How COVID vaccines have pushed the UK toward the end of lockdown

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The latest round of lockdown easing has now taken place in England, Wales and most of Scotland, with restrictions on households mixing indoors being relaxed to varying degrees across the three countries.

As with previous steps out of lockdown, four conditions had to be met ahead of things reopening. Two of these focused on vaccines. The UK

once again needed to show evidence of vaccines being successfully deployed and of them reducing COVID-19 hospitalisations and deaths in order for restrictions to ease.

The UK's vaccine rollout has been one of the fastest in the world, with excellent uptake, so it's clear that the deployment condition has been met. As of May 12, more than two-thirds of UK adults had been administered a first dose of a vaccine, with around half of these having received both.

There's also been a continuing reduction in COVID-19 hospitalisations and deaths, suggesting the second vaccine condition has been met too. But with lockdown running alongside the vaccination program, and other measures such as social distancing and masks being used simultaneously too, how can we tell how much of this change is down to vaccines specifically?

Measuring vaccines' effectiveness

Phase 3 clinical trials tested the Pfizer/BioNTech and Oxford/AstraZeneca vaccines in thousands of people last year. This research found that the two vaccines were 95% and 70% effective respectively at preventing COVID-19 disease compared with unvaccinated people. But this was efficacy recorded under trial conditions; effectiveness in the real world isn't always the same.

So, as the UK's vaccination program started, it was crucial to understand how well the vaccines were actually working as the pandemic evolved—particularly with new variants arising. This is why the Early Pandemic Evaluation and Enhanced Surveillance of COVID-19 (EAVE-II) platform was established—to collect data on the use of these vaccines to provide insight into their effectiveness and safety in the real world.

EAVE-II tracked who was getting the vaccine, who then contracted COVID-19, and whether they needed to be treated in hospital and if they died after their infection. My colleagues and I then analyzed the data that EAVE-II had gathered from across almost the entire population of 5.4 million people in Scotland.

We found that between 28 and 34 days after a first dose, the Pfizer/BioNTech vaccine was 91% effective and the Oxford/AstraZeneca vaccine 88% effective in reducing COVID-19 hospitalization compared with unvaccinated people. These results from a real-life setting back up the data from trials, showing how effective vaccines can be in protecting people from the worst effects of COVID-19. Importantly, they were also able to show that vaccines were proving highly effective at protecting people even while other protective measures (lockdown, social distancing, mask-wearing) were in place.

Subsequent studies have shown that the vaccines are also successful in reducing household transmission, cutting it by up to half. Together with our research, these studies show the importance of having a national linked dataset that brings together routinely collected electronic health records. Being able to quickly cross-reference people's vaccination status and medical condition was essential for our research.

What happens next?

With the coronavirus mutating as it spreads, the question now is how well the current vaccines will perform against new variants.

The Oxford/AstraZeneca team conducted a quick trial and found that the current version of their vaccine works just as well against the B117 variant that is now dominant in the UK. It does, however, appear to be less effective at preventing mild to moderate disease when facing the B1351 variant that arose in South Africa, which is also now circulating

in Britain.

And early research on the Pfizer/BioNTech vaccine—which is yet to be reviewed by other scientists—suggests that there is a small drop off in performance when facing B117 and B1351, but that overall it still works well against these.

However, the pressing question is how these and other vaccines will fare against the B16172 subvariant first discovered in India, which is also now spreading in the UK. We're still waiting for research to definitively answer this question, though early findings from a study being run by the University of Oxford suggest there's only a small decline in the protection offered by vaccines when facing the variant.

We also don't yet know whether vaccines will offer the same degree of suppression once lockdown measures have been lifted and people are mixing more freely. Israel relaxed lockdown restrictions after its successful vaccination campaign, and infections continued to decline there. However, Israel was facing the B117 variant; in the UK, it's possible that B16172—which appears to be more transmissible—will become dominant and be harder to suppress.

Certainly, with lockdown restrictions easing in the UK there's the potential for an increase in transmission. However, from existing data we can see that the ratio between infections and serious illness is increasing, meaning we're recording fewer hospitalisations or deaths per number of infections. If there is an increase in cases, it hopefully shouldn't mean a big spike in people getting seriously ill.

As the UK and the rest of the world continue with their vaccination programs, we must carry on monitoring how these COVID-19 vaccines protect people as the pandemic evolves. For now, the data suggests that vaccines have helped propel the UK into a position where reopening can

take place—but we need to remain vigilant in case the situation changes.

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