**Vaccine Myth(s)**

**C-A-S-E**: **C**orroborate-**A**bout Me-**S**cience-**E**xplain/Advise

Myth 1: Vaccines cause autism (MMR and autism)

* In 1998 Andrew Wakefield, an English physician, published a report (not a controlled study) about children with gastrointestinal problems, 8 of whom were diagnosed with autism within several weeks after receipt of MMR vaccine.
* In interviews, Dr. Wakefield shared his opinion that giving measles, mumps, and rubella together in a vaccine might lead to a leaky gut causing proteins and live virus to enter the bloodstream and then the brain causing autism. This theory was not part of the published report.
* It was later discovered that Dr. Wakefield falsified information, used faulty science, and took large sums of money from trial lawyers trying to improve a link between autism and MMR vaccine.
* Since that time, the Wakefield paper was retracted, Dr. Wakefield’s medical license was removed, and multiple studies all over the world involving hundreds of thousands of children have all shown **NO link between MMR or other vaccines and autism.**
* Autism diagnoses are increasing due to 1) greater awareness 2) universal screening 3) reclassification of the disorder which is much more inclusive 4) later parental age (especially of the father). The diagnosis is frequently made between 1 and 4 years of age during the time that we are giving the most vaccines, but just because things are related in time does not mean that one causes the other.

Myth 2: Vaccines are not safe

* Vaccines are studied and scrutinized as much or more than any other medical treatment.
* Vaccines are studied in thousands of people before approved for routine use and then are followed in post-approval studies in tens of thousands subjects.
* In addition, there is a national database to track any concerns about any vaccine called VAERS (Vaccine Adverse Event Reporting system). This system is in place to identify rare problems with vaccines.
* Using all of these studies and tracking systems involving millions of people, we study the relationship of vaccines to 200 categories of illness, death, emergency room visits or hospitalizations. If any safety concerns are identified and scientifically show, we change recommendations promptly. These systems are in place to make sure vaccines are as safe as anything we do in medicine.

Myth 3: This vaccine is too new

* Vaccines are studied and scrutinized as much or more than any other medical treatment. By the time a vaccine is recommended there are extensive scientific data and lots of experience with it so one can be reassured that the vaccine is not too new to use.
* Prior to licensure, there are 3 sets of rigorous studies:
  + **Phase I:** Researchers test a new drug or treatment in a small group of people for the first time to evaluate its safety, determine a safe dosage range, and identify side effects.
  + **Phase II:** The drug or treatment is given to a larger group of people to see if it is effective and to further evaluate its safety.
  + **Phase III:** The drug or treatment is given to large groups of people to confirm its effectiveness, monitor side effects, compare it to commonly used treatments, and collect information that will allow the drug or treatment to be used safely.
* After licensure there is ongoing surveillance for problems:
  + Active surveillance (controlled and studied prospectively)
  + Passive surveillance (anybody can report anything) so we can find any unexpected or rare problems associated with the vaccines.

Myth 4: We are giving too many shots (immune overload theory)

* Antigens are anything foreign to the immune system.
* Our immune systems can respond to billions of antigens and responds to many thousands of them in our day to day life.
* In the entire childhood vaccine series, we are giving 130-140 unique antigens. This is “a drop in the bucket” compared to the amount of antigens we are exposed to in everyday life and common infections.
* Our vaccines are different than they used to be. In 1960, we were giving just 3 vaccines (small pox, polio, DTP). Those vaccines contained over 3,200 antigens. Today, in the entire series of vaccines, although we are giving many more shots and protecting against many more diseases, we are giving **25 times less** antigens.
* The amount of shots we are giving is safe, effective, and tested vigorously.

Myth 5: Preservatives in vaccines are unsafe (toxic)

* Preservatives were used in some vaccines in the past to prevent contamination. Preservatives have been removed from almost all vaccines **NOT** because they were shown to be toxic, but because most vaccines are packaged as single dose vials now which do not require preservatives.
* The only current vaccine that may contain Thimerosal is influenza (flu). Thimerosal was a common preservative used in some vaccines before 2001. Thimerosal has never been shown to have any toxic effects in studies involving hundreds of thousands of patients, but was removed from almost all vaccines anyway.
* Some vaccines contain aluminum to help with the immune response.
* Aluminum comes from the earth’s crust. We are exposed to and ingest aluminum on a daily basis including in many household products including food, medicine, cosmetics, antiperspirants, etc.
* The amount of aluminum in vaccines is very small. Typically, adults ingest 7 to 9 milligrams of aluminum per day. For comparison, the aluminum contained in all vaccines is similar to that found in about 1 quart or 32 fluid ounces of infant formula which babies ingest safely each day.

Myth 6: It’s better to become immune by getting the infection naturally

* Vaccines save lives, suffering, and money. Vaccine preventable infections do not have benefits.
* In some but not all cases, natural immunity lasts longer than immunity from vaccines, but natural infection is associated with many risks and costs including: death, hospitalizations, severe disability including brain damage, hearing loss, birth defects, loss of limbs, sterility, etc.
* The risks of vaccines are very small. The risk of a severe vaccine injury is very rare. It is more likely to be struck by lightning or die while bathing than having a vaccine injury.
* Vaccines are very cost effective. Economic analysis for 2009 alone found that each dollar invested in vaccines and administration, on average, resulted in $3 in direct benefits and $10 in benefits when societal costs are included.
* The benefits of vaccines are very great.
  + A report published in 2013 found 26 million illnesses were prevented in the U.S. population over the last decade due to vaccines
  + A report published in 2007 found that 1-2 million illnesses per year were prevented due to vaccines.