Who gets to have the vaccine?

If a covid-19 vaccine is finally developed, tough decisions await about who should be first in line for the limited initial supply, says Graham Lawton

A volunteer in London is being given the world’s first vaccine against covid-19, with the hope of providing a strategy for a vaccine that works for everyone.

The vaccine is astraZeneca’s, which is being given to a volunteer in London, and is expected to work in the same way as the one that has been given to two people in the US. The volunteer is a 58-year-old man who has been given the vaccine by the UK’s national health service (nhs).

The body’s response to the vaccine will be monitored, and the results will be published in the coming weeks.

The vaccine is made up of several components, including a protein that is derived from the virus that causes covid-19. The vaccine is given intramuscularly, which means it is injected into the muscle, and it is given in a single dose.

The vaccine is being tested in a randomised, double-blind, placebo-controlled trial, which means that participants are randomly assigned to receive either the vaccine or a placebo. The placebo is a dummy injection, which does not contain any active ingredients.

The trial involves around 1,000 participants, who are being divided into two groups: one group will receive the vaccine, and the other will receive the placebo.

The trial will be conducted at several sites in the UK, and will involve participants from a range of age groups and health statuses. The participants will be followed up for 28 days after the vaccine is given, and their health will be monitored for any adverse reactions.

The results of the trial will be used to determine whether the vaccine is safe and effective, and if it is, the vaccine will be made available to the general public.

The vaccine is being developed by astraZeneca, a multinational pharmaceutical company, in collaboration with the University of Oxford, which is leading the trial.

The vaccine is expected to be available in late 2020 or early 2021, and it is hoped that it will be available to the general public by the end of 2021.

It is important to note that the vaccine is not the only option available for preventing covid-19. Other options include social distancing, wearing masks, and getting vaccinated with other vaccines that are already available.

It is also important to remember that the vaccine is not a cure for covid-19, and it is not 100% effective. It is estimated that around 80% of people who are vaccinated will develop immunity to the virus, but some people may still get sick.

In conclusion, the vaccine is a promising development, and it is hoped that it will be available to the general public soon. However, it is important to remember that the vaccine is not a cure, and that other measures, such as social distancing and wearing masks, will still be necessary.

Graham Lawton

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New Scientist Coronavirus

No one-size-fits-all vaccination

people in need of vaccination

should be first in line for the limited initial supply, says Graham Lawton. Of course, that day may depend largely on decisions being made now, in 2020, long before the pandemic is on the horizon.

It is August 2021, and the moment the world has been waiting for has finally arrived. After many false dawns, a vaccine against covid-19 has passed all the tests and is ready to be rolled out. It has been an arduous journey, but at last vaccine manufacturers around the world are cranking out thousands of doses a day. The end of the pandemic is on the horizon.

But this isn’t the end. It isn’t even the beginning of the end. There are more than 7.7 billion people in need of vaccination but perhaps only a billion doses available in the first six months of production.

Who gets one? Everyone agrees that front-line healthcare workers must be first in the queue. But who should be next? What is the best way to attain herd immunity? Will people accept the vaccine? And is it possible to stop rich countries from hoarding the supplies?

The answers to these questions depend largely on decisions being made now, in 2020, long before the pandemic is on the horizon. Of course, that day may never arrive. But let us assume that it does. What happens next?

No single approach

Even if a vaccine works, there is no one-size-fits-all vaccination regime. The two new vaccines on the horizon will have their own benefits and drawbacks. Of course, that day may never arrive. But let us assume that it does. What happens next?

In short supply

Even if an effective vaccine is developed, it will be in short supply. Making vaccines at scale is a happy accident. The nasal flu vaccine, for example, halts transmission, but that is not a happy accident. The nasal flu vaccine is by a vaccine team in Oxford, which says it could produce 2 billion doses within 12 months of approval. It is possible that two doses will be needed per person, so that would only be enough shots for fewer than 1 billion people, allowing for a 15 per cent wastage rate.

“It is quite unlikely that there is going to be enough vaccine for the entire world,” says Beate Kampschunter, director of the Vaccine and Infectious Disease organization’s strategy to the world health organization.

In the UK, the government has started modelling possible scenarios, but the results are still under wraps. One thing we can say, however, is that ring vaccination isn’t going to work. The WHO is transmitting contact with bodily fluids, so spreads relatively slowly, whereas covid-19 is a respiratory disease that spreads very rapidly.

The hard work has already started. The WHO published a preliminary vaccine allocation plan in June. It prioritises healthcare workers, of which there are about 110 million in the world. Next are the 600 million adults over the age of 65, and then the 1 billion adults over 30 with cardiovascular disease, cancer, diabetes, obesity or respiratory disease.

Individual countries are also formulating plans. In the UK, the joint committee on vaccination and immunisation held an extraordinary meeting on vaccine prioritisation on 18 June. It started from the premise that the priority is to “save lives and protect the NHS.”

But, paradoxically, the best strategy might be to vaccinate children. That is because a vaccine for covid-19 is likely to be given to under-12s, who are unlikely to be infected with the virus. This is because a vaccine for covid-19 isn’t a vaccine for the coronavirus, but it may not.

Vaccines are designed to protect individuals from severe illness or death, not to induce herd immunity. They sometimes produce it by preventing infection and transmission, but that is a happy accident.

The nasal flu vaccine, for example, halts transmission of the virus and can therefore create herd immunity. For this reason, it is principally

given to children to prevent them from infecting vulnerable older relatives who are unlikely to respond strongly to a vaccine.

But as yet we don’t know whether a covid-19 vaccine will work this way. “If vaccines become available, it will be because they are protective against disease,” says Grassly. “They may, or may not, also be protective against infection or transmission, but we don’t know yet.”

If a vaccine does promise herd immunity, it would probably be worth revising the vaccination prioritisation to take advantage, says Grassly. We know, for example, that some people don’t develop symptoms can still be highly contagious. There are also “superspreaders” who infect many more people than average. The difficulty will lie in identifying who those people are, but it may pay to prioritise vaccination for teachers and those working on public transport or in supermarkets, he says.

There would also be an argument for vaccinating children rather than vulnerable adults. “Healthcare workers should be first, then the intuitive thing is to vaccinate children,” says Alberto Giubilini of the uehiro centre for practical ethics at the University of Oxford. “But paradoxically, the best strategy might be to vaccinate children. That is because a vaccine for covid-19 is likely to be given to under-12s, who are unlikely to be infected with the virus.”

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in older people, in which case the strategy would be to vaccinate the people around them.

Another factor that could scupper herd immunity is what researchers call vaccine hesitancy. According to Heidi Larson, director of the Vaccine Confidence Project at the LSHTM, covid-19 anti-vaccine posts on social media outnumber positive voices by about four to one.

In denial

There are signs that the anti-vaccination mainstream is cutting through. In the UK, for example, Larson’s team has been asking samples of more than 2000 people whether they would be willing to be vaccinated. In late March, 30 per cent of people said yes. By the end of May, that had fallen to 10 per cent.

In the US, a poll conducted in May found that 42 per cent of people would definitely get vaccinated against coronavirus, 27 per cent definitely wouldn’t and the rest were unsure. A similar obstacle is the growing number of people who refuse to accept that covid-19 even exists, says Leesa Lin at the LSHTM. “There is clearly enormous political will that when vaccines are developed, rich countries don’t monopolise them,” she says. “We’ve heard world leaders like Emmanuel Macron saying that vaccines should be a ‘global public good’. That is significant because underlying it is a realisation, at the very highest levels, that without global herd immunity it’s going to be very difficult to bring this pandemic to an end.”

The World Health Organization (WHO) covid-19 vaccine prioritisation plan (see main article) emphasises the need for “equitable and fair global allocation” and a global coalition called COVAX is working to ensure that this happens. Countries that sign up then pool resources so that if one vaccine succeeds, all can have it. It is effectively an insurance policy, says Yamey.

At the time of writing, 170 countries with a combined population of 5 billion have expressed an intention to sign up, including the UK, Canada, New Zealand and Ireland. The 92 poorest of these countries will get a vaccine for free. Meanwhile, the teams behind the UK’s leading vaccine Full protections: a lab technician at work to develop a vaccine against covid-19

Vaccine nationalism

During the flu pandemic of 2009, high-income nations were criticised for hoarding vaccine doses. Will “vaccine nationalism” raise its ugly head again? Some world leaders seem to have learned the lessons of 2009, says Gavin Yamey at Duke University in Durham, North Carolina. “There is clearly enormous political will that when vaccines are developed, rich countries don’t monopolise them,” he says. “We’ve heard world leaders like Emmanuel Macron saying that vaccines should be a ‘global public good’. That is significant because it is a realisation, at the very highest levels, that without global herd immunity it’s going to be very difficult to bring this pandemic to an end.”

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candidates at the University of Oxford and Imperial College London have pledged to make their vaccines available on a not-for-profit basis. But the nationalist drumbeat is growing. Neither the US nor China has yet publicly declared an interest in COVAX. And several countries have signed deals with firms to buy disproportionate amounts of vaccine. “It is already obvious that countries that have contributed significantly to the funding of the research will want to have the first pick at the crop,” says Beate Kampmann, director of the Vaccine Centre at the London School of Hygiene & Tropical Medicine. For example, the UK government has secured a deal for 30 million doses of the Oxford vaccine, which is 5 per cent of the projected world supply for a country with less than 1 per cent of the global population.

The US has signed a deal to buy 350 million doses of the Oxford vaccine, 1.75 per cent of global supply for a country with 4 per cent of its population. US president Donald Trump has also set up an explicitly nationalist vaccine development programme called Operation Warp Speed.

“There is no such thing as a British or Chinese or American vaccine, any vaccine is going to be a global public good,” says Yamey. “The billion-dollar question is, are there deals a threat to the global fair distribution of vaccine? My answer is, they are.”

Meanwhile, Russia announced this week that it has become the first country to approve a vaccine. However, according to the WHO, the vaccine, being developed by the Gamaleya Institute in Moscow, is only in early trials raising concerns that it is being used before it is known to be safe. IT LOOKED as if the tide had turned against single-use plastic last year, with the European Union approving a ban on cutlery, straws and more. New York City’s plastic bag ban and consumer pressure continued to grow. Hygiene fears and the demand for masks has unleashed a plastic pollution pandemic, while industry lobbyists are pushing to roll back restrictions. It hasn’t been long enough for there to be official data on plastic waste and recycling rates, but there is no shortage of estimates and anecdotes. If every person in the UK used one single-use mask a day for a year, it would create 66,000 tonnes of plastic waste, according to one estimate by a University College London team. New Scientist readers have reported masks dumped on beaches, streets and in harbours.

Meanwhile, large parts of the retail and hospitality industry have suspended efforts to cut plastic use. Many coffee chains have stopped accepting reusable cups, pubs in the UK are only serving drinks in plastic, not glass, and more petrol stations have been equipped with single-use plastic gloves. Online supermarkets have stopped offering reusable or recycling plastic bags. The list goes on.

“Members of the public can help by using reusable pump bottles, and disposing of any single-use masks and gloves carefully, to avoid adding to the plastic pollution that already clugs our rivers and seas,” says Louise Edelman at Greenpeace UK. Governments and local authorities are also going backwards. California dropped its ban on single-use plastic bags for several months, although it has since reinstated it. Other places in the US, from Denver to Minneapolis, have delayed bag bans or fees for lifting existing ones.

“A Norway-backed effort to establish an international treaty on marine plastic pollution has indefinitely postponed its meetings because of covid-19. “The plastic industry is cynically using covid-19 as justification for removal of restrictions,” says Hilary Raby at Friends of the Earth. The drive must not succeed. Trade bodies in the US, Europe and the UK have written to government and official authorities asking for them to support the supposed benefits of single-use plastics during the pandemic, but haven’t yet won policy shifts. Meanwhile, plastic recycling rates may have fallen. Mushita Meron at the United Nations Environment Programme (UNEP) says he has heard reports of a decline due to broken supply chains, lower collections and fear of contaminated plastics. In the UK, 26 per cent of local authorities reported disruption to recycling. That figure fell to 18 per cent by late July.

Plastic’s resurgence has been sparked by mass overconsumption of the coronavirus, but it isn’t clear whether these are well founded. Several papers have found that the virus seems to last longer on plastic than on other materials, including glass and cardboard.

Scores of academics signed a statement saying reusable "products can be used safely by employing basic hygiene." One cause for hope is that people still seem to care about stemming plastic use despite the pandemic. In the UK, 24 per cent of people said covid-19 had made no difference to their plans to cut their use of plastic packaging, market research firm YouGov found in early April. Similarly, UNEP polling of people in Indonesia, Malaysia, the Philippines, Thailand and Vietnam suggests that the plastic pandemic pollution remains high.

While some businesses may have taken short-term steps backwards, there is little sign of big players reneging on long-term targets, such as UK supermarket Sainsbury’s last year pledging to halve plastic packaging by 2025. Some campaigners see covid-19 economic recovery plans and changes in consumer behaviour as a chance to clamp down on single-use plastic. “We have to move towards a more circular economy – slowing down the conveyor belt from production to waste, through more recycling, less single use throw away material, better design and targeted use of materials,” says Richard Bailey at the University of Oxford.