

WHAT TO EXPECT[®]

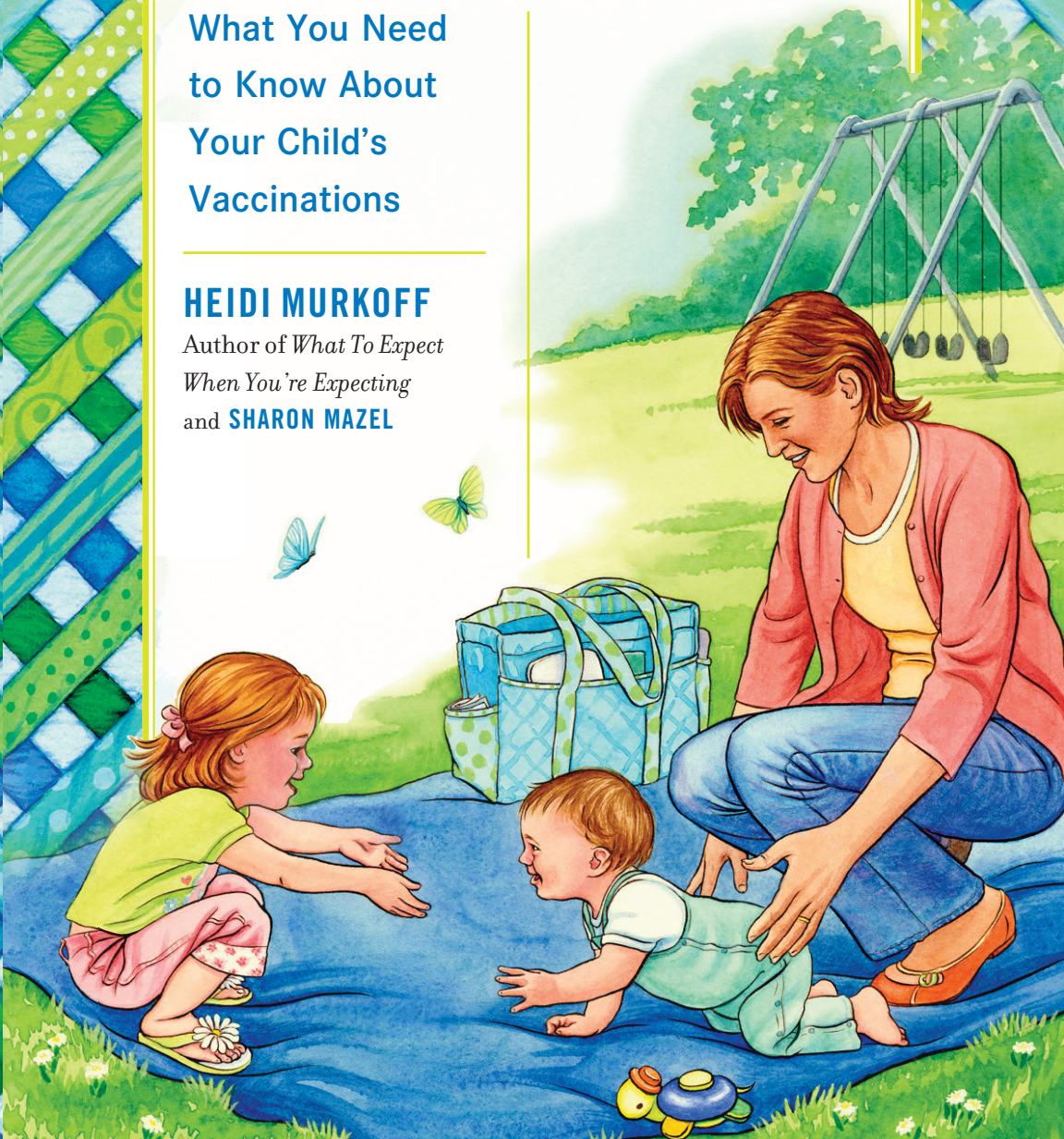
Guide to

IMMUNIZATIONS

What You Need
to Know About
Your Child's
Vaccinations

HEIDI MURKOFF

Author of *What To Expect
When You're Expecting*
and **SHARON MAZEL**



VACCINES AT A GLANCE

Use this handy chart to jot down the date your child receives each shot so you'll have a complete vaccination record for easy reference. Talk to your physician about the vaccines that are recommended.

VACCINE	DATE GIVEN	DATE GIVEN	DATE GIVEN	DATE GIVEN	DATE GIVEN	DATE GIVEN
Hepatitis B						
Rotavirus						
Diphtheria, Tetanus, Pertussis						
Haemophilus influenzae type b						
Pneumococcal						
Inactivated Poliovirus						
Influenza						
Measles, Mumps, Rubella						
Varicella						
Hepatitis A						



The **What to Expect Foundation** is a non-profit that helps families in need expect healthier pregnancies, safer deliveries, and happier babies. The Foundation's Baby Basics Program provides free prenatal health literacy education and support to low-income families, and has reached nearly a half million expecting families nationwide. To learn how you can help, go to www.whattoexpect.org.

The *What To Expect Guide To Immunizations* is **FREE**. To download a copy of this guide for your family, please go to www.whattoexpect.org.

Copyright ©2008, 2009 by Heidi Murkoff
 Cover and book illustrations by Nancy Lane
 Published by **The What to Expect Foundation**, 211 West 80th Street, Lower Level, New York, NY 10024
 All rights reserved. No portion of this book may be reproduced — mechanically, electronically, or by any other means, including photocopying — without written permission of the publisher.

WHAT TO EXPECT[®]

Guide to

IMMUNIZATIONS



Quick—what does measles look like? What are the symptoms of polio? How about mumps? If you're like most parents today, you may have heard of these serious childhood diseases, but probably have only the vaguest idea of what they actually are. And that's not surprising—even some of today's doctors probably haven't come any closer to many childhood diseases than a picture in a medical textbook.

There's a reason why some of these diseases are only a distant medical memory, at least in this country, and why being a child today is so safe. And that reason is vaccinations, one of the most important—and successful—public health interventions in history. Thanks to vaccines, widespread epidemics of such illnesses as smallpox, polio, diphtheria, measles, rubella, and mumps—devastating childhood diseases that were once serious threats to children in this country—may seem a sad thing of the past.

But for vaccines to continue protecting children, children have to continue being vaccinated—and that's where you come

in. Though no parent likes to see a needle headed his or her child's way, keeping up with those immunizations is by far one of the best ways to help keep your child (and all the rest of the children and adults in your community) healthy. And, believe it or not, it's easier than you'd think—especially now that you've got help at your fingertips.

Think of the *What To Expect Guide to Immunizations* as your partner in protecting your child from vaccine-preventable childhood illnesses. It's packed with what you'll need to know to keep your child fully vaccinated—information about the vaccines on your child's schedule of shots, answers to your questions about their safety, efficacy, and importance, the latest on the current generation of combination shots, tips on how to prepare your child for the needles coming his or her way, and much more. There's also an immunization visit planner that will help you keep track of which shots your child receives at each vaccine visit, plus a place for you to jot down all your pediatrician's instructions and advice.

THE IMMUNIZATION VISIT PLANNER

Take this **Immunization Planner** with you to each pediatrician visit so you can jot down which vaccinations your child will be receiving through age six, and any questions you might have for your doctor. There's also a place for you to write down your doctor's recommendations after vaccination.



IN THE HOSPITAL

Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

1ST MONTH VISIT

Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

2ND MONTH VISIT

Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

4TH MONTH VISIT

Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

6TH MONTH VISIT

Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

12TH MONTH VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

15TH MONTH VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

18TH MONTH VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

19TH-23RD MONTH VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

2ND-3RD YEAR VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

4TH YEAR VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

continued >

5TH YEAR VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____

6TH YEAR VISIT | Date: _____

Vaccines given: _____

Doctor's recommendations after vaccination: _____

Questions you might have: _____



ALL ABOUT IMMUNIZATIONS

Have questions about all the needles that are headed your child's way? What's in them? How do they work? Are they safe? And why does your child need them all, anyway? You'll find the answers to those and plenty of other common vaccine questions here.

WHAT'S IN A NAME?

You'll notice throughout this guide the word **vaccination** used interchangeably with the word **immunization**. That's because they mean roughly the same thing. Vaccines work by helping to make your child immune to a specific disease – and in general if your child is immune, he or she won't get sick if exposed to the disease. The immune system reacts to vaccines the same way it would if you were exposed to the natural disease, but vaccines allow your child to be protected from diseases without ever having to come down with them first.

IMPORTANCE OF VACCINES

“Why are immunizations so important?”

As a parent, you're always on the lookout for ways to protect your children. You're faithful about car seats. Fanatical about baby proofing and hand washing. You wipe down the shopping cart handle before your baby touches it, intercept the puddle-dropped cookie before it can be inserted back into your toddler's mouth, steer the stroller clear of coughers at the mall. But did you know that immunizations are one of the many steps you can take to help protect your little ones? Besides reducing the incidence of diseases, vaccinations also offer:

Protection from infection. Vaccines are one of the best ways to help keep your children healthy. Before vaccines were available, diseases such as polio, measles, rubella, smallpox, and diphtheria routinely harmed children, and, sadly, sometimes killed them. Thanks to the vaccinations your children will receive, the chances that they will contract any of these serious yet preventable illnesses are highly unlikely.

Protection for your community. Immunizing your children doesn't just help keep them healthy—it helps keep the entire community healthy. When you vaccinate your children, you're helping to protect other children. When other parents vaccinate their children, they're helping protect your children, too. If all children were vaccinated, outbreaks and epidemics could be prevented.

Protection for the future. Believe it or not, by immunizing your children, you're also helping to protect your grandchildren. Why's that? Because widespread vaccination has resulted in some diseases becoming wiped out. Once a disease has officially become medical history (as happily happened with smallpox), vaccination against that disease is no longer necessary (which is why the smallpox vaccine isn't given anymore). Talk about planning ahead for a healthier future!

EFFECTIVENESS OF VACCINES

“Do vaccines really work?”

Not only do vaccines work—they're really good at what they do, working around 90 to 100 percent of the time. Because of vaccines, many diseases that were once a serious threat to the health—and even life—of children in this country, are now at their lowest levels in history (see box).

It might seem strange to subject your child to shots for diseases that no one seems to get anymore—right? Wrong. These diseases might be rare in the United States now, but that's only because children are

IMPACT OF VACCINES		
	Cases per year before vaccines (average)	Cases reported in 2007
Diphtheria	175,885	0
Hib (<5 yrs old)	20,000 (est)	202*
Measles	503,282	43
Mumps	152,209	800
Pertussis	147,271	10,454
Polio (paralytic)	16,316	0
Rubella	47,745	12
Smallpox	48,164	0
Tetanus	1,314	28

* Serotype b or unknown serotype

now widely vaccinated. Take immunization out of the equation, and these diseases could become widespread—and potentially as dangerous as they once were.

Because of vaccines, children are better protected from more diseases than ever before. And by keeping your child's immunizations up to date, you'll be helping keep this amazing healthcare track record going strong.

WHOSE SCHEDULE IS IT ANYWAY?

“My baby's pediatrician told me my son will be getting lots of shots over the next few years on a particular schedule. Who decides which shots are recommended and when they should be given?”

Keeping children free of infectious disease is a process—a long and very carefully carried out one. The Food and Drug Administration (FDA) begins the process by deciding whether a vaccine is safe and effective. Once a vaccine is reviewed and licensed by the FDA, several expert committees—including the Advisory Committee on Immunization Practices (ACIP), the Committee on Infectious Diseases of the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP)—meet to review the evidence on the vaccine and then decide

whether or not to recommend the vaccine and who could benefit most from the vaccine. These same committees also review and update recommendations on existing vaccines.

Once these recommendations are in place, individual states take the next step, determining which vaccines should be required for day care and school entry. Currently, all 50 states have school vaccination laws — although there are some differences in what may be required where.

The best person to advise you on which shots your child should receive and when? Your child's doctor.

TIMING OF THE SHOTS

“Why do I need to make sure my child gets her vaccinations at the recommended time? Wouldn't she still be protected if she gets her shots six months late?”

They say timing is everything, and that's definitely the case when it comes to vaccines. They're most effective when they're given at the right time — and lots of careful consideration goes into deciding when that time is. In coming up with an optimal immunization schedule, experts take into consideration age-specific risks for disease, age-specific risks for complications, and age-specific immune response to the vaccine. Once they have this information in hand, the experts then determine a schedule for each vaccine that will safely and effectively protect at the youngest possible age. By following the recommended schedule, you'll be able to ensure that your child will get the best protection possible against vaccine-preventable diseases.

Another reason to keep up with those immunization schedules: Studies show that children who fall behind with their vaccines are less likely to be fully vaccinated later on (and therefore less protected).

Still, if you've fallen behind, that doesn't mean that you have to give up. There are effective ways to catch up, and get your child back on vaccine track (see next question).

DELAY OF VACCINES

“We're not able to get my son the shots he needs at the recommended time. Is it a problem if vaccines are delayed?”

Schedules may be a matter of opinion when it comes to other areas of a baby's life, but when it comes to vaccinations, sticking to that recommended timetable is definitely considered the optimum plan. That's because a little doesn't go a long way with vaccines. If your child's not up to date with vaccines, he's just not fully covered — and therefore susceptible to the diseases that the shots prevent. And the proof is in the studies, which have shown that the recommended ages and intervals between doses of multi-dose vaccines provide the very best protection for your child.

That said, it's never too late to get started or to pick up where you left off. Late or delayed immunizations are still better than no immunizations at all. In fact, there

FACT OR FICTION?

FICTION: *Getting so many vaccines will overwhelm my child's immune system.*

FACT: The schedule of recommended shots may seem daunting (more than 20 shots by the time your child is 2!), and might even have you wondering how your little one's immune system will be able to handle it all — but actually, research shows that there's no need to worry. Healthy babies safely respond to numerous challenges to their immune system every day, from germs on the floor (the ones he or she picks up with that dropped teething biscuit) to bacteria in foods, from dust in the living room air to cold viruses floating around the supermarket. Vaccines, say experts, are an insignificant drop in the immune system bucket compared to what babies successfully tackle each day. Not only won't the vaccines overwhelm your baby's immune system, but they'll actually help strengthen it.

is even a “catch-up schedule” for delayed immunizations issued by the Centers for Disease Control and Prevention (CDC).

SHOTS AT SUCH A YOUNG AGE

“My baby is so little. Why are vaccines given at such young ages? Can’t I wait until she’s older?”

Why make little babies and toddlers the targets of so many “big” vaccines? Because they’re also the most likely targets of the diseases these vaccines prevent, precisely because they are so young. What’s more, serious complications are most likely to strike the littlest children – an infection that can make an older child or adult miserable for a few days can make a baby or toddler dangerously ill. So protecting your little bundle of joy with a full schedule of vaccines is a safe way to go.

LOW RISK OF DISEASE

“If the chances of my child getting these diseases are so low these days, why should I bother immunizing him?”

The problem is, a low risk isn’t no risk – which means that an unvaccinated baby is a baby at risk. The only disease that has been completely wiped out in the world is smallpox (which is why smallpox is the only vaccine that is no longer needed). The rest of the diseases that children are immunized against still make occasional appearances and may pose a risk to anyone who isn’t fully vaccinated. In fact, experts frequently say that the diseases that are so uncommon in the US are only a plane ride away. That’s because outbreaks in this country often begin when an unvaccinated person travels to a country where vaccination isn’t routine, and where diseases like polio, diphtheria, or measles still occur. The traveler then picks up the disease, and brings it home – a dangerous souvenir that can then be passed around to anyone who

CASE IN POINT

Think that you don’t have to vaccinate your children because the risk of vaccine-preventable diseases is so low these days? Think again. Lapsing rates of immunizations are the reason why epidemics begin – both in this country and abroad. It has happened in our time, and can happen again if children fail to be vaccinated. Case in point:

As recently as 2006, an outbreak of mumps occurred in a few Midwest states, affecting over 4,000 people. Experts believe this outbreak – the first in 20 years – started with an infected traveler to the US from England (where vaccination rates have been lower in recent years), but was able to spread in this country due to incomplete vaccinations.

In 1999, a measles outbreak occurred in the Netherlands – beginning among a population of children who, for religious reasons, were not immunized against the disease. In all, nearly 3,000 people ended up contracting the disease, 3 died from it, and nearly 70 suffered complications serious enough to require hospitalization.

Between 1989 and 1991, lapsing rates of MMR vaccinations among preschoolers in the US led to a sharp jump in the number of measles cases. 55,000 people became sick and 120 died.

isn’t vaccinated or hasn’t yet been fully vaccinated (including those who are at greater risk, such as infants and pregnant women). Foreign visitors can also bring diseases into the country.

Another good reason to immunize your baby fully: today’s low risks could potentially grow into high risks. If enough parents stop immunizing their children, diseases that have been under control for years can actually make comebacks, causing epidemics.

Yes, the risk of a vaccine-preventable disease affecting your baby (or someone

HERD IMMUNITY

Herd immunity, when a vaccinated portion of a population (aka the herd) confers protection from disease onto unvaccinated individuals, sounds like a safe bet — a great way to keep your child safe from vaccine-preventable diseases without having to subject him or her to all those shots — but it really isn't. Here's why:

It's believed that herd immunity can only occur if about 95 percent of people are vaccinated—and every person who isn't vaccinated increases the chance that they and others will come down with the disease in question.

Tetanus, a vaccine-preventable disease, isn't even covered by herd immunity because it's not a contagious disease. If your child isn't vaccinated against tetanus, it doesn't matter if everyone else is—he or she still won't be protected against it.

The concept of herd immunity can lull parents into a false sense of security—which can lead them to skip vaccinations. Not only does that pattern decrease the effectiveness of any herd immunity, each non-immunized child increases the risk that these contagious diseases can spread. After all, it takes just one non-immunized person to get a disease and then spread it to others who aren't immunized.

else's baby) is currently reassuringly low. And the best way to keep that risk down is to keep those vaccinations up. Any decline of immunization — either on a community or national or even an individual basis — can open up a window on vaccine-preventable diseases that immunizations have done such a great job keeping closed.

IMMUNITY FROM DISEASES

“Can children ever catch a disease that they have been immunized against?”

Vaccines are extremely effective most of the time, but occasionally a child won't have

a full response to a vaccine (most often to the influenza and chickenpox vaccines). Usually, in those cases, the vaccine doesn't protect completely but may prevent a full-blown version of the disease. In fact, studies show that most children who contract diseases they have been immunized against end up with mild cases of it. Typically those who end up with full-blown disease haven't been fully immunized (or haven't been immunized at all).

“I have a friend whose daughter got chickenpox even though she was vaccinated against it. What's up with that?”

Few things in medicine work 100 percent of the time, but vaccines have a pretty great track record. In fact, they work most of the time. Sometimes, however, for reasons unknown, a child may not respond to a particular vaccine — or may need a little extra help with the coverage. And that's why booster shots are recommended for certain vaccines. In the case of the chickenpox vaccine, a second shot (aka booster) is recommended between ages 4 and 6. If your child is immunized but still ends up getting chickenpox, you'll be happy to hear that it'll likely be a mild case of it — only a few blisters instead of the typical head-to-toe outbreak.

CATCHING A DISEASE FROM THE VACCINE

“Can my child get the disease from the shot itself?”

This is an understandable concern — but fortunately, one you can easily cross off your parental worry list. Most vaccines are made from bacteria or viruses that have been killed — which means they can't make anyone sick with the disease they're intended to prevent. Even those vaccines that are made from weakened live viruses (like the varicella or measles, mumps, rubella vaccines) carry only a tiny risk of causing the disease itself. And even in the unlikely event that

your child does get sick with the disease the vaccine is supposed to prevent, it will likely be a much less severe case of the illness than if he or she was infected with the disease-causing virus itself.

COMBO SHOTS

“Lately, many of the shots my baby has gotten seem to be for three or four diseases at once. Why’s that?”

Every parent wants their child to be on the receiving end of as few needle pricks as possible, while still keeping them fully protected against preventable diseases – and every doctor would like to give as few shots as they can, too. Enter combination vaccines – single shots that include immunizations against two or more diseases. You’re probably already familiar with two such combo shots – the MMR (which combines the measles, mumps, and rubella vaccines) and the DTaP (which combines vaccines against diphtheria, tetanus, and pertussis). But these days, more and more new combos are being introduced – and depending on the preference of your pediatrician, your child might be in line for one or more of these. The obvious good news about these combos: fewer shots for your child. The even better news: combo shots are just as safe and effective as individual shots. Another benefit to combo vaccines: it’s like getting two (or more) immunizations “for the price of one” (doctor visit). And since fewer doctor visits are required to ensure children will be getting all the vaccinations they need with combo shots, it’s more likely that the schedule will be finished – and finished on time. Some of the more recent combination shots approved by the FDA that your child might be on the receiving end of include:

- A combination Diphtheria, Tetanus and acellular Pertussis (DTaP), hepatitis B, and inactivated Polio (IPV),

given at age 2, 4, and 6 months instead of the individual shots.

- A combination hepatitis B and Hib vaccine, given as a three dose series at 2, 4, and 12 to 15 months.
- A combination DTaP and Hib vaccine, given only for the 4th dose of the DTaP and Hib series in children over 12 months.
- A combination DTaP, IPV, and Hib vaccine given at 2, 4, and 6 months of age and again between ages 12 to 15.
- A combination DTaP and IPV vaccine given between 4 and 6 years old.

SAFETY OF IMMUNIZATION

“I’ve heard some people question the safety of vaccines. Should I be worried?”

How many times have you read a newspaper or internet article or heard a story on the nightly news about the routinely positive effects of immunizations? Chances are, not that often – if ever. Now think about how many times you’ve heard from the media (and from other parents in the playground or on message boards) about the rare instances of a serious complication associated with vaccines? Probably a lot more. And it’s no wonder. Good news is typically classified by the media as no news – which is why you don’t hear a lot about it. The good news that you probably haven’t been hearing enough about vaccines is that they’re very effective and safe. Like anything in life, getting vaccines isn’t completely risk-free – but the small risk of a serious complication occurring as the result of a vaccine is outweighed by the enormous benefits in most cases. While reactions do sometimes occur with some vaccines (such as soreness or redness where the shot was given, fussiness, or a low-grade fever), the vast majority of these reactions

LESS OUCH WITH THOSE SHOTS

Needle pricks can look a lot worse than they actually feel (especially to the parent who's watching that needle head for their baby's impossibly soft skin). Any pain your child feels is fleeting (often more like a pinching sensation than actual pain) — and it's a pain with a very significant gain (protection against diseases that would hurt a lot more). Still, there are ways to help your child feel less pain with every prick:

A LITTLE CUDDLE. Studies show that babies who are held by their parent when they receive their shots cry less.

A LITTLE NURSING. Breastfeeding immediately before or during the shot may lessen the pain babies feel. Plus, breastfeeding offers the cuddle benefit as well.

SOMETHING SWEET. A little dab of sugar water on your baby's pacifier or tongue — given right before the shot — can minimize the ouch factor.

ANYTHING DISTRACTING. Many babies and young children can be easily distracted from anything, and that includes pain. Singing a song, holding up a favorite toy, reading a book can distract young children from the pain of a needle prick — or make the time go so quickly, they won't even know what stuck them. Blowing bubbles can be especially distracting, too — and once a child is old enough to mimic that blowing, the action itself could actually minimize the pain that's perceived.

NUMB IT AWAY. Another way to avoid that yelp is to pretreat the area that will receive the needle with an anesthetic cream before the shot. Ask your pediatrician if such a cream is right for your child — and if he or she can prescribe the cream before your next shot.



are mild and short-lived. Serious reactions are exceptionally uncommon.

Bottom line: vaccines are far safer than the diseases they prevent. Because of vaccines, many of the childhood diseases that once threatened our most vulnerable populations have been almost wiped out in the US. Without a doubt, vaccines are one of medical science's most amazing success stories — definitely a story that merits more headlines.

That said, your priority as a parent is, understandably, protecting your child from harm in any way that you can. When it comes to immunizations, one of the best ways to protect your child is to learn all you can about vaccines from reliable sources — and your child's doctor tops that list. Before having your child vaccinated, do your homework, so you can feel good about the informed decision you're making. Discuss with the pediatrician the potential risks or side effects from that particular

vaccine. You should also make sure you receive from your pediatrician the handout called the "Vaccine Information Statement" from the CDC. Armed with accurate information, you'll be able to schedule those vaccines with confidence.

ASSURING SAFETY OF VACCINES

"What does the government do to make sure the vaccines my child receives are safe?"

Vaccines don't just appear on the market — or on your child's immunization schedule. Years of testing are required before a vaccine can be approved and used. This testing and study process can take 10 years or longer in some cases. Once a vaccine has been shown to be safe and effective through trials, an advisory committee presents its findings, has open public meetings, and finally approves a vaccine. It's a long and appropriately complex

process – and there aren't any shortcuts.

From time to time, adjustments are made to vaccines to make them even safer and more effective. The DTP vaccine was

REPORTING ADVERSE REACTIONS TO VACCINES

Monitoring for safety doesn't stop once the vaccine is put into regular use. The CDC and the FDA continually monitor the vaccine and its side effects through the VAERS (Vaccine Adverse Event Reporting System) — a national vaccine safety surveillance program co-sponsored by the two groups designed to monitor and track reports of side effects or suspected injuries following vaccination. The Vaccine Safety Datalink (VSD) also monitors vaccinations with a large-linked database used to analyze vaccine related information. If there is any suspicion of a problem with a vaccine, health agencies will take quick steps to remedy the problem and help ensure safety. These steps can include changing the vaccine's labeling or packaging, putting out safety alerts, inspecting the manufacturer's facilities and records, revoking a vaccine's license, or even withdrawing recommendations for the use of the vaccine.

If you think your child has a vaccine related illness or injury, you should tell your doctor and you (or your doctor) should report the problem to VAERS. Since 1990, VAERS has received over 100,000 reports, most of them describing mild side effects such as fever. Even if you're not sure if there's a connection between an illness or side effect and a vaccine your child just had, you should still tell your doctor (who will contact the VAERS). VAERS will add your report to the data to determine if there is indeed a pattern that might help identify unknown side effects. If the symptoms or illness that your child is experiencing appears to be unrelated to the vaccine your doctor may be able to allay your concerns. For more information about VAERS, call 800.822.7967 or go online to www.vaers.hhs.gov.

modified to become the DTaP vaccine (an acellular version – with only part of the pertussis bacterium in it) after questions had been raised about side effects associated with the original formulation. The oral (live) polio vaccine that was initially used was replaced in the US with the inactivated polio vaccine, which carries no risk of causing polio itself.

MERCURY IN VACCINES

“Is there any mercury in vaccines? I've read that could be dangerous.”

Small amounts of thimerosal, an organic mercury-based preservative, had been used in some vaccines since the 1930s to prevent bacterial and fungal contamination. Thimerosal is also currently found in some commonly used medicines and products such as contact lens solutions and throat and nasal sprays.

Even though several studies have shown that the very low levels of thimerosal once used in some vaccines didn't cause harm, and though research suggests the thimerosal used in vaccines is expelled from an infant's body faster than the type of mercury found in fish, therefore leaving little chance for buildup in a baby's body, many experts believe that limiting any mercury exposure for children is a smart idea.

Accordingly, since 2001 in the US, all routinely recommended vaccines made for infants have been either thimerosal free or have contained only extremely small amounts of thimerosal. What's more, most of the recommended childhood vaccines (MMR, IPV, varicella, and PCV) never contained thimerosal at all.

Most importantly, numerous large-scale studies have not supported the theory that the small amount of mercury in a vaccine can cause developmental delays or disorders.

VACCINES AND DEVELOPMENT

“One mother in my son’s playgroup told me that vaccines could cause developmental disorders. I’ve heard that it’s not true. Who’s right?”

Numerous studies involving children have found no link between vaccines and developmental disorders such as autism. A report from the Institute of Medicine in 2004, based on comprehensive data and evidence gathered over a number of years found no link between thimerosal (mercury in vaccines) and developmental disorders and no link between the MMR vaccine and developmental disorders. A court case in 2009 found no scientific or medical evidence to back up the claims that vaccines and autism are linked. In fact, the long disputed 1998 study (which only studied 12 children) that suggested a possible link between the MMR vaccine and autism was retracted in 2004 and has been rejected by all major health organizations, including the American Academy of Pediatrics (AAP), the Centers for Disease

TREATING SIDE EFFECTS

Sometimes the “ouch” of a vaccination doesn’t end when the needle’s out. Soreness or a low fever can sometimes appear afterwards, along with some fussiness. A warm compress applied after the shot can help reduce soreness, as can moving the arm or leg in which the shot was given (you can “bicycle” a baby’s leg to help bring relief, or encourage a toddler to do a few rounds of head-shoulder-knees-and-toes). A non-aspirin pain reliever such as acetaminophen (after age 3 months) or ibuprofen (after age 6 months) can help with residual achiness, as well as with any low-grade fever, so ask the doctor about that before you leave the office. Some doctors even recommend a dose of a non-aspirin pain reliever before the shot is given, to prevent these mild side effects in the first place.

Control and Prevention (CDC), the National Institutes of Health (NIH), and the World Health Organization (WHO). Indeed, the evidence shows no association between vaccines and developmental disorders and no association between the increasing diagnosis of autism in recent years and vaccines.

SIDE EFFECTS

“Can these shots cause side effects?”

Vaccines are safe, but like any medicine, vaccines sometimes cause reactions or side effects. Most of the time, the reactions are localized (soreness or redness where the shot is given), mild and brief (lasting no more than a day or two). A low-grade fever can also sometimes occur, but anything more serious is rare.

Proving that a vaccine is related to a specific side effect isn’t easy. That’s because little kids get sick a lot anyway and there’s a chance they could be coming down with something coincidentally right around the time they received a vaccine – possibly causing some to blame the vaccine when the blame really lies with the germs picked up at the playground.

It’s also important to consider that vaccines are given at a time in life when certain health conditions begin or become apparent. For example, the MMR vaccine is given at a year to 15 months, the same time that developmental delays are often noticed in a child, causing questions as to the relationship between the vaccine and the delays.

Regardless, if your child has a serious side effect from a vaccine (which would be rare), such as an allergic reaction (signs would include difficulty breathing, wheezing, hives, weakness, dizziness, paleness, swelling of the throat, or a fast heartbeat) or if your child develops a high fever or you notice any behavior changes following a vaccine, call your doctor (or take your child to the doctor or emergency room) right away.

TODDLER TEARS AND FEARS

Once your toddler reaches a certain age, he or she has likely smartened up to the fact that most doctor visits might include a shot. And this realization may make way for lots of pre-visit anxiety — and lots of in-office kicking and screaming. To help prepare the toddler in your life for those inevitable immunizations, while also minimizing the fears and tears for both of you:

Ahead of time, explain to older toddlers that the shot will help keep them healthy, and will make sure that they don't get sick or have "boo-boos".

Be honest about upcoming shots. Don't say there isn't going to be a shot when you know there is going to be one — this ploy will work only once, then backfire indefinitely. Mistrust isn't something you want your toddler to associate with doctors.

Let your toddler know it's okay to cry, but encourage him or her to be brave. Explain that a shot doesn't hurt much (a lot less than banging a knee or scraping an elbow), and it only hurts a second. Practice timing a second to show how brief that really is.

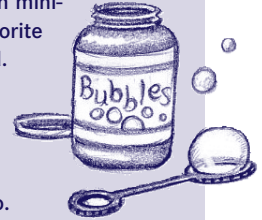
Keep your cool. If you're anticipating a hard time when the shot's approaching — or if you're sending stress signals of your own — your toddler's bound to crumble.

If it's okay with your doctor, allow your toddler to chose the site of the injection (the

right or left arm, for example) to give your child a sense of control over the process.

Bring along lots of distractions — a teddy bear for the toddler to clutch, bubbles to blow (also teach your toddler to blow during the shot, which minimizes the pain), a favorite book to read out loud.

Having the doctor "examine" a doll or teddy first, while the toddler holds it, can help ease anxiety, too.



Offer lots of after-shot accolades (even if your toddler yelled and screamed the whole time). This is a big deal for a little kid, so for best results next time, pump up the praise this time.

Consider a post-shot treat — promise a trip to the playground, the children's museum, to the ice cream shop, or to the toy store for a little ticket item. Don't withhold the treat if your toddler wasn't cooperative — having had the shot should entitle him or her to the treat, no best behavior strings attached.

Never use shots as a threat — as in "if you don't stop crying (or don't get into the tub... or don't get ready for dinner) now, I'm bringing you to the doctor for a shot!"

ALLERGIES

"My daughter is allergic to many things. Can she be allergic to vaccines too?"

Occasionally, a child can have an allergy to a substance that is a component of a vaccine. But the risk that a vaccine can cause a severe reaction in an allergic child is low, estimated at about 1 in a million. Should an allergic reaction occur (usually characterized by hives, difficulty breathing, wheezing, and so on), it would most likely happen within about 30 minutes after the shot is given, and your doctor would be able to treat it (with antihistamines, steroids, epinephrine,

or whatever might be deemed appropriate). Let the doctor or nurse know about any allergies your child has before vaccines are administered. Allergies to yeast, latex, eggs, gelatin, neomycin, or a reaction from previous vaccines would be reason not to give certain vaccines to your child.

If your child does have a severe allergic reaction to a first dose of a vaccine, it is recommended that he or she not get another dose of that vaccine. The reassuring news: if your baby didn't have an allergic reaction after the first dose of a vaccine, it's unlikely that he or she will have an allergic reaction to later doses of that particular vaccine.

GETTING VACCINATED WHILE SICK

“My child has a cold and is scheduled for some shots this week. Can he still get vaccinated while he’s sick?”

A mild illness (a runny nose, an ear infection, a cough, mild diarrhea, or low fever) is usually not a reason to delay a vaccination. In fact, since many young children often have colds, skipping a shot because of a mild illness could lead to indefinite (and unwise) delays. On the other hand, if your child is battling a moderate to severe illness or has fever over 101°F, it’s probably best to postpone his shots until he’s feeling better. Do let the doctor or nurse know about any illness, mild or moderate, that your child may have before he’s vaccinated, and if it’s recommended that the shot be delayed, don’t forget to set up a new appointment for the vaccine.

VACCINATING THE PREMATURE BABY

“My baby was born premature. Is there anything I should do differently when it comes to vaccinating her?”

Worried that your preterm infant is too fragile to be vaccinated? Not sure if the

recommendations for vaccines were made with only full-term, full-sized babies in mind? Worry and wonder not. Nearly all babies, including those who arrived early or are small for gestational age, can receive the routinely recommended vaccinations on the standard schedule. There’s no need to adjust that schedule for a baby’s gestational age – the calculations are done by “birth” age. Remember that premature babies are just as susceptible as any infant to the infections and diseases these vaccines protect against – and if they do get sick from these vaccine-preventable diseases, they’re more likely to develop serious complications.

As for concerns that the vaccine dose might be too “big” for your very low birth-weight baby, you can put those aside, too. When it comes to vaccines (most of them, at least), one size fits all. That’s because the immune response is similar no matter what the size or weight a person is – even a very little person like your baby.



WHEN TO CALL THE DOCTOR AFTER AN IMMUNIZATION

Though severe reactions to immunizations are rare, you should call the doctor if your baby has any of the following symptoms within two days of a vaccine shot:

- ✓ High fever (over 104°F)
- ✓ Crying for more than three hours at a time (not to be confused with colic)
- ✓ Seizures or convulsions – often related to high fever
- ✓ Severe, persistent seizures or major alterations in consciousness
- ✓ Listlessness, unresponsiveness, excessive sleepiness
- ✓ An allergic reaction (such as swelling of mouth, face, or throat; breathing difficulties; rash)
- ✓ Behavior changes — you know your little one best, so if you notice any type of behavior that’s not normal for your child, it’s always smart to check with the pediatrician – just to be on the safe side.

Though these symptoms could be unrelated to the vaccine, and could be signs of an unconnected illness, any severe response that follows a vaccination should be immediately reported to your doctor for evaluation. You or your doctor should then report the symptoms to VAERS, (the Vaccine Adverse Event Reporting System; see page 11). Collection and evaluation of such information by VAERS and other agencies may help reduce future risks.

VACCINES EXPLAINED

Curious about the vaccines that your baby or toddler is on the receiving end of? Wonder what's in that needle, anyway? Here are the ABC's of routine childhood vaccinations.

Hepatitis B (HepB)

HEPATITIS B is a liver disease that is spread through contact with the blood or other body fluids of an infected person. Those who become chronically infected with the disease can have serious problems such as cirrhosis (scarring of the liver) or liver cancer. Nearly 5,000 people die from complications of chronic hepatitis B each year.

The vaccine. Hepatitis B vaccine is made from one part of the hepatitis B virus. Since the three doses of the vaccine usually confer lifetime immunity, vaccination beginning at birth or shortly thereafter means your baby will probably never have to worry about catching hepatitis B.

The dose. Three doses of the vaccine are needed. The first is usually given at birth (though it can also be given between birth and 2 months); the second dose is given between 1 to 4 months; the third is given between 6 to 18 months.

Rotavirus (Rota)

ROTAVIRUS is an intestinal virus that is extremely contagious, spreading easily through contact with contaminated hands or objects and through the air, and infecting nearly all children by the time they're five years old. The disease commonly appears between the months of November and May. Before the vaccine was approved, rotavirus triggered more than 400,000 doctor visits and more than 55,000 hospitalizations for diarrhea, vomiting, and dehydration each year in the US. Rotavirus can even be fatal, accounting for 20 to 60 deaths each year in the US. Symptoms include fever, upset stomach, and vomiting, followed by diarrhea that lasts from three to eight days.

The vaccine. The rotavirus vaccine was added to the immunization schedule in 2007. It is an oral vaccine (a liquid given in the mouth) that contains live (but weakened) rotavirus virus.

The dose. Depending on the brand your doctor uses, either two oral doses are given at 2 and 4 months, or three are given at 2, 4, and 6 months.

WHO'S CALLING THE SHOTS?

Every parent feels his or her child's pain — whether it's from a scraped knee, a bumped head, or a bruised ego. Seeing a needle headed for your child's tender skin can also bring on the parental empathy — served up with a side of anxiety (and maybe even a few tears on your part). In fact, sometimes it's hard to tell who's dreading the shots more — the parent or the child. That's normal, and easy to understand — after all, no parent wants to see their child in pain, even for a quick second. But next time your child is scheduled for a vaccination, try to remember who's calling the shots. Children take their emotional cues from their parents — and even the youngest babies will be able to sense your fear and anxiety. If you're a nervous wreck each time the needle appears, your child is likely to react in the same way you do. If you're the model of mellow, your child's likely to be calmer, too. So chill out, and try the tips on page 10 for minimizing your child's pain from vaccinations at your next visit.

Diphtheria, Tetanus, Pertussis (DTaP)

DIPHTHERIA is spread through coughing and sneezing. It initially causes sore throat, fever, and chills. It can also cause a thick covering to form over the back of the throat, blocking the airways and making breathing difficult. If it isn't promptly treated with the proper medication, the infection causes a toxin (poison) to spread in the body that can then lead to heart failure or paralysis. About 1 in 10 of those affected will actually die from diphtheria.

TETANUS is not a contagious disease. Instead, a person typically becomes infected with tetanus if tetanus bacteria found in soil, dirt, dust, or manure enter the body through a wound or cut. Symptoms, which can take up to 3 weeks to appear, include headache, crankiness, stiffness of

VACCINES EXPLAINED

the jaw and neck, and then painful muscle spasms throughout the body. There are about 30 reported cases a year of tetanus in the US, and 1 out of 10 people who get the disease die from it.

PERTUSSIS (aka whooping cough) is a very contagious airborne bacterial infection that causes violent rapid coughing and a loud “whooping” sound upon inhalation. Infants who contract the disease often need to be hospitalized. Between 20 to 40 children under the age of 3 months die from pertussis each year in the US.

The vaccine. DTaP is a combination vaccine protecting against three diseases: diphtheria (D), tetanus (T), and pertussis (P). All three components of the vaccine are “inactivated”— meaning they are killed and incapable of causing the disease. The “a” stands for “acellular” which means that the pertussis part of the vaccine contains only parts of the pertussis bacterium, not the entire cell.

The dose. Five doses of DTaP are needed. The shots are given at 2, 4, and 6 months, followed by a booster between 15 to 18 months, and then another booster between 4 to 6 years old. Since protection can fade over time with this particular vaccine, the Tdap booster vaccine is recommended for adolescents between 11 and 12 years of age.

Haemophilus influenzae type b (Hib)

HIB DISEASE used to be the leading cause of bacterial meningitis in children under the age of 5. In the 1980s before an effective Hib vaccine was available, 1 in 200 children were infected. Among those children, one in 4 had suffered permanent brain damage, and about 1 in 20 died. The disease is spread through the air by coughing, sneezing, even breathing. If the bacteria gets into the lungs it can spread to the brain and other organs.

The vaccine. The Hib conjugate vaccine is made from the sugar coating of the Hib bacterium (in other words, it’s made from just one part of the bacterium).

The dose. Four doses are usually recommended, given at 2, 4, and 6 months, and again between 12 and 15 months of age (though one brand of the vaccine calls for only three doses, at 2 and 4 months and between 12 and 15 months of age).

Pneumococcal (PCV)

PNEUMOCOCCAL DISEASE is a common cause of ear infections, pneumonia, meningitis, and blood

FOR THE LATEST...

For the latest information on vaccines and the CDC’s recommended immunization schedule, go to www.whattoexpect.org or www.cdc.gov/vaccines.

infections. Invasive pneumococcal infections can even lead to death in some children. It is spread through person-to-person contact and is most common during winter and early spring.

The vaccine. The pneumococcal conjugate vaccine is an inactivated (killed) vaccine made from the sugar coatings of pneumococcal bacteria and gives immunity to the 7 different strains of pneumococcal bacteria that cause the most serious infections in children.

The dose. Four doses of PCV are recommended. They are given at 2, 4, and 6 months, and again between 12 and 15 months.

Inactivated Poliovirus (IPV)

POLIO is a disease that has caused paralysis in millions of children worldwide. It is caused by a virus that is spread mainly through contact with the feces of an infected person (such as when changing diapers) and can cause severe muscle pain and paralysis within weeks (though some children with the disease experience only mild cold-like symptoms or no symptoms at all).

The vaccine. The polio vaccine used in the US contains 3 types of inactivated (killed) polio virus.

The dose. Children should get 4 doses of the vaccine at 2, 4, and 6 to 18 months, and again between ages 4 to 6 years.

Influenza

INFLUENZA (aka the flu) is a seasonal illness caused by a virus and spread through sneezing, coughing — even breathing or hand-to-mouth contact after touching a surface with the virus on it. Flu symptoms include fever, sore throat, coughs, headache, chills, and muscle aches. Complications can range from ear and sinus infections to pneumonia and even death. Influenza is different from most other vaccine-preventable diseases because the viruses are always changing, meaning that immunity acquired one year may not protect against future influenza viruses. That’s why a yearly vaccine is recommended.

The vaccine. The flu shot contains inactivated influenza virus strains that have been determined to be the strains that will most likely cause influenza illness for that particular year.

The dose. One dose yearly beginning around October or November is recommended for children 6 months of age and older. Children younger than 9 years of age receiving the vaccine for the first time need two doses at least 4 weeks apart. Once your child is 2 years of age or older, he or she may be able to receive a yearly influenza vaccine that is delivered as a nasal mist instead of a shot.

Measles, Mumps, Rubella (MMR)

MEASLES is a highly contagious illness that causes fever, runny nose, cough, and a rash all over the body. Measles can also progress to pneumonia, infection of the brain (encephalitis), seizures, brain damage, and even death.

MUMPS (like measles) is spread through the air and causes inflammation of the salivary glands, leading to swollen cheeks and jaw. Mumps can lead to meningitis, encephalitis, deafness, or even death.

RUBELLA (also known as German Measles) is spread through the air and causes fever and a slight rash on the face and neck and, in older children and adults, swollen tender glands at the back of the neck and arthritis-like symptoms in the joints. The greatest danger from rubella is to unborn babies who, if their mothers contract rubella during early pregnancy, are at risk of being born deaf, blind, brain damaged, or with heart defects.

The vaccine. The MMR vaccine contains weakened measles (M), mumps (M), and rubella (R) viruses.

The dose. Two doses are recommended. The first is given at 12 to 15 months, the second between 4 and 6 years of age.

Varicella

VARICELLA, more commonly known as chickenpox, used to be one of the most common childhood diseases. Chickenpox causes fever, drowsiness, and an itchy blister-like rash all over the body. It is easily spread through coughing, sneezing, breathing, and through contact with fluid from the blisters. Though usually mild, it occasionally causes more serious problems such as encephalitis (a brain disease), pneumonia, bacterial infections, and in rare instances, even death. Newborns and those who contract the disease when they are older are much more likely to develop serious complications.

The vaccine. The varicella vaccine is made with live (but weakened) chickenpox virus and prevents chickenpox in 70 to 90 percent of people who receive it (and prevents a serious form of chickenpox in more than 95 percent of immunized people). A small percentage of people who get the varicella vaccine develop chickenpox even though they were vaccinated. Such so-called “break-through” infection is usually milder than normal chickenpox and with fewer lesions.

The dose. Two doses of the shot are recommended, the first at 12 to 15 months and a second booster dose between 4 and 6 years of age.

Hepatitis A (HepA)

HEPATITIS A is a liver disease affecting 125,000 to 200,000 people a year, about 30 percent of them children under age 15. The virus is spread through personal contact or by eating or drinking contaminated food or water. Symptoms of the illness in children over age 6 include fever, loss of appetite, stomach pain, vomiting, and jaundice (yellow skin or eyes). Severe hepatitis A can cause liver failure.

The vaccine. The hepatitis A vaccine is made from inactivated (or killed) virus. Because the vaccine is relatively new, it is not known for how long it confers immunity, but experts suggest it may be able to last 20 years or more.

The dose. Two doses are recommended. The first dose is given when the child is 12 months of age and a booster dose is given at least 6 months after the first.



AS YOUR CHILD GROWS

There are two other vaccines your child may be in line for as he or she gets older:

The meningococcal conjugate vaccine, recommended for all children 11 to 12 years old (and for children ages 2 to 10 at high risk) to prevent meningococcal disease, the leading cause of bacterial meningitis (an infection of the fluid surrounding the brain and spinal cord).

The HPV vaccine, recommended for girls age 11 to 12, to prevent human papillomavirus infection, which may cause cervical cancer and genital warts. The vaccine is given in 3 doses over the course of 6 months.

Keeping up with your child's vaccinations is by far one of the best ways to help keep him or her healthy. And, believe it or not, it's easier than you'd think — especially now that you've got help at your fingertips. Think of this *What To Expect Guide to Immunizations* as your partner in protecting your child from vaccine-preventable childhood illnesses. It's packed with what you'll need to know to keep your child fully vaccinated.

There's also an immunization visit planner that will help you keep track of which shots your child receives at each vaccine visit, plus a place for you to jot down all your pediatrician's instructions and advice.

There's no better way to know what to expect when it comes to vaccines!



- ◆ Information about the vaccines on your child's schedule of shots.
- ◆ Answers to your questions about a vaccine's safety, effectiveness, and importance.
- ◆ The latest on the new generation of combination shots.
- ◆ Tips on how to prepare your child for the needles coming his or her way.
- ◆ And much more...



The What to Expect Foundation has developed this vaccination guide with support from GlaxoSmithKline (GSK) to help parents better understand the recommended shots their children will receive as babies through age six.

GlaxoSmithKline — one of the world's leading research-based pharmaceutical and healthcare companies — is committed to improving the quality of human life by enabling people to do more, feel better and live longer. GSK develops and manufactures vaccines that can help save lives and prevent illnesses. For company information, please visit www.gsk.com.



HEIDI MURKOFF is the mom who wrote *What To Expect*, the bestselling series that has helped over 27 million families from pregnancy through their child's toddler years. Heidi and **The What to Expect Foundation** are committed to helping every family know what to expect — which is why she donated all of her time and services for this program.