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Medical News & Perspectives

Public Health Officials Mark 50th Year of Measles Vaccine Concern Remains About Outbreaks in Pockets of Unvaccinated

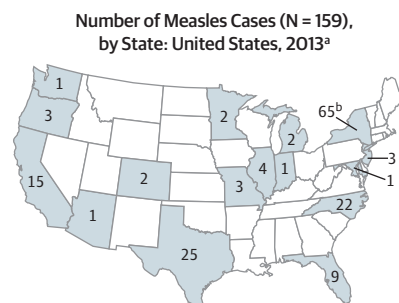
Bridget M. Kuehn, MSJ

Until the 1960s, measles was a rite of passage for US children; nearly all had the disease before they reached adolescence. But each year, 400 to 500 died from rare complications of the illness, 48 000 were hospitalized, 7000 had seizures, and about 1000 developed brain damage or lost their hearing, according to the US Centers for Disease Control and Prevention (CDC). Within 4 years of the vaccine's licensure in 1963, the number of annual US measles cases dropped from 4 million to 2000, according to Alan Hinman, MD, MPH, director for programs at the Task Force for Global Health's Center for Vaccine Equity.

The vaccine's global influence was even more dramatic. Before the vaccine's introduction, an estimated 2.6 million individuals died from measles worldwide each year, but as its use became common in the 1980s, the death toll fell by 90%, according to Peter Strebel, MB, ChB, MPH, accelerated disease coordinator in the Immunizations, Vaccines, and Biologicals Department at the World Health Organization (WHO), who spoke at a CDC press briefing in December 2013.

This year, US officials are marking a decade of measles elimination, meaning that the virus is no longer actively circulating although sporadic outbreaks may occur, in the United States (Papania MJ et al. *JAMA Pediatrics*. doi:10.1001/jamapediatrics.2013.4342 [published online December 5, 2013]). Since 2001, there has been fewer than 1 case of measles per 1 million US individuals; rubella reached this same threshold in 2004. Of the few measles cases that did occur in the United States, 84% were

imported from countries where measles is circulating or linked to imported cases. An uptick of measles clusters in pockets of unvaccinated US residents has raised concerns among public health officials and renewed efforts to improve vaccine coverage here and abroad.

^a As of August 24, 2013.^b Includes New York City.Source: Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep*. 2013;62(36).

In 2013, there were 159 measles cases in the United States, an increase from the earlier average of 60 cases a year. Only 2% of those cases involved people who were fully vaccinated.

"It's no longer a native disease, but it is a foreign visitor," said Hinman. "We need to eliminate it elsewhere."

In fact, measles remains a pressing threat in many parts of the world, with 400 deaths each day, CDC Director Thomas Frieden, MD, MPH, said during the briefing. Most of these cases occur in the developing world, where vaccine coverage is poor. Measles is also experiencing a resurgence in Europe, Pakistan, and Nigeria, where vaccination efforts have

been set back by refusals or violence against those administering vaccines, said Strebel.

Frieden noted many cases imported into the United States in recent years have originated in Europe, highlighting the need for a global effort to eliminate measles.

"Measles anywhere has the potential to cause an outbreak here," he said.

Uptick in US Clusters

High rates of vaccination in the United States have helped keep measles outbreaks small and often isolated to communities with low vaccination rates.

On average, over the past decade the country has seen just 60 cases of measles a year, but in 2013, measles cases spiked to 175 with 9 outbreaks. Most of the outbreaks have been traced back to travelers who were infected in another country, and fewer than 2% of the US individuals who became infected were fully vaccinated.

Gregory S. Wallace, MD, MS, MPH, lead of the measles/mumps/rubella/polio team in the CDC's Division of Viral Diseases, said that the "vast majority" of measles cases brought into the country by travelers do not prompt outbreaks because high vaccination rates hamper its spread. But if an infected traveler exposes a cluster of unvaccinated individuals, or if the index case isn't quickly reported to public health authorities, others may be infected.

The combination of an unvaccinated traveler and slow reporting of cases contributed to the largest outbreak of measles in the United States since 1996. The outbreak started when an unvaccinated 17-year-old

returned to New York City from a trip to the United Kingdom in March 2013 (*MMWR Morb Mortal Wkly Rep.* 2013;62[36]:752-753). The infection spread quickly through 2 orthodox Jewish communities in Brooklyn, with 58 cases ultimately identified, among unvaccinated individuals. About a third of the individuals never received medical care for their illness, and public health authorities were notified only after the infection had begun to spread. As a result, a larger number of people were potentially exposed, and public health officials had to find and notify about 3500 individuals of possible exposure.

Two other fairly large outbreaks involved clusters of unvaccinated individuals elsewhere in the nation. An unvaccinated traveler returning from India sparked a 23-case outbreak primarily among unvaccinated individuals who were part of a North Carolina religious community (*MMWR Morb Mortal Wkly Rep.* 2013;62[36]:753-753). In Texas, a megachurch where the pastor promoted vaccine refusal was the center of a 21-case outbreak, with a traveler who had visited Indonesia the original source of infection (*MMWR Morb Mortal Wkly Rep.* 2013;62[36]:741-743).

"Without those 3 outbreaks, we would have had an average year," Wallace said.

Wallace emphasized that physicians should be alert to the possibility of measles in patients with a fever and rash, especially if they have recently traveled out of the country or been exposed to a traveler. He noted that the

CDC's measles vaccine recommendations for travelers differ from the typical vaccine schedule. For example, infants as young as 6 months who are leaving the country are recommended to receive 2 doses of measles vaccine at least a month apart prior to travel, and adults who are traveling should also receive 2 doses of the vaccine unless they were born before 1957, in which case they have likely already been infected and have immunity.

Frieden emphasized that large US outbreaks have been isolated to communities where many individuals have sought religious or personal exemptions to vaccination. "It's not a failure of the vaccine; it's a failure to vaccinate," he said.

Global Elimination

The United States and its North and South American neighbors have all successfully maintained measles elimination, and the number of cases worldwide decreased by 58% from 853 480 to 354 922 from 2000 to 2011 (*MMWR Morb Mortal Wkly Rep.* 2013;62[2]:27-31). But achieving the WHO's goal of global eradication by 2015 will take coordinated international efforts.

The World Health Assembly has established interim goals to increase national and local vaccination rates, reduce yearly incidence, and reduce measles deaths. The GAVI Alliance has committed \$750 million to improve vaccination rates in low-income nations where measles remains a killer. Frieden said the international community

needs to work together to increase the core capacity of societies to respond to measles. Officials, he says, need to have access to tests, the ability to ensure high vaccination rates, and the resources to respond in real time to outbreaks. "The vast majority of the world doesn't have that capacity," Frieden said.

Samuel Katz, MD, Wilburt Cornell Davison Professor and Chair Emeritus of Pediatrics at Duke University Medical School and one of the scientists who helped create the measles vaccine, noted that improvements are being made to the vaccine to make it easier to administer in resource-poor settings. For example, aerosol, droplet, and micro-needle formulations are being created.

But while global measles elimination efforts ramp up, some pockets of vaccine resistance and even violence against public health officials have cropped up in Pakistan and Nigeria. Katz commended the efforts of local health officials in resource-poor countries, who in some cases are putting their lives on the line; some vaccinators have been assassinated, Katz noted. "The people out there in the field really deserve the credit," he said.

Vaccine hesitancy has also led to an increase in outbreaks in Europe, Katz said, with the CDC genotyping identifying strains from the United Kingdom, Spain, and France. Hinman noted that in 15 US states, at least 10% of children haven't received their measles vaccinations by age 3 years. Katz said that lack of experience with measles has led a generation to forget how serious the disease can be. He noted that many parents who'd experienced measles in the 1960s were quick to accept the vaccine. In sub-Saharan Africa, for example, where measles claimed the lives of 10% to 15% of children prior to vaccination, mothers were told not to count their children until measles had passed.

"Success is our worst enemy. Young parents and health workers have never seen it and don't appreciate the severity of illness," Katz said.

He urged clinicians to educate parents about measles and the measles vaccination and to intervene if parents are misinformed. Claims that measles vaccinations cause immune disorders, central nervous system disorders, and diabetes have all been debunked, he noted.

"Measles can be deadly," said Frieden. "We need to keep our guard up." ■



Measles causes a characteristic rash, but many physicians who were trained after vaccination became widespread may have little experience diagnosing it.