Indiana Epidemiology Newsletter

Indiana State Department of Health

A Monthly Publication of the Epidemiology Resource Center

Volume 10, Issue 4 April 2007

Illnesses Associated with Unpasteurized Dairy Products

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Despite the risks of consuming unpasteurized dairy products and research indicating no meaningful difference in the nutritional values of pasteurized and unpasteurized milk, reported cases of illness related to unpasteurized dairy products still occur each year in Indiana. Consuming unpasteurized dairy products can lead to diseases such as listeriosis, salmonellosis, campylobacteriosis, brucellosis, typhoid fever, tuberculosis, and diphtheria. These infections can be especially severe in pregnant women and their unborn fetuses and can result in miscarriage, stillbirths, and birth defects. Complications can also include meningitis, sepsis, liver failure, and even death. Since 2001, there have been five reported disease outbreaks involving unpasteurized dairy products in the United States. These outbreaks have caused more than 200 people to become ill and five stillborn births, and have involved many states, including Indiana.

Two cases of unpasteurized dairy product exposures were reported the week of April 16, 2007, to the Indiana State Department of Heath (ISDH) Epidemiology Resource Center. These cases illustrate the need for education regarding the risks associated with consuming unpasteurized milk, especially for those at higher risk of illness (pregnant women, children, elderly, and those with weakened immune systems), as an important public health message.

Case one: A 24-week pregnant woman was confirmed positive for campylobacteriosis. She reported drinking raw milk purchased from a farm on a regular basis. She has declined to release the name or location of the farm that sells the raw milk. She and her family drink the milk because of the "nutritional benefits" of raw milk and did not believe that the milk was the source of her infection.

Case two: A 34-week pregnant Hispanic woman was confirmed positive for listeriosis. She was hospitalized in intensive care and underwent an emergency C-section. Fortunately, the infant was not infected. The woman is still under direct medical care and receiving a two-week course of

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intravenous antibiotics. She reported daily consumption of unpasteurized queso fresco that was purchased from a local vendor that visits her community on Saturdays. Although none of the cheese she consumed was available for testing, some of the cheese that the family currently had from the same vendor was collected for testing. The results were negative for *Listeria*, however, coliforms were TNC and *Staph aureus* was > 7,000 cfu.

The ISDH and the Board of Animal Health (BOAH) are collaborating on these investigations. The sale of raw milk for human consumption is illegal in Indiana, although raw milk can be purchased legally from a farm that will be pasteurizing the milk or using it for animal feed. In either case, the milk must be collected in bulk tanks. Individuals cannot purchase small amounts, e.g., one or two gallons of milk, at a time.

Cow-sharing or cow-leasing is a process in which persons purchase a "portion" of a cow and provide fees for boarding. Persons then take raw milk from the cow without actually "purchasing" the milk from the farmer. According to the BOAH, Indiana law (IC 15-2.1-23-8; IC 15-2.1-23-8.5) states that a person may not offer, sell, or deliver raw dairy products, which would include cow shares.

Although raw milk cheese can be sold in Indiana under regulation, consumers should buy food products from inspected, licensed sources only. Do not assume that any cheese is safe unless it is clearly labeled with the manufacturer's/distributor's name and address or facility code, date of manufacture, and a statement that the cheese has been cured or ripened for at least 60 days.

Education is also important regarding the risk of illness from consuming raw milk cheeses, such as queso fresco, and the potential dangers of infection. The link below provides some *Listeria* information in Spanish; however, some of the links on the page no longer exist.
http://www.ces.ncsu.edu/depts/foodsci/taskforce/queso/
http://www.cfsan.fda.gov/~pregnant/whillist.html

Human Rabies Case in Indiana

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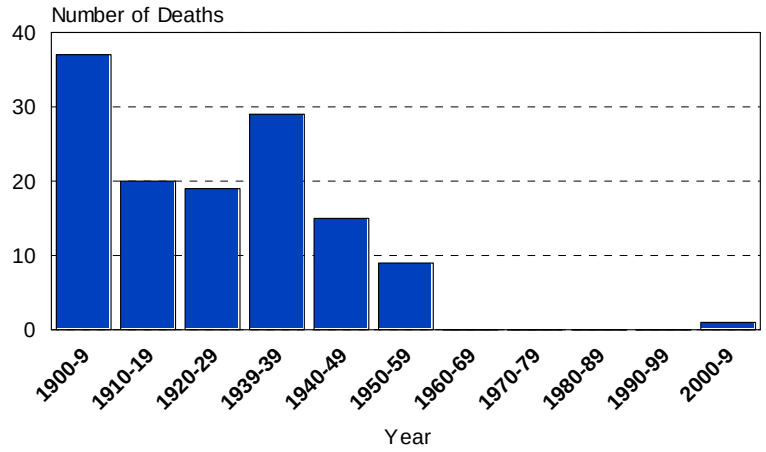
Veterinary Epidemiologist

On November 2, 2006, a 10-year-old girl from Marshall County, Indiana, died from rabies. This is the first known human rabies case in Indiana since 1959, when a Sullivan County boy died from rabies. Historically, human rabies cases have not been so rare. Between 1900 and 1949, there were 120 recorded deaths; and between 1950 and 2006, there were 10 recorded deaths, most of which occurred in the 1950s. Figure 1 shows the distribution of cases by decade. The good news is that the risk of rabies to Hoosiers has greatly decreased over time, however, the risk remains for rabies transmission from reservoir species to both our pets and ourselves.

Figure 1. Human Rabies Deaths in Indiana, 1900-2006



The Marshall County girl was bitten by a bat in her home in late June. At the time, the exposure was not considered significant; therefore, she did not receive medical assistance. On September 30, while visiting her father in the Chicago area, she complained about her arm hurting and was given an over-the-counter pain medication. Over the next 5-6 days, she complained of non-specific symptoms and was seen twice by health care providers. By October 7, she was dehydrated and admitted to a local hospital. On October 8, she showed increasing signs of neurological illness and was transferred to an Indianapolis tertiary hospital for additional evaluation and care. During the next week, the history of the bat exposure resurfaced, and biopsy material, saliva, and spinal fluid were submitted to the Centers for Disease Control and Prevention (CDC) for testing. The tests were positive for rabies virus, and the virus was identified as the silver-haired bat strain. In spite of extensive medical care, the child died on November 2.

Rabies has long been an issue for the citizens of Indiana. The Bacteriological Laboratory of the Indiana State Board of Health identified the first laboratory-confirmed rabid animal using Negri bodies as criteria on December 1, 1906. As laboratory methods improved, knowledge of the lab's capability became widespread, and the logistics of transporting an animal's head to Indianapolis became easier, the number of animals tested and the number of rabies positives increased. In the late 1950s, the direct fluorescent antibody test became available, and the Indiana State Board of Health Rabies Laboratory adopted this much improved method of testing. Table 1 provides the number of positive specimens examined in the first seven years of laboratory testing.

Table 1. Rabies-positive Animals Identified at the Indiana State Board of Health Laboratory

Year	1907	1908	1909	1910	1911	1912	1913
Number Positive	4	73	69	66	115	166	198

Laboratories in Chicago, Cincinnati, Fort Wayne, and the Indiana Veterinary College in Indianapolis were also testing animals, so the numbers above do not reflect the full extent of the rabies problem. In fact, most animals suspected of having rabies were not examined at all but were destroyed. The logistical problems of shipping an animal head to Indianapolis at that time would have been difficult. Table 2 reports by species the results of rabies exams for 320 animals examined in 1912. The most common species tested then, as well as now, was dogs. The history

of rabies in dogs and their likelihood of having bitten humans and, thus, possibly transmitting rabies to humans continues to drive the testing of large numbers of dogs today.

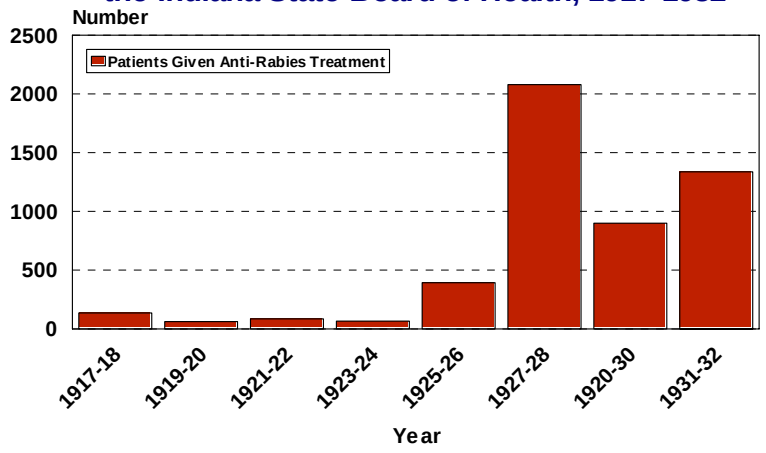
Table 2. Test Results for 320 Animals Examined for Rabies at the Indiana State Board of Health Laboratory, 1912

Species	Dog	Cat	Hog	Cow	Horse	Human	Rabbit
Positive	146	1	1	9	1		
Negative	133	1	1		1	1	1
Unsatisfactory	6						

In 1912, testing for rabies in wildlife would not have been a high priority and was overshadowed by the concern for rabies in domestic animals and human exposure from those animals. Humans exposed to rabid animals were treated with the Pasteur treatment, a series of injections of rabbit spinal cord dried for varying lengths of time. In 1911, the Indiana General Assembly adopted rules that required the Indiana State Board of Health to provide the Pasteur treatment free for indigents, and the Indianapolis Pasteur Institute suggested its availability to provide such treatment for $50 per treatment.

In 1932, the Indiana State Board of Health Annual Report listed both the number of animal heads found positive for rabies and the number of anti-rabies treatments given to people. This listing illustrates the increasing use of the Board of Health Laboratory and demand for anti-rabies treatments over time. The number of anti-rabies treatments given is a reflection of the number of animals determined to be rabies positive by the Laboratory.

Figure. 2 Patients Receiving Anti-Rabies Treatment From the Indiana State Board of Health, 1917-1932



In 1923, the Indiana General Assembly declared that dogs were considered private property and could be taxed as private property. In 1937, the Indiana General Assembly declared that the personal property tax on dogs would go into the township dog fund and be used for payment to individuals for damage to livestock by free roaming dogs or "for the taking of the Pasteur treatment for hydrophobia incurred by any person by reason of a person being bitten by, or exposed to, a dog known to have hydrophobia, within any township of Indiana."

The 1943 Indiana State Board of Health Annual Report states that 123 individuals received free rabies antitoxin that year. These individuals represented 21 counties, with the number of

individuals receiving vaccine ranging from 1 to 30. Counties with the most recipients were Vanderburgh (30), Jackson (25), Greene (16), and Lake (10). This statement only referred to those who received free treatment and did not include those who received treatment at their own expense.

During the 1920s, national efforts to prevent rabies in people transitioned to preventing and eliminating rabies in dogs, the most frequent source of rabies in people. This included leash laws, area-wide quarantines, and the introduction of rabies vaccines for dogs. In 1921, phenolized inactivated virus vaccine was first used to immunize dogs. In 1938, a human rabies isolate was grown in day-old chicks and embryonating chicken eggs to develop an attenuated live virus vaccine for animals. In 1948, the Flurry strain virus was used to develop another day-old chick and embryonating chick egg attenuated live virus animal rabies vaccine. The last two vaccines were majorly responsible for the reduction of canine rabies in this country.

In 1938, rabies in both humans and animals became nationally reportable. There were 9,412 cases that year, with 47 human deaths. It is certain that cases were underreported, as there was limited surveillance and the laboratory testing was not as sensitive as what is used today. Nationally, in 2005, there was a total of 6,419 reported cases of rabies, which included only 494 domestic animal cases and 1 human case. Of the 494 domestic animals, only 76 occurred in dogs. Recently, the CDC announced that the canine rabies virus variant has been eliminated from the United States—a profound success for rabies control programs. Dogs continue to contract rabies, mainly from exposure to wildlife reservoirs, and it is essential that dogs continue to be vaccinated against rabies. Rabies in cats has been more frequently reported for a number of years in part due to the failure to vaccinate cats that have access to the outdoors and to reservoir animals.

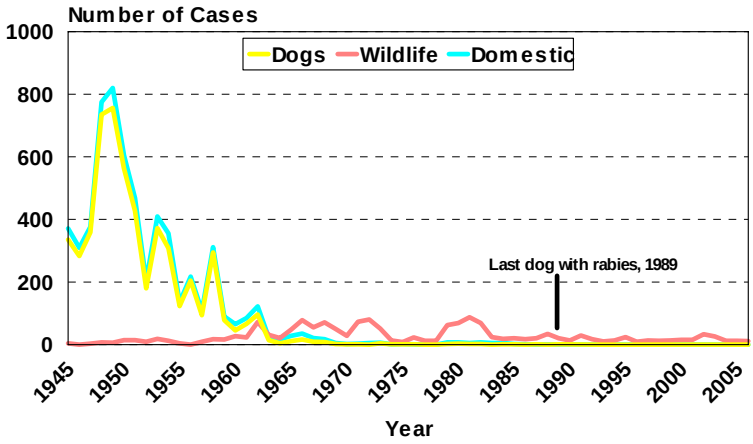
Statistics for animals testing positive for rabies in Indiana are available from 1945-2006 and are used for the rest of this article (Table 3).

Table 3. Number of Animals Identified as Rabies Positive by Species, Indiana, 1945-2006

Species	Number	Species	Number
Dogs	5,404	Skunks	908
Bats	468	Bovines	322
Cats	284	Foxes	242
Horses	15	Pigs	4
Raccoons	4	Woodchucks	2
Goats	1	Mouse	1
Opossum	1	Sheep	1
		Other	94

Indiana's experience with rabies follows the national experience. The number of dogs with rabies markedly decreased after the introduction of the improved rabies vaccine and especially after the introduction of the Flurry strain vaccine in 1948. Rabies vaccination for dogs was first legally required in Indiana in 1958 and for cats in 1994. The impact of leash laws and voluntary vaccination had already made an impact on the number of rabid dogs by that time. Figure 3 illustrates the tremendous drop in the number of rabies cases per year in domestic animals (mostly dogs) in the late 1940s to the early 1960s.

Figure 3. Animal Rabies, Indiana,1945-2006



Reports of rabies in cattle in Indiana during this time period have increased or decreased in relationship to the number of reported skunks with rabies. Figure 4 illustrates the epidemic of skunk rabies in Indiana from 1960 to 1985. Without knowing the number of skunks being submitted for rabies testing from 1945 to 1960, the positives reported here may represent testing selection in favor of domestic animals in a passive surveillance system. The number of skunks submitted for rabies testing from the 1980s to the present has decreased significantly, with only four skunks submitted in 2005. The relationship between the number of skunks being submitted and the number of positives is shown in Figure 5.

Figure 4. Rabies in Selected Species, Indiana, 1945-2003

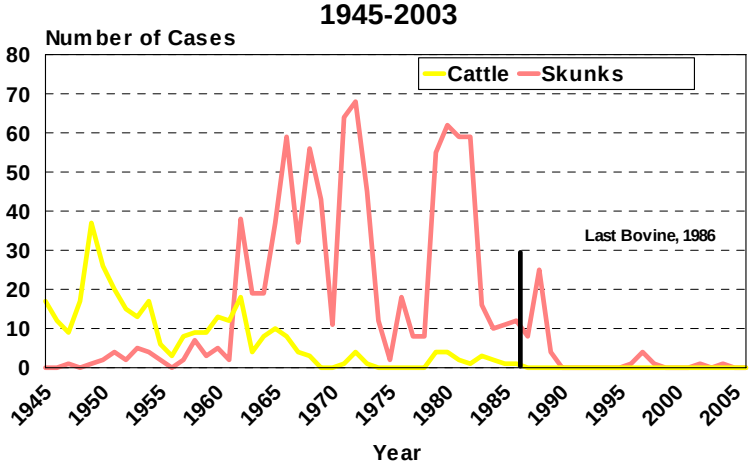
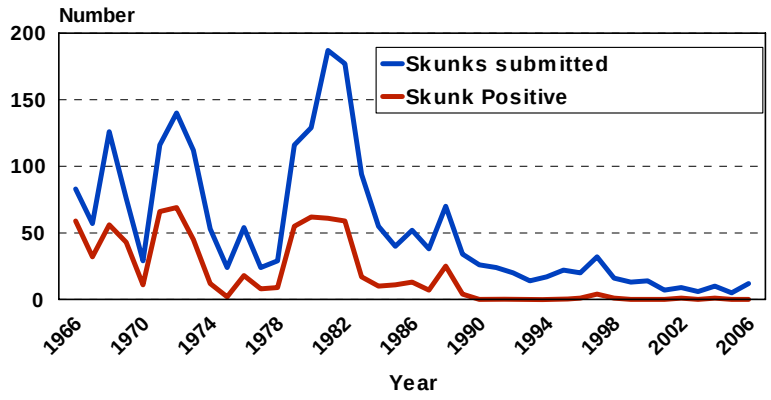
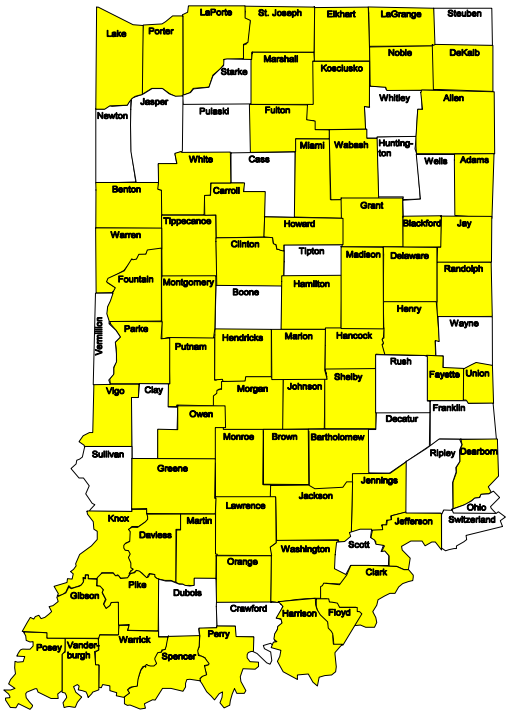


Figure 5. Skunks Submitted for Rabies Testing, Indiana 1966-2006



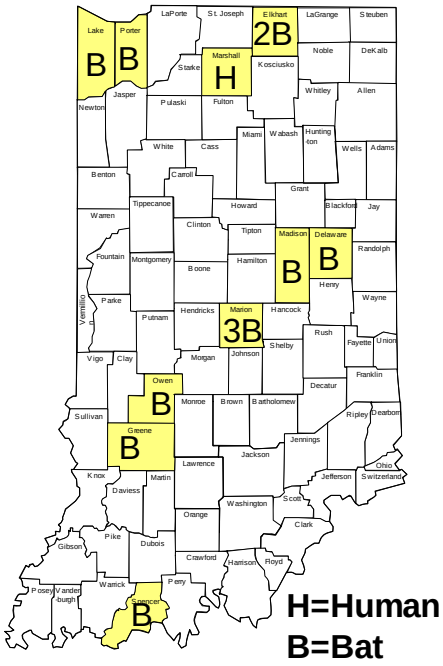
Rabies in bats, the source of rabies infection for the 2006 Marshall County human rabies case, was first recognized as a source of rabies for human infection in 1956 when a boy from Florida died after being infected by a bat bite. The state Rabies Laboratory identified the first confirmed rabies positive bat in 1965. Although the number of bats submitted to the Laboratory has increased, the number of bats testing positive for rabies has never exceeded 32 per year and has averaged 7.6 positive bats per year. From 1966 to 2006, 5 percent of the bats submitted for testing have been rabies positive. The percentage of positive bats has ranged from 1.3 percent to 15.3 percent positive, but from 1966-2006, 5.1 percent of the bats submitted have been rabies positive. Counties that have submitted positive bats since 1965 are shown in Figure 6.

Figure 6. Counties Submitting Rabid Bats, 1965-2006



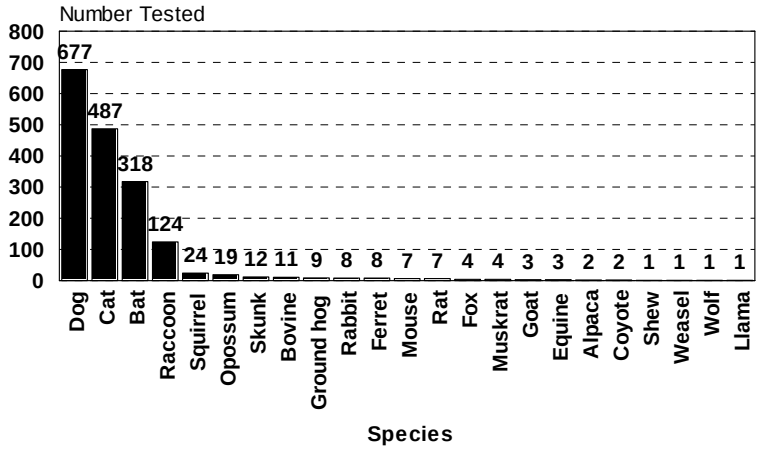
While not every county has submitted a positive bat to the Laboratory, most counties have at some time during this time period. Marshall County, the residence of the 2006 human rabies case, has submitted three positive bats, the last in 1989. All counties should assume that there are rabies-positive bats present. When evaluating individuals who have been exposed to a bat, one should assume the bat is rabies positive until proven negative by the Laboratory. Figure 7 shows the species and the number of cases of rabies in Indiana in 2006.

Figure 7. Rabies Cases in Indiana, 2006



The Indiana State Department of Health (ISDH) Rabies Laboratory continues to test a large number of animals for rabies and, in 2006, tested almost 1,800. Testing still primarily includes dog and cats, as these species have more contact with humans and bite individuals more frequently than other animals. The ISDH Rabies Laboratory also conducts rabies testing diagnostically for veterinarians to eliminate rabies as a cause of death for animals with a neurological disease. Figure 8 illustrates the range and number of species that are submitted to the Laboratory each year.

Figure 8. Species and Number Tested for Rabies, Indiana, 2006



Much has changed during the 100 years since the state Rabies Laboratory starting using the Negri body as a diagnostic test for the presence of rabies—newer and better diagnostic testing; the capability to do molecular testing to determine source of virus; better immune globulin and rabies vaccine to prevent the disease in people; and the change from dog, to skunk, to bat as the primary reservoir of rabies virus in Indiana. While the impact of rabies on people has been greatly reduced due to a number of factors, it is important to appreciate the importance of proper animal bite management as a public health message.

This article is dedicated to the current and former Indiana State Rabies Laboratory workforce for 100 years of service in handling potentially highly infectious animals to enable important medical decisions to protect the health of Indiana citizens.

May Is Viral Hepatitis Awareness Month

In order to promote awareness of viral hepatitis, the second annual Indiana HepFest was held on May 4-5, 2007. There was no charge for admission. HepFest provided free blood testing, education, music, and food. The event was held in Auburn at the World War II Victory Museum. For more information, please contact Christie Soaper at ladytruckr@mchsi.com.

Hepatitis means inflammation of the liver. Hepatitis can result from alcoholism, drug use, cancer, and/or infectious disease. Although several infectious agents can cause hepatitis, five specific viruses (A-E) are responsible for most cases. In the United States, hepatitis A, hepatitis B, and hepatitis C are responsible for the highest burden of disease.

Viral hepatitis causes significant medical, public health, and financial burdens for Indiana residents. Viral hepatitis can become a chronic (lifelong) infection requiring prolonged, advanced medical care, including liver transplants. Chronic hepatitis can lead to liver cancer, cirrhosis (liver scarring), liver failure, and even death. Many people who are infected show no symptoms and can unknowingly transmit the infection to others. In the U.S., thousands of new cases are reported each year, and an estimated 4.5 million people live with chronic hepatitis.

The symptoms of acute (newly acquired) hepatitis A, B, and C are the same. Symptoms occur more often or are more severe in adults than in children, and symptoms do not occur at all in some cases of viral hepatitis. Symptoms may include:

- tiredness
- vomiting
- diarrhea
- loss of appetite
- nausea
- abdominal discomfort
- dark urine
- clay-colored bowel movements
- yellowing of the skin and eyes (jaundice)

Although symptoms for all hepatitis viruses are similar, the viruses are spread very differently. Hepatitis A virus is spread through the fecal-oral route, when a person consumes food or drink that has been contaminated with the stool from an infected person or by close contact with someone who is infected. Both hepatitis B and hepatitis C viruses can be spread by exposure to blood or body fluids, e.g., unprotected sex (more common with hepatitis B), intravenous drug use, needle sticks, or from an infected mother to baby during pregnancy and delivery.

Safe and effective vaccination is available for hepatitis A and hepatitis B, and vaccination is the most important preventive measure. The Advisory Council on Immunization Practices (ACIP) recommends both vaccines in the routine childhood immunization schedule. It is especially important for adults to be vaccinated against hepatitis A if traveling internationally and to be vaccinated against hepatitis B if sexually active. Those who are infected with hepatitis C are encouraged to be vaccinated against hepatitis A and hepatitis B to prevent further liver infection. Reduction of other risk factors, such as practicing safer sex and avoiding intravenous drug use, is also important to prevent infection.

For Indiana statistics on viral hepatitis, please visit:
www.in.gov/isdh/dataandstats/disease/diseases_index.htm.

For more information on viral hepatitis, please visit:
www.in.gov/isdh/healthinfo/quick_faqs.htm
http://www.cdc.gov/ncidod/diseases/hepatitis/index.htm
http://www.liverfoundation.org/chapters/indiana/

Training Room

INDIANA STATE DEPARTMENT OF HEALTH IMMUNIZATION PROGRAM PRESENTS:

Immunizations from A to Z

Immunization Health Educators offer this FREE, one-day educational course that includes:

- Principles of Vaccination
- Childhood and Adolescent Vaccine-Preventable Diseases
- Adult Immunizations
    - Pandemic Influenza
- General Recommendations on Immunization
    - Timing and Spacing
    - Indiana Immunization Requirements
    - Administration Recommendations
    - Contraindications and Precautions to Vaccination
- Safe and Effective Vaccine Administration
- Vaccine Storage and Handling
- Vaccine Misconceptions
- Reliable Resources

This course is designed for all immunization providers and staff. Training manual, materials, and certificate of attendance are provided to all attendees. Please see the Training Calendar for presentations throughout Indiana. Registration is required. To attend, schedule/host a course in your area or for more information, please reference **http://www.IN.gov/isdh/programs/immunization.htm.**

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.IN.gov/isdh/dataandstats/data_and_statistics.htm

HIV/STD Quarterly Reports (1998-June 06)	Indiana Mortality Report (1999, 2000, 2001, 2002, 2003, 2004)
Indiana Cancer Incidence Report (1990, 95, 96, 97, 98)	Indiana Infant Mortality Report (1999, 2002, 2003, 2004)
Indiana Cancer Mortality Report (1990-94, 1992-96)	Indiana Natality Report (1998, 99, 2000, 2001, 2002, 2003, 2004)
Combined Cancer Mortality and Incidence in Indiana Report (1999, 2000, 2001, 2002, 2003)	Indiana Induced Termination of Pregnancy Report (1998, 99, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Health Behavior Risk Factors (1999, 2000, 2001, 2002, 2003, 2004, 2005)	Indiana Marriage Report (1995, 97, 98, 99, 2000, 2001, 2002)
Indiana Health Behavior Risk Factors (BRFSS) Newsletter (9/2003, 10/2003, 6/2004, 9/2004, 4/2005, 7/2005, 12/2005, 1/2006, 8/2006, 10/2006)	Indiana Infectious Disease Report (1997, 98, 99, 2000, 2001, 2002, 2003, 2004, 2005)
Indiana Hospital Consumer Guide (1996)	Indiana Maternal & Child Health Outcomes & Performance Measures (1990-99, 1991-2000, 1992-2001, 1993-2002, 1994-2003)
Public Hospital Discharge Data (1999, 2000, 2001, 2002, 2003, 2004, 2005)	

HIV Disease Summary

Information as of March 31, 2007 **(based on 2000 population of 6,080,485)**

HIV - without AIDS to date:

387	New HIV cases from March 2006 thru March 31, 2007	12-month incidence	6.62 cases/100,000
3,717	Total HIV-positive, alive and without AIDS on March 31, 2007	Point prevalence	64.62 cases/100,000

AIDS cases to date:

332	New AIDS cases from March 2006 thru March 31, 2007	12-month incidence	5.77 cases/100,000
3,977	Total AIDS cases, alive on March 31, 2007	Point prevalence	69.14 cases/100,000
8,213	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in March *MMWR* Weeks 9-13		Cumulative Cases Reported January – March *MMWR* Weeks 1-13	
	2006	2007	2006	2007
Campylobacteriosis	41	41	71	70
Chlamydia	1,919	1,775	5,209	5,075
Cryptosporiosis	6	8	9	10
Cyclosporiosis	0	0	0	0
E. coli O157:H7	6	2	10	2
Haemophilus influenzae	0	2	12	7
Hepatitis A	2	4	4	5
Hepatitis B	4	3	5	5
Gonorrhea	823	723	2,291	2,060
Legionellosis	0	1	3	4
Listeriosis	3	0	3	2
Lyme Disease	2	0	2	0
Measles	0	0	1	0
Meningococcal, invasive	7	1	8	7
Mumps	0	0	0	0
Pertussis	25	2	44	3
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	51	70	99	110
Shigellosis	15	6	30	14
Streptococcus pneumoniae (invasive, all ages)	122	74	183	152
Streptococcus pneumoniae (invasive, drug resistant)	34	14	49	37
Streptococcus pneumoniae (invasive, <5 years of age)	9	3	20	11
Syphilis (Primary and Secondary)	8	3	22	10

REPORTED CASES of selected notifiable diseases (cont.)

Disease	Cases Reported in March *MMWR* Weeks 9-13		Cumulative Cases Reported January – March *MMWR* Weeks 1-13	
	2006	2007	2006	2007
Tuberculosis	11	13	29	38
Yersiniosis	0	2	1	2
Animal Rabies	0	0	0	0

For information on reporting of communicable diseases in Indiana, call the *Epidemiology Resource Center* at (317) 233-7125.

Indiana State Department of Health

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Cover photo of Cryo-EM reconstruction of a norovirus capsid.courtesy of Dr. B.V.V. Prasad, Baylor College of Medicine, Houston, TX 77030

The *Indiana Epidemiology Newsletter* is published monthly by the Indiana State Department of Health to provide epidemiologic information to Indiana health care professionals, public health officials, and communities.