

Vaccine Wars: Public Health vs. Private Fears

By Pamela Adams Vaughn

Hannah Poling was an interactive, playful and communicative toddler when she received five childhood vaccinations at 19 months of age.

Two days later, she was described as lethargic, irritable and feverish, and, by day 10, she had developed a rash. Her situation deteriorated from there, and, in 2001, she was diagnosed with a developmental disorder with some features similar to autism spectrum disorders.

Hannah's parents asserted that their daughter, now 9, had developed autism after receiving the vaccines.

But more testing showed that Hannah suffered from an underlying, genetic disorder in her mitochondria, which can produce symptoms like autism.

The Polings, who live in Georgia, sought redress for their daughter's illness from the U.S. Department of Health and Human Services under the Vaccine Injury Compensation Program (VICP) — and won. (People who claim vaccine injury and seek redress from VICP need only provide a biologically plausible explanation, rather than prove by a preponderance of scientific evidence that the vaccine caused harm.)

In March of this year, the Polings went public with their case, adding fuel to the already smoldering fire in some people's minds that vaccines can trigger autism in children.

This and other stories in the media have produced some very tangible public concerns about a possible vaccine-autism link, as well as a sense of distrust about the government and vaccination policy in general. Interestingly, this phenomenon is not just limited to the United States, but is mirrored in some European countries, as well.

The *New York Times* reported in June that, although "study after study has failed to show any link between vaccines and autism ... many parents of autistic children are convinced that vaccines — usually given around the time autism becomes apparent — are to blame."

And the result of this kind of reasoning? Some segments of the public are choosing not to vaccinate.

Indeed, some public health experts in the United States believe that recent outbreaks of measles (the highest rate in seven years), pertussis (whooping cough), mumps and other vaccine-preventable diseases are worrisome signs of disease resurgence, as parents forego or delay vaccinations for their children — and risk the public's health in the bargain.

Enter two Creighton experts, Archana Chatterjee, M.D., and Linda Ohri, Pharm.D. Both are active locally, regionally and nationally on immunization issues, with the two serving as key speakers at a major immunization conference in Omaha this past summer. Chatterjee is an expert consultant to metro Omaha's Immunization Task Force, as well as



Photo by Brandon McKenna, BA'95

Linda Ohri, Pharm.D., left, and Archana Chatterjee, M.D., nationally recognized experts on immunization issues, pose with children at Creighton's James R. Russell Child Development Center. Both have served on Omaha's Immunization Task Force — Chatterjee is a past chair and Ohri is the current chair.

past chair, and Ohri is current chair of the group.

These two Creighton professionals have spent years in health care practice. They've seen up-close what vaccine preventable diseases can do. Both have cared for many patients who have suffered from acute infections or their chronic complications, among them, influenza; meningitis due to HiB, pneumococcal and meningococcal infections; whooping cough, tetanus and others.

Chatterjee's own brother, who never received any vaccinations because their mother did not believe in them, suffers from autism.

Both Chatterjee and Ohri know their patients' suffering — and the human scourge of these vaccine-preventable diseases.

Chatterjee, chief of the Division of Pediatric Infectious Diseases and professor of pediatrics at Creighton, believes that the current vaccine controversy may be showing that vaccines, in some ways, are "victims of their own success," having eradicated terrible diseases of which people now

have little memory or experience.

The Creighton physician points out that in 1900, for example, half of all children born in the U.S. died by 5 years of age of today's vaccine-preventable diseases.

By contrast, in 2000, vaccines were available in the U.S. against 21 infectious diseases. Smallpox has been eradicated worldwide and polio from most of the world. Measles, which took three-quarters of a million lives worldwide as recently as

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2000, declined 68 percent to 242,000 deaths in 2006, because of massive immunization programs in developing countries. In the U.S. alone, deaths from seven other vaccine-preventable diseases are near zero.

"Millions of lives have been saved, life expectancy has increased, quality of life is enhanced and a huge burden of suffering and disability has been eliminated," Chatterjee adds.

Still, with this success comes forgetfulness, and diseases such as measles or polio seem so remote a possibility in developed nations that some people will opt for not vaccinating their children against these forgotten killers.

Add any suggestion that the vaccines themselves also may pose a risk to their children's health, and the public starts to opt out of vaccinations, even at the risk of breaking the law. All children in the U.S. are required to be properly immunized before attending school, but two forms of exemption have been standard: the medical exemption, offered in each state, and the religious exemption, offered in

48 states. But as of July 9, 2008, 21 states also have passed legislation that gives parents the choice to refuse immunizations for their children on purely philosophical (personal opinion) grounds, while still gaining school admission.

This phenomenon of refusing vaccinations for philosophical reasons has occurred recently on both sides of the Atlantic, as skepticism has grown about compulsory immunizations. In fact, a large measles outbreak this past winter in the U.S. was traced to unvaccinated Americans traveling to and from Switzerland and bringing measles back with them, only to start outbreaks in their own communities. (Switzerland has a decided population of vaccine protesters.)

Chatterjee and Ohri, associate professor in the Department of Pharmacy Practice, are of the same mind: The best guide for wading through controversies like these is knowledge.

And that's where knowing about immunizations and how they work — as well as the rigorous process of testing and perfecting them — is crucial to public understanding. This knowledge also helps separate the facts about vaccines from the very real heartbreak that parents, like the Polings, suffer when their children succumb to unexplained illnesses.

Vaccines work by teaching the body to fight the disease for which the vaccine has been developed.

But, instead of introducing actual infectious “germs” into the body to

stimulate the body's own defenses, the vaccine introduces either weakened-live (non-infectious) or purified-killed immunity stimulating parts of the disease agent (antigens). These substances trigger an immune response in the body in the form of antibodies to fight the real disease. These antibodies will remain with the person and protect them for some time, often for life, against the disease.

If enough people in a human population are vaccinated against a disease, it will be hard even during an outbreak for that disease to spread. For example, if Person A comes down with the disease and exposes Person B who is immune to the disease due to vaccination, Person B will not expose Person C, even if Person C is not vaccinated. This is “herd immunity,” whereby a largely vaccinated population can provide indirect protection to a certain number of individuals who, for health reasons (such as immune disorders or organ transplants), are not able to be immunized directly.

This is also why refusing immunization threatens herd immunity and can enable the disease to get a foothold in the larger community.

Ohri and Chatterjee point out that long before a vaccine is licensed, it must go through a lengthy pre-licensure trial, first in the laboratory, then in animals and, finally, in clinical trials with humans.

The pre-licensure human studies themselves encompass three phases. Here, vaccines are tested on thousands

of people, with common reactions identified. In fact, the number of required subjects in vaccine trials is typically much larger than the number required in other drug trials.

All phases of vaccine testing must be successfully completed before the vaccine may be licensed and allowed on the market. Creighton, in fact, is a regular participant in national trials in a variety of stages for many medications, including vaccines.

The pair offer the following facts to help people steer through today's vaccine controversies, which seem to be cropping up as terrible diseases like diphtheria, polio, (hard) measles and whooping cough fade from public memory.

Vaccines and autism

Some immunization opponents link the MMR vaccine (measles, mumps and rubella) or thimerosal-containing vaccines with an increased incidence of autism. Many scientific studies have failed to prove this association.

This MMR “link” was first pushed forward in England in 1998 by British physician Andrew Wakefield, whose research was published in, and later retracted by, the medical journal *Lancet*. Later, that research was shown to have been funded — and Wakefield heavily reimbursed — by a group of parents suing the makers of the MMR vaccine. Following this discovery, 11 of the 13 physicians co-authoring the original article retracted their support for Wakefield's research, but not until the U.K. was faced with plummeting MMR vaccinations and a resurgence of the three diseases.

Later claims linked autism with thimerosal, an ethyl mercury-containing preservative used since the 1930s to keep vaccine supplies from contamination. According to the Centers for Disease Control and Prevention (CDC), there is no convincing scientific evidence of harm caused by the low doses of thimerosal in vaccines, except for minor reactions like redness and swelling at the injection site.

However, the CDC notes, in July



Read More Online

For more information about vaccines and common misconceptions, and for a complete listing of recommended immunization schedules for children and adults, go to www.cdc.gov/vaccines.

More information on immunizations can also be found through the American Academy of Pediatrics: www.aap.org/healthtopics/immunizations.cfm

and the American Academy of Family Physicians: www.aafp.org/online/en/home/clinical/immunizationres.html

The Power of Vaccines

Vaccines have literally transformed the landscape of medicine over the course of the 20th century. Before vaccines, parents in the United States could expect that every year:

■ Polio would paralyze 10,000 children.



AP Photo

■ Rubella (German measles) would cause birth defects and mental retardation in as many as 20,000 newborns.

■ Measles would infect about 4 million children, killing 3,000.



Photo by Corbis

■ Diphtheria would be one of the most common causes of death in school-age children.

■ Pertussis (whooping cough) would kill thousands of infants.

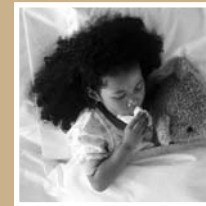


Photo by Corbis

■ A bacterium called Haemophilus influenzae type b (HiB) would cause meningitis in 15,000 children, leaving many with permanent brain damage.

From Children's Hospital of Philadelphia website: chop.edu

In 1999, the Public Health Service agencies, the American Academy of Pediatrics and vaccine manufacturers agreed that thimerosal should be reduced or eliminated in vaccines as a precautionary measure. The World Health Organization, on the other hand, has not removed thimerosal from its vaccines.

And, although the U.S. government's Vaccine Injury Compensation Program awarded the Polings compensation for their daughter's illness, a scientific review by the Institute of Medicine concluded that "the evidence favors rejection of a causal relationship between thimerosal-containing vaccines and autism."

So, why does the government recommend that certain vulnerable groups not eat mercury-containing fish, but previously had not restricted thimerosal/mercury-containing vaccines?

Methyl mercury, not ethyl mercury, is the form of mercury found to accumulate in some fish, and it is classified as an environmental contaminant with one source being burning coal. Because of methyl mercury's presence in our food chain, its long half-life and its tendency to be stored in the body rather than

eliminated from the gut, the government has limited the amounts of seafood and fish to be consumed by certain vulnerable members of the public.

Ethyl mercury, on the other hand, is much less toxic than methyl mercury, is quite rapidly eliminated from the body and has been removed from all vaccines routinely administered to children over the last decade. It should be noted that rates of autism have continued to rise in the U.S. despite this removal of thimerosal (containing ethyl mercury) from childhood vaccines.

Kids getting too many shots

Another issue voiced by vaccine opponents concerns the number of vaccinations that children are given today, a recommendation of 11 in the first six years of life. A child's system, they argue, simply cannot tolerate the introduction of so many disease antigens in the timeframe for giving the vaccines.

But Ohri argues that "a child picking up a dropped 'binky' (pacifier) and putting it back in her mouth is exposing herself to many more antigens (germs) than are present in all childhood immunizations.

"The human body is structured to

respond to many different antigens simultaneously," she adds, including those introduced by scheduled immunizations.

What vaccine precautions should people be aware of?

Ohri points out that there are real precautions for people who should not be getting vaccinated with specified vaccines; these include people with immune system problems. Cancer patients and those taking immune suppressive drugs belong on this list of people who generally should not receive live vaccines except under careful management, Ohri cautions.

However, these individuals, Ohri says, often have an increased need for killed vaccines against diseases they are at high risk of developing — flu, for example. An inactivated flu shot would be appropriate for this group to receive.

Finally, no one who has previously shown a severe allergic reaction to a vaccination should receive another, Ohri says, except under care of an allergy specialist. Individual vaccines may have other precautions that will be discussed by the patient's health care provider.