



Risk Mitigation Consulting Inc.

Intelligence and Analysis Division

WHITE PAPER SERIES

Measles Outbreaks in the United States

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INTENT

This white paper is designed to provide analysis of relevant, publicly available information on threat and hazard events/trends and their potential impacts to the interests of the United States, both at home and abroad. This product is not intended to be an all-encompassing assessment of the subject.



Measles Outbreaks in the United States

Introduction

Measles is a highly contagious disease and can cause pneumonia, encephalitis (swelling of the brain) and death. It spreads through the air when an infected person coughs or sneezes. If not immunized, 9 out of 10 people exposed to the infection will contract it. While many individuals recover from the infection, 1 in 4 must be hospitalized. Before the measles vaccination program started, an estimated 3 to 4 million people got measles each year in the United States. Of these, approximately 500,000 cases were reported each year to CDC; of these, 400 to 500 died, 48,000 were hospitalized, and 1,000 developed encephalitis (brain swelling) from measles. When the measles vaccine was introduced in 1963, rates rapidly plummeted. The Centers for Disease Control and Prevention (CDC) says two doses of measles-mumps-rubella (MMR) vaccine are about 97% effective in preventing this disease. In 2000, only 86 cases were reported in the United States, and the disease was declared nationally “eradicated.” A disease is considered eliminated from a country when it can no longer be contracted within its borders, though cases tied to international travel can still occur. However, the United States has since experienced a surge in measles cases.^{2,8}

Herd Immunity

Not all people are healthy enough to receive vaccinations. They are protected from contagious diseases such as measles by a phenomenon called “herd immunity.” When a high percentage of the population is vaccinated, it is difficult for infectious diseases to spread, because there are not many people who can be infected. For example, if someone with measles is surrounded by people who are vaccinated against measles, the disease cannot easily be passed on to anyone, and it will quickly disappear again. As measles is one of the most contagious infectious diseases, an immunization rate of 93-95% is needed to protect vulnerable members of the population. These members include those without a fully working immune system, newborns, the elderly, pregnant women and many of those who are very ill in hospital. Receiving a vaccine protects not only the individual, but also their community.^{2,3}

Vaccine Hesitancy

Vaccine hesitancy (a reluctance or refusal to be vaccinated or to have children vaccinated) was identified by the World Health Organization (WHO) as one of the top ten global health threats of 2019. These objections can be rooted in concerns regarding the safety of vaccines, religious beliefs, misconceptions regarding vaccination effectiveness, pure falsehoods and “conspiracy theories,” and a variety of other topics. However, there remains an overwhelming scientific consensus about the safety and efficacy of vaccines. As parents refuse to vaccinate their children, these children become vulnerable to diseases such as measles, and weaken regional and national herd immunity. Within the United States, these individuals, called “anti-vaxxers,” remain a minority.^{1,5,6}

Vaccination hesitancy has a long history and appears to follow a general pattern. First, there is a suggestion that the vaccine has an adverse side effect, resulting in a medical condition. This condition is generally one whose number are on the rise or whose origins are not clear. This



suggestion is then improperly tested, and reports are released claiming the connection between a vaccine and this medical condition was proven. Though more research attempting to recreate the initial study is released showing this conclusion is false, it takes years to convince many people of the vaccine's safety.⁷

One example of this in the United States is the fear of a link between vaccines and autism. A paper was published in 1998 suggesting a connection between the MMR vaccine and autism. The results of the study were never able to be reproduced and the paper's findings were later shown to be falsified and manipulated. However, fears of this connection continue to persist.^{1,7}

In general, as a vaccine reaches high levels of immunization, the disease treated becomes less common. As people become less concerned with that disease, many will start to believe the immunization is no longer needed, pointing to the decreasing number of cases reported. However, this results in an increase in the number of unvaccinated individuals, vulnerable to disease. Because of this cycle, high vaccination rates can be difficult to maintain.⁷

Measles Cases Surge in the U.S.

In 2019, there has been a surge in the number of reported measles cases in the United States. Several outbreaks have occurred, many in communities with low immunization rates. The disease was likely reintroduced to the United States by individuals who traveled to foreign countries and returned, interacting with non-immunized individuals. So far this year, as of 30 May 2019, the CDC has reported 971 measles cases in 26 states. Between 2001 and 2018, 2014 reported the highest annual total, 667 cases, at a rate of 1.83 cases per day. However, from January to May of 2019, the rate has increased to 6.47 cases per day. While cases have been reported in 23 states, a majority have occurred in New York, California, and Washington. Of the 971 reported cases, over 500 were diagnosed in two Brooklyn neighborhoods (Williamsburg and Borough Park) and they are mainly among unvaccinated children in Orthodox Jewish communities. Forty-two people have been hospitalized, including 12 treated in intensive care units. Local governments have responded by requiring vaccinations, banning unvaccinated children from schools, or imposing fines. Most of the outbreaks over the past 10 years have been traced to a traveler who came into contact with a number of unvaccinated individuals.^{4,5}

Mitigation

As a disease becomes less and less frequent due to high vaccination rates, the importance of receiving the vaccine can become lost. According to WHO, measles has seen a 30% increase in cases globally. The United States has also experienced a surge in the number of measles cases, stemming mostly from communities with low vaccination rates. In hopes of regaining herd immunity and protecting their citizens, communities are beginning to require vaccinations from citizens, or ban unvaccinated children from attending school. Within the United States, measles is still considered eradicated. The average citizen is still most likely to encounter measles when traveling to places currently dealing with measles outbreaks, including Israel, Brazil, Japan, the Philippines and some countries in Europe and Africa. However, an individual residing in an area with low vaccination rates risks exposing not only themselves, but also transmitting the disease to any unvaccinated members of their community.⁶



Source List

1. *Some Common Misconceptions About Vaccination and How to Respond to Them.* Vaccinations and Immunizations. CDC. <https://web.archive.org/web/20150120055820/http://www.cdc.gov/vaccines/vac-gen/6mishome.htm>.
2. *Is Measles Here to Stay?* NPR Public Health. <https://www.npr.org/sections/health-shots/2019/04/30/718220586/is-measles-here-to-stay>.
3. *Herd Immunity.* Vaccine Knowledge Project. University of Oxford. <http://vk.ovg.ox.ac.uk/herd-immunity>.
4. Brian Pascus. *Measles Cases in 2019 Have Already Exceeded All Of 2018.* CBS News. <https://www.cbsnews.com/news/measles-outbreak-2019-exceed-2018-numbers-anti-vaccination/>.
5. Reis Thebault. *CDC Finds 78 New Measles Cases as Outbreak Sprints Toward Record and Experts Blame Anti-Vaxxers.* The Washington Post. https://www.washingtonpost.com/health/2019/04/09/measles-outbreak-cdc-seventy-eight-new-cases-one-week/?utm_term=.e867fcd128ad.
6. *Ten Threats to Global Health in 2019.* World Health Organization. <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>
7. *The Anti-Vaccination Movement.* Measles and Rubella Initiative. <https://measlesrubellainitiative.org/anti-vaccination-movement/>.
8. *Measles Vaccination.* CDC. <https://www.cdc.gov/measles/vaccination.html>