

INTERNATIONAL SOS WEEKLY SCIENTIFIC UPDATE

Focussing on immunity and vaccine development

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23 October 2020

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1. DOWN SYNDROME HAS 10 TIMES THE RISK OF COVID-19 DEATH

Down Syndrome is associated with immune dysfunction, congenital heart disease, and pulmonary pathology. A study released in the [Annals of Internal Medicine](#) on 21 October 2020 found a 4-fold increased risk for COVID-19-related hospitalization and a 10-fold increased risk for COVID-19-related death in persons with Down syndrome. The study noted people with Down Syndrome are a group that is currently not strategically protected.

2. WHAT IF THE COVID-19 VACCINE ONLY WORKS HALF THE TIME?

Multiple coronavirus vaccines are being developed. It is very likely that some vaccines will be approved soon - and be widely available by the end of 2021. The FDA (US Food and Drug Administration) will not grant approval for a vaccine that has less than 50% efficacy.

For COVID, it is thought that 60-70% of the population being immune will constitute herd immunity, which will slow or stop the transmission of coronavirus. The level of immunity is a function of the percentage efficacy of the vaccine and the percentage of the population receiving the vaccine.

Vaccine efficacy	Population vaccinated	Population immunity	Herd immunity achieved?
100%	100%	100%	YES
80%	80%	64%	POSSIBLY
70%	90%	63%	POSSIBLY
60%	70%	42%	NO
55%	80%	44%	NO
50%	70%	35%	NO

Given the level of vaccine hesitancy, we hope for vaccines with an efficacy of at least 80%.

A [new survey in JAMA Network Open](#) evaluating factors predictive of whether people would accept the vaccine found that vaccine efficacy was the No. 1 determinant. People were, on average, 16 percent more likely to accept a vaccine with 90% efficacy compared to one with 50% efficacy.

3. AN UNINTENTIONAL AND UNFORTUNATE HERD IMMUNITY EXPERIMENT

[The Washington Post](#) reports on the folly of herd immunity. It described “what happened in La Crosse, Wisconsin, after thousands of college students arrived in the small city for fall classes. The students packed bars, disdained masks and generally spread the coronavirus among each other. Then the virus spread throughout the community, and ultimately into La Crosse's nursing homes, leaving 19 dead, where previously there had been no deaths.”

4. LAZARUS: SCORES PUBLIC FAITH IN A GOVT'S COVID-19 LEADERSHIP

To better understand public perceptions of government responses to COVID-19, researchers developed LAZARUS, a survey tool and methodology that scores public faith in a government's COVID-19 leadership.

Those surveyed were asked to rank the following ten questions from “Completely agree” to “Completely disagree”.

1. The government helped me and my family meet our daily needs during the COVID-19 epidemic in terms of income, food, and shelter.
2. The government communicated clearly to ensure that everyone had the information they needed to protect themselves and others from COVID-19, regardless of socioeconomic level, migrant status, ethnicity or language.
3. I trusted the government's reports on the spread of the epidemic and the statistics on the number of COVID-19 cases and deaths.
4. The government had a strong pandemic preparedness team that included public health and medical experts to manage our national response to the COVID-19 epidemic.
5. The government provided everyone with access to free, reliable COVID-19 testing if they had symptoms.
6. The government made sure we always had full access to the healthcare services we needed during the epidemic.
7. The government provided special protections to vulnerable groups at higher risk such as the elderly, the poor, migrants, prisoners and the homeless during the COVID-19 epidemic.
8. The government made sure that healthcare workers had the personal protective equipment they needed to protect them from COVID-19 at all times.

9. The government provided mental health services to help people suffering from loneliness, depression and anxiety caused by the COVID-19 epidemic.
10. The government cooperated with other countries and international partners such as the World Health Organization (WHO) to fight the COVID-19 pandemic.

Results: Average Score by Country (out of 100)

- China 80.48
- South Korea 74.54
- South Africa 64.62
- India 63.88
- Germany 61.32
- Canada 61.00
- Singapore 57.55
- Italy 51.71
- United States 50.57

These results may well be seminal in predicting national levels of “vaccine hesitancy”.

Read more at [PLOS ONE](#).

5. MAYO CLINIC RELEASES HEALTH PASSPORT APP

The [Mayo Clinic](#), in partnership with the digital health start-up Safe Health Systems, has launched a new health and connected diagnostics platform that can be used to store COVID-19 testing and vaccination data, as well as test results for sexually transmitted diseases (STDs) and other medical conditions.

6. TRAVEL BETWEEN GUANGDONG AND MACAU USING BLOCKCHAIN

The [South China Morning Post](#) (Hong Kong) reports that more than “17 million people have travelled between Macau and China’s southern Guangdong province since May using a mutually recognised QR health code system. The critical technology used: blockchain.

“Blockchain technology is seen as a secure way to transfer data as it stores records in a network of computers instead of a centralised system. Each new record is linked to previous ones, making it extremely difficult for anyone to make changes.

“The mainland China-Macau health code system, based on technology by Chinese open-sourced blockchain platform FISCO BCOS and WeBank, a fintech developer backed by Chinese internet giant Tencent Holdings, provides a solution to a major challenge to cross-border travel’, FISCO BCOS said in a press release on Monday.

“Health authorities in Chinese mainland and Macau need to verify the health information submitted by users crossing the border and yet they are not supposed to exchange data directly with each other to stay in compliance with their corresponding regulations,’ the blockchain platform said.”

7. GLOBAL SURVEY RESULT: MOST PEOPLE WOULD GET A COVID-19 VACCINE

Results of an international survey of 13,426 people in 19 countries to determine potential acceptance rates and factors influencing acceptance of a COVID-19 vaccine have been published in [Nature](#).

The study showed that most people would get a COVID-19 vaccine if their government or employer recommended it.

In most of the 19 countries surveyed in the study, current levels of willingness to accept a COVID-19 vaccine are insufficient to meet the requirements for community immunity.

Of the participants, 71.5% reported that they would be very or somewhat likely to take a COVID-19 vaccine, and 61.4% reported that they would accept their employer's recommendation to do so.

Differences in acceptance rates ranged from almost 90% (in China) to less than 55% (in Russia). Respondents reporting higher levels of trust in information from government sources were more likely to accept a vaccine and take their employer's advice to do so.

8. EUROPE, NORTH AMERICA SHOULD LEARN FROM ASIA ON COVID-19

In a [WHO Press Conference](#) on 19 October, Dr Mike Ryan, Director of the World Health Organization's Health Emergencies Programme said, "Europe and North America should follow the example of Asian states by persevering with anti-COVID measures and quarantining anyone who comes into contact with infected people.

"Over recent months, authorities in Australia, China, Japan and South Korea had reduced the spread by detecting cases, isolating them and quarantining contacts.

"In other words, they ran through the finish line and beyond and they kept running, because they knew the race wasn't over, that finish line was false. Too many countries have put an imaginary finishing line and when they cross this may have decelerated some of their activities.

"The countries in Asia, South Asia, the Western Pacific that have been successful to my mind have really continued to follow-through on those key activities.

"Asia's success is their ability to find the cases and the contacts; maybe not all the cases but enough to break the chains of transmission."

9. INDIA AT HEART OF GLOBAL EFFORTS TO PRODUCE COVID VACCINE

[The Guardian](#) reports that, "As the largest global supplier of drugs and producer of 60% of the world's vaccines, India has long been known as the 'pharmacy of the world'.

"A deal has been struck for the Serum Institute of India to produce 1 billion doses of the Oxford/AstraZeneca vaccine. In anticipation of its success, the Serum Institute has already begun production of almost 2 million doses of the vaccine.

"This week, the Serum Institute of India said it was confident the AstraZeneca vaccine would be ready by December and would be licensed for distribution in India by March.

"The Serum Institute also began human trials on an intranasal COVID vaccine this week."

10. PFIZER VACCINE INTERIM ANALYSIS UPDATE

An article in the [South China Morning Post](#) (Hong Kong) discusses next steps for the BioNTech-Pfizer vaccine candidate. Phase 3 trials are underway with around 38,000 participants in over 120 centres.

“Early data from various trials of the candidate have been submitted to American, European and Canadian regulators, and more will be submitted in coming weeks.

“The first efficacy data ‘read-out’ from the BioNTech-Pfizer trial could be available later this month.

“Data on the first 32 participants who have been infected by the virus will be studied in the first read-out. If 26 or more of them belong to the control group, with six or less who actually received the vaccine, **it would be the first sign of efficacy with statistical significance.**

11. ASTRAZENECA PHASE 3 TRIAL IN THE US MAY RESUME THIS WEEK

[Reuters](#) reports anonymous sources stating that AstraZeneca’s Phase 3 COVID-19 vaccine trial in the United States is expected to resume as early as this week as the U.S. Food and Drug Administration has completed its review of a serious illness.

12. UK PLAN TO BE FIRST TO RUN HUMAN CHALLENGE COVID TRIALS

The [BBC](#) reports that in January 2020 the UK will begin “human challenge” studies where up to 90 healthy people will be deliberately exposed to COVID.

The trials will be run under the auspices of Imperial College London, the Department for Business, Energy and Industrial Strategy, the private company hVIVO, and the Royal Free London NHS Foundation Trust.

The first step is for researchers to use controlled doses of SARS-CoV-2 virus to discover what is the smallest amount that can cause COVID infection in volunteers aged 18 to 30; a so called “virus characterization” study. The aim is to study the disease COVID in a controlled environment.

Later phases may include exposing vaccinated and non-vaccinated subjects to the virus. The Government is putting £33.6m towards the study.

13. CHINA HAS VACCINATED 60,000 PEOPLE WITH NO ADVERSE REACTIONS

[The New York Times](#) reports that “‘China has vaccinated 60,000 people against the coronavirus and none of them have experienced any adverse reactions,’ a senior Chinese official said. This has all happened before the completion of late-stage trials.

“The figures came from Tian Baoguo, a senior official at China’s Ministry of Science and Technology, who spoke at a news conference. “Initial results show that they are safe,” he said.

“China has four vaccine candidates in Phase 3 trials, the last stage of testing before regulatory approval. Because the outbreak is largely under control in China, these trials are conducted in more than 10 countries.”

14. MODERNA EXPECTS INTERIM RESULTS FROM VACCINE TRIAL IN NOVEMBER

Speaking at the [Annual Tech Live](#) conference, Moderna's CEO Stephane Bancel said that he expects interim results from its coronavirus vaccine trial in November and that the United States government could approve the drug for emergency use in December.

Moderna started a 30,000-person Phase 3 study in July in the US and enrollment is nearly complete.

15. US STATES GET READY FOR COMPLEX COVID VACCINE PLANS

[WebMD reports](#) that "the CDC had set a deadline of this past Friday for all 50 states, nine territories, and five large cities to submit their draft plans to distribute the vaccine.

"We all know that the goal is not to have a safe vaccine sitting on the shelf, but to have a program to administer the vaccine safely and effectively as another tool to end the pandemic," Nancy Messonnier, MD, director of the CDC's COVID-19 vaccine planning unit, said on an Oct. 5 CDC planning call.

"The CDC will review the draft vaccination plans and provide technical assistance.

"There are things about COVID-19 that make this a daunting task — it is a complex and evolving landscape. **There are six vaccines being developed in the US, and they are not interchangeable — there are differences in doses, adverse events for different populations, and storage requirements,**" Messonnier said."

16. NEW OXFORD UNIVERSITY TEST CAN IDENTIFY CORONAVIRUS IN FIVE MINUTES

On 12 October 2020 we reported on a coronavirus test being developed by the University of California Berkley using CRISPR technology with the only point of care technology required being a mobile phones.

Today, scientists at the Oxford University's Physics Department [report](#) they are developing a COVID-19 test that can identify SARS-CoV-2 in five minutes or less.

The methodology uses a convolutional neural network (a form "deep learning algorithm") to distinguish between microscopy images of single intact particles of different viruses.

From a throat swab, the test can rapidly differentiate, with high accuracy, SARS-CoV-2, the virus responsible for COVID-19, from negative clinical samples, as well as from other common respiratory pathogens such as influenza and seasonal human coronaviruses.

The speed in returning results means the test could be used in businesses, airports, and music venues to help provide coronavirus-free spaces, the release said.

Rapid-result testing is considered an important part of reopening national economies during the pandemic.

17. UNICEF TO STOCKPILE OVER HALF A BILLION SYRINGES BY END 2020

[UNICEF](#) will stockpile 520 million syringes in its warehouses in 2020, the beginning of a larger plan to have one billion syringes available by 2021. The goal is to guarantee initial supply and help ensure that syringes arrive in countries before the COVID-19 vaccines.

The plan includes purchasing boxes for the safe disposal of syringes and mapping out cold chain equipment to ensure delivery of effective vaccines.

18. VACCINES DON'T SAVE LIVES, VACCINATIONS DO

A Discussion Of "Vaccine Hesitancy"

A [WebMD poll](#) in the US in late July 2020 found that fewer than half of the respondents plan to be vaccinated in the first year a COVID-19 vaccine is available, and fewer than a third said they would be vaccinated in the first 90 days.

[Univadis](#) reports that at the 2020 ESCMID** Conference on Coronavirus disease, "Dr Pauline Paterson, Co-Director of The Vaccine Confidence Project, UK, noted that the level of vaccine hesitancy was already high in many countries before the COVID-19 crisis.

"Dr Paterson quoted public surveys asking people if they would take a novel COVID-19, with positive responses varying from 75% from US participants, to 85% in Australia, 62% in France, 75% in Portugal, and 90% from the UK.

"Dr Paterson said key to successful uptake of any COVID-19 vaccine will be reassuring the public about safety, 'with transparency, accountability, and timeliness' as well as a willingness to listen to concerns."

Dr. Paul Offit, Director of the Vaccine Education Center, Philadelphia, addressing the virtual [American Academy of Pediatrics \(AAP\) 2020 National Conference](#) said on 6 October that, "I think we can get a vaccine that's 75% to 80% effective at preventing mild to moderate disease, but that means one of every four people can still get moderate to severe disease, and that is if there is high uptake of the vaccine, which may not be the case. Recent polls have suggested there is considerable concern about the pending vaccines.

"It's somewhat understandable," Offit acknowledged, especially given the 'frightening' language used to describe vaccine development. Terms such as 'Warp Speed may suggest that haste might trump safety considerations."

** European Congress of Clinical Microbiology & Infectious Diseases

On 1 October, [The Conversation](#) defined three types of vaccine hesitancy to be addressed:

1. Those who have concerns about the safety of the vaccine
2. Those un-impressed by science – the classic "anti-vaxxers"
3. The environmentally concerned - a small but growing group. An example of their concern is a petition circulating stating that several COVID-19 vaccines in development "use squalene as an adjuvant - a helper ingredient - and that the squalene is sourced from sharks. It is not yet clear whether any of the vaccines in development contain shark squalene, but it is used in other vaccines. If used in adjuvants for COVID vaccines, conservationists warn this will vastly increase the number of sharks that will be killed."

International SOS Explainer: It is generally accepted that the level of immunity in the population (herd immunity) needs to be 60-70% to stop the spread of SARS-CoV-2.

Assuming all immunity is from vaccination, different percentages of vaccine efficacy and population vaccinated give differing levels of herd immunity:

VACCINE EFFICACY	% VACCINATED	HERD IMMUNITY
100%	100%	100%

100%	50%	50%
70%	70%	49%
80%	40%	32%

19. MASKS WILL STILL BE NEEDED AFTER VACCINE IS RELEASED

[Dr. Tom Frieden](#)*** tweeted on 19 October 2020, “A vaccine won’t take COVID off the table. We’ll still need to adapt our lives to reduce risk, find cases and clusters, and wear masks for the foreseeable future.”

The concept that vaccines will not be a total solution was also mentioned by Dr. Paul Offit (see above), “Even after effective vaccines for SARS-CoV-2 are in widespread use, wearing masks will still be advisable to prevent COVID-19.”

***Dr. Tom Frieden: Previous Director of the U.S. Centers for Disease Control and Prevention (CDC), and President and CEO of Resolve to Save Lives, a \$225 million, five-year initiative to prevent epidemics and cardiovascular disease.

20. NHS (UK) IN DISCUSSIONS WITH BMA REGARDING DECEMBER VACCINE PROGRAMME

[Pulse](#), an online magazine for GPs in the UK, reports talks at the “highest levels” around mobilising for a COVID-19 vaccine program from December 2020. “Some sources are putting the chances of the programme being started this year as 50/50.”

The discussions are between NHS England, the British Medical Association (BMA), and other groups over who will be administering vaccines and who will be the first groups to receive the vaccine.

21. US TO USE CVS AND WALGREENS TO VACCINATE LONG-TERM CARE RESIDENTS

[The New York Times](#) reports that the US administration will contract with CVS and Walgreens pharmacies to provide free coronavirus vaccines once they are available to residents of long-term care centers around the country. CVS and Walgreens are the two largest pharmacy store chains in the US

22. INDIA, SOUTH AFRICA ASK WTO TO EASE IP RULES FOR COVID-19

[Associated Press](#) reports that South Africa and India have asked the World Trade Organisation (WTO) to ease international & intellectual property agreements on COVID-19 vaccines, treatments and tests so that developing countries are not left behind.

“The two countries argue...that without a rapid waiver of some existing safeguards for intellectual property rights, some countries - particularly developing ones that have been disproportionately impacted - would find it hard to access vaccines or medicines quickly.

“Activists have warned that a COVID-19 vaccine could be hoarded by rich countries in a race to inoculate their populations first. Some countries, including Britain, France, Germany and the US have ordered hundreds of millions of doses of potential vaccines even before clinical trials have shown they are effective.”

23. WIDESPREAD COVID VACCINE COULD BE READY BY APRIL, FAUCI SAYS

A “safe and effective” coronavirus vaccine may be widely available by April, Dr. Anthony Fauci, Director of the NIAID (National Institute of Allergy and Infectious Disease), said on [CBS Evening News](#) on 15 August.

“That would be predicated on the fact that all of the vaccines that are in clinical trials have been proven to be safe and effective.

“Based on the current clinical trial timelines, researchers will likely know by November or December whether a safe vaccine candidate is ready, he said. A few million doses may be available by then, and a larger number of doses would be available by the end of the first quarter of 2021.”

24. CEPI SELECTS PT BIO FARMA AS A MANUFACTURER FOR A COVID-19 VACCINE

[The Jakarta Post](#) reports that “State-owned pharmaceutical holding company PT Bio Farma has been selected to work with the Coalition for Epidemic Preparedness Innovations (CEPI) as a potential manufacturer for a COVID-19 vaccine.”

“CEPI will use the company’s facility to produce one million doses of a COVID-19 vaccine a year. Production is expected to start between the fourth quarter of 2021 and the first quarter of 2022.

CEPI is a foundation that takes donations from public, private, philanthropic, and civil society organisations, to finance independent research projects to develop vaccines against emerging infectious diseases. CEPI was founded by the Bill and Melinda Gates and aims to deliver two billion doses of potential COVID-19 vaccines to its partner countries by the end of 2021.

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