

## The Vaccine Controversy

Several states are experiencing an increase in preventable childhood diseases such as measles and whooping cough. latest measles outbreak, but prevention is the key to controlling the spread of this potentially fatal disease. The primary tool that every parent has to protect their children is vaccination. In the last decade or so vaccination has become controversial among some parents and this has led to an increased number of vulnerable children. When that is coupled with the recent wave of immigration from areas where preventable diseases are endemic, there is grounds for a disaster. One of the most widely discussed controversies concerns the possible connection between vaccinations and neurological problems such as autism spectrum disorder (ASD). I would like to take a few moments to discuss some of the controversies and some of the theories regarding the development of autism.

### What is Autism

Autism is a developmental disorder that was first identified in 1943. The incidence of ASD in the United States is 1 per 110 children, and is higher in other countries. While there is no agreement on what actually causes autism, some theories are genetic problems, viruses, inflammation of the brain or autoimmune difficulties. Environmental factors such as toxins are also thought to have a large influence on the rates of autism.

One of the theories for the **increase** in diagnosis of autism is heightened awareness of the condition and its reclassification as a spectrum disorder rather than a standalone diagnosis. What that means is that the symptoms of autism can range from being totally unable to interact with others along with severe speech, intellectual, and emotional disabilities, to a person who is not as receptive to social cueing as a non-autistic person might be, or is simply seen as very shy. It is interesting that as the incidence of autism has increased the incidence of diagnosis with intellectual disabilities has decreased, therefore one could make the assumption that persons who had been previously diagnosed as intellectually deficient are now being re-classified as autistic. Whether that change in classification is truly valid or not is open to debate. The argument has also been made that the diagnosis of autism has increased in proportion to the increased amount of federal aid money available to children with a diagnosis of autism. Additionally, diagnosis of autism does not seem to carry the same social stigma as a diagnosis of mental retardation or other developmental disabilities.

There have been recent studies suggesting that children who suffered from neonatal jaundice (yellow jaundice) showed a four – fold increase in the development of autism. Additionally, there has been a great deal of evidence that children who exhibit neurological difficulties at birth, however transient, also have a much higher rate of autism which makes the case for a genetic component already present at birth. Also, children whose fathers were older than 50 or younger than 25 showed had a much greater level of autism. The University of California – Davis conducted a study of the effects of environmental changes on the development of autism and determined to that there is a close correlation between maternal illness and malnutrition, specifically folic acid deficiency, and the development of autism. Because there is an increased risk of developing autism when a child either has a sibling with autism or a parent with some sort of a neurological developmental problems such as

ADHD or dyslexia, there is an argument to be made for a genetic component. There are also several genetic syndromes that are not considered autism but have autism like symptoms.

There are several red flags that parents should be aware of: if a child doesn't attempt to communicate in any form including pointing at objects or vocalizations by age 12 months, doesn't speak by 16 months for form basic sentences by 24 months, doesn't recognize their own name by age 12 months, doesn't make eye contact, doesn't interact with others, does not respond to facial expressions of parent, refuses physical contact, repeats words or phrases obsessively, shows any signs of obsessive-compulsive behavior, cannot handle even minor changes in their environment including changes as simple as where their toys are placed, is fascinated for long periods of time by looking at a single object such as a wheel, must play with toys in a specific manner or becomes upset, has unusual reactions to the way things look, feel or taste, or loses social skills or communication skills that they have previously learned, the parent should immediately have a discussion with their healthcare provider and insist that the child be screened and that their questions be answered.

### **Do Vaccines Cause Autism**

There have been a large number of studies looking at the causes of autism, especially as it relates to childhood vaccinations – specifically the measles, mumps, and rubella (MMR) vaccine. This vaccine is given between the ages of 12 months and 15 months and then again at age 5 years. The vast majority of studies have shown that the fact that symptoms of autism develop so soon after the administration of the MMR vaccine is coincidental, in that this is the age at which most autistic children start to become symptomatic. There have been some conflicting studies, but the number of children studied was very small and some of the methodology has been questionable.

Thimerosal, an ethyl- mercury-based preservative often used in medicines, was long thought to be one of the contributing factors to the development of autism. Thimerosal contains ethyl -mercury which is not toxic, rather than methyl -mercury which has demonstrated toxicity. In 1999, any preservatives containing mercury were removed from most vaccines in an attempt to reassure parents and to address the controversy. Thimerosal was actually never used in the MMR vaccine, so naming it as a culprit and linking it to the MMR vaccine is simply not historically correct.

This controversy was started in part in 1989 when Dr. Andrew Wakefield published a study of eight children who developed symptoms of autism after receiving the MMR vaccine in the prestigious British medical Journal *The Lancet*. He stated that all of the children he studied had a type of colitis and he felt that this inflammation was allowing inappropriate substances to leak into the bloodstream and travel to the brain. There were several problems with his study: he only studied eight children, he did not study any healthy children, he was neither a neurologist nor a pediatrician, and the children that he did study did not have intestinal symptoms prior to developing autism. Several government agencies have since attempted to replicate his results without success. The United Kingdom studied 500 autistic children and found no difference in rates of development of autism between vaccinated and unvaccinated children. The state of California found similar results in all kindergarten students studied between 1980 and 1994. In Canada a study of 30,000 children found that rates of autism among

unvaccinated children were actually higher. Similar results were found in Finland and Denmark. It should be noted that Dr. Wakefield was forced to withdraw his study and that his medical license has since been revoked in the United Kingdom on the grounds of abuse of developmentally challenged children, 12 counts of fraud, and falsifying research for financial gain. Unfortunately many parents in the United Kingdom began to refuse to vaccinate their children following this publication, resulting in a very large measles outbreak they are in the 1990s and early 2000's.

Dr. Wakefield had also suggested thimerosal as a culprit in the development of autism as he reported increased levels of mercury in the blood and urine of autistic children. What he failed to mention was that the non-autistic children that he tested also had measurable amounts of mercury in their blood, often at a level that was higher than that of the autistic children. A follow-up study was published in 2012 by a major university in Australia consisting of the assessment of a large number of children both with and without autism. The goal of the study was to measure the amount of mercury in their systems in an attempt to establish a link between mercury-based preservatives and the development of autism. The results in this case found no difference in the levels of mercury found in any of the children. Sweden and Denmark removed thimerosal from vaccines in 1992 but the incidence of autism in both of those countries has continued to rise. Interestingly in Poland where thimerosal is still used in most vaccines, the level of autism has actually fallen.

In total there have been 20 published studies involving large numbers of children and almost none of them have been able to show a definite link between thimerosal and the MMR vaccine. One of the sadder effects of the removal of thimerosal from vaccines has been a drop in the vaccination levels in Third World countries. Higher income nations in North America and Western Europe have the luxury of being able to afford the higher cost of single-dose vials which are much more expensive due to manufacturing capacity transportation costs and storage space, while Third World countries often rely upon the cheaper packaging of the multi-dose vial which must contain some sort of a preservative.

In 1986, the federal government ruled that there is no proven link between vaccines and autism. Advocates for children with autism have criticized this ruling stating that the government set too high of a standard in establishing their evidence. The National Childhood Vaccine Injury Act of 1986 was passed to allow vaccine manufacturers some relief from lawsuits arising from side effects or bad reactions to vaccines. One of the arguments made by anti-vaccination advocates is that "if vaccines are so safe why does the government have to protect the manufacturers". This board was actually established to deal with claims of injury from the pertussis vaccine, not the MMR. There is a very small profit margin in the manufacture of vaccines due to price controls imposed by the federal government. Because the risk of litigation virtually erased that profit margin, many vaccine manufacturers stopped producing vaccines and caused a critical shortage. Therefore the federal government felt that it was in the interest of public health to provide both a pool of money which could be available to compensate persons injured by vaccines, and an independent court system that would be able to objectively evaluate any cases of injury arising from vaccines. Keep in mind that all medications have side effects and that when a medication is administered on such a large scale as a vaccine is administered, there are bound to be persons who have bad reactions.

## **Why Are Parents Refusing to Vaccinate**

Some research suggests that part of the reason that the controversy has spread so widely in North America, the United Kingdom, and Western Europe is due to our reliance on popular media such as news accounts, twitter, and Face Book for medical information. While the Internet has been a very useful tool in helping laypersons gain access to medical information, it has also allowed the dissemination of information that is driven by social agendas or conspiracy theories and is patently false at a rate of almost 90%. Also, it can be very difficult for a person with no medical or statistical background to evaluate the data that is presented in many studies. Additionally, news media sources often report conflicting studies in an attempt to balance their presentations which is admirable but leaves the untrained reader at a loss to determine which studies are valuable and which studies are inadequate or false. Many studies have shown that the news media can be instrumental in bending public opinion which can be a good thing, but when dealing with complex medical decisions, parents are better off discussing any questions with their healthcare provider. Sadly, social and popular media have a tendency to sensationalize information which has no place in making medical or healthcare decisions.

## **Why Should We Vaccinate**

The spread of infectious diseases has decreased greatly since vaccines were invented in the 1700s. One of the first vaccines developed was against smallpox, a disease that has largely been eradicated. Until recently there was almost a very high vaccination rate in the United States. Because of controversies however, parents have started to refuse to vaccinate their children in growing numbers. This has caused a loss of what the medical community refers to as "herd immunity", and has allowed diseases such as measles and whooping cough (pertussis) to re-establish a foothold in the population. The maintenance of herd immunity also has the effect of protecting children and adults who cannot be vaccinated due to illness or age from exposure to diseases contracted by unvaccinated children. Childhood death from preventable diseases is now almost unheard of, except in the unvaccinated population. Additionally, approximately 42,000 adults die annually in the United States from diseases that could have been prevented by vaccines. This number is higher than the amount of adults killed in auto accidents.

Many parents are increasingly refusing to vaccinate children or using alternative vaccination schedules. Many of these parents have no memory of what it was like before vaccines became widely used, and therefore have no appreciation for the seriousness of these diseases. Some parents, especially during this time of recession, cannot afford to pay for well-child visits or to have their children vaccinated. What they do not understand is that in almost all 50 states all children are eligible for coverage under CHIP programs and that vaccines are available free of charge under the Vaccines for Children program to lower income families. Also, most healthcare providers will work with parents who are having financial difficulties to help them keep their costs down while still providing their children the needed vaccines.

## **Summary**

While there is always a risk to any medication, it has to be noted that the risk of death and neurological damage to a child from the measles is 1 case per thousand while the risk of neurological damage to a child from the measles vaccine is 1 case per million. In all areas where thimerosal and preservatives are no longer used in vaccines the autism rate has continued to rise. If there was a true link between the MMR vaccine and autism, removal of the preservative should have caused the rate of autism to drop, but that has not happened. Outspoken advocate groups of the anti-vaccination movement rarely consist of healthcare providers, but are populated by celebrities and/or well-meaning and desperate parents who are searching for an answer to their child's suffering. Families who do not vaccinate for legitimate religious reasons are small in number and generally do not use public forums to advance their beliefs, consider their decision to be strictly personal. As a healthcare provider, I feel that vaccination is secondary only to sanitation in the control of preventable infectious disease. While the decision to vaccinate your children is one that has to be made by you and you alone in conjunction with your healthcare provider, my educated opinion is that the risk involved in vaccinating your child is far outweighed by the risk of contracting the disease which may well be fatal. At this point, far more people have died from exposure to commonly prescribed antibiotics such as penicillin than have ever been harmed by vaccines, yet these antibiotics are distributed almost indiscriminately and without regard to risk. Tylenol has been known to cause liver failure while aspirin and ibuprofen have caused fatal stomach bleeding, yet no one questions their safety and millions of doses are consumed daily. Why there is such undeserved vilification of life-saving treatments like vaccines escapes me.

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