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SINCE the first reports of the novel coronavirus, the list of known symptoms has changed, as has our understanding of what the virus does to the body. Health advice, for both governments and individuals, has evolved, too. And although some countries claim to have virtually eliminated the virus, others are only now seeing cases beginning to spike and some are seeing what looks like a “second wave” of infections. What can we learn from the countries that got it right – and those that got it so very wrong?

Fast action
One major early fumble was the incorrect assumption that the virus was like the flu. Many nations already had a plan in place for dealing with a pandemic flu. “It inhibited their ability to think about how to respond to another virus,” says Jennifer Nuzzo at Johns Hopkins University in Maryland.

The coronavirus required a different response, says Michael Baker at the University of Otago in Wellington, who advised the New Zealand government on the country’s covid-19 response. Flu typically has an incubation period – the time between someone becoming infected and showing symptoms – of around one to two days. This makes it extremely difficult to trace the contacts of an infected person before they get sick themselves.

The coronavirus, on the other hand, appears to have an incubation period of about five to six days, but potentially several weeks. “It means that it’s a slower moving wave and there are more opportunities to use contact tracing and isolation and quarantine,” says Baker. “We know that’s the case because [the SARS coronavirus] was contained and eliminated with those traditional measures.”

In addition, while flu can “sweep through a population in a matter of weeks”, he says, the coronavirus can stick around for much longer and can have lasting health effects for those who survive covid-19. This is one reason why the idea of waiting to achieve herd immunity rather than taking action to limit the impact of the virus – a strategy the UK and Swedish governments initially considered – was widely dismissed by the scientific community.

Today, the UK has the highest number of recorded coronavirus cases in western Europe, probably in part due to the UK government’s delayed response to the outbreak. One factor that unites the nations that have done a better job at limiting case numbers is a quick initial response.

“In countries like China, South Korea, Japan, the initial response was quite rapid, so the containment phase worked really well for them,” says Rajiv Chowdhury at the University of Cambridge. By quickly identifying new cases and where they were coming from, these countries stood a much better chance of interrupting the ongoing transmission of the virus, he says.

Well-timed lockdowns
Another strategy that appears to have been successful was the use of lockdowns: imposing restrictions on movement to contain the spread of disease. A lack of such constraints in Sweden has been widely blamed for the country’s level of cases, which far exceeds those of neighbouring countries. “When you just let things go, and don’t implement any control measures… I think we’ve seen that the results can be devastating,” says Susy Hota at the University Health Network in Canada.

Lockdown rules have varied widely worldwide, but implementing restrictions early on worked well for many countries, including China and New Zealand. New Zealand’s lockdown was particularly strict: schools, universities and almost all businesses were shut, and people could only leave their homes for essential reasons. Such measures succeeded in lowering the R number – the average number of people one person with the virus will go on to infect – from around 2 to around 0.5 within five weeks, says Baker.

Modelling has suggested that implementing lockdown just a week earlier in the UK could have avoided 20,000 deaths.

But lockdowns don’t necessarily work the same way in low and middle-income countries, where it can be much harder for people living in low-quality housing in densely populated areas to stay home and lose out on income.
in many countries where numbers continued to rise. But because of the difficulties in enforcing restrictions, case numbers continued to rise. While there were few in many low-income nations. In theory, it makes sense to introduce lockdown while cases are still low, says Chowdhury. But because of the difficulties in enforcing restrictions, case numbers continued to rise.

Cases are now climbing in many countries where governments have eased restrictions that have become economically unsustainable. “That’s a trend I see in many countries in Latin America, South-East Asia and Africa,” says Chowdhury.

These and other regions are fast becoming the next coronavirus hotspots. Many people in Bangladesh, for example, found it hard to comply with lockdown restrictions, with almost three-quarters of those in urban areas losing their main source of income. In Brazil, mixed messaging from the government weakened the impact of lockdown. The virus is currently spreading significantly in both countries.

Alternative approaches may work better in some countries, says Chowdhury. The World Health Organization (WHO) has recommended that Pakistan, which has also experienced a spike in cases, impose a rolling two-week-on, two-week-off lockdown, for instance. More localised lockdowns could also be effective. This approach has already been adopted in a number of other countries, including in the UK city of Leicester.

Travel restrictions
Lockdown alone isn’t enough, however. Since the beginning of the outbreak, the value of testing people for the virus, tracing their contacts and encouraging them to isolate themselves has become clear. “It has proven to be important, not just for helping to interrupt transmission... but also for us to better understand where transmission is occurring,” says Chowdhury. So we can have targeted efforts to protect people in those environments,” says Nuzzo.

Part of New Zealand’s success was down to the strengthening of test-and-trace capacities, for example. “New Zealand was not the world leader in this,” says Baker. “We learned from the Asian experience.” Specifically, Baker and his colleagues followed what had worked in places like Taiwan, which has reported fewer than 10 deaths to date.

Both New Zealand and Taiwan enforced border controls early on in the outbreak, restricting the arrival of travellers who might bring the virus in with them. Travel restrictions also worked well for Nepal and Sri Lanka, says Chowdhury.

Some countries that didn’t impose such restrictions appear to have suffered as a result. “That has been a key factor in how quickly we saw the local epidemic become a pandemic in Bangladesh,” says Chowdhury. When outbreaks were hitting Europe and the Middle East, Bangladeshis in these regions boarded flights back to the country. “People were scared and wanted to go to their home country, and a good proportion were potentially carrying the virus,” says Chowdhury. “It was impossible for the local government to screen so many people so suddenly and, as a result, they lost control.”

The first UK outbreaks are thought to have been triggered by people returning from ski holidays in Italy and Austria, and cases also came from China, says Patricia Schlagenhauf at the University of Zurich in Switzerland. “It’s obvious that travel does contribute a lot to the spread of the virus,” she says.

20,000
UK deaths might have been avoided by a swifter lockdown

However, at the start of the pandemic, the WHO made a point of not recommending that international travellers be screened for infections or travel be restricted in any way. “Later, they did advise against unnecessary travel,” says Schlagenhauf.

But travel restrictions and bans are hard to implement and people can always find ways around them, says Hota. Such restrictions aren’t always the best use of resources, either, especially for bigger nations and those that aren’t islands, where the challenge is much greater, says Nuzzo. She highlights the experiences of the US, which banned most non-residents from arriving from China in February. “But there are a lot of people travelling from China to the United States anyway because they are residents of the US,” says Nuzzo. The public health resources dedicated to managing this small pool of people could have been better implemented elsewhere, says Nuzzo. “I had a colleague at a large city health department who said that they had two returning travellers from China who they needed to put into...
quarantine,” she recalls. “They had 33 staff dedicated to finding them a hotel, monitoring them, making sure their safety was ensured and making sure they didn’t leave,” she says.

“It ate up all of [the] resources to do things like expand hospital capacity and protect nursing homes and expand laboratory testing,” says Nuzzo. “There was a lot of stuff the US needed to be doing in January, February and early March that [it] just didn’t do.”

Blocking travel from China didn’t help places like New York. The city’s huge outbreak is thought to have been triggered by travellers bringing the virus from Europe, says Nuzzo.

Face masks and coverings
A better understanding of how the virus spreads is also changing the way we try to tackle its spread. We have learned, for instance, that people without symptoms can spread the virus. This appears to be true of both those who later go on to become unwell and those who never develop any symptoms.

And while we still don’t know exactly how important this mode of transmission is for the overall spread of coronavirus, the finding has helped to shift the advice on mask wearing for the public. In April, the WHO advised that people with symptoms should wear a face covering, but that there was no evidence to support mass mask wearing in the wider community.

The organisation changed its position in June, and currently recommends that people over 60 and those with underlying health conditions don a medical-grade mask in settings where they are unable to keep their distance from others. Non-medical masks are also recommended for anyone visiting indoor public settings, such as shops, schools and public transport, as well as those living in cramped conditions, or spending time in areas where there is widespread transmission or where physical distancing is impossible.

Even now, there are no robust, randomised, controlled trials to show that mask wearing in the community slows the virus’s transmission. Sceptics caution that cloth masks vary in their ability to limit the spread of infectious particles – and none will completely prevent transmission.

There are also concerns that, outside clinical settings, face masks are often improperly used. Many users continue to touch their faces while wearing face coverings, wear them below their noses or fail to wash them between uses, for example, rendering them much less effective.

Despite the lessons learned, many countries remain a long way from eliminating the virus, and a mix of strategies will be required. “I think the goal is to keep the case numbers as low as possible until we get a vaccine,” says Nuzzo. 

What we still don’t know about the virus’s spread

Despite all we have learned about how the coronavirus is transmitted and how best to contain it, plenty of questions remain unanswered.

Mass gatherings
The role that mass gatherings play in the virus’s spread is still unclear. A football match in Milan, Italy, in February is thought to have contributed to the particularly large outbreak that followed in the area. Outbreaks have also been linked to big social gatherings. Modelling studies suggest that mass gatherings can act as so-called superspreader events. Yet we still don’t know how important these events have been in the spread of coronavirus, says Rajiv Chowdhury at the University of Cambridge.

Superspreaders
More generally, the role of superspreaders – people who infect a disproportionate number of others – remains unknown. That is partly because researchers and governments have tended to focus on the R number, which indicates the virus’s ability to spread, instead of the K number, which illustrates how much of that spread is due to what proportion of people.

The K number might suggest, for example, that 10 per cent of people are responsible for 80 per cent of infections. “It sheds light on the variation behind R and how much a disease relies on mass gatherings,” says Chowdhury. “It’s something we need to look at.”

Indoor locations
We have learned that being close to someone, indoors, plays a significant role in spreading the coronavirus. But how well venues can manage this risk is still being investigated.

Bars, nightclubs, ski resorts and cruise ships have all been linked to outbreaks. People won’t be covering their faces when eating or drinking and they get close to each other to speak when loud music is playing. Alcohol is likely to lower inhibitions regarding social distancing, too.

Schools
We have learned that only a tiny percentage of children appear to experience severe cases of covid-19, but children may still pass the virus on to adults. The evidence from reopening schools so far is mixed. There have been encouraging signs in Europe, but some schools in Israel have had to be closed again after hundreds of students and staff have tested positive.

“Quarantining travellers from China ate up all the US’s resources. There was a lot it just couldn’t do”

coverings, wear them below their noses or fail to wash them between uses, for example, rendering them much less effective.

Still, scientific consensus has swung in the past few months. Now, most scientists will argue that, as the use of face masks is supported by a handful of small, weak studies, and they don’t do any harm, they are worth using, at least in places where it is hard to keep away from other people. “There’s no reason not to use them,” says Nuzzo.

Despite the lessons learned, many countries remain a long way from eliminating the virus, and a mix of strategies will be required. “I think the goal is to keep the case numbers as low as possible until we get a vaccine,” says Nuzzo.