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## Immigrants Can Help Improve Immunization Rates in the United States

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While working as a physician with Doctors Without Borders in Ethiopia, I watched helplessly as diphtheria claimed the life of my 1-year-old refugee patient from South Sudan. Presenting with fever and massively swollen glands in her neck, her symptoms followed the classic textbook description. The telltale grayish film covering her tonsils confirmed the clinical diagnosis. Over the course of several days, she developed an irregular heart rhythm, an old superficial wound began to ooze blood, and her urine output gradually slowed to a halt. My young patient's body began to swell, and she eventually passed away in her mother's arms.

In our rural tent hospital, the recommended antibiotics were available but there was no possibility of procuring the diphtheria antitoxin. Even with full treatment (antibiotics plus antitoxin), there is still a chance she would have succumbed to the disease; current mortality rates for properly-treated diphtheria reach 10%. Prior to treatment availability in the US, diphtheria caused death in up to 50% of those infected.<sup>1</sup> The only thing that certainly would have prevented my patient's loss of life would have been not getting diphtheria infection in the first place. This could have been achieved through vaccination; after 3 to 4 doses of the diphtheria vaccine, it is 97% effective.<sup>2</sup> However, years of conflict in her home country of South Sudan had destroyed their routine immunization program. The crowded conditions and low immunization coverage rates in the refugee camp in Ethiopia were a perfect recipe for outbreaks of vaccine-preventable diseases.

War and other forms of conflict are frequently the culprit for disrupted immunization practices, as government attention and funding are diverted elsewhere and people are displaced due to fighting. In other instances, the causes are related to deficiencies in resources and infrastructure, such as limited quantities of vaccinations and/or insufficient cold storage in which to transport and maintain them. Challenges may also arise in the form of physical obstacles, with mountains or difficult terrain preventing delivery of immunizations to remote populations. Although these access concerns cumulatively remain the biggest barrier to achieving worldwide protection, the growing, widespread, anti-vaccination movement is sparking outbreaks of disease across the globe, reversing decades of progress in decreasing the prevalence of vaccine-preventable diseases.

One recent, devastating example of an avoidable epidemic began in September 2019 in the small island nation of Samoa. The year prior, 2 infants died after receiving measles vaccinations due to the inadvertent mixing of the vaccine powder with a muscle relaxant anesthetic instead of sterile diluent. Although the nurses who committed this terminal error were tried and imprisoned, anti-vaccination sentiment soared. According to the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO), the measles vaccination rate in Samoa fell from 74% in 2017 to 31% in 2019,<sup>3</sup> well below the 93-95% rate needed to provide herd immunity against the disease. Over the course of about 3 months, approximately 2.5% of the population became infected with measles and more than 70 people (mostly children < 5 years old) died. In order to control the epidemic, the

government and international partners launched massive vaccination campaigns and a concerted effort was made to combat the dissemination of false, anti-vaccination information.<sup>4</sup>

Despite the global increase in human displacement, a worldwide rise in anti-vaccine rhetoric, and scattered outbreaks of vaccine-preventable diseases in several countries, my decade-long experience of working with new immigrants to the US has shown that they are generally relatively well vaccinated prior to arrival. To understand this seemingly contradictory phenomenon, it is important to examine the typical vaccination histories for different categories of new US arrivals. For example, refugees – immigrants fleeing war or persecution who have been granted permission overseas to move to the US – are frequently given vaccinations during a medical examination prior to travel. Immigrants who enter on a visa are usually immunized by the US Department of State in their country of origin. Although the majority of asylum seekers or those who enter the US without documentation are not vaccinated during the immigration process, most of them have received a comprehensive set of immunizations per their home country's childhood immunization program. This is evident in the 2018 WHO and UNICEF estimates of immunization coverage for frequent countries of origin such as Guatemala, Honduras, El Salvador, and Mexico. For the vaccines evaluated, coverage rates in those countries were mostly between 81% and 97%, compared to approximately 91 to 94% in the US.<sup>5</sup> For vaccines not commonly administered in countries outside the US, such as varicella and hepatitis A, many immigrants have already had the illness and are thus now immune. For all of the above reasons, the risk of exposure to vaccine-preventable diseases through new US arrivals is very low.

Once in the US, new immigrants have incentives to continue to receive recommended doses in each vaccine series. For refugees and others seeking to obtain lawful permanent residency (ie, a "green card"), they must complete the full complement of immunizations recommended by the US Centers for Disease Control and Prevention. In addition, in order to register for and keep their children enrolled in school, newly arrived families must comply with school vaccine requirements. Apart from these external drivers, immigrants are often internally motivated as well; they have seen vaccine-preventable illnesses in their home countries – or heard about them from their parents or grandparents – and desire to protect their families from these diseases.

Although vaccines are highly regarded by most recently arrived immigrants, barriers must be addressed to help new arrivals become fully vaccinated by US standards. Importantly, health care professionals must acknowledge and refute the anti-vaccination rhetoric in order to protect immigrant families from these unsubstantiated fears. In 2017, an outbreak of measles occurred within the Somali-American community in Minnesota, predominantly in Hennepin County. Immunization coverage with 1 dose of the measles-mumps-rubella (MMR) vaccine by age 2 years had declined in that community from over 90% in 2004 to only 35.6% in 2014, due to misinformation that the MMR vaccine could cause autism.<sup>6</sup> This incorrect, anti-vaccine messaging had specifically

been targeted at families of Somali descent, leading to discrepant vaccine coverage rates between Somali and non-Somali children.

In addition to promoting immunization benefits, information must be provided to new arrivals to explain how and where to access immunizations, including through the Vaccines for Children (VFC) program. This federally funded program is available at nearly 40,000 sites across the US, and its providers are required to provide the vaccines free of charge as well as waive any administration fee if the family is unable to pay.<sup>7</sup> Furthermore, any orientation programming for new immigrants (in healthcare facilities as well as in communities and schools) should include a description of the US vaccination schedule, since the type and timing of immunizations are likely different than those in their home countries. Lastly, it is imperative that new immigrant children establish care with a primary care provider and are followed in a medical home, which has been correlated with improved vaccination rates.<sup>8</sup> Since the US health system is complex and categorically different from many systems around the world, having a medical home can help new arrivals better navigate their preventive and acute care needs.

Immigrants to the US bring with them hope for a better future for their families, a hope for health and happiness that is shared by families across the globe. Through accessible medical care and accurate immunization information, we can help each other on one step toward that vision: by eliminating vaccine-preventable diseases, we can create a future in which more children – both in the US and worldwide – will not just survive; they will thrive.

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