

Vaccination Policies: Between Best and Basic Interests of the Child, between Precaution and Proportionality

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How should liberal-democratic governments deal with emerging vaccination hesitancy when that leads to the resurgence of diseases that for decades were under control? This article argues that vaccination policies should be justified in terms of a proper weighing of the rights of children to be protected against vaccine-preventable diseases and the rights of parents to raise their children in ways that they see fit. The argument starts from the concept of the ‘best interests of the child involved’. The concept is elaborated for this context into the dual regime structure in which parents have fiduciary authority over what they consider to be best for their child, and the state has fiduciary authority over a child’s basic interests. This argument leads to conditional mandatory vaccination programs that should be informed by a correct balancing of the two legal principles of proportionality and precaution. This results in contextual childhood vaccination policies of upscaling interference: a three-tiered approach of increased intrusion, from voluntary program when possible and mandatory or even compulsory programs when necessary to protect the child’s basic interests.

Introduction: The (Contested) Contribution of Vaccinations

Societal protection against infectious diseases is generally considered a classic task for governments. A century ago, diseases like measles, diphtheria, polio and whooping cough were 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 great majority of parents are convinced of the beneficial effect of vaccinations and enroll their offspring in such programs voluntarily. However, since the introduction of the first vaccination programs in the beginning of the nineteenth century, various groups have rejected vaccinations. Traditionally, the most well-known objectors are members of religious groups who argue that vaccination interferes with divine providence. In the last two decades, however, Western societies have encountered an emerging modern anti-vaccination movement that claims that the risks of vaccination outweigh the purported benefits. Unlike the religious 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.¹

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 various measles outbreaks in European states and North America. Since January 2018, 47 of the 53 countries in the European Region have reported over 100,000 measles cases, of which about 60 per cent were hospitalized, and over 90 measles-related deaths (World Health Organization, 2019). How should liberal-democratic governments deal with opposition to vaccination when it leads to the resurgence of diseases that for decades were assumed to be under control? One serious public-relations problem with preventive vaccination is that they require an explicit action—vaccination—the benefits of which are remote *non-events* that can only be made visible through hypothetical statistics—the number of persons *not dying* annually (van Wijhe *et al.*, 2016).

Given the possibly disruptive effects of infectious diseases like measles, the state has a compelling interest in preventing (major) outbreaks. In an earlier paper, I argued that there is sufficient principled ground to defend unconditional mandatory childhood vaccination programs for all children without medical contraindications,

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only allowing medical, but not religious or philosophical exemptions (Pierik, 2018). This conclusion was based on two arguments: first, mandatory programs are an important tool to incentivize sufficient vaccination uptake to sustain herd immunity, and second, the government has its own responsibility to protect the health of young 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 prevented easily and safely through vaccination.

Although unqualified mandatory programs might provide the most robust protection for vulnerable members of society, as a general policy proposal, it has two drawbacks. First, mandatory childhood vaccination might be a disproportionately intrusive legal measure in societies with long and successful traditions of voluntary programs that generate sufficient compliance and undiminished herd immunity (Haverkate *et al.*, 2012). Second, with robust collective protection through herd immunity, the actual risk of infection is very limited. This has led to an increasing number of parents questioning whether vaccination is still in the best interests of their child. This article takes these reservations towards unconditional mandatory vaccination onboard and develops an alternative argument, defending, firstly, *conditional* mandatory vaccination programs and, secondly, argued for in terms of a proper weighing of the rights of children to be protected against vaccine-preventable diseases and rights of parents to raise their children in ways that they see fit. The proposal in this article diverges from unconditional programs in that vaccination is mandatory only under specific conditions, as determined in the article. If these conditions are not met, the choice to vaccinate remains up to the parents. The question is how such a scheme can be justified normatively and designed legally, and under which conditions vaccinations should become mandatory.

Two caveats apply. First, the article does not discuss childhood vaccination in general, but focuses on one specific disease: measles. Diseases differ significantly in their prevalence, their contagion and the danger they pose to the infected. Measles is a ‘pure’ example in this context: it is a severe and extraordinarily contagious disease, with outbreaks common enough to pose a significant threat to public health. Moreover, over time, a vaccine has been developed and tested through and through that 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.²

The second caveat is that this article is mainly concerned with the regulatory side of vaccination policies,

not with the biomedical and epidemiological evidence on the effectiveness and safety of vaccinations. The article takes the broad consensus of the scientific community for granted that vaccines in basic childhood vaccination programs are safe and effective. There is some chance of minor, local and temporary side effects. However, the chance of long-term side effects is extremely small and in no way do they offset the protective benefits that vaccines provide (Maglione *et al.*, 2014; McNeil *et al.*, 2016). Simultaneously, current discussions in the social media and the emerging influence of the 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, the very aim of this article is to discuss the regulation of childhood vaccinations in the face of these disputes.

The Collective Good of Herd Immunity and the Individualistic Turn

Given their possible disruptive effects, the state has a compelling interest in preventing (major) outbreaks of infectious diseases such as measles.³ Indeed, although it remains contested whether the liberal-democratic state should *promote* public health through collective institutions, it is undisputed that it should *protect* society against major threats to public health (Verweij and Houweling, 2014). Measles is a case in point. It is an unusually contagious disease: an infected person can infect between 15–25 persons in an unvaccinated population, so one or two measles cases in a day care center will likely result in infection of all unprotected children.⁴ Even if a person only experiences the disease in its mildest form, she remains infectious. Thus, 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. This implies that such diseases should not merely be discussed in terms of parent–child responsibilities, but also in terms of public health.

A primary 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, the disease-causing microorganisms, to circulate within the population, so 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 per cent, at which point major outbreaks are precluded

(Orenstein *et al.*, 2007: 1434).⁵ Herd immunity, hence, provides 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. First, herd immunity also protects the category of infants and young children who have not yet completed the recommended childhood immunization schedule—children only receive their first MMR vaccination around their 14th month. The second category concerns the small percentage (1–5 per cent) of persons for whom their vaccination turns out to be insufficiently effective because the vaccination does not mount an adequate immune response.⁶ The third category concerns those persons who cannot undergo vaccination for medical reasons: because they have certain forms of cancer, a compromised immune system, or are likely to suffer from a serious allergic reaction. The fourth and final category concerns children of parents who refused to vaccinate for religious or philosophical reasons. In all these cases, exposure to a pathogen would create a risk prevented by robust herd immunity. It is through this collective protection of herd immunity that large-scale vaccination programs are so much more effective than individual vaccinations. This is the main reason why governments focus so much on collective vaccination programs as an important contribution to public health.

When large-scale collective vaccination programs were introduced in the 1950s, they were heralded as key contributors in the fights against horrible diseases, the outbreaks of which disrupted society regularly and seriously. The success of vaccination programs can be measured by the fact that, after their introduction, massive outbreaks gradually vanished. The paradoxical result is that, over time, this public health success 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. Vaccination programs present a trade-off: the individual child inoculated is protected, society as a whole is safer, and immunocompromised persons and newborn babies are indirectly protected. However, the risks involved befall only those who undergo vaccination. The more robustly that herd immunity is established in a specific society, the less an individual inoculation contributes to the protection of that particular child, since she is already protected indirectly. Now that robust herd immunity has minimized the risks of the diseases themselves, the attention of parents has shifted from concerns about disease outbreaks to the risks associated with vaccinations. Moreover, worries about side effects have been exaggerated and exploited by anti-vaccination

websites that disperse the wildest speculations about so-called ‘vaccine harm’ with anecdotal evidence as ‘alternative medical truths’. Consequently, well-meaning hesitant parents systematically over-perceive the magnitude of the risks involved with vaccination, causing them to doubt whether the benefits of vaccinations do outweigh their dangers (Larson *et al.* 2011: 526).

Science and technology theorists like Goldenberg and Koerth-Baker emphasize that the current public questioning of vaccines cannot (only) be explained in terms of anti-science ideology or misunderstandings of the science (Goldenberg, 2016). It should be understood in terms of a different assessment of the risks of the MMR vaccination’s side effects, given that the disease became virtually invisible in the Western world (World Health Organization, 2018).⁷ What if one’s child is the exception that experiences the extremely rare but severe side effect? Koerth-Baker (2016) argues the current vaccine hesitancy can, at least partly, be explained by the public image of vaccination programs being focused too much on increasing and maintaining herd immunity, with too little attention given to parental considerations concerning vaccinations’ side effects. This implies, they argue, that state agencies should not repetitively rehearse the importance of collective benefits like herd immunity but, instead, engage much more directly with parents’ genuinely sincere questions about the risks for their child, both from the disease itself *and* from the vaccination against it.

Best Interests, Basic Interests and ‘What Is Best for Children’

Parents increasingly require a justification of vaccination policies in terms of the individual benefits for their child, which is, of course, something that we normally expect parents to do. Inevitably, their judgment will be guided by their own conceptions of a good life, and their own understanding of the circumstances. In cases where their child requires medical treatment, they will often depend on the pediatrician’s assessment of the situation, and ideally the pediatrician’s medical view and their own judgment concur. From a legal and medical-ethical perspective, both are supposed to act in the best interest of the child, defined by Buchanan and Brock (1989: 10) as ‘acting so as to promote maximally the good (i.e. well-being) of the incompetent individual’.⁸ The principle is central in children’s law through Article 3 of the *United Nations Convention on the Rights of the Child* (UNCRC) which emphasizes that, in all actions concerning children, state agencies must take children’s best interests

as a *primary consideration*. The UNCRC explicitly focuses on children as separate right bearers, because of their dependent position, giving them less opportunities to defend their interests themselves. In an elucidation, the *United Nations Committee on the Rights of the Child* (2013: 37) writes:

The expression ‘primary consideration’ means that the child’s best interests may not be considered on the same level as all other considerations. This strong position is justified by the special situation of the child: dependency, maturity, legal status and, often, voicelessness. Children have less possibility than adults to make a strong case for their own interests, and those involved in decisions affecting them must be explicitly aware of their interests. If the interests of children are not highlighted, they tend to be overlooked.

If we acknowledge children as separate rights bearers, it becomes clear that ‘best interests’ is to be used as an objective standard for evaluating decisions that medical practitioners and parents make as fiduciaries *for* the child. However, in some cases parents and medical practitioners disagree on whether a child needs a specific medical treatment. Jehovah’s Witnesses’ refusal to consent to a blood transfusion for a newborn ‘rhesus baby’ is a case in point (Wolley, 2005; Conti *et al.*, 2018). If medical treatment is necessary in cases of an imminent and severe threat to health, it is usually considered as being objectively in the best interest of that child. Indeed, in such acute situations, a best interests judgment made by medical practitioners and, ultimately enforced by judges in court, may be relatively straightforward, even if it is disputed by parents.

However, in the case of preventive treatments like vaccination, the standard of ‘best interest’—understood objectively as ‘acting so as to promote maximally the good (i.e. wellbeing) of the incompetent individual’ fails to provide much guidance. If a medical decision does not involve a situation of clear and present danger, many other medical and non-medical considerations may also be relevant in determining what maximizes the good for the specific child. This argument is especially relevant in discussions of the protection against relatively small risks. Why should a narrow medical perspective, seeking to fully eliminate this risk always prevail in such cases? Indeed, absence imminent threats, it makes sense to have more attention to parental views on what is best for the child. This implies that the singular conception of ‘best interests’ is not of much help in situations where parents contest not-urgent medical interventions as proposed by medical specialists.

As an alternative, I propose to analyze these disputes in terms of the dual notions of ‘what is best for the child’ as determined by parents, and ‘basic interests’, for which medical practitioners and the state are held responsible. I define the concept of ‘what is best for the child’ as the goals that parents are striving for when they raise their children in line with their idea of the good life. For various reasons, the concept should be understood in an open sense. First, there is a wide variety in how parents conceive what is best for the child, and the liberal state should provide parents much leeway in raising their children in line with their ideas of the good life and transmitting those values to their children. This stems from the parental freedom of religion and conscience, which itself originates from the liberal idea of tolerance towards various ideas of the good life. Second, children have an irreducible plurality of personalities; what might be good for one child might not be good for another to stimulate and develop them to their full potential. Since parents know their children best, they are in the best situation to assess their children’s character, inclinations, talents and what she needs to develop her potential.

This concept of ‘what is best for the child’ as determined by parents must be clearly distinguished from ‘basic interests’, for which health professionals and state agencies are responsible.⁹ Following Rawls (1999), I define ‘basic interests’ as those higher-order interests that children have in developing and exercising the basic capacities that are indispensable for growing up into a self-reliant and cooperating citizen in one’s society, regardless of one’s (future) idea of the good life. The state should ensure the background conditions and necessary prerequisites that guarantee the child’s ‘open future’ (Feinberg, 1980; Millum, 2014). Of course: both the concepts of ‘basic interests’ and ‘open future’ are contested, can be challenged, and should always be open for democratic contestation of some sort (Shapiro, 1999: 85). At the same time, child rearing unavoidably presupposes certain ideas about what is indispensable in the development toward adulthood and which circumstances undermine this development. Pointing out that these ideas are intrinsically controversial does not undermine their necessity. In each political community, a legal consensus has solidified on a specific set of basic interests that the state should guarantee for all its (underaged) citizens. And in virtually all political communities this set includes the protection against vaccine-preventable diseases, either through voluntary, or more mandatory programs.

In the case of non-urgent medical decisions, I have replaced the singular notion of ‘best interests’, prevalent

in law and medical practice, by the dual notions of ‘what is best for the child’ and ‘basic interests’. Indeed, despite the dominance of the best-interests parlance in constitutional and international law, it makes more sense to argue that the state has the primary responsibility for a child’s *basic interests*. After all, do we really think in the context of all-things-considered policies that a liberal-democratic state, restricted by the requirements of state neutrality, should pursue what maximizes the good of the child? This dual terminology emphasizes that parents and state agencies share a dual regime structure of authority over children. These roles are complementary since they have different provinces of legitimate authority over the child. The state has the fiduciary responsibility to ensure that children’s basic interests are met, and against that background, parents have the fiduciary obligation to ensure what is best for their child.¹⁰

In most cases, most of the time, the two fiduciary authorities work in tandem in complementary ways in the interests of the child. The concept of ‘basic interests’ as defined above is in line with what most parents see as what is best for their child. However, since there is no clear-cut division between ‘what is best’ and ‘basic interests’, border disputes may arise where the two fiduciary authorities overlap and conflict. Problems emerge when a parent’s views of what is good for her child conflict with one or more dimensions of the political consensus on basic interests. Relevant to this discussion are parents who oppose the MMR vaccination. For example, some parents are still convinced by the (scientifically debunked) claim of Andrew Wakefield that the MMR vaccine causes autism (Deer, 2011a,b). Other parents, for example those who follow Rudolf Steiner’s anthroposophy, consider measles merely as an innocent childhood disease and, simultaneously, as a meaningful step in the process of development from child to adulthood—on a par with shedding primary teeth. Their doctrine insists that such childhood diseases provide individuals with a natural resilience against diseases like cancer and allergies later in life. Since followers of anthroposophy perceive measles as a beneficial disease, they prefer their children to encounter it. Even though this claim might sound intuitively plausible, large-scale research has never been able to demonstrate these positive effects of measles later in life. Still other parents insist in forgoing vaccination because they seek to carve out all-natural lives for their children, to maintain their purity, or avoid contamination, assuming that vaccines contain toxic preservatives such as the mercury-based thimerosal.¹¹ What unites these parents is that they dispute the outcomes of mainstream science that vaccines are safe and effective or are deeply suspicious of modern

medicine altogether. The last category is parents in Christian congregations, who might not dispute the mainstream medical assessment of the risks and benefits of vaccination but decide against vaccination because their religious convictions. Even though they deplore the possible health risks for their children, they postulate that their child’s fate—being infected with measles or not—is ultimately in God’s hand and that humans should not meddle with divine providence through vaccination. This short survey shows that parents genuinely have divergent ideas about what is best for their child and, consequently, arrive at different conclusions regarding the desirability and necessity of childhood vaccination. The emerging vaccine hesitancy in the Western world is a result of the emerging public debate on epistemic and moral issues concerning the truth value of the scientific and medical-professional consensus on vaccination safety.

In these discussions, vaccine-critical parents typically conflate two arguments. First, decisions about childhood vaccination should primarily be determined by the interests of the child involved; second, this implies that they, as parents, have the authority to determine what these interests are in the context of vaccination. However, these two claims are independent, and there is no reason why someone who accepts the first claim must also accept the second. The fact that some parents are convinced that vaccine refusal is best for their child does not imply that their conviction is in line with the best medical evidence available. Western governments cannot simply ignore the emerging public questioning of vaccinations by vaccine-hesitant parents. At the same time, they also cannot ignore their responsibility to protect children’s basic interests, including the protection against the risks of vaccine-preventable diseases. How must these rights be weighed against one another?

Parental autonomy is firmly embedded in international conventions. Article 18 of the *International Covenant on Civil and Political Rights* (ICCPR) protects the right to freedom of thought, conscience, and religion, while article 18(4) states that ‘the States Parties to the present Covenant undertake to have respect for the liberty of parents . . . to ensure the religious and moral education of their children in conformity with their own convictions’. Article 2 of the First Protocol to the European Convention on Human Rights states, ‘In the exercise of any functions which it assumes in relation to education and to teaching, the State shall respect the right of parents to ensure such education and teaching in conformity with their own religious and philosophical convictions’. There is no reason to *a priori* exclude the right to make decisions on vaccination from this fiduciary autonomy.

At the same time, and as argued above, article 3 of the UNCRC directs states to protect the basic interests of children who cannot yet make well-informed decisions on vaccination. Prudent government policy implies finding a good balance between two interests. On the one hand, there is the right of non-vaccinating parents to raise their children according to their deeply held convictions and the corresponding duty of the government not to interfere with these parental choices. On the other hand, there is the right of the child to have her *basic interests* protected and to grow up in good health, including the protection against avoidable diseases, with the corresponding duty of the government to protect the rights of the child. The question that emerges then is: under which circumstances is the protection of the child's basic interests' grounds for the government to override the rights of parents to follow their (deeply felt) desire not to vaccinate?

Parental Prerogative or *Parens Patriae*?

It is generally taken for granted in liberal-democratic regimes that parents have the primary prerogative in the upbringing of their children. Neutrality requires the state to be agnostic towards the myriad ideas about the good life that parents may endorse, including their ideas about what is best for their child. Moreover, it is both in the interests of parents and the interests of children that government does not interfere unnecessarily in the privacy of family-life and parent-child relationship, as protected by, for example art. 8 ECHR. Still, there remains a difference between the freedom of parents to live their own life in line with their idea of the good life and their freedom in the way they raise their children. Parents act as fiduciaries and guardians on behalf of the child who herself is not yet capable of making deliberate choices—a role that slowly dissolves in the process of the child approaching adulthood. Yet, from the very start at (or even before) birth, parenthood comes primarily with the obligation to protect the ongoing interests of children as vulnerable and maturing moral human beings in the process of developing into self-reliant persons.¹² Parental autonomy is not a self-standing right, it is a right that parents have *in their role* as parents and fiduciaries and in their endeavor of guiding their offspring on their way towards independence. After all, children are neither an extension of their parents nor valid objects of their parents' self-expression. Instead, they are 'self-originating sources of valid claims' (Rawls, 1980: 543). If parents fail to take on their role as parent responsibly, the state has a responsibility to intervene.

On the one hand, the state usually delegates its initial responsibility for addressing children's basic interests to parents, working from the assumption that parental decisions not only promote what is best for their child but also her basic interests. Given the fact that most parents deeply care about their children and interact with them daily, they are in the best situation to understand the unique needs of their children and make decisions that are best for their child. On the other hand, the state never fully relinquishes to parents the final authority over a child's basic interests. Instead, it assumes a secondary, inverted role. It leaves most choices concerning childrearing to parents and only interferes actively when it is evident that, through parental decisions, a child's basic interests are (about to be) harmed. That is, the state employs a 'harm threshold', below which basic interests are harmed to such an extent that state interference is necessary and justified (Diekema, 2004; Birchley, 2016a,b). For example, the freedom of parents to raise their children in line with their ideas of the good life should not result in the avoidable risk of death or lifelong disability for children, and the state has an obligation to intervene to protect the infant, when this can be done easily and safely (Dawson, 2011: 146). The doctrine of *parens patriae* allows state interference to protect a child's basic interests, iconically established as a legal principle by the US Supreme Court in *Prince v Massachusetts* (1944): 'Parents may be free to become martyrs themselves. But it does not follow that they are free, in identical circumstances, to make martyrs of their children'.

In a democratic, pluralistic state, the government can only hold legitimate authority to ensure basic interests of children if empirical claims about what does or does not contribute to health and wellbeing are truly independent and devoid of commitments to specific world views. Moreover, given that this authority may imply overruling choices of parents, judgments about basic interests of children should be based on the best possible biomedical evidence available. Hence, as far as the contribution of vaccination to a child's health is concerned, democratic governments will make decisions by appeal to the state of scientific knowledge about vaccination and not to anthroposophic or other world views. Given that there is a very broad scientific consensus that diseases like measles, polio and pertussis can have very serious—lethal or permanently disabling—complications and that vaccinations against these infections are effective and safe, it is reasonable to hold that such vaccinations indeed do protect a basic interest of each child.

This argument provides an answer to the question posed in the last section: under which circumstances is

the protection of the child's basic interests grounds for the government to override the rights of parents to follow their (deeply felt) desire not to vaccinate? Even though parental prerogative is the most plausible starting point of this discussion, it is never an absolute principle. The doctrine of *parens patriae* holds that the state has its own responsibility to ensure that the basic interests of all children are secured. Its application in a specific case may be debatable, but the concept of *parens patriae* itself is not suspect in the least (Reiss, 2015: 3). At the end of the day, the state has a responsibility to safeguard the child's basic interests, including the interest of being free from preventable diseases. What is established within the political community as a child's basic interests set constraints of the freedom of parents to raise their children following their conception of the good life. The *harm threshold* functions as an emergency brake on parental prerogative when the basic interests of children are harmed, especially in cases of serious long-term or permanent injury or death—when alternative, less risky options are available (Dawson, 2005: 78).

This conclusion is in line with—and endorses—a central principle of modern constitutional thought that the state must have the ultimate *Kompetenz-Kompetenz*, that is, the competence to determine the respective areas of competence of natural persons and associations within its jurisdiction (Laborde, 2017: 160–196). Of course, parents have the freedom of religion and conscience and the subsequent parental prerogative to raise their children in line with their ideas of what is good for their child. However, it is the state that determines *the limits* of these fundamental rights, especially when they clash with other fundamental rights and freedoms—including the rights of children to have their basic interests protected. Only governmental agencies can unilaterally determine the range and limits of the rights and duties of (associations of) citizens within its jurisdiction. To sum up: the state has the ultimate competence to employ the harm threshold as an emergency brake on parental prerogative when the basic interests of children are (about to be) harmed. The next question, under which circumstances the government should be pulling this emergency brake, will be answered in the next section.

Between Proportionality and Precaution

Given the possible negative health effects of measles, we can conclude that the protection of children's basic interests implies that they should be safeguarded against contracting the disease. However, this does not *ipso facto*

justify unconditional mandatory vaccination programs. After all, individuals can be protected in two quite different ways: individually through vaccination and collectively through robust herd immunity. Given the fact that herd immunity does not require a vaccination rate of 100 per cent—measles outbreaks can be contained at 92–94 per cent—there is theoretical room to tolerate non-vaccination. If herd immunity is robustly guaranteed, unvaccinated children are protected indirectly. This implies that decisions on vaccine policies are not only dependent upon the various risks of the disease and risks and benefits of its vaccination, but also upon the contingent prevalence of herd immunity in a specific community.

Given their responsibility for protecting the basic interests of children, how much leeway can state agencies give to the practice of non-vaccination? In countries in which the large majority of parents vaccinate their children voluntarily, the collective good of herd immunity is assured as a positive externality of private voluntary choices. Several European countries have long traditions of broad compliance with encouraging, but non-coercive vaccination programs (Haverkate *et al.*, 2012). In such situations where voluntary vaccination ensures herd immunity, there are good liberal arguments to tolerate the practice of non-vaccination. Yes, non-vaccinating parents are free riders: their children's basic interests are protected through the herd immunity as generated by other, vaccinating parents.¹³ And yes, vaccine denialists usually produce all kinds of arguments that are not backed by state-of-the-art medical research. Still, the liberal-democratic state should display a *gritted-teeth* toleration towards non-vaccinating parents, at least as long as the basic interests of their children and other vulnerable persons are not harmed (Pierik, 2017: 225–226).

This liberal-democratic argument favoring tolerance of non-vaccination can be translated into the legal *principle of proportionality*, requiring that a government's interference with citizens' freedom must be proportional to the goal the law seeks to achieve (Klatt and Meister, 2012: 8–10; Alexy, 2014: 52–54; Brems and Lavrysen, 2015: 141; Rivers, 2014). The principle is usually employed in a four-pronged test. Given the particular circumstances of the case:

1. There must be a legitimate purpose for a measure;
2. The measure must be suitable to achieve the purpose, potentially with a requirement of (scientific) evidence to show it will have that effect;
3. The measure must be necessary to achieve the purpose, the importance of serving that purpose

must be sufficient to justify the intensity of the interference, and there cannot be any less onerous way of doing it—also known as *the principle of subsidiarity*; and

4. The measure must be reasonable, considering the competing interests of the groups at hand.

Does this imply that mandatory vaccination can be justified? The aim of childhood vaccination programs is to protect society and its members against outbreaks of infectious diseases. As argued above, this is an important, legitimate and even classic policy goal (cf. 1). Mandatory policies aimed to achieve herd immunity are highly suitable to achieve this aim (cf. 2). However, mandatory policies are not a *necessity* in situations where voluntary vaccination suffices to protect robust herd immunity (cf. 3). Indeed, if children are safeguarded indirectly through voluntary vaccination, governmental agencies can refrain from mandatory programs. Even though unvaccinated children might in extreme cases run the risk of infection, for example, by being in the same room with an infected person within their *herd-immunized-bubble*, this rare risk does not justify a general policy of mandatory childhood vaccination. If we take the *principle of proportionality* seriously, parents cannot be legally coerced to vaccinate in situations where sufficient herd immunity is voluntarily generated, because the chance of contracting the disease approaches zero, making mandatory childhood vaccination a disproportional legal measure (cf. 4). To be sure: my argument does not claim that herd immunity provides the best protection available, or that individual protection through vaccination would not be preferable (Bester 2017). I only argue that in situations in which children are already protected indirectly through herd immunity, mandatory programs disproportionately interfere in parental authority.¹⁴

Nevertheless, it should be perfectly clear what kind of right this is. It is a tolerance-based and conditional right, *not* a straightforward and inalienable right of parents that nullifies the duty to vaccinate. Moreover, governments should not accept the alternative epistemic assessments of the benefits of measles or the dangers of vaccination as truth claims. They should only *tolerate* the convictions and the ensuing practice of non-vaccination if the interests of children to be shielded from measles are protected indirectly. This governmental self-restraint should be revoked immediately when robust herd protection is endangered because unprotected children run the risk of being infected, falling ill, and becoming a vector in the further spread of the disease. In situations where herd immunity is—or is about

to become—compromised, the responsibility of the state to protect children's basic interests kicks in. If parents refuse vaccinations in such a context, the protection of vulnerable persons' basic interests implies that governmental agencies should legally override parental autonomy here.

Because it is not exactly clear when and where an outbreak may occur, it makes sense to follow the *precautionary principle*—which is usually employed in situations where decisions to avoid threats of serious or irreversible damage must be made in a context of uncertainty (Marchant 2003, Resnik 2004, Sunstein 2005, Steel 2014). There is no single authoritative formulation of the principle, but the basic gist is that the state is required to take decisive action to forestall or prevent threats of serious and irreversible harm as soon as there is evidence that this threat is genuinely plausible, not just after the harm has occurred.¹⁵ Since such decisions are inherently made in a context of uncertainty, the lack of complete scientific assurance cannot be a reason to refrain from making such a decision.

As a general policy, the precautionary principle may be too cautious because there are simply too many 'unknown unknowns' against which the state could take precautions. Moreover, since it requires state action *before* a threat actually has struck, it may induce governments to intervene too early. However, in concrete policy decisions like these, the principle provides good guidance: there is sufficient evidence-based knowledge about the risk of an outbreak. National public health institutions monitor vaccination trends very carefully and have detailed knowledge about the geographical distribution of vaccination rates. In addition, there is good scientific knowledge available on the infectiousness of diseases and the relationship between decreasing vaccination rates and the increasing risk of an outbreak.

The principle of precaution requires that such a choice is informed by *state-of-the-art* scientific insights, but it ultimately remains a normative political decision. Science can determine the risk of an outbreak at a certain vaccination rate; ultimately the political community must determine which risk of an outbreak is considered unacceptable. Since outbreaks can develop unpredictably quickly, the application of precautionary reasoning implies that the state must have established policies to fall back on, even in a situation of robust herd immunity. Such policies must consist of two elements. First, the determination of the threshold itself: at which vaccination rate should the voluntary nature of the vaccination program be abandoned? Second, which more mandatory measures should be implemented once the threshold is met?

Contextual Policies of Upscaling Interference

The last section argued that the principle of proportionality prohibits mandatory vaccination in situations where voluntary programs provide robust herd immunity. Voluntary vaccination implies that the choice to vaccinate is ultimately left to parents with no negative repercussions for non-vaccinating parents. This does not imply that governmental agencies should sit back and relax; it only leads to the conclusion that mandatory programs are disproportional in this specific context. Voluntarily generated herd immunity is a precious collective good that should be cherished and actively protected. Three venues are relevant here: actively stimulating voluntary vaccination, actively countering vaccine denialism and actively employing all means available to protect unvaccinated persons.

To stimulate voluntary vaccination, governmental agencies should enable and promote free access to 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 boost the effect by setting up elaborate state immunization programs, provided through a comprehensive statewide 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 unmistakable nudge to comply with the schedule. Moreover, governmental agencies should make it as easy as possible for parents to have their children vaccinated, by offering vaccinations at alternative locations or during extended opening hours, primarily adapted to the scheme of parents of young children. Secondly, governmental agencies should launch campaigns to inform the public about the dangers of infectious diseases and protection of vaccinations, as an antidote to anti-vaccination websites that disperse the wildest speculations with anecdotal evidence for ‘alternative medical truths’. Freedom of speech implies that vaccine denialists cannot be forbidden 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 (Venkatraman *et al.*, 2015).

Finally, governmental agencies should endorse non-coercive policies to protect unvaccinated persons against infections. It can actively provide travel advisories to parents on areas in the world where herd immunity is undermined to ensure that unvaccinated children do not

encounter such diseases unconsciously.¹⁶ They should ensure an up-to-date registration of individual vaccination uptake—and the lack thereof—to ensure each person has access to her vaccination status later in life. Another possibility is to actively approach young adults (14–18 years old) in schools to warn them about the risks of not being vaccinated and enable them to catch up to missed vaccinations easily and for free.

In situations in which the collective protection of children through herd immunity is (or is about to be) undermined, the precautionary principle kicks in. This justifies the introduction of mandatory vaccination programs, which imply that the government will withhold valuable social goods or services from families who choose not to vaccinate their children for non-medical reasons (Navin and Largent, 2017). An example is the policy that makes vaccination a prerequisite of day care attendance. Although there is no federal regulation, all the US states legally require the vaccination of children prior to school or day care entry. In some states, parents can receive a waiver after they have been granted exemption for their religious and/or philosophical objections.¹⁷ Similar policies have successfully been introduced in France and Italy where unvaccinated children are refused admission to day care centers, schools or summer camps. These policies still leave the choice to vaccinate up to the parents, but the decision not to vaccinate has serious implications.¹⁸ Not having access to childcare arrangements might hamper work–life balance, especially for single parents and two-income households. In another approach, governments make access to child-related advantages, including child allowances, dependent on vaccinations. An example is the Australian *no-jab-no-pay* policy, in which parents who do not fully immunize their children—up to 19 years of age—are not eligible for various forms of family assistance (Sabin, 2015). Again, the policy leaves the choice to vaccinate up to the parents, but the decision to forgo vaccination will lead to various financial setbacks.¹⁹

If these mandatory policies do not suffice to restore robust herd immunity, a next step is compulsory vaccination: a legal duty to vaccinate, the refusal of which would imply breaking criminal law and running the risk of punitive action by the government. For example, Belgian parents can be fined or even imprisoned if they forgo the polio vaccination for their child. Finally, in the extreme case of an acute outbreak of measles, judges could—locally and temporarily—forcibly impose vaccination of specific children that have encountered the disease, against the will of the parents. The latter approach is the most intrusive policy option because it

bypasses parental discretion fully: parental choice is not just burdened, it is eliminated. An example is the 1990 measles outbreak in the US city of Philadelphia that centered on two fundamentalist churches, Faith Tabernacle and First-Century Gospel, whose members did not believe in vaccination—or modern medicine in general. Nine children died from measles during the outbreak. Ultimately, a judge ordered the church members' children vaccinated, setting parental objections aside. The judges came to this decision because the children were in direct danger of falling ill and becoming a vector in the further spread of the disease—a risk that can be reduced with vaccination, even after infection (Reiss and Weithorn, 2015: 967–968).

This implies that governmental agencies have a range of options at their disposal, enabling them to employ the least restrictive alternative that is 'reasonably necessary' to guarantee the sufficient protection of children (Gostin *et al.*, 1999). The three-tiered approach presented above—voluntary, mandatory and compulsory—enables contextual childhood vaccination policies. The more herd immunity is compromised within a society, the more intrusive policies are justified to safeguard the basic interests of unprotected children. 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.²⁰ Determining which rung on the ladder is appropriate for a particular society at a specific moment ultimately depends on contextual factors. The first rung concerns a situation of robust herd immunity, only necessitating non-coercive policies: encouraging vaccination and protecting unvaccinated persons. The second rung concerns situations in which herd immunity is under threat. Under-vaccination usually occurs in specific, geographically bound 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, because they bring children from various communities 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. The last rung concerns situations of actual outbreaks. Judges can

require the forced vaccination of specific children in case of clear and present danger. Again, these court judgments should be informed by state-of-the-art epidemiological and medical insights considering 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 increased targeting. Society-wide voluntary policies encouraging vaccination can be designed by health authorities; more intrusive mandatory policies must be laid down temporarily and locally by the minister. A judge can only sentence forced vaccination in individual cases.

One could ask whether this approach, narrowly focused on the interests of the child involved, also sufficiently represents the interests of children who cannot be vaccinated for medical reasons. After all, the state has an important role to protect the basic interests of all children, especially vulnerable children who cannot protect themselves for medical reasons and who must rely on robust herd immunity. A normative argument that explicitly starts from the perspective of the best interests of the vaccinated child cannot take on board 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 a 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 the coercive apparatus and start introducing mandatory programs, affecting parents who forego vaccination for non-medical reasons. Such a mandatory program will not only protect the individual children vaccinated, but it will also have the aggregated effect of re-establishing herd immunity, which indirectly protects those who cannot protect themselves. That is, a rising tide lifts all boats. Accordingly, mandatory childhood vaccination programs justified by the interests of the children involved will protect all children, including those who cannot protect themselves for medical reasons.

Conclusion

This article analyzed vaccination policies in terms of the proper weighing of the rights of children to be protected against vaccine-preventable diseases and rights of parents to raise their children in ways that they see fit. It was concluded that the default position is that parents are bestowed with the responsibility to determine what is best for their child, but this is not an absolute principle.

Given the potential health effects of measles, protecting their basic interests implies that children should be protected against the disease—which could ultimately justify mandatory childhood vaccination policies. So yes, vaccination policies should be justified in terms of the interests of the child involved, but it is the state, not parents, that has the ultimate competence of determining how these basic interests should be understood. In line with this author's earlier paper (Pierik, 2018), he is still convinced that there is sufficient principled ground to defend mandatory childhood vaccination. However, he accepts that the principle of proportionality requires governmental agencies to refrain from enforcing mandatory programs in situations in which children are shielded collectively through herd immunity. The moment when these voluntary measures do not suffice to maintain robust herd immunity, the state's responsibility for children who cannot stand up for their interests requires more mandatory interventions. The precautionary principle provides governmental agencies with the policy discretion to introduce more coercive measures to protect citizens in situations with a plausible but still uncertain risk of an imminent outbreak. State agencies have the responsibility to take the appropriate preventive steps to safeguard the lives of those within their jurisdiction against foreseeable and avoidable risks.

It is vital for immunization programs that they are generally endorsed by the public at large and that the large majority of parents participate voluntarily. Collective protection against infectious diseases is not only determined by the quality of vaccines provided, but also the strength of generalized trust parents have in health care professionals and the system in general. This implies that governments should invest a great deal of energy in public trust in voluntary vaccination programs, only reverting to coercive policies as a last resort. Simultaneously, trust in the government also requires active interventions when outbreaks of diseases like measles are imminent. Here, the principle of proportionality reverses: it is disproportional if the government does not act to protect vulnerable persons in the face of an imminent outbreak.

Conditional mandatory programs are more accommodating to vaccine-hesitant parents than blanket unconditional mandatory programs. Instead, it presents a three-stage approach of encouraging, mandatory and compulsory vaccination programs. If voluntary vaccination generates robust herd immunity, vaccination can remain voluntary. The more herd immunity is compromised, the more unvaccinated persons are at risk, and the more intrusive policies are justified. The basic idea is that the state can only tolerate the practice of non-vaccination if, and to the extent that robust herd

immunity sufficiently protects vulnerable persons indirectly and that such decisions must be informed by state-of-the-art epidemiological and medical research. Indeed, these author's arguments do not accommodate alternative epistemic claims on the risks of vaccines and non-vaccination.

Notes

1. It remains an open question whether the current anti-vaccination movement is a new phenomenon or merely a new round of an old discussion. The historian Mark Largent emphasizes that there are only a very few historical links between the 'current' anti-vaccination movement and previous movements (Largent, 2012). Novel is the fact that social media like Facebook and Twitter offer vaccine deniers an unprecedented opportunity to propagate their message to a much wider audience. Moreover, it is evident that the infamous 1998 Wakefield paper, suggesting a link between vaccination and autism, reignited the opposition to vaccination.
2. I am convinced that similar arguments can be made for diseases like polio, mumps, rubella and whooping cough. A practical problem is that the measles vaccine is part of the MMR triple vaccine, combining inoculations against measles, mumps and rubella. However, that does not undermine the normative argument.
3. Outbreaks of diseases like measles will still be disruptive. Nevertheless, since so many persons have been vaccinated nowadays, they will not have the devastating effects they had in pre-vaccination times.
4. Opel *et al.* (2016) have argued that, since measles pose a much higher risk to public health than other vaccine-preventable infectious diseases, this disease should be singled out as the only disease warranting mandatory vaccination. For a critique, see Byington *et al.* (2016).
5. The commonly used term 'herd immunity' is slightly misleading because the 'immunity' part falsely suggests full protection against the disease. However, even the threshold vaccination rate does not imply full societal *immunity* because local outbreaks are still possible. Since the term has become so strongly established in these debates, I will accept it here, but with the above-mentioned caveat.
6. The first vaccination administered around the 14th month provides an average protection of 95 per

- cent, adding a second inoculation between the ages of 2 and 9 years provides an average protection of 99 per cent. Consequently, 1–5 per cent of vaccinated persons remain vulnerable to the disease.
7. Still, 110,000 people died from measles in 2017, mostly children under the age of five.
 8. See also Archard (1993: 113), Dawson (2005) and Chervenak *et al.* (2016).
 9. This terminology is very much inspired by the distinction between best and basic interests as proposed by Shapiro (1999).
 10. Since the notion ‘what is best for their child’ can lead to conflicting claims, for example in families with children with special needs, parents are often the best situated to assess and balance the competing interests of family members. This implies that they sometimes have to make difficult choices when their children’s interests’ conflict (Diekema, 2004: 244).
 11. Even though there is no evidence that thimerosal is harmful, it has been removed from all childhood vaccines since 2000 to forestall parental anxiety.
 12. On the interrelationship between parental rights and parental responsibilities see: Archard (2010) and Millum (2018).
 13. For a critical discussion of free riders from the perspective of fairness, see Giubilini (2019: 48–52) and Navin (2016: 140–146).
 14. My argument here has much in common with Dawson (2007).
 15. This principle emerged in the context of environmental policy to protect human societies against ecological damage from human-made pollution, overconsumption, industrialization, etc. Interestingly enough, in vaccination policies the principle works the other way around: vaccination is a human-made answer to a risk arising from natural threats.
 16. It could even make vaccination compulsory for travelers to measles-infested areas, because such a trip generates the risk of infection for the travelers and the unprotected persons they encounter after having returned home. This is not a mandatory policy in the strict sense because it is related to voluntary travel.
 17. Although the discussion on waivers for parents with religious and/or philosophical objections is an important topic in the current discussion, I will not address it here because I have discussed it at length in Pierik (2017).
 18. I am reluctant to argue in favor of programs that make vaccination mandatory for school attendance because access to basic education is also a basic interest of children. Such a policy would imply sacrificing access to basic interest in order to incentivize another. One way of dealing with this issue is to deny non-vaccinated children access to childcare, but not to school, in the hope that this measure will already encourage sufficient parents to vaccinate.
 19. Linking vaccination to a reduction in access to child-related advantages is problematic in one sense in that it goes against the principle of purpose-binding and could lead to the misuse of power—*détournement de pouvoir*. The reduction serves a different purpose (increasing the vaccination rate) than the purpose for which the benefits are intended (supporting parents in their endeavor to raise children).
 20. For a critical analysis on the metaphor of the intervention ladder, see Dawson (2016). I agree with Dawson’s critique of the ladder as a guide to ethical policy making in general, at the same time I contend that it remains very helpful in specific policy debates as discussed here.

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