

Childhood Vaccine Exemptions: A Broader Perspective Is Required

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A selective view of childhood vaccine exemption policy is presented by Opel et al in *Pediatrics*.¹ Their primary premise is that recent attempts to restrict nonmedical vaccine exemptions are scientifically and ethically problematic.¹ The authors suggest that rather than working to eliminate all nonmedical exemptions for vaccines, the focus should be on exemptions related to measles, which they see as a unique vaccine-preventable disease. The authors provide information on the highly contagious nature of the measles virus, provide accurate safety and efficacy data about the measles vaccine, and discuss the ethics of the least-restrictive alternative (LRA). They use this information to argue that only measles should be restricted from nonmedical vaccine exemptions. However, we disagree with their interpretations and seek to provide an alternative approach.

First, the authors point to the contagiousness of measles as distinctive among infectious diseases. They refer to the high R0 of measles in comparison with other vaccine-preventable infectious diseases. The R0 is defined as the average number of secondary cases produced by a typical infected person in a fully susceptible population.² The R0 has implications for the spread and control of an infection within a population and provides a basis for understanding the proportion of the population that must be immunized to provide herd or community immunity. Opel et al¹ point to the fact that other vaccine-preventable infections have lower R0 than measles, ranging from 4 to

7 as opposed to 12 to 18, although their estimates may be low for some vaccine-preventable infections such as pertussis (R0 5–17) and polio (R0 2–20).³ The fact that some vaccine-preventable infections have R0 values lower than 12 to 18 should not be reassuring. In fact, the 1918 A/H1N1 influenza strain, which led to a pandemic resulting in the deaths of 20 to 40 million worldwide, had an R0 of 2 to 3⁴ and more recently, the Ebola outbreak in western Africa, which also had worldwide impact, had an R0 of only 1.5.⁵ All infections with an R0 >1 can have sustained spread within a population. In the prevaccine era, vaccine-preventable infections other than measles resulted in hundreds of thousands of cases and thousands of deaths annually.⁶ Although the prevention of measles transmission requires high immunization rates of 92% to 94%, as noted by Opel et al,¹ maintaining community immunity for most other vaccine-preventable infections with lower R0 values also requires high immunization rates approaching ~85% to 94% of the susceptible population.³

Opel et al¹ attempt to distinguish measles, as opposed to other vaccine-preventable infections, as an important public health problem and stress that the measles vaccine is safe and effective. We agree that although the measles vaccine has been one of the most prominent vaccines challenged by vaccine critics, it is safe and effective and has been a major benefit to public health in the United States and worldwide. We would argue, however, that far from being unique to measles, the threat



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to public health and the safety of available vaccines are factors that characterize all vaccine-preventable infections. A recent evaluation of vaccine impact in the 2009 US birth cohort demonstrated that routine childhood immunizations would prevent ~42 000 deaths, 20 million cases of disease, and save \$13.5 billion in direct health care costs and \$68.8 billion in societal costs.⁷ Without adequate vaccine coverage, we face the reemergence of vaccine-preventable infections across the United States, which could overwhelm our public health and medical systems. Fortunately, the US population has access to many licensed vaccine products, which like the measles vaccine, have been shown to be safe and effective through prelicensure trials and postlicensure surveillance required by the US Food and Drug Administration. As conclusively demonstrated by the Institute of Medicine and other recent reports, childhood vaccines are safe and rarely associated with adverse events.^{8,9}

Apart from their comments on R0 and the public health impact of vaccine-preventable infections, Opel et al¹ inappropriately assert that, with the exception of measles vaccine, honoring religious exemptions is ethically required as the LRA. The LRA doctrine, however, was developed by the courts to address serious deprivations of personal liberty, such as involuntary commitment and quarantine¹⁰ and so is not generalizable to all public health activities.^{11,12} Indeed, Nancy Kass,¹³ whom Opel et al¹ quote regarding choice in public health interventions, stated later in the same paragraph that voluntariness is required only if most people say yes to an intervention if asked. The fact that more people are saying no to vaccines is precisely the problem we are now facing in the United States, which undermines

the application of even an expansive interpretation of the LRA.

Ethics is not the only issue here. As a matter of law, the government is free to require immunizations, reflecting its power, and its duty, to protect the health of the public.¹⁴⁻¹⁶ This is especially true where, as here, the data regarding the safety and efficacy of vaccines and the consequences of vaccine-preventable diseases are so clear.⁹ The fact that different states may choose different requirements does not in any way detract from this fundamental power and obligation of the state. Moreover, religious exemptions are not required by the First Amendment protection of freedom of religion. Rather, they are the product of legislative activity in the 1960s and 1970s, and thus can be repealed.¹⁴ Indeed, one could argue that nonmedical exemptions are themselves unethical and represent short-sighted policy, as they allow families a free ride on the immunization decisions of others while placing others at risk.

Although we disagree with Opel et al¹ regarding their characterization of measles as a unique infectious illness, their interpretation of the ethics related to public health interventions, and the advantage they perceive from selective removal of nonmedical exemptions, we acknowledge that the authors have clearly outlined the very real risks associated with the selective removal of nonmedical exemptions. First, eliminating nonmedical exemptions only for measles vaccine could easily lead to the misperception by parents and others that measles is the only vaccine that is actually needed for health and that vaccines for other childhood illnesses are a matter of personal preference, an idea we believe to be obviously incorrect. Further, selective removal of nonmedical exemptions will

challenge the provider/parent relationship. Research clearly shows that the most convincing proponent for vaccines is the health care provider.¹⁷⁻¹⁹ Having to describe the contagion of each individual vaccine-preventable disease would be extremely complex for medical providers, and could undermine communication leading to greater parental confusion with reduced vaccine uptake. Third, selective elimination of nonmedical exemptions could erode herd immunity for other infections if overall vaccine rates are reduced. For example, the administration of conjugate pneumococcal vaccine to young children has had an enormous impact on adult pneumococcal disease.^{20,21} Fourth, if nonmedical exemptions are eliminated for measles vaccine but not for other vaccines, an artificial demand for monovalent vaccine products, which are currently not manufactured, could be created. This unmet demand in turn could lead to further parental dissatisfaction. These reasonable and predictable outcomes of selective elimination of nonmedical exemptions could have a profound impact on public health. Finally, selective immunization, far from making record keeping easier, only increases its complexity. For these reasons, we believe the better approach is to work to eliminate all nonmedical exemptions for childhood vaccines, a position shared by the American Medical Association,²² the Infectious Diseases Society of America,²³ and is currently the basis of a policy statement being developed by the American Academy of Pediatrics.

ABBREVIATION

LRA: least-restrictive alternative

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