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The World Can't Beat Covid Without AstraZeneca

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Overview

In the face of the ongoing threat posed by Covid and the highly transmissible Omicron variant, leaders must do all they can to ensure their populations can live safely and freely alongside the virus and prevent new strains from emerging. This means avoiding lockdowns while employing measures to prevent health-care systems from being overwhelmed. Such an objective rests first and foremost on vaccinating at-risk populations and in turn vaccinating the world.

The emergence of Omicron is the starkest reminder yet that for as long as a large portion of the global population remains unvaccinated, we are all at risk. Without renewed efforts to vaccinate the world, new variants are inevitable. The real risk is that one of these new variants proves even more adept than Omicron at evading our vaccines and unravelling our progress towards life as normal.

And yet, as of 31 January, just over 62 per cent of the global population had received a dose of a Covid-19 vaccine [1] – meaning billions worldwide are yet to receive a single dose. Even more worrying is that hundreds of millions of these are at-risk adults. Omicron, now the world's dominant strain, may be less severe than Delta, but it is more transmissible and poses a sevenfold risk to unvaccinated people compared to those who have been inoculated. [2]

Every leader around the world should be doing all they can to protect their citizens from being hospitalised and dying from Covid. Vaccines are critical to this aim, and each one should be assessed by how effective it is at preventing hospitalisations and deaths.

Evaluated against these measures, the AstraZeneca vaccine has proved to be a vital tool in the fight against Covid and should be used by leaders around the world – especially in countries with low vaccination rates. The AstraZeneca vaccine has saved countless lives already and, effectively deployed, could well save many more. Despite its efficacy and safety ratings remaining in lockstep with mRNA vaccines, the biggest challenge for the AstraZeneca vaccine has been vaccine hesitancy, resulting in the expiration of doses even in countries with low vaccine rates. Hesitancy was accelerated by the spread of misinformation relating to side-effects and exacerbated by confusing decision-making from leaders early in the pandemic. But, as the evidence shows, the AstraZeneca vaccine is effective, safe and durable.

We will not be able to vaccinate the world without it.

The Case for AstraZeneca

Figure 1 – Assessing the strengths of the AstraZeneca vaccine

Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1050721/Vaccine-surveillance-report-week-4.pdf; https://www.biospace.com/article/comparing-covid-19-vaccines-pfizer-biontech-moderna-astrazeneca-oxford-j-and-j-russia-s-sputnik-v/; https://www.sciencedirect.com/science/article/pii/S0140673622000940?via%3Dihub

AstraZeneca has proved highly effective against previous Covid variants, and emerging evidence shows it has an important role to play in combatting Omicron. For instance, the UK Health Security Agency (UKHSA) reported that within 24 weeks following two doses of AstraZeneca, the vaccine had effectiveness of 55 per cent and 59 per cent against hospitalisation and death. Across the global

population, this could save countless lives. Taken as the first two doses in a three-dose regimen, the same study showed effectiveness of 95 per cent against death from Omicron. [3]

AstraZeneca has proved to be an effective booster against previous Covid variants, especially when it follows two doses of another vaccine type – the so-called mix-and-match approach. Evidence suggests it will remain effective against Omicron and will be of particular value following two doses of inactivated vaccines. Across Africa and South-East Asia, where the inactivated Chinese vaccines Sinovac and Sinopharm were distributed at scale early in 2021, this is especially important. The protection these vaccines provide against hospitalisation has been shown to quickly wane. The World Health Organisation (WHO) has approved AstraZeneca boosters for both these vaccines, and real-world evidence from Chile suggests an AstraZeneca booster can raise Sinovac's protection to 97 per cent against Delta. [4] Ahead of real-world results, a lab-based challenge trial conducted by Oxford University showed the vaccine significantly boosted levels of antibodies against Omicron when used as a third dose. [5]

AstraZeneca has performed well when compared with other vaccines, including mRNA doses, in its effectiveness against hospitalisation and death. Throughout the pandemic, the vaccine has been effective and there is no evidence to suggest this will not continue to be the case, especially as part of a multidose regimen or a mix-and-match strategy. For example, against Delta, two doses were 92 per cent effective against hospitalisation, similar to two doses of Pfizer which were 96 per cent effective. [6] As recent UKHSA data shows, two doses of Pfizer and two doses of AstraZeneca produced similar effectiveness levels against the Omicron variant at around 55 per cent versus hospitalisation within 24 weeks following a second dose.

Vaccinating the World

Ensuring full use is made of the AstraZeneca vaccine globally is vital for a number of reasons. It is cheap, it is easy to store and it makes up a substantial proportion of the word's available vaccine supply. Critically, it continues to prove effective. [7]

All of this has clear implications for governments around the world. For the first time, a clear global norm should be established on AstraZeneca. Evaluated against two simple objectives – first, saving lives, and second, reducing hospitalisations – it continues to be a credible vaccine, regardless of variant. This should underpin faster global efforts to take advantage of the jab to vaccinate the world and provide boosters to populations where immunity is waning.

As Omicron has proved so clearly, until the whole world is safe from Covid, no single country is safe. Without AstraZeneca the world will not win the fight against the virus. Until we're able to drastically

increase the number of people around the world who are fully vaccinated, we risk the future emergence of more transmissible or more lethal variants. Achieving global vaccination at speed requires the use of all available vaccines that are deemed safe and effective.

Recommendation

We recommend that leaders and policymakers in countries with low vaccination rates review the data and analysis set out in this report and reconsider any decisions they have made to delay rollout of the AstraZeneca vaccine, or not to approve it as a booster when used together with doses of other vaccine types.

The AstraZeneca Vaccine Is Safe and Durable

Safety

The Key Message for Leaders:

AstraZeneca is safe, with limited side-effects. People are 23 times more likely to develop blood clots if they catch Covid than if they get the vaccine.

Tackling vaccine hesitancy will be key to vaccinating the world as quickly as possible, and this means providing clear assurance that the AstraZeneca vaccine, as with all other WHO-approved vaccines, is safe to use. It has undergone rigorous review during clinical trials and by regulatory agencies, and its side-effects are continuously monitored around the world. Of course, no vaccine is ever entirely risk free, but the past year has proved that AstraZeneca has a favourable benefit-risk profile.

Although we now know the vaccine to be safe and effective, temporary suspensions and safety concerns over AstraZeneca have often knocked confidence and hindered global vaccination drives. Back in March 2021, AstraZeneca was the most trusted vaccine in the UK, but confidence levels quickly declined across all age groups following reports of a potential link between the vaccine and blood clots.

The UK was lucky that overall confidence in vaccines remained high, but temporary suspensions of the AstraZeneca vaccine in a number of European countries have had more serious fallout elsewhere. At a national level, a number of African governments have refused or handed back AstraZeneca doses. The Democratic Republic of the Congo (DRC), for example, where more than 99 per cent of the population are still unvaccinated, delayed its rollout of more than 1.7 million doses in early March 2021 following the suspensions in Europe. It was then forced to hand back 1.3 million of those doses before they expired. [8] In February last year, South Africa temporarily suspended its rollout, and a nursing union publicly advised its 17,000 members to boycott the vaccine. [9]

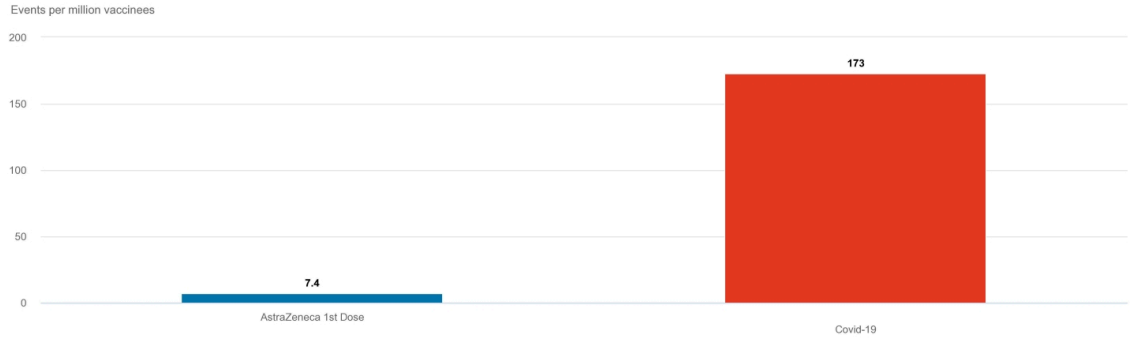
In many cases, safety concerns – and even active misinformation – at the state level has then compounded vaccine hesitancy among individuals. In June, Kenya was forced to offer AstraZeneca more widely after a vaccine drive aimed at health-care workers managed to reach just 38 per cent of the country's 400,000 frontline health staff. And in Nigeria, Chika Offor, founder of the Vaccine Network

for Disease Control, claimed the decision of some European governments to restrict use of AstraZeneca had heightened fears in Nigeria, which was already struggling with high hesitancy rates. [10]

When combatting this sort of hesitancy, context is key. Much of the hesitancy surrounding the AstraZeneca vaccine can be partially attributed to misleading presentation of data examining potential causal links between the jab and blood clots. For data to be used effectively, it needs to be put into context. This means also equipping people with accurate figures on:

- the likelihood of developing a blood clot from AstraZeneca compared to the likelihood of developing a blood clot from a Covid-19 infection.
- the risk of developing a blood clot from AstraZeneca compared to the risk of developing a blood clot generally.

Figure 2 – The likelihood of developing serious blood clots (venous thromboembolism with thrombocytopenia) from the vaccine compared to those resulting from a Covid-19 infection



Source: Laporte JR et al. "Vaccines Against Covid-19, Venous Thromboembolism, and Thrombocytopenia. A Population-Based Retrospective Cohort Study", preprint: https://www.medrxiv.org/content/10.1101/2021.07.23.21261036v1 .

As the figure above illustrates, an individual is 23 times more likely to develop a blood clot if they contract Covid-19 than if they receive a dose of the AstraZeneca vaccine. Clearly communicating these comparative risks is vital to encouraging those who have not yet been vaccinated due to fear of side-effects to change their mind.

Durability

The Key Message for Leaders:

Protection from AstraZeneca against hospitalisations remains significant for at least 20 weeks.

It is now more than a year since the first Covid-19 vaccine was administered in the UK and, as expected, studies around the world are beginning to show that vaccine-induced immunity does decrease over time.

The extent to which immunity wanes is still being investigated, but based on existing studies we know that all approved vaccines provide an effective immune response for several months after vaccination. With billions worldwide still waiting for their first dose of a Covid vaccine, monitoring initial levels of protection is just as important as looking at the impact of boosters.

UK data from September 2021 showed that AstraZeneca remained around 80 per cent effective against hospitalisations for at least 20 weeks post-vaccination, a rate comparable to Pfizer. Omicron may reduce the efficacy of the most commonly used vaccines, but given the evidence from trials that the AZ vaccine generates a diverse and durable T-cell response to multiple variants which results in a broader response than antibodies alone, we should be optimistic about its potential to provide durable protection. This is of course something to keep a close eye on as more data emerges, but durability is unlikely to present major issues in future rollouts of AstraZeneca.

The AstraZeneca Vaccine Is Effective Against Omicron

The Key Message for Leaders:

The AstraZeneca vaccine significantly reduces the risk of hospitalisations and deaths from Omicron. Administering even just two doses could still save millions of lives worldwide.

The AstraZeneca vaccine is highly effective in preventing hospitalisations and deaths from Covid-19, with a durable immune response that can be boosted further following a third dose.

The AstraZeneca vaccine is also effective against the Omicron variant, especially in reducing the likelihood of hospitalisation. The UKHSA reported that within 24 weeks following two doses of AstraZeneca, the vaccine had effectiveness of 55 per cent and 59 per cent versus hospitalisation and death. [11]

What Is "Vaccine Effectiveness"?

Messaging on vaccine efficacy and effectiveness should be as clear as possible. How well people understand efficacy figures will affect how they think about the vaccine, whether they get it and how they behave after getting it, all of which have implications for our efforts to fight the virus.

A vaccine's *efficacy* is measured in a controlled clinical trial and is based on how many people who were vaccinated developed the outcome of interest, in this case Covid-19 infection, compared with how many people who received the placebo developed the same outcome. Efficacy is a measure of how much a vaccine lowers the risk of becoming infected.

Vaccine *effectiveness* is calculated the same way; however, effectiveness is measured in the real world, not in clinical trials. Effectiveness is measured by observing how well a vaccine works to protect the population as a whole.

Figure 3 – Defining and calculating vaccine effectiveness

WHAT DOES VACCINE EFFECTIVENESS MEAN?

1 Efficacy is a measure of how much a vaccine lowers the risk of getting sick.

A vaccine's efficacy is measured in a **controlled clinical trial** and is based on how many people who were vaccinated developed the outcome of interest, in this case Covid-19 infection, compared with how many people who received the placebo developed the same outcome. Efficacy is a measure of how much a vaccine lowers the risk of becoming infected.

Unvaccinated group

If this is the number of unvaccinated people who contract the disease...

Vaccinated group

64.3% fewer people will contract it if they get vaccinated.

2 Vaccine effectiveness is calculated the same way.

However, effectiveness is measured in the **real world**, not in clinical trials. Effectiveness is measured by observing how well a vaccine works to protect the population as a whole.

AstraZeneca Is Effective Against Omicron

The main objective of governments is to reduce hospitalisations and prevent deaths caused by Covid-19, and it is clear that AstraZeneca is effective at achieving both these goals. Recent data from the UKHSA

shows that even just two doses of AstraZeneca provide vital protection against Omicron, in a welcome indication that AstraZeneca is still suitable for global use against this variant.

The latest data from the UKHSA shows that AstraZeneca is about 55 per cent effective against hospitalisation from the Omicron variant 20 to 24 weeks after the second dose, and just over 30 per cent effective 25 weeks after vaccination. [12] Two doses of AstraZeneca are 59 per cent effective against death from the Omicron variant.

The past year has shown the effectiveness of AstraZeneca against hospitalisation and death against the Delta variant to be on par with many of the other vaccines available, including Johnson & Johnson, [13] Moderna [14] and Pfizer. [15] And although, much like these other vaccines, AstraZeneca's effectiveness is reduced by Omicron, the UK's experience shows protection levels are still significant enough to provide a valuable line of defence against hospitalisations and deaths.

Comparing Vaccine Effectiveness Across Viruses

Omicron does reduce the effectiveness of many of the most common vaccines, but again it is crucial to contextualise the data. When compared with vaccines for other viruses or diseases, the Covid-19 vaccines remain just as effective, if not more so. For example, in years when the flu vaccine's active components correspond most closely to that season's flu variant, flu vaccines have been shown to reduce the risk of requiring medical attention by between 40 and 60 per cent. [16]

Other vaccines that protect against certain diseases also have similar effectiveness levels as the Covid-19 vaccines, and often require more than one dose to provide the most protection. In the case of the malaria vaccine, effectiveness is substantially lower than that typically provided by the Covid-19 vaccines, which highlights another important point: a vaccine does not need to provide near-perfect protection to be a valuable resource and save lives.

Figure 4 – Examples of effectiveness and required doses of other vaccines, for comparison

Measles, mumps and rubella	Two doses needed	One dose is 93 per cent effective against measles, 78 per cent effective against mumps and 97 per cent effective against rubella. Two doses are 97 per cent effective against measles and 88 per cent effective against mumps. [17]
Polio	Three or four doses needed	Two doses are 90 per cent effective; three/four doses are 99 per cent effective. [18]
Malaria (vaccine approved October 2021)	Four doses needed	Four doses are 30 per cent effective at preventing severe disease. [19]

The AstraZeneca Vaccine Is a Viable Booster

The Key Message for Leaders:

AstraZeneca is a WHO-approved booster that provides a significant increase in protection. Regulatory agencies should move to approve it as soon as possible.

In light of this new data regarding waning immunity, countries that have been able to vaccinate a majority of their population have administered booster jabs. However, despite it being both safe and effective, many of these countries are yet to approve AstraZeneca for use as a booster.

Studies have shown AstraZeneca to be a safe and effective booster to complement all main vaccines against the Delta variant, but it is in combination with inactivated vaccines that AstraZeneca – which is affordable, effective and comparatively easy to transport – could prove the biggest game-changer.

As of mid-October 2021, China's CoronaVac and Sinopharm vaccines accounted for almost half of the 7.3 billion Covid-19 vaccine doses delivered globally. These inactivated vaccines have been key in fighting the pandemic, particularly in less wealthy nations in Asia and South America. [20]

However, both SinoVac's CoronaVac and Sinopharm appear to offer limited protection against Omicron. A Hong Kong study of 25 two-dose CoronaVac recipients found that none had detectable neutralising antibodies against the new variant. Even at three doses, CoronaVac failed to produce sufficient levels of neutralising antibodies to protect against Omicron. Similarly, Shanghai Jiao Tong University found that a booster shot of Sinopharm produced significantly less neutralising antibody activity compared with its activity against the original Wuhan strain. [21]

More detailed data is still emerging, but it is clear that inactivated vaccines are leaving many developing countries particularly vulnerable to Omicron. The good news is AstraZeneca can be used as a safe and effective booster to top up protection. The WHO has approved AstraZeneca as a booster for both CoronaVac and Sinopharm, and an Oxford University study has found that a third dose of AstraZeneca prompted an "extraordinary response" against both Omicron and Delta following two doses of Sinovac.

The Oxford University study, which included both Omicron and Delta infections in Brazil, also found that AstraZeneca is an effective booster after an initial course of CoronaVac. Researchers measured the increase in antibody levels in individuals who had an initial two-dose course of CoronaVac 28 days after

receiving a booster jab. The pre-print study reported that all groups had a substantial rise in protective antibodies following a booster – specifically a 77-times increase for Johnson & Johnson booster recipients, 90-times for AstraZeneca booster recipients and 152-times for Pfizer booster recipients. However, individuals who received a booster of CoronaVac only saw a 12-times increase. [22]

AstraZeneca is therefore an attractive booster option for countries that have relied heavily on inactivated vaccines. As Omicron spreads and initial immunity wanes, topping up protection levels is more important than ever, and AstraZeneca provides an affordable and effective way of doing so.

The AstraZeneca Vaccine Is Cheap, Easy to Store and Available for Distribution in Large Quantities

The Key Message for Leaders:

AstraZeneca is affordable, accessible and available.

The development of the AstraZeneca vaccine is the result of a non-profit collaboration between researchers at Oxford University and AstraZeneca, meaning it costs roughly one-tenth of the price of some other vaccines on the market. It has also been licensed to other manufacturers around the world to amplify its global production capacity. [23]

In mid-November AstraZeneca hit a major milestone, having supplied 2 billion doses of the vaccine around the world. The AstraZeneca vaccine is the largest contributor to COVAX, supplying more than 240 million doses so far, and is being manufactured in 15 countries for distribution in more than 170 countries. [24]

The AstraZeneca vaccine is the most affordable vaccine on the market. It can be challenging to definitively confirm the cost of Covid vaccines worldwide: some information is not publicly available, prices can vary based on supply agreements and prices can fluctuate over time or from country to country. However, the price ranges below give a sense of the relative costs of four major vaccines: [25]

- AstraZeneca: $2.15 to $2.25 per dose
- Johnson & Johnson: $10 per dose
- Pfizer: $19.50 per dose
- Moderna: $25 to $37 per dose

AstraZeneca's affordability also makes it suitable for use in combination with mRNA vaccines. So far, the UK is only using Moderna and Pfizer in its booster campaign, but a recent real-world study by the UKHSA into the effectiveness of booster jabs found that it made very little difference which vaccine an individual had originally received: [26]

- An individual who received two doses of AstraZeneca is about 50 per cent protected against symptomatic disease after five months. Following an mRNA booster jab, the level of protection increases to just over 93 per cent.
- An individual who received two doses of Pfizer is about 70 per cent protected against symptomatic disease after five months. Following a mRNA booster, the level of protection increases to 94 per cent.

This study shows that regardless of which vaccine an individual received for their primary course, booster jabs increase the protection level almost equally. What is not equal, however, is the overall cost of administering a full course of each vaccine plus a booster. The cost of two AstraZeneca doses plus one Pfizer or Moderna booster is much lower than the cost of administering two primary Pfizer doses plus a Pfizer or Moderna booster. For countries planning a long-term vaccination strategy, this should be a key consideration.

AstraZeneca is not only more affordable, it's also more accessible. Securing an adequate supply of a safe and effective vaccine is only half the battle when rolling out a nationwide immunisation programme. Doses must be transported from manufacturing plants around the world and delivered to health-care settings and other venues that are administering jabs.

Unlike mRNA vaccines, the AstraZeneca vaccine can be stored at the normal temperature of a conventional refrigerator and has a shelf life of up to six months. This relieves the need for countries to have extensive cold-chain infrastructure in place and removes the need to purchase expensive super-cold storage freezers that not all health-care settings can access. This means that AstraZeneca provides a more affordable option not just in terms of the doses themselves, but also in terms of the infrastructure required to roll them out at scale.

Conclusion

The world is entering a new phase in the response to Covid: trying to live alongside the virus. This will not only require careful domestic policy measures to reduce deaths and hospitalisations; it will also need collaborative global efforts to vaccinate – and boost – the world.

The biggest threat to global recovery is the potential for new variants to emerge in places that lack sufficient vaccine coverage. And yet, billions of people are yet to be fully vaccinated around the world. The only way to combat these low levels of vaccination is to use all available vaccines – including AstraZeneca.

This is not only a question of building vaccine supply and absorption capacity; it will also require tackling vaccine hesitancy. In 2021, many decisions were taken by leaders and public-health bodies that have impacted the public's view of the AstraZeneca vaccine. While many of these decisions were taken owing to fears or concerns at the time, we now have sufficient data that is clear and compelling: AstraZeneca is safe and effective.

No country is safe from Covid-19 until all countries are safe from Covid-19. For that reason, we need to restore global confidence in AstraZeneca. To do so, we make the following recommendation:

Recommendation

We recommend that leaders and policymakers in countries with low vaccination rates review the data and analysis set out in this report and reconsider any decisions they have made to delay rollout of the AstraZeneca vaccine, or not to approve it as a booster when used together with doses of other vaccine types.

Charts created with Highcharts unless otherwise credited.

Footnotes

1. ^ https://www.nytimes.com/interactive/2021/world/covid-vaccinations-tracker.html
2. ^ https://drees.solidarites-sante.gouv.fr/sites/default/files/2022-01/2022-01-28%20-%20Appariements%20sivic-sidep-vacsi%20Drees.pdf
3. ^ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1050721/Vaccine-surveillance-report-week-4.pdf
4. ^ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4005130
5. ^ Vaxzevria significantly boosted antibody levels against Omicron (astrazeneca.com)
6. ^ Vaccines highly effective against hospitalisation from Delta variant - GOV.UK (www.gov.uk)
7. ^ https://www.unicef.org/supply/covid-19-vaccine-market-dashboard
8. ^ https://www.reuters.com/world/africa/vaccine-hesitancy-slows-africas-covid-19-inoculation-drive-2021-05-04/
9. ^ https://www.reuters.com/business/healthcare-pharmaceuticals/vaccines-arrive-south-africa-faces-widespread-scepticism-over-safety-2021-02-08/
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11. ^ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1050721/Vaccine-surveillance-report-week-4.pdf
12. ^ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1050721/Vaccine-surveillance-report-week-4.pdf
13. ^ In the first real-world test of the vaccine's efficacy against the Delta variant, the Johnson & Johnson vaccine was 71 per cent effective against hospitalisation and 96 per cent effective against death. The study included over 477,000 health-care workers in South Africa.
14. ^ A preprint study which analysed the effectiveness of the Moderna vaccine against Delta in the population of Qatar found that after two doses Moderna was 84.8 per cent effective against any Delta infection, symptomatic or asymptomatic, and was 100 per cent effective severe, critical or fatal infections. The study is yet to be peer reviewed.
15. ^ In the same study from Qatar, researchers found that Pfizer was 89.7 per cent effective against severe, critical or fatal infections after two doses.
16. ^ https://www.cdc.gov/flu/vaccines-work/vaccineeffect.htm

17. ^ https://www.cdc.gov/vaccines/vpd/mmr/public/index.html
18. ^ https://www.cdc.gov/vaccines/vpd/polio/hcp/effectiveness-duration-protection.html
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25. ^ https://www.biospace.com/article/comparing-covid-19-vaccines-pfizer-biontech-moderna-astrazeneca-oxford-j-and-j-russia-s-sputnik-v/
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