To Immunize or Not?

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To immunize or not – for some this is an easy question to answer, however, for a small but growing number of parents, the decision to vaccinate has become a source of much lament. Due to an effective immunization campaign in the United States, previously common childhood diseases –such as polio, diphtheria, tetanus, mumps, measles - are now rare. In addition, no vaccine is 100 percent effective, and some may have mild or, occasionally serious adverse effects. Therefore, the perceived risk of an adverse vaccine effect seems more real than the threat of the illnesses that they are designed to prevent.

The decision to vaccinate is further complicated by misinformation generated by an aggressive anti-vaccine movement which has effectively used the media and internet to spread false claims of harm by vaccines; most notably the highly publicized, but unproven link between vaccines and autism. As a result many parents are now questioning the safety, efficiency, and even the necessity of vaccines.

Vaccines are one of the greatest public health triumphs in the history of modern medicine. Invented in the late 18th century, when Edward Jenner observed that milkmaids who contracted and recovered from cowpox (vaccinia) never seemed to get smallpox, an often fatal disease. Jenner boldly tested his theory by injecting an 8 yr old boy with material from cowpox pustule. The boy, later intentionally inoculated with smallpox, never contracted the disease. Since then, vaccines have saved many lives and obviated much suffering.

In the pre-vaccine era, infectious diseases were rampant and exacted a tremendous toll on the population. With many of the vaccine preventable diseases (VPD) virtually or completely eliminated due to mass immunization programs, younger parents in the US may not have experienced the devastation caused by some of VPD and may not completely understand the risk of unimmunized world. Along with success of immunization come doubts not only about the risk of VPD, but also about the safety of vaccines in general.

Many parents are concerned with the apparently aggressive vaccine regimen, wondering if their child's immune system will be overwhelmed. Currently our children receive up to 30 shots, preventing 14 diseases by the time they turn six and up to 5 shots may be given at one visit. But in fact, our immune system is ready to be challenged at birth as soon as we enter the world. As children, we encounter thousands of germs playing, eating or just breathing. Vaccines comprised of 4 to 7 organisms, present a minimal challenge on the immune system compared to the load presented by the everyday world we live in. Today's vaccines are better engineered and although the numbers of vaccines have increased, the actual load on the immune system has decreased since their predecessors. The 14 vaccines given to children today contain a total of 150 antigens as compared to smallpox vaccine which had 200 or even whole cell pertussis which had 3000!

Of great concern for many parents is the possible link between vaccines and autism which has received much media attention. Initially, the vaccine- autism link was blamed on thimerosal, also known as *ethyl* mercury, sometimes confused with *methyl* mercury, a compound found in fish and related to neurotxic side effects. Since the 1930s, this mercury-based preservative was used as an additive to certain vaccines to prevent fungal and bacterial contamination.

Thimerosal's bad reputation stemmed from more than an unfortunate name and relation, it came from unfortunate timing. The symptoms of autism arise in early childhood around the time of administration of vaccines, so some proposed a causal link between autism and thimerosal.

The only known side effects of receiving low doses of thimerosal in vaccines have been minor reactions such as redness and swelling at the injection site. However thimerosal was removed from vaccines, as a precautionary measure. Since 2001, with the exception of some influenza vaccines, thimerosal has not been used in the routinely recommended childhood vaccines. Significantly, the rates of autism *continued to rise* despite the removal of thimerosal from vaccines.

The measles-mumps-rubella (MMR) vaccine and autism controversy arose in 1998 when a British gastroenterologist, Andrew Wakefield and his colleagues published their observations of 12 children in whom abdominal symptoms developed after MMR vaccination. Nine of the 12 children developed autism. They concluded that MMR vaccination causes intestinal inflammation which leads to the development of autism. When it was discovered that trial lawyers claiming damage from the MMR vaccine funded their work, 10 of the 13 authors published a retraction in 2004, stating that an MMR-autism link was never proven.

Since the Wakefield article, numerous studies have been published refuting the link between autism and vaccines. One of these studies followed over 500,000 Danish children. About 82% of these children had received the MMR vaccine. The risk of autism in the group of vaccinated children was the *same* as that in unvaccinated children.

More conclusively, in their 2004 report the Institute of Medicine stated that neither thimerosal nor the MMR vaccines are associated with autism. This statement is founded on an extensive and critical review of all available information including, clinical and epidemiologic studies, case series, individual case reports, and testimonials.

Although the Wakefield study was significantly flawed and was later discredited, it was widely publicized in the British media and is the major contributor to the declining MMR vaccination rates in Britain. The public health impact of this misinformation continues to be felt and is in part responsible for the recent measles outbreak in the US. In the first half of this year alone (January to July), we have seen the largest measles outbreak since 1996. The CDC reported 131 cases of measles as compared to an average 63 cases per year during 2000-2007. The cases were imported by US travelers abroad and tourists

from several countries in Europe, Asia and Israel. What is most alarming is that this outbreak was not the result of a high number of imported cases (only 17) but rather greater transmission or spread of the virus as infected individuals were coming into contact with clusters of unvaccinated persons. Many of the cases among US children occurred in unimmunized children whose parents claimed exemption from vaccination due to religious or personal beliefs, or in children too young to be vaccinated. Although no deaths were reported, 15 of the patients were hospitalized including 4 children <15mos of age.

The recent measles outbreak demonstrates how important it is to maintain high levels of immunization rates in our communities. We offer protection to our unimmunized neighbors simply because many around them are immunized. Certain vulnerable individuals rely on the majority of us being vaccinated for protection since they themselves cannot be vaccinated because of age, allergies or underlying medical conditions. If the infected individuals had encountered immunized individuals, we may have avoided an outbreak this year.

It is disheartening to see fear and misinformation cause a resurgence of vaccine preventable diseases in one of the most developed countries in the world. Claims about vaccine safety are valid and necessary to police safety but the consequences of not immunizing, compel us to be critical of each claim and examine all the evidence.

Growing up in a third world country, I witnessed first hand the crippling effects of polio on lives of families; I myself contracted measles, chicken pox and mumps. I will never forget the look of concern in my parents' eyes as they watched me struggle to sip fluids, my neck and cheeks painfully swollen from mumps. I was very blessed to be among the ones who survived. So for me when it came to immunizing my precious girls, it was an easy choice. As an immunologist, a pediatrician, and a mother, I urge of parents who are considering the question 'whether to immunize or not' to learn about the benefits and risks of not vaccinating as well as their possible side effects discuss any specific questions or concerns you may have with a physician or other healthcare provider. The risk *not* to immunize is often too great!

References:

1. Nield LS, Kamat DM. Anti-Vaccine Media: Its impact-and strategies to combat it. *Consultant for Pediatricians*. 2008;7:S4-S7.
2. Wilson GN, Ramirez MO. Vaccinations: Immunizations do not cause Autism spectrum disorder ...They prevent it. *Consultant for Pediatricians*. 2008;7:S9-S12.
3. Wakefield AJ, Murch SH, Anthony A. Ileal-lymphoid-nodular hyperplasia, nonspecific colitis, and pervasive developmental disorder in children. *Lancet*. 1998;351:637-641.
4. Update: Measles — United States, January-July 2008. *MMWR*. 2008;57:893-896.

Reliable vaccine information resources:

Medical organizations: AAP, AAFP and AMA.

CDC: Information on immunization, vaccines and the diseases they prevent. www.cdc.gov/vaccines

Children's Hospital of Philadelphia – Vaccine Education Center: The Center seeks to dispel some of the common misconceptions and misinformation surrounding childhood vaccines. www.chop.edu

Immunization Action Coalition: Provides childhood, adolescent and adult immunization information and education materials www.immunize.org

Immunization Gateway: Links to many expert immunization resources available on the internet. www.immunofacts.com/

Institute for Vaccine Safety: Information on vaccines currently in the media including anthrax, hepatitis B, MMR, and thimerosal. www.vaccinesafety.edu/

National Network for Immunization Information: Information about immunization including a guide to evaluate vaccination on the web. www.immunizationinfo.org/