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Under the Needle: Understanding the Benefits and Misconceptions of Vaccinations

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Under the Needle:

Understanding the Benefits and Misconceptions of Vaccinations

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Abstract

By and large, medical and government institutions such as the CDC have been primarily responsible for educating the public on the necessities of vaccinations, and quelling fears regarding them. As the world becomes more connected, proponents of the anti-vaccination movement find common ground via social media platforms and other outlets from which to confirm preexisting notions that vaccines are detrimental to recipients. This places a burden on both the aforementioned institutions as well as the general public to deal with potential outbreaks before they either resurge from previously low infectivity rates, or before they reach epidemic proportions.

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As a species, humans have adapted to survive dangerous conditions and overwhelming odds by benefiting from the concept of community. Phrases such as “strength in numbers” are born from this mindset, and the drive to be social creatures is very much evident in human behavior, such as the formation of cliques, friend groups, clubs, and cities. It seems counterproductive then that some would choose to threaten those forms of communities by not protecting themselves against pathogens and agents known for wreaking havoc, specifically regarding vaccinations. It is important then to understand how and from where this anti-vaccination mindset developed, and what can be done to educate the public on this matter.

One lesser misunderstanding is that vaccines are only needed in childhood and that updates and further vaccinations are not necessary. For example, Zostavax, the formerly recommended shingles vaccine has been determined to only be approximately fifty to sixty percent effective as determined by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention [CDC], 2018). Recently, the CDC has been recommending that patients acquire the new Shingrix vaccine from their pharmacies and physicians. With approximately a 90% prevention rate, the Shingrix vaccine offers significantly more protection than its predecessor. Despite this, there are skeptics who are certain that the initial shot was sufficient, and often question the necessity of a secondary one, believing that once they receive the vaccine, they no longer need to be concerned with that particular illness or that further vaccinations are redundant. Considering the varying levels of effectiveness in the vaccine and the fact that not all bodies respond in a uniform manner, this is not the case, and it puts themselves and their community at risk for exposure.

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One of the more persistent claims is that vaccines can lead to the onset of autism in children. This argument was heavily spurred on by the now discredited research done in 1998 by Andrew Wakeham, a former British gastroenterologist. His work is cited as being the building block for the vaccine/autism debate, and anti-vaccine movements are often seen using his work or elements of his work to support their arguments. Opponents to this belief argue that Wakeham's research and creditability are faulty at best and destructive at worst, leading to the modern-day assumption that vaccines lead to autism. One author (Lisa Gross, 2009, para. 4) states that Wakeham believed that "the measles virus caused a leaky gut, sending toxic substances into the bloodstream and, ultimately, the brain." This theory of his most likely gained traction due to Wakeham's background in gastroenterology, but it became clear that his credentials were not enough to support his hypothesis when his peers quickly scrutinized his work. Today, despite the work of many researchers to prove that this is not the case, anti-vaccine proponents still cling to an outdated theory. They then refuse to vaccinate their children, putting them at serious risk of contracting an otherwise preventable disease. This also weakens local herd immunity, another point that anti-vaccine groups bring up as a reason that they believe that vaccines are unnecessary.

Herd immunity is summed up as protection by the protected. With thousands of people receiving vaccines for various diseases, the general availability for a virus or similar disease to strike a population becomes drastically lower. This, in turn, also protects those who have not received the vaccine as the consequential lower infection rates means that the unvaccinated are also at a reduced risk for contracting the disease. While herd immunity is certainly a concept grounded by science, it is far from a foolproof way to avoid infection. Most populations are not static; people travelling from out of the area or vice versa create an environment where

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vaccinated people may leave and unvaccinated people may enter, increasing the likelihood of infection. As previously stated, vaccines are not one-hundred percent effective in and of themselves, meaning that even the vaccinated population is still at risk. It seems that herd immunity is used to shift the responsibility of vaccination onto others, while still attempting to reap the benefits of a vaccinated society. This overconfidence in herd immunity puts additional strain on the community and government groups such as the CDC to emphasize the importance of vaccinations to reduce the chances of an outbreak.

CDC estimates for the 2018 flu season stated that they anticipated widespread outbreaks in forty nine of fifty states and Puerto Rico, with local and regional activity being detected in Guam, The Virgin Islands, Hawaii and Washington D.C (CDC, 2018). This is the first time since at least 2003 that the entire continental U.S. has had been estimated to be classified as having widespread infection rates, if Washington D.C. is not counted. The CDC had predicted a particularly heavy flu season as early as the summer of 2017 and recommended vaccination as soon as possible to avoid contracting it. However, many people decided to wait until much later in the season before getting the appropriate shots. This resulted in rush to acquire the vaccine late into flu season, putting strains on vaccine supplies, Tamiflu, and even saline bags, as the sick and dehydrated flooded local hospitals in the wake of the destruction of saline bag manufacturing facilities in Puerto Rico due to 2017 hurricane activity. While this mindset is not strictly tied to an anti-vaccine movement, the false notion that waiting until further into flu season is better than vaccinating early is one that even vaccinators can focus on improving in.

Skepticism is not a new facet of American society, and doses of it are healthy, however the skepticism surrounding the inactive ingredients within vaccines cause enough concern that people are willing to forgo them entirely, believing that they contain toxins and other harmful

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chemicals. Heather Stecher (personal communication, March 14, 2018), a pharmacy intern and former pharmacy technician, believes that inactive ingredients are one of the biggest concerns patients have with vaccines, however she also states that rather than communicating with their doctors or pharmacists, they take the word of rumor as law, leading to a decrease in the amount of shots. Citizens, already distrustful of their own government, find themselves looking for consultation and affirmation in social media echo chambers, strengthening false notions that put themselves and others in danger.

When questioned about his opinion on the most common misconception regarding vaccinations, CVS pharmacist Richard Scanlon (personal communication, March 14, 2018) stated with certainty that the most prevalent myth he had encountered was the belief that vaccines caused the disease they were meant to prevent. He clarified by saying that he administers inactivated vaccines, and that if a patient displays symptoms of the disease (in this case influenza), that they were already infected with the disease prior to immunization, and that the immunization process was not to blame for two reasons. First, the vaccine, as previously stated, was inactive, and therefore unable to follow through with the lytic cycle necessary for the virus' parasitic replication. Secondly, the human body takes approximately two weeks to develop antibodies capable of fighting back against the virus, meaning there is a window of opportunity for infection, even after immunization.

Doctors and scientists stand by the tireless effort placed into the research of vaccines because they have confidence that it will save lives. Edward Jenner, the father of the smallpox vaccine, stated in his first paper regarding a description of cow-pox that “the system becomes affected--the pulse is quickened; and shiverings, succeeded by heat, with general lassitude and pains about the loins and limbs, with vomiting, come on. The head is painful, and the patient is

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now and then even affected with delirium.” (Jenner, 1798, para. 4). This excerpt details the horrific bodily conditions that those affected by the disease went through, while later, in his third paper, he describes a significantly shorter time of illness and quicker recovery after inoculation. When one considers that this was over two hundred years ago, the developments since this time have been extraordinary. Modern day scientists continue to build off of two hundred years of tried and true testing; we are only getting better at saving lives.

The consequences of not getting vaccinated are apparent, and yet considerations are not being taken to consider the health of those in the public. Children whose parents oppose vaccinations, face serious illness or death from otherwise preventable diseases. Absences from school continue to climb as kids are told to stay home so as not to spread the disease to others. The consequences of being administered a vaccine almost never outweigh the risk. A group of researchers determining the effectiveness of the influenza vaccine in the United States during the 2015-2016 flu season found that “after adjustment for potential confounders, the estimated vaccine effectiveness against any influenza virus was 48%” (Belongia et al. 2017 p.5). Aliments regarding vaccines are being blown out of proportion, and incessant fearmongering by various groups is turning people away from living a potentially healthier life.

The immunization process is not flawless, but when responsible steps are taken, it is not just one’s own life that is saved or improved, but also the lives of those in their schools, workplaces, and communities. The virulent 2017-2018 flu season may very well be the tip of the iceberg if the public at large does not begin to consider nationwide and global repercussions of ignorance in this matter. Never before in the history of mankind have we been so connected, with seemingly limitless information being shared with us all the time via social media, news outlets,

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and personal interactions. It is our job as friends, coworkers, parents, and citizens, to filter through misinformation, so that we may understand the necessity of living in a protected world.

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