Before the Zika virus: A look back at Rubella and microcephaly

photo credit: Laikipia Pixabay.com

The Zika virus in the news these days reminds us of another microcephaly-causing virus which scourged our world in the not-so-distant past. In the years right before the Two Peds doctors were born (late 1960s), the virus Rubella routinely swept through the United States and the rest of the world. The

airborne germ Rubella, just like the mosquito-spread Zika virus, caused most people just a mild illness that they usually never even knew that they had. After they were sick, they became immune to the virus. But when pregnant women contracted Rubella early in pregnancy, their unborn children sometimes ended up with microcephaly.

Microcephaly is a condition where a small, underdeveloped, or abnormal brain leads to a small head at birth. Many children with microcephaly have significant mental disabilities.

So what happened to Rubella? It's the R in the MMR vaccine. We give this vaccine to all children, first at 12-15 months, and again at 4-6 years of age. We vaccinate girls to protect their unborn fetuses when they are pregnant, and we also vaccinate boys. Although boys will not become pregnant, they can contract the disease and spread it to others who are pregnant. It is standard practice for obstetricians to test all of their pregnant patients for immunity to Rubella. If a woman is not immune, she is given the MMR vaccine after delivery to prevent coming down with Rubella during future pregnancies.

Because of the success of this safe vaccine, it is extremely rare to have child born with Congenital Rubella Syndrome and its accompanying problems. The syndrome not only included the mental impairments associated with microcephaly but also was associated with blood disorders, heart defects, deafness, visual impairment, developmental delay, and seizures. In the United States where the vaccine rates are high enough, no cases have been reported since 2004. In the rest of the world, cases still occur in countries with limited access to vaccines against Rubella. Approximately 100,000 cases of Rubella worldwide per year still occur according to the Centers for Disease Control.

Scientists are working on a vaccine against the Zika virus because, as is often the case, preventing a disease is often easier, less costly, and more successful than attempting to

cure it. For a basic explanation of how vaccines work, please see our prior post on this topic. Trials for a vaccine for Zika may begin as early as summer 2017.

But if we look at history, Rubella was once a dreaded virus too. Now, with the widespread use of a vaccine, although still dreaded, the rates of Rubella have dropped dramatically. Zika hopefully will not be far behind.

Naline Lai, MD and Julie Kardos, MD

Getting back to basics: How do vaccines work?

Recent comments by politicians have brought vaccines back into the public eye. In this post, we get down to basics.

Did you ever wonder how a vaccine works?

To understand how vaccines work, I will give you a brief lesson on the immune system. Trust me, it is interesting. Let me give you an example of me. When I was eight, I had chicken pox. It was a miserable week. I started out with fever and headache, then suffered days of intense body itching from blister-like spots, and ultimately, because I scratched off some scabs, ended up with scars. During this time, my immune system cells worked to battle off the chicken pox virus. Immune cells called memory cells also formed. These cells have the unique job of remembering (hence the name "memory cells") what the chicken pox virus looks like. Then, if ever in my life I was to contact chicken pox again, my memory cells could multiply and fight off the virus WITHOUT MY HAVING TO GET SICK AGAIN WITH CHICKEN POX. So after I recovered, I was able to play with my neighbor even while he suffered with chicken pox. I returned to school where other children in my class had chicken pox, but I did not catch chicken pox again. Even now, as a pediatrician, I don't fear for my own safety when I diagnose a child with chicken pox, because I know I am immune to the disease.

This is an amazing feat, when you think about it.

So enter vaccines. A vaccine contains some material that really closely resembles the actual disease you will protect yourself against. Today's chicken pox vaccine contains an altered form of chicken pox that is close to but not actually the real thing. However, it is so similar to the real thing that your body's immune system believes it is, in fact, real chicken pox. Just as in the real disease, your body mounts an immune response, and makes memory cells that will remember what the disease looks like. So, if you are exposed to another person with chicken pox, your body will kill off the virus but YOU DON'T GET SICK WITH THE CHICKEN POX. What a

beautiful system! Rather than thinking about a vaccine as a foreign substance, think of it as a substance that is able to strengthen your body's natural immune system.

Before chicken pox vaccine, about 100 children per year in the US died from complications of chicken pox disease. Many thousands were hospitalized with pneumonia, skin infections, and even brain damage (encephalitis) from chicken pox disease. Now a small injection into the arm can prevent a disease by creating the same kind of immunity that you would have generated from having the disease, only now you have one second of pain from the injection instead of a week of misery and possible permanent disability or death. I call that a Great Deal!

I used the example of chicken pox because the vaccine was invented during my own lifetime. However, I could have used the example of polio, which, prior to its vaccine development in 1955, paralyzed 10,000 children per year in the United States, or measles, which infected 4 million children per year and killed 3000 per year in the United States before doctors began to give children a vaccine against measles in 1963.

All vaccines operate by this principle: create a safe environment for your immune system to make memory cells against a potentially deadly disease. Then when you are exposed to someone who actually has the disease, you will not "catch" it. Your body will fight the germs, but you do not become sick. If everyone in the world were vaccinated, then the disease itself would eventually be completely eradicated. Even if MOST people were vaccinated, this disease eradication can occur, because the majority of immunized people protect the few who are too young or too ill to receive vaccines themselves. This happened with small pox, a disease that killed 50 percent of infected people. There is no longer small pox because nearly everyone on earth received the small pox vaccine. Now we do not need to give small pox vaccine because the disease no longer exists. This is a huge vaccine success

story.

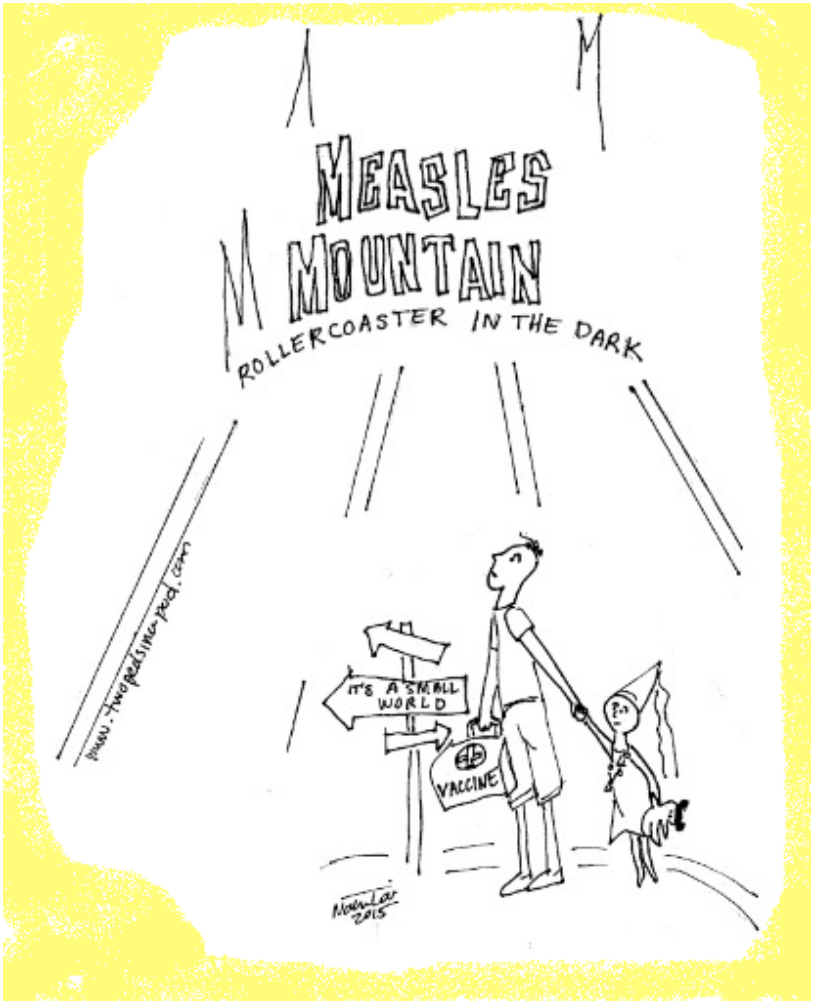
Friedrich Nietzsche said “What doesn’t kill us makes us stronger.” We pediatricians feel this is unacceptable risk for children. We would rather see your child vaccinated against a disease in order to become immune rather than risking the actual disease in order to become immune. The vaccines that we give children protect against diseases that can cause serious, lifelong disability or death.

Hopefully this blog post answers your questions about how vaccines work. For more details or more in-depth explanations, I refer you to the AAP (American Academy of Pediatrics) website www.aap.org, the Immunization Action Coalition, Children’s Hospital of Philadelphia’s Vaccine Education Center, and the book *Vaccines: What You Should Know*, by pediatricians Dr. Paul Offit and Dr. Louis Bell.

Julie Kardos, MD and Naline Lai, MD

For more information about vaccines, please see our prior posts: Should I vaccinate my child?, Closure: there is no link between the MMR vaccine and autism, Fact or Fiction: a flu vaccine quiz for all teachers, babysitters, parents, and anyone else who breathes on children, Do vaccines cause autism?, Measles outbreak: would you recognize measles in your child?, A vaccine parable , and Are my teen’s vaccines up to date?

Should I vaccinate my child?



“Let’s skip this ride.”

Should I vaccinate my child? Yes, yes, yes!

The recent measles outbreak originating in Disneyland among mostly-unvaccinated children and adults highlights how important it is to continue to immunize children against preventable infectious diseases, even if we think they are rare.

There are many deadly diseases we can’t prevent, but we do have the power to prevent a few. We now have the ability to prevent your children from getting some types of bacterial meningitis, pneumonia, and overwhelming blood infections. With vaccines we can prevent cases of mental retardation, paralysis, blindness, deafness, and brain infections. Immunizations are a safe way of boosting children’s natural immune systems. Yet some of our parents continue to doubt the

benefits of vaccines and to fear harm from them.

Let’s look at another kind of prevention. You would never drive your car without putting a seatbelt on your child. Even if you don’t know anyone who was in a fatal car accident, you still buckle you and your child up. You may know a kid who emerged from a car accident with only a scrape, yet you still buckle you and your child up.

You may never know a child who is paralyzed by polio or who died of whooping cough, but it does happen and can be prevented. Just like with car accidents, it’s better to prevent the injury than to play catch-up later. Dr. Kardos’s grandfather routinely rode in the front seat of his car without his seatbelt because he “had a feeling” the seatbelt might trap him in the car during an accident. Never mind that epidemiologists and emergency room doctors have shown people are much more likely to die in a car accident if they are not wearing a seat belts, he just “had a feeling.”

We know no one likes a needle jab, but for most vaccines, no one has invented any better way of administration.

When it comes to your children, parental instinct is a powerful force. We routinely invite our patients’ parents to call us about their children if their instincts tell them something might be wrong, and we always welcome and at times rely on parents’ impressions of their children’s illnesses to help us make a diagnosis and formulate a treatment plan.

However, in the face of overwhelming evidence of safety and benefits of vaccines, we pediatricians despair when we see parents playing Russian roulette with their babies by not vaccinating or by delaying vaccinations. We hope fervently that these unprotected children do not contract a preventable debilitating or fatal disease that we all could have prevented through immunizations.

There is no conspiracy here. We both vaccinate our own

children. We would never recommend any intervention where the potential for harm outweighs the potential for good. We have valid scientific data that every year vaccines save thousands of lives. One of them could be your child's life.

Should you vaccinate your child?

YES!

Julie Kardos, MD and Naline Lai, MD

Updated from our earlier 2011 post

Visit these posts for more infomation about vaccines: How Vaccines Work, Evaluating Vaccine Sites on the Internet, Do Vaccines cause autism? and Closure: there is no link between the MMR vaccine and autism

Also, please visit the recent Institute of Medicine's analysis of vaccine side effects.