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## COVID-19 vaccines: no time for complacency

“Yes. Yes. Yes.” That was the response of John Bell, Regius Professor of Medicine at the University of Oxford, when asked whether we could be confident that life will be returning to normal by spring. He was being interviewed by the BBC shortly after the announcement last week by Pfizer and BioNTech that their COVID-19 vaccine candidate had 90% efficacy in clinical trials. Similar announcements about the Russian Sputnik V and Moderna vaccines followed soon after. The prospect of preventing illness and death, and avoiding the harm and misery of extended restrictions, is a cause for optimism. But although it is right to be hopeful and encouraged, we are far from ending COVID-19 as a public health issue.

Unfortunately, the trials’ results were announced via press releases, leaving many scientific uncertainties that will dictate how the vaccines will affect the course of the pandemic. Little safety data are available. How well the vaccines work in older people or those with underlying conditions and their efficacy in preventing severe disease are still unclear. Peer-reviewed publication should resolve these issues, but other questions will not be answerable for some time. For one, the duration of protection is unknown and will have a huge bearing on the practicalities and logistics of immunisation (will boosters be needed? How often?).

Whether the vaccines prevent transmission of SARS-CoV-2 or mainly just protect against illness is largely unknown too. If the latter, achieving herd immunity through immunisation becomes a difficult prospect. Pfizer and Moderna together project that there will be enough vaccine for 35 million individuals in 2020, and perhaps up to 1 billion in 2021. As a result, many millions of people at high risk of disease will not be immunised any time soon, necessitating the continued use of non-pharmaceutical interventions. There is a danger that the public might become complacent following the news of promising vaccines, but how much more difficult will it be to ensure adherence to guidance and restrictions when a vaccine is available to many but others remain unprotected? Vaccine hesitancy is also a clear threat to COVID-19 control. New data show that willingness to take a COVID-19 vaccine is far from universal. When even wearing a face mask can be painted as a political act rather than a public health measure, responsible leadership and careful public communications will be essential.

These concerns will be irrelevant in places where a vaccine is unavailable entirely. Leaving aside the huge logistical challenges of manufacturing and roll-out (including onerous cold-chain requirements for some candidates), vaccine nationalism remains a major threat to equitable access. COVAX, the GAVI-led financing mechanism to provide COVID vaccines to low-income and middle-income countries, has raised US\$2 billion, but needs \$5 billion more for 2021. Pfizer and Moderna have not yet reached agreements with COVAX to supply vaccines; Pfizer has issued an expression of interest. By contrast, a handful of high-income countries have already secured the option to buy hundreds of millions of doses. Although some vaccine developers have promised to limit profits from the COVID-19 pandemic, Pfizer and Moderna have made no such commitments.

What does the long-term future look like? Will SARS-CoV-2 become endemic, in a post-pandemic phase? It is likely, but it is too early to be sure what form this endemicity will take. Vaccines will be just one determinant. Reinfections are another: they appear rare so far, but the pandemic is still young. The nature and length of immune responses, and the characteristics of the virus and infection play a role too. Can infection provide sterilising immunity? How quickly does protective immunity wane? How severe might reinfection be? How does immunity vary by sex, ethnicity, and age? Will we have annual seasonal outbreaks? Or longer spells of quiescence punctuated by re-emergence? And how will health systems have to adapt accordingly? These issues and many others will determine the continuing impacts of COVID-19 on health and all are still poorly understood.

2020 has been a year of incredible scientific achievement. In less than 12 months, researchers have characterised a novel illness, sequenced a new virus’s genome, developed diagnostics, produced treatment protocols, and established the efficacy of drugs and vaccines in randomised controlled trials. Many people are feeling hopeful for the first time in a long time. But there is still much to learn and many barriers to overcome. On Nov 14, 5 days after the announcement by Pfizer, 663 772 new cases of COVID-19 were recorded, the largest number in a single day. It is a dangerous moment to be complacent. ■ *The Lancet*



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For more on **public attitudes to COVID-19 vaccines** see *Nat Med* 2020; published online Oct 20. <https://doi.org/10.1038/s41591-020-1124-9>

For more on **COVAX funding** see <https://www.gavi.org/news/media-room/over-us-2-billion-raised-support-equitable-access-covid-vaccines-additional-us-5>

For more on **whether COVID-19 will become endemic** see Shaman J, Galanti M. Will SARS-CoV-2 become endemic? *Science* 2020; **370**: 527–29