

SCIENTIFIC AMERICAN™

Permanent Address: <http://www.scientificamerican.com/article.cfm?id=straight-talk-about-vaccination>



See Inside

Straight Talk about Vaccination

Parents need better information, ideally before a baby is born

By Matthew F. Daley and Jason M. Glanz | Wednesday, August 24, 2011 | 124 comments

Last year 10 children died in California in the worst whooping cough outbreak to sweep the state since 1947. In the first six months of 2011, the Centers for Disease Control and Prevention recorded 10 measles outbreaks—the largest of which (21 cases) occurred in a Minnesota county, where many children were unvaccinated because of parental concerns about the safety of the standard MMR vaccine against measles, mumps and rubella. At least seven infants in the county who were too young to receive the MMR vaccine were infected.

These troubling statistics show that the failure to vaccinate children endangers both the health of children themselves as well as others who would not be exposed to preventable illness if the community as a whole were better protected. Equally troubling, the number of deliberately unvaccinated children has grown large enough that it may be fueling more severe outbreaks. In a recent survey of more than 1,500 parents, one quarter held the mistaken belief that vaccines can cause autism in healthy children, and more than one in 10 had refused at least one recommended vaccine.

This sad state of affairs exists because parents have been persistently and insidiously misled by information in the press and on the Internet and because the health care system has not effectively communicated the counterarguments, which are powerful. Physicians and other health experts can no longer just assume that parents will readily agree to childhood inoculations and leave any discussion about the potential risks and benefits to the last minute. They need to be more proactive, provide better information and engage parents much earlier than is usually the case.

Peril of Business as Usual

Right now pediatricians typically bring up the need for vaccines during the well-baby checkup held about two months after birth. That visit has a jam-packed agenda. In the usual 20 minutes allotted for the appointment, the physician must learn the answers to many questions, of which the following are but a sample: How many times is the baby waking to feed at night? Is the child feeding well? Where do measurements of height, weight and head circumference fall on a standard growth chart? Do the parents know how and when to introduce solid food and how to safely lay the child down to sleep? Are various reflexes good? Can the sounds of a heart murmur be heard through the stethoscope? Are the hip joints fitting properly in their sockets, or are they dislocated?

Generally in the final seconds of the visit, assuming all has gone well to this point, the doctor mentions the required schedule for six recommended inoculations: the first DTaP shot (for diphtheria, tetanus and pertussis, also known as whooping cough), the polio shot, a second hepatitis B shot (the first having been given in the first few days after birth), the pneumococcal conjugate shot (for bacterial pneumonia and meningitis), the HiB shot (for another type of meningitis) and finally the rotavirus vaccine (to prevent a severe



Image: Getty Images

ADVERTISEMENT

diarrheal infection). This is the point in the visit at which more and more pediatricians report a disheartening turn of events: although most parents agree to the inoculations without hesitation, a growing number say they would like to delay or even refuse some or all of the vaccinations for their infants.

A proper conversation that respects the reluctant parents' concerns, answers their questions and reassures them that the inoculations are indeed necessary—that countless studies by hundreds of researchers over many decades have shown that vaccinations save millions of lives—will likely take at least another 20 minutes. Meanwhile, though, other families sit in the waiting room, itching for their own well-baby checkups to start.

This all too common scene should never happen. Having this discussion at the two-month well-baby visit is too late. By then, parents may have read about any issues on the Web or chatted with other moms and dads in the park. Discussion with medical professionals should begin long before, usually during, or even prior to, the pregnancy. The evidence summarized below should form the basis for these exchanges.

Fears and Facts

Although parents give many reasons for not wanting to vaccinate their children, we have noticed at least three recurring themes. Some do not believe their children are at risk for diseases such as polio, measles and tetanus, which are now rarely seen in the U.S. Others do not believe that certain vaccine-preventable diseases, such as chicken pox and measles, are particularly serious. And many worry about the safety of vaccines. The concerns may be about immediate, well-defined side effects such as fever or may take the form of anxiety that vaccines might harm the immune system or cause chronic diseases years later. Each of these concerns can be met with a careful review of the evidence.

Together we have conducted a series of studies to better quantify the risks of not vaccinating—information that speaks to the mistaken belief that today's children are unlikely to come down with whooping cough, measles or the like if they skip their inoculations. Our investigations looked at hundreds of thousands of children in Colorado and compared the risk of various vaccine-preventable diseases in children whose parents had refused or delayed vaccines, compared with children whose parents had had them vaccinated. We found that unvaccinated children were roughly 23 times more likely to develop whooping cough, nine times more likely to be infected with chicken pox, and 6.5 times more likely to be hospitalized with pneumonia or pneumococcal disease than vaccinated children from the same communities. Clearly, the parental decision to withhold vaccination places youngsters at greatly increased risk for potentially serious infectious diseases. These results also show the flaws in the “free rider” argument, which erroneously suggests that an unvaccinated child can avoid any real or perceived risks of inoculation because enough other children will have been vaccinated to protect the untreated child.

Depending on fate to soften the blow from an infection is also more dangerous than most people realize. One out of every 20 previously healthy children who get the measles will come down with pneumonia. One out of 1,000 will suffer an inflammation of the brain that can lead to convulsions and mental retardation, and one to two out of 1,000 will die. Similarly, chicken pox can lead to severe infections of the skin, swelling of the brain, and pneumonia. Even when no complications arise, chicken pox is painful and triggers high fevers and itchy rashes. Vaccinated children who develop chicken pox (no vaccine is perfectly effective all the time) usually suffer much milder symptoms.

Even when parents appreciate the peril of not vaccinating, they want to know that vaccines are safe. Because vaccines are given to huge numbers of people, including healthy infants, they are held to a much higher safety standard than medications used for people who are already sick. Nothing in medicine is 100 percent safe, however, and the absolute safety of vaccines cannot be proved. Safety can be inferred, though, by the relative absence of serious side effects in multiple studies.

Studying the safety of vaccines is a complicated, labor-intensive process. Fortunately, the U.S. has a sophisticated system, a federally funded program that does not receive any money from vaccine manufacturers. This system can both test specific hypotheses and perform general monitoring of the safety of newly licensed vaccines. As a new theory arises, it can be rigorously tested.

Perhaps the biggest boost to the antivaccine movement came in 1998, when, in a paper in the *Lancet*, Andrew J. Wakefield and 12 colleagues proposed that the measles vaccine could cause autism in susceptible children. In the years since, more than a dozen studies have convincingly shown that vaccines do not cause autism. In fact, it is rare in science that published scientific findings have been so

thoroughly, and publicly, disproved. The *Lancet* retracted the Wakefield article in early 2010. Most of the co-authors no longer vouch for the study findings. And Wakefield himself was accused of falsifying the data and lost his medical license.

Despite the complete dismantling of Wakefield's vaccines-cause-autism hypothesis, public skepticism about vaccination has only increased as new speculative theories have been put forward. Maybe, some contend, vaccine preservatives cause long-term problems. Or maybe the growing number of vaccines all assaulting the immature immune system at once causes complications. Or perhaps trouble can arise from a toxic combination of vaccines with air pollution, chemical and metal contamination of the environment, and the increasing stress of modern life.

That this cycle—debunked links followed by ever grander speculation—keeps repeating itself is a clear indication that the scientific community is more reactive than proactive when engaging the public about vaccine safety. Investigating narrow, specific theories about vaccines does not seem to provide adequate reassurance to parents with broad and vague worries about vaccines.

So where does this leave the conversation between health professionals and parents? A good place for talks to begin would be in a prenatal class devoted to vaccines or through Web chats with physicians and vaccine researchers. Web interactions, in particular, might encourage prospective parents to openly air their concerns and raise sensitive questions they may not feel comfortable asking in a face-to-face visit with their child's own pediatrician. Education campaigns should also be carried out. But many moms and dads will still need a forum where they can find accurate information, voice their worries, and engage in a full discussion about the benefits and risk of vaccines. And many will still want their infant's doctor to look them in the eyes and say, "This is one of the best things you can do for your child's health."

The key facts parents need to know, though, are that vaccines prevent potentially fatal diseases, that vaccines have a high degree of safety, and that their safety is constantly evaluated and reevaluated in a system operating independently from the pharmaceutical companies that make vaccines. Unless this message gets spread widely and well, too many doctors and parents are going to find themselves in emergency rooms and isolation wards, watching children suffer with the devastating effects of measles, whooping cough or some other readily preventable infectious disease.

TRY A RISK-FREE ISSUE

YES! Send me a free issue of Scientific American with no obligation to continue the subscription. If I like it, I will be billed for the one-year subscription.


Email Address

Name