Europe Should Consider Mandatory Measles Immunization for School Entry

Y. Tony Yang,1 Shalinee Bhoobun,3 Taha Itani,4 and Kathryn H. Jacobsen2
Departments of 1Health Administration and Policy, and 2Global and Community Health, George Mason University, Fairfax, Virginia; 3Department of Paediatrics, Evelina London Children’s Hospital, Westminster, United Kingdom; and 4Department of Public Health Medicine, School of Public Health, Bielefeld University, Germany

Corresponding Author: Y. Tony Yang, ScD, LLM, MPH, George Mason University, 4400 University Dr., MS 1J3, Fairfax, VA 22030.
E-mail: ytyang@gmu.edu.

Received November 5, 2015; accepted January 9, 2016.

Disneyland has marketed itself as being the happiest place on Earth, but in early 2015 it became the focal point for a measles outbreak that spread across much of the United States [1]. Thousands of people were exposed to one of the more than 100 individuals diagnosed with measles, including more than 20 children and adults who were intentionally unvaccinated [1]. This newsworthy event was relatively inconsequential compared to the number of measles cases in Europe in recent years. More than 30 000 cases were diagnosed across the World Health Organization European Region in 2013, with more than 1000 cases each in Germany, Italy, the Netherlands, the United Kingdom (UK), and several other countries [2]. England and Wales alone had more than 1000 confirmed cases during an outbreak in 2012–2013, with the incidence rates highest among older children and adolescents who had missed childhood vaccinations [3]. Large-scale emergency vaccination campaigns were rolled out across the UK in an attempt to protect the population and curtail the outbreak [4]. This previously eliminated virus is now at the forefront of every British clinician’s mind when assessing a child with a rash.

Although significant increases in measles vaccine rates in low-income countries have substantially reduced the annual global incidence rate, approximately 100 000 measles deaths are still estimated to occur across Africa and Asia each year [5]. With so many cases of measles occurring worldwide each year, imported cases of measles frequently occur in Europe and other low-incidence places and then spark local or more widespread outbreaks, including outbreaks in healthcare facilities [6]. Measles is transmitted primarily from person to person via airborne respiratory droplets, but the virus can also spread through the aerosolization of droplet nuclei [7]. Vaccination is the best option available for interrupting the transmission cycle. Lifelong immunity is usually acquired after natural infection with the virus or after 2 doses of live measles vaccine [8]. Many decades of research have shown that the measles vaccine is effective and safe, with very few adverse outcomes when the vaccine is administered appropriately [9].

Globally, approximately 84% of children have received at least 1 dose of a measles-containing vaccine. The rates are relatively high in the Western Pacific (97%), European (95%), and American (92%) regions and considerably lower in the Eastern Mediterranean (82%), African (77%), and Southeast Asian (76%) regions [10]. However, these numbers may be misleading, because in some regions there is considerable variation in vaccination rates by country. In several European nations, less than 90% of children have received at least 1 dose of measles-containing vaccine [11]. There are also significant differences in vaccination rates within countries, such as members of the Roma population being less vaccinated than their neighbors [2].

Most high-income countries aim to achieve a coverage rate of at least 95% to minimize local transmission when cases are imported, and mathematical models suggest that an even higher vaccination coverage rate of approximately 97% may be required in some populations to achieve herd immunity against measles and protect the small percentage of people who are medically unable to be vaccinated [12]. Because some individuals have a medical condition that makes vaccination unsafe, and because a small proportion of individuals who have been vaccinated against measles remain susceptible to the virus, the only way to reach the coverage levels required for herd immunity is for nearly every healthy child to be vaccinated. Mandatory vaccination for school entry is one option that has been shown to be effective at achieving population-level measles vaccination rates adequate for prevention of
widespread outbreaks in countries that have implemented it [13].

Consider the example of the United States, where there is no national policy about vaccination for school entry but all 50 states have passed laws mandating that children be immunized before starting school at approximately 5 years of age. The individual states have widely varying lists of allowable medical, religious, and philosophical exemptions from vaccine requirements [14]. The result of mandated vaccination with a limited number of allowable exemptions is that median 2-dose measles, mumps, and rubella (MMR) vaccination coverage was 94.0% among the 49 states and the District of Columbia that reported 2014–15 school vaccination coverage [15], even though states allowing more types of exemptions tend to have lower vaccination rates and more outbreaks [14]. Across the Pacific, Australia has also adopted a strict policy of mandatory vaccination before school entry, and no nonmedical exemptions are allowed. Parents must either vaccinate their children or forfeit welfare and child benefits [16]. This system is widely accepted in Australia and appears to be effective at protecting public health [17].

The situation is quite different in Europe, where measles vaccine is widely recommended but is mandatory in only a few countries (mostly in Eastern Europe) and the majority of countries merely recommend universal vaccination for children as part of a comprehensive vaccination plan [18]. A variety of incentives—combined vaccines, informational and promotional campaigns, and pricing strategies—are used to encourage participation, and these initiatives have helped drive the overall vaccination rate to approximately 95% across the continent [19]. However, there is wide variation in measles coverage rates between and within countries. In 2012, the percentage of children who received at least 1 dose of measles-containing vaccine was 94.6% across the European region but only 76.0% in Austria, 79.2% in Ukraine, and 86.0% in Denmark [20]. In 2010, only 91.5% of German children seeking school entry (typically between ages 4 and 7 years) had received 2 doses of MMR vaccine, and there were wide variations by region [21]. In 2013, 88.3% of 5-year-olds in England had received at least 2 doses of the MMR vaccine (MMR2), but the rate was only 80.7% in London, and some communities within London had much lower MMR2 rates, such as 63.8% in Kensington and Chelsea and 64.2% in the City of Westminster [22].

Adverse media coverage and anti-vaccination campaigns have had a damaging impact on vaccine uptake. A now-retracted article published by The Lancet in 1998 that linked the MMR vaccine to autism sparked widespread and continuing negative media coverage questioning the safety of vaccines [23]. The resulting anxiety among parents and even some healthcare workers caused a steep drop in vaccine uptake, with vaccination rates in England dropping to 80% within 5 years after the debunked article was published [24]. Although uptake rates are on the increase in the UK, a sizeable proportion of older children, adolescents, and young adults remain susceptible to measles because they were not vaccinated as young children [24]. A catch-up campaign offered by the Department of Health has observed that the parents who bring older children for immunization tend to be from lower-income communities where logistical and practical barriers may have prevented earlier vaccination, whereas parents from higher socioeconomic groups who made an intentional decision not to vaccine do not participate in catch-up programs [25].

Besides concerns about vaccine injuries and the risk-benefit ratio for vaccines for relatively uncommon infections, the lower vaccination rate in some European countries is associated with a rise in antivaccination advocates who raise concerns about parental autonomy [26]. In addition, an apparently growing number of parents believe that their children benefit from direct exposure to the virus, with some even going to the extent of attending “measles parties” where unvaccinated children are exposed to infected children to trigger acquisition of natural immunity [27]. Even some clinicians have misconceptions and apprehensions about vaccination, with some general practitioners advising against immunization [28].

The strategies for mitigating these concerns and for enforcing adherence to vaccine requirements vary significantly from country to country [18]. For example, Slovenia and the UK have sought to alleviate safety concerns by establishing no-fault vaccine injury compensation funds [18], whereas Norway uses a national vaccine register to identify individual children who fall behind the recommended national immunization schedule and reach out to their parents with health education materials [18]. Some communities offer a more flexible immunization schedule to alleviate parental concerns about the timing and spacing of vaccines [29]. However, there are other broader options that should be considered for improving regional immunization coverage rates for infectious diseases that remain endemic or epidemic in Europe. One the most effective ways to increase vaccination coverage across Europe might be mandatory school entry vaccination of healthy children.

There are 2 main arguments against mandatory school entry vaccine policies, even when they allow for exemptions [13]. One is that mandatory vaccination policies are unnecessary because measles vaccination rates are
generally high even in countries that have not implemented strict requirements. It is true that some countries without vaccine requirements have maintained high coverage rates, but the evidence shows that many countries and communities without mandatory vaccination policies have child vaccine coverage rates well below herd immunity thresholds [2]. The other key concern is that compulsory vaccination puts additional cost and safety burdens on governments while perhaps reducing public trust and violating personal freedoms [13]. The ethical argument that parents of healthy children are obligated to protect vulnerable children who are medically unable to receive vaccinations can be countered by equally well argued calls for parental autonomy [30]. All of these valid concerns require serious consideration, including examination of how vaccine policies incorporate the cultural and political values of individual countries. Multifaceted strategies tailored to individual countries are more likely to increase vaccination uptakes than region-wide mandates.

Despite these concerns, the continuing burden from measles—and the associated risks of encephalitis, other serious complications, and death—across Europe makes it important to revisit all of the options available for improving immunization rates. Allowable exemptions from mandatory school-entry vaccination policies need to be carefully considered, especially in high-income countries where few parents consider measles to be a significant risk to their children. Although more research is needed to measure the direct impact of school-based entry laws on measles incidence rates, the current evidence shows that from a public health policy perspective, mandatory vaccination requirements for school entry can be one of the most effective tools for ensuring that vaccine coverage rates reach the level necessary to prevent widespread epidemics.

Acknowledgments

Potential conflicts of interest. All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest.

References


