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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

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

- No one knows what is going to happen
- Beware of a second peak in this first wave
- Article / Journal roundup
- Update on Texas
- Focus on Brazil
- A View from the Lab: Professor John Oxford
 - Tracking of COVID-19 in the USA - Imperial College London (report 23)
 - A new COVID-19 vaccine by the autumn?
 - A government led assessment of Roche and Abbott diagnostic antibody tests
 - Roche Elecsys anti SARS-CoV-2 assay
 - The Abbott diagnostic test
 - Are politicians 'hiding behind science to cover their errors of judgement'?

NO ONE KNOWS WHAT'S GOING TO HAPPEN

An [opinion piece in the New York Times](#) is prescient and worth reading. Below are selected paragraphs from the article. Dr Mark Lilla, Professor of Humanities at Columbia University in New York, emphasizes that we cannot predict the future.

"But it is a truth that humans have never been able to accept. People facing immediate danger want to hear an authoritative voice they can draw assurance from; they want to be told what will occur, how they should prepare, and that all will be well. We are not well designed, it seems, to live in uncertainty.

"The history of humanity is the history of impatience. Not only do we want knowledge of the future, we want it when we want it.

"When the gods are silent, human beings take things into their own hands. In religions, where the divine was thought to inscribe its messages in the natural world, specialists were taught to take auspices from the disposition of stars in the sky, from decks of cards, dice, a pile of sticks, a candle flame, a bowl of oily water, or the liver of some poor sheep. With these materials, battles could be planned, plagues predicted, and bad marriages avoided.

"Our addiction to economic forecasting is far more consequential. Here the footnotes really do matter but politicians and the press encourage magical thinking. The candidate declares: 'My plan will create 205,000 new jobs, raise the Dow 317 points and lower the price of gasoline 15 cents.'

"The public square is thick today with augurs and prophets claiming to foresee the post-COVID world to come. I, myself, who find sundown something of a surprise every evening, have been pursued by foreign journalists asking what the pandemic will mean for the American presidential election, populism, the prospects of socialism, race relations, economic growth, higher education, New York City politics and more. And they seem awfully put out when I say I have no idea.

"I understand their position. With daily life frozen, there are fewer newsworthy events to be reported on and debated. Yet columns must be written, and the 24/7 cable news machine must be fed. Only so much time can be spent on the day's (hair-raising) news conferences or laying blame for decisions made in the past or sentimental stories on how people are coping. So journalists' attention turns toward the future. But the post-COVID future doesn't exist. It will exist only after we have made it.

"A dose of humility would do us good in the present moment. It might also help reconcile us to the radical uncertainty in which we are always living. Let us retire our prophets and augurs. And let us stop asking health specialists and

public officials for confident projections they are in no position to make — and stop being disappointed when the ones we force out of them turn out to be wrong.”

BEWARE OF A SECOND PEAK IN THIS FIRST WAVE

In a [Press Conference](#), Dr. Mike Ryan, the Executive Director of the WHO Health Emergencies Program, today clarified the difference between pandemic “second waves” and “second peaks in the first wave.”

Dr. Ryan explained that epidemics often come in waves separated by months or a year. However, he emphasized that just because case numbers are currently going down in many countries, this is due to “pressure that we have put on the virus” due to severe public health interventions; this is not the natural course of the disease. He said numbers will not necessarily continue to go down giving us months to prepare for a second wave; instead, if we “ease pressure on the virus” we could get a second immediate peak in this first wave.

Dr Ryan emphasized that countries with declining cases should continue to develop the public health and social measures, the surveillance measures, the testing measures and a comprehensive strategy to maintain pressure on the virus.

ARTICLE / JOURNAL ROUNDUP

COVID-19 patients are no longer infectious after 11 days of getting

COVID-19 patients are no longer infectious after 11 days of getting sick even though some may still have a positive PCR test, according to a new study by infectious disease experts in Singapore.

A positive test “does not equate to infectiousness or viable virus,” a [joint research paper](#) by Singapore’s National Centre for Infectious Diseases and the Academy of Medicine, Singapore said. The virus “could not be isolated or cultured after day 11 of illness.” The paper was based on a study of 73 patients in the city-state.

Infectious SARS-CoV-2 only found in throat swabs prior to eight days from developing symptoms.

[Another group](#) have studied the ability of SARS-CoV-2 virus obtained from throat swabs to infect Vero cell lines. They found that infectivity was only observed when symptom onset to test was less than eight days.

COVID-19 starting to affect rural America

There are [reports](#) of a significant increase of COVID-19 cases in American rural areas, which also have few hospital beds. Sixty million Americans live in these areas where the populations are poorer and older than those of urban areas. In addition, immigrants and undocumented workers tend to live in rural areas.

Rural counties now have some of the highest rates of COVID-19 cases and deaths in the country signaling a new phase of the pandemic as states lift stay-at-home orders.

“It is coming, and it’s going to be more of a checkerboard,” said Tara Smith, a professor of epidemiology at Kent State University in Ohio. “It’s not going to be a wave that spreads out uniformly over all of rural America; it’s going to be hot spots that come and go. And I don’t know how well they’re going to be managed.”

High levels of antibodies in infected hospital staff in France

A [non-peer reviewed](#) paper on 22 May finds that antibodies against SARS-CoV-2 coronavirus were detected in virtually all hospital staff sampled from 13 days after the onset of COVID-19 symptoms, in a new study based on hospital staff with mild disease in eastern France. The neutralizing activity of the antibodies increased over time.

This study used the “S-flow assay” which the study says has a high sensitivity.

Four volunteers develop significant reaction to second dose of Moderna vaccine

In the 45-person Moderna study, four participants experienced what are known as “Grade 3” adverse events to the second dose, which was ten times stronger than the first. These side effects are severe or medically significant but not immediately life-threatening.

One volunteer [has described the incident](#). Twelve hours after receiving his second dose, he developed a fever of more than 103 degrees, sought medical attention, and, after being released from an urgent care facility, fainted in his home. He recovered within a day.

Such side effects are “noteworthy, but it doesn’t stop the train,” said William Schaffner, a professor of preventive medicine and infectious diseases at Vanderbilt University Medical Center. The goal of studies is to establish a threshold at which something might go wrong.

Wuhan tested 7M people in 12 days

Authorities in Wuhan have [tested nearly seven million people in 12 days](#) after several infections prompted fears of a second wave. A total of 6.68 million people underwent nucleic acid tests, of which 206 asymptomatic cases were reported. Wuhan’s mass testing campaign is part of China’s efforts to prevent the resurgence of the epidemic.



Following testing, the results are automatically displayed at the bottom of the QR code app which is mandatory for all residents. A green QR code means that the resident lives in a low-risk or non-infected area and can travel freely around the city.



Image: [ABC](#)

Sweden “wrong” not to shut down, says former state epidemiologist

[The Guardian reports that](#) the predecessor of Sweden’s state epidemiologist, Anders Tegnell, now believes Sweden should have had tougher restrictions in the early stages of the pandemic to bring the virus under control. She says she has changed her mind due to the relatively high death toll in Sweden compared to neighbours Denmark, Norway and Finland. Sweden has run the least restrictive strategy of any developed country, leaving lower secondary schools, bars, restaurants, shopping malls and gyms open, and allowing gatherings of up to 50 people. It has placed heavy reliance on the social responsibility and common sense of the public.

Missouri health officials call for self-quarantine of partiers

Following [images](#) of a packed pool party at the Lake of the Ozarks in Missouri, St. Louis County has issued a travel advisory and the Kansas City Health Director has called for self-quarantine of those who attended.



Image: [Yahoo News](#)

Social distancing ignored on Air New Zealand flight



A passenger on an Air New Zealand flight who remained seated on landing, has released photos of other passengers shoulder to shoulder in the aisle. New Zealand has been one of the most successful countries in suppressing the pandemic and now have only 28 active cases of COVID-19, with one person in hospital.

Roughly half the Twitter accounts pushing to “Reopen America” are bots

[Carnegie Mellon University researchers](#) analysed over 200 million tweets discussing COVID-19 and related issues since January and found that roughly half the accounts – including 62% of the 1,000 most influential retweeters – appeared to be bots.

"We're seeing up to two times as much bot activity as we'd predicted based on previous natural disasters, crises and elections," said Kathleen Carley, a Professor in the School of Computer Science's Institute for Software Research and Director of the Center for Computational Analysis of Social and Organizational Systems(CASOS) and Center for Informed Democracy & Social - Cybersecurity (IDeaS.)

"Carley said multiple factors contribute to the surge. First, more individuals have time on their hands to create do-it-yourself bots. But the number of sophisticated groups that hire firms to run bot accounts also has increased. The nature of the pandemic matters too. Because its global, it's being used by various countries and interest groups as an opportunity to meet political agendas."

[From Wikipedia:](#) A Twitter bot is a type of bot software that controls a Twitter account via the Twitter API. The bot software may autonomously perform actions such as tweeting, re-tweeting, liking, following, unfollowing, or direct messaging other accounts.

SARS-CoV-2 RNA concentrations in primary municipal sewage sludge as a leading indicator of COVID-19 outbreak dynamics

A [non-peer reviewed](#) article "has produced a SARS-CoV-2 RNA concentration time course in primary sewage sludge during a COVID-19 outbreak in the New Haven, Connecticut Metropolitan area.

"Approximately 200,000 people are served by the treatment facility and COVID-19 total documented cases by testing rose from less than 29 to 2,609 during the March 19 to May 1, 2020 surveillance period.

"SARS-CoV-2 RNA was detected in all environmental samples and, when adjusted for the time lag, the virus RNA concentrations were highly correlated with the COVID-19 epidemiological curve and local hospital admissions.

"SARS-CoV-2 RNA concentrations were a seven-day leading indicator ahead of compiled COVID-19 testing data and led local hospital admissions data by three days. Decisions to implement or relax public health measures and restrictions require timely information on outbreak dynamics in a community.

"The results demonstrate:

1. The utility of SARS-CoV-2 primary sludge monitoring to accurately track outbreaks in a community and
2. That primary sludge SARS-CoV-2 RNA concentrations can be a leading indicator over other commonly used epidemiology approaches including summarized COVID-19 test results and hospital admissions."

Fomite transmission of rhinovirus and norovirus but not influenza virus shown in new study

A fomite is an inanimate object that, when contaminated with a pathogen (such as bacteria or viruses), can transfer disease to a new host. Especially important are schools, daycare centers, and long-term care facilities which may have high loads of pathogens on inanimate objects.

A [new study](#) has analyzed fomite-mediated transmission through a comparative analysis across multiple pathogens and venues. It looked at direct fomite (e.g., shedding onto fomites) and hand-fomite (e.g., shedding onto hands and then contacting fomites). Three pathogens were examined, influenza, rhinovirus, and norovirus in four venue types. A thorough literature search was conducted.

- The reproductive number (R_0) for the fomite route for rhinovirus and norovirus is greater than 1 in nearly all venues considered, suggesting that this route can sustain transmission
- For influenza, on the other hand, R_0 for the fomite route is smaller suggesting many conditions in which the pathway may not sustain transmission
- The direct fomite route is more relevant than the hand-fomite route for influenza and rhinovirus, compared to norovirus

- The relative importance of the hand-fomite vs direct fomite route for norovirus is strongly dependent on the fraction of pathogens initially shed to hands.

Conclusions:

- Fomite-mediated transmission is an important pathway for the three pathogens examined
- The effectiveness of environmental interventions differs significantly both by pathogen and venue.
- *While fomite-based interventions may be able to lower R_0 for fomites below 1 and interrupt transmission, rhinovirus and norovirus are so infectious ($R_0 \gg 1$) that single environmental interventions are unlikely to interrupt fomite transmission for these pathogens.*

We look forward to similar studies regarding SARS-CoV-2

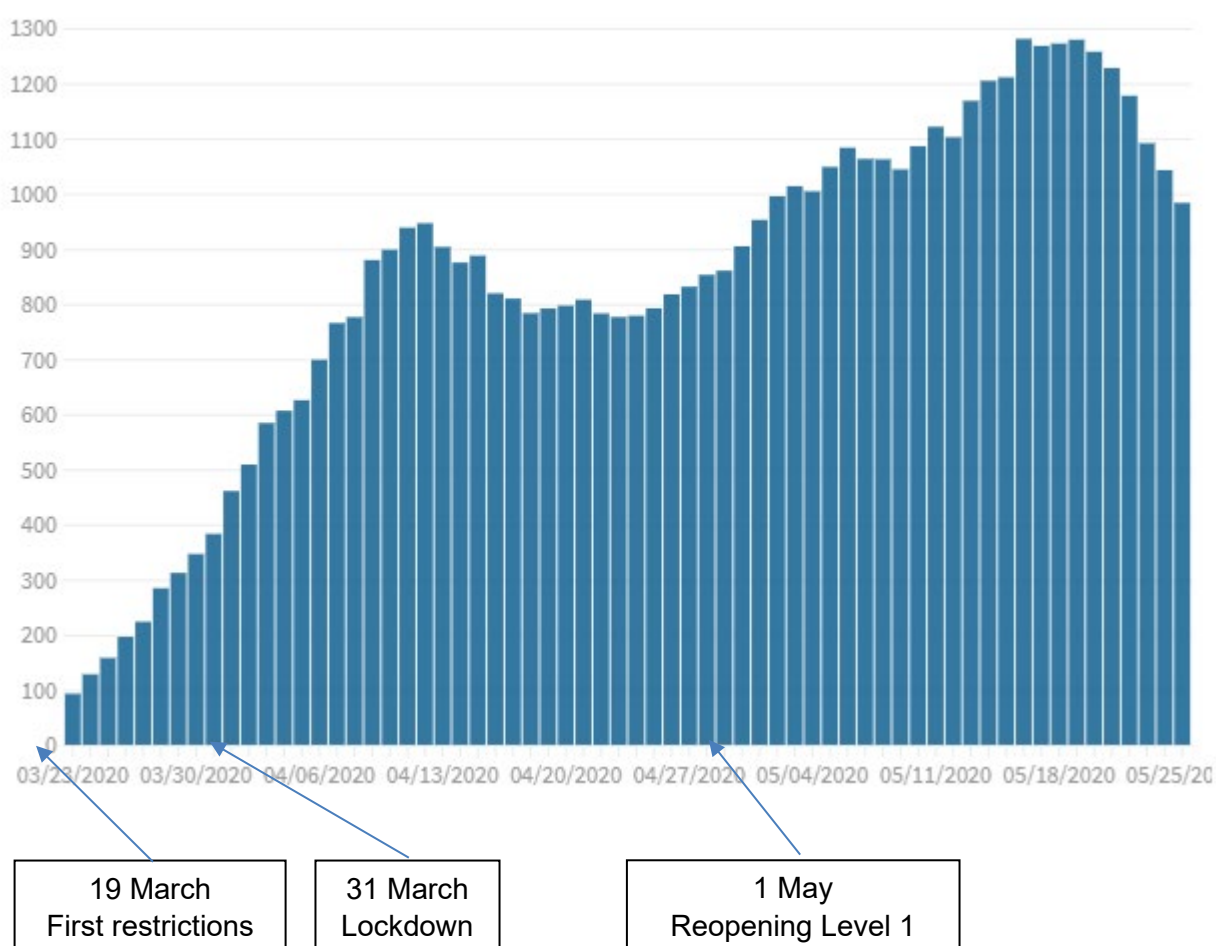
UPDATE ON TEXAS

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

New cases per day

The graph below from the Houston Chronicle shows an apparent decrease of daily confirmed cases from 1,257 to about 975 cases per day over the last week. We will continue to report on Texas as a possible microcosm of the USA. However, daily confirmed cases remains higher than when the re-opening began on 1 May.

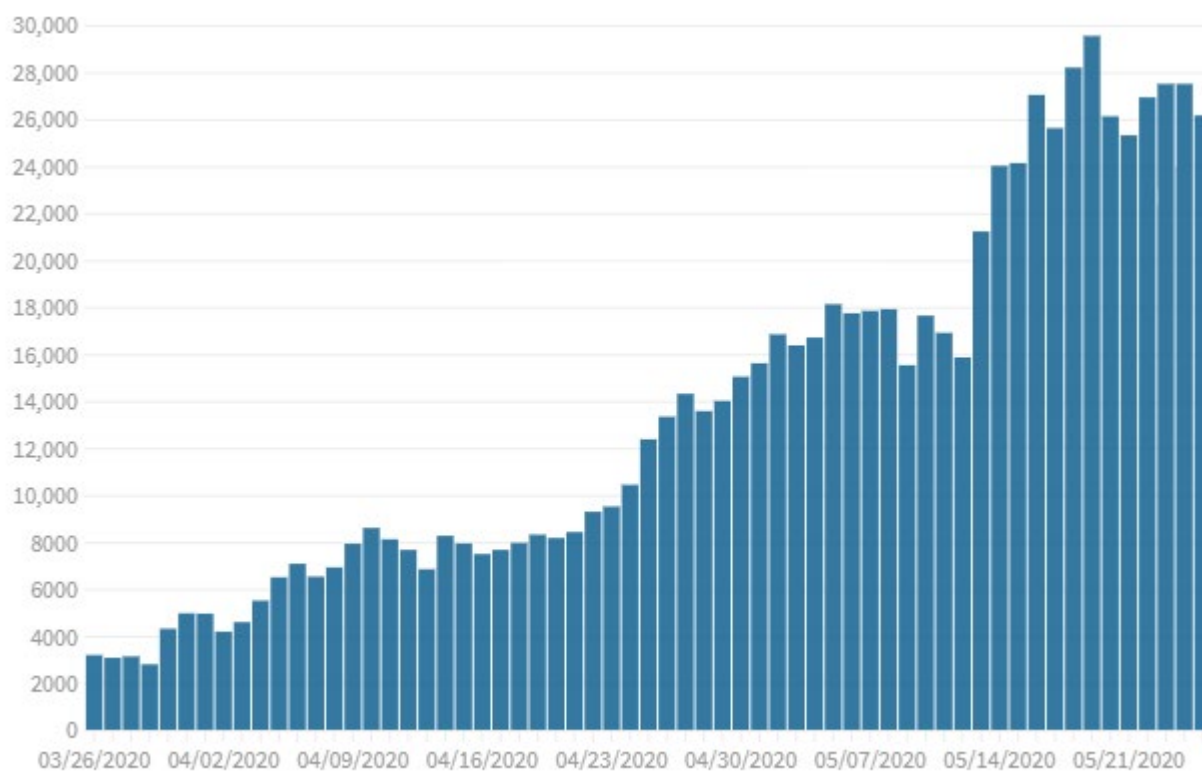
Texas: Seven day rolling average of new confirmed cases: [Houston Chronicle](#)



Tests performed per day

Texas has not yet achieved its goal of 30,000 tests per day

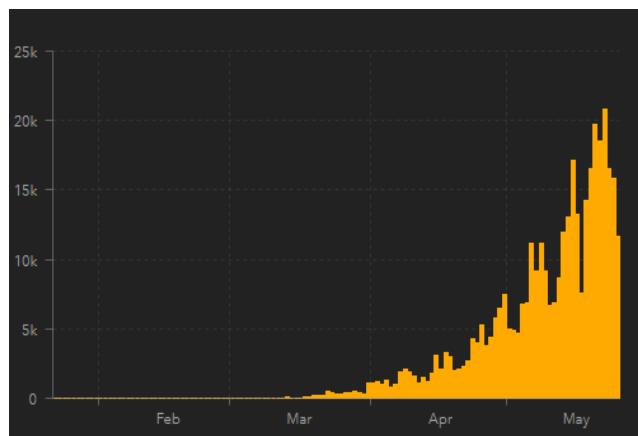
Texas: Rolling average of tests by day: [Houston Chronicle](#)



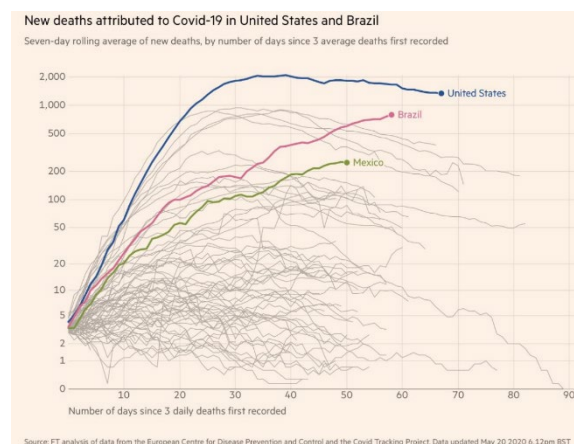
FOCUS ON BRAZIL

Brazil now has 375,000 confirmed COVID-19 cases, second only to the USA.

- Brazil is confirming approximately 16,000 new cases per day; there have been 24,000 deaths
- On Monday, Brazil registered 807 deaths compared to 620 in the US
- A new [University of Washington study](#) warns that the total death toll for Brazil could climb five-fold to 125,000 by early August.



Graph: [John Hopkins](#)



WHO warning

The WHO has warned Brazil against reopening its economy before performing more testing to control the spread of the COVID-19 pandemic.

WHO executive director Michael Ryan said in a news conference that Brazil's "intense" transmission rates meant it should keep some sort of stay-at-home measures in place, regardless of negative impacts on the economy.

However, Rio de Janeiro Mayor Marcelo Crivella, an evangelical bishop, announced he was including religious institutions in the list of "essential services" and Sao Paulo Governor Joao Doria ruled out a full lockdown in Brazil's largest state economy and said he would start loosening restrictions on 1 June.

The USA yesterday moved the timing of travel restrictions from Brazil to 11.59pm, 26 May. The ban applies to foreigners traveling to the US if they have been in Brazil in the preceding two weeks.

Infections have been [reported](#) in thousands of residents of Paradise City, Sao Paulo's second biggest favela with 100,000 residents. In addition, thousands of freshly dug graves are appearing in Sao Paulo's cemeteries.



Image: [AP](#)

Politics has played a big part in the evolution of COVID-19 in Brazil, as it has in many countries.

President Jair Bolsonaro downplayed COVID-19 for months, calling it "a little flu" that Brazilians were uniquely suited to overcome. In February, Julio Croda, the Chief Infectious disease Advisor to Brazil's Health Ministry developed a detailed policy on social distancing. This was rejected by President Bolsonaro, after which Mr Croda resigned. President Bolsonaro has attended anti-lockdown protests in person.

Health experts say the disease is spreading rapidly amongst the indigenous populations, including across the border to Peru and Colombia. In these areas, many hospitals are severely understaffed, under-resourced and far away from many isolated rainforest communities. Critical COVID-19 patients are being evacuated by plane to the only intensive care units in the vast region, but services are severely stretched.

The Mayor of Manaus called what was happening to his people a "crime against humanity". "I fear genocide and I want to denounce this thing to the whole world. We have here a government that does not care about the lives of the Indians."

A VIEW FROM THE LABORATORY: PROFESSOR JOHN OXFORD

Tracking of COVID-19 in the USA - Imperial College London (report 23)

It would appear from [this analysis](#) that the epidemic is not under control in most US states. The Imperial group deduces that "increased morbidity following the relaxation of social distancing could result in doubling of deaths". Nationally 4.1% of people have been infected, varying from 0.2% in Montana to 16.6% in New York. The R_0 is 2.2 on average, varying from 0.3 in Montana to 5 in New York. The USA has the highest new virus mortality of all countries. The authors estimate that twice the current number of deaths are to be expected. "As states begin to reopen careful surveillance and monitoring are essential to avoid a deadly second wave."

A new COVID-19 vaccine by the autumn?

An important topic over the summer will be developments in the COVID-19 vaccine. Could it induce protection against disease or illness, or less likely could it like some coronavirus vaccines of domesticated animals, make the disease worse?

Should we focus on the old well investigated methods of virus passage at low temperatures to select for virus mutations where the "new" virus does not grow at 37°C in the lung and so replicates in the nose and upper airways where the temperature approximates to 33°C. Such viruses for live attenuated vaccines are called "temperature sensitive" (ts) and "cold adapted". Examples are Flumist and live polio (Sabin). Successful live vaccines are mumps, rubella, yellow fever, polio, influenza.

On the other hand, there has been great success with simply growing a virus in cell culture and the inactivating with formalin or B-propiolactone. This is the "killed virus vaccine" approach used by Salk for his polio vaccine.

Over the years, scientists have explored the use of both virus RNA and DNA, and the use of another virus to carry the antigen (in the current case, the COVID-19 spike gene) into the cell. This is the molecular approach at the Oxford Vaccine Institute and the carrier is a chimpanzee adenovirus. Hence the vaccine has "Ch" in its name. This is necessary because all of us have been infected by, and are immune to, one or more of the 35 or so human respiratory or enteric (gut) adenoviruses from childhood onwards.

Nationalism as well as big business can enter the equation and sometimes will help by giving an impetus or sometimes impede. Sometimes the road to a successful vaccine is difficult. We are still struggling to find a vaccine

against HIV. In fact, in 1990, the playing field of potential HIV vaccines included two killed vaccines, Salk and our own at Retroscreen Virology in London. There was a plethora of experimental vaccines, with many novel methods being set up, all of them completely untested.

Louis Pasteur produced a live rabies vaccine, attenuated for virulence by the 3rd method, routine passage in another species, this time in the brain of rabbits. Nowadays, an RNA virus like COVID-19 is being altered by inserting nucleotides. But which ones will attenuate?

In the absence published data, we are already besieged with conflicting results. Bill Haseltine, an established scientist and Professor at the Harvard Medical School, has cast some gloom over the macaque data from the Oxford Institute compared to a whole virus inactivated vaccine from SinoVac, a large Chinese Company. According to Haseltine the SinoVac vaccine protects the macaques against pneumonia and disease where the UK vaccines does not do both. But I hope both vaccines go forward to “success”.

A government led assessment of Roche and Abbott diagnostic antibody tests

These antibody tests, alongside PCR, may be the research success story of the COVID-19 outbreak.

1. Roche Elecsys anti SARS-CoV-2 assay

The test was carried out by the Diagnostic Support Group at Porton Down, near Salisbury. This is a well-established virology group researching vaccines as well as diagnostics. The staff are government employees. The test incorporated 93 samples from COVID-19 convalescent patients and also 472 negative serum samples. These were from a variety of sources but would have contained antibody to epidemic coronavirus which correlate and infect perhaps 20% of the community as a common cold. These samples were negative in the assay which in theory (except from the rather small sample!) gives a specificity of 100%. Thus, the kit is designed to detect specific antibody to COVID-19 and not antibody to related coronavirus and it does this for the limited number of serum samples. Thus, they have deduced a specificity of 100% which I am sure pleased the Roche scientists!

The sensitivity of the assay is 83.87%. This is more complicated because specific antibody usually increases as time progresses after infection (e.g. 1-6 months) and then may decrease. Not unexpectedly, serum samples taken less than 20 days after the onset of symptoms gave the lowest “sensitivity” but with an interval of 40 days, the sensitivity was 100%. At 21 days, we have a figure of 87.7% and overall, 83.87%. The Porton group conclude this is in line with the information from Roche and with other ELIZA kits assayed. Personally, I was quite pleased with this result.

2. The Abbott diagnostic test

This second test from Abbott was evaluated at Public Health England laboratories at Colindale in North London for the UK government. Ninety-six sera from convalescent patients and 759 “negative” samples were tested. All the negative samples tested negative to give a specificity of 100% whereas the sensitivity was 92.71%. At 14 days this figure was 93.9 and at 21 days post symptom onset was 93.4% in line with other ELIZA tests.

In conclusion, both these assay systems will be most helpful to delineate the percentage of persons who have been infected and to analyse vaccine responses.

The next step is to determine the longevity of this antibody response, and the most important practical question “does this antibody give protective immunity”?

Are politicians “hiding behind science to cover their errors of judgement”?

Brian Cox is a dynamic and high-profile astrophysicist and is probably the best-known scientist in the UK. He is Professor of Particle Physics at the University of Manchester and, in essence, is accusing Ministers in the UK of using the mantra of “following the science” as a single defense to justify their actions or lack of action with COVID-19.

Professor Cox was giving a talk at the Science Media Centre in London. I am a member of this group which essentially puts journalists with media queries together with a scientist to attempt to answer them.

Professor Cox is asking for more clarity on the decisions and the scientific evidence to be placed on the table, and I support this. It is very tempting to blame the science if a decision is made which turns out to be wrong. My own criticism is that this rather cosy arrangement is too nationalistic and often talks of “British vaccines”, and “World Class British Science”.

I would like to have a few very real experts on coronavirus, perhaps from Berlin, the USA and Rotterdam on the government committees. England has always been rather strong on influenza, but not, at least recently, on coronavirus. This is a pity because the first human coronavirus was identified at the Common Cold Unit in Salisbury in the mid-60's and the first electron micrographs were taken there to show the “corona” of spikes and hence the name of the family on everyone's lips.

Cox viewed the “curve of understanding” of COVID-19 to be too early to really exist. Therefore, to argue “we are following the science” is too simplistic. **Comment from DQ:** this aligns with the earlier section, “No one knows what is going to happen”.

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