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IT LOOKS likely that some countries will soon be able to vaccinate at least some people against the coronavirus (see page 7), but until vaccines are widely available, mass testing is seen as a route back to normal life.

For example, UK prime minister Boris Johnson announced on 23 November that daily coronavirus tests will be given to people who have come into contact with anyone who has tested positive for the coronavirus, in an attempt to limit the number of days they have to self-isolate. The measure will be trialled in Liverpool, which began mass testing earlier this month.

But while extensive testing has helped places such as China and Singapore keep the spread of coronavirus low, it won’t work on its own. Many other policies are needed to make testing successful at containing the spread of the coronavirus. “Just testing people does not get rid of covid,” says Christina Pagel at University College London (UCL). People need incentives to get tested, for example, and it must be easy for them to do so. Those who test positive need to self-isolate, and they need financial support to do so. Their contacts need to be quickly traced, isolated and tested too. Once a region has eliminated the spread of coronavirus within a community, strict border controls can prevent it entering again from outside the region. And all this needs to be combined with wider measures to limit exposure, such as wearing face coverings and social distancing.

“All those things have to work and if they don’t work, if one of them is leaky, you get problems,” says Pagel. “That’s what’s been happening in Europe.”

This is why some researchers think the UK government is making a mistake in rushing to do mass testing without rigorously implementing these other measures. “The way [England is] going about it means it will fail miserably,” says Angela Raffle at the University of Bristol in the UK.

Countries cannot simply pin all their hopes on vaccination and ignore testing, as it could take years to vaccinate entire populations. “We have a long process before we can roll out the vaccine,” says Jasmina Panovska-Griffiths, who is also at UCL. “[England] still needs to get test and trace right.”

Here is what is needed to make a testing scheme succeed:

People must have an incentive to get tested
The first step in using testing to help control the spread of covid-19 is to detect as many cases as possible. In many countries, everyone who has potential covid-19 symptoms is meant to get tested. However, there are good reasons to think many are not. In Australia, for instance, one recent survey found that just 15 per cent of people with cold or flu-like symptoms were getting tested for covid-19. The most common reason for not doing so was that they didn’t think they had covid-19, which is reasonable – just 0.4 per cent of UK users of the COVID Symptom Study app reporting symptoms of illness had a positive coronavirus test as of August – but misses the point. Some people may not get tested because of the time and effort involved, or because being swabbed is unpleasant. And for others it is because they or other members of their household could lose income or their jobs if they have to isolate after a positive test.

“We have to give people an incentive to do it,” says Pagel. This is even more important with mass-testing programmes. People who feel fine may be less likely to get tested than those with symptoms. In Liverpool, less than a fifth of the population came forward for a test in the first week of mass testing.

What’s more, this and other mass-testing programmes being launched in England will attempt to provide weekly testing for everyone. Asking venues to demand evidence that people have been tested recently could encourage take-up, says Julian Peto at the London School of Hygiene & Tropical Medicine. “If you can’t get into a pub or go to a restaurant, you’re going to want to get your test.”
false negatives, and they are only coronavirus, as tests can return won’t still be able to pass on the doesn’t mean that you can’t or Getting a negative test result less accurate after rapid tests, which can be still take precautions, especially People who test negative should to self-isolate actually do so if contacts are traced fast enough – ideally within 24 hours – these people can isolate in time to stop further spread. Unfortunately, the test-and-trace systems in many countries aren’t efficient enough to achieve this. England’s system has repeatedly missed its own targets. Germany’s system did better but was overwhelmed as case numbers rose in the autumn. “The capacity of local health authorities was exceeded,” says Ralf Reintjes at the Hamburg University of Applied Sciences in Germany. We must ensure that people asked to self-isolate actually do so In some countries, such as China, people with covid-19 have been quarantined in special facilities. But in most countries, people are merely required to self-isolate at home. This works only if they and the other members of their household really do isolate. Some countries in Asia have taken a carrot-and-stick approach. For instance, Taiwan tracks people in isolation using their phones. Police check on any apparent violations, with fines for those who have left home. But there is also financial compensation and support, such as the delivery of bags of food and other essentials. In Europe, there has been less enforcement and less support. “Europe is not handling the isolation part well. This needs to be managed isolation with support financially, emotionally and practically,” says Devi Sridhar at the University of Edinburgh, UK. “European countries seem to just expect people to isolate without thinking through how to ensure this happens.” A study in May found that only 1 in 5 people in the UK were self-isolating after developing symptoms (medRxiv, doi.org/ggs9n24). Surveys in early September showed that 54 per cent of people in England asked to isolate were staying at home, the head of England’s test-and-trace programme, Dido Harding, told a committee of MPs on 10 November, though the figures aren’t publicly available and she said they hadn’t been quality checked. The rise could be because England has introduced fines of up to £10,000 for not self-isolating, as well as compensation of £500 for people on low income who are asked to isolate. But there is still no systematic enforcement. “One of the biggest differences compared with Asia is we have football match without it, that’s a wonderful way to encourage people to participate,” he says. People who test negative should still take precautions, especially after rapid tests, which can be less accurate Getting a negative test result doesn’t mean that you can’t or won’t still be able to pass on the coronavirus, as tests can return false negatives, and they are only

40% Proportion of cases in Taiwan due to pre-symptomatic spread University of Warwick, UK. “Do they go and see their grandmother? Do they stop wearing masks?” If so, there is a risk that mass-testing programmes, such as the £100 billion England-wide testing scheme, dubbed Operation Moonshot, could actually increase transmission, she says. There are particular concerns about the rapid tests being used for mass testing in England and Slovakia, which are less sensitive than standard tests. “This test is not good enough to pick out people in the first part of an infection,” says Jon Deeks at the University of Birmingham, UK. People exposed to those who test positive must be traced quickly If the aim of testing is to stop the coronavirus spreading further, it will work only if positive results are followed up – and fast. First, those who test positive have to be told to self-isolate as soon as possible. Then, everyone they have come into contact with needs to be found quickly, told to isolate and tested too. What makes this difficult with the coronavirus is that people become infectious before they develop symptoms, so even if infected people self-isolate and get tested as soon as they become ill, they may already have passed on the virus. In Taiwan, around 40 per cent of cases have been due to pre-symptomatic spread, says Hsien-Ho Lin at the National Taiwan University in Taipei. This means that even the most efficient testing system can’t prevent all secondary cases. But if contacts are traced fast enough – ideally within 24 hours – these people can isolate in time to stop further spread. Unfortunately, the test-and-trace systems in many countries aren’t efficient enough to achieve this. England’s system has repeatedly missed its own targets. Germany’s system did better but was overwhelmed as case numbers rose in the autumn. “The capacity of local health authorities was exceeded,” says Ralf Reintjes at the Hamburg University of Applied Sciences in Germany.

A woman posting a sign requiring face coverings in a shop window in Wales
much more relaxed isolation,” says Pagel. “No one checks up on you and makes sure you are doing it.” She fears that the fines will deter people from coming forward for testing in the first place.

Border controls can prevent reintroductions of the virus from outside a region
Many of the countries that have been successful in controlling the virus have used strict border controls to prevent it being brought in from other countries.

Travellers to Australia, for example, have to quarantine in a hotel room for two weeks upon arriving in the country – and even this hasn’t been enough to prevent a couple of outbreaks.

Most countries in Europe relaxed border controls during their summer to help the tourism industry. In August, Sridhar warned that summer holidays would lead to winter lockdowns, and there is some evidence that she is right.

Several European countries have imposed restrictions in October and November.

Genetic studies have revealed that a variant of the coronavirus called 20A.EU1 emerged in Spain in June and spread to many other European countries, probably carried by returning tourists (medRxiv, doi.org/fjrv).

“Our study looking at the 20A.EU1 variant highlights that travel did play a role in spreading this variant around Europe in the summer,” says Emma Hodcroft at the University of Basel, Switzerland. “Few countries screened returning travellers. Most relied on ‘honour system’ quarantines that may not have worked as well in practice as we might have liked it to in theory.”

The UK could introduce tougher border controls together with the Republic of Ireland, says Pagel.

Even with mass testing, we still need tried-and-true methods such as face coverings and social distancing
South Korea is sometimes portrayed as having controlled the coronavirus mostly with its test-and-trace programme, but it has implemented many other measures, too, including shutting schools very early on.

“In South Korea, testing was one of several measures that allowed them to control the epidemic,” says Francois Balloux at UCL.

In Taiwan, another country that has been successful at controlling the virus, an analysis by Lin found that the widespread use of face coverings, physical distancing and handwashing had a bigger impact than test, trace and quarantine (medRxiv, doi.org/fjrw).

It is the combination of the two approaches that has worked to control the outbreak in Taiwan, says Lin. This combination may have failed in other countries because these measures haven’t been implemented as effectively.

“There is no country, not a single one, that controlled [covid-19] by testing alone or even mainly by testing,” says Balloux.

Effective contact tracing and mass testing aren’t enough. Sometimes we must use lockdowns too
In China, entire cities – including Wuhan, Qingdao and Kashgar – have experienced strict lockdowns after small outbreaks, with every resident tested in just days. The idea was to stop infected people spreading the coronavirus beyond their household, making contact tracing easier.

In Slovakia, mass testing was also done as part of a lockdown. The country tested two-thirds of its population of 5 million people over two days at the start of November, and then did follow-up tests in the worst regions a week later. It is now easing restrictions.

The UK government, however, seems to view mass testing as an alternative to lockdowns. “If it works, we should be able to offer those who test negative the prospect of fewer restrictions, for example meeting up in certain places with others who have also tested negative,” said Johnson during the 23 November press conference.

But without a lockdown, efficient contact tracing is even more vital if mass testing is to make any difference.

“In England, we really need to get the contact-tracing element working,” says Allyson Pollock at Newcastle University in the UK. “We were very concerned when the government decided to ramp up the test-and-trace system without fixing it, and to extend it to mass testing of the whole population.”

She thinks England’s mass-testing programme needs to be paused and rethought in order to be effective.