

Mandatory Vaccination for Ireland; An Informed Intervention or a Knee-Jerk Reaction?

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Europe and many other parts of the world are experiencing recurring outbreaks of vaccine preventable diseases, most notably measles and mumps. This worrying trend is broadly consistent with vaccination coverage rates dropping below the threshold for population-level protection. Measles outbreaks, in particular, have led to significant health risks for vulnerable populations such as the very young, pregnant women and those who are immunocompromised. The number of confirmed measles cases in Europe for 2019 is currently 17 times higher than in 2016¹. In the Irish context, there have been 2353 mumps notifications nationally since the beginning of the year and 42 confirmed measles cases reported, with a number of measles outbreaks having occurred. In light of these ongoing public health risks, there has been an increased amount of discussion around the use of mandatory vaccinations (MV), in order to achieve herd immunity against a number of diseases².

Introducing MV in Ireland would be a major departure from the norm and could have potentially significant ethical and legal consequences. Therefore, the evidence base for such an intervention needs careful consideration around the balance between benefits and costs. As MV has been introduced in several settings comparable with Ireland, there is some, albeit limited, evidence available to guide policy. This article aims to briefly describe some of the pros and cons of MV programmes and to consider the utility of such a programme in Ireland.

The first question to consider is whether mandatory vaccination achieves higher vaccination coverage. Different countries have had different experiences. Unsurprisingly, making vaccination a legal requirement or a requirement for school entry is likely to increase uptake to some extent. However, the question remains as to whether it increases uptake to a level sufficient to provide population-level protection.

Two European countries, France and Italy, have recently added new vaccines to their pre-existing MV schedule, partly in response to sustained measles transmission. While seeing a modest absolute increase in first dose MMR uptake of 3%, bigger gains were seen with hepatitis B (6% increase) and Meningococcal C (36% in dose 1, with a 5.7% increase for dose 2) in France, one year after these vaccines were made mandatory³. The large increase in meningococcal vaccine coverage also coincided with a drop in meningococcal disease notifications. In Italy, a 2.3% increase in measles coverage was seen when vaccination was made compulsory in 2017, with regional variation in coverage from 82-97%⁴. However, neither country has reported reaching 95% coverage nationally⁵, the level at which herd immunity is reached for very contagious diseases such as measles. This is an evolving situation and will be closely watched in the coming years. It is also difficult to disaggregate the effects of MV and the effects of improvements in public vaccination programmes and publicity that have usually accompanied European MV projects. This effect is evidenced by the increased uptake of non-compulsory vaccines seen in both countries.

More broadly speaking, ten countries in Europe have some form of MV, for all or some vaccines in their schedules. Germany will be introducing mandatory measles vaccination in March 2020. Enforcement strategies around the world range from fining parents who don't immunise their children, to refusal of school or preschool entry to unvaccinated children. Of the seven countries in Europe to have achieved a 95% coverage rate for a second dose of measles vaccination, four (Malta, Iceland, Sweden, Portugal) are in countries where vaccination against the disease is not

mandatory and three (Croatia, Hungary, Slovakia) are in countries where MV occurs. In Croatia, coverage rates have been falling, despite compulsory vaccination, with many of the vaccinations in the mandatory package now having coverage below 95% (first dose measles coverage has been below 95% since 2013). The Croatian experience illustrates one of the main concerns around MV - that it does nothing to achieve public buy-in and may increase suspicion around vaccination. Recent data from Croatia indicated that around a third of parents fear that vaccination may harm their child⁶. However, both Hungary and Slovakia have kept coverage rates high with their MV programmes, though levels of second-dose measles vaccination have decreased in Slovakia in the past 5 years. Slovakia also has one of the highest rates of measles in the European Union⁷. When looked at as a whole, there has been no obvious correlation between mandatory vaccination and vaccine uptake in Europe⁸.

In the United States, most states have some form of MV, yet the USA has suffered some of the biggest measles outbreaks in its recent history since embracing this strategy and is at risk of losing its measles-free status². Australia has strict laws around claiming financial assistance for unvaccinated children, and some states penalise childcare facilities that enrol unvaccinated children. This has resulted in an increase in vaccination rates, but MMR coverage rates at 2 years of age remain below 95%, though the number of fully immunised children at 5 years of age is approaching 95% nationally. The situation in Australia is different to that seen in many countries because support for MV is relatively high amongst the population and the main political parties⁹, which has seen a smoother implementation than would perhaps be seen in other regions.

Given the scale of the problem in Ireland, MV seems like an attractive idea to many. However, there are numerous barriers to vaccination facing patients on an ongoing basis that could be addressed before considering legal options. Extensive international evidence shows that vaccination uptake is strongly linked to factors such as socioeconomic status, ethnicity and education, with significant inequities between groups¹⁰, though coverage may be lowest at either end of the socioeconomic spectrum¹¹. Barriers facing Irish patients and healthcare providers have been well described and are similar to those seen around Europe¹². There are issues with information-sharing and access to data, as well as problems around accessibility, especially for those whose socioeconomic or housing circumstances preclude stable relationships with healthcare providers. In short, it is likely that people at the more vulnerable end of society would be disproportionately penalised by changes to vaccination laws. Reducing access to schools for some of the most disadvantaged members of society or imposing financial penalties on their families, will likely have little effect on the healthcare system's ability to make itself accessible to these groups. From a public health perspective, it would seem naive to believe that we have exhausted all other options to remove barriers to access for our patients, such that the only route left would be legal.

At present, Ireland does not have a comprehensive suite of information about vaccination. There is no national register, so linked information about MMR1 (largely delivered in primary care), MMR2 (mainly delivered in schools) and all other vaccines is lacking. The data that is currently published does not report uptake by deprivation or other social determinants of health – the evidence base is not as solid as it should be to make decisions about MV. Surveillance of measles cases also does not routinely identify the reason for non-immunity in notified cases - the relative contribution of vaccine denial to reduced coverage and disease burden is actually unknown.

It is likely that one of the reasons for a surge in the level of discourse around MV is that, aside from it being a seemingly simple solution, there is a belief that vaccine refusal is the main issue driving these outbreaks. While data isn't enormously clear on what is driving the resurgence in cases, aside from low coverage, the evidence that this is a result of anti-vaccination scaremongering is not convincing. Vaccine denial has long been an issue in achieving good levels of vaccine coverage, but most of the evidence suggests that rates of vaccine objection haven't changed a great deal in recent times¹³. Limited Irish data suggests that we have a level of trust in vaccination that is higher than the EU average¹⁴. This is something that we have in common with the UK, who recently lost their measles-free status. There is also an important distinction between people who are absolutely opposed to vaccination and those who are "vaccine hesitant". While it is unlikely that we can change the minds of the most entrenched vaccine-deniers, those with genuine concerns should be reassured and encouraged using imaginative and engaging communication strategies, in the same way that we aim to educate those who have concerns about other medical interventions. To legally compel people who simply have some concerns about vaccination may even entrench their position further and propel them into a more anti-vaccination state¹⁵.

In summary, while the data on MV is not conclusive, evidence for its role in increasing coverage to the necessary levels is very limited, especially in the European setting. The success of compulsion would likely be dependent on a number of social, geographic and economic factors. Given the data that we currently possess, it would seem much more likely that a properly resourced public health system is the solution to falling vaccine coverage. This requires regional immunisation coordinators and a dedicated real-time national uptake surveillance system that would allow clinicians to engage with their patients on the issue of vaccination in a meaningful way. This would likely produce better results than legal compulsion, without the risk of crossing ethical boundaries. Further timely research is now required into the reasons behind decreasing vaccine uptake in Ireland, beginning with an examination of the primary health care mechanisms employed to deliver immunisation. A deeper understanding of barriers to vaccination and possible solutions would seem the rational place to start from, before turning to the law to solve a health problem.

Declaration of Conflicts of Interest:

The authors have no conflict of interest to declare.

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References:

1. Drew L. The case for mandatory vaccination. *Nature*. 2019;575(7784):S58-s60.
2. Draeger E, Bedford HE, Elliman DAC. Should measles vaccination be compulsory? *BMJ (Clinical research ed)*. 2019;365:l2359.
3. Levy-Bruhl D, Fonteneau L, Vaux S, Barret AS, Antona D, Bonmarin I, et al. Assessment of the impact of the extension of vaccination mandates on vaccine coverage after 1 year, France, 2019. *Euro surveillance : bulletin European sur les maladies transmissibles = European communicable disease bulletin*. 2019;24(26).
4. D'Ancona F, D'Amario C, Maraglino F, Rezza G, Iannazzo S. The law on compulsory vaccination in Italy: an update 2 years after the introduction. *Euro Surveillance: bulletin European sur les maladies transmissibles = European communicable disease bulletin*. 2019;24(26).
5. European Centre for Disease Prevention and Control. *Surveillance Atlas of Infectious Diseases [Internet]* [Cited 2019 Nov 26]. Available from: <http://atlas.ecdc.europa.eu/public/index.aspx>.
6. Lovric Makaric Z, Kolaric B, Tomljenovic M, Posavec M. Attitudes and beliefs related to childhood vaccinations among parents of 6years old children in Zagreb, Croatia. *Vaccine*. 2018;36(49):7530-5.
7. European Centre for Diseases Prevention and Control. *Monthly Measles and Rubella Monitoring Report 2019 [Internet]* [cited 2019 November 25]. Available from: <https://www.ecdc.europa.eu/sites/default/files/documents/measles-monthly-report-november-2019.pdf>.
8. Action plan on Science in Society related issues in Epidemics and Total pandemics. *Compulsory vaccination and rates of coverage immunisation in Europe [Internet]*. Italy; 2016 [Cited 2019 Dec 2]. Available from <http://www.asset-scienceinsociety.eu/outputs/other-projects-documents/compulsory-vaccination-and-rates-coverage-immunisation-europe>
9. Smith DT, Attwell K, Evers U. Majority acceptance of vaccination and mandates across the political spectrum in Australia. *Politics*. 2019;26339571985945.
10. Tabacchi G, Costantino C, Napoli G, Marchese V, Cracchiolo M, Casuccio A, et al. Determinants of European parents' decision on the vaccination of their children against measles, mumps and rubella: A systematic review and meta-analysis. *Human vaccines & immunotherapeutics*. 2016;12(7):1909-23.
11. Fielding JE, Bolam B, Danchin MH. Immunisation coverage and socioeconomic status - questioning inequity in the 'No Jab, No Pay' policy. *Australian and New Zealand journal of public health*. 2017;41(5):455-7.
12. The European Commission. *The Organization and Delivery of Vaccination Services in the European Union [Internet]*. European Commission; 2018. [cited 2019 Dec 2]. Available from https://ec.europa.eu/health/sites/health/files/vaccination/docs/2018_vaccine_confidence_en.pdf

13. Beard FH, Hull BP, Leask J, Dey A, McIntyre PB. Trends and patterns in vaccination objection, Australia, 2002-2013. *The Medical journal of Australia*. 2016;204(7):275.
14. The European Commission. State of vaccine confidence in the EU 2018 [Internet]. The European Commission; 2018. [cited 2019 Nov 30]. Available from https://ec.europa.eu/health/sites/health/files/vaccination/docs/2018_vaccine_confidence_en.pdf
15. Helps C, Leask J, Barclay L. "It just forces hardship": impacts of government financial penalties on non-vaccinating parents. *Journal of public health policy*. 2018;39(2):156-69.