Tdap Vaccine for Preteens and Teens

Last updated JUNE 2014

Why does my child need Tdap vaccine?

Babies and little kids get shots called DTaP to protect them from diphtheria, tetanus, and pertussis (whooping cough). But as kids get older, the protection from the DTaP shots starts to wear off. This can put your preteen or teen at risk for serious illness. The tetanus-diphtheria-acellular pertussis (Tdap) vaccine is a booster shot that helps protect your preteen or teen from the same diseases that DTaP shots protect little kids from.

- **Tetanus** is caused by a toxin (poison) made by bacteria found in soil. The bacteria enter the body through cuts, scratches, or puncture wounds in the skin. Tetanus can cause spasms which are painful muscle cramps in the jaw muscle (lockjaw) and throughout the body. The spasms can cause breathing problems and paralysis. A preteen or teen with tetanus could spend weeks in the hospital in intensive care. As many as 1 out of 5 people who get tetanus dies.
- **Diphtheria** is not as common as tetanus but can be very dangerous. It spreads from person to person through coughing or sneezing. It causes a thick coating on the back of the nose or throat that can make it hard to breathe or swallow. It can also cause paralysis and heart failure. About 1 out of 10 people who get diphtheria will die from it.
- **Pertussis (whooping cough)** spreads very easily through coughing and sneezing. It can cause a bad cough that makes someone gasp for air after coughing fits. This cough can last for many weeks, which can make preteens and teens miss school and other activities. Whooping cough can be deadly for babies who are too young to have protection from their own vaccines. Often babies get whooping cough from their older brothers or sisters, like preteens or teens, or other people in the family.

When should my child be vaccinated?

All preteens should get one Tdap shot when they are 11 or 12 years old. If your teen is 13 years old up through 18 years old and hasn't gotten the shot yet, talk to their doctor about getting it for them right away.

What else should I know about the vaccine?

The Tdap shot has been studied very carefully and is safe. It is recommended by the Centers for Disease Control and Prevention (CDC), the American Academy of Family Physicians, the American Academy of Pediatrics, and the Society for Adolescent Health and Medicine.

The Tdap shot can cause mild side effects, like redness and soreness in the arm where the shot was given, headache, fever, or tiredness. Some preteens and teens might faint after getting the Tdap vaccine or any other shot. To help avoid fainting, preteens and teens should sit or lie down when they get a shot and then for about 15 minutes after getting the shot. Serious side effects from reactions to the Tdap shot are rare.

How can I get help paying for these vaccines?

The Vaccines for Children (VFC) program provides vaccines for children ages 18 years and younger, who are not insured, Medicaid-eligible, American Indian or Alaska Native. You can find out more about the VFC program by going online to www.cdc.gov and typing VFC in the search box.

Where can I learn more?

Your child's doctor or nurse can give you more information about the Tdap vaccine and the other vaccines your child may need. There is also information on CDC's Vaccines for Preteens and Teens website at www.cdc.gov/vaccines/teens.

DISTRIBUTED BY:
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™
Louisiana Chapter

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CS 249472C

Tdap Vaccine

As a parent, you do everything you can to protect your children's health. The Tdap vaccine can help protect not only your child's health but also the health of those around them, like babies who are too young to be vaccinated.

Tdap and whooping cough

The Tdap shot protects against three diseases: tetanus, diphtheria, and pertussis or whooping cough.

Whooping cough is the most common of those diseases and spreads very easily through coughing and sneezing. It can cause a bad cough that makes someone gasp for air after coughing fits. This cough can last for many weeks, which can make preteens and teens miss school and other activities. Though not very common, whooping cough can also lead to complications like cracked ribs and pneumonia, even among healthy preteens and teens.

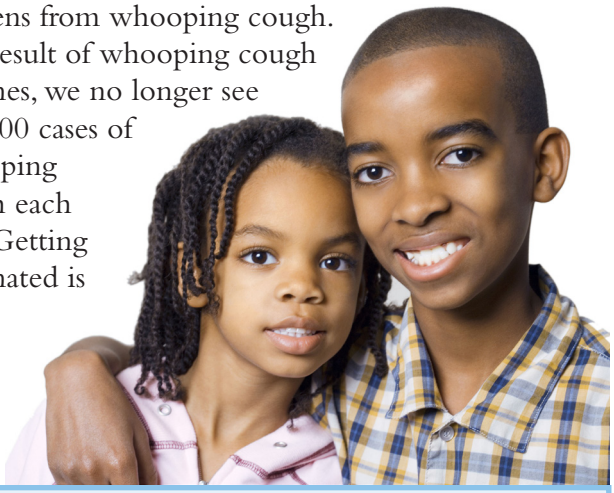
Whooping cough can be deadly for babies, especially those who are too young to have protection from their own vaccines. The majority of reported whooping cough deaths are in babies younger than 3 months old. Often babies get whooping cough from their older brothers or sisters, like preteens or teens, or other people in the family.

Tdap vaccination is recommended for preteens at ages 11-12

All preteens should get one Tdap shot when they are 11 or 12 years old. If your teen is 13 years old up through 18 years old and hasn't gotten the vaccine yet, talk to their doctor about getting it for them right away. Babies and little kids get shots called DTaP to protect them from diphtheria, tetanus, and whooping cough. But as kids get older, the protection from the DTaP shots starts to wear off. This can put your preteen or teen at risk for serious illness. The Tdap vaccine is a booster shot that helps protect your preteen or teen from the same diseases that DTaP shots protect little kids from.

Whooping cough vaccines work

Even though whooping cough shots don't provide lifelong protection, on time vaccination can still help protect preteens from whooping cough. As a result of whooping cough vaccines, we no longer see 200,000 cases of whooping cough each year. Getting vaccinated is



Is Tdap vaccine safe?

The Tdap shot has been studied very carefully and is safe. It is recommended by the Centers for Disease Control and Prevention, the American Academy of Family Physicians, the American Academy of Pediatrics, and the Society for Adolescent Health and Medicine.

The Tdap vaccine can cause mild side effects, like redness and soreness in the arm where the shot was given, headache, fever, or tiredness. Some preteens and teens might faint after getting the Tdap vaccine or any other shot. To help avoid fainting, preteens and teens should sit or lie down when they get a shot and then for about 15 minutes after getting the shot. Serious side effects from reactions to the Tdap shot are rare.

The Tdap vaccine can safely be given at the same time as the other recommended vaccines, including the HPV, meningococcal, and influenza vaccines. Learn more about all of the recommended preteen vaccines at www.cdc.gov/vaccines/teens.

DISTRIBUTED BY:
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™
Louisiana Chapter

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

CS249472G

the best way to prevent whooping cough and its complications. Those who get a whooping cough shot and still get whooping cough are much more likely to have a mild illness compared to those who never received the vaccine. Vaccinated preteens and teens will have fewer coughing fits, shorter illness, and are less likely to crack a rib or develop pneumonia, among other benefits.

Help paying for vaccines

The Vaccines for Children (VFC) program provides vaccines for children ages 18 years and younger who are uninsured, Medicaid-eligible, or American Indian/Alaska Native. Learn more about the VFC program at **www.cdc.gov/Features/VFCprogram/**

Whether you have insurance, or your child is VFC-eligible, some doctors' offices may also charge a fee to give the vaccines.

Callie's story: "Callie could have caught whooping cough from anyone."

On Christmas Eve 2009, Katie and Craig welcomed their daughter Callie Grace into the world. After trying for 5 years to have a child—and suffering several miscarriages—the couple considered Callie their miracle baby. Callie was born 6 weeks early, but she was healthy and strong and came home after only 2 weeks in the hospital.

In January, when she was a month old, Callie developed a soft, dry cough. "It sounded like when a child mimics their parent to get attention. I took her to the doctor," Katie recalls. The doctor did not find any serious signs of illness, so he sent them home.

However, over the next couple of days, Callie's condition worsened. She continued to cough, and she also became pale, lethargic, and suddenly lost her healthy appetite. Katie took Callie back to the doctor, and while they waited, Callie stopped breathing. A nurse was able to get Callie breathing again, and they were rushed to the hospital by ambulance.

"At the hospital, nurses and doctors flocked to our room," Katie remembers. "It was truly overwhelming. I was scared and Callie was screaming." Callie was admitted to the Pediatric Intensive Care Unit, where the staff ran tests to try to find out what was wrong. After a couple of days of monitoring, they started her on antibiotics, while still waiting on test results.

During Callie's second day at the hospital, she seemed to be doing better and her parents were hopeful that she'd recover. But the next night, Callie stopped breathing again. Family members watched helplessly from behind a glass wall as doctors tried for 45 minutes to revive her. Tragically, Callie could not be saved. She was only 5 weeks old. "We never dreamed we'd lose her," Katie said.

A few days later, the family found out that whooping cough was the cause of Callie's death. "We could not believe it," Katie says, "We were so careful to not expose her to a lot of people," Katie says.

The first dose of DTaP vaccine is recommended at 2 months of age but babies are not fully protected until they get all the recommended doses. Callie was too young to even get her first dose of DTaP.

Babies need whooping cough vaccination on time, but there's another important way to protect them. Pregnant women should get Tdap in the 3rd trimester of each pregnancy. Family members and others who are around babies, including child and teenage siblings, should be up-to-date with whooping cough shots.

"Callie could have caught whooping cough from anyone—even from someone in the hospital right after she was born. People with even a slight cough might have whooping cough but not know it. I urge people to be sure they get the Tdap booster shot," Katie says. "Getting that shot could save a life."

For more information about the vaccines recommended for preteens and teens:
800-CDC-INFO *(800-232-4636)*
www.cdc.gov/vaccines/teens

La vacuna Tdap para preadolescentes y adolescentes

Actualizado en junio de 2014

¿Por qué necesita mi hijo la vacuna Tdap?

Los bebés y los niños pequeños reciben vacunas llamadas DTaP para protegerlos contra la difteria, el tétanos y la tosferina (pertussis, también llamada tos convulsa). Sin embargo, cuando los niños crecen, la protección de las vacunas DTaP empieza a desaparecer y esto puede poner a su preadolescente o adolescente en riesgo de contraer enfermedades graves. La vacuna contra el tétanos, la difteria y la tosferina acelular (Tdap) es una vacuna de refuerzo que ayuda a proteger a su preadolescente o adolescente de las mismas enfermedades de las que la vacuna DTaP protege a los niños pequeños.

- El **tétanos** es causado por una toxina (veneno) que producen las bacterias que se encuentran en la tierra. La bacteria ingresa al cuerpo a través de cortaduras, rasguños o heridas punzantes en la piel. El tétanos puede causar espasmos, que son dolorosos calambres musculares, en el músculo de la mandíbula (trismo) y en todo el cuerpo. Los espasmos pueden causar problemas para respirar y parálisis. Un preadolescente o adolescente con tétanos podría pasar semanas en cuidados intensivos del hospital. Hasta 1 de cada 5 personas que contraen el tétanos muere como consecuencia de la enfermedad.

- La **difteria** no es tan común como el tétanos, pero puede ser muy peligrosa. Se propaga de persona a persona a través de la tos o el estornudo. Produce un recubrimiento espeso en la parte posterior de la nariz o la garganta que puede causar dificultar para respirar o tragar. También puede causar parálisis e insuficiencia cardiaca. Alrededor de 1 de cada 10 personas que contraen difteria morirá como consecuencia de la enfermedad.

- La **tosferina (pertussis, también llamada tos convulsa)** se propaga con mucha facilidad a través de la tos y los estornudos. Puede causar una tos intensa que deja a la persona con sensación de asfixia después de un ataque de tos. Esta tos puede durar muchas semanas, lo cual puede hacer que los preadolescentes y los adolescentes pierdan días de escuela y otras actividades. La tosferina puede ser mortal para los bebés que son demasiado pequeños para tener la protección de sus propias vacunas. A menudo, los bebés contraen la tosferina de sus hermanos o hermanas mayores, como preadolescentes o adolescentes, o de otras personas en la familia.

¿Cuándo se debe vacunar mi hijo?

Todos los preadolescentes deben recibir una vacuna Tdap a los 11 o 12 años. Si su adolescente tiene de 13 a 18 años y todavía no le han puesto la vacuna, hable con su médico para que se la pongan inmediatamente.

¿Qué más debo saber sobre la vacuna?

La vacuna Tdap ha sido estudiada muy cuidadosamente y ha demostrado ser segura. Los Centros para el Control y la Prevención de Enfermedades (CDC), la Academia Estadounidense de Médicos de Familia, la Academia Americana de Pediatría y la Sociedad de Salud y Medicina para Adolescentes la recomiendan.

La vacuna Tdap puede causar efectos secundarios leves, como enrojecimiento y dolor en el brazo donde se coloca la inyección, dolor de cabeza, fiebre o cansancio. Algunos preadolescentes y adolescentes pueden desmayarse después de recibir la vacuna Tdap o cualquier otra. Para ayudar a evitar un desmayo, los preadolescentes y adolescentes deberían sentarse o recostarse cuando se les ponga una vacuna y mantenerse en esa posición por unos 15 minutos después de recibir la inyección. Las reacciones graves a la vacuna Tdap son raras.

¿Cómo puedo obtener ayuda para pagar por estas vacunas?

El programa de Vacunas para Niños (VFC, por sus siglas en inglés) proporciona vacunas para niños de hasta 18 años que no tengan seguro médico, que cumplan con los requisitos para recibir Medicaid o que sean indoamericanos o nativos de Alaska. Puede averiguar más sobre el programa VFC en Internet en www.cdc.gov/spanish/especialesCDC/ProgramaVacunas.

¿Dónde puedo obtener mayor información?

El médico o el enfermero de su hijo le puede dar más información sobre la vacuna Tdap y las demás vacunas que su hijo podría necesitar. También hay información en el sitio web de los CDC "Vacunas para preadolescentes y adolescentes" en www.cdc.gov/spanish/especialesCDC/VacunasPreadolescentes/.

DISTRIBUIDO POR:

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

250070-D

Tetanus: Questions and Answers

Information about the disease and vaccines

What causes tetanus?
Tetanus is caused by a toxin (poison) produced by the bacterium *Clostridium tetani.* The *C. tetani* bacteria cannot grow in the presence of oxygen. They produce spores that are very difficult to kill as they are resistant to heat and many chemical agents.

How does tetanus spread?
C. tetani spores can be found in the soil and in the intestines and feces of many household and farm animals and humans. The bacteria usually enter the human body through a puncture (in the presence of anaerobic [low oxygen] conditions, the spores will germinate).

Tetanus is not spread from person to person.

How long does it take to show signs of tetanus after being exposed?
The incubation period varies from 3–21 days, with an average of eight days. The further the injury site is from the central nervous system, the longer the incubation period. The shorter the incubation period, the higher the risk of death.

What are the symptoms of tetanus?
The symptoms of tetanus are caused by the tetanus toxin acting on the central nervous system. In the most common form of tetanus, the first sign is spasm of the jaw muscles, followed by stiffness of the neck, difficulty in swallowing, and stiffness of the abdominal muscles.

Other signs include fever, sweating, elevated blood pressure, and rapid heart rate. Spasms often occur, which may last for several minutes and continue for 3–4 weeks. Complete recovery, if it occurs, may take months.

How serious is tetanus?
Tetanus has a high fatality rate. In recent years, tetanus has been fatal in about 10% of reported cases.

What are possible complications from tetanus?
Laryngospasm (spasm of the vocal cords) is a complication that can lead to interference with breathing. Patients can also break their spine or long bones from convulsions. Other possible complications include hypertension, abnormal heart rhythm, and secondary infections, which are common because of prolonged hospital stays.

Obviously, the high probability of death is a major complication.

How is tetanus diagnosed?
The diagnosis of tetanus is based on the clinical signs and symptoms only. Laboratory diagnosis is not useful as the *C. tetani* bacteria usually cannot be recovered from the wound of an individual who has tetanus, and conversely, can be isolated from the skin of an individual who does not have tetanus.

What kind of injuries might allow tetanus to enter the body?
Tetanus bacilli live in the soil, so the most dangerous kind of injury involves possible contamination with dirt, animal feces, and manure. Although we have traditionally worried about deep puncture wounds, in reality many types of injuries can allow tetanus bacilli to enter the body. In recent years, a higher proportion of cases had minor wounds than had major ones, probably because severe wounds were more likely to be properly managed. People can also get tetanus from splinters, self-piercing, and self-tattooing. Injecting drug users are also at risk for tetanus.

I stepped on a nail in our yard. What should I do?
Any wound that may involve contamination with tetanus bacilli should be attended to as soon as possible. Treatment depends on your vaccination status and the nature of the wound. In all cases, the wound should be cleaned. Seek treatment immediately and bring your immunization record with you.

With wounds that involve the possibility of tetanus contamination, a patient with an unknown or incomplete history of tetanus vaccination needs a tetanus- and diphtheria-containing shot (Td or Tdap) and a dose of tetanus immune globulin (TIG) as soon as possible.

A person with a documented series of three tetanus- and diphtheria-containing shots (Td or Tdap) who has received a booster dose within the last ten years should be protected. However, to ensure adequate protection, a booster dose of vaccine may still be given if it has been more than five years since the last dose and the wound is other than clean and minor.

Is there a treatment for tetanus?
There is no "cure" for tetanus once a person develops

Technical content reviewed by the Centers for Disease Control and Prevention

www.immunize.org/catg.d/p4220.pdf • Item #P4220 (7/13)

symptoms, just supportive treatment and management of complications. The best "treatment" is prevention through immunization.

How common is tetanus in the United States?
Tetanus first became a reportable disease in the late 1940s. At that time, there were 500–600 cases reported per year. After the introduction of the tetanus vaccine in the mid-1940s, reported cases of tetanus dropped steadily.

From 2000 through 2007 an average of 31 cases were reported per year.

Almost all cases of tetanus are in people who have never been vaccinated, or who completed their childhood series, but did not have a booster dose in the preceding 10 years.

What is neonatal tetanus?
Neonatal tetanus is a form of tetanus that occurs in newborn infants, most often through the use of an unsterile cutting instrument on the unhealed umbilical stump. These babies usually have no temporary immunity passed on from their mother because their mother usually hasn't been vaccinated and therefore has no immunity.

Neonatal tetanus is very rare in the United States (only two cases have been reported since 1989), but is common in some developing countries. It caused more than 257,000 deaths worldwide each year in the years 2000 to 2003.

Can you get tetanus more than once?
Yes! Tetanus disease does not result in immunity because so little of the potent toxin is required to cause the disease. People recovering from tetanus should begin or complete the vaccination series.

When did vaccine first become available for diphtheria, tetanus, and pertussis?
The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?
These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as “inactivated” vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What’s the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?
It’s like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small “d” which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?
The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given in the deltoid muscle for children and adults age 7

years and older.

Who should get these vaccines?
All children, beginning at age 2 months, and adults need protection against these three diseases—diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?
The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?
Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?
Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?
After a properly spaced primary series of DTaP or Td/Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?
Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?
Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?
No.

Diphtheria: Questions and Answers

Information about the disease and vaccines

What causes diphtheria?
Diphtheria is caused by a bacterium, *Corynebacterium diphtheriae.* The actual disease is caused when the bacteria release a toxin, or poison, into a person's body.

How does diphtheria spread?
Diphtheria bacteria live in the mouth, throat, and nose of an infected person and can be passed to others by coughing or sneezing. Occasionally, transmission occurs from skin sores or through articles soiled with oozing from sores of infected people.

How long does it take to show signs of diphtheria after being exposed?
The incubation period is short: 2–5 days, with a range of 1–10 days.

What are the symptoms of diphtheria?
Early symptoms of diphtheria may mimic a cold with a sore throat, mild fever, and chills. Usually, the disease causes a thick coating at the back of the throat, which can make it difficult to breathe or swallow. Other body sites besides the throat can also be affected, including the nose, larynx, eye, vagina, and skin.

How serious is diphtheria?
Diphtheria is a serious disease: 5%–10% of all people with diphtheria die. Up to 20% of cases lead to death in certain age groups of individuals (e.g., children younger than age 5 years and adults older than age 40 years).

What are possible complications from diphtheria?
Most complications of diphtheria are due to the release of the toxin, or poison. The most common complications are inflammation of the heart leading to abnormal heart rhythms, and inflammation of the nerves which may cause temporary paralysis of some muscles. If the paralysis affects the diaphragm (the major muscle for breathing), the patient may develop pneumonia or respiratory failure. The thick membrane coating at the back of the throat may cause serious breathing problems, including suffocation.

How do I know if someone has diphtheria?
The diagnosis of diphtheria can only be confirmed after a physician takes a small sample of infected material from the patient's throat (or other site) and has the sample tested in a laboratory. But because this disease progresses quickly, treatment usually should begin based on the health professional's assessment of the patient.

Is there a treatment for diphtheria?
Diphtheria is treated with both antibiotics and with diphtheria antitoxin. Diphtheria antitoxin is produced in horses and was first used in the United States in 1891. Antitoxin does not get rid of toxin that is already attached to the body's tissues, but will neutralize any circulating poison and will prevent the disease from getting worse. The patient should be tested for sensitivity to this antitoxin before it is given.

How common is diphtheria in the United States?
Diphtheria was once a greatly feared illness in the United States. In the 1920s, there were between 100,000 and 200,000 cases of diphtheria each year with 13,000–15,000 deaths. Because of widespread immunization and better living conditions, diphtheria is now rare in the United States (during 1998–2009, seven cases of respiratory diphtheria were reported to CDC).

Recent surveys have found that immunity decreases with age, and only 30% of U.S. adults age 60–69 years are vaccinated against diphtheria. This is a concern because the disease continues to occur in other parts of the world. For example, after the breakup of the former Soviet Union, their vaccination rates fell, and large outbreaks of diphtheria began in 1990 in the Newly Independent States. From 1990 to 1998, more than 150,000 people got sick from diphtheria and more than 5,000 people died. This situation, and other outbreaks around the world, illustrates what can happen when vaccination levels fall. Outbreaks in other countries also increase the risk of diphtheria importation into the United States.

Can you get diphtheria more than once?
Yes. Even individuals recovering from diphtheria should be immunized against the disease as soon as possible.

When did vaccine first become available for diphtheria, tetanus, and pertussis?
The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in

Technical content reviewed by the Centers for Disease Control and Prevention

www.immunize.org/catg.d/p4203.pdf • Item #P4203 (7/13)

widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?

These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as "inactivated" vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What's the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?

It's like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small "d" which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?

The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given in the deltoid muscle for children and adults age 7 years and older.

Who should get these vaccines?

All children, beginning at age 2 months, and adults need protection against these three diseases—diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?

The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?

Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?
Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?
After a properly spaced primary series of DTaP or Td/Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?
Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?
Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?
No.

Pertussis (Whooping Cough): Questions and Answers

Information about the disease and vaccines

What causes pertussis?
Pertussis, commonly known as whooping cough, is caused by a bacterium, *Bordetella pertussis.*

How does pertussis spread?
Pertussis is spread through the air by infectious droplets and is highly contagious.

How long does it take to show signs of pertussis after being exposed?
The incubation period of pertussis is commonly 7 to 10 days, with a range of 4–21 days.

What are the symptoms of pertussis?
Pertussis disease can be divided into three stages:

Catarrhal stage: can last 1–2 weeks and includes a runny nose, sneezing, low-grade fever, and a mild cough (all similar symptoms to the common cold).

Paroxysmal stage: usually lasts 1–6 weeks, but can persist for up to 10 weeks. The characteristic symptom is a burst, or paroxysm, of numerous, rapid coughs. At the end of the cough paroxysm, the patient can suffer from a long inhaling effort that is characterized by a high-pitched whoop (hence the name, "whooping cough"). Infants and young children often appear very ill and distressed, and may turn blue and vomit. “Whooping” does not necessarily have to accompany the cough.

Convalescent stage: usually lasts 2–6 weeks, but may last for months. Although the cough usually disappears after 2–3 weeks, paroxysms may recur whenever the patient suffers any subsequent respiratory infection. The disease is usually milder in adolescents and adults, consisting of a persistent cough similar to that found in other upper respiratory infections. However, these individuals are still able to transmit the disease to others, including unimmunized or incompletely immunized infants.

How serious is pertussis?
Pertussis can be a very serious disease, especially for infants. Infants (6 months of age and younger) are the children most likely to die from this disease. Rates of hospitalization and complications increase with decreasing age. The breathing difficulties associated with this disease can be very distressing and frightening for the patient and his or her family.

Although adults are less likely than infants to become seriously ill with pertussis, most make repeated visits for medical care and miss work, especially when pertussis is not initially considered as a reason for their long-term cough. In addition, adults with pertussis infection have been shown to be a frequent source of infection to infants with whom they have close contact.

What are possible complications from pertussis?
Younger patients have a greater chance of complications from pertussis than older patients. The most common complication is secondary bacterial infection, which is the cause of most pertussis-related deaths. Pneumonia occurs in one out of 20 cases; this percentage is higher for infants younger than age 6 months.

Infants are also more likely to suffer from such neurologic complications such as seizures and encephalopathy, probably due to the reduction of oxygen supply to the brain. Other less serious complications include ear infection, loss of appetite, and dehydration.

Adults with pertussis can have complications such as pneumonia (up to 5% of cases) and rib fracture from coughing (up to 4% of cases). Other reported side effects include (among others), loss of consciousness, female urinary incontinence, hernias, angina, and weight loss.

How do I know if my child has pertussis?
The diagnosis of pertussis is usually made based on its characteristic history and physical examination. A laboratory test may be done, which involves taking a specimen from the back of the patient's throat (through the nose).

Is there a treatment for pertussis?
Antibiotics are necessary in treating pertussis cases. The drug of choice is usually a form of erythromycin that is also given to all household and other close contacts of the patient to minimize transmission, regardless of age and vaccination status.

Patients also need supportive therapy such as bed rest, fluids, and control of fever.

All close contacts younger than seven years of age should complete their DTaP vaccine series if they have not already done so. If they have completed their primary four dose series, but have not had a

Technical content reviewed by the Centers for Disease Control and Prevention

www.immunize.org/catg.d/p4212.pdf • Item #P4212 (7/13)

dose from age 4 to 6 years, they should be given a booster dose if it has been at least 6 months since the last dose. People age 10 years and older should receive a dose of Tdap if they haven't received it already.

How long is a person with pertussis contagious?
People with pertussis are most infectious during the catarrhal period and during the first two weeks after onset of the cough (approximately 21 days).

How common is pertussis in the United States?
Before a vaccine against pertussis was available, pertussis (whooping cough) was a major cause of childhood illness and death in the United States. From 1940–1945, over one million cases of pertussis were reported. With the introduction of a vaccine in the late 1940s, the number of reported pertussis cases in the U.S. declined from approximately 200,000 a year in the pre-vaccine era to a low of 1,010 cases in 1976.

Since the 1980s, the number of cases of pertussis has increased, especially among babies younger than 6 months and teenagers. In recent years, several states have reported a significant increase in cases, with outbreaks of pertussis reaching epidemic levels in some states. Many infants have died from whooping cough during this epidemic.

Can you get pertussis more than once?
Reinfection appears to be uncommon but does occur. With natural infection, immunity to pertussis will likely wane as soon as seven years following disease; reinfection may present as a persistent cough, rather than typical pertussis.

When did vaccine first become available for diphtheria, tetanus, and pertussis?
The first inactivated toxin, or toxoid, against diphtheria was developed around 1921, but it was not widely used until the 1930s. In 1924, the first tetanus toxoid (inactivated toxin) was produced and was used successfully to prevent tetanus in the armed services during World War II. The first pertussis vaccine was developed in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria and tetanus toxoids to make the combination DTP vaccine. A series of 4 doses of whole-cell DTP vaccine was quite (70–90%) effective in preventing serious pertussis disease; however, up to half of the children who received the vaccine developed local reactions such as redness, swelling, and pain at the injection site. In 1991, concerns about safety led to the development of more purified (acellular) pertussis vaccines that are associated with fewer side effects. These acellular pertussis vaccines have replaced the whole cell DTP vaccines in the U.S.

In 2005, two new vaccine products were licensed for use in adolescents and adults that combine the tetanus and diphtheria toxoids with acellular pertussis (Tdap) vaccine. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

How are vaccines made that prevent diphtheria, tetanus and pertussis?
These vaccines are made by chemically treating the diphtheria, tetanus, and pertussis toxins to render them nontoxic yet still capable of eliciting an immune response in the vaccinated person. They are known as "inactivated" vaccines because they do not contain live bacteria and cannot replicate themselves, which is why multiple doses are needed to produce immunity.

What's the difference between all the vaccines containing diphtheria and tetanus toxoids and pertussis vaccine?
It's like alphabet soup! Here is a listing of the various products:

- DTaP: Diphtheria and tetanus toxoids and acellular pertussis vaccine; given to infants and children ages 6 weeks through 6 years. In addition, three childhood combination vaccines include DTaP as a component.
- DT: Diphtheria and tetanus toxoids, without the pertussis component; given to infants and children ages 6 weeks through 6 years who have a contraindication to the pertussis component.
- Tdap: Tetanus and diphtheria toxoids with acellular pertussis vaccine; given to adolescents and adults, usually as a single dose; the exception is pregnant women who should receive Tdap during each pregnancy.
- Td: Tetanus and diphtheria toxoids; given to children and adults ages 7 years and older. Note the small "d" which indicates a much smaller quantity of diphtheria toxoid than in the pediatric DTaP formulation.

How are these vaccines given?
The DTaP and DT preparations are all given as an injection in the anterolateral thigh muscle (for infants and young toddlers) or in the deltoid muscle (for older children and adults). Tdap and Td are given

in the deltoid muscle for children and adults age 7 years and older.

Who should get these vaccines?
All children, beginning at age 2 months, and all adults need protection against these three diseases—diphtheria, tetanus, and pertussis (whooping cough). Routine booster doses are also needed throughout life.

How many doses of vaccine are needed?
The usual schedule for infants is a series of four doses of DTaP given at 2, 4, 6, and 15–18 months of age. A fifth shot, or booster dose, is recommended between age 4 and 6 years, unless the fourth dose was given late (after the fourth birthday).

For people who were never vaccinated or who may have started but not completed a series of shots, a 3-dose series of Td should be given with 1 to 2 months between dose #1 and #2, and 6 to 12 months between dose #2 and #3. One of the doses, preferably the first, should also contain the pertussis component in the form of Tdap.

Because immunity to diphtheria and tetanus wanes with time, boosters of Td are needed every ten years.

When adolescents and adults are scheduled for their routine tetanus and diphtheria booster, should they get vaccinated with Td or Tdap?
Immunization experts recommend that the first dose of Tdap be given to all adolescents at age 11–12 years as a booster during the routine adolescent immunization visit if the adolescent has finished the childhood DTaP schedule and has not already received a dose of Td or Tdap. If a child age 7–10 years did not complete a primary series in childhood, a dose of Tdap may be given earlier as part of the catch-up vaccinations.

All adults should receive a single dose of Tdap as soon as feasible. Then, subsequent booster doses of Td should be given every ten years. Pregnant teens and women should receive Tdap during each pregnancy. Adolescents and adults who have recently received Td vaccine can be given Tdap without any waiting period.

If someone experiences a deep or puncture wound, or a wound contaminated with dirt, an additional booster dose may be given if the last dose was more than five years ago. This could be a dose of Td or Tdap, depending on the person's vaccination history. It is important to keep an up-to-date record of all immunizations so that repeat doses don't become necessary. Although it is vital to be adequately protected, receiving more doses than recommended can lead to increased local reactions, such as painful swelling of the arm.

Who recommends the use of these vaccines?
The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Physicians (ACP) all recommend this vaccine.

What side effects have been reported with these vaccines?
Local reactions, such as fever, redness and swelling at the injection site, and soreness and tenderness where the shot was given, are not uncommon in children and adults. These minor local and systemic adverse reactions are much less common with acellular DTaP vaccine; however, a determination of more rare adverse effects can only be made when additional data are available following extended use of DTaP.

Side effects following Td or Tdap in older children and adults include redness and swelling at the injection site (following Td) and generalized body aches, and tiredness (following Tdap). Older children and adults who received more than the recommended doses of Td/Tdap vaccine can experience increased local reactions, such as painful swelling of the arm. This is due to the high levels of tetanus antibody in their blood.

How effective are these vaccines?
After a properly spaced primary series of DTaP or Td/Tdap, approximately 95% of people will have protective levels of diphtheria antitoxin and 100% will have protective levels of tetanus antitoxin in their blood. However, antitoxin levels decrease with time so routine boosters with tetanus and diphtheria toxoids are recommended every 10 years. Estimates of acellular pertussis vaccine efficacy range from 80% to 85%—a level believed to be far more efficacious than the previously-used whole cell pertussis vaccine.

Can a pregnant woman receive Tdap vaccine?
Yes. All pregnant women should receive Tdap during each pregnancy, preferably between 27 and 36 weeks' gestation. Because infants are not adequately protected against pertussis until they have received at least 3 doses of DTaP, it is especially important that all contacts (family members, caregivers) of infants younger than age 12 months are vaccinated with Tdap. If a new mother hasn't been vaccinated with

Tdap, she should receive it before hospital discharge, even if she is breastfeeding.

Who should not receive these vaccines?
Generally, any person who has had a serious allergic reaction to a vaccine component or a prior dose of the vaccine should not receive another dose of the same vaccine. People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher within two days, collapse or shock-like state within two days, persistent crying for more than three hours within two days, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Can the vaccine cause the disease?
No.

Protect yourself from **whooping cough**… Get vaccinated!

What is whooping cough?

Whooping cough is a serious disease caused by bacteria. It is called whooping cough because of the "whoop" heard when a person who has it gasps for breath. Whooping cough is also known as pertussis.

How do you catch it?

Whooping cough is spread through the air by coughing and sneezing. It is very contagious.

Is it serious?

Whooping cough can trigger coughing so severe that it results in vomiting and broken ribs. The cough can last for weeks or months.

More than half of babies younger than one year old who get whooping cough are hospitalized. Babies are the most likely to die from whooping cough or have complications such as seizures and brain damage.

Am I at risk?

Yes. Whooping cough is most dangerous for babies, but anyone can become seriously ill from it.

How can I protect myself from whooping cough?

You can protect yourself (and others) by getting vaccinated.

All babies, children, and teens should get vaccinated against whooping cough as part of their regular checkups.

Adults should also get vaccinated against whooping cough to protect themselves, their families and friends, and babies they may be in contact with.

Ask your healthcare provider if you need this vaccine!

Babies and children need to be vaccinated with DTaP vaccine, and older children, teens, and adults should receive Tdap vaccine. These vaccines protect against diphtheria, tetanus, and pertussis (whooping cough).

▶ For more information, visit www.vaccineinformation.org

For other vaccine handouts in this series,
visit www.immunize.org/vaccine-summaries

immunization action coalition
IAC
immunize.org

Technical content reviewed by the Centers for Disease Control and Prevention
1573 Selby Avenue ▪ Saint Paul, Minnesota ▪ www.immunize.org
www.immunize.org/catg.d/p4416.pdf ▪ Item #P4416 (5/13)