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Baseless Fears of Vaccine and Autism

 There is a debate in the United States that questions the safety of vaccinations, and there are many people who are concerned that immunizing children are far riskier than deciding against vaccinating them, and they are displeased with being mandated to vaccinate their young children. Why do we currently require the children in our nation to acquire certain vaccinations? Many parents who are against vaccinations feel that they should have control over such decisions, and presume that it is unfair that the government regulates vaccination requirements in order for children to attend school. Many schools can legally exclude unvaccinated children from their program, and maintain that immunizations are mandatory. This may seem unreasonable to some, however, the benefits of vaccinating children greatly surpass the risks of not. Some parents in certain states pursue vaccine exemptions, and have the choice to opt out of vaccinating their children due to personal beliefs. A number of parents choose against vaccinating their children due to a variety of unfounded fears, including the controversial link between the use of vaccines and autism, despite scientific evidence refuting such claims.

Attempts to prevent disease and other harmful disorders in children and adults go back over a thousand years. As reported by *The History of Vaccines*, the first reference to the use of vaccines, or *inoculation*, as it were referred to long ago, was administered in the Chinese culture as early and far back as 1000 CE. The inoculation was called, *variolation*, and it was the first derived method used in an attempt to immunize an individual against variola virus, also called *smallpox*. According to *Healthy Children*, the first successful vaccine development began in the 1700’s when Edward Jenner, a British doctor, noticed some milkmaids who had contracted a virus which caused cow pox, had been immune to smallpox (2015). Jenner wanted to test his theory, thus, he scratched the arm of an eight-year-old boy with some sample retrieved from a cowpox sore. He later attempted this same method once more, however, the second time he used a very small amount of smallpox. Surprisingly, the child never contracted the disease. Since then, this same method has been used to create vaccines for multiple diseases around the world. These advanced protective measures were able to eradicate smallpox from the world in 1977. By 1991, in the United Sates, polio had been eliminated. And as stated by the *American Academy of Pediatrics*, prior to the availability of diphtheria vaccine, the United Sates had over 12,000 deaths a year, whereas, after the vaccine was widely available, only one death was reported in 1998.

 As long as science, medicine and medical practices have existed, there have been people who have been against the idea of vaccinations, and for some, they have been opposed to the idea of any government-mandated vaccinations. Even though this is a prevalent current social issue in the United States, it is nothing new. Activists against vaccines began to appear in the 1800’s, where there were many who considered being obligated by law to get vaccinated an intrusion of their privacy. This argument is still held today, however, the more prevailing concern is the threat of a link between autism and vaccinations. Based on an article on *Healthy Children,* at the present time, there are three major arguments that are currently used by those who believe the link to be true. The first and most used theory is that the MMR (measles, mumps, rubella combination vaccine) can cause a child to develop autism. Another argument is that thimerosal, which is the preservative that was once used in vaccinations, is one of the causes of children developing autism. The third theory is that a child who receives too many vaccinations at one time, or over a short period of time, has the potential to suffer from a weakened immune system, and thus, is more likely to develop autism (2015). There has been constant research conducted on all three of the anti-vaccine movement theories, most of which have all concluded that there is no scientific evidence to support any of these claims.

Although there has been an alarming rate of increase of diagnoses of autism, there has not been sufficient evidence or authentic published data to support that vaccinations are linked to autism development. The basis of such claims was due to a false report published by a medical doctor who falsified results in his study. A single study was conducted and published in 1998 in The Lancet, a prestigious British medical journal, which erroneously stated that there is a link between the measles, mumps and rubella (MMR) vaccine and autism, which created false fear in many parents and led to a sharp decline in the number of children receiving the MMR vaccine following his study. Dr. Andrew Wakefield and twelve of his colleagues conducted this fraudulent study, and received worldwide media attention, which caused doubt in many parents about the safety of the MMR vaccine. The findings of the study were as followed:

Behavioural disorders included autism (nine), disintegrative psychosis (one), and possible postviral or vaccinal encephalitis (two). There were no focal neurological abnormalities and MRI and EEG tests were normal. Abnormal laboratory results were significantly raised urinary methylmalonic acid compared with age-matched controls (p=0.003), low haemoglobin in four children, and a low serum IgA in four children. (638)

Once published, the medical and scientific community immediately began to research to try and recreate and verify Wakefield’s findings by conducting and publishing studies of their own. None of the doctors, researchers, and scientists were able to reproduce his report, and all publications which succeeded Wakefield’s study, refuted his work. There were many issues surrounding his original case study, and one of the first problems to be pointed out was that the sample size from Wakefield’s study only included twelve participants. In statistical terms, a small sample size can reduce the likelihood of a significant result, whereas using a large sample size can produce a smaller margin of error. Andrew Wakefield’s research was flawed due to the small sample size, and any scientific conclusion drawn from his study was invalid. However, according to Wakefield, all twelve of the participants developed a type of behavioral, developmental, and gastrointestinal disorders, with nine of the twelve participants having autism. Their parents claimed eight of the twelve participants had developed the symptoms after receiving the MMR vaccine. After publication of the original study, ten of the twelve original co-authors posted a retraction in the Lancet, stating, “We wish to make it clear that in this paper no causal link was established between MMR vaccine and autism as the data were insufficient” (750). They published the retraction after it was revealed that a law firm, which had intentions of suing vaccine manufactures, financially compensated Andrew Wakefield. The events that took place following the scandal further lowered the credibility of Dr. Wakefield. The Lancet completely retracted his original publication in February of 2010, and shortly after, Wakefield had his medical license revoked. Wakefield’s study was dishonest and his intention on publishing his fraudulent paper was seen as an opportunity to gain financially off of the fears and worries of parents around the world. His tarnished publication resulted in a drop of MMR vaccinations in the U.S. and Europe, which led to an increase of measles diagnosis. Even though a lot of research and case studies have continuously been conducted since Wakefield’s publication, and there has never been a study that reproduced his results, and no association between vaccinations and autism development have been established, Andrew Wakefield continues to stand by his study. He continues to mislead people even after other researchers disputed his false claims, refuted his allegations, and even he himself has been unable to recreate the same outcome. According to Alice Park, the author of *Doctor Behind Vaccine-Autism Link Loses License*, Wakefield recently appeared on the Today show in May of 2010 stating, “There are millions of children out there suffering, and the fact [is] that the vaccines cause autism” (2010).

 As previously stated, there have been countless studies that have been completed and published, all of which discredit the idea that the MMR vaccine causes autism, and the largest of those studies was published in April of 2015. The study observed 95,727 children, and it compared kids who received the measles, mumps, and rubella vaccine against those who did not. The authors of *Autism Occurrence By MMR Vaccine Status Among US Children With Older Siblings With And Without Autism,* also examined children who had older siblings, and compared those participants with older siblings who had previously been diagnosed with autism, to those with older siblings who showed no signs of autism. This allowed the ability to see the effects of the MMR vaccine against those who were considered at high risk for developing autism, and this difference in autism prevalence between children with or without an older sibling affected by autism was consistent with earlier studies, and their conclusion was no surprise to those who are in the medical field:

In this large sample of privately insured children with older siblings, receipt of the MMR vaccine was not associated with increased risk of ASD, regardless of whether older siblings had ASD. These findings indicate no harmful association between MMR vaccine receipt and ASD even among children already at higher risk for ASD. (1538)

Once more, there was no observed link between the MMR vaccine and autism, even amongst those children who were determined to be of high risk by having an older sibling who had been diagnosed with autism disorder. One might assume that if it is not the vaccine itself that is causing children to develop autism, it may be an element that is found inside the vaccine.

 One of the ingredients that have been a cause for concern for some was Thimerosal. Thimerosal was used in vials of vaccines to prevent the growth of germs. According to the Center of Disease Control and Prevention (CDC), “Thimerosal does not stay in the body long enough to reach harmful levels” (2015). The body naturally metabolizes and eliminates it relatively quickly. And as of 2001 vaccines are no longer manufactured with Thimerosal, however, autism rates continue to climb. If thimerosal was the cause of autism, the rate of autism development would not increase, or there would have been a decrease in the reported diagnoses of the disorder after thimerosal additive was discontinued. It is important to note that Thimerosal was never used in MMR, chickenpox, polio, or pneumococcal conjugate vaccines, which discredits the argument against MMR vaccine and autism development. One study conducted by John Heron and Jean Golding, analyzed the link of Thimerosal and autism, by monitoring over 14,000 children, all from the same geographical area, and all born within a year of each other. Their results were surprising, and according to the authors of the study, “Contrary to expectation, it was common for the unadjusted results to suggest a beneficial effect of thimerosal exposure” (577). Their study did not show any negative effects to psychological or neurological behavior, and they suggested that in reality, exposure to thimerosal displayed a positive effect when the child was exposed to it at the age of three months. The theories that the MMR vaccine causes autism, and the thimerosal ingredient that was removed from vaccines, cause autism, have been disproved. The last remaining theory is that getting too many vaccines in a short amount of time causes autism.

 Those who are opposed to vaccinations have had two arguments against immunizations discredited by science and scientific facts. Their third main argument began after the opposing views on thimerosal were proven to be false. Anti-vaccine activists declared that a child who receives too many vaccine injections in a short period of time would develop autism. Once this theory started to circulate, doctors and researchers began to study it. There were multiple case studies that were performed to observe these allegations. One such study was conducted by Frank DeSefano, Christopher Price, and Eric Weintraub. During their research they analyzed a total of 256 children with autism and an additional 752 undiagnosed children. They monitored and compared antigen levels of each of the children at the ages of 3 months, 7 months, and 2 years. They concluded, “In this study of MCO members, increasing exposure to antibody-stimulating proteins and polysaccharides in vaccines during the first 2 years of life was not related to the risk of developing an ASD” (561). This was the last main argument debunked through the miracle of science. It would seem safe to assume that after all three arguments against vaccinations and their link to autism development have been discredited, people are less likely to oppose vaccines, however, that is untrue. Many people have held on to their beliefs, even when science proves their concerns are unfounded.

Despite what some individuals may think or believe, there are many benefits to science. Some of the benefits to science are that it allows researchers to learn and develop new ideas, advance technology and medicine in order to enrich mankind and even save lives. Nevertheless, many speak against science and medicine and discredit the benefits of vaccines. It is a well-known fact that vaccines are not without risks, but the benefits of preventing infectious diseases with vaccines far outweigh the risks. What is vital to comprehend is that the choice to not vaccinate affects more than just those who oppose them. Some parents argue that it is not up to others whether their children get vaccinated, however, parents who fail to vaccinate their kids may be endangering the health of other unvaccinated children. The anti-vaccine movement has spread like wildfire since the fraudulent publication of Andrew Wakefield, and no matter how much effort is made to reassure the population that vaccinations are safe and do not cause autism, many people still distrust science. The anti-vaccination movement has allowed some diseases that at one time were thought to be eradicated, to come back in certain areas. That is because when the number of unvaccinated children rises too far, community immunity is affected. Many people do not trust the government to mandate vaccinations and more people are starting to home school their children to be excluded from such regulations. This is mainly due to people being misinformed about vaccinations. If society was able to move past this divisive issue, imagine what could be done if researchers were able put the time, money, and effort that they continuously put into disproving false vaccination claims, and instead they invested all those resources into discovering a cure for, or the prevention of autism?

 Work Cited

Jain, Anjali, et al. "Autism Occurrence By MMR Vaccine Status Among US Children With Older Siblings With And Without Autism."*Jama* 313.15 (2015): 1534-1540. *MEDLINE with Full Text*. Web. 5 Mar. 2016.

DeStefano, Frank, Cristofer S Price, and Eric S Weintraub. "Increasing Exposure To Antibody-Stimulating Proteins And Polysaccharides In Vaccikmnes Is Not Associated With Risk Of Autism." *The Journal Of Pediatrics* 163.2 (2013): 561-567.*MEDLINE with Full Text*. Web. 8 Mar. 2016.

Heron, Jon, and Jean Golding. "Thimerosal Exposure In Infants And Developmental Disorders: A Prospective Cohort Study In The United Kingdom Does Not Support A Causal Association." *Pediatrics* 114.3 (2004): 577-583. *MEDLINE with Full Text*. Web. 1 Mar. 2016.

Murch, Simon H, et al. "Retraction Of An Interpretation." *Lancet (London, England)* 363.9411 (2004): 750. *MEDLINE with Full Text*. Web. 4 Mar. 2016.

"Retraction--Ileal-Lymphoid-Nodular Hyperplasia, Non-Specific Colitis, And Pervasive Developmental Disorder In Children." *Lancet (London, England)* 375.9713 (2010): 445. *MEDLINE with Full Text*. Web. 4 Mar. 2016.

Wakefield, A J, et al. "Ileal-Lymphoid-Nodular Hyperplasia, Non-Specific Colitis, And Pervasive Developmental Disorder In Children." *Lancet (London, England)* 351.9103 (1998): 637-641. *MEDLINE with Full Text*. Web. 1 Mar. 2016.

"History of Immunizations." *HealthyChildren.org*. American Academy of Pediatrics, 21 Nov. 2015. Web. 10 Mar. 2016. <https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/History-of-Immunizations.aspx>.

"Vaccine Studies: Examine the Evidence." *HealthyChildren.org*. American Academy of Pediatrics, 21 Nov. 2015. Web. 10 Mar. 2016. <https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/Vaccine-Studies-Examine-the-Evidence.aspx>.

"All Timelines Overview." *History of Vaccines*. The College of Physicians of Philadelphia. Web. 11 Mar. 2016. <http://www.historyofvaccines.org/content/timelines/all>.

Park, Alice. "Doctor behind Vaccine-autism Link Loses License | TIME.com."*Time*. Time, 24 May 2010. Web. 11 Mar. 2016. <http://healthland.time.com/2010/05/24/doctor-behind-vaccine-autism-link-loses-license/>.

"Thimerosal in Vaccines." *Centers for Disease Control and Prevention*. Centers for Disease Control and Prevention, 27 Oct. 2015. Web. 12 Mar. 2016. <http://www.cdc.gov/vaccinesafety/concerns/thimerosal/>.