

INTERNATIONAL SOS WEEKLY SCIENTIFIC UPDATE

Focussing on immunity and vaccine development

Produced by Dr. Doug Quarry
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A. Vaccine Development & Approval

1. Oxford/AstraZeneca COVID-19 vaccine approved in the UK

The Oxford University/AstraZeneca vaccine has been approved in the UK by the [Medicines and Healthcare products Regulatory Authority](#) (MHRA).

To allow as many vulnerable people to be vaccinated as soon as possible, initially one full dose will be given with the second full dose being given within 12 weeks. Because the Oxford vaccine needs only normal refrigeration at 2-8C, a rapid rollout to GP practices and care homes is expected.

The vaccination programme will start on Monday 4 January and pharmacists will eventually be able to give the vaccinations, as they do with influenza shots.

AstraZeneca expects to provide the UK with two million doses a week.

The UK has already given over 800,000 people the Pfizer/BioNTech vaccination.

2. Why the UK is initially using a full dose / full dose AstraZeneca vaccine regimen

The [Guardian reports](#) the UK Medicines and Healthcare products Regulatory Agency (MHRA) saying it is probable that the greater efficacy of the half-dose/full-dose regimen is due to a larger time interval between doses, rather than the size of the dose used.

“Effectiveness was high, up to 80%, when there was a three month interval between first and second doses, which is the reason for our recommendation,” Munir Pirmohamed, Chair of the Commission on Human medicines expert Working Group on COVID-19 vaccines, said at a [news conference](#) on 30 December.

“We also looked at the half dose regimen, which has been publicised quite widely, but we felt that the results were not borne out by the full analysis,” he said.

In November, AstraZeneca announced a [new global trial of its vaccine](#) with the half-dose / full-dose regimen.

3. Sinopharm vaccine candidate 79% effective in Phase 3 trials

The [New York Times reports](#) that Chinese vaccine company, Sinopharm, has said that a [vaccine candidate](#) made by its Beijing Institute of Biological Products arm has been shown to be 79% effective in interim Phase 3 trials.

However, the announcement, only a few sentences long, provided no breakdown of results and left many questions unanswered.

4. AstraZeneca vaccine not ready for quick European approval

[Reuters reports](#) that: “The European Medicines Authority (EMA) will most likely not be able to approve the COVID-19 vaccine developed by drug maker AstraZeneca and the University of Oxford in January, the watchdog’s Deputy Executive Director, Noel Wathion, said.

“They have not even filed an application with us yet’, Wathion said in an interview with Belgian newspaper, Het Nieuwsblad, published on 29 December.”

5. Novavax begins Phase 3 trial in US and Mexico

[Novavax](#) has started a Phase 3 trial of their vaccine in the United States and Mexico.

The trial aims to enroll 30,000 participants between the two countries and will focus on populations with a high-risk of becoming infected, with priority given to subgroups that have been disproportionately impacted by COVID-19.

Novavax differs from the mRNA vaccines as it directly delivers spike protein which has been created in the lab. [Dr Ali Nouri** explains](#).

International SOS comment: While Novavax is behind other vaccine makers, experts agree that at least several vaccines will be needed to end the pandemic.

**Dr Ali Nouri PhD is a molecular biologist and President of the Federation of American Scientists.

6. Promising results in study of Sputnik V vaccine

The Russian Federal Service for Surveillance in Healthcare (Roszdravnadzor) has [published updated instructions](#) (in Russian) for the Sputnik V vaccine. Sputnik V can be given to people over 60 years of age.

The [Tass news agency reports](#) that there is no difference in safety profiles or immune response between men or women, or across different age groups.

[Tass also reports](#) that the head of the Gamaleya Research Center for Epidemiology and Microbiology, which developed the vaccine, states that 85% of people who have been vaccinated in the clinical trials did not have any side effects. Of the 15% of people who did have side effects, these included redness at the injection site, a headache for less than a day, or a mild fever for a couple days.

7. New data to show Oxford/AstraZeneca vaccine to be as effective as Pfizer & Moderna

AstraZeneca chief executive, Pascal Soriot, told the [Sunday Times](#) that researchers have devised a "winning formula" and that will show that the Oxford vaccine is as effective as the Pfizer and Moderna vaccines, protecting 95% of patients and “100% effective” in preventing severe illness requiring hospitalization. Mr Soriot said that the results would be published in a medical journal.

AstraZeneca’s announcement has, however, been received some criticism with [many scientists asking](#) for the data to back the claim.

We reported yesterday that the Oxford/AstraZeneca vaccine may be approved in the UK within days and that the vaccine is a mainstay in global vaccination efforts due to its relatively low cost and ease of storage.

B. Vaccine Distribution

1. Europe starts COVID-19 vaccination

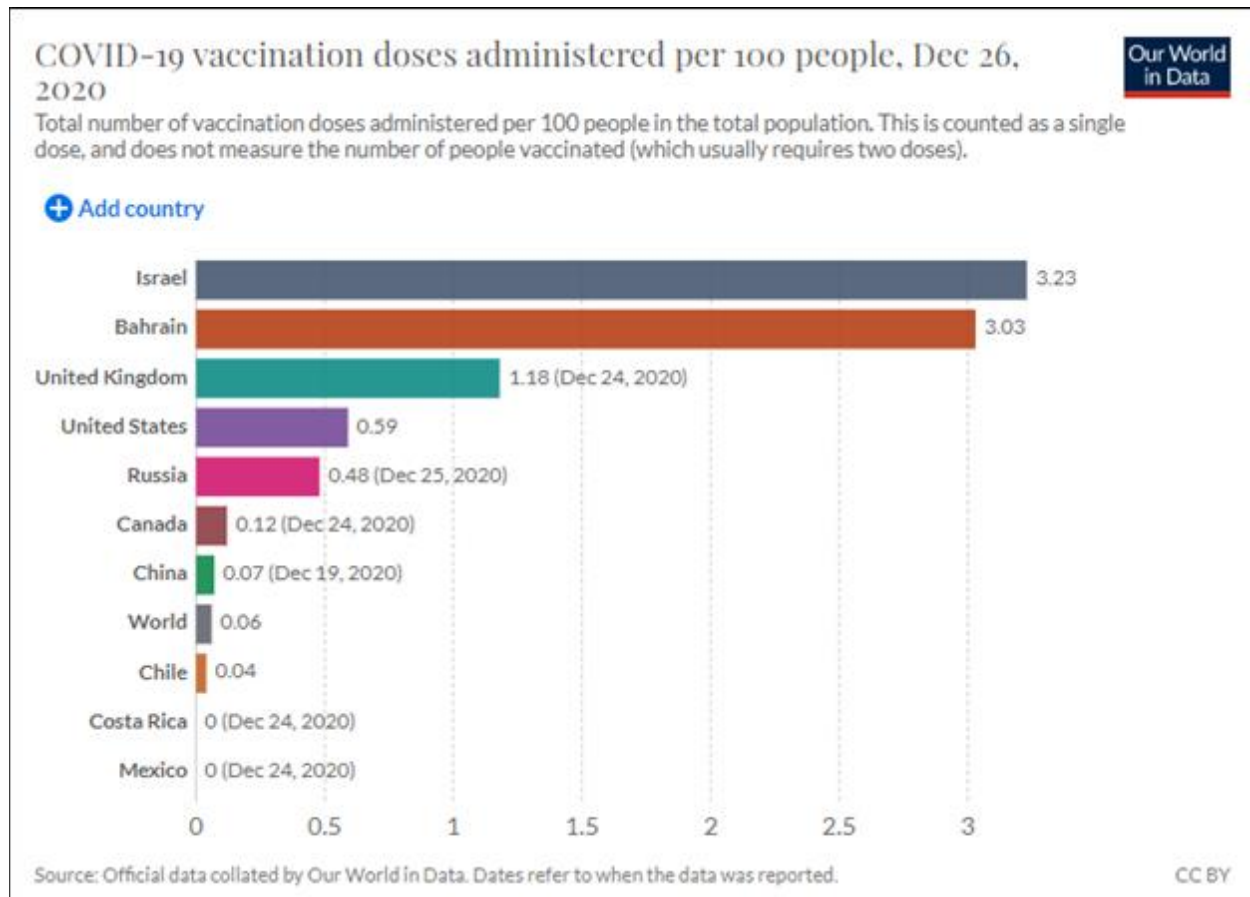
[International SOS](#) (password protected site) reports that many European Union (EU) member countries began their COVID-19 vaccination programs on 26-27 December. The countries include Austria, Belgium, Bulgaria, France, Germany, Greece, Italy, Luxembourg, Portugal, Spain, Hungary and Slovakia.

The vaccination campaigns started after the EU's medicine regulator approved the BioNTech/Pfizer vaccine on 21 December.

The EU has ordered 300 million doses of the BioNTech/Pfizer vaccine (enough for 150 million people) as well as hundreds of millions of doses of yet-to-be-approved vaccines from AstraZeneca, Sanofi-GSK, Johnson & Johnson, CureVac and Moderna.

2. Israel is #1 in vaccination per capita with 3.2% vaccinated and a daily rate of 1.1%

[Eran Segal** has tweeted](#) that Israel has already vaccinated 3.2% of its population, making it the leading country in this category. Bahrain is second, having vaccinated 3.03%. Israel has a population of 1.4 million and is vaccinating about 100,000 people per day. Mr Segal says that this strategy should end Israel's COVID-19 fatalities by March, 2021.



3. Vaccinations with Sputnik V have started in Belarus and Argentina

Both Belarus and Argentina began mass vaccination campaigns with Russian vaccine Sputnik V on Tuesday, 29 December, [News24 reports](#).

The Gamaleya National Research Institute of Epidemiology and Microbiology has previously [announced](#) Sputnik V to be more than 91.4% effective.

A voluntary vaccination program using Sputnik V began in Russia this month, but a recent survey found that only 38 percent of Russians intended to get the vaccine, [reports the New York Times](#).

4. Pfizer will complete the supply of first 200 million doses to the EU by September

[Reuters reports that](#): “The distribution of an initial 200 million doses of the COVID-19 vaccine developed by Pfizer and BioNTech across the European Union will be completed by September, a spokesman for the EU Commission said on Monday.”

5. Guangdong Province vaccinates 180,000 against COVID-19

[Caixinglobal reports](#) that the Guangdong Government has announced that 180,000 people have been vaccinated against COVID-19. The vaccinations were for people with higher coronavirus infection risks and no serious adverse effects were encountered. Those vaccinated included: customs officials, long-

haul drivers, health-care workers, public transport system employees and people who need to go abroad for work or study. The Guangdong Government did not specify which vaccine it is giving to the public.

6. Slow rate of vaccination in the US

[Bloomberg reports](#) that the US is vaccinating only about 200,000 people a day against COVID-19. Operation Warp Speed has distributed 11.45 million doses from Moderna and Pfizer with only 2.13 million people being vaccinated.

Officials blame delicate vaccines with complex storage requirements, uncertainty over the supply of doses and strain on local health agencies already facing historic challenges.

C. Outbreaks and Epidemiology

1. UK variant: more will die, may require school closings and accelerated vaccine rollout

The Centre for Mathematical Modelling at the London School of Hygiene and Tropical Medicine released a [non-peer-reviewed study](#) on 23 December investigating the UK coronavirus B.1.1.7 variant, renamed “SARS-CoV-2 Variant of Concern 202012/01”.

The study found that the variant is 56% more transmissible and warned that new control measures, including closing schools and universities and accelerated vaccine rollout may be necessary. While the study found no evidence that the variant was more deadly than others, “...the increase in transmissibility is likely to lead to a large increase in incidence, with ... hospitalisations and deaths projected to reach higher levels in 2021 than were observed in 2020...”

[Eric Topol](#)** has Tweeted an updated list of 20 countries where the variant has been identified

- Europe: UK, Denmark, Netherlands, France, Italy, Spain, Switzerland, Sweden, Finland, Ireland, Germany, Iceland, Belgium
- Asia: South Korea, Singapore, Japan (+Hong Kong)
- Australia, Canada, Israel, Lebanon

[Adam Kucharski](#)*** has provided a short “[tweetorial](#)” on why a variant that is 50% more transmissible would cause more deaths than a variant that is 50% more deadly.

**Eric Topol is Founder and Director of Scripps Research Translational Institute and a Professor of Molecular Medicine at Scripps Research Institute. He is the medical editor of Medscape.

***Adam Kucharski is an Associate Professor at the London School of Hygiene & Tropical Medicine. A mathematician by training, his work on global outbreaks has included Ebola, Zika and COVID-19

2. Despite strict measures, England’s virus cases are rapidly increasing

We [reported yesterday on a study](#) suggesting that the more contagious UK coronavirus variant may lead to significantly increased case numbers.

The [BBC reports](#) that despite nearly half of England being under the strictest lockdown measures, the rate at which the coronavirus is spreading is of “extreme concern”.

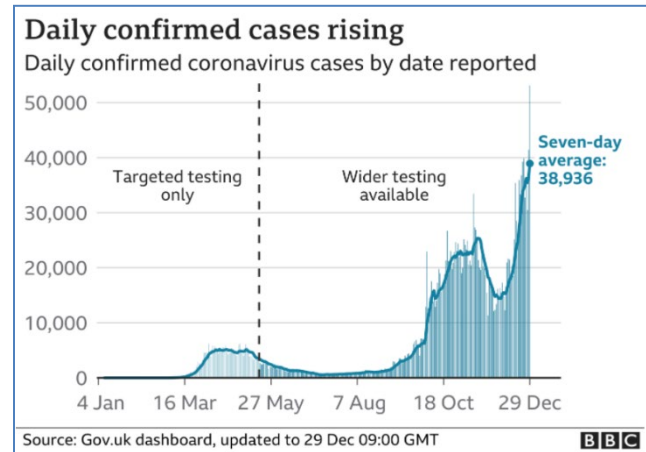
There were 53,135 laboratory confirmed cases on 29 December, the highest figure yet for a single day.

The health system, while having to cope with increased case numbers, is also being asked to speed up its mass COVID-19 vaccination program.

With the expected imminent approval of the Oxford/AstraZeneca vaccine in the UK, the number of doses available will increase dramatically.

International SOS comment: We wait to see how the new more-transmissible variant will affect other countries; however, this development would appear to make rapid vaccination vital to exiting the pandemic.

Breaking news: [CNN reports](#) that the first known case of UK COVID-19 variant in the US is in Colorado



D. Immunity

1. Dr Fauci explains his new estimate of vaccination rate to achieve herd immunity

In an [interview on CNN State of the Union](#), Dr Anthony Fauci*** explained his logic that it would take a vaccination rate of 70-85% to develop herd immunity.

Dr Fauci's bases his calculation on experience with measles vaccination. "Measles is one of the most transmissible infections and the vaccine is about 98% effective. When you get below 90% vaccination rate, you start seeing breakthrough infections against the herd immunity," he said.

"COVID-19 vaccine is about 94-95% effective. As COVID-19 is not as transmissible as measles, I made a calculation that you would need a little less than 90% vaccination rate – and that is how I got to 85%.

"So, I think that 70-85% for herd immunity is reasonable, and most of my colleagues agree."

Dr Fauci went on to discuss the US vaccination timeline

Dr Fauci explained that right now, the US is going through priority groups, front-line health people, essential people in society and the elderly. This part of the program should be completed by late March / early April, then anyone can get vaccinated.

It will take several months to get enough of the general population vaccinated to reach herd immunity, but this should be by the middle to end of summer, he continued.

"By fall, we will have reached herd immunity and can expect a return to some form of normality."

***Dr Anthony Fauci is an American physician and immunologist who has served as the Director of the National Institute of Allergy and Infectious Diseases since 1984.

E. NEWS

1. The GHSI did not measure pandemic preparedness

The [Guardian](#) reports that in October 2019 the [Global Health Security Index](#) (GHSI)** ranked 195 countries according to their capacity to deal with outbreaks of infectious disease. The index placed the US and UK first and second, South Korea ninth, New Zealand 35th and China 51st, while a number of African countries were ranked low on the scale.

In March 2020, Johns Hopkins health policy analyst, Sarah Dalglish, wrote in the [Lancet](#): “The pandemic has given the lie to the notion that expertise is concentrated in, or at least best channelled by, legacy powers and historically rich states.”

The Guardian suggests: “that while many factors that contribute to good epidemic management are measurable - disease surveillance arrangements, emergency response plans, intensive care unit capacity - some are more ephemeral, or hard to discern until they are needed. And yet good leadership, public trust in government and experts, and a sense of solidarity also powerfully shape a population’s vulnerability to infectious disease.”

** The GHSI was developed by the Nuclear Threat Initiative and the Johns Hopkins Center for Health Security in Baltimore, Maryland,

2. Wearing a mask is powerful to stop the spread of droplets

According to a [new British study](#), wearing a mask dramatically decreases the likelihood of transmitting COVID-19. The study found that wearing a mask blocked 99.9% of droplets when talking or coughing and that cloth and surgical masks were effective.

3. Learning to live with COVID-19

In its final [WHO virtual news conference for 2020](#), Dr Mike Ryan**** warned that it may be premature to imagine a world in which COVID-19 has been eradicated.

Dr. Ryan said that SARS-CoV-2 is likely to become endemic in the global population. He explained that vaccinations do not guarantee that infectious diseases will be eradicated. Societies would do better to focus on getting back to full strength, rather than on the "moonshot of eradication", Dr Ryan concluded.

****Dr Mike Ryan is Executive Director of the World Health Organization's Health Emergencies Programme

4. Embraer releases vaccine transport guidelines for its planes

[The transport of COVID-19](#) vaccines requires temperatures as low as -70°C, which are maintained using dry ice. An Embraer aircraft can transport over one hundred thousand vaccines, depending on the aircraft configuration and containers used

[Simplifying Flying](#) reports that managing CO2 levels is the biggest challenge when transporting COVID-19 vaccines. The pilots need to safeguard against carbon dioxide incapacitation or intoxication. It is

recommended that some personnel are onboard in the cabin to keep an eye on the cargo. But it should be the least amount of people possible. Airline employees must be trained and aware of potential CO2 intoxication.