

Outbreaks of Vaccine Preventable Diseases

The United States is currently on track for 2018 to have the second highest number of measles cases since at least 2011. With 107 cases reported through the first half of July, the US could see over 200 measles cases this year for the third time this decade (CDC). Vaccines are one of the most effective and cost efficient public health tools. Vaccines prevent an estimated 42,000 child deaths each year in the United States, as well as billions of dollars in direct medical costs and even more in total societal costs. The rise of vaccine hesitancy and the anti-vaccination movement are reducing childhood vaccination rates, making society more susceptible to outbreaks of these preventable diseases, with many larger outbreaks occurring in settings where over 80% of the children infected were not vaccinated (CDC). A study reviewing pertussis (whooping cough) outbreaks since 1977 and measles since 2000 showed that well over half and up to 90% of unvaccinated children in these outbreaks were intentionally unimmunized despite having no medical contraindication. Below, some of the recent outbreaks of the most common vaccine preventable diseases are highlighted. These events highlight the importance of ensuring high vaccination rates in our communities.



2017

Minnesota experienced an outbreak with at least 79 confirmed measles cases reported to the Minnesota Department of Health over a two-month period in mid-2017. Almost all of the infections occurred in unvaccinated children, and a large majority of the cases were US born children of Somali descent, which was a susceptible population due to low vaccination rates. Unfortunately, the community had low vaccination rates due to misinformation spread by anti-vaccine groups that targeted this vulnerable population of refugees. It is estimated that this outbreak cost the state health department \$1 million, which does not include the money healthcare facilities spent on post-exposure prophylaxis, nor the economic costs spent by the state's departments of education or human services.



2014

In Ohio, the largest measles outbreak of the decade spread quickly through an Amish community resulting in 383 infections. 89% of those ill were unvaccinated, and high levels of herd immunity contributed to only 4 cases occurring outside of the Amish community.



2016-2017

Mumps outbreak in an Arkansas community resulted in almost 3,000 cases. The Arkansas Department of Health mobilized to deliver over 7,000 doses of MMR (measles, mumps, rubella) vaccine to the at-risk population. The vaccination rate for children in the community was over 90%, but in the adult population was under 50% which helped sustain transmission of the disease.



2014-2015

At least 125 patients contracted measles at a popular amusement park in California in December of 2014 to February of 2015. 110 of these patients were California residents, 49 of whom were unvaccinated, with a similar number being unsure of their vaccination status. Twelve of the patients were infants too young to have yet received the vaccine, and 67% of the patients who were eligible but had not received the vaccine were intentionally unvaccinated due to personal beliefs.

Centers for Disease Control and Prevention. (2018). Mumps Cases and Outbreaks. Retrieved from <https://www.cdc.gov/mumps/outbreaks.html>

Gastanaduy, P., Budd, J., Fisher, N., et al. (2016). A Measles Outbreak in an Underimmunized Amish Community in Ohio. *The New England Journal of Medicine*, 375, 1343-1354.

Hall, V., Banerjee, E., Kenyon, et al. (2017). Measles outbreak—Minnesota April–May 2017. *Morbidity and Mortality Weekly Report*, 66(27), 713-717.

Minnesota Department of Health. (2017). MDH confirms new measles case linked to outbreak. Retrieved from <http://www.health.state.mn.us/news/pressrel/2017/measles071317.html>

Phadke, V., Bednarczyk, R., Salmon, D., & Omer, S. (2016). Association Between Vaccine Refusal and Vaccine-Preventable Diseases in the United States. *The Journal of the American Medical Association*, 315(11), 1149-1158.

Smith, N. (2017). Update on Mumps Outbreak: Arkansas. Retrieved from https://www.hhs.gov/sites/default/files/Smith_16x9_Update%20on%20Mumps%20Outbreak%2C%20Arkansas-remediated.pdf

Southeray, S. (2017). Minnesota measles outbreak to cost state \$1 million. Retrieved from <http://www.cidrap.umn.edu/news-perspective/2017/05/minnesota-measles-outbreak-cost-state-1-million>

Zipprich, J., Winter, K., Hacker, J., et al. (2015). Measles Outbreak—California, December 2014–February 2015. *Morbidity and Mortality Weekly Report*, 64(06), 153-154.