



Forcing the issue

When people show reluctance to vaccinate their children, many countries make immunization mandatory. But not everyone favours the approach. **By Liam Drew**

In 2015, the World Health Organization (WHO) declared that the United Kingdom had eradicated the infectious viral disease rubella. The following year, it similarly designated the country as measles-free after confirmed cases numbered fewer than 125 for the second consecutive year.

Immunization rates in UK children were high at that time. They had slumped to a nadir in the mid-2000s following the false assertion in 1998 that the measles, mumps and rubella (MMR) vaccine was linked to autism. But by 2016, more than 95% of the country's 5-year-olds had received one dose of MMR, and roughly 85% had received the pre-school booster that maximizes immunity.

When 95% of a population is immune to measles, the disease cannot spread. This is known as herd immunity, and it is the cornerstone of

the WHO's long-held plan to eradicate measles globally. Achieving this would rid the world of a very serious disease, for which 1 in 1,000 cases is fatal. In 2010, eradication was considered achievable by 2020. But that time is almost here, and the disease is not close to being eradicated. In fact, it is on the rise.

During the first half of this year, Europe had 90,000 cases of measles – more than 17 times the number reported in the whole of 2016. In August, the United Kingdom lost its measles-free status (as did Albania, Greece and the Czech Republic). The United States, which is currently experiencing the highest number of measles cases since 1992, is also at risk of losing the measles-free standing that it has held since 2000.

The resurgence of measles is a symptom of falling rates of immunization against infectious

disease. "When immunization rates drop and herd immunity frays, it's always measles that comes back first," says Paul Offit, a paediatrician specializing in infectious disease at the Children's Hospital of Philadelphia, Pennsylvania. "Measles is the canary in the coal mine."

Earlier this year, the WHO named hesitancy to vaccinate as one of the ten gravest threats to global health. As a result, governments around the world are considering policies that would make vaccinations mandatory. Over the past 5 years, legislators in Australia, France and Italy have restricted school access for children who haven't received the country's recommended panel of vaccinations, including MMR. Some US states are doubling down on existing vaccination requirements for schoolchildren by removing the ability for parents to legally refuse vaccines for non-medical reasons. And

in September, the UK health secretary Matt Hancock responded to pressure – including a letter from four prominent London doctors calling for action to address the United Kingdom’s falling immunization rates – with the announcement that the government had taken legal advice on how it might make vaccinations compulsory.

This is a common reaction among politicians, says Noni MacDonald, a paediatrician at Dalhousie University in Halifax, Canada, and a founding member of the WHO’s Global Advisory Committee on Vaccine Safety. But mandates are not as clean a solution as policy-makers might hope. A variety of incentives and penalties have been employed, with differing levels of enforcement, and the effectiveness of each approach is not clear cut. Because the factors driving low immunization rates are not the same everywhere in the world, MacDonald says that governments should frame their policy-making decisions around two questions: “What problem are you trying to fix? And is a mandate the way to fix it?”

A pressing need

“In a better world, we wouldn’t need mandates,” says Offit. “People would educate themselves about vaccines and make the best decision for their children and for themselves. Assuming there’s not a medical contraindication, they’d get vaccinated every time.”

Evidence of vaccination’s effectiveness is resounding. Government agency Public Health England estimates that the measles vaccine, first introduced in the United Kingdom in 1968 and combined with mumps and rubella vaccines in 1988, has prevented 20 million cases of measles and saved 4,500 lives. Widely used vaccines have excellent safety records. In terms of improving public health, vaccination is second only to providing clean drinking water.

Despite this, countries around the world are failing, to varying extents, to reach levels of coverage required to achieve herd immunity – especially for MMR. Misinformation is a major problem, according to Offit. “There’s a lot of bad information out there,” he says. “It scares people – begs them to make bad decisions.”

Other researchers say that vaccines are victims of their own success. A worldwide survey published by the London-based charitable foundation Wellcome (see go.nature.com/2qg0mnp) this year showed that vaccine hesitancy is a problem mainly in high-income countries, where widespread immunization has made outbreaks of infectious disease much less common. As cases become rarer, the number of people with first-hand experience of the seriousness of the diseases diminishes. Belief in the need for vaccinations weakens, as more

people calculate that the safer course is to go without them, says Helen Bedford, a children’s health specialist at Great Ormond Street Institute of Child Health, London. “When the disease isn’t around,” she says, “half the equation has been removed – all the risk is focused on the vaccine.”

It is against this backdrop that the idea of enforcing vaccination is raised. Proponents of mandatory vaccination argue that despite what is arguably a removal of individual freedom, the ethical justification for intervention is twofold. The first argument is that the state is acting to prevent parents from making decisions on behalf of their children that unnecessarily expose them to the risk of infectious disease. Through this lens, mandating vaccination is akin to legally requiring that young children are secured in an appropriate car seat.

The second argument is that failure to vaccinate not only puts the unvaccinated individual at risk, but also anyone they come into contact with – including those too young to be immunized and people who, for medical reasons, cannot be vaccinated. “The libertarian argument falls apart,” Offit says. “If you’ve made the choice to put your child in harm’s way, and to put those who they come into contact with in harm’s way, then you’ve done harm.”

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His opinion echoes that of the US Supreme Court of 1905, which upheld the legality of an 1809 mandate for smallpox vaccination in Massachusetts, stating “There are manifold restraints to which every person is necessarily subject for the common good.”

Making a mandate

Governments can never force someone to get themselves or their child vaccinated – it is a foundational principle of medical ethics that consent must be given for any procedure. The decision to make vaccination mandatory is therefore a decision to impose some form of penalty on those who do not follow the law.

A common penalty is to exclude unvaccinated children from school, because these are hotspots for disease outbreaks. This has long been the case in the United States – since 1980, all 50 states have formally linked vaccination to school entry. Australia, France and Italy have taken similar action. Australia also has legislation that withholds financial child support from the parents of unvaccinated children

without medical exemptions. In Italy, fines are also levied on parents.

But penalties can be considerably softer. Josephine Sauvage, one of the London doctors who wrote to the UK health secretary, suggests that a mandate could record children’s vaccination status at school entry, and require anyone who declines immunizations to register a conscientious objection. It would be the first such UK mandate since one was implemented for smallpox more than 100 years ago.

Although mandatory vaccination has existed in various forms for more than 200 years, there is a paucity of good epidemiological studies of the effects of different mandates, MacDonald says. The introduction of new laws is often accompanied by increased publicity about vaccination, which makes it harder to identify the specific effects of legislation. The social contexts in which mandates are applied also vary from place to place and are continually shifting.

In the United States, which recommends a panel of vaccinations, the number of states with specific mandates proliferated from 20 in 1963 to all 50 (plus the District of Columbia) in 1980. That expansion was backed by nationwide surveys in the 1970s showing that the incidence of measles was higher in states without mandates, and lowest in states where mandates were strictly enforced.

Early evidence from Italy and France shows that immunization coverage has risen with the introduction of mandates. And the No Job, No Pay legislation withholding state benefits that was introduced in Australia in 2015 coincided with full immunization rates rising by around 3%. Nationwide coverage is now nearly 95%.

Several US states have taken steps to restrict people’s ability to opt out for non-medical reasons. In 2016, after a well-publicized outbreak of measles at Disneyland in California, the state made it impossible for people to legally opt out of immunization on anything other than medical grounds. Legislators in New York took the same action this year after a measles outbreak in Brooklyn, as did the state of Maine.

There is evidence that the California legislation has worked – between 2013 and 2017 the proportion of children attending kindergarten who were not up to date on their vaccinations halved, to 4.9%. But this might not tell the whole story. Daniel Salmon, director of the Johns Hopkins Institute for Vaccine Safety in Baltimore, Maryland, points out that the number of unvaccinated children being educated at home in California almost quadrupled between the 2016–17 and 2018–19 school years.

Salmon also contends that increases in immunization rates have been largely



A measles outbreak in April led to the New York mayor declaring a public-health emergency.

offset by a spike in the number of medical exemptions awarded since the 2016 legislation came in. There is evidence of physicians listing conditions not typically viewed as contraindications for vaccination. A further round of legislation, introduced in California in September, will see the reasons physicians give for medical exemptions monitored and controlled more closely.

The wrong problems

For Salmon, the game of legislative cat and mouse in California highlights the problems that can emerge when lawmakers try to combat a complex social phenomenon with tighter regulations. Mandates, he says, are “a quick legislative fix that will have an effect to some extent”. But to achieve stable high vaccination rates in the long term, public-health policies need to address the underlying causes of faltering uptake.

The problem highlighted by the WHO earlier this year was not vaccine refusal, but vaccine hesitancy. In most countries, the proportion of the population that staunchly opposes vaccines is less than 2%. The bigger problem, Salmon says, is the much larger group of people with some concerns about vaccination that might make them hesitant. He estimates that up to one-third of Americans have concerns about vaccines. “Making the laws stricter doesn’t address that,” he says.

The small (albeit vocal) minority of people who refuse vaccines outright rarely change their minds. The much larger hesitant population, however, does respond to information campaigns. Therefore, rather than directing a limited pot of money, health-system resources and political capital towards levying penalties for non-compliance, Salmon would prefer to

see greater investment in education and more efforts to facilitate meaningful conversations between concerned people and health-care professionals. Currently, the opportunity is limited. In the United States, Salmon says, there is no insurance code through which paediatricians can be reimbursed for consulting with parents on vaccination. And Bedford says that in the United Kingdom, the number of health visitors – the public-health practitioners who typically have such conversations – has been cut by one-third in recent years.

MacDonald agrees with the need for greater engagement. Different parents have different concerns about vaccines. For instance, some fear alleged impurities in the vaccine, whereas others are concerned about minor side effects. Studies show that public messages that broadly extol the safety of vaccines are less effective than addressing parents’ specific questions.

Bedford, however, argues that blaming falling immunization coverage on vaccine hesitancy neglects another, bigger problem: ensuring access to vaccines. This issue is commonly associated with low-income countries – and certainly, measles outbreaks last year in Yemen and Venezuela can be directly attributed to social and political events that disrupted medical services. But, says Bedford, even in high-income countries, efforts to make sure that people know how and when to get their children vaccinated are falling short. Work needs to be done, and she fears that focusing resources on implementing mandates would detract from it.

In the United Kingdom, Bedford says, vaccination rates are lowest in socially disadvantaged areas and communities in which people frequently move around. In parts of London, which has the lowest immunization

rates in the country, one in three infants change address before they’re one, meaning that the health system often loses contact with them.

For these reasons, Bedford and others argue that punitive mandates can lead to disadvantaged groups bearing the brunt of financial and social penalties. Peter McIntyre, who studies paediatric infectious disease at the University of Sydney in Australia, says that he had similar reservations when Australia hardened its stance on vaccination. Although the campaign focused on a middle-class demographic who had lodged non-medical exemptions under the old system, this wasn’t the largest group not getting vaccinated. That comprised people who were not accessing health services because of socioeconomic factors. He was concerned that denying financial support and educational opportunities to people on low incomes who were already experiencing difficulty accessing health care would only increase health disparities. Now, however, he says his fears have been at least partially allayed – the Australian government took steps to improve access by improving the vaccination register, making vaccines available to older children to catch up and investing in reminder and educational schemes.

Although less dramatic than mandates, flexible services that make appointments easier to get have increased immunization uptake. And simply sending reminders – especially for the second MMR jab, which is due around three years old when parents tend not to have as much contact with health workers – is one of the best-proven strategies for improving uptake in high-income countries. “Mandating vaccination really isn’t top of the pile in terms of what we should be doing,” says Bedford.

Indeed, most countries that achieve a stable MMR coverage of more than 95%, such as Portugal and Sweden, do not have mandates. What they have instead are populations with high confidence in vaccines, and health-care systems that provide easy access to their services.

MacDonald is wary of politicians calling for ever-fiercer laws. “They want a simple solution,” she says. “They hope that the fairy dust will fix it and they won’t have to worry any more.” But the truth is that a low rate of vaccination is too complex a problem to have such a straightforward salve. What MacDonald and many others want is careful consideration of all the factors behind low immunization rates in a community. “Everyone thinks this is a simple yes or no issue,” she says, “but it’s much more complicated than that.”

Liam Drew is a writer based in London.