

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. UK trial to mix and match COVID vaccines to try to improve potency

The [Guardian reports](#) that in January 2021 the UK is likely to trial several regimens using one COVID-19 vaccine for the first dose and a different vaccine for the second dose. The idea is to determine if mixing and matching COVID vaccines gives better protection than two doses of the same one.

The trial can only be run with licensed vaccines and will begin if the Oxford/AstraZeneca vaccine is approved in the coming weeks.

Those who take part in January's trial will get one shot of AstraZeneca's vaccine and one of the Pfizer injection. Moderna vaccine will also be included if it receives approval.

2. Hong Kong secures enough COVID-19 vaccines to cover all residents

The [South China Morning Post](#) reports that Hong Kong has purchased another 7.5 million doses of vaccine from AstraZeneca.

Summary

1. The 7.5 million doses of Sinovac vaccine are expected to arrive in January
2. The second vaccine supply comes from Pfizer/BioNTech and was secured via mainland firm Fosun Pharma
3. The AstraZeneca vaccine is expected to arrive by the middle of 2021

3. Sinovac one step closer to approval in Brazil

The [Global Times](#) reports that on 21 December Brazil's National Health Surveillance Agency (Anvisa) "issued a Good Manufacturing Practices (GMP) certification to Sinovac for manufacturing a biological active pharmaceutical ingredient and for its sterile production line.

"The completed step is one of the prerequisites for continuing both the registration process for Sinovac's vaccine and an eventual request for authorization for emergency use of the vaccine that will be presented to Anvisa."

4. Canada grants emergency use to Moderna vaccine

[Health Canada](#) granted emergency use for the Moderna vaccine in people aged 18 and over. The regulatory body granted emergency use to the Pfizer-BioNTech vaccine earlier this month.

5. BioNTech confident despite virus mutation

BioNTech Chief Executive [Ugur Sahin said on 21 December](#) that he was confident a COVID-19 vaccine co-developed by his company would be effective against a variant of the virus that has emerged in Britain.

Countries across the globe have shut their borders to Britain due to fears about a highly infectious new coronavirus strain.

Sahin was speaking shortly after the European Union (EU) provided authorization for vaccine campaigns to begin after Christmas.

6. Oxford says vaccine has better immune response with two full-dose regimen

[NatureMedicine](#) has published results from Phase 1/2 trials of the Oxford vaccine. The vaccine has a better immune response when a two full-dose regimen is used, rather than a full-dose followed by a half-dose booster.

Previous late-stage trial results showed higher efficacy when a half dose was followed by a full dose, compared to a two full-dose regimen, though more work needs to be done to confirm the result.

The university said it had explored a full-dose/full-dose regimen and a full-dose/half-dose regimen, as a possible "dose sparing" strategy.

7. J&J enrolls 45,000 participants for Phase 3 trials

[Johnson & Johnson](#) has fully enrolled 45,000 participants in Phase 3 clinical trials for its Janssen coronavirus vaccine. Data from the trial is expected to be available by the end of January and the company hopes to apply for an Emergency Use Authorization (EUA) from the US Food and Drug Administration (FDA) in February.

The company had earlier this month announced cuts in enrollment for the vaccine trial from its original plan for 60,000, as higher rates of COVID-19 infections amid a worsening pandemic should generate the data it needs with fewer study subjects.

The Johnson & Johnson vaccine is a single-dose adenovirus vector vaccine and does not need to be frozen.

8. CureVac vaccine moves to Phase 3 trials

German biotech firm [CureVac](#) has started a large Phase 2b/3 trial of its two-dose mRNA COVID-19 vaccine. The trial is expected to recruit more than 35,000 participants in Europe and Latin America.

Subjects 18 years of age or older will be enrolled at multiple sites and will receive a two-dose schedule of either the vaccine or placebo.

B. Vaccine Distribution

1. ECDC releases guidance for vaccination priority

The European Centre for Disease Control and Prevention (ECDC) released [strategies](#) for vaccination rollout in the EU and European Economic Area (EEA). As the initial phases begin, demand is expected to exceed supply, and strategies will need to be monitored over time and adapted as necessary.

The four strategies are:

- Strategy 1a: Vaccination of people at risk of severe outcomes due to older age
- Strategy 1b: Vaccination of people at risk of severe outcomes due to preconditions
- Strategy 2: Vaccination of healthcare workers
- Strategy 3: Vaccination of adults 18-59 years of age
- Strategy 4: Universal vaccination (everyone aged above 18 years)

2. Indonesia has ordered six COVID-19 vaccines

The Government has announced ([in Indonesian](#)) that there will be six different COVID-19 vaccine used in the country. These are:

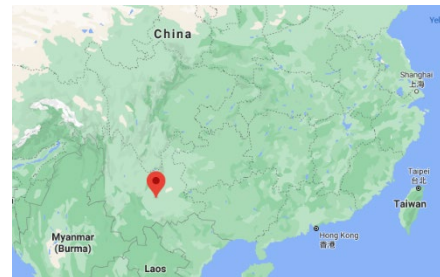
- Locally made “Red and White” vaccine still in development
- Oxford-AstraZeneca vaccine
- Sinopharm vaccine
- Moderna vaccine
- Pfizer-BioNTech vaccine
- Sinovac vaccine

Vaccines will be provided free to the public.

3. China begins construction of first mRNA COVID-19 plant

China’s first mRNA COVID-19 vaccine production plant will be built in Yuxi, Southwest China's Yunnan Province. It will take eight months to complete and is expected to produce 120 million doses of vaccine annually, reports the [Global Times](#).

The vaccine, called ARCoVax, is being co-developed by the Academy of Military Medical Sciences, Suzhou ABOGEN and Yunnan Walvax Biotechnology Co.



4. US to buy another 100 million doses of Moderna vaccine

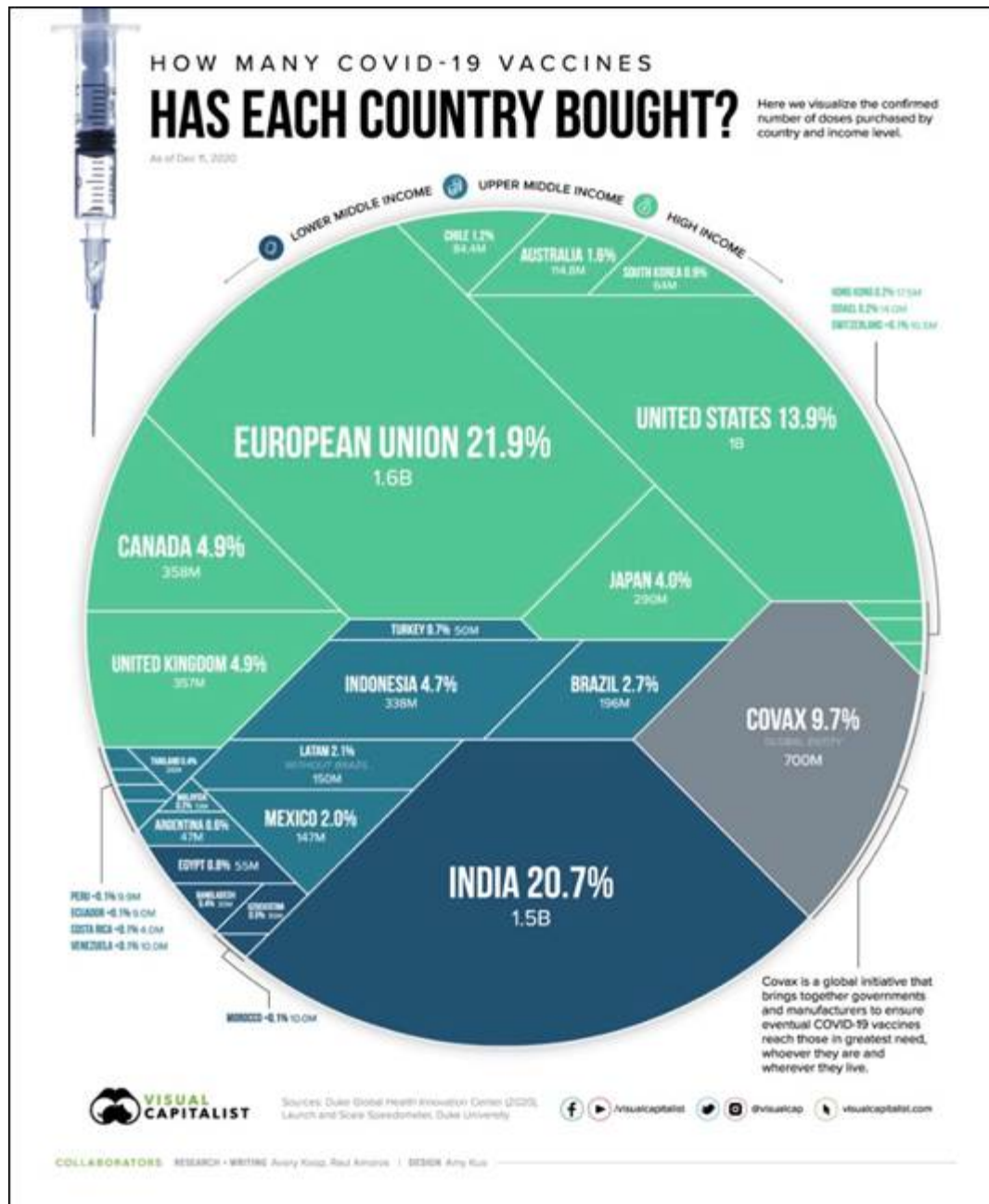
The [US Government](#) will purchase another 100 million doses of the Moderna mRNA vaccine, on top of its original order of 100 million.

Under the agreement, Moderna will leverage its US-based manufacturing capacity to fill, finish and ship vials of vaccine as the bulk material is produced. The additional doses ordered will provide for continuous delivery through the end of June 2021.

5. Visualisations of the international purchase and supply of COVID-19 vaccine

Source: [VisualCapitalist.com](https://visualcapitalist.com)

1.1 How many COVID-19 vaccines has each country bought?



6. Major US companies are lobbying in a scrum for early vaccine

The [Washington Post](#) reports that: “Companies across America - from Amazon and Uber to railroads and meatpacking plants - are lobbying states and the Federal Government to prioritize their workers for early immunization against the coronavirus amid limited supplies of the vaccine.

The Advisory Committee on Immunization Practices (ACIP) [voted](#) on 20 December “to recommend that grocery store workers, teachers, day-care staff, adults over 75 and other front-line workers who cannot work remotely should be the next to get the coronavirus vaccine, followed later by another large batch of essential workers and elderly people.”

C. Outbreaks and Epidemiology

1. Second new variant detected in UK

UK Health Secretary Matt Hancock [has announced](#) that another new coronavirus variant from South Africa has been detected in the UK. He said anyone who had been there in the last two weeks must quarantine immediately.

In relation to this second variant, [Professor Devi Sridar** has Tweeted](#): “Really not good. This strain also affects young, healthy people from reports from S. African hospitals. We really need a plan and strategy now to get numbers low & keep them there with travel restrictions.”

[Watch Prof Sidar's full interview with BBC](#)

** Prof Devi Sridar: Professor & Chair of Global Public Health, Edinburgh Uni Med School. Director of @GlobalHealthGP

2. Los Angeles County hospitals are preparing for potential “healthcare rationing”

The [Los Angeles Times reports](#) that Los Angeles County hospitals are preparing for potential healthcare rationing.

Southern California’s medical system is faced with the prospect of not being able to provide critical medical care to everyone who needs it, which would significantly increase the chances of patients dying as they wait for help.

A document obtained by The Los Angeles Times gives guidance on how doctors should approach their rationing of ICU care. Instead of trying everything to save every patient, their goal during a crisis is to save as many patients as possible, meaning those less likely to survive will not receive the same level of care they would otherwise.

3. Some experts recommend “ring-vaccination” in the Sydney COVID-19 outbreak

Following almost 14 days with no community transmission of COVID in Australia, there is now a significant outbreak in the Northern Beaches of Sydney, with around 100 confirmed cases over the last seven days.

The area from Manly in the south to Palm Beach in the north has been under a stay-at-home order for several days. A significant contact tracing and quarantine effort is underway and fortunately the daily number of confirmed cases is reducing.

The [ABC reports](#) that some experts are recommending the vaccination contacts of confirmed cases – so called “ring vaccination” - even though it is not known how effective vaccines are when given after exposure.

“The fact that we're having this Sydney outbreak with this terrible timing over Christmas and New Year is an even greater imperative to get the vaccine ASAP,” said Professor Raina McIntyre, Head of the Biosecurity Program at the Kirby Institute.

However, Professor Tony Cunningham from the University of Sydney said NSW had been doing the right thing by focusing on contact tracing and waiting to roll out the vaccine. He said the vaccine could take a week to start having any significant effect...“and by that time, the horse has bolted on the virus and people have spread the virus.”

Read more on “[ring vaccination](#)”
Non-peer reviewed article by [Prof Raina McIntyre](#)

4. Importance of lineage B.1.1.7 [aka VUI - 202012/01 variant] still unclear

[Science reports](#) that on 8 December it was first noticed that Kent, in southeast England, was experiencing a surge in cases cause by the B.1.1.7. variant. This variant was found to have acquired 17 mutations. Scientists think this may have happened during a long infection of a single patient, which allowed SARS-CoV-2 to go through an extended period of fast evolution, with multiple variants competing for advantage.

The UK “[New and Emerging Respiratory Virus Threats Advisory Group](#)” (NERVTAG) met on 18 December and considered four analytic approaches regarding the transmissibility of VUI - 202012/01 variant. These included:

- Growth rate from genomic data: suggested a higher growth rate than other variants
- Studies of R values: suggest an absolute increase of the R-value of between 0.39 to 0.93
- PCR ct values: suggest a decrease of ct value of around 2 for the new variant
- Inferred viral load: suggests a 0.5 increase in log₁₀ viral load

Summary: NERVTAG has moderate confidence that VUI-202012/01 demonstrates a substantial increase in transmissibility compared to other variants.

NERVTAG also stated that there are currently insufficient data to draw any conclusion on:

- Underlying mechanism of increased transmissibility
- The age distribution of cases
- Disease severity
- Antigenic escape (explained in the article)

However [Science reports](#) “Christian Drosten, a virologist at Charité University Hospital in Berlin, saying that the rapid spread of B.1.1.7 might be down to chance. Scientists previously worried that a variant that spread rapidly from Spain to the rest of Europe - confusingly called B.1.177 - might be more transmissible, but today they think it is not; it just happened to be carried all over Europe by travelers who spent their holidays in Spain.

“Something similar might be happening with B.1.1.7, says Angela Rasmussen, a virologist at Georgetown University.”

D. Immune Response

1. Vaccination is the only acceptable path to herd immunity

In an article in [Med Commentary on 21 December](#) (paid subscription) Angela Rasmussen PhD** postulates “that proposals to reach the herd immunity threshold through naturally acquired infection, rather than vaccination, have complicated public health efforts and popularized policies that will lead to widespread transmission and mortality.

Dr Rasmussen discusses “The Great Barrington Declaration, which called for ‘focused protection’ of the vulnerable while encouraging young healthy people to resume their normal lives.” Dr Rasmussen postulates that: “this has resulted [in the US] in minimal federal guidance to encourage essential interventions such as face masks and distancing intended to reduce transmission.

Dr. Rasmussen states that: “Herd immunity has never been achieved through naturally acquired infections and is only possible at global population scale through mass immunization.” Dr Rasmussen continued that “until recently, herd immunity referred to population immunity acquired through vaccination.”

**Angela Rasmussen PhD is a virologist at Center for Global Health Science and Security at Georgetown University Medical Center, studying host responses to infection by combining classical virology with modern systems biology approaches.

E. COVID Testing

1. Lateral flow devices effectively detect COVID-19 variant

[Public Health England](#) confirmed at least five of the lateral flow devices (LFDs) currently in use in the United Kingdom “...successfully detected samples containing the new variant.”

This is important as the LFDs detect corona virus antigen and can identify those who are infected but do not yet have symptoms. Results are available within 30 minutes.