

The Anti-Vaxxers Movement and National Security

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Abstract:

The article reviews the national security implications of the anti-vaccine movement (“Anti-Vaxxers”) in the United States. In addition to reviewing the background and psychology of the Anti-Vaxxers movement, the national security implications of both naturally-occurring pandemics and bioterrorism are considered.

VACCINES ARE AMONG THE STRONGEST TOOLS in the medical armamentarium against infectious diseases (Immunization Action Coalition, 2018). Despite the cultural advances in sanitation, clean water and personal hygiene, vaccines play a major role in decreasing morbidity and mortality of infections. If one compares morbidity figures for the early 20th century with 2016, one sees that measles has decreased from over 500,000 cases to 69, smallpox from 29,000 to zero, and rubella from 47,000 to 5 (CDC 2019b; CDC 2016). These remarkable results can be attributed to the effectiveness of the vaccines and herd immunity. Vaccines are not 100 percent effective, but the concept of herd immunity prevents the spread of an infectious vector even if the population is not totally protected. The recent outbreaks of measles, a highly infectious and potentially fatal disease, in the United States underscores the risk to the public health of significantly large groups of people deciding not to vaccinate their children, as well as waning immunity in the adult

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population. This has dangerous implications for public health for both natural and purposeful future pandemics.

There are serious public health ramifications and national security issues if there was a naturally occurring pandemic with a novel organism or an infectious disease outbreak due to bioterrorism. Disease transmission is now a global phenomenon because of air travel and open borders. Increasing drug resistance is also another threat (WHO 2018). In addition, the relative ease of “bad actors,” such as nation states or terrorists, to weaponize infectious agents has increased the vulnerability of the population. Reduction in mortality and morbidity by halting the spread of the organism will require both social isolation and mass vaccination. In the Ebola outbreak of 2014–2016 only a small number of possible contacts were placed in isolation within the United States, but despite the press coverage, some still went out into the public, including one physician television correspondent (McCoy 2015). The economic burden from the 2014–2016 Ebola outbreak on the United States was \$2.4 billion (CDC 2019a) and \$53 billion worldwide (Miles 2018). The CDC in 2017 updated guidelines on social distancing and isolation (Qualls et al. 2017). Clearly, social isolation will be one component of preventing the spread of a potential pandemic. A critical strategy will be the use of a vaccine, if available, to control outbreaks. Historically, the complexities of manufacturing vaccines and distributing them to entire populations were the main difficulties in managing outbreaks, but this has changed. Today, the biggest threat in controlling an outbreak comes from those who categorically reject vaccination.

This poses specific risks for bioterrorism events where lack of trust in government, coupled with a fear of vaccinations, will produce gaps in our ability to achieve herd immunity. This can be magnified by nefarious use of social media, such as Russian trolls spreading vaccination fears, making it much more difficult to achieve compliance. As stated before, since vaccines are not always 100 percent effective, spread of the disease will continue, especially to the most vulnerable — the very young, those with compromised immune systems, and the elderly. This is compounded by our mobile society that will allow further spread even with social isolation. Severe government restrictions on travel may need to be put in place, but the impact of such restrictions on both the economy as well as the supply chain for food, medications, and other essentials will have more impact than would otherwise be necessary. The SARS coronavirus outbreak of 2003 resulted in only 800 deaths worldwide, but the cost to the world economy was estimated to be \$40 billion (Lee and McKibbin 2004). Finally, the human toll of suffering due to the disease will be much greater than was necessary.

Vaccines work by helping the body develop immunity to an infectious agent that it has never been exposed to naturally. They imitate a naturally occurring infection by stimulating the immune system to produce both cells and antibodies that will fight the infection, often preventing or minimizing symptoms. Since this process may take several weeks, there is a window after vaccination where the infection can still produce illness. Also, the elderly and people with weakened immune systems may not respond to vaccines. There are five types of vaccines: Inactivated vaccines, live-attenuated vaccines, toxoid vaccines, subunit vaccines, and conjugate vaccines (CDC 2018). In order to deliver long-lasting immunity, some vaccines require multiple doses, and some require boosters, such as a tetanus booster every 10 years. For one example, smallpox was eradicated worldwide, which allowed the discontinuation of the vaccine. Following 9/11, fear of weaponized smallpox prompted the New York State Department of Health to start a program of volunteer clinicians who would be revaccinated and trained on giving the vaccine if needed.

The percentage of the population that needs to be immunized in order to provide herd immunity varies based on the infectious agent. This threshold, called "basic reproduction number," is often referred to as "R0." This number represents how many people in an unprotected population one infected person could pass the disease along to. For example, R0 for measles is between 12 and 18, whereas for polio, it is between 5 and 7. The higher this number is, the higher the immunity threshold must be to protect the community. Because measles is extremely contagious and can spread through the air, for example, the immunity threshold needed to protect a community is high, at 95%. Diseases like polio, which are somewhat less contagious, have a lower threshold—80% to 85%.⁴ (Funk 2017).

There are many reasons people choose to not vaccinate their children or themselves. These reasons range from personal and religious beliefs, to medical reasons such as allergies, to distrust of vaccine ingredients. State laws establish vaccination requirements for school children, and these laws often apply to children attending not only public schools but also private schools and day care facilities. All states provide medical exemptions, and some states also offer exemptions for religious and/or philosophical reasons. State laws also establish mechanisms for enforcement of school vaccination requirements and exemptions. In response to the current measles outbreak, Washington state passed a new law limiting the use of parents' personal and philosophical objections to refuse vaccinations for their children (Lee 2019), and the California legislature has also proposed a bill to close the personal and philosophical objection loophole (Liss 2019).

The modern anti-vaxxer movement, composed of people who falsely believe that vaccines are dangerous, started with the publication 20 years ago of a now-retracted study by David Wakefield that erroneously linked the measles, mumps and rubella vaccine (MMR) to autism (McCoy 2015). And while the Centers for Disease Control (CDC) has released studies that show no link between autism and vaccines or that an aggressive vaccination schedule for children causes autism, many people still believe that there is a connection and refuse to vaccinate their children. There has also been a rejection of scientific evidence in many communities that vaccines protect against disease, predating widespread use of the Internet and social media. Worldwide, there are many cases of leaders lying to their citizens about vaccine efficacy in populist movements, including by Italy's Five Star Movement, which is now a part of that country's government, and among the Taliban in Afghanistan. Healthcare workers involved in intelligence operations in locales including Pakistan has led to distrust of the services offered, including vaccines against deadly diseases like polio and measles (McNeil, Jr. 2012).

While the anti-vaxxer movement is not new, a 2019 report issued by the World Health Organization (WHO) named "vaccine hesitancy" one of the top 10 threats to global health (WHO 2019). Vaccine hesitancy is defined as the belief that vaccines are not important, safe or effective. It is not just the United States that is experiencing a surge in measles cases; several western countries including the United Kingdom, Australia, New Zealand and Italy have experienced recent measles outbreaks. The World Health Organization recently issued a report that estimated there were 6.7 million cases of measles worldwide in 2017, an increase of 30 percent over 2016 numbers. In addition, Washington, Oregon and New York are in the midst of a widespread measles outbreak, with most cases in Washington involving children under 10 who were not vaccinated (Floccus 2019). In April 2019, nearly 700 students and staff were quarantined at the University of California, Los Angeles (UCLA), and California State University, Los Angeles (CSULA) after possible exposure to a person with measles (Mele 2019).

There have been several disease outbreaks in the U.S. in recent years including a 2015 measles outbreak originating at Disneyland that proceeded to infect 70 people in six states. And

it's not just measles; many other diseases that had been all but eradicated by modern medicine are candidates for or have experienced outbreaks, including whooping cough, polio, mumps and more.

In addition to the retracted study by Wakefield, there are several other factors driving the anti-vaxxer movement. These include alignment with other conspiracy movements including the far right (Weill 2019), and social media misinformation and propaganda campaigns by many foreign and domestic actors. Included among these actors is the Internet Research Agency (IRA), the Russian government-aligned organization that has been identified as responsible for interfering in the 2016 U.S. presidential election. Russia's disinformation campaigns are not limited to the United States; they continue to play a role in anti-vaxxer initiatives in many western countries including Italy, Australia and the United Kingdom. Russia's ultimate goal is to sow discontent and distrust in topics and initiatives that serve U.S. interests (Kirk 2019).

Social media continues to play a significant role in propagating false and misleading information about vaccines. In March of this year, Ethan Lindenberger, a teen who had himself vaccinated against his mother's wishes, testified in front of a Senate committee and attributed his mother's anti-vaccine ideology to misinformation she read on Facebook (Doubek 2019). Facebook has acknowledged that their algorithms have targeted anti-vaccination materials and advertisements toward women (since mothers are still primary caregivers for most children) in areas with high numbers of measles reports and have agreed that they need to reduce the distribution of health and vaccine-related misinformation.

A 2018 study (Broniatowski et al. 2018) found that the Internet Research Agency has used both trolls (individuals who misrepresent their identities with the intention of promoting discord) and bots (accounts that automate content promotion) to amplify anti-vaxxer positions on the Internet. These trolls were Russian users connected to the Internet Research Agency; their goal was to present both pro- and anti-vaccination information in the form of posts that would sow division, act as a political wedge issue and exploit discord. Twitter bots distributed spam and malware impersonating human users to distribute anti-vaccine messages. In many cases, tweets and posts by the Internet Research Agency bots and trolls were identified with the hashtag #VaccinateUS. The authors tied both anti- and pro-vaccine messages to U.S. politics and often referenced conspiracy theories focused on the U.S. government. These messages often cited arguments and opinions designed to heighten ethnic and racial tensions. Standard anti-vaccine messages not tied to Russian trolls and bots did not generally target socioeconomic or racial tensions that exist in the U.S.; rather, they generally characterized vaccines as unsafe for all people.

In April 1947 millions in New York City received smallpox vaccinations after a businessman contracted the disease from his travels and returned to New York. Ring vaccination, in which anyone who had contact with infected individuals were immunized, halted the spread of the disease, but almost all New Yorkers were immunized by the end of the month (Sepkowitz 2004). Pictures from that time show people waiting politely on lines blocks long for their immunization. Unfortunately, based on the anti-vax movement fueled by false information spread by social media, this type of public response seems unlikely today.

Both natural and intentional epidemics pose a serious risk for the United States and the world. The direct effect of such an epidemic in terms of morbidity and mortality is clear, but the toll on the infrastructure can be just as devastating. Social distancing and isolation have impacts that include loss of manufactured goods, reduced food supply, and other disruptions to the supply chain. We live in a "just in time" culture where supplies will be quickly consumed and not replaced. This was underscored by Hurricane Maria, which caused widespread damage in Puerto Rico and halted the production of drugs and medical supplies manufactured there (Aton 2017).

Conclusion

What can we do to prevent this scenario? We need to have bipartisan leadership support the scientific evidence. In addition, clinicians, health educators, community and religious leaders, and physicians must be part of a campaign to refute the anti-vaxxers and need to specifically reach out to communities with a high prevalence of vaccine hesitancy. We also need social media companies to continue to refine the algorithms that power their services to better distinguish quality information from deceptions or otherwise misleading information. Unfortunately, there is no guarantee that these approaches will be successful. Therefore, public health and emergency planners must now prepare for possible scenarios where herd immunity will not be a tool to control a pandemic.

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