



Researchers are watching for evidence that COVID-19 shots are reducing deaths.

SCIENTISTS SEEK CLUES THAT COVID-VACCINE ROLLOUTS ARE WORKING

Vaccinated people in Israel are less likely to get COVID-19, but a population-wide effect will take time to manifest.

By Smriti Mallapaty

As countries worldwide distribute the first rounds of COVID-19 vaccines, researchers are eagerly watching for early signs that the shots are having an impact on the pandemic. This month, researchers in Israel reported preliminary figures suggesting that people vaccinated there were about one-third less likely to test positive for SARS-CoV-2 than were people who had not received a shot. But scientists say that population-wide effects of immunization will take time to become clear.

Many factors will determine how soon scientists will be able to detect the impact of vaccines on the pandemic. Among them are the extent of vaccine coverage, the effectiveness of shots at preventing disease and infection, and the rate of viral transmission.

Israel and the United Arab Emirates are leading the world in vaccine coverage. The two nations have vaccinated roughly one-quarter of their populations – more than two million people each. Other nations, such as the United Kingdom and Norway, have targeted their vaccination programmes at high-risk groups. Britain has vaccinated more than 4 million people, mostly health-care workers

and older people, including those living in care homes; Norway has immunized all residents of nursing homes, some 40,000 people.

First signs

The results from Israel are among the first to report the impact of vaccines administered to people outside clinical trials. They provide an early indication that the two-dose RNA-based vaccine developed by Pfizer–BioNTech can prevent infection or limit its duration in

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some vaccinated people (see go.nature.com/2naozhz; in Hebrew).

In a preliminary analysis of people older than 60, researchers found that two weeks after the first injection, the chances of testing positive for the virus were 33% lower in 200,000 people who received the vaccine than in 200,000 who did not.

“We were happy to see this preliminary result that suggests a real-world impact in the

approximate timing and direction we would have expected,” says Ran Balicer, an epidemiologist at Israel’s largest health-care provider, Clalit Health Services, in Tel Aviv. He expects to get more conclusive results several weeks after people receive their second shot.

Another analysis, by Maccabi Healthcare Services, found a similar trend, although neither data set has been peer-reviewed.

Clinical trials of the Pfizer–BioNTech vaccine show it to be around 90% effective at preventing COVID-19, and the preliminary data suggest it can also provide some protection from infection. But it will take longer to establish whether vaccinated people no longer spread the virus to unvaccinated people, says Balicer.

More than 75% of older people in Israel have been vaccinated, and Balicer expects to see a drop in hospitalizations among older people over the coming weeks.

Most countries are prioritizing COVID-19 vaccinations for people who have a high risk of getting severe disease and dying. So, the first evidence that shots are working in those countries will probably be reductions in hospitalizations, and then in deaths, says Alexandra Hogan, an infectious-disease modeller at Imperial College London.

Indirect effects

If vaccines are effective at preventing infections, then their indirect benefit – protecting unvaccinated people – will be visible only once enough people have been immunized, says Natalie Dean, a biostatistician at the University of Florida in Gainesville.

Israel will probably be the first country to see this kind of population-wide impact, say researchers. This is because it is using a high-efficacy vaccine and aiming for wide coverage with the explicit goal of achieving herd immunity – when enough people are immune to a virus for its spread to be controlled.

In some places, the first signs of indirect protection might emerge in specific groups who have been widely vaccinated, such as health-care and long-term-care workers and their families, says Dean.

But teasing the population-level effects of vaccines on the number of COVID-19 cases from the impacts of other public-health interventions, such as social distancing and lockdowns, will be tricky. “Infectious diseases are very unpredictable – so you end up needing a lot of data to smooth out a lot of unpredictability,” says Dean.

The effect of vaccines on reducing overall COVID-19 infections will be more difficult to ascertain in regions such as Norway, which have largely brought the virus under control, says Hogan.

Yet rampant transmission also complicates such investigations, until countries reach high vaccine coverage, adds Dean. Vaccinated

health-care workers, for example, might be able to protect their families from infection, but when the virus is everywhere, there will be lots of opportunities for it to enter a household, she says.

Israel aside, vaccines will not have an impact on viral spread any time soon, says Raina MacIntyre, an epidemiologist at the University of New South Wales in Sydney, Australia. “Many other countries are using much

lower-efficacy vaccines, which are unlikely to control infection,” she says.

Modelling work by Hogan shows that vaccines that are less effective at preventing infection will have a smaller impact on transmission in the population (see go.nature.com/2yf8yhe). “But even with an imperfect vaccine, that population-level impact on deaths could still be quite substantial,” she says.

family from the start of this year, could see many *Science* manuscripts shared with open licences. According to Clarivate Analytics in Philadelphia, Pennsylvania, 31% of articles published in *Science* in 2017 acknowledged a Plan S funder.

Some other journals have also adopted green OA to comply with Plan S. *The New England Journal of Medicine* told funders in October that it would permit green OA in 2021 for Plan S-funded scientists, for instance. The UK Royal Society has allowed green OA in its journals for years and permits sharing under open licences if funders require it.

Routes to open access

Other highly selective subscription journals have adapted to Plan S in different ways. In November, publisher Springer Nature said that it would offer OA at Nature-branded journals for a charge of €9,500 (US\$11,500) per paper; it is also running trials of a programme to reduce prices at some of its journals. (*Nature* is editorially independent of its publisher.) And in December, publisher Elsevier in Amsterdam announced a suite of OA options for Cell Press journals, with an €8,500 charge to publish OA in *Cell* and €7,600 for other journals.

But many scientists worry that these prices are too high. Although Plan S funders might pay the fees for their scientists, many other researchers will not be able to afford the OA option. (Elsevier said it would waive OA fees for researchers in the lowest-income countries, and reduce them for some others.) This is why the AAAS has opted for green OA, rather than bringing in gold OA at its subscription journals, the publisher explained.

“This approach reflects AAAS’s concern that facilitating open access by gold routes alone puts undue financial obligation on authors, which could freeze in place or further exacerbate longstanding inequities for authors across race, gender, geographies, disciplines, and institutions,” it said in a statement.

“It’s a bold move to go for a green OA solution to meeting Plan S requirements, and notable that they are pointing to the inequities associated with the article-processing-charge business model,” says Stephen Curry, a structural biologist at Imperial College London.

The AAAS’s approach does mean that most scientists publishing in its journals won’t have a fully OA option, notes Lisa Hinchliffe, a librarian at the University of Illinois at Urbana–Champaign. “It is unfortunate that this perpetuates the differentials we see in the ecosystem, where some publishing pathways’ privileges are extended to certain scholars but not others,” she says.

The AAAS wants to try the green OA model for its subscription journals as a “year-long experiment to see if this is sustainable”, says Bill Moran, the publisher of the Science family of journals.

PUBLISHER OF SCIENCE EXPANDS OPEN-ACCESS POLICY

Paywalled titles will let some researchers share accepted manuscripts under open licences.

By Richard Van Noorden

In a step towards open access, the publisher of *Science* will start allowing some authors publishing in its high-profile subscription journals to share their accepted manuscripts openly online under liberal terms that mean anyone could reproduce or redistribute the work.

The change ensures that scientists with grants from some funding agencies that insist on open-access (OA) publishing under the bold Plan S initiative can still publish in the Science family of subscription journals. Around two dozen funders have signed up to Plan S, which began on 1 January 2021, although individual agencies have different starting dates.

In the past few months, many selective subscription journals have introduced options for authors to pay fees to have their papers published OA, in response to Plan S. But the American Association for the Advancement of Science (AAAS) in Washington DC, which publishes *Science*, says it wants to avoid this because it is concerned about introducing OA-publication charges that could be financially out of reach for authors.

The new AAAS policy instead allows researchers funded by some Plan S agencies to post accepted versions of their articles online freely as soon as their papers appear, and under open licences that let anyone else redistribute or reproduce the manuscripts. (Some Plan S agencies, such as UK Research and Innovation, haven’t yet finalized their policies on manuscript-sharing, so the AAAS policy doesn’t apply to them yet.)

The AAAS already allowed this kind of immediate author-initiated sharing, sometimes called green open access, but

its terms stated that the manuscripts could be shared only on personal or institutional web pages, and couldn’t be redistributed. Researchers also had to wait six months before they could post manuscripts in repositories such as PubMed Central. That did not satisfy Plan S funders, which say that if scientists can’t publish OA in journals (a process sometimes called gold OA), then they must share their accepted manuscripts under fully open licences as soon as they are published.

Legal obligation

In July 2020, some Plan S funders even said that they would make it a legal condition of grants that authors retain the rights to share their accepted manuscripts openly – no matter what a journal’s publishing agreement says.

The AAAS now says that scientists funded by Plan S agencies that adopt this ‘rights retention scheme’ (RRS) will be able to apply open licences to their shared manuscripts. No other scientists publishing in AAAS journals will be able to do this.

Plan S always enabled authors to comply with its policy through this type of green OA, says Johan Rooryck, the executive director of cOAlition S, the group of funders signed up to the initiative. “We are delighted that AAAS is updating its policy,” he said in a statement.

The new arrangement, which applies to all research submitted to journals in the Science

“It’s a bold move to go for a green OA solution to meeting Plan S requirements.”