

Anti-Vaccine Decision-Making and Measles Resurgence in the United States

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Olivia Benecke, BA¹ and Sarah Elizabeth DeYoung, PhD² 

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Introduction

Measles outbreaks in 2019 reached emergency levels in the United States, in addition to other countries such as the Philippines, Ukraine, Venezuela, Brazil, Italy, France, and Japan.¹ The aim of our article is to provide an overview of the major social, psychological, and technological factors that led to these outbreaks in the United States. We also explore the policy landscape and potential solutions for public health researchers. Specifically, we address the social and contextual factors can provide health professionals with tools to develop an effective pro-vaccine response campaign for this highly contagious, preventable disease.

Epicenter of the Outbreak

During January 2019, a measles outbreak in Clark County, Washington, in the United States infected 72 people, 53 of whom were children aged between 1 and 10 years. This prompted the governor to declare a state of emergency.² Though once eliminated, measles outbreaks are becoming increasingly common. Since 2014, public health officials have observed an increase in vaccine opposition throughout the United States, primarily concentrated in major metropolitan areas. Seventeen states allow for nonmedical vaccination exemptions. This dangerous trend renders multiple populous cities vulnerable to vaccine-preventable diseases.³ Recent resurgences of measles, mumps, and pertussis and increased mortality from vaccine-preventable diseases prompt an in-depth exploration of the social and behavioral factors that influence the “anti-vaxx” movement. Understanding these social and behavioral factors can prevent these behavioral trends from gaining additional traction throughout the United States and beyond, protecting an increasingly connected world from preventable illnesses.

Historical Context

In the United States, fear of vaccines emerged in the 18th century. Religious figureheads often referred to them as “the devil’s work” and actively spoke against them.^{4,5} In the 19th century, the movement became increasingly politically motivated as passage of laws in Britain made it mandatory for parents to vaccinate their children. In response, anti-vaccine activists formed the Anti-Vaccination League in London, emphasizing their mission to protect individual liberties that were being “invaded” by government.⁵ These movements expanded to Britain in the 1970s and 1980s when parents increasingly refused to vaccinate their children against pertussis in response to a report that attributed 36 negative neurological reactions to the pertussis vaccine. This caused a decrease in the pertussis vaccine uptake in the United Kingdom from 81% in 1974 to 31% in 1980, eventually resulting in a pertussis outbreak in the United Kingdom.⁵

However, the anti-vaccination sentiments in recent decades were also fomented by the 1998 publication of a series of articles in *The Lancet* by a former British doctor, Andrew Wakefield. Wakefield suggested a connection between the measles, mumps, and rubella (MMR) vaccine and development of autism in young children. Despite flawed research methodology, and conflict of interest in funding, the MMR vaccine rates continued to drop dramatically. Members of the anti-vaccine

¹University of Georgia, Athens, GA, USA

²University of Delaware, Newark, DE, USA

Corresponding Author:

Sarah Elizabeth DeYoung, University of Delaware, 166 Graham Hall, 111 Academy Street, Newark, DE 19716, USA.

Email: sedeyou@udel.edu



movement still cite his research as a talking point in refuting vaccinations.

There is an inverse association between nonmedical exemption rates and MMR vaccine coverage of kindergarteners in the 17 states that allow for vaccination exemptions.³ States with higher overall nonmedical exemption rates have lower MMR vaccine coverage, demonstrating the dangerous and lasting influence of Wakefield's publication.

The anti-vaxx movement may also be situated within economic and social movements in the United States. Sociological research on parental perception about vaccination decision-making reveals that gender, resources, and norms influence medical decision-making.^{6,7} As Reich⁶ points out, ideas about neoliberalism and skewed perceptions of feminist concepts of bodily autonomy and parental decision-making trumps medical expertise. Reich's data and findings suggest that upper-class women may adopt anti-vaxx sentiments as a means for expressing independence—while tragically undermining the value and science behind herd immunity. The landscape of vaccination is complex. Lack of access to regular healthcare—for low-income families, can reduce vaccination compliance (Chen et al., 2018).⁸

The Role of Social Media in the Anti-Vaxx Movement

Persuasion from entertainment and pop culture figures can influence health behavior and decision-making about vaccinations (eg, Tiedje et al¹⁰). Celebrities such as Jenny McCarthy, Alicia Silverstone, Rob Schneider, and Robert De Niro used fear-based messaging to influence parents to avoid vaccination, particularly in claiming a false link between vaccinations and autism.⁵ Political leaders also play a role in spreading misinformation. Donald Trump shared anti-vaxx messages on social media,⁹ although in recent months he encouraged vaccinations. More recently, vocal representative Jonathan Strickland in Texas described vaccinations as “sorcery.”

Another reason skepticism has begun to flourish over vaccinations is due to the spread of misinformation on social media.²⁰ Medical knowledge that was once held exclusively by medical professionals is now accessible to anyone and can be shared in posts that become “viral.” According to an analysis of YouTube videos about immunization, 32% opposed vaccination.⁵ Perhaps more concerning, these videos had higher ratings and more views than pro-vaccine videos. In addition, a study that explored the content of the first 100 anti-vaccination sites found after typing “vaccination” and “immunization” into Google revealed that 43% of websites were

anti-vaccination.⁵ Skeptics also use online platforms to advocate vaccine refusal; as many as 50% of tweets about vaccination contain anti-vaccine beliefs.¹⁰ Research suggests that it only takes 5 to 10 minutes on an anti-vaccine site to increase perceptions of vaccination risks and decrease perceptions of the risks of vaccine omission.⁵

Among these social media influencers are parents who attribute the deaths of their children or illnesses they contract to “vaccine injury,” and they often take to the Internet to discuss their experiences and warn other parents. Indeed, a substantial part of the vaccine discussion takes place on anti-vaccine website discussion boards such as *Age of Autism*, *Say No to Vaccines*, and *Naturalnews.com*.¹² Even on mainstream social media sites like Facebook and Twitter, anti-vaccine discussions are flourishing as these groups have closed their forums to anyone who describes themselves as “pro-vaccine.” According to Shelby and Ernst¹² these parents and other anti-vaccine activists “have relied on the profound power of storytelling to infect an entire generation of parents with fear and doubt”.

Perhaps the most common trope told by this group is the “overnight autism” narrative, in which a parent takes their child in to get the MMR vaccine only to watch them digress cognitively almost immediately after.¹² In the anti-vaccine community, these stories serve as cautionary tales that vaccines are dangerous without accurate information to refute their claims. Additionally, the widespread involvement of bots and malware promoted by foreign powers in online public health discourse is skewing discussions about vaccination. In 2015, DARPA's (the US Defense Advanced Research Projects Agency) Bot Challenge asked researchers to identify “influence bots” on Twitter in a stream of vaccine-related tweets, focusing heavily on the actors behind the content.¹¹ Researchers studied #VaccinateUS, a Twitter hashtag linked directly to Russian troll accounts connected to the Internet Research Agency—a company backed by the Russian government that specializes in online influence projects.¹¹ One of the primary tactics used by these influence bots is to use the vaccine debate to target socioeconomic tensions that are unique to the United States. For example, anti-vaccine tweets from this source will often blame elite groups for forcing vaccine on low-income people. In addition, it was determined that “93% of tweets about vaccines are generated by accounts whose provenance can be verified as neither bots nor human users yet who exhibit malicious behaviors.”¹¹ This amplifies the misinformation that parents are exposed to, and it fuels the belief that the science behind vaccine efficacy and safety is still debatable.

Psychological Factors and Beliefs

In tandem with access to information, components of social psychology play a key role in understanding the escalation of the anti-vaccine movement. After surveying 1000 parents of children younger than 13 years of age who were living in the United States, researchers found that the morals of purity and liberty were most associated with vaccine hesitancy.¹⁴ Those who place high value on liberty are most concerned with individual freedom, resenting government mandates that demand parents vaccinate their children. Similarly, those who value purity disapprove “of acts that are deemed ‘disgusting’ or ‘unnatural,’” which they associate with vaccination.¹⁴ Indeed, anti-vaccination websites and other propaganda often claim that vaccines contain “contaminants.” According to epidemiologist Amin¹⁴ this finding is significant because many pro-vaccine arguments and campaigns are grounded on the values of harm and fairness. For example, they usually strive to remind parents that getting immunized helps prevent outbreaks, or they frame it as an obligation to protect those who cannot be vaccinated.¹⁴ Understanding the sociobehavioral variables that influence vaccine-hesitant parents is critical because it will allow the public health community to develop a more targeted and effective response campaign that will prevent this dangerous movement from growing.

Mitigation Against Misinformation

Sites like Facebook, Twitter, and Instagram are all home to flourishing anti-vaccine communities. In 2017, Pinterest blocked all searches for the term “vaccines,” as a part of the company’s enforcement of a broader policy against health misinformation.¹⁵ Soon after, YouTube announced that anti-vaccine channels and videos on its platform would no longer be able to advertise or receive money from viewers. In addition, in March of 2019, Facebook said it will no longer recommend groups and pages that spread hoaxes about vaccines, and that it will also reject ads that do this.¹⁵ Instagram also recently announced that it would block anti-vaccine hashtags, such as #vaccinescauseautism and #vaccinesarepoison.¹⁶

Despite these strides, groups are still finding ways to spread misinformation. For example, one can still find anti-vaccine content on Pinterest by instead searching for “measles vaccine.” While Facebook’s new policies are making it more difficult for a lay person to come across anti-vaccine propaganda, the platform is not banning the groups altogether.¹⁵ Twitter has yet to make any formal announcements regarding action against anti-vaccine related content.¹⁶

Education and Anti-Vaxx Movements

Effectively countering the anti-vaccine movement should be addressed through understanding mechanisms for increasing trust between the medical community and parents. Issues of mistrust began with the way in which the measles vaccine campaign was introduced in the United States in 1967. Concerned by the relationship between socioeconomic disparities and infectious disease incidence, the Johnson administration made federal funds for measles vaccination available starting in 1965. A mass measles eradication began in 1967, which did not allow popular confidence around the vaccine to take hold.⁴ In addition, early side effects left some parents skeptical.

In Great Britain, public health officials and policy-makers cautiously established a large-scale clinical trial to distinguish the relative benefits of the different available vaccines and possible immunization schedules.⁴ Through this, the goal was to convince parents about vaccination efficacy from a disease they previously thought to be inevitable.⁴ This method of transparency was a success, and mass evacuations were accepted by the public when they were introduced in 1968.⁴ The disparities in these cases highlight the importance of the responsibility held by doctors and public health officials in keeping the science behind vaccines transparent and parents informed. This allows confidence and trust around the practice to take hold.

In the United States, most of the Centers for Disease Control and Prevention Vaccine Information Statements parents receive before vaccination dedicate almost half of their information to detailing risks of the vaccines and providing information to parents on how to report negative vaccine reactions to the National Vaccine Injury Compensation Program.¹² This does little to reassure parents who may feel fearful or skeptical. Information in these statements should also contain content about the benefits of vaccinations. Outreach efforts should also focus on communities and marginalized group that may have higher levels of mistrust in government-based medical services. It is also important to acknowledge the harm caused to racial minorities by government trials such as the Tuskegee Study in the United States (Reverby, 2017).¹³ Eroded trust can still be a factor today in medical decision-making, and this historical context should be considered when working with communities for vaccination promotion.

In addition, public health officials should use social science and behavioral research to develop pro-vaccine narratives. Indeed, emerging evidence suggests that one

of the most persuasive and effective means of communicating vaccine information to some parents is through sharing anecdotes.¹² Doctors and public health organizations should publish stories online or in pamphlets of successful vaccine appointments and preventable disease horror stories. Some parents who feel strongly about the importance behind vaccines may serve as “vaccine ambassadors.”¹² These parents can volunteer to provide their e-mail addresses or phone numbers to the clinic to hand to vaccine-hesitant parent, allowing peer-to-peer communication to serve as interventions.¹⁷

Policy Implications

The anti-vaccine movement poses several implications for the future direction of public health policy. Developing public policy that closes vaccine loopholes is critical. Despite all 50 states having legislation requiring vaccines for students, almost every state allows exemptions for people with religious beliefs against immunizations. Specifically, 17 states grant philosophical exemptions for those opposed to vaccines because of personal or moral beliefs, and 45 permit “conditional entrance” on the promise that children will be vaccinated. Rarely do schools follow-up.¹⁶ Indeed, lifetime exemption is as easy as obtaining a notarized letter.

Exemptions cluster geographically—these are places at greater risk as herd immunity disappears. In order to counter these loopholes, the Centers for Disease Control and Prevention recommends that states begin by implementing vaccination requirements that reach more children through a broad range of facilities, that have more requirements for receiving an exemption, that require parental documentation of exemption requests, and that are implemented with strong enforcement and monitoring.¹⁸ Indeed, with the recent measles outbreaks that occurred this past winter, 8 states are considering removing personal exemptions for the measles vaccine.¹⁹ As of right now, only 3 states—Mississippi, West Virginia, and California—prohibit nearly all vaccine exemptions. This number is expected to grow as bills to restrict exemptions are now pending in a growing number of states.¹⁹

Long-Term Solutions

To address the root causes of the measles outbreak, social science can inform community-based interventions and policies.

Additionally, social media platforms should play an active role in monitoring and banning false information. Second, medical and public health professionals must take a different approach in informing skeptical

parents about vaccines that includes outreach for vulnerable communities. Finally, K-12 policies on vaccines and common loopholes should be addressed through policy change.

These longterm programs should be carried out through collaborative efforts. Research by sociologists, psychologists, public health researchers, and other scholars should be integrated with strategies launched by nonprofits, state-level health initiative, and community health promotion efforts.

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Both authors contributed to the writing for this article. The first author (Benecke) wrote initial drafts of the content and the second author (DeYoung) provided guidance on revisions and organization of content.

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ORCID iD

Sarah Elizabeth DeYoung  <https://orcid.org/0000-0001-8420-8762>

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