Under-vaccinated communities face heightened risk of measles outbreaks that can spread nationally within a year unless squelched quickly, but a vigorous vaccination response during a 2014 outbreak in North American Amish communities in Ohio prevented widespread transmission, according to a recent study published in the online version of Risk Analysis, a publication of the Society for Risk Analysis.

Washington, D.C.—An aggressive vaccination effort in response to the 2014 measles outbreak among North American Amish communities in Ohio significantly reduced the transmission of measles and the expected number of cases, according to a new study, even though under-vaccination among the North American Amish and in other communities around the United States led to the highest national annual number of reported cases in 2014 in the last 20 years.

In their new study—Modeling measles transmission in the North America Amish and options for outbreak response—Dr. Kimberly Thompson and her colleague at Kid Risk, Inc. (www.kidrisk.org), Kasper H. Kisjes, explored the impact of the 2014 outbreak response compared to no or only partial response. They concluded that “aggressive outbreak response efforts in Ohio probably prevented widespread transmission of measles within the entire North American Amish.”

The research suggests that improving immunization coverage in the entire network of North American Amish communities, and by analogy any other similar networks of under-immunized individuals, would reduce the real risk of measles outbreaks in the United States. Fortunately, the United States benefits from access to a rotating vaccine stockpile that can supply extra vaccine rapidly for outbreak response as needed, but preventing the outbreaks would avoid expensive and significant disruptions to county health departments and the need for quarantine and treatment of Americans exposed to measles.

Although high immunization coverage in the United States overall provides good protection, measles remains a real threat. An outbreak associated with Disney theme parks in California last winter led to 131 reported cases in California and cases reported in 6 other states, Canada, and Mexico. Due to an unrelated importation, on July 2 Washington State reported the first measles-related death in the United States in more than a decade. While deaths from measles occur rarely in high-income countries, recent deaths in the United States and Germany provide powerful reminders that measles is still a deadly disease.
“As long as measles viruses circulate anywhere in the world, all populations remain at risk for importations,” according to Dr. Thompson, President of Kid Risk, Inc. and Professor of Preventative Medicine and Global Health at the University of Central Florida College of Medicine. “With sufficient resources and a commitment from enough people in the world to get vaccinated, we could end measles and some other vaccine-preventable diseases permanently,” says Thompson. In the United States, the public health system maintains high immunization coverage and most children receive vaccines that prevent sustained transmission, so we do not see many cases. Unfortunately, however, a small fraction of parents and caregivers appear to worry more about vaccines than the diseases they prevent. Thompson suggests that people who refuse vaccines “may think that they are beating the system when really they are breaking the system while others may think that their choices do not matter, although when it comes to preventing disease transmission, we’re all in this together.” She emphasizes that “under-immunized individuals remain at risk of developing the measles if exposed at any time over the course of their lives.”

The study of the North American Amish measles outbreak adapted an individual-based model developed to explore potential poliovirus transmission in the North American Amish to explore both the 1988 Pennsylvania and the 2014 Ohio measles outbreaks in the Amish. “Similar to the situation for polio, relatively high immunization coverage in the general population maintains measles elimination” in the United States, according to the authors. “However, immunization rates among the Amish remain uncertain and clusters of under-immunized individuals in the general population can sustain transmission in some pockets.”

Another recent study published in Risk Analysis by Dr. Thompson and colleagues explored immunization coverage in Central Florida—a high-risk area for importations due to its large number of family attractions and international tourists. The study found relatively low percentages of religious exemptions in the area along with relatively high and even coverage. Florida only allows vaccine exemption for religious beliefs. This contrasts with California, which until very recently allowed vaccine exemptions for religious and personal beliefs. Despite known importations of measles into Central Florida in recent years, the outbreaks that occurred led to only a handful of cases.

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Contact David Clarke at dclarke@scgcorp.com to arrange an interview with the author(s). Note to editors: The complete study is available upon request from David Clarke or at: http://onlinelibrary.wiley.com/doi/10.1111/risa.12440/abstract