

## *Commentary*

### **Public Health Need and Vaccination<sup>a</sup>**

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In Western and economically developed nations, children are required to receive vaccinations for diseases commensurate with the likelihood of infectious exposure to them. Because these countries have the economic means and resources to offer their children protection against those diseases spread primarily through airborne transmission, a recommended vaccination schedule is devised based on the country's specific public health needs (The Children's Hospital of Philadelphia, n.d.). While theoretically idiosyncratic by geographic region, these schedules are generally government-issued and regulated recommendations that children receive a certain type and number of vaccinations against easily preventable infections and diseases.

In the United States specifically, the U.S. Department of Health and Human Services' Centers for Disease Control and Prevention (CDC) recommends immunizations for children aged birth through six years to prevent spread of the following diseases: Hepatitis B (vaccinations recommended at birth, between one and two months, and between six and 18 months); Rotavirus (vaccinations recommended at two, four, and six months of age); Diphtheria, Pertussis, and Tetanus (vaccinations recommended at two, four, and six months of age, as well as between 15 and 18 months and between four and six years); Haemophilus Influenzae Type B (vaccinations recommended at two, four, six, and between 12 and 15 months of age); Pneumococcus (vaccinations recommended at two, four, six, and between 12 and 15 months of age); Polio (vaccinations recommended at two and four months of age, as well as between six and 18 months and between four and six years); Influenza (vaccination recommended annually beginning at six months of age); Measles, Mumps, and Rubella (vaccinations recommended between 12 and 15 months and between four and six years); Varicella (vaccinations recommended between 12 and 15 months and between four and six years); and Hepatitis A (two doses of vaccine recommended between 12 and 23 months; CDC, 2013, January 4). For children aged seven through 18 years, the CDC recommends immunization against the following diseases: Diphtheria, Pertussis, and Tetanus (additional vaccination recommended between 11 and 12 years of age); Human Papillomavirus (three vaccinations recommended between 11 and 12 years of age) and Meningococcal Disease (vaccination recommended between 11 and 12 years of age, with a booster at age 16; CDC, 2015).

Proponents of immunization maintain that vaccines forestall the spread of easily preventable diseases, saving the lives of countless children (ProCon.org, 2015). According to CDC estimates, vaccination saved 732,000 children in America from premature death and another 322 million from illness over a 20-year period (Gholipour, 2014). Those who favor early immunization further suggest that vaccination is, in fact, necessary to protect the majority of a population against a possible outbreak of contagious disease (NIAID, 2013).

Advocates of immunization further point to the safety and effectiveness of common vaccines used in the prevention of widespread disease transmission. The official position of the CDC is that vaccines are safe and present only minor side effects, with the benefits of vaccination far outweighing the potential risks (CDC, 2013, February 24). The American Academy of Pediatrics has found that "most childhood vaccines are [between] 90% and 99% effective in preventing disease" (American Academy of Pediatrics, 2008). Moreover, despite the claims of detractors that vaccine ingredients like thimerosal (a mercury compound), formaldehyde, and aluminum are harmful to children, immunization proponents argue that vaccines do not expose children to large, detrimental quantities of these agents and, in fact, are largely free of caustic substances like thimerosal (USFDA, 2014).

However, opponents of immunization maintain that too little is known about possible adverse reactions to vaccines. A review conducted by Demicheli, Rivetti, Debalini, and Di Pietrantonj (2013) of the existing literature on the safety of vaccines for measles, mumps, and rubella (MMR) concluded that current research on possible harmful effects of MMR vaccines is inadequate. The United States' Vaccine Adverse Event Reporting System (VAERS) has seen approximately 30,000 reports of adverse reactions to vaccines over a 24-year period, with 10%-15% of the cases reported associated with hospitalization, permanent disability, major illness, or death (Vaccine Adverse Event Reporting System, n.d.). The CDC, while espousing mandatory vaccination, has also noted that the practice continues to present a very prevalent risk of allergic reaction in children; Vaccines for diphtheria, tetanus, and pertussis – as well as those for measles, mumps, and rubella – may cause seizures, coma, reduced consciousness, or brain damage (CDC, 2014, August 19). Other sources have linked vaccines to learning disabilities, asthma, and autism, among other life-altering afflictions (Mercola, 2011; National Vaccine Information Center, 1998). A case control study conducted by Salmon et al. (2005) – for which surveys were mailed to the parents of 815 children across four states who had been exempted from vaccines – found concern about the possible harm of vaccines to be the most common reason for requesting an exemption (offered by 69% of respondents); the findings of Salmon et al. further uncovered low levels of confidence in medical authorities, a dearth of trust in government institutions, and heightened belief in the efficacy of alternative medicine practices to be associated with vaccine refusal.

Detractors of mandatory immunizations for children likewise point to the infringement of such a practice on the individual's right to determine proper medical treatment for his or her child, as well as on religious freedoms. Some maintain that federally mandated medical practices entail succumbing to the will of the body politic, thereby relinquishing the basic right over one's physical person (ProCon.org, 2015). Moreover, members of several religions whose freedom to worship is otherwise protected by the First Amendment of the United States Constitution – including Amish, Christian Science, and Scientology sects – find their beliefs compromised by vaccination requirements for their children (Wenger, McManus, Bower, & Langkamp, 2011; Vidula, 2010).

While the corresponding vaccination schedules in developing nations are theoretically devised based on the prevalence of specific diseases in those countries, the need for children to be vaccinated against certain diseases is universal. In Western and developing nations alike, children are often required to receive immunizations to prevent diphtheria, pertussis, tetanus, hepatitis B, measles, tuberculosis, and polio (WHO, 2014). And, because of the efforts of worldwide immunization programs, the mortality rate for measles decreased by 71% between the years of 2000 and 2013; likewise, the efforts of these programs have helped to reduce the mortality rates of both polio and tetanus to their lowest historic rates (Cashin-Garbutt, 2013).

However, whether for economic reasons or scarcity of resources, vaccinations for hepatitis A, influenza, meningococcus, mumps, pneumococcus, rotavirus, rubella, and varicella (many of which are contracted via airborne virus transmission) are not universally administered, with their absence from established vaccination schedules most glaring in African nations (WHO, 2014). It is significant to note that, in devising vaccination schedules for children, developing countries must take into consideration concerns that are not as prevalent in comparatively wealthier nations; varying levels of access to health care, the often formidable cost of the vaccines themselves, as well as vaccine availability and feasibility of storage are among the factors that developing countries must necessarily consider when mandating an immunization regimen for its children (World Health Organization, United Nations Children's Fund, & World Bank, 2009). Even those vaccines whose administration is mandated by established schedules do not reach the children for whom they are intended; of the approximately 22 million unimmunized children worldwide, 70% live in just ten developing countries: Afghanistan, Chad, the Democratic Republic of Congo, Ethiopia, India, Indonesia, Nigeria, Pakistan, the Philippines and South Africa (Cashin-Garbutt, 2013). Poor quality of living conditions, membership in a minority group, and low socioeconomic status are among the reasons that such a disparity exists between children receiving needed vaccinations in Western as opposed to developing countries (Cashin-Garbutt, 2013).

In the United States, recent data indicate that the state of Mississippi has the highest vaccination rate in the nation for school-age children, with 99.7% of kindergartners having received the state's complete series of recommended vaccinations in 2013 (Frankel, 2014). The state has done this by instituting an aggressive public health program and severely limiting the vaccination exemptions that other states permit. Although increasing its rate of vaccinations in children to an impressive figure compared to other states nationwide, Mississippi has done so at the cost of respecting the religious or philosophical objections to vaccination that the state's residents might raise. Although clearly benefitting the larger community and boasting one of the lowest rates of childhood disease in the nation (Mississippi State Department of Health, 2014), Mississippi has accomplished these feats at the cost of individual freedom of choice, thereby demonstrating a relative lack of respect for the diversity of its citizens, as well as their right to make medical choices for themselves and their families.

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