

Mandatory vaccination between the precautionary principle and the principle of proportionality.

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Abstract

Recent measles outbreaks in Europe and North America brought to light what has been brewing below the surface for a while: a slow but steady decline in vaccination rates, resulting in an increasing number of pockets of under-vaccination. In the face of the recent outbreaks, several states have tightened their vaccination obligations, for example by limiting the option of non-medical exceptions (2015 California); by cutting off non-vaccinating parents from family assistance payments (2016 Australia); or by introducing straightforward vaccination obligations (2017 Italy, France).

In an earlier paper (Pierik, 2017a), I argued that there is sufficient principled ground to defend unqualified mandatory childhood vaccination programs. However, unconditional programs are disproportionate intrusive in societies with successful voluntary programs. Moreover, certain parents might reject to subject their child to vaccination programs with the mere aim to protect the collective good of herd immunity. Such hesitant parents might be more open to (mandatory) vaccination programs when it can be shown that these are in the best interest of their child. This paper takes these reservations onboard and develops an argument for vaccination programs that is justified in terms of the best interests of the child involved.

I argue that employing a best-interests approach does not *ipso facto* settle the debate because different actors have different ideas on how these best interests must be conceptualized. But it does redirect the focus to the core issue in this debate: who should ultimately settle what the best interests of children are? I argue that not parents but government should have the final say in these matters. Moreover, I conclude that a conditional mandatory program is indeed in the best interests of the child involved. And in determining *under which conditions* mandatory vaccination is justified, state agencies must weigh the rights of parents to raise their children as they see fit against the right of children to have their health protected against infective diseases. The answer ultimately requires a contextual balancing between two legal principles: *the principle of proportionality* and the *precautionary principle*.

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1 Introduction: the (contested) contribution of vaccinations

The protection of society against infectious diseases is generally considered to be a classic task for government. A century ago, diseases like measles, polio and whooping cough were one of the major causes of death and the introduction of large-scale vaccination programs has dramatically reduced (or even eliminated) outbreaks of these diseases in the western world. A large majority of parents is convinced of the beneficial effect of vaccination on the health of their offspring and enroll their children in such programs voluntarily. However, since the introduction of the first vaccination programs in the beginning of the nineteenth century, a myriad of groups of parents have refused to vaccinate their children. Traditionally, the most well-known objectors are members of religious groups, predominantly Protestant Christian congregations who argue that vaccination interferes with divine providence. In recent years, however, Western societies have encountered an emerging modern anti-vaccination movement that claims that the risks of vaccination outweigh the purported benefits. Unlike the more traditional groups, that were primarily inwardly oriented, this new anti-vaccination movement actively and successfully reaches out to new parents through anti-vaccination websites and TV-celebrities.²

After a long period in which the idea that vaccinations were beneficial and safe gained an ever-stronger foothold in Western societies, this new movement heralded a turning point in the public trust in vaccines. The renewed vaccine hesitancy has led to a decline in vaccination uptake, to various measles outbreaks in European and North America (World Health Organization, 2017); Europe registered a 4-fold increase in measles cases in 2017, causing 35 deaths (World Health Organization, 2018). How should government deal with such opposition to vaccination when it leads to the re-emergence of diseases that for decades were assumed to be under control? One serious public-relation problem with preventive vaccination is that they require an explicit action – vaccination – which' benefits are remote *non*-events, that can only be made visible through hypothetical statistics – the number of persons *not having died* this year.

Given the possible disruptive effects of infectious diseases like measles, the state has a compelling interest in preventing (major) outbreaks. In an earlier paper (Pierik, 2017a) I argued that there is sufficient principled ground to defend unconditional mandatory childhood vaccination, only allowing for medical exemptions and not for religious or philosophical exemptions. This conclusion was based on two arguments: firstly, mandatory programs are a necessary condition to incentivize sufficient vaccination uptake to maintain herd immunity; and secondly, government has its own responsibility towards children and should not permit parents to put their children at avoidable risks of death and suffering – falling ill from a vaccine-preventable disease – when this can be done easily and safely through vaccination.

Although unqualified mandatory vaccination will provide the most secure protection for vulnerable members of society, as a general policy it has two drawbacks. Firstly, mandatory childhood vaccination might be a disproportionate intrusive legal measure in societies with long and successful traditions of voluntary vaccination programs (Haverkate et al., 2012, p. 12). There seems to be no good argument for introducing mandatory policies in contexts where voluntary

² It remains an open question whether the current anti-vaccination movement is a new phenomenon or whether it is merely a new round in an old discussion. Novel is the fact that social media like Facebook and Twitter offer vaccine-deniers an unprecedented opportunity to diffuse their message to a much wider audience.

vaccination programs generate sufficient compliance and undiminished herd immunity. Secondly, some parents question the necessity of vaccination, now outbreaks of the disease have become rare. Given the established collective protection through herd immunity, these parents consider the presence of rare but serious side effects of vaccination a safety priority rather than a reasonable risk – as health officials usually consider it (Goldenberg, 2016, p. 564). These parents thus assess vaccination primarily from the perspective of the individual child involved. This paper takes these two reservations towards unconditional mandatory vaccination onboard and develops an alternative argument for the earlier paper defending (1) *conditional* mandatory vaccination, (2) and which is argued for in terms of the interests of the individual child involved. Where the earlier paper had the advantage of philosophical rigor, straightforwardly defending unqualified mandatory vaccination, this paper seeks to present a more contextual, pragmatic – and thus more complex argument. The question is how such a scheme can be justified normatively, designed legally and, given that it concerns *conditional* mandatory vaccination under which conditions vaccination should be mandatory.

Two caveats apply. First, the paper does not discuss mandatory childhood vaccination in general, but focuses on measles. The reason is that diseases differ significantly in their prevalence, their contagiousness and the danger they pose to health once infected. Measles is a ‘pure’ example for this paper: it is an extraordinarily contagious disease, quite severe, and outbreaks remain common enough to pose a significant threat to public health. Moreover, over time a vaccine has been developed and tested through and through, which is considered to be safe, effective, and a necessary means to prevent outbreaks. Finally, measles is a clear example of a childhood disease because the first vaccination must be administered long before the age of reason kicks in.³

The second caveat is that this paper is mainly concerned with the regulatory side of vaccination policies and not with the biomedical and epidemiological evidence on effectiveness and safety of vaccination. I take the broad scientific consensus that vaccines are safe and effective largely for granted. In addition, I endorse the general idea that government policy on infectious diseases should be based on these *state-of-the-art* insights from biomedical and epidemiological research and should encourage an evidence-based medical practice. Of course, like any other knowledge, scientific knowledge is always fallible, and insights might change over time. Having said that, there comes a point in time to conclude that there is no genuine *scientific* controversy anymore. Yes, the subject is still passionately discussed on social media, but the genuine scientific debate extinguished decades ago. One can only speak of a genuine debate if the steady flow of articles corroborating the safeness and effectiveness of vaccines would be contradicted by an equally steady flow of articles in biomedical journals showing limited effectiveness or serious side effects of vaccines. But critical articles are strikingly scarce, and more often than not experimental studies based on small samples.

At the same time, current discussions on social media and the emerging anti-vaccination movement make clear that there are evident epistemic and moral disputes on these issues that should not be simply pushed aside by appealing to a scientific and professional consensus. Indeed,

³ However, I am convinced that similar arguments can be made for diseases like polio, rubella and whooping cough. A practical problem is that measles vaccine is part of the MMR triple-vaccine, combining inoculations against measles, mumps and rubella, but that does not have to undermine this normative argument.

the very aim of this paper is to discuss the regulation of childhood vaccination in the face of these disputes.

2 The collective good of herd immunity

Given their possible disruptive effects, the state has a compelling interest in preventing (major) outbreaks of diseases like measles.⁴ Indeed, although it remains contested whether the liberal state should *promote* public health through collective institutions, it is undisputed that it should *protect* society against major threats to public health (Verweij & Houweling, 2014). Measles is an unusual contagious disease.⁵ This implies that a patient is not only a victim of the disease, but also a vector in its further spread, since infected persons (can) infect others and contribute to outbreaks. Even if a child only experiences the disease in its mildest form, she remains infectious and thus a threat to others. This makes that such diseases should not merely be discussed in terms of parent-child responsibilities, but also in terms of public health.

The major aim of vaccination programs is herd immunity, which occurs when a critical portion of a community is immunized against a contagious disease. This disables the pathogens to circulate within the population, so that the disease cannot gain a foothold in that society. The only way herd immunity can be achieved is through mass vaccination; the threshold level for measles is 92-94% at which point major outbreaks are precluded (Orenstein, Strebel, & Hinman, 2007, p. 1434).⁶

Herd immunity thus provides a higher-order collective protection because it prevents diseases from breaking out altogether, opening the door to a full eradication of a disease, and protecting vaccinated *and* unvaccinated persons. Firstly, it protects infants and young children who have not yet completed the recommended childhood immunization schedule. Newborn babies are initially protected by maternally derived antibodies. Over time, however, the effect of these antibodies fades out and until their first vaccination they can only be protected through herd immunity. The second category concerns the small percentage (1-5%) of persons for whom their vaccination turns out to be insufficiently effective because the vaccination does not mount an adequate immune response.⁷ They usually get infected during large outbreaks of the disease. The third category concerns those persons who cannot undergo vaccination because they have certain forms of cancer, have a compromised immune system, or are likely to suffer from a serious allergic reaction. The final category concerns children of vaccine-hesitant parents. It is through this collective protection of herd immunity that large-scale vaccination programs are so much more effective

⁴ Outbreaks of diseases like measles will be disruptive, however, since so many persons have been vaccinated nowadays, they will not have the devastating effects they had in pre-vaccination times.

⁵ For this reason, Opel, Kronman, Diekema, Marcuse, and Kodish (2016) have argued that measles pose a more important problem than other vaccine-preventable infectious diseases. For a critique see Byington, Clayton, and Edwards (2016).

⁶ The commonly used term 'herd immunity' is slightly misleading because the immunity-part falsely suggests full protection against the disease. But even the threshold vaccination rate does not imply full societal *immunity* because local outbreaks are still possible. However, since the term has become so strongly established in these debates, I will hold on to the term, but including the abovementioned caveat.

⁷ The first vaccination, administered around the 14th month provides an average protection of 95%; adding a second inoculation around the age of nine years provides an average protection of 99%. As a result, 1-5% of vaccinated persons remains vulnerable to the disease.

than individual vaccination. This is the main reason why governments focus so much on collective vaccination programs as an important contribution to public health.

3 The focus on public health and the individualistic turn

When collective vaccination programs were introduced on a large scale, they were heralded as key-contributors in the fights against outbreaks of horrible diseases. The success of vaccination and vaccination programs can be measured by the fact that after their introduction massive outbreaks have vanished gradually. The paradoxical result is that, over time, this public health goal has faded into the background, since many persons living in the western world today have not witnessed the devastating effects these diseases had a few generations ago. At the same time, more and more attention is paid to the risks associated with vaccinations. Maya Goldenberg (2016, p. 564) contends that many parents approach the issue of vaccine-safety first and foremost from an individualized approach: to what extent does the presence of rare but serious adverse effects of vaccination cause a safety risk for their children? Such parents will not be relieved by reassurances that MMR stopped outbreaks of diseases, contributes to herd immunity or public health in general, or that dangers of vaccine-preventable diseases are many times greater than the risk of a serious adverse reaction to the vaccine. Instead, they are primarily interested in the question whether the MMR vaccine is safe for *their child*, especially given the low incidence of outbreaks of measles nowadays.

Vaccination programs present a trade-off: the individual child inoculated is protected, society as a whole is safer, immunocompromised persons and newborn babies are better protected. However, the risks involved befall those who undergo vaccination (Koerth-Baker, 2016). Since there is no such thing as a risk-free medical intervention, it is inevitable that adverse reactions will occur in some cases, even when all reasonable precautions are taken in the manufacture and delivery of vaccinations and even when these adverse reactions are extremely rare. However, the reassurance that the chance of serious side-effects is extremely slim remains unfathomable abstract to certain parents. What if it turns out that your child is the exemption that experiences the extremely rare but severe side effect?

Moreover, the more robust herd immunity is established in a specific society, the less an individual inoculation provides a contribution to the protection of the individual child involved – since she is already protected collectively. It further strengthens the robustness of herd immunity, but many parents question whether this collective goal is weighty enough to justify subjecting one's child to the risk of a vaccination. *Science and technology*-theorists like Goldenberg and Koerth-Baker emphasize that the current public questioning of vaccines cannot (only) be explained in terms of an anti-science ideology or a misunderstanding of the science. Instead, they argue that part can be explained by the public image of vaccination programs as being focused too much on increasing and maintaining herd immunity, with too little interest for parental considerations concerning short *and* long term side effects of vaccination (Koerth-Baker, 2016). This implies, they argue, that state agencies should not repetitively rehearse the importance of collective benefits like herd immunity, but engage much more directly with genuine questions of parents on the risks for their child of the disease itself and the vaccination against it.

Thus, parents require a elucidation of vaccination policies in terms of the benefits for the individual child involved. This dovetails quite nicely with the ‘best interests approach,’ a method of decision-making within medical-ethics and law that is employed in making important decisions for persons who are not (yet) competent to make such decisions themselves.⁸ The basic idea is that, while making such a decision the interests of the person involved should be the ultimate guide. The approach is the foundation of Art. 3 of the *Convention on the Rights of the Child*, stating that in all actions concerning children, their best interests must be a primary consideration in the actions of state agencies. The method is employed, for example, when Judges in Court have to decide in a dispute between divorced parents on a major medical intervention for their child. As such, these considerations make the method well suited to discuss the justification childhood vaccination programs.

4 Best interest-analyses and the burdens and benefits of vaccination

Even though the best-interests approach is widely used in legal and medical-ethical decisions, in general terms it is quite an underdetermined concept. Is it a general or a partial assessment? Is it a comparative or superlative assessment? Is an objective or subjective assessment? Should it provide sufficient protection of a child’s interests or the best protection thereof? This is not the place to provide an in-depth analysis of the approach, instead, I tailor it to the context at hand, a partial best-interests’ analysis in the context of childhood vaccination against measles. It starts with a *narrow assessment*, based on generic evidence-based medical knowledge of health risks and a *comparative* concept, balancing the potential harm and benefits of the *action* – vaccination – and *inaction* – forgoing vaccinating. Later I will compare this with alternative assessments.

The risk of harm resulting from vaccination can be determined by assessing the likelihood of medical complications and the significance of these possible consequences. This risk must be weighed against the risks of not vaccinating: the likelihood of contracting a disease and the potential harm caused by this disease.

The risk of harm resulting from vaccination is much smaller than vaccine-sceptics suggest, but it is not negligible, since there is no such thing as a risk-free medical intervention. It is inevitable that adverse reactions will occur in some cases, and even when all reasonable precautions are taken in the manufacture and delivery of vaccinations. The great majority of side effects are local and minor – a sore arm or low-grade fever for a few days. A recent meta-analysis concluded that after the administration of over 25 million vaccine doses, 33 cases of vaccine-triggered anaphylaxis, a potentially life-threatening allergic reaction, were confirmed (McNeil et al., 2016). Other research arrives at a similar conclusion: “there is evidence that some vaccines are associated with serious adverse events; however, these events are extremely rare and must be weighed against the protective benefits that vaccines provide” (Maglione et al., 2014, p. 325). In sum: there is some chance of minor, local and temporary side effects and there is an extremely small chance of major side effects.

The risks of not vaccinating can be described as follows. The measles is an unusually contagious disease: an infected person can infect between 15-25 persons in an unvaccinated population, so

⁸ For an elaboration see Agnus Dawson’s very helpful paper on best interests and vaccination (2005).

one or two measles cases in a classroom will likely result in infection of all unprotected children.⁹ Moreover, there is no curative medical treatment for measles. Once infected, the patient has to endure the disease and during this period she is susceptible to various risks – the only treatment available is prevention through vaccination. Out of every 1000 infected persons, one to two will die, one will develop encephalitis (a swelling of the brain that can lead to convulsions and leave the person deaf or with an intellectual disability) and as many as 50 will get pneumonia. Even an ‘uncomplicated’ course of measles can result in a week with a high fever, cough, sore throat, and rash covering the entire body.¹¹

Given these risks as related to the various options, an account of the best interests of the children in good health, merely based on this strict biomedical and consequentialist assessment, ranks the various options in the following way:¹²

- (1) not contracting the disease, not being vaccinated;
- (2) not contracting the disease, being vaccinated;
- (3) contracting the disease, not being vaccinated;
- (4) contracting the disease, being vaccinated.¹³

Given the health effects of measles, even in its most uncomplicated form, it is in the best interests of the children involved to be shielded against the disease, preferably without having been vaccinated – option (1) – but if that cannot be assured, by undergoing vaccination – option (2) – in order to make sure that options (3) and (4) are precluded. Individuals can be protected against measles in two ways: collectively – through robust herd immunity – and individually – through vaccination. This implies that the assessment of the best interests of a child is not only dependent upon the various risks of the disease risks and benefits of its vaccination, but also upon the contingent prevalence of herd immunity in her community. As long as robust herd immunity is guaranteed, unvaccinated children are collectively protected. This narrow assessment of the best interests of the child suggests that the most important interest of children involved is to be protected against contracting the disease; a secondary interest is not to be inoculated if they can be robustly protected indirectly, through robust herd immunity.

However, this particular ranking is based on a set of premises that is not shared universally. Parents with different interpretations of what constitutes the best interests of their child, will arrive at different rankings. For one thing, a large majority of parents vaccinate voluntarily, regardless of

⁹ Opel et al. (2016) have argued that since measles pose a much higher risk to public health than other vaccine-preventable infectious diseases, that this disease should be singled out as the only disease warranting mandatory vaccination. For a critique see Byington et al. (2016).

¹⁰ An unvaccinated person who underwent (and survived) the disease is also protected against measles afterwards.

¹¹ <http://www.cdc.gov/measles/about/complications.html> (accessed January 12, 2016). The last major measles outbreak was in France in 2008-2011, in which 10 patients died and almost 5,000 patients were hospitalized, including 1,023 for severe pneumonia and 27 for encephalitis/myelitis (Antona et al., 2013).

¹² This ranking only concerns individual children in good health; the situation is different for children that are immunocompromised because of diseases like leukemia, that should be guarded against vaccination through medical exemptions. In the conclusion, I will shortly elaborate what the argument in this paper implies for these immunocompromised children.

¹³ Option (4) only occurs during huge outbreaks of the disease and affects those 1-5% of vaccinated persons for whom vaccination did not mount to an adequate immune response (see footnote 7).

the prevalence of robust herd immunity, because they consider the MMR vaccine safe enough and/or because they do not want to be dependent on herd immunity to have their child protected. Anthroposophist parents, on the other hand see measles as an innocent but necessary stage in the process of development from child to adulthood – on a par with shedding primary teeth. The anthroposophical doctrine insists that such childhood diseases provide individuals with a natural resilience against diseases like cancer and allergies later in life. Since they see measles as a beneficial disease, they prefer their children to encounter it. Still other parents abhor vaccination because they are still convinced by Wakefield's (debunked) claim that the MMR-vaccine causes autism. Other parents insist to forgo vaccination because they seek to carve out 'all-natural' lives for their children, maintain their 'purity', or avoid contamination, assuming that vaccines contain toxic preservatives such as thimerosal, a mercury-based preservative.¹⁴ These parents dispute the outcomes of mainstream science and argue that being vaccinated is much more dangerous than the risk of contracting the disease. A last category of parents might not dispute the mainstream medical assessment of the risks and benefits of vaccination but decide against vaccination because their religious convictions tell them that vaccination is an inappropriate meddling in divine providence. Members of such Protestant Christian congregations have very principled objections against vaccination. And even though they deplore the possible health risks this might generate for their children, they postulate that their fate – being infected with measles or not – is in Gods hand, and that man should not meddle with divine providence through vaccination.

Governmental agencies also have their perspective on the best interests of children in vaccination discussions. It is important to realize that government policy cannot be geared toward this or that individual child. Parents can – and should – primarily focus on the interests of their offspring, but government can only take the interests of all children within its jurisdiction into account. The first option *not being vaccinated, not contracting the disease* presupposes the availability of robust herd immunity – the very thing that will be endangered if this option would be offered as general advice to parents by state agencies. This implies that government agencies can

This short survey shows that employing a best-interests-assessment does not straightforwardly settles the debate because different actors have genuinely different ideas about what constitutes a child's best interests and, consequently, arrive at different conclusions on childhood vaccination. This leads to the conclusion that shifting the focus to the best interest of children does not *ipso facto* answer the question under which conditions mandatory vaccination programs are justified. But it does redirect the focus to the core question in this debate. Whose voice should ultimately prevail in determining what the best interests of children are: their parents or governmental agencies?

5 Parental prerogative or *parens patriae*?

It is the default position in liberal-democracy that parents have the primary prerogative in the upbringing of their children in line with their idea of the good life, which only allows limited governmental interference. Since we generally assume that parents will make health care decisions concerning their child on the basis of what is in her best interests, they are endowed with the initial

¹⁴ Even though there was no evidence that thimerosal was harmful, it has been removed from all childhood vaccines since 2000, to forestall parental anxiety.

responsibility for making such decisions on behalf of their children – we could call this the *principle of good-faith*. Of course, parents might also be deeply involved with general issues of public health, but when faced with important choices concerning vaccination, we generally assume that their decisions will primarily be determined by what they see as the best interests of their child.

However, the argument in the last section makes clear that we should disentangle two separate arguments that are usually intermingled in phrases like *parents should have much autonomy in raising their child because they will act in her best interests*. The first argument is that parents have much autonomy in the way they raise their children; the second argument is that important decisions for not-yet-competent children should primarily be guided by their best interests. Many interests of children are context-dependent, and the *principle of good-faith* makes that parents have much discretion power to follow their subjective parenting style: religious or secular; strict or more lenient, etc. However, even though this parental prerogative is the most plausible starting point of the discussion, it can never be an absolute principle. Government has its own responsibility to protect the health of children and should overrule parental decisions when they imply a high risk of significant harm – death or serious long-term or permanent injury – when alternative, less risky options are available (Dawson, 2005, p. 78).

The emerging vaccine hesitancy in the western world points to an important public debate on epistemic and moral issues concerning the truth-value of the scientific and professional consensus on vaccination safety. Governmental agencies cannot simply ignore this discussion. At the same time, the state has a duty to protect under-aged children who cannot yet make a well-informed decision on vaccination. The fact that some parents are convinced that vaccine refusal is in the best interest of their child does not imply that this belief is in line with the best medical evidence available – regardless whether these convictions originate from an alternative reading of medical data or from religious convictions. In these contexts, the right of vaccine-hesitant parents to raise their children according to deeply held convictions conflicts with the right of children to be protected against the risks of vaccine-preventable diseases. How must these rights be weighed against one another?

Posing the question in this way, implicitly answers a question raised earlier: not parents but the government should have the final say in these matters. A central principle of modern constitutional liberal democratic thought is that government has the ultimate *Kompetenz-Kompetenz* to determine the respective areas of competence of natural persons and associations within its jurisdiction. It is the state that provides parents with the freedom of religion and conscience and the parental prerogative to raise their children in the way they see fit. But it also the state that determines the limits of these fundamental rights and freedoms, especially when they clash with other's rights and freedoms. Only governmental agencies can unilaterally determine the rights and duties of (associations of) citizens within its jurisdiction (Laborde, 2017, pp. 160-196). Translated to the discussion at hand: how should government agencies weight the right of vaccine-hesitant parents to raise their children according to deeply held convictions against the right of children to be protected against the risks of vaccine-preventable diseases?

6 Between proportionality and precaution

The right of parents to raise their children in line with their idea of the good life is embedded in the legal right to the freedom of religion and conscience, which itself originates from the idea of toleration towards various ideas of the good life. The latter idea is one of the cornerstones of liberal-democratic thought: governmental agencies should accommodate minority practices in the most generous manner possible, especially when these practices do not transgress fundamental rights of others. Given the fact that herd protection can be maintained at a vaccination rate of 92–94%, there is theoretical room to tolerate non-vaccination. In countries in which the large majority of parents vaccinate their offspring voluntarily, the collective good of herd immunity is robustly assured as a positive externality of private voluntary choices. For example, the Dutch encouragement policy is very successful in maintaining herd immunity through voluntary vaccination.¹⁵ More in general, several European countries are having a long and successful tradition in which health authorities and their advice is generally trusted by parents, and a broad compliance with non-coercive but encouraging vaccination programs generates high vaccination rates (Haverkate et al., 2012, p. 12).

In situations where voluntary vaccination ensures robust herd immunity, there are good liberal arguments to tolerate the practice of non-vaccination. Yes, non-vaccinating parents are free-riders: their children are protected through herd immunity as generated by vaccinating parents. And yes, vaccine denialists usually come up with all kind of arguments that are not backed by evidence-based medical research. Still, the liberal-democratic state should display a *gritted-teeth toleration* towards non-vaccinating parents, as long as interests of their children and other vulnerable persons are not harmed.

This liberal-democratic argument in favor of toleration to non-vaccination can be translated into the legal *principle of proportionality*, requiring that a government's interference with a citizens' freedom must be proportional in relation to the goal the law seeks to achieve (Alexy, 2014, pp. 52-54; Brems & Lavrysen, 2015, p. 141; Klatt & Meister, 2012, pp. 8-10). The principle is usually employed in a three-pronged-test: (1) there must be a legitimate aim for a measure; (2) the measure must be suitable to achieve the aim, potentially with a requirement of evidence to show it will have that effect; (3) the measure must be necessary to achieve the aim, and there cannot be any less onerous way of doing it; and the measure must be reasonable, considering the competing interests of the different groups at hand.

What does the principle tell us about unconditional mandatory vaccination? The aim of mandatory childhood vaccination (ad. 1) programs is to protect society and its members against outbreaks of infectious diseases which is, as argued above, an important, legitimate and even classic policy goal. Mandatory policies, aimed to achieve herd immunity is highly suitable to achieve this aim (ad. 2). However, mandatory policies are not a *necessity* in situations where voluntary vaccination protects robust herd immunity. Indeed, governmental agencies can refrain from coercing parents to vaccinate, as long as children are shielded indirectly through outcomes of voluntary vaccination. Even though unvaccinated children might, in extreme rare occasions run

¹⁵ Even though the Dutch Institute for Public Health (RIVM) has registered a drop in vaccine uptake of 0,5% for the youngest cohorts in the last three years (van Lier et al., 2017).

the risk of infection, for example by being in the same room with an infective person within their *herd-immunized-bubble*, this rare risk does not justify a general policy of mandatory childhood vaccination. After all, the chance of contracting the disease approaches zero, which makes mandatory childhood vaccination a disproportional legal measure. The *principle of proportionality* makes that parents cannot be legally coerced to vaccinate situations where robust herd immunity is voluntarily generated.

But it should be perfectly clear, though, what kind of right this is. It is a toleration-based and conditional right, *not* a straightforward and inviolable right of parents that nullifies the duty to vaccinate. Moreover, government should not accept their alternative epistemic assessments of the benefits of diseases or the dangers of vaccination as truth-claims. Government should only *tolerate* the convictions and the ensuing practices of non-vaccinating parents. Government has a duty to protect the best interests of children involved and that implies that they should be protected against measles. As long as they are protected indirectly, government can defer a legal duty to vaccinate, but this restraint should be revoked at the moment robust herd protection is endangered. The practice of non-vaccination can and should be tolerated if, and to the extent that it does not endanger the health of underage citizens.

Indeed, in situations where collective protection through herd immunity is – or is about to become compromised, the parental freedom not to vaccinate should be curtailed. In such a situation, unprotected children run the risk of being infected, falling ill, and becoming a vector in the further spread of the disease. Here the responsibility of the state to protect the health of children kicks in. If parents do not voluntarily vaccinate in such a context, it is in the best interests of their children involved that governmental agencies legally override their parental choice. And since it is not exactly clear when and where an outbreak may occur, the *precautionary principle* justifies preventative decision-taking to ensure the health of unprotected children. The principle provides governmental agencies with a certain policy discretion to introduce coercive measures to protect citizens in situations with a plausible but still uncertain risk of an imminent outbreak. The precautionary-element requires governmental agencies to err on the side of caution, and their discretionary space should be guided by the best scientific knowledge available on the risks involved.

7 Contextual policies of upscaling interference

In the last section I argued that the principle of proportionality prohibits mandatory childhood vaccination in situation where voluntary vaccination protects robust herd immunity. This does not imply that governmental agencies should sit back and relax; it only leads to the conclusion that, in this context, coerced vaccination programs are disproportional. Voluntarily generated herd immunity is precious collective possession that should be cherished and actively maintained. Governmental agencies should pursue three major paths here: actively stimulate voluntary vaccination; actively counter vaccine hesitancy; and actively employ all means available to protect unvaccinated persons.

For starters, governmental agencies should subsidize vaccines and their administration, guaranteeing the availability of a sufficient supply of safe vaccines free of charge to parents or their health insurance. They could booster its effect by setting up an elaborated state-immunization program, provided through a comprehensive state-wide net of child health centers. The Dutch

system, for example, entices parents to vaccinate through an effective system of vaccination reminders. Parents can ignore the set-up schedule, but the program generates an unmistakably pervasive instigation to comply with the schedule. Moreover, governmental agencies should encourage or even oblige daycare centers and schools to publicize their non-vaccination rates, which provides parents with relevant information to be taken into consideration and which can be balanced against other variables in the choice for a specific daycare center or school: travel distance, pedagogic climate, opening hours, price, etc.¹⁶ Secondly, governmental agencies should launch campaigns to inform the public on the dangers of infectious diseases and protection of vaccination, as an antidote to anti-vaccination websites. The latter disperse the wildest speculations with anecdotal evidence for ‘alternative medical truths,’ while official sites can only provide peer reviewed information. Medical specialists are handcuffed by professional standards in their attempts to counter this fear mongering. Vaccine denialists are, of course, protected by the freedom of speech to disperse their views; still, government should make serious attempts to make sure that their unscientific and ungrounded claims do not dilute the voice of evidence-based science too much (Venkatramana, Gargb, & Kumarc, 2015). Finally, governmental agencies should endorse non-coercive policies to protect unvaccinated persons against infections. It can actively provide travel advisory to parents on areas in the world where herd immunity is undermined in order to ensure that unvaccinated children do not encounter the diseases unconsciously.¹⁷ They should ensure a good registration of individual vaccination uptake, to make sure that each person has access to her vaccination status later in life. Another possibility is to actively approach young adults (14-16 years old) in schools to warn them on the dangers of not being vaccinated.

This self-restriction of the state to not coercively intervene is required by the principle of toleration, the ensuing right to freedom of religion and conscience of parents, and the legal principle of proportionality. Moreover, it can also be justified in terms of the best interests of the child involved. After all, it is in the interests of a child that the government does not interfere in the intimate parent-child relationship without a compelling reason.

In situations in which the collective protection of children through herd immunity is or is about to be undermined, the precautionary principle kicks in, justifying more coercive programs which can be designed in various ways. Some governments have made access to child-related advantages, including the child allowance, dependent upon vaccination. An example of such a policy is the Australian *no jab, no pay plan*, as accepted by the Australian Government (Sabin, 2015). Parents who do not fully immunize their children – up to 19 years of age – will cease to be eligible for various forms of family assistance payments. It basically leaves the choice to vaccinate up to the parents, but the decision to forgo vaccination will lead to various financial setbacks. Another way is the US

¹⁶ This solution does not curtail the freedom of parents, although it requires them to provide information on the vaccination status of their child, once placed in the venue. Preliminary Australian data shows that one third of parents don’t want to enroll their children in a primary school with a high numbers of unvaccinated children (Dunlevy, 2017).

¹⁷ It could even make vaccination mandatory for travelers to measles-infested areas, because such a trip generates the risk of infection for the traveler and the unprotected persons he encounters after he returned home. I don’t consider this a mandatory policy in the strict sense because it is related to voluntary travel.

policy, making vaccination a prerequisite of daycare or school attendance. Although there is no federal regulation, all US states legally require the vaccination of children prior to school or daycare entry.¹⁸ Parents can only receive a waiver after they have been granted exemption for their religious and/or philosophical objection against vaccination. In theory, this approach leaves the choice to vaccinate up to the parents, but the decision not to vaccinate requires parents to request the exemption and might lead to a number of impractical side effects. Not having access to childcare-arrangements, or having to arrange home schooling might hamper a work-life balance, especially for single parents and two-income households. Finally, the recently introduced mandatory programs in Italy and France policy-changes are examples of a legal duty to vaccinate, which refusal would imply breaking criminal law and running the risk of punitive action by government – being fined or even imprisoned.

Finally, in the extreme case of an acute outbreak of measles, judges could – locally and temporary – enforce *compulsory vaccination*, a forced vaccination against the will of the parents of specific children that might have encountered the disease. Compulsory vaccination is the most intrusive policy option because it bypasses parental discretion fully by eliminating the opportunity to oppose or prevent one's child vaccination – parental choice is not just burdened, it is eliminated. It is justified because the children are in direct danger of falling ill and becoming a vector in the further spreading of the disease. An example is the 1990 measles outbreak in the city of Philadelphia that centered around two fundamentalist churches, Faith Tabernacle and First-Century Gospel, whose members did not believe in vaccination – or modern medicine generally. Nine children died from measles during the outbreak, and ultimately a judge ordered vaccination of the children of the church members over parental objections (Rubenstein Reiss & Weithorn, 2015, pp. 967-968).

This implies that governmental agencies have a set of less and more restrictive policy options at their disposal to employ the least restrictive alternative that is “reasonably necessary” to guarantee sufficient protection of children (Gostin, Burris, & Lazzarini, 1999, p. 124). The three-tiered approach presented above – voluntary, mandatory and compulsory policies – enables contextual childhood vaccination policies. The more herd immunity is compromised within a society, the more intrusive policies are justified to safeguard unprotected children in danger. *The Nuffield Council on Bioethics* (2007) discusses such an approach in terms of an *intervention ladder*, ranking the legal options available with progressive steps from merely encouraging policies to more coercive approaches, limiting parental choice through mandatory vaccination, and ultimately eliminating parental choice through compulsory vaccination. Determining which ‘rung’ on the ladder is appropriate for a particular society at a specific moment ultimately depends upon contextual factors. The first ‘rung’ concerns a situation of robust herd immunity, only necessitating non-coercive policies: encourage vaccination and protect unvaccinated persons. The second ‘rung’ concerns situations in which herd immunity is under threat. More often than not, under-vaccination occurs in specific, geographical bounded risk-clusters. For example, the Dutch and US *bible-belts* are well known for harboring under-vaccinated religious communities and this more contextual approach could target such risk-clusters. Certain schools are usually hubs of infections,

¹⁸ Although the discussion on waivers for parents with religious and/or philosophical objections is an important issue in the current discussion, we will not address it in this paper, because I have discussed it at length in another paper (Pierik, 2017b).

because they bring children from various communities together in together in single classrooms. Governmental agencies could start by explicitly targeting these hotbeds of under-vaccination with information campaigns and targeted but still voluntary vaccination programs. If those interventions do not suffice, the minister of health should decree an emergency ordinance to make vaccination mandatory in a well-defined area. As argued in the last section, the precautionary-element requires governmental agencies to err on the side of caution, to make sure that individual children remain protected, and that these decisions be guided by the best scientific knowledge available on the risks involved. Such mandatory policies should be guided by *state-of-the-art*-knowledge on the infectiousness of these diseases and factual knowledge on vaccination coverage, broken down by region. National public health institutions like the *Dutch National Institute for Public Health* (RIVM) monitor vaccination trends very carefully, have knowledge about vaccination rates up to the ZIP-Code level and within schools, daycare centers, etc. The precautionary principle requires that such public health institutions should err on the side of caution, to make sure that individual children remain protected. So, if the vaccination rate in a specific area falls below the threshold levels, vaccination should become mandatory, even though there are no explicit signs of an outbreak. The last ‘rung’ concerns situations of actual outbreaks. Judges can require the compulsory vaccination of specific children in case of clear and present danger. Again, these judgments of the Court should be informed by *state-of-the-art* epidemiological and medical insights taking into account the period between the inoculation and the moment of effective protection.

Thus, the argument not only presents a three-tiered approach of increased intrusion, but also of increased targeting. Society-wide voluntary policies encouraging vaccination can be designed by bureaucrats in the ministry of health; more intrusive mandatory policies must be laid down temporarily and locally by the minister; and compulsory vaccination can only be sentenced by judges in individual cases.

8 Conclusion

This paper analyzed collective childhood vaccination programs from the perspective of the best interests of the child involved. I concluded that the default position is that parents are bestowed with the responsibility to determine what is in the best interest of their child, but that this is not an absolute principle. Given the serious health effects of measles, it is in the best interests of children to be protected against the disease which, as a last resort measure could ultimately justify coercive policies. However, the principle of proportionality requires governmental agencies to refrain from enforcing this duty, as long as children are shielded collectively through robust herd immunity. Even though unvaccinated children still run minimal risks in this situation, coercive measures would be disproportionate to protect against these risks. However, this restraint should be revoked at the moment robust herd immunity is endangered. Here the principle of precaution kicks in. This implies that the assessment of the best interests of children is not only dependent upon the various risks and benefits of the disease and its vaccination, but also upon the contingent prevalence of herd immunity in her community.

Voluntary policies that encourage vaccination are, from a normative and regulative perspective, categorically different from coercive policies – even though it might be hard to draw a clear conceptual border in actual practice. It is vital for achieving the collective good of herd immunity that vaccination programs are generally endorsed by the public at large and that the large majority

of parents voluntarily participate in such immunization programs. The public health goal of collective protection against infectious diseases is not only determined by the quality of vaccines provided, but also the amount of trust by parents. After all, having one's child inoculated implies asking a health care professional to perform a medical intervention on our child that is beyond our knowledge and that can potentially hurt her. Parents will only make that choice when they have a generalized trust in health care practitioners and the system in general. This implies that governments should invest a great deal of energy in public trust the health care system, and only revert to coercive policies as a last resort.

This paper defending *conditional* mandatory programs is more accommodating to vaccine-hesitant parents than my earlier paper (Pierik, 2017a). Instead of a blanket approach of unconditional mandatory childhood vaccination, it presents a three-stage approach of encouraging, mandatory and compulsory vaccination. The more herd immunity is compromised within a society, the more unvaccinated children are at risk, and the more forceful – and intrusive – policies are justified. Coercive policies can only be justified when voluntary vaccination fails to protect children. So even though it might never revert to mandatory or even compulsory vaccination schemes, the state must have the legal capacity to do so in reserve. An analogy can be made to compulsory military service: conscription still exists in many western states, including the Netherlands, but it has been suspended temporarily. However, it can be re-activated immediately in times of war.

The argument in this paper, contextually accessing vaccination policies, is also more restrictive than the recent unconditional mandatory vaccinations programs as recently introduced in France and Italy, that also include mandatory vaccination against the non-contagious tetanus. Even though it only defends a program of conditional mandatory vaccination, the idea of a contextual intervention ladder presupposes that the state has already ensured the capacity to legally enforce vaccination, to be able to employ it if necessary.

At the same time, the argument does *not* accommodate alternative epistemic claims on the risks of vaccines and non-vaccination. The basic idea remains that, government policies concerning vaccination must be informed by *state-of-the-art* epidemiological and medical research on the risks of measles and its vaccine. Its conclusion is that, given the serious health effects of measles, even in its most uncomplicated form, it is in the best interests of the children involved to be protected against the disease. This implies that governmental agencies ultimately determine what the best interests of children are in this context of severe health risks. Parents are only *tolerated* to follow their alternative views and forgo vaccination when their child is sufficiently protected collectively through herd immunity.

A final question remains whether this approach, narrowly focused on the best interests of the child inoculated, also caters the interests of immunocompromised persons – persons with specific forms of cancer, compromised immune systems, or being likely to suffer from a serious allergic reaction. The state has an important role to protect persons who cannot protect themselves and who can only be protected indirectly through the maintenance of robust herd immunity. A

normative argument that explicitly starts from the perspective of the best interests of the child involved, cannot take onboard the protection of immunocompromised persons as a sufficient normative reason for mandatory vaccination. They will, however, be protected indirectly. A situation of compromised herd immunity implies that all unvaccinated children run an equal risk of contracting the disease – immunocompromised children *and* children of parents who forego vaccination for non-medical reasons. In situations in which herd immunity is (or becomes) compromised, governmental agencies will scale up its coercive apparatus and start enforcing mandatory programs on parents who forego vaccination for non-medical reasons. Such a mandatory program will not only protect the individual children vaccinated, it will also have the aggregated effect of re-establishing herd immunity, which indirectly protects those who cannot protect themselves – *a rising tide lifts all boats*. So, mandatory childhood vaccination programs based on best-interest's arguments, will not only protect the children involved, but also those who cannot protect themselves.

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