

# Important Facts Regarding Immunizations

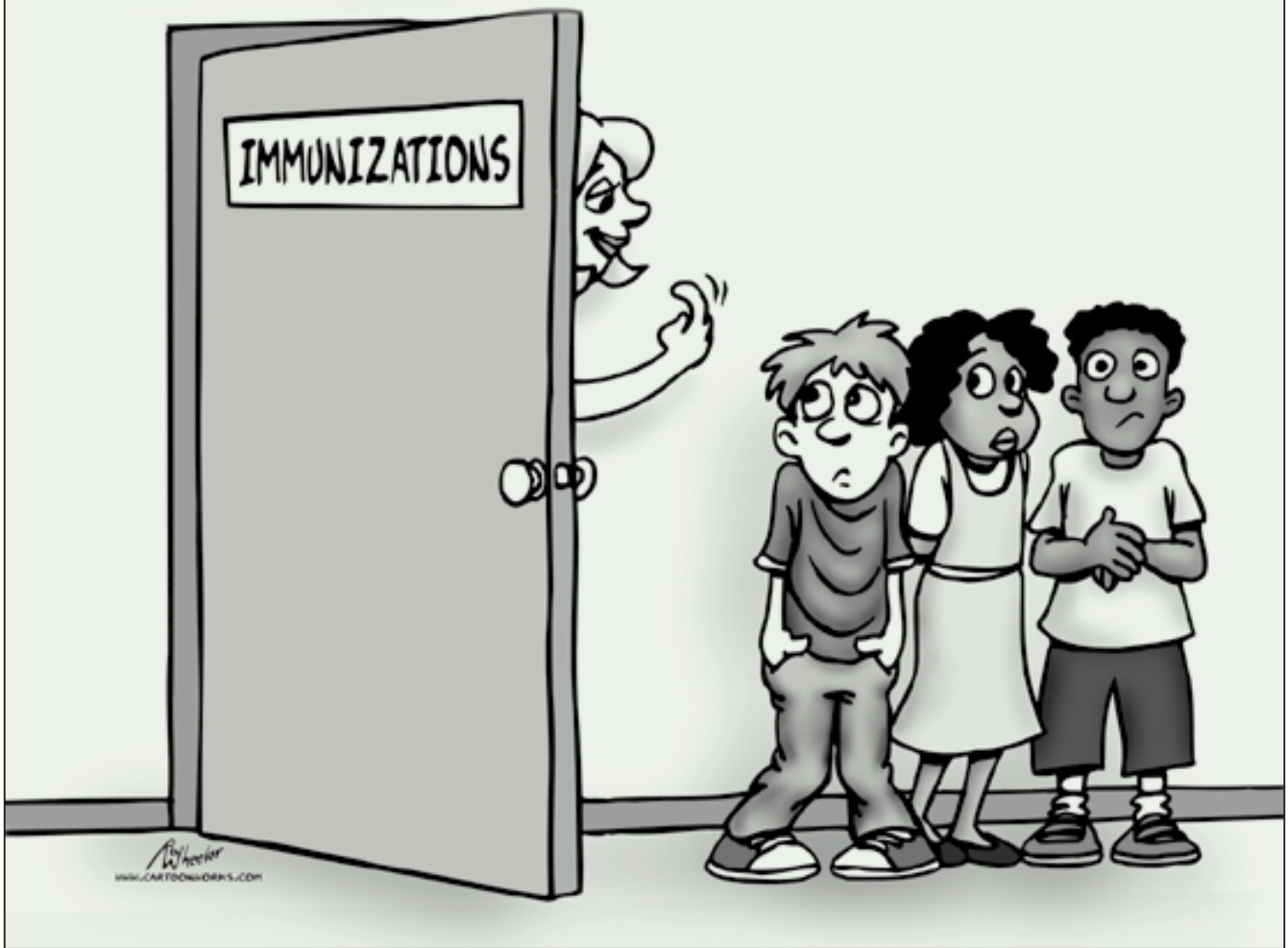
*There has been such a dramatic drop in immunization/vaccination rates that many experts believe preventable illnesses such as measles, whooping cough (pertussis), diphtheria, tetanus, polio, chickenpox (varicella), and tuberculosis will soon again become a real threat.*

**A**round the world, too many children are growing up vulnerable to deadly and preventable diseases. In the U.S., misinformation or lack of information are the main reasons so many children are unprotected. In developing countries, children's vulnerability to preventable diseases is due to a variety of factors such as underutilization of existing services, unavailability of vaccines, and cost.<sup>1</sup> These deficiencies have led to such a dramatic drop in immunization/vaccination rates that many experts believe preventable childhood illnesses such as measles, whooping cough (pertussis), diphtheria, tetanus, polio, chickenpox (varicella), and tuberculosis will soon again become a real threat. In fact, more than 70,000 Americans of all ages<sup>2</sup> (and some two million children in other countries<sup>3</sup>) continue to die each year from preventable diseases, and many more suffer needlessly.

It is estimated that immunizations have prevented more than three million childhood deaths annually from measles, neonatal tetanus, and pertussis, along with more than 400,000 cases of polio.<sup>4</sup> For this decade, the global disease control goals set by the World Health Organization (WHO) are to reduce measles morbidity by 90 percent and measles mortality by 95 percent; to eradicate poliomyelitis worldwide, and to eliminate neonatal tetanus.

This article seeks to inform teachers and educational administrators about the importance of immunizations in preventing potentially deadly diseases in children and adults. We will first discuss how vaccines work to protect the body from disease, and the immune system's response once the body is exposed to infectious agents. We will also discuss vaccine recommendations in the U.S. and interna-

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tionally, describe the risks and benefits of immunizing, along with some of the consequences of contracting various vaccine-preventable diseases, suggest school immunization policies, and advise how to respond when parents object to immunizing their children. It is not our intent to be judgmental, only to present the facts.

### The Body's Fight Against Disease

**The Immune System:** Our bodies were designed with

wonderful defense mechanisms against infectious diseases. The skin acts as a major barrier to germs. Its lubricating oils, along with saliva, sweat, and tears, contain bacteria-killing chemicals. Impairment of these defenses affects the body's ability to fight disease. For example, when a cut breaks the protective barrier, germs and viruses can attack and cause infection. In certain circumstances, like immune system deficiencies, the body may be overwhelmed by diseases that it would otherwise be able to combat successfully.<sup>5</sup>

## Glossary of Terms

1. **Immune system**—"the internal organs, tissues, cells, and mechanisms that protect the body against disease by producing antibodies against foreign bodies (antigens)."
2. **Immunity**—"the state of being not susceptible to a particular disease or infection."
3. **Antibody**—"a specialized protein produced by the body that combines with a specific antigen; antibodies play the central role in immunity to specific pathogens."
4. **Antigens**—"any of a number of substances—including toxins, foreign proteins, and microorganisms—which, when introduced to the body, cause antibody formation."
5. **Vaccines**—are created by using inactive or weakened antigens. They provide immunity by "inducing a mild infection that triggers the body's own natural immune defenses."
6. **Vaccinations/Inoculations**—an injection or oral form of a vaccine administered for the purpose of protection against disease.
7. **Pathogen**—a microorganism that causes disease.
8. **Morbidity**—measures the prevalence or the incidence of acute or chronic diseases.
9. **Mortality**—death or death rates—in public-health terms, as caused by disease.

When invading germs or microorganisms (infectious agents) get into the body, the immune system calls on specially programmed cells, called lymphocytes, to wage an attack. They form protective proteins called antibodies. Once the body develops a strain of lymphocytes to make antibodies against a specific invader (such as measles), the person is usually protected against the disease for life. Proteins (known as antigens) coat the pathogens and help trigger the immune response. Being vaccinated/inoculated with a modified, inactive, or fragmented antigen (which still contains the protein) will generally provide the same immunity as contracting the disease. Many vaccinations confer immunity for life, but some (such as tetanus) need to be repeated at certain intervals.<sup>6</sup>

Some people question whether it is better to be naturally infected (by getting the disease) rather than to be vaccinated (immunized) against it. The National Network for Immuniza-

tion Information (NNII) answers: “No! Diseases cause suffering and, in some cases, permanent disability or death. Vaccines protect from the disease without risking the serious adverse effects of that illness.”<sup>7</sup>

### What Are the Risks of Not Immunizing?

Up to 30 percent of U.S. families hold misconceptions about immunizations. This influences their decision whether to have their children (and themselves) vaccinated. They do not realize how susceptible they and their children are to disease or how deadly the consequences can be. (See chart on page 15.) Many parents—and even doctors—have never seen anyone with polio, diphtheria, or tetanus, but many have heard or read sensationalized and sometimes misleading stories in the media, on the Internet, or by word of mouth about some rare side effects experienced by a child who recently received a vaccination.<sup>8</sup> As Dias and Marcuse put it: “alleged adverse events associated with vaccines make the 6 o’clock news, immunization successes do not.”<sup>9</sup> Nonetheless, immunizations are extremely important ways that parents can protect their children, themselves, and the community against deadly infectious diseases. The benefits of immunizing vastly outweigh the risks. However, schools should address sensitively parents’ concerns about the safety of vaccines and provide them with as much information as possible. In many cases, such people are simply misinformed.

### What Are the Risks of Immunizing and the Possible Side Effects?

The risks of immunizing are few. They may include brief and mild side effects such as “soreness where the shot was given, fussiness, and fever. In very rare cases, vaccines can cause a serious reaction.”<sup>10</sup> The vaccine development process

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### The Importance of Vaccines

- “It is much better to gain immunity from a vaccine. Vaccine-preventable diseases can kill; they can cause permanent disabilities such as paralysis from polio, liver damage or liver cancer from hepatitis B infection, and deafness from meningitis caused by several bacteria (Hib, pneumococci, and meningococci). In addition, brain damage can result from measles, Hib meningitis, or pertussis. If a woman gets rubella while pregnant, her baby could have serious birth defects.
- “Immunity from a vaccine offers protection against future disease that is similar to immunity acquired from a natural infection. Several doses of a vaccine may be needed for a child to have a full immune response.
- “For some vaccines [i.e., tetanus and Haemophilus (Hib) flu], the vaccine is better at creating immunity than a natural infection would be.”

Source: NNII, 2000, p. 1.

includes testing on animals and volunteers, when any adverse reactions are recorded. A vaccine is approved for use on the public only when it can be shown that the risks of immunization are far less than the risks of contracting the disease. If children contract certain infectious diseases, there is a real risk that permanent damage or death may result. In addition, they will suffer unnecessary pain and have to miss many days of school. These risks far outweigh the risk of a few side effects from vaccinations.<sup>11</sup>

### What Are the Benefits of Immunizing?

Vaccines are very effective, and most children who receive these vaccines will be fully protected. However, the vaccines do not “take” in some children. Even the children who do not develop full immunity will benefit from vaccines. Some will experience a milder form of the disease, and because other people in their community are being immunized, all children are less likely to be exposed to the disease.<sup>12</sup>

### Recommendations

**Adults:** Although this article concentrates on the need to immunize children, adults also need protection against infectious diseases. Researchers report that many adults do not choose to be vaccinated, not only because of their fear of side effects<sup>13</sup> but also because they think that immunization is only for children.<sup>14</sup> They may believe they’re unlikely to contract the disease.<sup>15</sup> Therefore, school officials should take these factors into consideration when writing and enforcing immunization policies. While it’s probably unrealistic to try to make this a requirement for admission, schools can inquire about the parents’ level of protection against certain diseases and inform them of the importance of being immunized.

**M**ake sure that school employees (and volunteers) have their immunizations up to date. Employees and students planning to study abroad or to go on international mission trips or tours may need additional doses. Ascertain whether women in their childbearing years have had rubella (German measles) or have been vaccinated against it. Rubella not only poses a threat to the young mother-to-be, but also to her unborn child.<sup>16</sup>

Health-care employees and students, food handlers, people with compromised immune systems, and those who work with dangerous substances (i.e., certain bacteria or viruses)

**Many vaccinations confer immunity for life, but some (such as tetanus) need to be repeated at certain intervals.**

may need to be vaccinated against diseases such as tuberculosis, hepatitis B, influenza, and typhoid.<sup>17</sup>

You may have seen television programs (such as *Little House on the Prairie*) where an outbreak of smallpox, diphtheria, or another disease killed half the town or where doctors had people quarantined in one house outside of town so that the rest of the population didn’t contract the disease. In 1918-1919, more than 20 million people worldwide died from influenza, *and the disease continues*

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to kill about 36,000 Americans each year.<sup>18</sup> When they hear the term *epidemic*, people think of smallpox or the plague during the Dark Ages, but epidemics are not a thing of the past. Dias and Marcuse<sup>19</sup> reported on a recent outbreak of measles in Alaska, which spread to many children who had not been fully immunized. Vaccines have been shown to protect society from outbreaks such as these.

**Infants and Children:** The following immunizations, recommended by the World Health Organization (WHO), are the standard internationally for infants under 1 year old: GCG against tuberculosis, diphtheria, pertussis, tetanus, oral polio (three doses), measles, hepatitis B, and yellow fever. In the U.S., the recommendations are pretty much the same, with a few exceptions: mumps, diphtheria, tetanus, measles, rubella (German measles), pertussis (whooping cough), haemophilus (Hib) meningitis, hepatitis B, chickenpox, and tuberculosis

(after a certain age). Influenza vaccine is also recommended for children 6-23 months of age.<sup>20</sup> Polio vaccine also should be given. Although the disease has been nearly eradicated in the U.S., there is still the threat of an outbreak of epidemic proportions.<sup>21</sup>

Infants should also be inoculated against pertussis (whooping cough), which can develop into pneumonia and is potentially fatal. Some parents have refused to allow their chil-

## *The benefits of immunizing vastly outweigh the risks.*

draining copies of their children's immunization records, parents should also be aware of how long ago certain vaccines were administered. For example, if a teenager steps on a nail, the doctor will want to know if he or she has had a tetanus shot in the past 10 years.

Other immunizations are recommended for special populations (i.e., the very young, elderly, chronically ill, or those at high risk for disease) or for people who will be exposed to various diseases.<sup>25</sup> Student missionaries and other travelers to developing countries may require immunizations against the following diseases: tetanus, diphtheria, polio, rabies, typhoid, hepatitis A and B, meningococcal disease, yellow fever, Japanese encephalitis, and influenza (flu). They should be aware that they may be exposed to other serious diseases (particularly in developing countries) for which no vaccines are available (i.e., ebola) or for which existing vaccines are only less than ideally protective (i.e., cholera, tuberculosis, and malaria). In areas where natural disasters such as hurricanes have created conditions ripe for disease, immunizations such as tetanus and typhoid may be necessary. Travelers need to plan ahead, as some vaccines (such as the one for hepatitis) require multiple shots over a period of time to ensure full protection.<sup>26</sup>

### **Children, Adolescents, and Young Adults:**

The American Academy of Pediatrics (AAP) recommends the following specific groups

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dren to be immunized because the pertussis vaccine can cause adverse effects that range from minor irritations (fairly common) to brain damage (very rare). The risk is greatest in children who have experienced convulsions with fevers. Certain harmful side effects attributed to the pertussis vaccine, luridly described on some Internet Web sites, occurred after the administration of the now-obsolete whole-cell preparation. The new cellular vaccines have fewer side effects than the old vaccine.<sup>22</sup> Nonetheless, the U.S. National Childhood Vaccine Injury Act, which went into effect October 1, 1988, promises compensation for any child injured by recommended childhood vaccines, including coverage of medical expenses, pain and suffering (up to \$230,000), and protected loss of income for the child.<sup>23</sup>

Many people now believe that mandatory protection against smallpox should be reinstated worldwide because of the very real threat of bio-terrorism.<sup>24</sup> Health-care workers will probably be among the first to be immunized. Debate centers around the need to assess the risks of the vaccine as compared to the probability of a bio-terrorism attack.

Most immunizations should be given before children start school (see immunization chart on page 14). In addition to re-

## **Resources**

- National Network for Immunization ([www.immunizationinfo.org/](http://www.immunizationinfo.org/))
- Parents of Kids with Infectious Diseases (PKIDS) ([www.pkids.org/](http://www.pkids.org/))
- The Vaccine Page ([www.vaccines.com/](http://www.vaccines.com/))
- Center for Disease Control ([www.cdc.gov/](http://www.cdc.gov/))
- National Immunization Program (NIP) ([www.cdc.gov/nip/](http://www.cdc.gov/nip/))
- National Healthy Mothers, Healthy Babies Coalition (HMHB) ([www.hmhb.org/parent.htm1#immunization/](http://www.hmhb.org/parent.htm1#immunization/))
- CDC International Traveler's Line ) (1-877-FYI-TRIP or 1-877-394-8747)
- Global Alliance for Vaccines ([www.vaccinealliance.org/](http://www.vaccinealliance.org/))
- Institute for Vaccine Safety—John Hopkins University ([www.vaccinesafety.edu/](http://www.vaccinesafety.edu/))
- The Vaccine Page ([www.vaccines.com/](http://www.vaccines.com/))
- National Center for Infectious Diseases (NCID) ([www.cdc.gov/ncidod/](http://www.cdc.gov/ncidod/))



who have never been infected or vaccinated with chickenpox to receive immunizations. They include: (1) all healthy children 12 to 18 months; (2) all healthy children 18 months to 12 years of age who have never had chickenpox; (3) all family members living with individuals who have compromised immune systems (e.g., HIV/AIDS); and (4) all susceptible health-care workers.<sup>27</sup>

### School Immunization Laws

Throughout the U.S., proof of immunization is required for school entry. The legislation requiring this ranks as one of the most important efforts to protect children and to safeguard public health. These laws have significantly reduced the infectious disease rates in the U.S. However, preschoolers in many areas are at risk because the laws do not require them to be immunized. School officials should take this into account when assessing the immunization status of their students and their families.

Vaccinations in the 21st century are even more vital than a hundred years ago to protect public health, considering the threat of bio-terrorism. It is particularly important to educate people about the importance of vaccination because they have little or no memory of the deadly effects of these diseases.



























### School Recommendations

In the U.S., parents must be informed in writing about the benefits and risks of immunizing their children before they are vaccinated. This is a useful policy to apply elsewhere as well. School officials should refer parents to their physician or health-care provider if they have any questions regarding the benefits and risks of immunizations.<sup>29</sup>

Teachers, school administrators, and school nurses must stress the importance of immunizations in their contacts with students, parents, and the community. Parents should be required to submit immunization records or forms before their children are allowed to enter school.<sup>30</sup> The school nurse should file these forms in a safe place and organize a system to review them regularly, informing parents when additional vaccinations are needed. In small schools without a school nurse, the head administrator must ensure that children receive required immunizations. Records should be checked on a yearly basis.

In the U.S., public schools have established policies to handle a family's refusal to have their children immunized based on religious or philosophical beliefs. Adventist schools for the most part do not subscribe to these policies. In general, if a parent refuses to have his or her child immunized (except in unusual cases such as a severe allergy to a certain

**Schedule for the Most Commonly Recommended Immunizations**

AGE	Hep-B Hepatitis B	Pneumo- coccal Conjugate	*DTaP Diphtheria, Tetanus, Pertussis	*Hib Haemophilus Influenza Type b	IPV Polio	MMR Measles, Mumps, Rubella	Chicken- pox Varicella
Birth							
2 months					Oral		
4 months					Oral		
6 months					Oral		
12-18 months	 (6-18 mo.)	 (12-15 mo.)	 (15-18 mo.)	 (12-15 mo.)	 (6-18 mo.)	 (12-15 mo.)	 (12-18 mo.)
4-6 years					Oral	 May be given at ages 4-6 or 11-12 years	
11-16 years	 All teens need a series of three shots		 Td—just diphtheria & tetanus, not pertussis				
 = injection							

\* Sometimes DTP and Hib are given together in one shot. \*\* This dose of Hib may not be needed, depending on the brand. Children should also receive Tb (tuberculosis) vaccine once between 11 and 16 years of age (NNII, 2000).

Please note: The parent should check with a health-care professional to determine his or her preferred immunization schedule and suggested vaccinations, which needs to be personalized for each child.

vaccine), most Adventist schools will not admit the student into the school.

All employees and others working with students at Adventist schools should regularly complete a form, with documentation, indicating whether their immunizations are up to date. Immunization against preventable diseases should be a requirement for employment or for volunteering at the school. The school board should consult with the local superintendent and public-health agencies in deciding which immunizations to require.

What about home-schooled children? Some of them participate in various school activities. Rota and colleagues found no “data indicating that home-schooled children [in the U.S.] are under-immunized or that their parents subscribe to a particular philosophy regarding immunizations.”<sup>31</sup> They reported that, of the 48 states whose immunization policies they checked, only nine had a method to determine the vaccination status of home-schooled children.<sup>32</sup> This is a significant problem if unvaccinated children are allowed to participate in school activities, as they could pose a threat to the school community. Adventist

**When they hear the term epidemic, people think of smallpox or the plague during the Dark Ages, but epidemics are not a thing of the past.**

schools would be wise to include a formal statement in their immunization policy to address this problem.

#### **Summary/Conclusion**

Whether to immunize their children against preventable diseases is a simple choice for some parents, a very difficult one for others. The media tend to sensationalize rare cases of adverse reactions to a vaccine. Schools should assure parents that such cases are unusual and that most children (and adults) benefit from being vaccinated against deadly diseases. Parents should be encouraged to investigate the pros and cons of immunizing their children. Health-care providers and medical experts do not take it lightly when even

one child suffers ill effects from vaccination. Researchers are trying to discover as much as they can about deadly disease, its consequences, and how to protect the public. They are also developing safer vaccines with fewer side effects.

As early as the elementary level, teachers should talk to students about the importance and benefits of immunizations. Children are the best mediums for disseminating messages to

### **Vaccines and Vaccine-Preventable Diseases**

- **DTaP vaccine**—protects against diphtheria, tetanus, pertussis (whooping cough). “**Diphtheria** is a very serious disease that can make people unable to breathe or move. It can cause health problems. One out of 10 people who get diphtheria die.” “**Tetanus** can cause muscle spasms that make a person unable to open his or her mouth or swallow. Three out of 10 people who get tetanus die.”
- **Td vaccine**—protects against tetanus and diphtheria. **Pertussis** “can cause spells of violent coughing and choking, making it hard to breathe, drink, or eat. Babies can get pneumonia, become brain damaged, or even die.”
- **Hepatitis B vaccine**—protects against hepatitis B. Hepatitis B “causes flu-like illness with loss of appetite, nausea, vomiting, rashes, joint pain, and jaundice. In some people, the virus stays in the liver for the rest of their lives, possibly causing severe liver disease, cancer, or liver failure, resulting in death.”
- **Hib vaccine**—protects against a “form of meningitis, pneumonia, and a deadly airway infection called epiglottitis.” **Hib Meningitis** “causes an infection of the lining of the spinal cord and brain and is very serious for children under five (5) years old—especially infants.”
- **IPV I (inactivated polio) vaccine**—protects against polio. **Polio** “can cause paralysis and even death.”
- **Pneumococcal Conjugate vaccine**—protects against “other forms of meningitis and pneumonia, and serious infections of the blood called bacteriemia.”
- **MMR vaccine**—protects against measles, mumps, and rubella (German measles). **Measles** “cause a rash, fever, cough, and watery eyes. It can also cause pneumonia, brain damage, hearing loss or death.” **Mumps** causes a painful swelling of the saliva glands and can lead to serious problems such as arthritis, inflammation of the brain and spinal cord, and hearing loss. Mumps can cause swollen testicles and occasionally sterility in adult males. **Rubella (German measles)** “cause[s] fever, swollen glands, and a rash. But if a pregnant woman gets rubella, it can be very dangerous for the unborn baby. The baby can be born blind, mentally retarded or have hearing defects.”
- **Varivax vaccine (Chickenpox vaccine)**—protects against varicella. **Varicella** can cause fever, blisters, and bumps, which cause itching and may leave scars. It is usually not life-threatening. Chickenpox may recur as shingles (herpes zoster), which causes severe nerve pain and a rash and can be dangerous for people with weak immune systems.
- **Influenza vaccine**—protects against influenza. **Influenza** usually causes cold-like symptoms but various strains may be more severe, i.e., chills, fever, all-over muscle pain, nausea, vomiting, and headache, even death.—Source: *Community Connection*, Community Facts: Community Health Systems of San Bernadino, California, 1997.

their parents. Although some parents are careful to keep their children's vaccinations up to date, they may not be as conscientious about their own protection. Your students' preschool-age siblings should also be targeted by the school's immunization programs. Although children must be vaccinated before entering school, waiting until they are 5 or 6 years old can put large parts of the population at risk for serious infections.

**I**mmunizations protect more than the vaccinated child—they guard the health of other students, teachers, administrators, school employees, parent volunteers, visitors (grandparents, siblings) and anyone else who attends school functions, as well as the local community. The old saying “an ounce of prevention is worth a pound of cure” will never go out of date. ☞



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## Teachers, school administrators, and school nurses must stress the importance of immunizations in their contacts with students, parents, and the community.

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