When will lockdown end? Nations look for coronavirus exit strategies

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There are three main strategies for leaving coronavirus lockdown, but each risks a dangerous second wave and further lockdowns if things don't go as planned

People applaud health workers in locked-down Madrid, Spain

BANS, curfews and wide-reaching restrictions. For many people worldwide, severe limitations on daily life because of the coronavirus have become the new normal. But as we adjust to these measures, what prospect is there of returning to the old normal? What is the world's exit strategy?

If you are hoping for a return to your old life, there is good news and bad news: it will happen, but not necessarily soon. "It is absolutely the case that government advisers and researchers are considering the question of an exit strategy," says epidemiologist Mark Woolhouse at the University of Edinburgh, UK. But what different nations' exit strategies will look like, how long we will have to wait for them, and whether they will work, are all still up in the air. In addition to this, a lack of coordination at the international level could spell trouble when the time comes.

The lockdowns that many nations are enduring are a short-term strategy to reduce the average number of subsequent infections each pan case causes, in order to stop the rate of infections increasing exponentially. This is known as "flattening the curve". The approach is intended to prevent hospitals being overwhelmed, which should lessen the death count. It also buys time to develop new treatments and better understand the infection.

Lockdown isn't a long-term strategy, however. "We want to get out of lockdown because of all the damage it is doing to society as a whole, economically and psychologically," says Woolhouse. But there is a risk to lifting restrictions that have successfully flattened the curve: the curve unflattens and the rate of infection returns to exponential growth. "We want to get out, but we don't want the epidemic to take off again," says Woolhouse.

In other words, the two things we want to achieve – a flat curve and an end to lockdown – are incompatible. Devising an exit strategy, then, becomes a question of determining the best time to lift restrictions, and the action to take to keep infection rates under control.

One thing is clear: we can't bank on a vaccine getting us out of this. It will take many months to develop an effective one – if we manage it at all. "I do not think waiting for a vaccine should be dignified with the word 'strategy'. It's not a strategy, it's a hope," says Woolhouse.

So how do you get out of lockdown without unleashing a dangerous "second wave" of infections among people who weren't exposed to the virus the first time round? A second wave like this is "highly likely", says Susy Hota, medical director of the infection prevention and control programme at the University Health Network in Toronto, Canada.

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Any second wave will probably be less severe than the first, says Woolhouse. "With any newly emerging virus, it's the first wave that is the worst. After that, it will settle down and become much more manageable." For example, since the 2015 to 2016 Zika epidemic, subsequent outbreaks have tended to fizzle out due to the detection and control measures now in place, plus a degree of immunity.

Exit strategies therefore have to include a plan to manage a second wave. Broadly, there are three ways to do this: we can call them hold, build and shield.

The hold strategy plays the long game: lockdown until the rate of new infections falls close to zero, then lift the lockdown and pivot to an aggressive containment strategy. That means diagnosing second-wave cases as quickly as possible, isolating them, tracing their contacts and isolating them too, if necessary, to cut all new lines of transmission.

That requires building the capacity to do far better containment and contact tracing than most countries managed the first time round. Waiting for the infection rate to be near zero also risks having to impose lockdown for a long time.

Increasing capacity

The second strategy, build, buys time for health services to recover from the first wave and build capacity to deal with the second. In richer nations, health services' limiting factors are intensive care beds and staff. So this strategy involves locking down for long enough to recruit enough of both, then releasing restrictions gradually and dealing with the second wave, hopefully with a much lower mortality rate. But how much intensive care capacity is enough to achieve that? It is a difficult question, and a wrong answer could cost many lives.

Option three, shield, is to end a lockdown abruptly while extensively protecting those who are likely to be most vulnerable to the virus. This means finding ways to ensure the safety of older people and those with health conditions that make them more likely to get seriously ill and die. Pulling this off requires widespread community screening to find out who is infectious – especially people with no symptoms – and making sure they don't come into contact with vulnerable people.

Healthcare workers are given tests for the virus at a drive- through centre in London

Another element of this is developing antibody tests to identify medical staff and care workers who have recovered from the virus and may therefore be at a lower risk of infecting others.

The overall effect would be to reduce critical cases and deaths, and hence take pressure off hospitals while allowing herd immunity to build up in the less-vulnerable population. Covid-19 can kill younger people without other health conditions, albeit not often, but if shielding can reduce the number of cases among more vulnerable people, healthcare services should be better placed to treat these.

Choosing between these three strategies depends to a large extent on a few unknowns, particularly how quickly a population crosses the threshold into herd immunity – the point at which enough people have acquired antibodies to the virus to stop it from readily circulating in the population.

We don't yet know if recovering from covid-19 makes you immune to the virus in the long term. But even if immunity is only temporary, once enough people have encountered the virus, herd immunity will still slow or stop its spread for a while. "Herd immunity will kick in if the infection spreads widely enough," says Woolhouse. "But we need a better understanding of herd immunity to this virus to decide between the three options." If herd immunity builds quickly, then option three is perhaps the least worst, for example.

All three strategies may also have to be abandoned or temporarily suspended if second waves get out of hand, which could mean a repeat cycle of lockdown, relaxation, lockdown. “It’s certainly possible that once we have released the lockdown we may need to reintroduce it,” says Woolhouse.

The UK’s deputy chief medical officer, Jenny Harries, recently said she expected the UK to be able to begin lifting restrictions sooner rather than later, but warned that they couldn’t be lifted all at once, and may have to be reimposed.

“If we are successful, we will have squashed the top of that curve, which is brilliant, but we must not then suddenly revert to our normal way of living – that would be quite dangerous,” she said. “If we stop then, all of our efforts will be wasted and we could potentially see a second peak. We need to keep that lid on and then gradually we will be able to hopefully adjust some of the social distancing measures and gradually get us all back to normal.”

The chances of success for any of the strategies are unknown. They can be assessed using models, but their calculations are only as good as the numbers and assumptions they are based on, and even then can produce highly uncertain results. One recent modelling study of how the UK epidemic might pan out over the next 18 months concluded that “the inherent randomness of societal processes can lead to a wide range of possible outcomes”.

“Models are based on major assumptions and often these assumptions are wrong,” says virologist Jonathan Ball at the University of Nottingham, UK. “Whilst such models can give an insight into what might happen, they can’t tell us what will happen, and the sooner we realise this the better.” There is no substitute for on-the-ground research, he says.

Learning from China

For that, many are turning to China, the initial centre of the epidemic. “China was the first country to enforce lockdown,” says epidemiologist Caroline Walters at Imperial College London. “So because they’re a little bit ahead, I think there will be a lot of eyes on how they are handling the situation.”

China has essentially followed the hold strategy, imposing strict social distancing in Wuhan in Hubei province on 23 January, where the outbreak started. This was closely followed by similar measures elsewhere, which appears to have contained the outbreak. On 23 March, the Chinese government announced that, for the first time since the epidemic began, there had been five consecutive days with no new cases in the country caused by local transmission. Restrictions have been relaxed, including across most of Hubei, and are due to be lifted in the city of Wuhan on 8 April.

“Life is not back to normal, but they started to slowly let people move around a little bit more,” says Walters. “They are not in full lockdown like they were.”

Extensive testing and contact tracing is being combined with some continuing social-distancing practices. China has also closed its borders to everyone except citizens to reduce the number of new cases coming in from abroad.

“Early signs suggest that China has to some degree successfully exited stringent social distancing”

As a result, economic activity seems to be rebounding, according to a recent study from Imperial College London’s COVID-19 Response Team, of which Walters is a member. The team obtained a data set of the level of movement within major cities in every province of mainland China between 1 January and 17 March, captured by the Chinese search engine Baidu’s location-based services on phones.

“We used movement data as a proxy for economic activity,” says Walters, “and we had data on the case numbers of coronavirus.” Movement is linked to economic activity as it indicates people are shopping and going to work.

They found that, in the early part of the data set, levels of movement were closely correlated with the number of new cases, indicating that people were spreading the virus as they went about their daily lives. But once the containment measures had been imposed and then relaxed, that correlation disappeared.


Children playing in a square in Wuhan, China, earlier this month

"Transmission was staying low, despite people being able to move," says Walters. "We're seeing some people being able to return to normal economic activity without the virus returning to the same level of transmission."

She warns that these results don't prove anything. "All we're looking at is a correlation, not causation, we can't say directly 'this caused this'." The team also warns that the results don't rule out further outbreaks, or predict when activity will fully return to normal. But the study concludes that the results "do suggest that China has successfully exited their stringent social distancing policy to some degree".

Lack of coordination

Last month, both sectors of China's economy, services and manufacturing, reported a return to growth after a major slump in February. China's National Bureau of Statistics says that more than half of enterprises had resumed work, although it cautions that China's economy hasn't yet returned to normal.

Reports are also emerging that some recently reopened businesses such as cinemas and bars are being abruptly shut again. Authorities haven't explained these closures, according to a report in The Washington Post. But just before they happened, National Health Commission spokesperson Mi Feng said "the possibility of a new round of infections remains relatively high". Epidemiologists say that if a second wave hits China, it will be evident by the end of this month.

So can China serve as a model for the rest of the world? To some extent yes, says Walters, but exit strategies will have to be adapted to local conditions. "Not all countries are going to have the capacity to do the testing or the contact tracing," she says. Even within China, exit strategies differ from region to region, according to local circumstances.

The European Union has said it is working on a coordinated exit strategy, but as yet there are no details. Some countries that are still in the early stages of outbreaks, such as Canada, have yet to even start thinking about how to exit, says Hota.

Up to now, exit strategies are being handled at a national or transnational rather than international level despite the outbreak being a pandemic, says Woolhouse. The World Health Organization told New Scientist that there is no global exit strategy yet, saying that the organisation is currently focusing on responding to the virus instead.

Whatever exit strategies are eventually put in place, it is likely we will eventually get back to something resembling our old lives. "We have to find a way of living with this virus and still functioning more or less as normal," says Woolhouse. "I think we are going to be living with this virus for possibly forever but certainly the foreseeable future. So the long-term strategy is, how do we live with covid-19?"

In a year or so, vaccines may become a part of the answer, and improved treatments and some level of herd immunity will play a role too.

“I think that we will get back to our old lives,” says Walters. “Pandemics have happened before. People may end up feeling a bit differently about the world they live in, but what we’re experiencing right now is not forever. It’s a measure brought in to achieve a certain goal, which is the flattening of the curve to protect our health system. We don’t know exactly when it will end. But it will end.”