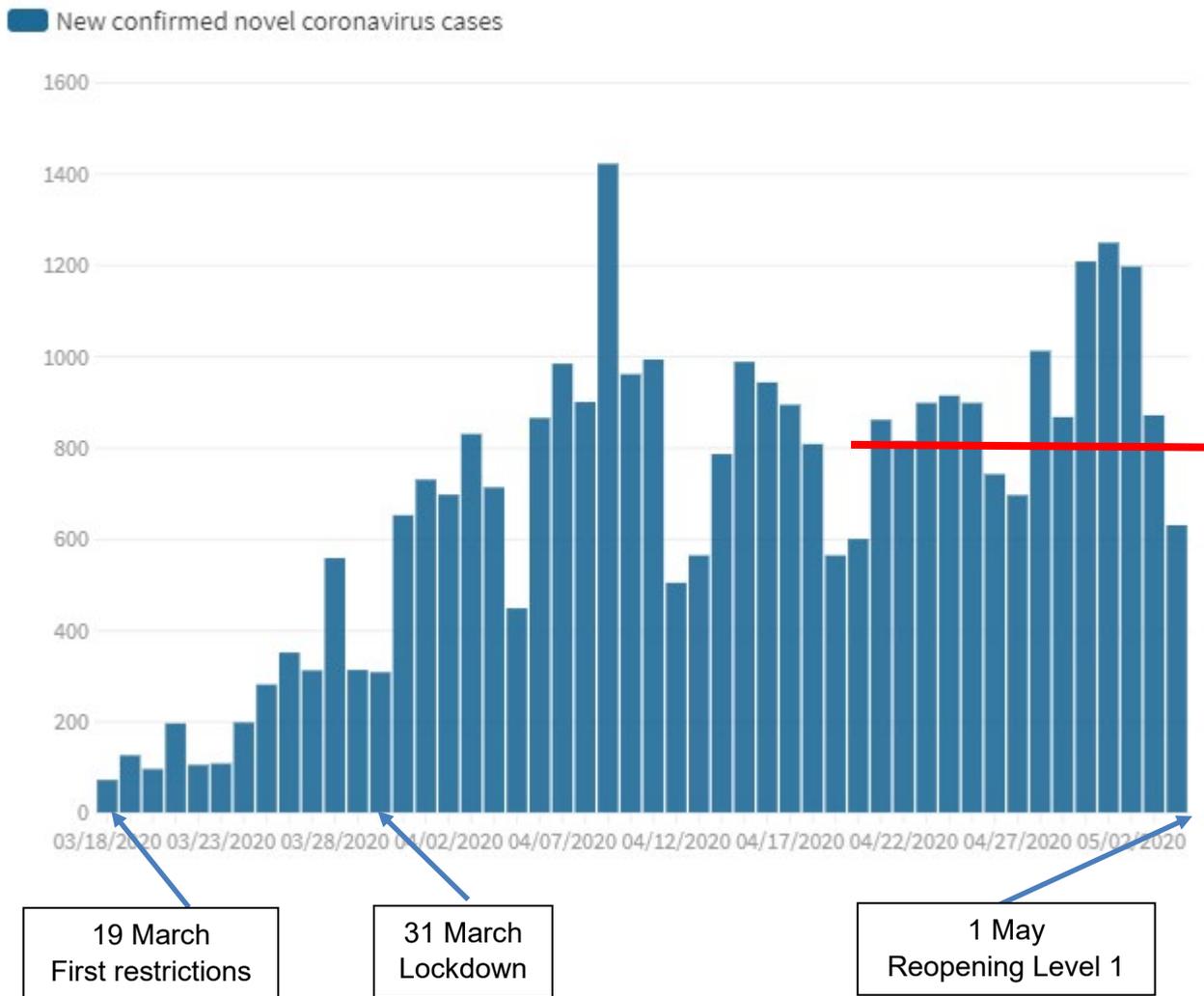
#### The State of Texas

The population of the State of Texas is nearly 30 million.

#### Texas COVID statistics:

Population	30 million
Total confirmed cases	33,369
Total deaths	906
Active cases	15,672
Hospitalizations	1,888
Crude Case Fatality Rate	2.7%
Tests performed total	427,210
Percent of population tested	1.4%
Tests performed 5 May	19,000

Texas: new confirmed cases: [Houston Chronicle](#)



At present, there are about 800 new confirmed cases per day in Texas. Texas HAS NOT passed its peak of new cases.

## Public Health Interventions

Governor Greg Abbott has issued a number of Executive Orders to mitigate the spread of COVID-19 in Texas.

Date	Summary	Approximate new cases per day	Details
19 March	First restrictions	160 cases	Schools open No gatherings > 10 people Avoid drinking at bars, restaurants, food courts Avoid gyms & massage parlors Drive-thru and pick-up encouraged
31 March	Lockdown	360 cases	Schools closed Bars closed Minimize non-essential gatherings Minimize in-person contact with people who are not in the same household Avoid eating or drinking at bars and restaurants <b>Allowed:</b> Hunting & fishing / physical activity like jogging or bicycling / churches / places of worship <b>Allowed essential services:</b> healthcare, grocery stores, gas stations, banking and financial services, utilities, childcare for essential service employees, government services.
1 May	Reopening Level 1	800 cases	Schools remain closed Must wear mask when outdoors: penalty \$1,000 (little enforcement) Dining in restaurants allowed: 25% occupancy Museums & libraries open: 25% occupancy Elective surgery: can start Parks open: pre-booking required Churches / places of worship: open Outdoor sports allowed if =< 4 participants Cinemas may open (operators keeping closed) Bars and gyms: open
8 May	Reopening Level 2	Future	Barber shops, hair and nail salons to open Six feet distancing required Masks strongly encouraged
18 May	Reopening Level 3	Future	Gyms can open at 25% capacity

### More details:

- Harris county (includes Houston) issued a “Stay home, Stay safe” order on March 24. This expired on 1 May.
- 14-day quarantine for travellers from Louisiana lifted
- 14-day quarantine for travellers from New York maintained
- There is no date for the reopening of bars.
- More details can be found on the [“Open Texas”](#) website

Governor Abbott also said that with Texas reopening, the state is preparing for “flareups,” for which the state has surge response teams who will deal with these cases.



Many restaurants have re-opened with certain precautions like pre booking, limited occupancy and use of personal protective equipment

## FOCUS ON HOUSTON

The City of Houston is in Harris County, Texas, and has 7 million residents. It is the fourth largest city in the USA after New York, Los Angeles and Miami.

### Medical services

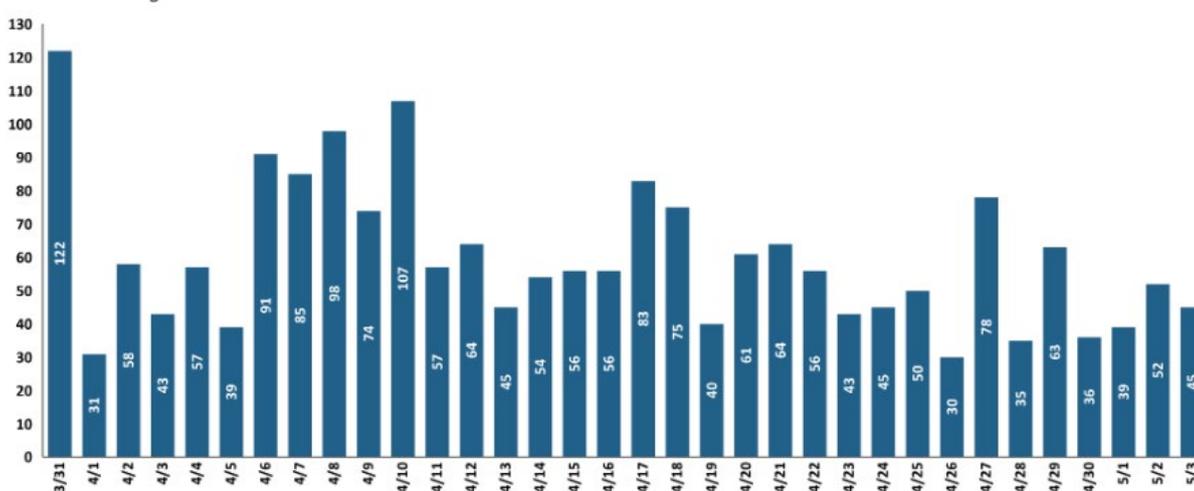
Texas Medical Center (TMC) is the heart of the healthcare industry sector in Houston. TMC has reported a steady rate of COVID-19 hospitalizations, however the number of ICU and ventilator cases is below the normal maximum capacity, and much less than the expanded capacity.

DAILY NEW COVID-19 CASES

May 4, 2020

### TMC DAILY NEW COVID-19 HOSPITALIZATIONS

ICU & Med Surg

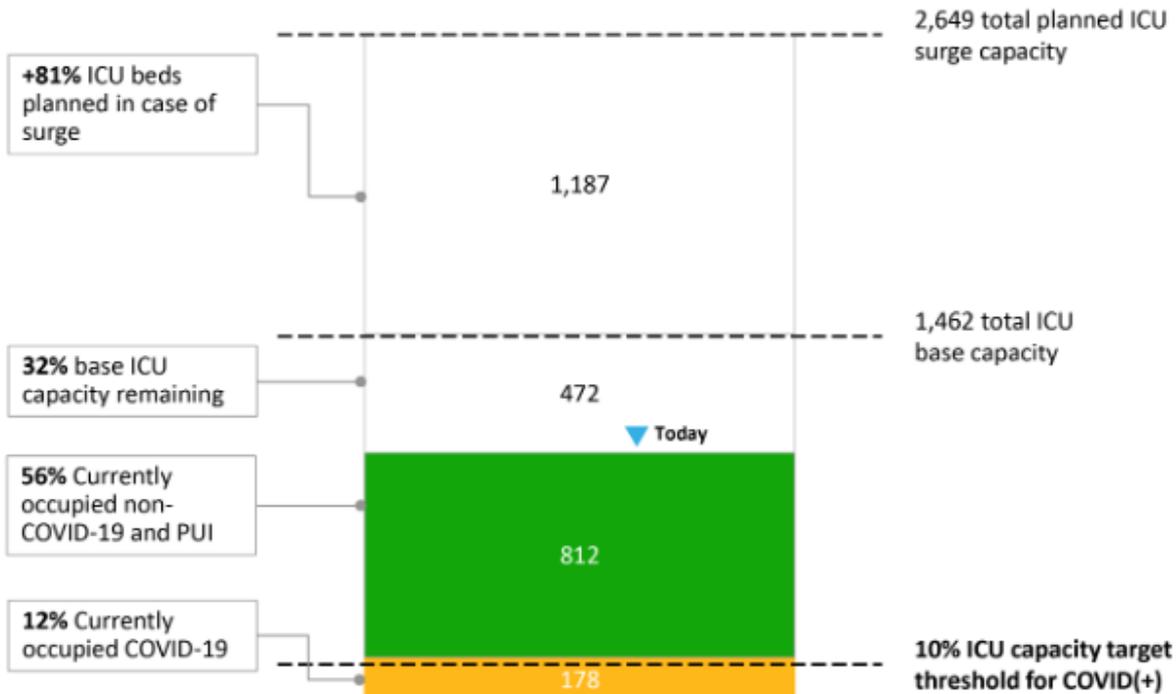


Source: TMC institution clinical census  
**TMC** | TEXAS MEDICAL CENTER  
 \*TMC\* refers to the group of individual hospitals and institutions that make up Texas Medical Center

This document is solely intended to share insights and best practices rather than specific recommendations. Individual institution data is shown as reported and has not been independently verified.

# TMC ICU BED CAPACITY

- No concern
- Moderate concern
- Warning

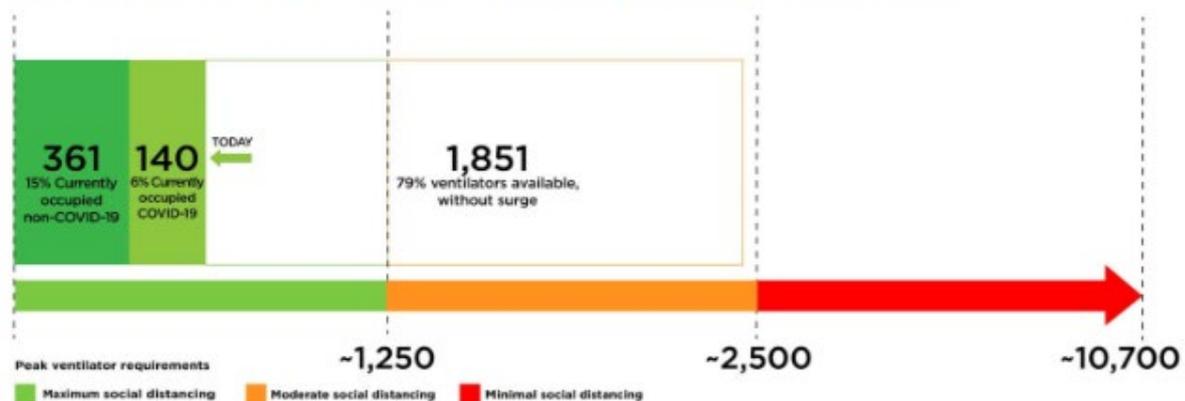


TMC | TEXAS MEDICAL CENTER  
 Internal data collected from CHI St Luke's, Harris Health System, Houston Methodist, MD Anderson Cancer Center, Memorial Hermann, Texas Children's Hospital, UTMB  
 "TMC" refers to the group of individual hospitals and institutions that make up Texas Medical Center  
 All guidelines should be in accordance with CDC guidelines

# TMC Ventilator Capacity Modeling



## Texas Medical Center ventilator capacity modeling



Internal data collected from CHI St Luke's, Harris Health System, Houston Methodist, MD Anderson Cancer Center, Memorial Hermann, Texas Children's Hospital  
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 This material is not intended to guide clinical decisions and treatment

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## COVID 19 Testing

COVID-19 testing has become increasingly available in Houston, however, is still below target levels

Tests are generally only available to symptomatic patients who book by calling 211. A doctor can also refer for a test. Testing is free or covered entirely by health insurance. Results can take 3-5 days. “Drive through” testing posts also have been established in various locations.



Drive through COVID 19 PCR testing

The private sector is still awaiting the availability of Point of Care PCR testing technologies, such as the Abbott ID NOW or Cepheid GeneXpert devices which are more accurate and faster than lab-based PCR tests.

## Texas COVID-19 App

Texas has recently introduced the “Texas Health Trace” app which allows the user to:

- Learn about your risks with a Self-Checker and
- Report exposure to COVID-19 or
- View COVID-19 test collection sites.

*It does not track close contacts.*

## Public reaction

Houstonians’ reaction to lockdown has been a mixture of accepting, rejecting and spectating.

While experts have been pushing for strict and careful adherence to social distancing and stay home orders, many business owners, especially small businesses, encountered financial challenges and an increasing number of unemployed workers filed for government support.

The current situation is:

- Texans have been suffering lock-down fatigue for the last 2-3 weeks
- Businesses have been lobbying congress to reopen so as not to be ‘devastated’ by the shut-down
- Civil rights & Freedom of Movement organisations have mobilized
- Competing priorities: Health vs Economy

Since the reducing of restrictions on 1 May, more people are out and about. Employees are somewhat divided on returning to the workplace. There are increasing demands for employers to accommodate leave and work from home requests. It is now a “Battle of Confidence” to get employees to return to the workplace and feel secure.



**Part of the demonstrations to re-open economy and ease restrictions**

### **Business reaction**

While business wishes to resume operations, there are no standards for contact tracing, use of PPE, cleaning, and instructions for creating a safer workplace. Employers and individuals are responsible for preparing conditions to operate.

Many businesses, including hospitals, have started to communicate their plans for the resumption of services to their customers via emails and messages to “test” the public feeling. Reopening depends on these results.

### **Oil and Gas**

The oil and gas industry sector has been hit hard by both the pandemic and the massive reduction in oil demand and prices globally. Many of the major corporations in Houston have recently been working on recovery plans and designing matrices to help their decision makers prepare carefully on allowing their workforce to safely come back to work.

### **Full re-opening of Houston**

According to the Governor’s plan, by June 01, whole Houston will reopen if there is no resurgence of COVID 19 cases.

### **ASSESSMENT**

It is possible that new waves of infection will occur as restrictions are lifted.

## CONTACT TRACING: HUMANS VS APPS

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Contact tracing endeavors to identify those who have come into contact with infected person/s and to institute appropriate public health interventions.

The main goal of contact tracing is to interrupt the ongoing transmission and reduce the spread of an infection.

### Definitions of a contact required, such as “Close contact of a COVID-19 case”:

- Face-to-face contact in any setting with a confirmed or probable case, for greater than 15 minutes cumulative over the course of a week, in the period extending from 48 hours before onset of symptoms in the confirmed or probable case, or
- Sharing of a closed space with a confirmed or probable case for a prolonged period (e.g. more than two hours) in the period extending from 48 hours before onset of symptoms in the confirmed or probable case.

### Protocols required, such as “Management of a close contact of a COVID-19 case”:

- Screening:
  - Routine laboratory screening for COVID-19 is not recommended for asymptomatic close contacts
- Education:
  - Close contacts should be counselled about their risk and the symptoms of COVID-19 and provided with a COVID-19 factsheet. They should be advised to self-quarantine.
- Quarantine:
  - Asymptomatic close contacts should be advised to self-quarantine at home for 14 days and monitor their health.
- Follow-up:
  - There should be active daily monitoring of close contacts for symptoms for 14 days

### Contact tracing is labour intensive

The UK government is now recruiting 18,000 people to perform contact tracing. However, scientists claim the UK will need to recruit as many as 100,000 contact tracers for this to be effective.

[Professor Azeem Majeed](#), Head of Public Health at Imperial College London, said, “If for example, you look at Wuhan in China, they recruited 9,000 contact tracers for 11 million people. That’s around 50,000 people for England. So we need to look at large volumes of contact tracers, not just a few hundred or a few thousand. We need tens of thousands, maybe even 100,000 people to do contact tracing.”

Public Health chiefs have suggested the contact tracing programme might last until 2024 and beyond.

### The basics of COVID-19 contact tracing apps

A contact tracing app aims to log when people come into contact with others who are suspected of being infected with COVID-19 using Bluetooth signals.

### Models of data storage in COVID apps

There are two models of data storage for contact-tracing apps:

1. **Decentralised model:** where all relevant contact information is held only on users’ phones
2. **Centralised model:** some data is held in a single database.

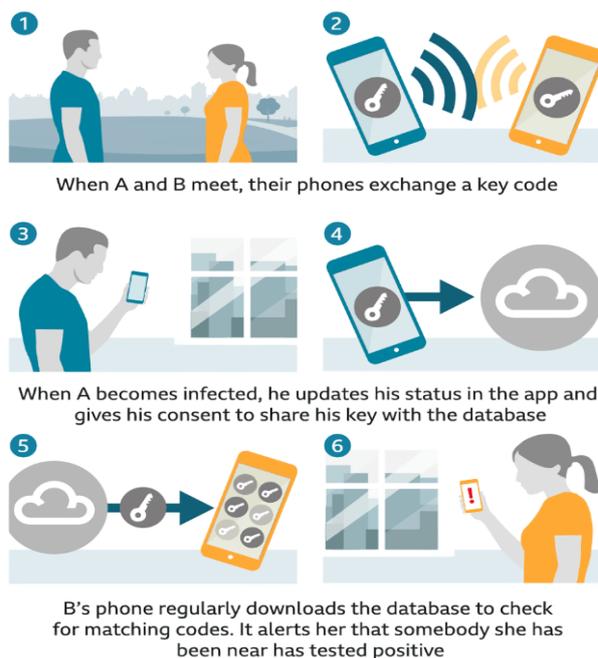
## Apple and Google co-operation

Apple and Google are cooperating to develop a set of interfaces and developer tools to support contact tracing apps. These are based on the **decentralized model** which they argue it is best for privacy.

Apple has released an early beta version of its software update that incorporates the technology, iOS 13.5, while Google is rolling out an update via its Google Play app store. The [first phase of Apple and Google's system](#) will allow apps deeper access to Apple's iOS and Google's Android operating systems for more consistent tracing, even if the phone is locked or other apps are in use.

[Apple and Google](#) have said they will ban the use of location tracking in apps that use a new contact tracing system.

### What Apple and Google have proposed



Source: Apple/Google

BBC

## Alternatives to Bluetooth assisted apps

A few countries, including [South Korea and Israel](#), are using high-tech methods of contact tracing that involve tracking peoples' location via phone networks. But such centralized, surveillance-based approaches can be viewed as invasive and unacceptable in many countries for privacy reasons.

[Taiwan is not yet using a contact-tracing app](#), but authorities are also using location-based technology to enforce quarantine.

## Singapore App



TogetherTrace is the Singapore app.

When released in April, there were only 385 confirmed COVID-19 cases, but now, the country of 5.7 million people has had a second wave and cases have jumped past 9,000. However, only about one in five have downloaded the app.

Critics, however, say that [Bluetooth is flawed as a contact tracing technology](#) because of its potential to turn up a large number false positives. Data privacy is another major issue, and Prime Minister Lee Hsien Loong acknowledged as much. "There will be some privacy concerns," he said yesterday. "But we will have to weigh these against the benefits of being able to exit from the circuit breaker and stay open safely."

[iPhone issues plagued Singapore's app](#), with the app required to be in the foreground on an unlocked iPhone to work efficiently.

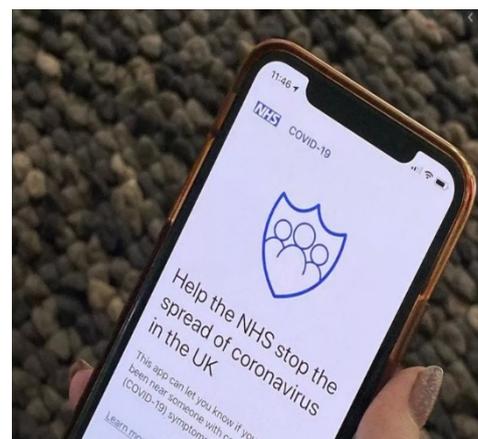
## UK / NHS App

A new app being developed by the NHS is due to be released across the UK in the coming weeks after being tested on the Isle of Wight. It uses the “**centralised**” data storage model, raising privacy concerns.

These have been rejected by the NHS team stating that only healthcare officials will be able to access this log through a special application programming interface.

No specific privacy-related legislation has been introduced in the UK.

But the app shows the huge challenges the NHS faces in designing an effective app [without the help of the tech giants that make our phones.](#)



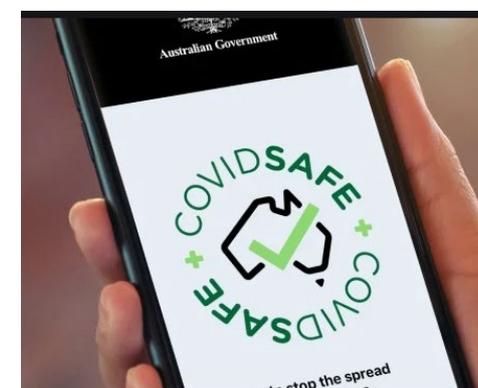
## Australian app

Australia released its COVIDSafe app on 15 April with a goal that it is downloaded by 40% of Australians. At 6 May, there have been five million downloads. It uses “**decentralised**” data storage and is supported by a significant amount of privacy-related legislation.

It works on the “decentralized” data model.

How it works:

- Registration involves providing a name (can be a pseudonym), an age range, a mobile phone number and a postcode
- COVIDSafe works by using Bluetooth technology to log when a person comes into close contact with others who have downloaded the app (Bluetooth “handshake”)
- If one of those people tests positive to COVID-19, a human contact tracer will ask permission to access the data collected on that person’s app
- People who have been in close contact with the confirmed case will then be manually contacted
- The app can store 21 days’ worth of contact information after which it is deleted.



App designed in Singapore

- The Australian app was designed in Singapore and partially modelled on the SingaporeTraceTogether app. The [Senior Director of Government Digital Services](#) in Singapore said his app “cannot replace manual contact tracing” but it could be a “supplement”.

## Other tracing apps:

### New York:

- Former NYC Mayor Bloomberg is [developing mobile apps](#) to help New York State trace coronavirus cases

### India

- Believed to be the [second in the world to go live after Singapore](#), has reached 50 million downloads on Android phones, which dominate the market. That’s a small fraction of the 500 million-strong smartphone user base, not to mention the population of over 1.3 billion. If a person tests positive for COVID-19, people who were near that person for a certain period of time can be alerted via their phones. The India app also has other functions and uses GPS data to identify infection clusters.

### New Zealand

- The Government has promised that a COVID-19 contact-tracing app will be [available in less than two weeks](#). It is likely to use decentralised data storage to be more compatible with the Australian app.

## Hong Kong

- In Hong Kong, the focus has been on home quarantine monitoring.
- Mandatory wristbands have been introduced for those arriving from overseas and are required to be worn for a 14-day home quarantine period.
- The wristband is linked to an app, StayHomeSafe, and uses geo-fencing technology to alert the authorities if the wearer leaves their home during their quarantine period.
- Privacy concerns have been deflected on the basis that the wristbands have limited functionality and do not collect location data.

NOTE: Hong Kong has been very successful in limiting the spread of SARS-CoV-2 WITHOUT a contact tracing app.

## FOCUS ON PERU

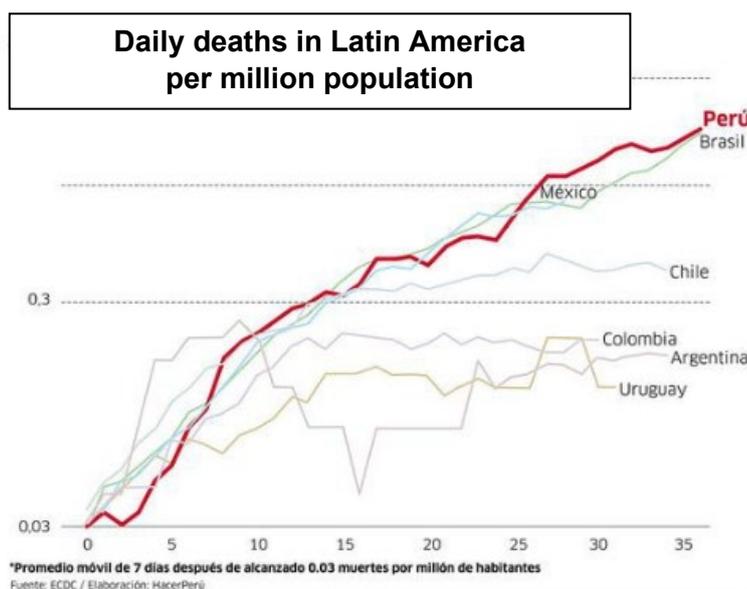
*Contributing authors:*

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As in many Latin American countries, Peru is facing the dilemma of either controlling the COVID-19 health emergency and increasingly aggravating the economic crisis, or avoid the greatest economic impact, consequently provoking a health emergency.

Peru introduced a lockdown on 4 April and visits and length of stay in categories including retail, recreation and workplaces fell by an average of almost 90%, twice as successful as Mexico and Brazil.

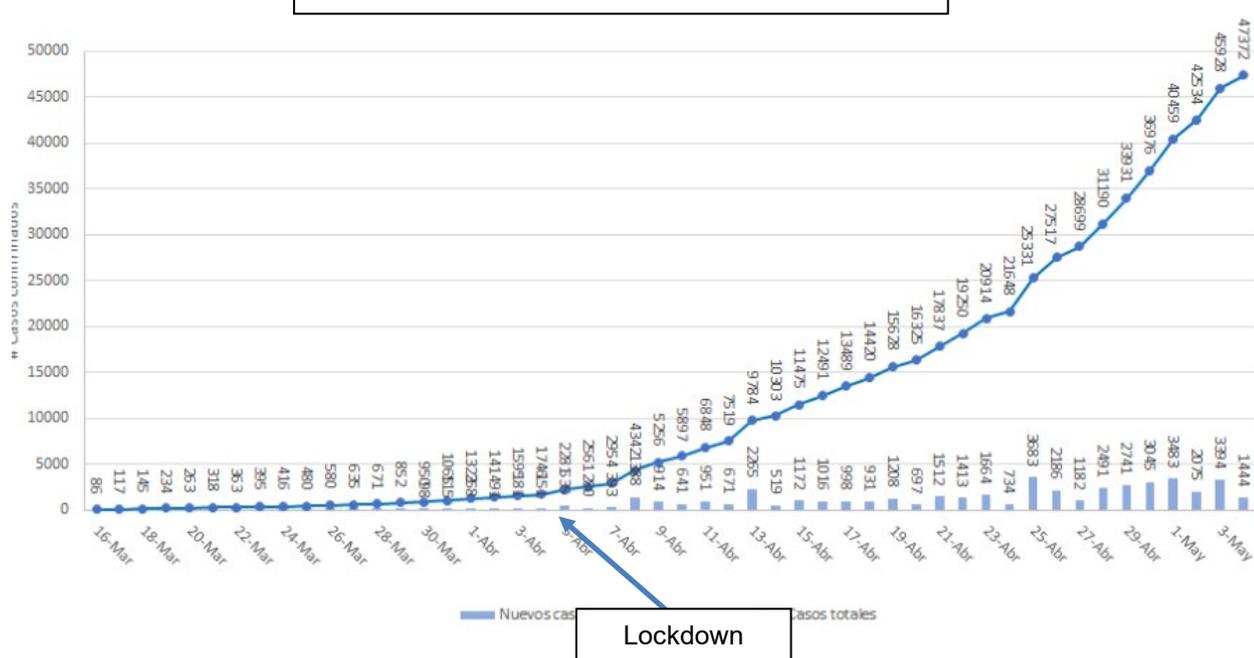
The reality is that more than half of the population is worried more about hunger than contracting COVID-19.



Countries such as Argentina, Colombia, Chile and Uruguay, took serious and strict actions against COVID-19 early are showing better control of the outbreak.

On the other hand, Peru is showing a very similar epidemic curve to those countries (Mexico and Brazil) where leadership has not reacted adequately.

### COVID-19: Total cases in Peru

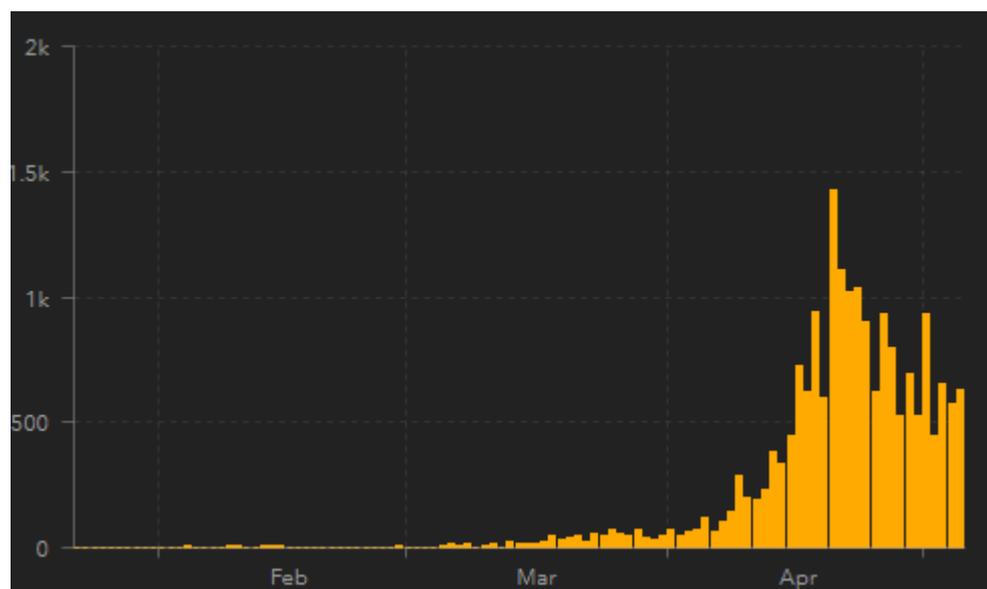


It is almost impossible to predict what the future of the COVID-19 epidemic however projections are not encouraging. Most likely, the epidemic will continue to escalate, more deaths will occur, and the economy will be severely effected.

#### National statistics as of May 4, 2020:

- Confirmed cases: 47,372 (+1,444)
- COVID-19 Inpatient cases: 5,435 (+154)
- ICU COVID-19 cases (on ventilator): 694 (+15)
- Recovered: 14,427 (+877)
- Deaths: 1,344 (+58)
- Number of tests: 385,492 (+10,396)
- Diagnostic tests per million inhabitants: 11,646.3
- Death rate: 2.84%
- Total ICU beds with ventilators available in the country: 849
  - Number of beds occupied: 694
  - Available: 155 available.

## QUICK REVIEW OF SINGAPORE'S SECOND WAVE



Singapore seems to have [passed the peak](#) of its second COVID-19 wave which has been associated with the dormitory-style living conditions of many South Asian workers.

## A VIEW FROM THE LABORATORY: PROFESSOR JOHN OXFORD

### Caution about reopening schools

Christian Drosten's virology group from Berlin examines viral load in SARS-COV-2 infected patients using real time PCR from 3,712 patients ([Terry Jones et al, Analysis of SARS-COV-2 load](#)). Is age related to viral load? Most interestingly, the group included children and found that viral loads even in young children do not differ from adults. They came to the rather striking conclusion that children may be as infected as adults and were cautious about opening schools in the present lockdown! The authors note that studies in China and Germany suggested that rates at which children are infected are similar to adults.

How important are children as a source of infection? It was apparent in Wuhan that thousands of paediatric cases were missed because they were asymptomatic. The authors note that in Germany kindergartens and schools closed early. So children could be more likely to receive rather than spread infections in households. This does not mean that children are less infectious. Children have greater physical activities and closer social interactions than adults. The authors caution against unlimited reopening of schools and kindergartens since children may be as infectious as adults.

### A new diagnostic test to detect early host gene activity in pre-symptomatics

An important piece of [virological research](#) involved the USA group DARPA and academic groups and the possible discovery of a "genetic signature" in human genes of persons infected with COVID-19 but not yet showing symptoms.

The new work involved research teams at Mount Sinai, New York, Duke and Princetown Universities. Dr Eric Van Gieson's team have worked in the topic over the last few years but with influenza and RSV. My own quarantine unit at Queen Mary College (called, in succession Retroscreen, hVivo and now Open Orphan worked on the topic).

Certainly, with knowledge of “pre-infectious cases” a transmission chain could be shut down before it even starts. Essentially this is a blood test to identify host mRNA’s in white blood cells which are host directed and a very early response to infection. Obviously, blood is more difficult to access but the test will likely be more reliable than swabs from the nose where there can be great variability in sample collection. The research group has asked for approval of the test from the FDA for “emergency use”.

### **Medium-term clinical effects of the virus**

There is increasing focus from clinical virologists on the recovery phase after an acute COVID-19 event. It is becoming more apparent that there can be long and lingering symptoms. A senior research fellow and a separate clinical lecturer noted that the symptoms can last at least five weeks, including a cough, severe fatigue, chills and insomnia.

### **Virus in saliva changes Chinese eating habits**

As regards the virology of infection, China itself is trying to change dining habits, both at home and in restaurants. The virology shows that unlike influenza for example, with COVID-19 there are high levels of virus in saliva. Saliva-laden virus would easily move from shared dishes. Traditionally eating in China involves sharing dishes but using personal chopsticks. Now a new etiquette will involve a “public spoon” or even separate portions. It is considered now that 85% of infectious clusters in Guangdong and Sichuan were initiated in families. A common scene at home is food shared between different members of the family viz grandparents, grandchildren, parents etc.

### **Remdesivir to be further investigated**

A [statement](#) about the clinical effects of Remdesivir at the weekend is a contradiction to the report on the WHO website and noted in our last report and was issued by NIH on 30 April. The NIH report describes how hospitalised patients with advanced COVID-19, and given the drug recovered faster than similar patients given a placebo.

Obviously, we will have to wait for the full paper referred to by NIH to be published. Meanwhile we have the Lancet paper on which the WHO report was based. The authors did not detect significant reductions in COVID-19 RNA loads in the respiratory tract and sputum. This was somewhat surprising because in in vitro experiments using Vero E6 cells and also in human nasal and bronchial airway epithelial cells 20µM of drug reduced viral titres by more than 7 logs of virus at 48hrs. This is powerful inhibition of viral replication in vitro. The NIH report noted that compared to the previous study (The Lancet paper) their study group was less ill when enrolled and was treated somewhat earlier in the disease.

The authors in the Lancet noted that the target population which should have been involved was not achieved because the stringent public health measures in Wuhan had marked reductions in new patient presentations in mid-March, so it is possible that earlier treatment might have provided extra benefit. This is a common occurrence, for example, with influenza and antivirals, like neuraminidase inhibitors where the guide rule is ‘earlier the better’. The authors noted that the pharmacokinetics of the drug, and especially the concentration of the active metabolite, the triphosphate, is unknown. It would seem that higher doses of the drug could be used in future clinical trials. Also, they were unable to test for any drug resistance. Drug resistant mutants were selected in vitro but still remain susceptible to higher doses of drug, and, moreover, showed impaired fitness. This means that such mutants may not spread and, in theory could be outgrown by drug-susceptible virus.

### **Postscript: personal non-virological observations**

A personal piece by an A&E consultant in Coventry notes that the latest report from the Intensive Care National Audit and Research Centre recorded that people admitted to ICU's have a mean age of 59. Before arrival at the hospital, 92% lived their lives independently and the same percentage did not have a severe co-morbidities. However, only 50% left ICU alive. If mechanical ventilation is applied, only one third survive.

### **A social divide of risk in the UK**

The much-respected office of National Statistics (ONS) have published data showing that those living in the poorest parts of England and Wales are dying at twice the rate of those in richer areas. The figures are 55.1 deaths per 100,000 in the most deprived areas, compared with 25.3 in the least deprived areas.

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