

Childhood Immunizations in Utah

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Immunization Policy in Utah

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Introduction

Utah comes sixth in the nation in an overall health assessment by the United Health Foundation (www.unitedhealthfoundation.org), but the 2006 National Immunization Survey (NIS) ranked Utah fourth to last in the nation for the number of two-year olds fully immunized according to the recommended schedule (National Immunization Program, Centers for Disease Control and Prevention). While the NIS shows a national average of 80.8% of children completing the immunization series on time, Utah lags behind with only 74.1% of Utah's children aged 19-35 months up-to-date. Steve McDonald, a spokesman for the Utah Department of Health, stated that "some parents believe such diseases as measles, mumps and whooping cough are a thing of the past and don't feel an urgency to immunize their children against them" (Hamilton 2005). With the recent increases in Pertussis (whooping cough) in Utah, and the outbreak of almost 1000 cases of mumps in the mid-West last year, this is a matter of some concern.

The National Immunization Survey

The National Immunization Survey (NIS), begun in 1994, is an annual survey which monitors childhood immunization coverage. It is sponsored by the National Immunization Program (NIP) and conducted jointly by NIP, the National Center for Health Statistics (NCHS), and the Centers for Disease Control and Prevention. The survey measures the number of children, 19-35 months of age, who have completed the 4:3:1:3:3 series by 24 months of age. This series represents doses of 4 DTaP (Diphtheria, Tetanus, Pertussis), 3 Polio, 1 MMR (Measles, Mumps, Rubella), 3 Hib (haemophilus influenzae type b) and 3 Hepatitis B. There are other immunizations that are also recommended outside of the 4:3:1:3:3 schedule. These include Rotavirus, Influenza, Varicella and Hepatitis A.

Utah's recommended schedule for childhood immunization follows the Centers for Disease Control and Prevention's "Recommended Childhood and Adolescent Immunization Schedule" (see Table 1 below). CDC also produces a "catch up" schedule for those who are behind.

Table 1: CDC Recommended Childhood Immunization Schedule 2007

Vaccine	Dose 1	Dose 2	Dose 3	Dose 4
DTaP	2 months	4 months	6 months	15-18 months
Polio	2 months	4 months	6-18 months	
MMR	12-18 months			
HIB	2 months	4 months	12-18 months	
Hep B	Birth	1-2 months	6-18 months	
Rotavirus	2 months	4 months	6 months	
Hep A (2 doses)	12-24 months			
Varicella	12-15 months			
Influenza	6 months then yearly			

Source: U.S. Department of Health and Human Services: Centers for Disease Control and Prevention, Recommended Childhood and Adolescent Immunization Schedule US 2007.

In July 2006, Utah was ranked 47th in the nation, with 74.1% of children up-to-date on the recommended immunization schedule, based on 2005 data¹. The national average was 80.8%, with the highest ranking state (Massachusetts) at 93.5% and the lowest ranking state, Nevada, at 66.7%. Table 2 below shows the state rankings.

Table 2: State Rankings for Childhood Immunizations as at July 2006

Rank (1-50)	State	Percent Immunized	Rank (1-50)	State	Percent Immunized
1	Massachusetts	93.5	26	New York	81.6
2	Nebraska	89.1	27	Vermont	81.5
3	South Dakota	86.9	28	Hawaii	80.1
4	Connecticut	86.1	29	Kentucky	79.7
5	Virginia	85.8	30	Montana	79.6
6	Minnesota	85.2	31	Florida	79.3
6	North Carolina	85.2	31	Missouri	79.3
8	North Dakota	85.0	33	Arizona	79.2
9	Iowa	84.9	34	Wyoming	78.6
10	Georgia	84.7	35	South Carolina	78.5
11	Delaware	84.2	36	New Mexico	78.4
12	Ohio	84.1	36	Texas	78.4
13	Kansas	83.8	38	New Jersey	78.2
14	Mississippi	83.6	39	Idaho	78.1
15	Illinois	83.5	39	Indiana	78.1
16	Colorado	83.4	41	California	77.9

¹ If Varicella is included (4:3:1:3:3:1 instead of 4:3:1:3:3) Utah's immunization rate is 69.8%.

17	Alabama	83.3	42	Washington	77.8
17	Maine	83.3	43	Louisiana	76.0
19	Pennsylvania	83.2	44	Oklahoma	75.7
20	Rhode Island	83.1	45	Alaska	75.4
21	Tennessee	82.9	46	West Virginia	74.9
22	New Hampshire	82.8	47	Utah	74.1
23	Michigan	82.7	48	Oregon	72.9
24	Maryland	82.3	49	Arkansas	67.8
25	Wisconsin	82.2	50	Nevada	66.7
				United States	80.8

Source: United Health Foundation, America's Health Rankings 2006.

The Importance of Immunizations

The Centers for Disease Control (CDC) stress that it is a myth to think that because vaccinations have enabled the U.S. to reduce most vaccine-preventable diseases to very low levels, we no longer have to worry about these diseases. Even though these vaccine-preventable diseases are at low levels in the U.S., many of them are prevalent in other parts of the world and can be brought into the country by travelers. Epidemics could be caused here if we are not protected by vaccinations, and the relatively few cases in the U.S. could quickly become thousands of cases. For example, the CDC reports that a drop in Pertussis vaccinations in Great Britain in 1974 led to an epidemic of more than 100,000 cases of Pertussis and 36 deaths by 1978. There are similar figures from Japan, where a drop in vaccination rates from 70% to less than 40% led to a jump in Pertussis from 393 cases and no deaths in 1974 to 13,000 cases and 41 deaths in 1979. In Utah, cases of Pertussis rose from 29 to 297 between 1997 and 1998, then from 121 in 2003 to 258 in 2003 and 618 in 2005. Table 3 below shows incidence of diseases in Utah over the last 10 years.

Table 3: Utah Reported Cases of Selected Vaccine-Preventable Diseases 1996-2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Measles	118	0	0	0	3	0	1	0	0	0
Pertussis	26	29	297	58	47	78	115	121	258	618
Mumps	3	8	5	4	7	1	7	4	2	7
Rubella	0	0	2	1	0	0	0	0	2	0

Source: Utah Department of Health, Bureau of Epidemiology, October 2006 (accessed at www.immunize-utah.org).

The CDC gives two reasons why vaccination is important. First, we need to protect ourselves and our children, and second, we need to protect those around us. There is a small number of people who cannot be vaccinated (because of severe allergies to vaccine components, for example), and a small percentage of people don't respond to vaccines. These people are susceptible to disease, and their only hope of protection is that people around them are immune and cannot pass disease along to them.

Many vaccine preventable diseases have severe effects. For example, Pertussis results in prolonged coughing spells that can last for many weeks, making it difficult for a child to eat, drink, and breathe. Vomiting often occurs after a coughing spell, so infants may lose weight and become dehydrated. In infants, Pertussis can also cause pneumonia and lead to brain damage, seizures, and mental retardation. The risks are similar with measles. As many as one out of 20 children with measles gets pneumonia, and about one child in every 1,000 who gets measles will develop encephalitis. This is an inflammation of the brain that can lead to convulsions, and can leave a child deaf or with mental disabilities. Additionally, of every 1,000 children who get measles, one or two will die from it. Measles can also cause pregnant women to have miscarriages, premature births and low-birth-weight babies. For a list of vaccine-preventable diseases, transmission and effects, see Appendix A. Likely because these diseases are not prevalent in the U.S. today and many younger parents have never known anyone with the disease, the potential impact is forgotten.

Children under 5 years are especially susceptible to disease because their immune systems have not built up the necessary defenses to fight infection. By immunizing by age 2, parents can protect their children from disease and also protect others at school or daycare (www.cdc.gov). Luman found that vaccination coverage studies usually measure the accumulated number of vaccinations by a specified age but that “children rarely receive all vaccinations as recommended” (Luman 2005).

Responsibility for Immunization Law

Individual states have the authority to determine which vaccines will be required by state law. States have a responsibility to protect individuals and the population of their state, and vaccinations prevent contagious diseases by reducing the chances of infection. Most states adopt the CDC’s recommended schedule (available at www.cdc.gov/nip).

Schools play a major part in enforcement of immunization laws. Currently, all 50 states have school immunization laws but there are differences in requirements among the states.

Utah Administrative Code R396-100 implements “immunization requirements for attendance at public, private or parochial kindergarten, elementary, or secondary school through grade 12, nursery school, licensed day care center, child care facility, family home care, or Head Start program in this state.” It is authorized by Section 53A-11-306. The requirements below are quoted directly from this code.

1) A student born before July 1, 1993 must meet the minimum immunization requirements of the CDC’s Advisory Committee on Immunization Practice (ACIP) prior to school entry for the following antigens: Diphtheria, Tetanus, Pertussis, Polio, Measles, Mumps, and Rubella.

(2) A student born after July 1, 1993 must meet the minimum immunization requirements of the ACIP prior to school entry for the following antigens: Diphtheria, Tetanus, Pertussis, Polio, Measles, Mumps, Rubella, and Hepatitis B.

(3) Commencing July 1, 2006, a student born after July 1, 1993, must also meet the minimum immunization requirements of the ACIP prior to entry into the seventh grade for the following antigens: Adult Tetanus/Diphtheria and Varicella.

(4) A student born after July 1, 1996 must meet the minimum immunization requirements of the ACIP prior to school entry for the following antigens: Diphtheria, Tetanus, Pertussis, Polio, Measles, Mumps, Rubella, Hepatitis B, Hepatitis A, and Varicella.

(5) To attend a Utah early childhood program, a student must meet the minimum immunization requirements of the ACIP for the following antigens: Diphtheria, Tetanus, Pertussis, Polio, Measles, Mumps, Rubella, and Haemophilus influenza type b prior to school entry.

It is clear that school enforcement can be effective. Table 4 below shows generally much higher rates of immunization by the time children enter school and kindergarten.

Table 4: Utah’s Immunization Levels - Percent Adequately Immunized

	2-year-olds	School Enterers (Kindergarten)	Licensed and (reporting) Unlicensed Day Care Centers/ Preschools	Head Start Centers
2000	68.2% ¹ /87.0% ²	93.2%	93.8%	94.8%
2001	66.1% ¹ /87.0% ²	93.8%	92.9%	93.0%
2002	75.7% ¹ /87.0% ²	58.8%	93.4%	94.3%
2003	78.8% ¹ /77.0% ²	68.4%	92.8%	92.9%
2004	71.3% ¹ /73.0% ²	74.4%	90.4%	93.8%
2005	74.1% ¹ /74.0% ²	81.4%	93.0%	93.5%

¹ National Immunization Survey-Centers for Disease Control and Prevention

² Utah Public Health Clinic data, Utah Immunization Program

Source: Utah Department of Health, Division of Community and Family Health Services, Immunization Program, October 2006.

Permissible Exemptions

Currently, all 50 states allow exemptions for medical reasons, 48 states for religious reasons (excluding Mississippi and West Virginia), and 20 states (including Utah) for philosophical reasons. In Utah, exemptions requests for these reasons are submitted on the Utah Department of Health Exemption Form under section 53A-11-302 of the Utah Statutory Code. The following are the exemptions allowed in Utah.

Medical Exemption

If a parent/guardian claims a medical exemption for a student, a Medical Exemption Form must be completed and signed by the student's licensed physician. The Medical Exemption Form may be obtained from the student's physician. The appropriate copy must be filed with the school or early childhood program.

Religious Exemption

If a parent/guardian claims a religious exemption for a student, a Religious Exemption Form must be completed and signed by the parent/guardian. The Religious Exemption Form may be obtained from a local health department. A local health department representative must witness and sign the Religious Exemption Form. The appropriate copy must be filed with the school or early childhood program.

Personal Exemption

If a parent/guardian claims a personal exemption for a student, a Personal Exemption Form must be completed and signed by the parent/guardian. The Personal Exemption Form may be obtained from a local health department. A local health department representative must witness and sign the Personal Exemption Form. The appropriate copy must be filed with the school or early childhood program.

The Utah Immunization Program conducted a survey of parents claiming personal exemptions during fall 2004 and spring 2005. The purpose of the study was to explore the reasons why individuals claim personal or philosophical exemption to immunizations. The total number of personal exemptions in the state for the combined fall and spring periods of 2005-06 was 2,194. From this group, 1,565 parents completed surveys. Of these, 34% of parents were college graduates, 41.2% had some college education, 16.1% were high school graduates and 8.7% had less than a high school education. The ethnic breakdown was 10.7% Hispanic and 89.3% non-Hispanic/Latino, and the race breakdown was 96.3% white and 3.2% other.

Reasons for requesting exemptions were categorized into the following areas:

- Immunization requirements conflict with my philosophical beliefs (46.3%)
- I heard that vaccines could cause chronic diseases (22.1%)
- My child has had a serious reaction to a vaccine in the past (16.2%)
- I am exempting my child from one vaccine (13.2%)
- I lost the immunization record (9.8%)
- A dose of vaccine given previously was given too early (2.4%)
- I do not have health insurance (2.1%)
- Immunizations cost too much money (1.7%)
- I do not have access to immunization clinics (0.2%)

In addition, 65.3% of respondents when asked, claimed to have specific concerns about the safety of vaccines and 21.3% said they had cultural beliefs that affects their views on immunization.

A recent study based on long-term data by the John Hopkins Bloomberg School of Public Health, the University of Florida and the CDC, found higher rates of Pertussis in states where parents can easily obtain exemptions for non-medical reasons (Omer et al 2006). The authors propose that states should carefully examine their exemption policies to ensure that Pertussis and other vaccine-preventable diseases are kept under control.

Reasons for Utah’s Low Levels of Immunizations

Murray pediatrician Bill Cosgrove has stated that the most likely reason for the low level of immunizations in Utah is not due to exemptions but “because of our large family size...the first child gets their vaccinations on time, but that decreases as parents have more children, and they put it off because of time away from work.”(Quoted in Salt Lake Tribune, Dec 13, 2005.)

Audrey M. Stevenson, Director for the Division of Family Health Services for Salt Lake County is currently researching factors influencing infant immunization rates in the state of Utah. One of these factors is birth order and immunization rates. Typically, states with the highest infant immunization rates have the lowest birth rates, but they also often have universal coverage so immunizations are free. A small percentage of those who claim exemptions for philosophical reasons in Utah do so because they cannot afford to pay for immunizations.

There are also many issues over family acceptance of immunizations. This is often because of parental perception or adverse press over vaccine safety. This can make parents confused. For example, the adverse press over the possible MMR and autism link led to a drop in MMR vaccinations. If a parent had a bad reaction to a vaccine or had other children who did, this can have a strong influence on their perception of safety. Table 5 below shows the risk of disease versus the risk from vaccines.

Table 5: Risk of Disease v. Risk from Vaccines

Disease	Risk from Disease	Risk from Vaccine
Measles	Pneumonia: 6 in 100 Encephalitis: 1 in 1,000 Death: 2 in 1,000	MMR Encephalitis or severe allergic reaction: 1 in 1,000,000
Rubella	Congenital Rubella Syndrome: 1 in 4 (if woman becomes infected early in pregnancy)	
Diphtheria	Death: 1 in 20	DTaP Continuous crying, then full recovery: 1 in 1000 Convulsions or shock, then full recovery: 1 in 14,000 Acute encephalopathy: 0-10.5 in 1,000,000 Death: None proven
Tetanus	Death: 2 in 10	
Pertussis	Pneumonia: 1 in 8 Encephalitis: 1 in 20 Death: 1 in 200	

Source: <http://www.cdc.gov/nip/publications/6mishome.htm>

The U.S. Public Health Service is currently researching which vaccine adverse events are truly caused by vaccines versus the diseases themselves, and how to reduce even further the already low risk of serious vaccine-related injury.

Wharton (2006) suggests that some other possible influencing factors on immunization rates could be:

Complexity of Immunization Schedule. It is difficult for many parents to keep up-to-date with the current schedule, which may change from child to child. The recommended schedule for a first child might have changed by the time they have a second or third child.

Transitory population. In Utah, families of young children change providers frequently so the continuity of care is difficult and it is difficult to keep track of immunization records. Attempts to fully populate the Utah Statewide Immunization Information System (USIIS) have been thwarted by provider participation rates.

Differences in practices between providers. Providers are often working on different systems, and this can confuse parents and make it difficult for providers to keep track of immunization records. For example, the yellow record cards that are given at birth are not used by Intermountain Health Care.

Education. If parents are unaware of the risks of certain diseases, they may not see the importance of keeping up-to-date with the recommended immunization schedule.

Ownership Issues. Some parents might expect that someone will let them know when their children are due to be immunized, while doctors might assume parents are aware of this. In some cases, this might result in neither party taking ownership.

Provider resources. Providers can greatly influence the rates by keeping on top of the schedules and checking records when children come into the office for routine visits or sickness. However, within a typical six-minute appointment, this can be difficult. It can also be costly in resources to keep track.

Research and Studies

Childhood immunization in Utah is an area that has received some attention and research from policy makers.

Immunization Summit

In November 2006, Utah held a statewide Immunization Summit where key policy and decision makers and implementers met to “discuss methods and strategies to increase Utah’s immunization rates” The summit’s key outcomes were:

- Development of a regional coalition including a learning collaborative;
- Media campaign updates;
- Development of a consolidated immunization schedule;
- WIC collaboration project
- USIIS evaluation including development of marketing materials, development of more user groups, and work on connections with provider electronic medical records.

A second annual summit was held in January 2007 to follow up on these issues.

Utah County Childhood Immunization Study

As an extension to the Immunization Summit, the Utah Department of Health and the Utah County Health Department with the George W. Romney Institute of Public Management at Brigham Young University carried out a study of barriers to childhood immunizations. The study was carried out in Utah County because of its high birth rates. It gathered information on family attitudes, knowledge, beliefs and barriers to childhood immunizations. The preliminary findings are shown in figure 1 below.

Figure 1: Barriers to Childhood Immunizations. Utah County Study (Fall 2005)

- Proportion of parents who agreed or strongly agreed that their knowledge about when their child should receive vaccines was adequate: 87.2%
- Proportion of parents who agreed or strongly agreed that their health care provider had adequately discussed their child's vaccines with them: 75.8%
- Proportion of parents who agreed that what they know about vaccines comes mostly from the internet: 9.2%
- Proportion of parents who agreed or strongly agreed that what they know about vaccines comes mostly from their health care provider: 77.2%
- Proportion of parents who agreed or strongly agreed that their health insurance does not adequately cover vaccines: 12%
- Proportion of parents who disagreed or strongly disagreed that their child will likely be just as healthy without vaccines: 78.6%
- Proportion of parents who agreed or strongly agreed that their religious beliefs do not support the immunization of children: 1.3%
- Proportion of parents surveyed who had incomes less than \$45,000 per year: 40.7%

Source: Immunization Coverage Report: State of Utah 2006, A1

Utah's Initiatives to increase immunization rates

The state of Utah has implemented many initiatives aimed at increasing immunization levels.

Utah Immunization Coalition

The Utah Immunization Coalition was originally formed in March 1993 as "Every Child by Two" (ECBT) with the aim of addressing the low immunization level among two-year-olds in Utah.

CASA

The Utah Immunization Program uses a computer software program called CASA (Clinic Assessment Software Application) to determine immunization levels.

Annual Immunization Assessments

To help assess the immunization levels in the state, and assist immunization providers to improve service delivery, the Utah Department of Health Immunization Program conducts annual assessments of immunization records in public health clinic and private providers enrolled in the Vaccines for Children (VFC) program.

Utah Statewide Immunization Information System (USIIS)

USIIS is a confidential, computerized, state-wide system that seeks to assist health care providers in tracking children's immunization records in both public and private sectors. It maintains a centralized record of children's immunization history, even when parents switch to different health care providers.

Care-A-Van

The Care-A-Van works as a mobile immunization clinic, designed to help increase access to immunization services. It primarily targets areas identified with low immunization levels or limited immunization services.

Email reminder service

Utah Department of Health's Immunization Program recently developed an email service that automatically reminds enrolled parents when their children's immunizations are due. Parents can register on the internet at <http://www.immunize-utah.org>.

National Infant Immunization Week 2006

This event was aimed at highlighting the importance of childhood immunizations. "Love Them, Protect Them, Immunize Them" events showcased Utah's new Electronic Immunization Reminder Service and revealed plans for tracking the immunizations of infants born in Utah and Washington Counties.

Vaccines for Children Program (VFC)

A federal program called Vaccines for Children provides free vaccines to eligible children, including those without health insurance coverage, all those who are enrolled in Medicaid, American Indians and Alaskan Natives, at their doctors' offices. The VFC program attempts to make up the difference in immunization rates between children in low-income and uninsured families and children in middle- and upper-income families by ensuring that all eligible children receive newly recommended vaccines.

Partnerships

In December 2005 through June 2006, the Utah Immunization Program partnered with the Women, Infants and Children (WIC) nutrition program on a pilot project in Tooele. The pilot worked with WIC recipients by providing an incentive if parents have children immunized according to the recommended schedule. Individual participants were tracked and the staff determined which clients were overdue for immunizations. At initiation of the pilot 25% of clients were found to not be up to date on immunizations. At the conclusion, this had dropped to 5%.

Funding

Utah's immunization program is funded by a line item on the Master Settlement Agreement for tobacco; the funding is \$950,000 annually. Currently, there is a risk that this funding will be reduced. If reductions occur, several programs would have to be evaluated for continuation. The greatest impact of this would be access. With the addition of state funds to the VFC program, the underinsured can currently be served in *any* VFC provider location. If funding is reduced, children and adolescents considered underinsured could then only receive vaccinations at federally qualified Community Health Centers.

Summary

It is clear that childhood immunization rates in Utah are impacted by a complex set of issues. A combination of factors, such as high birth rates, access to care issues, and the difficulties associated with tracking children in transitory populations, lead to a problem that is not easily solved. In order for the rates to increase, it is necessary to tackle some of the underlying issues that have been raised here. The Utah Immunization Program is already working hard to research new ways and means of increasing immunization rates but with the high birth rates in Utah this is a project that requires constant attention and adequate funding.

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Appendix A: Common Preventable Diseases and Effects

Disease Name	How it is spread	Effects
Diphtheria	Respiratory and physical contact	Can block the airway lead to breathing problems, heart failure, paralysis and even death.
Tetanus	Enters body through a cut or a wound.	Early symptoms include lockjaw, stiffness in the neck and abdomen, and difficulty swallowing. Later symptoms are a fever, elevated blood pressure. Death occurs in about 11% of cases, especially people over age 60.
Pertussis	Spreads when infected person coughs or sneezes.	Results in prolonged coughing spells that can last for many weeks. These spells can make it difficult for a child to eat, drink, and breathe. Vomiting often occurs after a coughing spell, so infants may lose weight and become dehydrated. In infants, it can also cause pneumonia and lead to brain damage, seizures, and mental retardation.
Polio	Enters the body through the mouth.	Polio virus can cause acute paralysis that can lead to permanent physical disability and even death.
Measles	Spread by coughing and sneezing. The disease is highly contagious, and can be transmitted from 4 days prior to the onset of the rash to 4 days after the onset.	Rash, high fever, cough, runny nose, and red, watery eyes (lasts about a week.) Causes ear infections in nearly one out of every 10 children who get it. As many as one out of 20 children with measles gets pneumonia, and about one child in every 1,000 who get measles will develop encephalitis. (This is an inflammation of the brain that can lead to convulsions, and can leave a child deaf or with mental disabilities.) For every 1,000 children who get measles, one or two will die from it. Measles can also make a pregnant woman have a miscarriage, give birth prematurely, or have a low-birth-weight baby.
Mumps	Spreads when an infected person coughs or sneezes.	Fever, headache, muscle aches, tiredness, and loss of appetite; followed by swelling of salivary glands. Severe complications are rare. However, mumps can cause inflammation of the brain and/or tissue covering the brain and spinal cord, inflammation of the testicles, inflammation of the ovaries and/or breasts, spontaneous abortion, and deafness, (usually permanent.)
Rubella	Spread by coughing and sneezing.	Rash and fever for two to three days (mild disease in children and young adults). If acquired by a pregnant woman it can cause deafness, cataracts, heart defects, mental retardation, and liver and spleen damage (at least a 20% chance of damage to the fetus if a woman is infected early in pregnancy).
Hepatitis B	Contact with an infected person's blood or other body fluid.	Short term illness can lead to loss of appetite, tiredness, diarrhea and vomiting, pain in muscles, joints and stomach, and jaundice. Longer term it can lead to liver damage, liver cancer and death.
Haemophilus Influenza	Spreads from an infected person to the nose or throat of others.	HIB is a leading cause of bacterial meningitis, an infection of the brain and spinal cord coverings, which can lead to lasting brain damage and deafness. HIB disease can also cause pneumonia, severe swelling in the throat, making it hard to breathe, infections of the blood, joints, bones and covering of the heart, and even death.
Varicella (Chickenpox)	Spreads easily by coughing, sneezing and direct contact. Highly contagious.	A skin rash of blister-like lesions, usually on the face, scalp, or trunk. Chickenpox is usually mild, but may be severe in some infants, adolescents, and adults. Some people who get chickenpox have also suffered from complications such as secondary bacterial infections, loss of fluids (dehydration), pneumonia, and central nervous system involvement. In addition, only persons who have had chickenpox in the past can get shingles, a painful inflammation of the nerves.

Source: <http://www.cdc.gov/nip/diseases>

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