Measles, Mumps, and Rubella: Oh My!

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“It would be tragic if efforts to eliminate or control communicable disease were to become hampered because the public's confidence was so eroded as to cause frightened segments of the population to oppose and reject vaccines. Neither can we afford a revival of serious childhood epidemics because a complacent and apathetic public with a diminishing memory, forgets the iron lung,” (Offit, 2011, 10). These were the words spoken by Senator Paula Hawkins before the Committee on Labor and Human Resources Development in the United States Senate. They have acquired a more and more ominous truth as the anti-vaccination movement has grown. Today, so many children go unvaccinated that diseases once thought to be long gone have made their reappearance in the form of new epidemics. Even more importantly, children today who are unable to get vaccinated due to legitimate health risks are now at an even greater risk of succumbing to these illnesses.

It is also important to understand how we arrived at this potential epidemic in the first place. Science has done incredible things for humanity. It put humans on the moon, allows us to travel farther and faster than ever
before, and it has helped us live past the age of 30. Therefore, it is difficult to understand how some people refuse to accept the science behind vaccines, especially when the experimental evidence is so readily apparent. The fact that we do not have to fear a child dying in the first five years of infancy and that some diseases like polio have almost been completely eliminated due to vaccinations provides striking evidence that vaccinations work. Despite this, there are groups of people that refuse to trust medical, scientific, and government officials and research, leaving their children unvaccinated.

To examine this phenomenon, I will first give a quick look at the origins and rise of the anti-vaccination movement, then I will look at its current effects, and last I will propose several possible courses of action to reverse the effects of the anti-vaccination movement.

**The Beginning: Early Symptoms**

Although the effects of the anti-vaccination movement have only recently become an issue, the movement's origins in America can be traced to April 19, 1982, when Lea Thompson's film *DPT: Vaccine Roulette* first aired on WRC-TV, a local TV station. “DPT, the initials stand for diphtheria,
pertussis, tetanus: three diseases against which every child is vaccinated. For more than a year we have been investigating the 'P': the pertussis portion of the vaccine. What we have found are serious questions about the safety and effectiveness of the shot” (Offit, 2011, 7). These are the opening words delivered in a dark monotonous tone narrated by Thompson. What follows are interviews with distressed parents accompanied by images of crying and disabled children, supposedly the result of getting the DPT Vaccine. By the time of the film's conclusion, the pertussis portion of the DPT vaccine has been implicated in everything from brain damage to Sudden Infant Death Syndrome (SIDS). The film was aired two more times on the local station, and once more nationally on The Today Show. Soon after, almost all forms of media were presenting their own stories on children damaged by the DPT vaccine. Thus, the anti-vaccination movement was born.

The response to DPT: Vaccine Roulette was rapid. On May 7th 1982, merely 18 days after DPT: Vaccine Roulette aired, Florida Senator Hawkins conducted the hearing mentioned earlier in the Senate, (Offit, 2011, 8-9). The goal of this hearing was to have the government intervene to help stop the
spreading of fear and distrust in vaccines. The hearing was largely successful as it assuaged concerned parents’ fears of the DPT vaccine and provided information of the risks of the DPT vaccine and compensation. In the same year that *DPT: Vaccine 4 Roulette* aired, the National Vaccine Information Center (NVIC) formed almost directly by Lea Thompson. NVIC is a non-profit group dedicated to providing information about vaccines to parents and advocating that vaccines may only be given to a child with the parents’ consent (National Vaccine Information Center, 2016). This organization is still active today and is growing in number.

In 1998 a new vaccine became the target for the anti-vaccine movement. This was the year Dr. Andrew Wakefield published his paper, “Measles Mumps and Rubella Vaccine: Through a Glass, Darkly,” in the journal *Lancet* (“History of Anti-Vaccination Movements,” 2016). Wakefield suggested that there was a possible link between autism and the MMR vaccine, sparking heated controversy between medical and scientific professionals and concerned parents, and was the source of the now widely believed idea that vaccines can cause autism. It later surfaced that Wakefield
had a conflict of interest when this paper was published and also had used falsified data. As a result, his paper was retracted by *Lancet* in 2010, and he was struck from the British Medical Register (Deer, 2011). In addition, several papers have subsequently been published affirming that there is no link between vaccines and autism. Despite this, the paper continues to be a cited source in the argument that vaccines cause autism.

The MMR as well as other vaccines were also implicated with autism due to their containing thimerosal. Thimerosal, an organic-mercuric compound, was used as a preservative in vaccines, preventing unwanted bacterial growth before the vaccine was administered, thereby actually making them safer (“Frequently Asked Questions About Thimerosal,” 2015). However, many people were alarmed because thimerosal contained mercury. Elemental mercury is indeed very dangerous, as it is highly volatile and can lead to brain damage. A vivid, if albeit fictional and highly stylized example of this is found in *Alice in Wonderland*'s Mad Hatter. However, elements in molecules behave differently when in their elemental state. The best example of this is sodium chloride, or table salt. Sodium reacts violently upon contact
with water and chlorine is a highly toxic yellow gas. When the two chemicals combine, however, they form salt: a compound that manages to exist in water without exploding and that humans consume far too much have, yet still survive. This is also true for mercury in thimerosal and papers have been published refuting the link between thimerosal and autism. Despite this, thimerosal was removed from all children's vaccines except some flu vaccines in 2001.

Since then, the anti-vaccination movement has grown and now includes many famous people and celebrities. Perhaps most famous and outspoken is Jenny McCarthy. Jim Carrey, Charlie Sheen, and even Donald J. Trump are counted among many other well-known persons that have come out against vaccinations being administered to children. Their notoriety poses a grave problem as it gives the anti-vaccine movement undeserved publicity and credibility, providing a platform to spread their misinformation to a wide and captive audience. The longer this is allowed, the larger the anti-vaccination movement will grow leading to public health issues even greater than we are currently experiencing today.
Epidemic: Anti-Vaccination Today.

The most damaging effect of anti-vaccination is that diseases once controlled through vaccinations - measles, mumps, and pertussis - have made a resurgence as full epidemics in some cases. Recently there was a measles outbreak in Disneyland. At least 125 people across multiple states and countries became sick with measles because an unvaccinated child brought a strain of the disease in from a foreign country (Zipprich et. al., 2015). This outbreak could have been prevented had a greater portion of the population been vaccinated. Recent research suggests that California's vaccination rate ranged anywhere from 50% to 86%. If more of the population was vaccinated, around 96% to 99% - a phenomenon known as herd immunity - could have been attained, greatly reducing the probability of transmission (Majumder et.al., 2015).

Attaining herd immunity is critical to preventing transmission of all forms of communicable diseases; when a certain portion of the population is successfully vaccinated, they act as a buffer, shielding any unvaccinated individuals within from disease transmission. This is extremely important:
not all individuals can be vaccinated either due to age or health complications. Of course, no vaccine is 100% effective at prevention; some individuals who have been vaccinated may still be susceptible to disease. In an unfortunate way, the concept of herd immunity has also played into the favor of anti-vaccination groups: when vaccination is high, disease transmission is low. Therefore it is possible to believe that the “risks” of a vaccine outweigh the potential benefit in any one case. Still, if only a few parents do this, they are still largely covered by the herd immunity and therefore experience no complications. It is only when the movement grows and herd immunity is lost that the complications from being unvaccinated become apparent.

Another problem involved with the development of the anti-vaccination movement is not just the denial of science related to vaccines, but the denial of all science. The resurgence of the anti-vaccination movement is accompanied by more visible growth in climate change denial, a belief in homeopathy, and the refusal to accept the idea of evolution just to name a few. The threat posed by the anti-vaccination movement is not an isolated
case, but rather fed by a systemic disconnect with how ideas are either transmitted or received.

This disconnect has a bittersweet irony to it because we live in the Information Age. Never before has such a wealth of information and knowledge been so accessible. The other side of the coin, however, is that there has never been such a wealth of disinformation readily available. I learned this first hand when searching for sources for this paper because I had to sift through countless websites put up by anti-vaccination groups presenting false information as fact. Some of these sites looked remarkably professional. In just a 30-minute search for information on vaccines, it is easy to see how some parents succumb to the anti-vaccine movement simply because of a lack of knowledge.

**Vaccinating the Anti-Vaxers**

Confronting the anti-vaccine epidemic is therefore difficult. Unlike most other public health issues where more wealth and better education play a part in reducing risk, parents not vaccinating their children are often the well-to-do and the educated. To add to this problem, the ones being affected
are young children, unable to have a voice in whether they want to be vaccinated. This creates a vexed situation: to help the ones most at risk, the parents must give consent.

The most immediate answer to solving the anti-vaccination problem is thus thought to be passing government regulation making vaccinations mandatory to all non-exempt children. Some states have attempted just that, including most recently by California where SB-277 was recently signed into law (Seipel and Calefati, 2015). This bill was formed directly in response to the preventable measles outbreak that occurred in Disneyland as well as in schools all across the state. This legislation is one of the most comprehensive vaccination bills passed in the United States: all children must be vaccinated to attend public or private school regardless of the parent's personal beliefs or religion. Only in cases of serious medical concerns is the family exempted. This makes California one of only three states to have mandatory vaccination, the other two being West Virginia and Mississippi.

Laws may not be the most effective course of action over time, however, as the rhetoric found in the anti-vaccination movement is closely
associated with several other conspiracy theories, such as those surrounding “big pharma.” This connection means that those within the movement likely already have a general mistrust of the government, and a state passing laws to force its citizens to do otherwise has the potential to cause the parents to either homeschool their child or to move to a different state where they may proceed to have their children unvaccinated. This is obviously counter-productive to the goal of getting children vaccinated and will still run the risk of future epidemics of preventable diseases.

The largest contributing factor to the growth of the anti-vaccination movement is lack of knowledge in the subject area and the spread of false information. A way to combat this without the use of laws and the government would be through increasing education and awareness. The basic concepts behind vaccinations are not hard to grasp and can easily be taught to both adults and young children. For instance, the concept of herd immunity and why it is important to be vaccinated could easily be demonstrated with water, several containers, and food coloring. Parents too can be taught things they may not have known, especially since barriers preventing disease
transmission like herd immunity are starting to break down and more epidemics become widespread. A combination of educating both the schoolchildren and the parents at home could limit the reach of the anti-vaccine movement greatly in the long-term and perhaps help to reverse the reach of other science-denial groups.

Another resource would be to consider celebrity advocacy. Jenny McCarthy, mentioned earlier, had her own prime-time program to speak to a captive audience about the dangers of vaccinations. There has been no equivalent outcry or promotion from the other side. Using well-known persons that believe in vaccination as well as presenting commercials and other forms of media resembling the efforts of the anti-vaccine movement can help to counter the overwhelming amount of false information. If parents are to make a reasoned choice for their children, they must have access to the most accurate, up-to-date information.

Finally, there is a fundamental flaw in the anti-vaccination movement’s approach: the belief that the parents view it as if it is their natural right to choose what is best for their child. They believe that either a government or
doctor making decisions for them in their field is a violation of their right to choose. They also believe that their decision only affects their child. I believe that both of these assumptions are wrong. Being forced to vaccinate a child is not an infringement of a parent’s right to choose, it is instead a prudent step to ensure that the child will grow up with as little suffering as possible, not having to worry about suffering pertussis for a month or longer or contracting measles. Again, the decision whether to vaccinate does not only affect that one child, but concerns all the adults and children with whom the child comes into contact. Therefore, not vaccinating a child endangers all those who are medically unable to receive vaccinations. If it is possible to turn the dialogue from being about the parents and their own choices to a discussion of the vulnerability of population at large, it may be possible to achieve a safe and vaccinated America.
References


