

Vaccines: Safe or Scary?

Dr. Todd Huffman March 2010

When it comes to child health, prevention is better than treatment. Nowhere is this more evident than with routine childhood immunizations.

There is zero doubt that childhood immunizations are one of the great inventions and public health triumphs of the 20th century, perhaps even in the history of mankind. When one weighs the benefit/cost ratio of current vaccines, they, along with clean water, remain the greatest health boon for children in the proud history of medical science.

Their stunning success, however, has spoiled us. Because vaccines have done their job, and vaccine-preventable diseases are no longer as prevalent as they once were, many parents do not see these diseases as a threat. The rarity of once-common disease is a victory so complete as to create complacency – which in turn creates conditions allowing the victory to be reversed.

Vaccines are so much the victims of their own success that, in the seeming absence of vaccine-preventable diseases, many parents now fear vaccines more than the diseases known to them only vaguely. Some even now imagine and argue that children would be safer without vaccines, because of their rare or entirely fictional side effects.

Yet perceiving the risk of vaccines as greater than the risk of the diseases they prevent is a terrible misperception. Withholding vaccinations as a result of this misperception is a profound miscalculation, with potentially devastating consequences.

Vaccines have worked so well that we suffer from a cultural mass amnesia – we've forgotten what these diseases can do and did to our children. Before the development of many of today's vaccines, hundreds of thousands of U.S. children annually became infected with viruses and bacteria that too often resulted in lifelong disabilities or death.

More than a half century of successful mass immunization programs have vastly decreased these vaccine-preventable illnesses to the degree that many American parents are unaware that most of these disease-causing germs still exist, and in our everyday environments. They do, they can be passed on to people who are not protected by vaccines, and they can be just as deadly.

Worldwide, tens of millions of lives have been saved by vaccination. Vaccines have saved more lives than any other single medical advance. UNICEF has estimated that more than one-third of children of the 10m children who die worldwide every year would live were they properly vaccinated.

While most modern parents have little or no experience with vaccine-preventable diseases, medical professionals regrettably do have that experience. Every doctor has seen no small number of unvaccinated children die or become disabled from one or more of these diseases. None of us want to see these infections again, especially when they are preventable.

We must not fail to appreciate our societal good fortune to be free from diseases that have been eliminated – smallpox – and to be largely free of diseases once terribly common – whooping cough, tetanus, mumps, measles, rubella (German measles) et al. Thanks to vaccines, polio and diphtheria are now confined to the world’s medical backwaters. But tetanus lives everywhere, in soil and rusty nails, and as many as 6 million Americans are exposed to whooping cough each year.

That is why we must continue to be diligent about vaccinating our children. That we rarely, if ever, see vaccine-preventable illness is owed to the fact that vaccines are working. And they will continue to work only so long as we continue to immunize our children.

Misinformation about vaccine safety has become so commonplace it is now affecting the judgment of parents at levels that could spark an outbreak of diseases previously eliminated from the United States by vaccination. Pockets of families resistant to vaccination are potential hotbeds for the spread of a vaccine-preventable infectious disease that could sweep through children at school where exemption rates are high.

Vaccine-preventable diseases are still widespread in much of the world. International travel is continually reintroducing these diseases into the United States. We are an immigrant nation. Our own citizens travel abroad with ease and in larger numbers than even before. Neither our borders nor our airport security checkpoints protect us from the import of diseases once common here and still common elsewhere.

For example, every year, measles, mumps, and other vaccine-preventable diseases enter the country through foreign visitors, or U.S. residents returning from abroad. In years past, a typical year would bring one outbreak, infecting ten to twenty people. In Third World countries with no measles vaccination, the disease killed nearly a quarter-million children in 2006.

But recent years have seen at least a dozen outbreaks in the U.S., the majority of those infected being American citizens who were unvaccinated, most by choice. As a result, measles cases in the U.S. are at the highest level in a decade, with nearly half of cases involving children whose parents rejected vaccination. Nearly one-quarter of cases have required hospitalization.

Public trust in the safety and efficacy of vaccines is one key to the remarkable successes of immunization programs within the U.S. and globally. Allegations of harm from vaccines have become so loud and widespread that they pose a threat to immunization programs, and to trust in recommendations from our public health authorities and the medical community.

The painful irony to these allegations, and the resultant decrease in childhood vaccination rates, is that the United States has the safest, most effective vaccine supply in history. Many years of testing are required by law before a vaccine can be licensed.

Once licensed and in use, vaccines are monitored by a comprehensive safety and effectiveness monitoring system that is run jointly by the FDA and CDC. Adverse events (10,000 are reported annually) possibly associated with vaccines are investigated and studied, and action is taken when vaccine recommendations need to be changed.

There is little in this world for which we have more scientific data about risk and benefit than vaccines. Billions of people have received them – name another medical intervention received by so many.

But the risk is not, and never will be zero. Although vaccines are among the most thoroughly tested substances that are put into people's bodies for medical purposes, they are not 100% safe. Nothing is absolutely, positively 100% safe – not vaccines, not antibiotics, not Tylenol™, not Pepcid™, not even so-called “natural” or herbal remedies.

However, vaccines are certainly far safer than allowing children to be vulnerable to the diseases they prevent.

On the basis of evidence from the billions of immunizations given worldwide over the past half-century, we know many things for certain: Vaccines do not cause autism. They do not cause diabetes. They do not weaken the immune system. And they do not cause unexpected death in infancy.

Yes, vaccines do have minor side effects. Some children experience soreness, a slight fever, or a local allergic reaction to the antibiotic in some vaccines. Serious side effects, however, are extremely rare. When weighed against the risk of serious complications and death from the disease themselves, such side effects seem pretty minor.

Again, no one claims “zero risk” for the vaccines against 16 diseases that are currently recommended to protect children in the U.S. We all want our vaccines to be as safe as humanly possible, but no matter what we do they will never, ever be absolutely, 100% safe. That's an impossible standard.

The reasonable and obtainable standard to which we strive is that vaccines should be far, far safer than the diseases against which they protect us, and they already meet that standard admirably. But by any measure, vaccines are incredibly safe, with a very low risk of complications. That is not to say that there isn't always room for improvement. There is.

But the demand for 100% safety is a utopian ideal whose real, albeit unacknowledged, purpose is an excuse for not vaccinating at all. If we are to avoid a return to the bad old days when epidemics of vaccine-preventable diseases wreaked suffering and death upon our populace, the misinformation and exaggerated claims of toxicity and harm due to vaccines must be countered with science-based information of the true benefits and risks of vaccination.

Giving up the known benefits of vaccines because of a vague, hypothetical possibility of risk is a poor trade-off.

The benefits provided by most vaccines extend beyond benefit to the individual who is immunized. They are not just personal but societal.

Vaccines offer significant public health benefit. Those who refuse to vaccinate not only risk the personal well-being of their children, but the society in which they choose to live. As the old saying goes, when you take up space within a community, you must also pay rent.

By choosing not to immunize, parents not only actively accept a health risk to their infants and young children that is greater by far than any risk posed by vaccines. Our youngest children, who are our most vulnerable to disease, cannot make decisions for themselves as to whether to vaccinate.

By choosing not to immunize, parents also create situations in which their children may pose a serious risk to other children, and to our friends, family, and neighbors who are medically fragile. An unimmunized child living in a well-immunized community derives significant indirect protections from “herd immunity”. But the same protections are not offered in return, an unfairness that borders on selfishness.

Widespread vaccination creates **herd immunity**, which means the disease has fewer hosts. When the presence of clusters of intentionally unvaccinated children allows a vaccine-preventable disease to gain a foothold in an area, medically-fragile children and adults are much more likely to get sick and to die from vaccine-preventable diseases unless they are protected by herd immunity.

Thanks to advances in medicine, we now live alongside premature infants; children with congenital heart, lung and metabolic diseases; children and adults with immune systems weakened by HIV, cancer, medications or chemotherapy; or people who have received organ transplants.

The medically fragile also include infants too young to have yet been immunized, and elderly persons who may not be immune or whose immunity has waned over the decades. For them, herd immunity is the only defense.

Additionally, a chronic illness such as leukemia can develop in any child – perhaps someday including one’s own. Children who cannot receive vaccines for medical reasons can only be protected by herd immunity. Such children are more likely to suffer serious consequences or even death should they contract a vaccine-preventable illness.

Who would not feel for the kid with leukemia who, after fighting off the cancer, might die from measles, or chickenpox, while her immune system is still recovering? Who would not feel for the person living with HIV/AIDS, doing everything he can to keep himself healthy, only to have his life cut short because his neighbor decided to turn her child into a disease vector at a “measles party” or “chickenpox party”. In short, who would not feel for those whose lives are at stake?

As long as the majority are vaccinated, a few can decline without courting harm. But when vaccination rates fall below a certain level this protection quickly begins to vanish. At that point, someone who refuses a vaccine imperils not only his own health but that of everyone he encounters.

The point of vaccinations, therefore, is to protect not merely ourselves, but our community. Vaccines are not just a means of preventing individual children from contracting disease. They are also a means of protecting entire populations.

As the percentage of people who are immunized rises, the transmissibility of diseases declines. Each person who is immunized becomes a firewall against the spread of disease. Each person

who is not immunized is not only personally unprotected, but weakens the firewall that can stop or slow the spread of disease.

Parents who choose to delay vaccination for non-medical reasons are not only prolonging their children's period of risk, they are endangering everyone else's public health. Parents who choose not to immunize their own children increase the potential for harm to other persons in four important ways:

- First, should an unimmunized child contract disease, that child poses a potential threat to other unimmunized children.
- Second, even in a fully immunized population, a small percentage of immunized individuals will either remain or become susceptible to disease. These individuals have done everything they can to protect themselves, yet they remain at risk.
- Third, some children cannot be immunized because of underlying conditions. These individuals derive important benefit from herd immunity and may be harmed by contracting disease from those who remain unimmunized.
- Finally, immunized individuals are harmed by the cost of medical care for those who choose not to immunize their children and whose children then contract vaccine-preventable disease.

Not vaccinating is truly a risk to the child, as well. A recent study from Colorado demonstrated that children with non-medical deferral of pertussis vaccine had a 23-fold increased risk of pertussis illness compared with children up to date on their immunizations. If the child is an infant, and contracts pertussis (whooping cough), the risk of death is as high as 1 in 10.

In an ideal world, a parent might want every child immunized except for their own – that way they get all the benefit and none of the risk. But this is a selfish concept, one that doesn't work.

It doesn't work because diseases that have been eliminated or greatly reduced in the U.S. still exist in the world. They are a threat to any unvaccinated child. The danger is also magnified as the population of unvaccinated children grows, and it is magnified still further when these children are in close contact – such as in school.

Parents who refuse immunization on behalf of their children are, in a sense, free riders who take advantage of the benefit created by the participation and assumption of immunization risk or burden by others while refusing to participate in the program themselves. These individuals place family ahead of civic responsibility. Although such parents reject what many would consider to be a moral duty, coercive measures to require immunization of a child over parental objections are justified only in cases in which others are placed at substantial risk of serious harm by the parental decision.

While parents' concerns about vaccinations need to be respected, understood, and addressed, so too must these same parents respect and understand that society has a right to expect them to join in the collective responsibility towards reducing illness within a population, a responsibility that extends beyond our own children.