2006 Indiana Report of Infectious Diseases

All incidence rates throughout the report are per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006.

Data for counties reporting fewer than five disease cases are not included to protect the confidentiality of the cases.

Data for fewer than 20 reported disease cases are considered statistically unstable.

Animal Bites

Anthrax

Arboviral Encephalitis

Babesiosis

Botulism

Brucellosis

Campylobacteriosis

Cholera

Cryptosporidiosis

Cyclosporiasis

Delta Hepatitis (hepatitis D)

Dengue Fever and Dengue Hemorrhagic Fever

Diphtheria

***Escherichia Coli* O157:H7**

Ehrlichiosis

Haemophilus influenzae (invasive disease)

Hantavirus

Hepatitis A

Hepatitis B

Hepatitis C

Hepatitis E

Histoplasmosis

La Crosse Encephalitis

Legionellosis

Leprosy

Leptospirosis

Listeriosis

Lyme Disease

Malaria

Measles

Meningococcal Disease

Meningitis (aseptic)

Mumps

Pertussis

Plague

Pneumococcal Disease

Poliomyelitis

Psittacosis

Q Fever

Rabies

Rocky Mountain Spotted Fever

Rubella

Salmonellosis

Shigellosis

Smallpox

Streptococcus A

Streptococcus B

Tetanus

Toxic Shock Syndrome

Trichinosis

Tuberculosis

Tularemia

Typhoid Fever

Typhus Fever (Murine)

Varicella (associated with hospitalizations and/or deaths)

Vibriosis

West Nile Virus

Yellow Fever

Yersiniosis

ANIMAL BITES

Animal bites to humans are reportable in order to assess the transmission risk of rabies virus from animals to humans and to assess the need for rabies postexposure prophylaxis. Animal bite reporting also helps public health professionals assess the circumstances of the animal bite, facilitate appropriate management of the involved animal, and provide information about disease risks and animal bite prevention.

Public Health Significance

While the incidence of rabies disease in Indiana's domestic animals is low, animal bites are still a public health issue as they are a preventable injury that causes pain, trauma and infection, loss of function, disfigurement, and anxiety.

Once an animal bite is reported to public health officials, the involved animal will either be quarantined for 10 days to observe for signs of rabies, or the animal head will be submitted to the Indiana State Department of Health Rabies Laboratory for diagnostic testing. Postexposure prophylaxis to prevent rabies may be recommended for the exposed person based on the rabies risk assessment.

While any animal has the potential to bite, most bites come from dogs. According to the Centers for Disease Control and Prevention (CDC), each year approximately 800,000 people in the U.S. seek medical attention for dog bites. Of those injured, 386,000 require treatment in an emergency department. The rate of dog bite-related injuries is highest for children aged 5-9 years. (See the following Web site for a detailed report: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5226a1.htm).

In general, dog bites can be reduced by adhering to the following guidelines:

- Do not approach an unfamiliar dog.
- Do not scream and/or run from a dog.
- Remain motionless (e.g., "be still like a tree") if approached by an unfamiliar dog.
- If knocked over by a dog, roll into a ball and lie still (e.g., "be still like a log").
- Children should not play with a dog unless supervised by an adult.
- Children should immediately report stray dogs or dogs displaying unusual behavior to an adult.
- Avoid direct eye contact with a dog.
- Do not disturb a dog who is sleeping, eating, or caring for puppies.
- Do not pet any dog without allowing the dog to see and sniff you first.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for animal bites.

Epidemiology and Trends

Animal bites are suffered disproportionately by the young. In 2006, 46 percent of reported bites in Indiana occurred to individuals less than 20 years of age. Figure 1 shows the number of animal bite victims by age. The rate of bite injury in children less than 1 year of age (475.54) is over two times that of any other age group. In children less than 1 year of age, 76 percent of animal bites were from dogs, 15 percent were from cats, and 2 percent were from bats.

Most animal bites are associated with animals that have the greatest interaction with humans. Of the 5,847 animal bites analyzed, 4,568 (78%) were committed by dogs and 1,016 (17%) by cats. A number of other wild and domestic species committed the remaining 5 percent. Table 1 presents the number of reported bites by species. The category "other" includes bites by goats, muskrats, and monkeys.

Rabies vaccination status was reported for 52 percent of biting dogs and 35 percent of biting cats. Of those animals with a reported vaccination status, 74 percent of dogs and 51 percent of cats were vaccinated for rabies (Figure 2). The difference in vaccination percentages is possibly due to dogs being associated with rabies and Indiana law requiring dogs to be vaccinated. Nationally, cats are diagnosed with rabies more frequently than dogs, especially in states where the raccoon rabies variant is present.

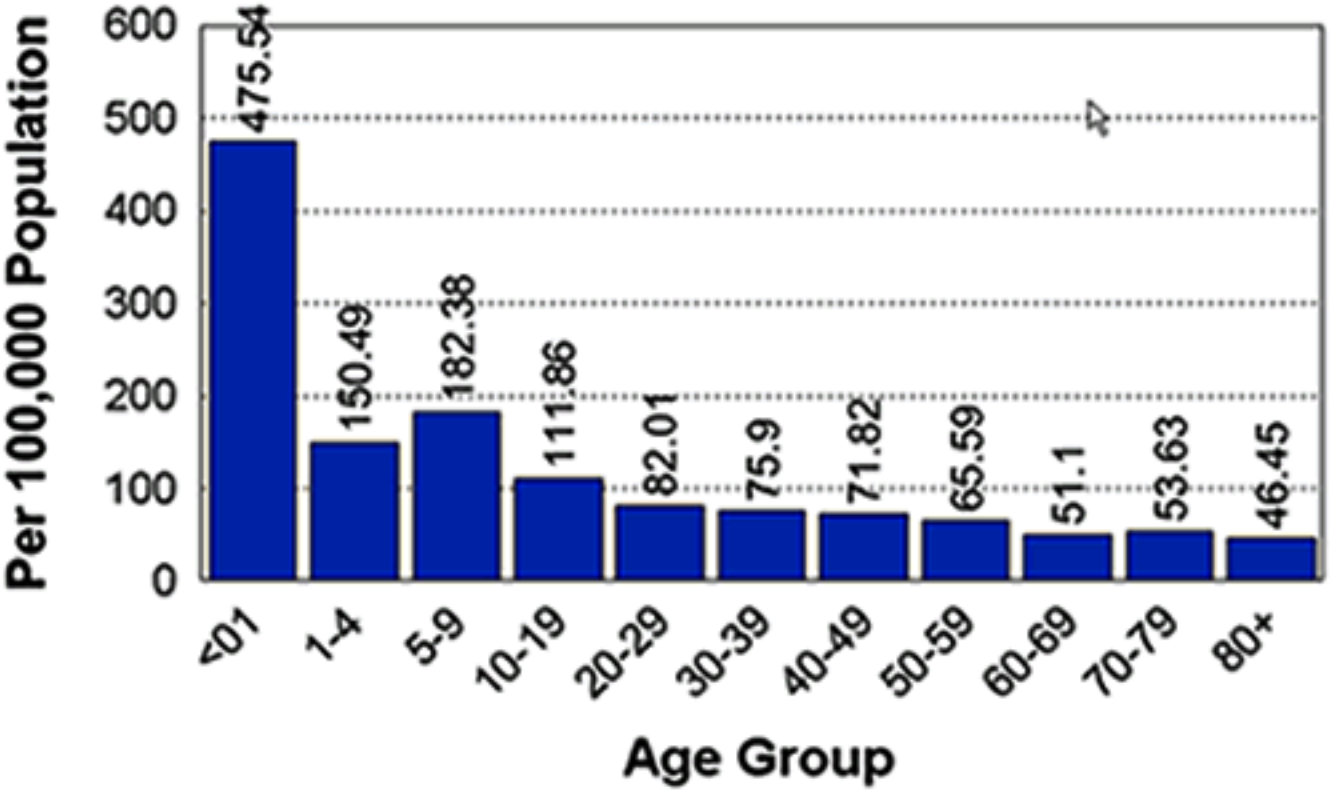
Two steps have been suggested to reduce animal bites: confinement and neutering. The 2006 Indiana animal bite data do not support this suggestion. For both dogs and cats, more bites were reported from confined animals than unconfined (Figure 3), and only intact male dogs were involved in more bites than other neutered animals (Figure 4 and Figure 5). Widespread community "leash laws" may be a factor in fewer reported animal bites by unconfined animals. According to the CDC, most dog bites incurred by persons 18 years of age or younger are by either a family or neighbor's dog.

You can learn more about animal bites by visiting the following Web site:
http://www.hsus.org/pets/pet_care/dog_care/stay_dog_bite_free/index.html

Table 1. Reported Animal Bites and Species, Indiana, 2006

Animal	Number	Animal	Number
Dogs	4,568	Rabbits	10
Cats	1,016	Equine	8
Bats	58	Pigs	4
Raccoons	41	Opossum	3
Squirrels	26	Chipmunks	3
Rats	24	Ferrets	3
Mice	16	Other	12
Hamsters	11	Unknown	44

Figure 1. Animal Bite Victims by Age*
Indiana, 2006



*Age information not reported for 13 people.

Figure 2. Rabies Vaccination Status of Biting Dogs and Cats -- Indiana, 2006

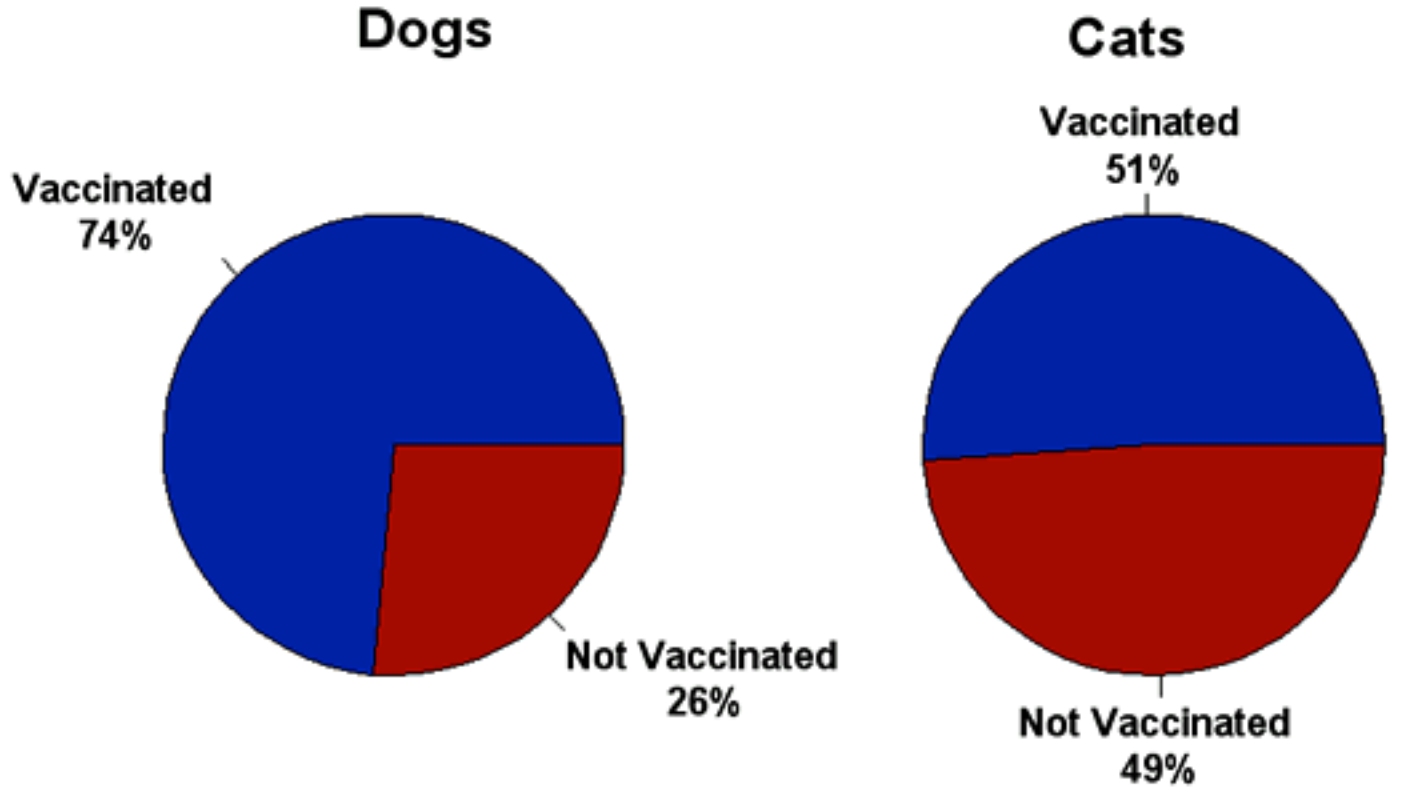
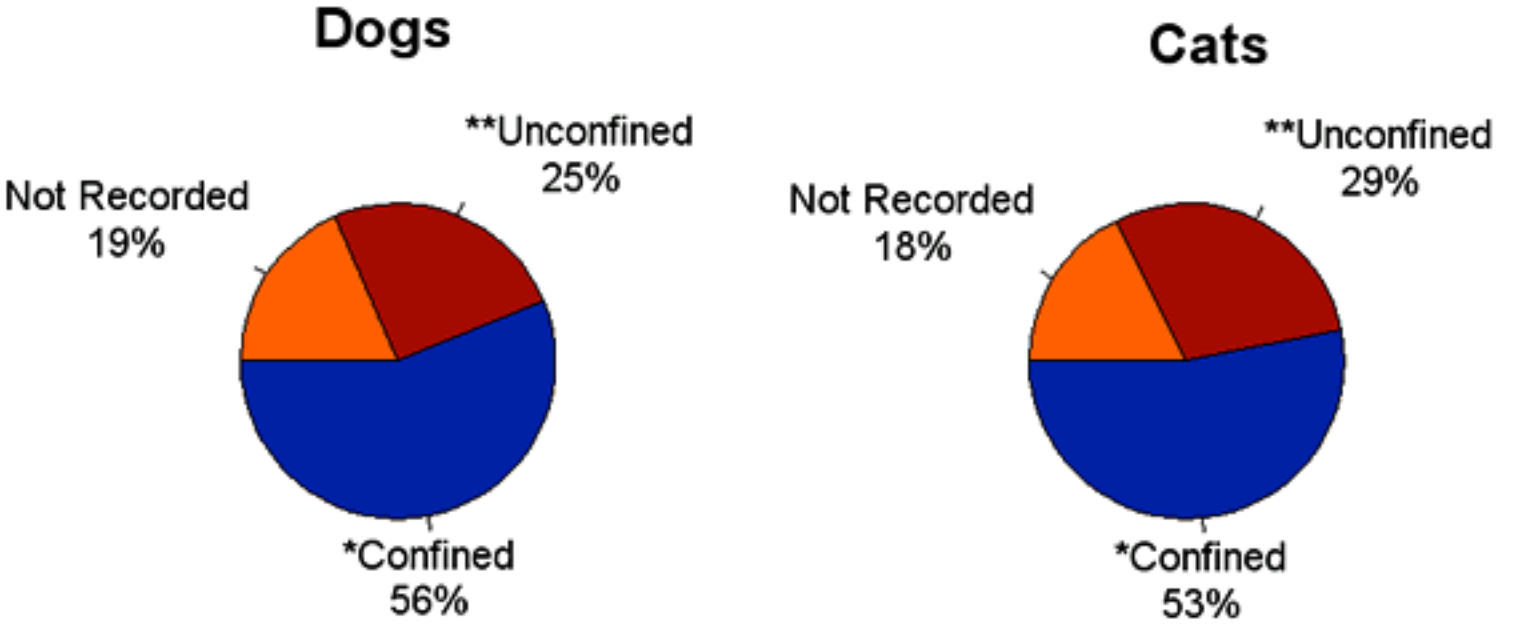


Figure 3. Animal Bites By Control Status Indiana, 2006



*Indoors, Penned, Tethered
**Stray, Roaming

Figure 4. Neutered Status of Biting Dogs by Sex Indiana, 2006

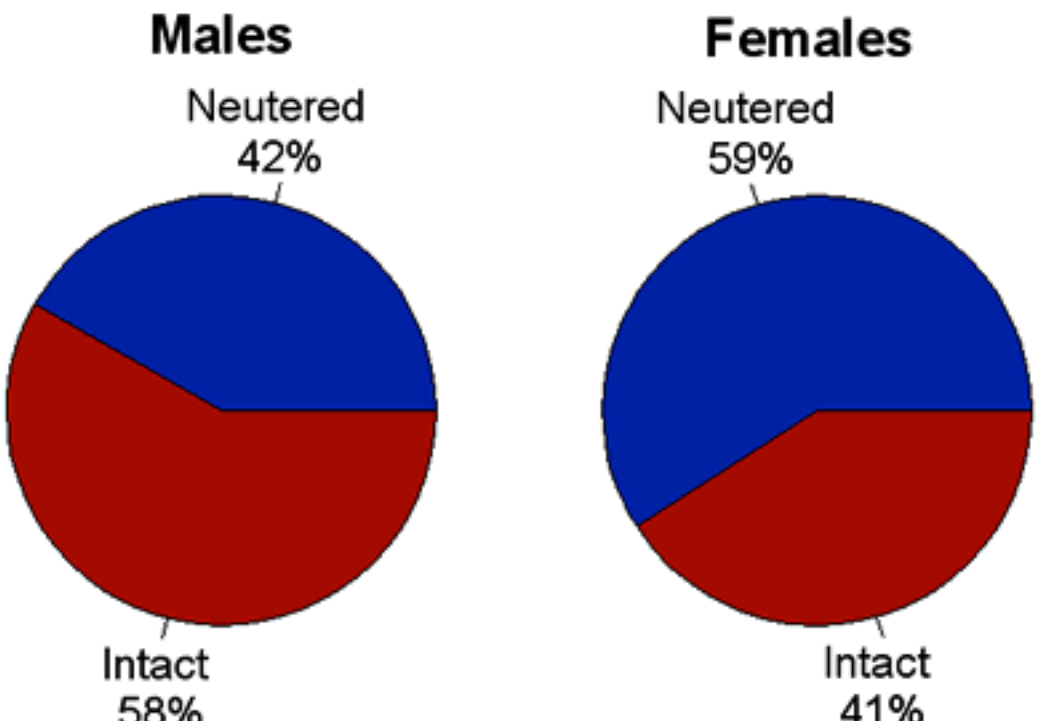
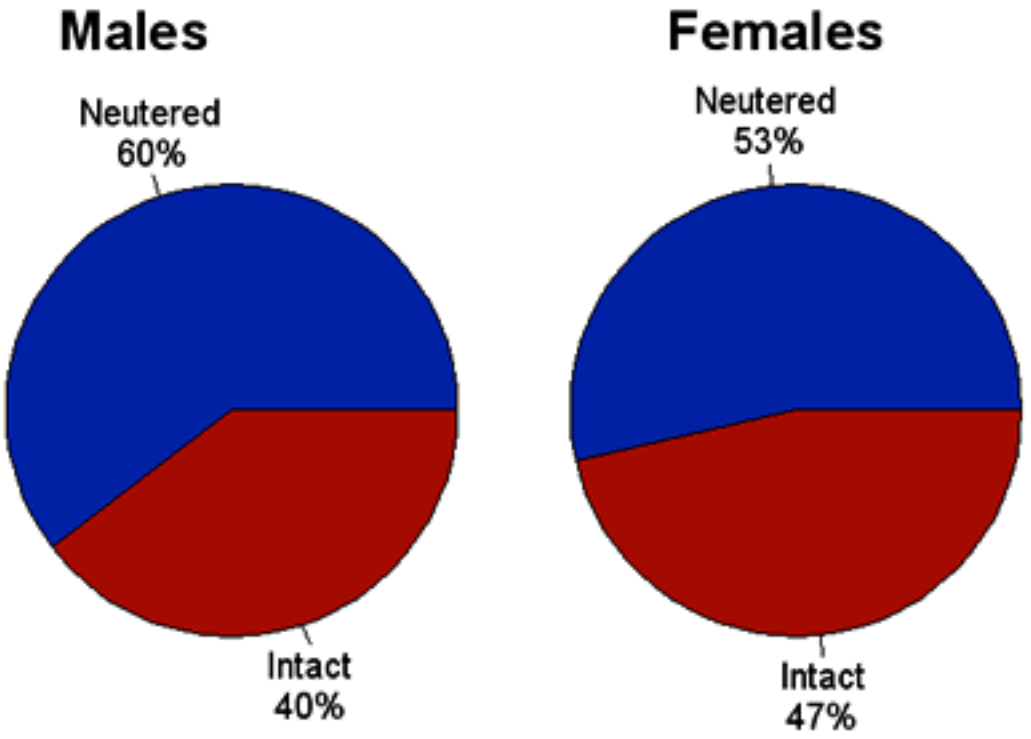


Figure 5. Neutered Status of Biting Cats by Sex Indiana, 2006



ANTHRAX

Anthrax is a bacterial disease of man and animals caused by the bacteria *Bacillus anthracis*. Anthrax bacteria form spores, which are extremely stable in the environment. There are three clinical presentations of the disease: 1) Cutaneous infections, the mildest form, occur when bacterial spores become embedded in the skin. 2) The gastrointestinal form, which is extremely rare, occurs when animals ill with anthrax are consumed as food. 3) Inhalation anthrax occurs when the spores are inhaled. Both the inhalation and gastrointestinal forms have high mortality rates. The reservoir of the bacteria is soil, where the spores can remain viable for years. The spores can be found worldwide and are found naturally in some western states in the U.S. and Canada. Animals, including livestock, can acquire the bacteria from contaminated soil. However, there have been no reported cases of anthrax in Indiana livestock since before 1960.

Public Health Significance

Symptoms of anthrax can occur within 7 days of becoming infected except for symptoms of inhalation anthrax, which can take up to 42 days to appear. The symptoms are different depending on how the disease is acquired.

Cutaneous: Skin infection starts with a small sore that resembles an insect bite or blister. The sore develops into a skin ulcer with a black area in the center. Most anthrax infections are cutaneous.

Gastrointestinal: Symptoms start with nausea, vomiting, fever, and loss of appetite and progress to more severe symptoms such as vomiting blood, stomach pain, and severe diarrhea.

Inhalation: Symptoms are similar to a common cold and include sore throat, mild fever, and muscle aches. As symptoms progress, breathing problems, tiredness, and chest discomfort can occur. Inhalation anthrax is usually fatal.

Antibiotics are used to treat all three types of anthrax. However, treatment success will depend on the type of anthrax infection and how soon treatment can begin.

An anthrax vaccine has been licensed for use in humans. The vaccine is recommended for the following groups:

- Laboratory personnel working directly with the organism.
- Persons who handle potentially infected animal products, e.g., imported hides.
- Veterinarians or other animal handlers who work in high-risk areas, especially outside the U.S.
- Military personnel.

The vaccine protects against cutaneous anthrax and is believed to be effective against inhaled spores in a biowarfare situation.

Anthrax is a Category A bioterrorism agent*. The anthrax spores can be released into the air by using weapons. As an agent of biological warfare, it is expected that a cloud of anthrax spores would be released at a strategic location to be inhaled by the individuals under attack.

Spores of *B. anthracis* can be produced and stored in a dry form and remain viable for decades in storage or after release.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for anthrax.

Epidemiology and Trends
There were no reported human or animal cases of anthrax in Indiana in 2006 or during the five-year reporting period 2002-2006.

You can learn more about anthrax by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/anthrax_gi.html

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/agentlist-category.asp

BABESIOSIS

Babesiosis is caused by hemoprotozoan parasites of the genus *Babesia*. The parasite attacks the red blood cells, causing their destruction and resulting in hemolytic anemia. Individuals with babesiosis often have enlarged livers and spleens. On the East Coast and in the Midwestern states, the disease is transmitted by the bite of infected deer ticks with the *Babesia* parasite. The deer tick lives on deer, meadow voles, and small rodents such as deer mice. Deer ticks also transmit Lyme disease and human granulocytic ehrlichiosis in Indiana. Co-infections of Lyme disease and *Babesia* have been identified in the New England states.

Public Health Significance
Symptoms of babesiosis usually occur 1-4 weeks after a tick bite but can appear months later. Most cases have mild symptoms that begin with fatigue and body aches. More severe symptoms may resemble malaria and include headache, fever, chills, and vomiting. Treatment is available and usually includes a combination of antiparasitic medications.

Although anyone can become infected with babesiosis, elderly people, persons with weakened immune systems, and people whose spleens have been removed are more at risk.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for babesiosis.

Epidemiology and Trends
There were no reported cases of babesiosis in Indiana in 2006, and only one reported case during the five-year reporting period 2002-2006.

You can learn more about babesiosis by visiting the following Web site:
http://www.cdc.gov/ncidod/dpd/parasites/Babesia/default.htm

ARBOVIRAL ENCEPHALITIS

Arboviral encephalitis viruses are transmitted by blood-feeding arthropods, the most common being mosquitoes and ticks. Indiana residents are at risk for four arboviral encephalitis viruses: 1) eastern equine encephalitis (EEE), 2) St. Louis encephalitis (SLE), 3) La Crosse encephalitis (LAC), and 4) West Nile virus (WNV), all of which are transmitted by mosquitoes. LAC encephalitis and WNV are addressed in separate sections of this report. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In warmer climates, cases may occur during the winter months because arthropods are active longer.

EEE is caused by a virus transmitted to humans and equines (horses) by infected mosquitoes and is maintained in a bird-mosquito cycle in fresh water swamps. In Indiana, the ecological system that supports the transmitting mosquito, *Culiseta melanura*, occurs only in the north central counties. Horse and human cases occur sporadically. EEE has a high mortality rate and is considered one of the most serious mosquito-borne diseases in the U.S.

SLE is also caused by a virus and is the most common mosquito-transmitted human pathogen in the U.S. The virus is maintained in a bird-mosquito cycle involving the *Culex* species of mosquito.

Public Health Significance
People infected with EEE often have no symptoms or mild flu-like symptoms, headache, and fever. Symptoms can become severe, infecting the central nervous system and eventually leading to seizures and coma. Symptoms appear 4-10 days after the bite from an infected mosquito. People most at risk of contracting EEE are those who live or visit areas where EEE is common and engage in outdoor recreational activities or people who work outdoors. While no vaccine or specific treatment exists for humans infected with EEE, there is a vaccine for horses.

Symptoms of SLE are similar to EEE and range in severity from headache and fever to coma, tremors, and convulsions. Symptoms appear 5-15 days after becoming infected with SLE. People most at risk of becoming infected with SLE are those who visit or reside in areas where mosquitoes carry the infection and people who work outdoors or participate in outdoor recreational activities. As with EEE, there is no vaccine for SLE.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for arboviral encephalitis.

Epidemiology and Trends
No human cases of EEE were reported in Indiana from 2002-2006.

There were no reported cases of SLE in Indiana in 2006, and only one reported case in the five-year reporting period 2002-2006.

You can learn more about arboviral encephalitis by visiting the following Web sites:
http://www.cdc.gov/ncidod/dvbid/arbor/index.htm
http://www.cdc.gov/ncidod/dvbid/arbor/eeefact.htm
http://www.cdc.gov/ncidod/dvbid/sle/Sle_FactSheet.html

BOTULISM

Botulism is caused by a nerve toxin (poison) produced by the *Clostridium botulinum* bacterium, which lives in the soil and grows best with little oxygen. These bacteria form spores, which allow them to survive harsh environments. The toxin can cause muscle paralysis, which can result in death if the breathing muscles become paralyzed. Botulism is considered a medical emergency. On average, one case of botulism is reported in Indiana every two years.

Botulism is not spread from person to person. There are three types of botulism:

- Foodborne botulism results from eating foods, especially improperly home-canned foods, that contain botulism toxin.
- Intestinal botulism (formerly infant botulism) results from eating certain foods, e.g., honey or natural syrups, that contain spores of botulism bacteria. These spores grow in the body and produce toxin in babies and people with gastrointestinal disorders.
- Wound botulism results from wounds becoming contaminated with *Clostridium botulinum*.

Public Health Significance

Symptoms of botulism can include diarrhea, vomiting, constipation, urinary retention, double or blurred vision, drooping eyelids, difficulty speaking or swallowing, dry mouth, muscle weakness, and muscle paralysis that begins in the upper body and progresses downward ("descending paralysis"). Muscle paralysis involves both sides of the body at the same time, starting at the head and moving towards the feet. These symptoms are a result of the bacterial toxin paralyzing the muscles of the body. Botulism symptoms typically begin within 12-36 hours (range of 6 hours to 10 days) after consuming contaminated food or after a wound has become infected with the bacteria. Babies with botulism appear tired, do not eat well, are constipated, have a weak cry, and limp muscles.

If discovered early, botulism caused by contaminated food or an infected wound can be treated with an antitoxin. While the antitoxin keeps the illness from becoming worse, it does not speed recovery. Antitoxin is rarely used to treat babies with botulism. Because the antitoxin can cause severe allergic reactions in some patients, the health care provider must rule out other possibilities for the illness before giving antitoxin.

Measures that would decrease the likelihood of transmission of botulism include:

- Foodborne:
  - Properly process and prepare all home-canned foods. Instructions for safe home canning are available from county extension services or from the United States Department of Agriculture (USDA) at http://www.uga.edu/nchfp/publications/publications_usda.html
  - Boil home-canned foods for 10 minutes before eating. The bacterial toxin is destroyed by heat.
  - Never eat foods from cans or jars that are bulging, discolored, have a bad taste or smell, or have swollen lids or caps.
  - If stored overnight, remove aluminum foil from leftover potatoes before refrigerating. Potatoes that have been baked while wrapped in aluminum foil should be kept hot until they are eaten or refrigerated.

    - Refrigerate oils that contain garlic or herbs.
    - Outbreaks have occurred following the consumption of uneviscerated fish (guts left inside the fish), fermented fish, and improperly processed foods (e.g., sautéed onions, chili peppers, and canned chili).
- Intestinal (including infants):
    - Honey should not be fed to babies less than 12 months of age. Honey can contain spores of the bacteria, which can easily grow in infants.
- Wound care:
    - Carefully clean and disinfect all cuts and wounds.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for botulism.

Epidemiology and Trends
There were no reported cases of botulism in Indiana in 2006, and only two reported cases during the five-year reporting period 2002-2006.

You can learn more about botulism by visiting the following Web sites:
www.cdc.gov/nczved/dfbmd/disease_listing/botulism_gi.html
www.cfsan.fda.gov/~mow/chap2.html

BRUCELLOSIS

Brucellosis is a systemic bacterial disease of animals caused by one of several *Brucella* species (*abortus, melitensis, suis, canis*) that can be transmitted to humans through one of three methods: 1) consumption of contaminated milk or meat; 2) handling of infected animal fetuses, vaginal fluid, or products of birth; or 3) inhalation of the organism in laboratories or slaughterhouses. Person-to-person transmission has been recorded by sexual activity and breast-feeding mothers.

Public Health Significance
In humans, symptoms of brucellosis usually appear within 5-30 days of becoming infected and are similar to influenza (the flu). Symptoms may include fever, sweats, headaches, weakness, profuse sweating, chills, and body aches. Groups at risk for brucellosis include meat inspectors, animal handlers, laboratory workers, and veterinarians. Treatment is available for brucellosis and, depending on the timing of treatment, recovery can take a few weeks to several months.

Since *Brucella* can be transmitted by inhalation, it is considered a Category B bioterrorism agent*.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for brucellosis.

Epidemiology and Trends
Brucella cases in humans rarely occur in Indiana or elsewhere in the U.S. due to the efforts of the United States Department of Agriculture and state animal health agencies to eliminate *Brucella* from livestock herds over the last 60-70 years. There was one reported case of brucellosis in Indiana in 2006, and that was the only case reported during the five-year reporting period 2002-2006. The source of infection for the one reported case is unknown but thought to be work related.

You can learn more about brucellosis by visiting the following Web sites:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/brucellosis_g.htm

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/brucellosis/

CAMPYLOBACTERIOSIS

Campylobacteriosis is a contagious disease caused by *Campylobacter* bacteria, which live in the intestines of many animals, including birds, farm animals, dogs, and cats. There are over 20 types of *Campylobacter* bacteria. Campylobacteriosis is one of the most commonly reported causes of diarrheal illness in humans.

There are many ways a person can become infected with *Campylobacter*. The most common exposures are foodborne (consuming undercooked poultry, unpasteurized dairy products), waterborne (swallowing untreated water, e.g., from lakes or streams), person-to-person contact, and contact with infected animals, primarily puppies, kittens, and livestock.

Public Health Significance

Typical symptoms include diarrhea, stomach cramps, fever, nausea, and vomiting. Symptoms usually appear 2-5 days after exposure, with a range of 1-10 days. For most people, *Campylobacter* causes symptoms that usually last no longer than one week, and they recover within 5-7 days without medical treatment. Since diarrhea can cause dehydration, an infected person should drink plenty of fluids. While antibiotics may be used to shorten the duration of illness and eliminate *Campylobacter* from the body, they are not recommended.

In general, campylobacteriosis can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after contact with animals and reptiles; after swimming; before, during, and after food preparation; and after exposure to raw meat products.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.
- Separate raw and cooked foods:
    - Avoid cross-contamination by keeping uncooked meat products and marinades separate from produce, ready-to-eat foods, and cooked foods.
    - Use separate equipment and utensils for handling raw foods.
    - Clean food-preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contact with raw meat products.
- Maintain safe temperatures:
    - Maintain proper temperatures during refrigeration (<40˚F), freezing (<2˚F), holding (keep food hot or at room temperature for no longer than 2 hours), and chilling (chill immediately and separate into smaller containers if needed).
    - Thoroughly cook all food items to USDA recommended safe minimum internal temperatures:
        - 145˚F – steaks, roasts, and fish
        - 160˚F – pork, ground beef, and egg dishes
        - 165˚F – chicken breasts and whole poultry
    - If the temperature cannot be checked, cook poultry until juices run clear and the meat is no longer pink.
- Eat safe foods:

    - Do not eat undercooked meat, poultry, eggs, expired foods, or unpasteurized dairy products or juice.
    - Wash all produce before eating raw or cooking.
    - Use treated water for washing, cooking, and drinking.
    - Avoid swallowing untreated water.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care services for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.
    - Do not change diapers near recreational water.
    - Do not go swimming or use hot tubs if you have diarrhea and for at least 2 weeks after diarrhea stops.
- Handle animals safely:
    - Wash hands after contact with farm animals, petting zoos, pets (including reptiles and amphibians), especially if they are suffering from diarrhea, and after contact with pet food/treats (including live or frozen rodents).
    - Keep pets out of food-preparation areas.
    - Do not clean pet or reptile cages in the kitchen sink or in the bathtub.
- Safe travel outside of the U.S.:
    - Drink bottled beverages and water, even when brushing teeth.
    - Do not eat uncooked fruits or vegetables unless you peel them yourself.
    - Do not eat foods or beverages from street vendors.
    - Do not consume local water or ice.

Healthy People 2010 Goal

The Healthy People 2010 Goal for campylobacteriosis is 12.3 cases per 100,000 population per year. Indiana met that goal for the five-year period 2002-2006 (Figure 1).

Epidemiology and Trends

In 2006, there were 578 reported cases of campylobacteriosis in Indiana, for a rate of 9.15 cases per 100,000 population (Table 1). This represents a slight increase in reported cases compared to 2005 (473). Males (10.03) were more likely to be reported than females (8.24). The rate for whites (7.87) was higher than that for blacks (3.02) or other races (2.86); however, 117 cases (20%) did not report race data.

Table 1. Campylobacteriosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	578	9.15	2,562
Race			
Black	17	3.02	65
White	439	7.87	1,804
Other	5	2.86	38
Not Reported	117	-	655
Sex			
Female	264	8.24	1,158
Male	312	10.03	1,391
Unknown	2	-	13

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows reported cases by year for 2002-2006. Incidence of disease was greatest during the summer months. Figure 3 shows cases per month for 2006. As shown in Figure 4, age-specific rates were greatest for infants under the age of 1 year (30.16), followed by preschoolers aged 1-4 years (17.40), and adults aged 40-49 years (11.71). The incidence rates were highest among the following counties reporting five or more cases: Montgomery (31.4), Whitley (24.6), and Randolph (24.3). Figure 5 shows counties reporting five or more cases of campylobacteriosis in 2006.

There was one outbreak of campylobacteriosis in Indiana in 2006. In February, an outbreak occurred in New Richmond, Indiana. A case-control study was conducted in order to determine whether the source may have been from food or water. Since a food source was not identified through the epidemiologic investigation, an environmental assessment was conducted to determine if the source of the outbreak came from the environment. The environmental inspector determined that a cross-contamination hazard occurred at the water treatment facility in New Richmond. Prior to the outbreak, the chlorine feed did not function properly; therefore, the water supply was not receiving the proper amount of chlorination. The equipment malfunction caused the chlorine levels in the water to fall below the recommended concentration levels of 1.00 ppm. Total coliform tests indicated the presence of various types of potential disease-causing microorganisms in the water from environmental sources. At least 34 residents reported illness, with 32 meeting the case definition. Recommendations were made to the water treatment facility in order to ensure a safe water supply to residents.

You can learn more about campylobacteriosis by visiting the following Web site:
http://www.cdc.gov/nczved/dfbmd/disease_listing/campylobacter_gi.html

Figure 1. Campylobacteriosis Rates by Year Indiana, 2002-2006

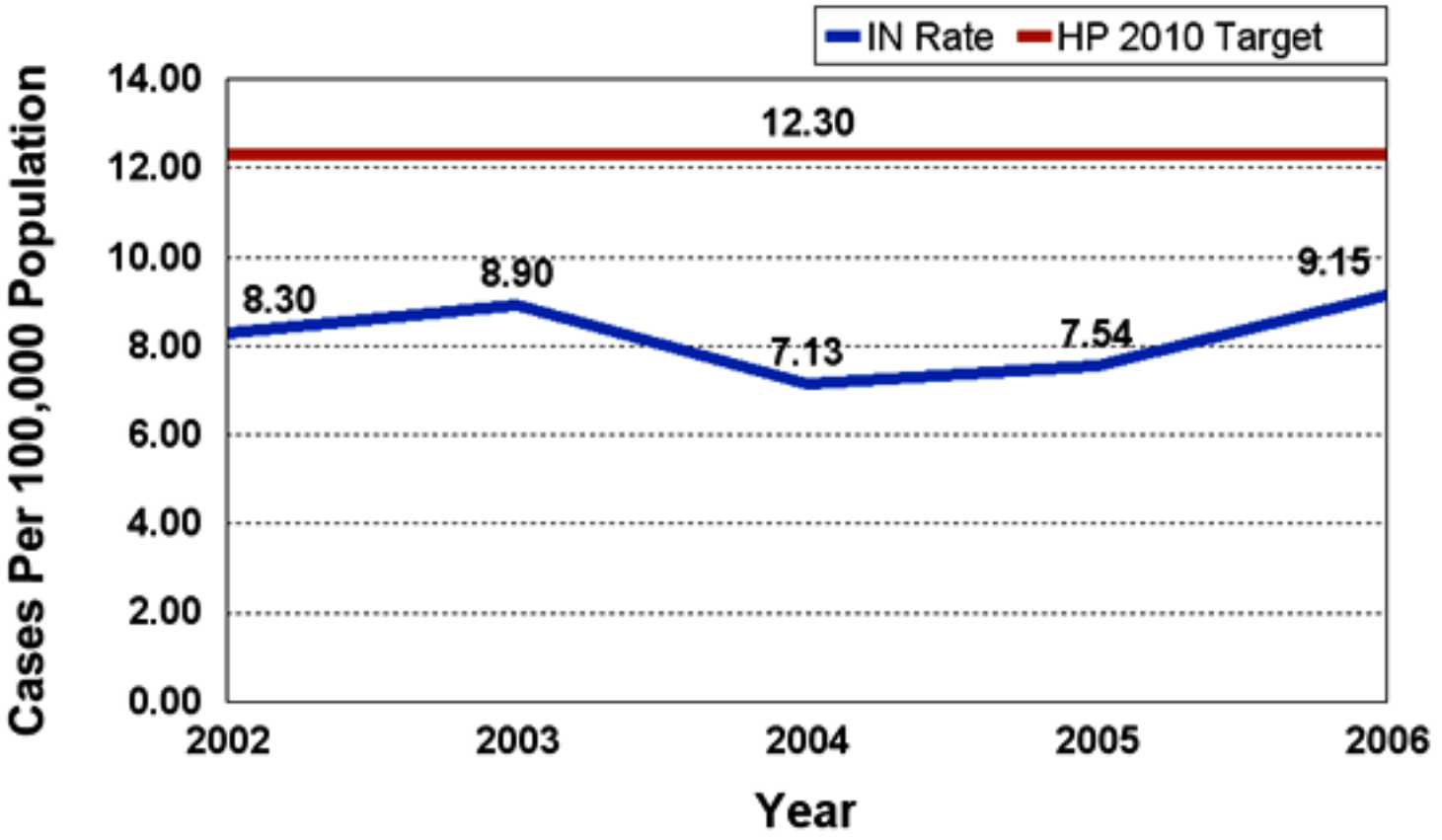
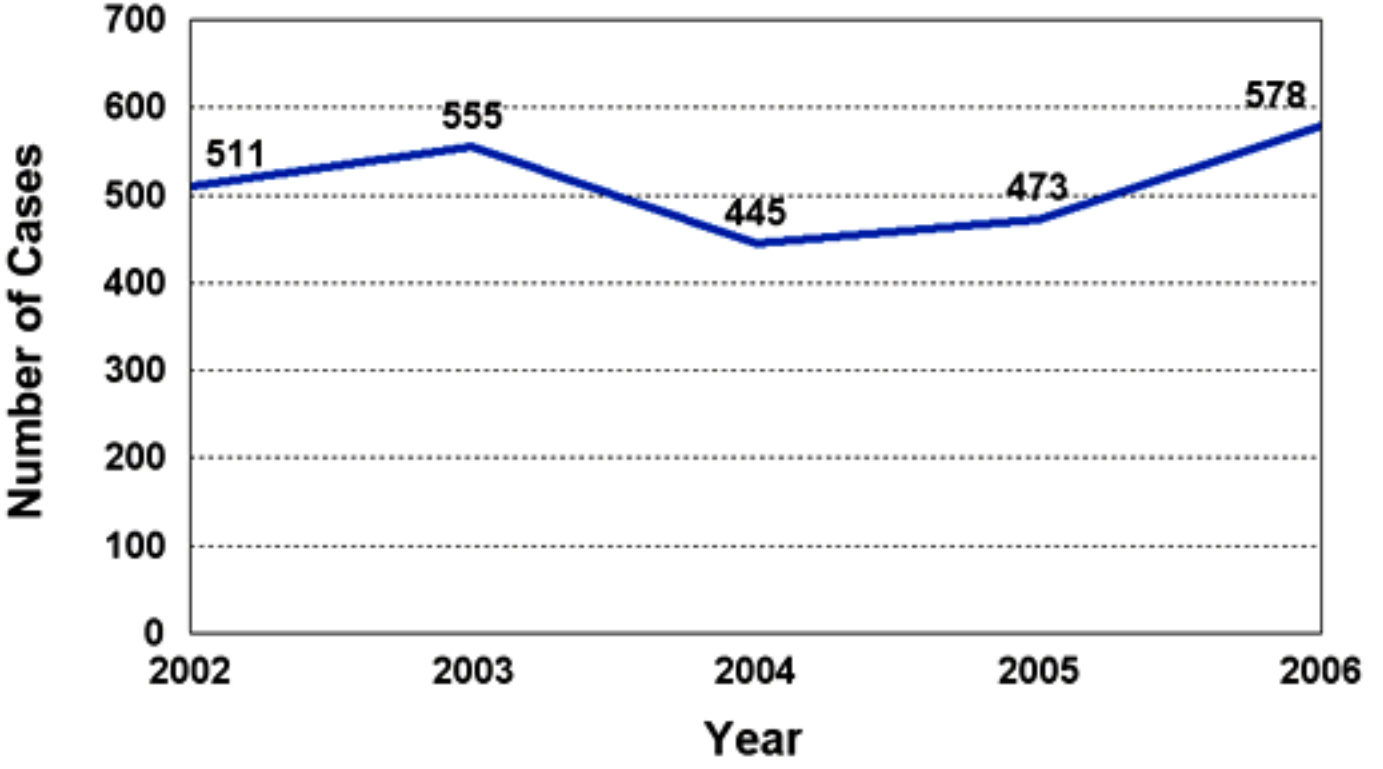


Figure 2. Campylobacteriosis Cases by Year*
Indiana, 2002-2006



*2003 case totals were updated from 553 to 555

Figure 3. Campylobacteriosis Cases by Month Indiana, 2006

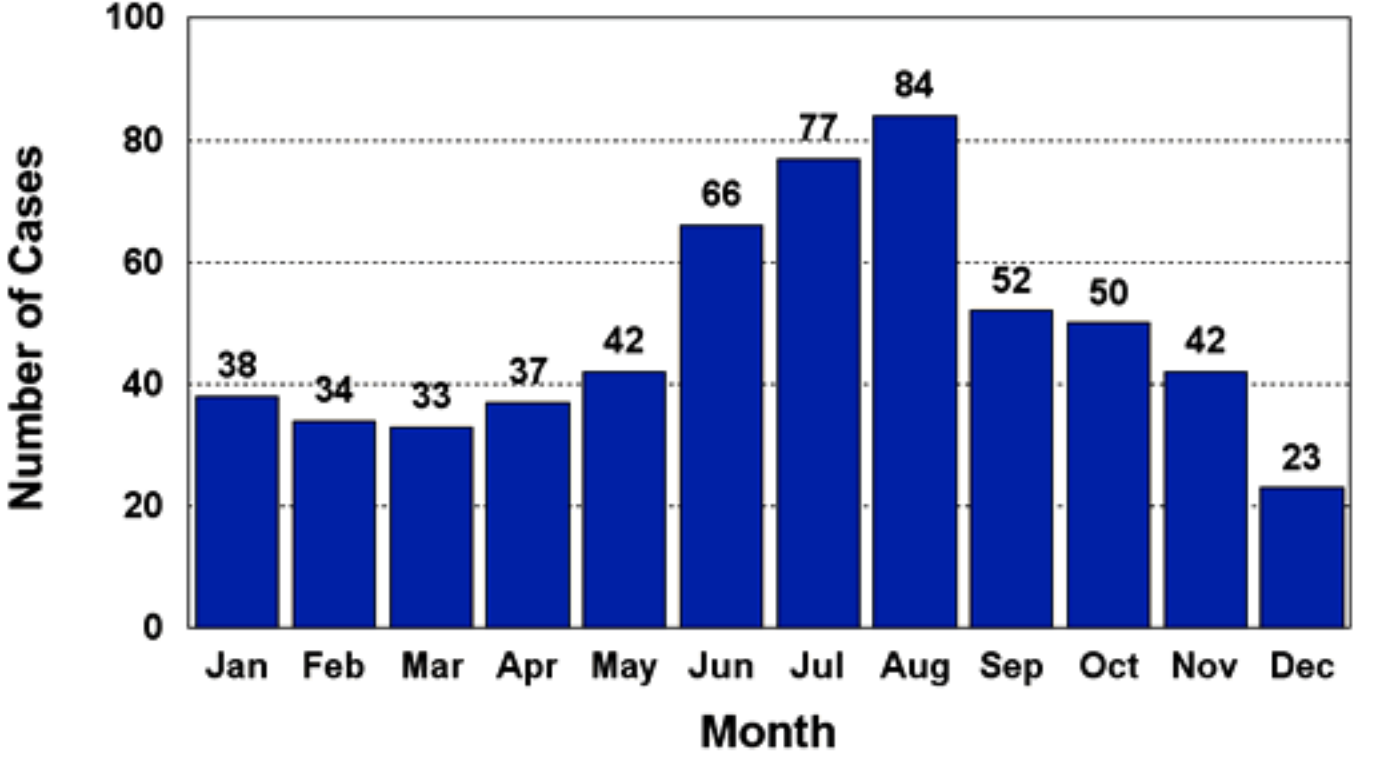
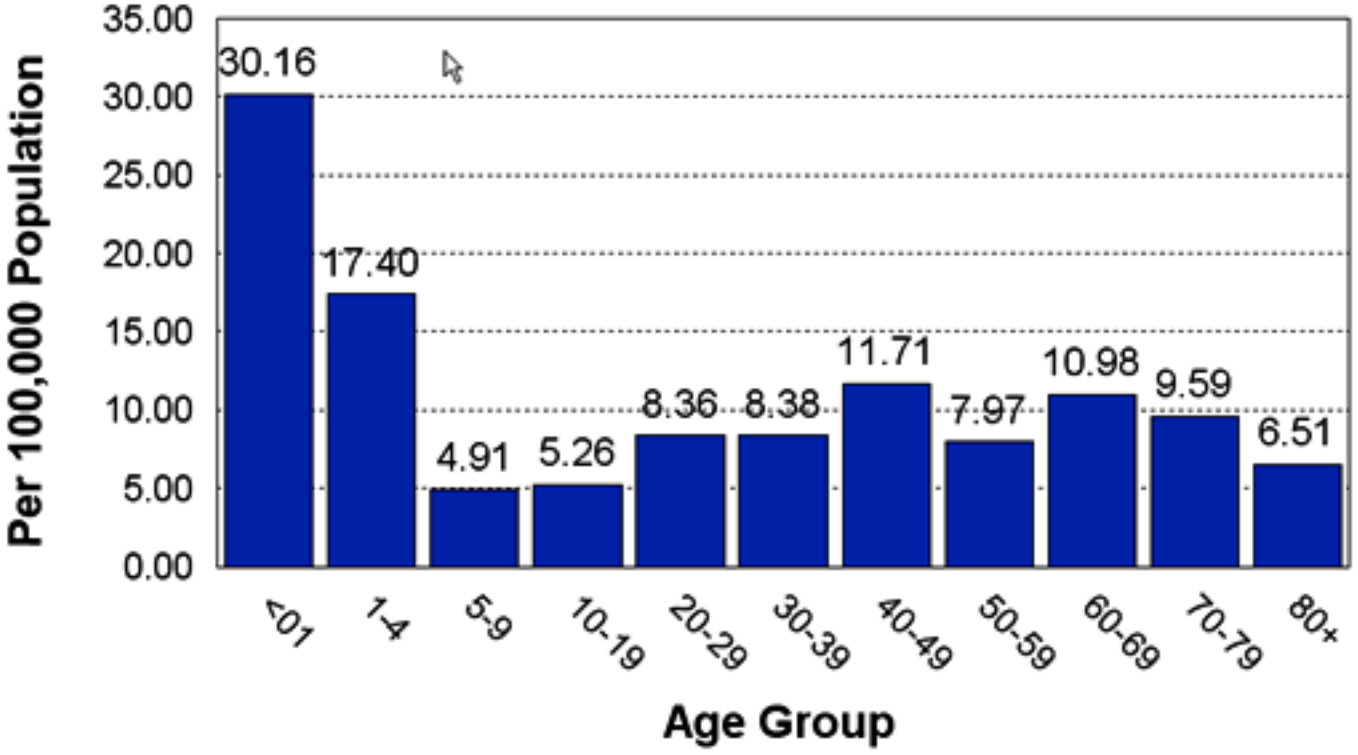
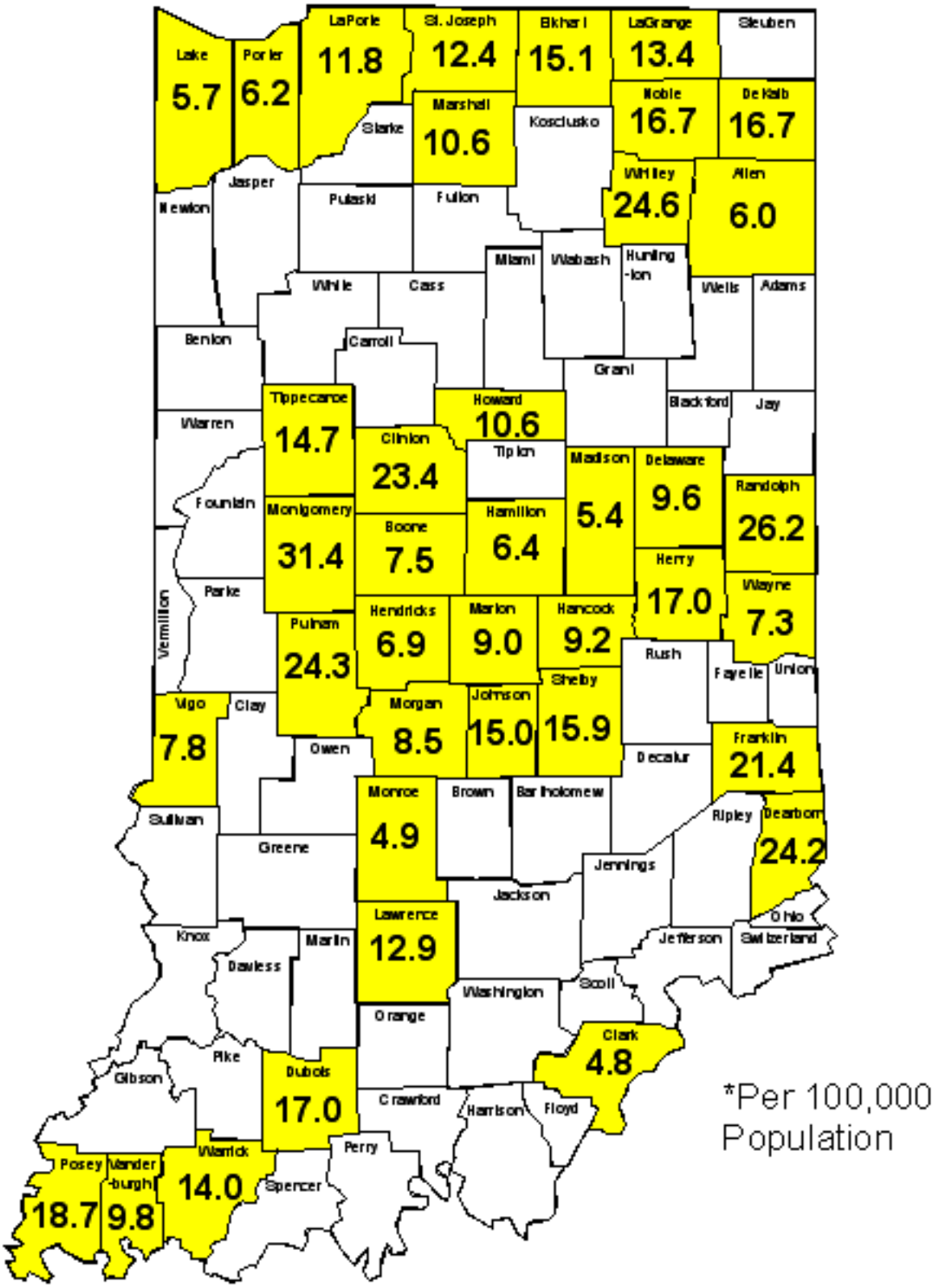


Figure 4. Campylobacteriosis Incidence by Age Group* Indiana, 2006



*Age information not reported for one case.

Figure 5. Campylobacteriosis Cases* by County -- Indiana, 2006



*Per 100,000 Population

CHOLERA

Cholera is a contagious diarrheal disease caused by toxins produced by *Vibrio cholerae* bacteria (O1 and O139 serogroups). Humans are the primary reservoir, although environmental reservoirs may exist in brackish water (a mixture of saltwater and fresh water) and estuaries (places where freshwater rivers and streams flow into the ocean). Shellfish found in the U.S. coastal waters may be contaminated with *V. cholerae*. Cholera is extremely rare in the U.S. and is usually related to travel to a country where cholera is common, such as Africa, Asia, and Latin America.

V. cholerae is passed in the stool and people become infected by ingesting feces from an infected person (fecal-oral route). *V. cholerae* is typically transmitted via the ingestion of food or water contaminated (directly or indirectly) with feces or vomitus of infected persons (e.g., via sewage). Water contaminated with *V. cholerae* can thus contaminate shellfish and raw produce.

Although direct person-to-person spread is unlikely, cholera may be transmitted as long as stools test positive for the bacterium, most likely until a few days after recovery from symptoms. Shedding of bacteria may occasionally persist for several months.

Public Health Significance

Symptoms of cholera can include diarrhea, vomiting, and dehydration and usually begin within 2-3 days (range of a few hours to 5 days) after exposure. Fever is usually absent. Infection with *V. cholerae* often results in asymptomatic or mild illness involving only diarrhea.

Approximately 1 out of 20 infected people will develop more severe illness characterized by profuse watery stools, nausea, some vomiting, and leg cramps. Because of rapid loss of body fluids, dehydration and shock can occur in the most severe cases. Without rehydration therapy, death can result within hours. The case fatality rate in severe, untreated cases may exceed 50 percent; with prompt rehydration, the fatality rate is less than 1 percent.

Cholera can be treated by immediate replacement of the fluid and salts lost through diarrhea. Patients can be treated with oral rehydration solution, a prepackaged mixture of sugar and salts to be mixed with water and drunk in large amounts. This solution is used throughout the world to treat diarrhea. Severe cases also require intravenous fluid replacement. Antibiotics shorten the course and diminish the severity of the illness, but they are not as important as rehydration.

In general, cholera can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after contact with animals and reptiles; after swimming; before, during, and after food preparation; and after exposure to raw meat products.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.

- Eat safe foods and drink safe water:
    - Use treated water for washing, cooking, and drinking.
    - Wash all produce before eating raw or cooking.
    - Do not eat uncooked shellfish or fish, including ceviche.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.
    - Do not change diapers near recreational water.
    - Do not go swimming or use hot tubs if you have diarrhea and for at least 2 weeks after diarrhea stops.
- Safe travel outside of the U.S.:
    - Drink bottled beverages and water, even when brushing teeth.
    - Do not consume local water or ice.
    - Do not eat uncooked fruits or vegetables unless you peel them yourself.
    - Do not eat foods or beverages from street vendors.
    - Do not bring raw produce or shellfish back into the U.S.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for cholera.

Epidemiology and Trends
There were no reported cases of cholera in Indiana during the five-year reporting period 2002-2006 and no outbreaks associated with cholera in 2006.

You can learn more about cholera by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/cholera_gi.html
www.cfsan.fda.gov/~mow/chap7.html

CRYPTOSPORIDIOSIS

Cryptosporidiosis is a contagious disease caused by a one-celled parasite, *Cryptosporidium parvum*, which can live in the intestine of humans, cattle and other mammals, poultry, fish, and reptiles. Healthy people recover on their own, but cryptosporidiosis can be very serious and even cause death in people with weakened immune systems. Because the parasite is protected by an outer shell (cyst), it can survive outside the body and in the environment for long periods of time. Concentrations of chlorine used in routine water treatment do not kill *Cryptosporidium* cysts. On average, 80 cases of cryptosporidiosis are reported in Indiana each year.

People become infected with *Cryptosporidium* by ingesting feces from an infected animal or person (fecal-oral route). Risk factors associated with cryptosporidiosis include:

- Eating food, most commonly produce, contaminated with stool from infected animals or contaminated water.
- Swallowing contaminated water from lakes, rivers, streams, swimming pools, or hot tubs.
- Swallowing treated but unfiltered drinking or recreational water.
- Having contact with an infected person's stool:
    - Not washing hands after contact with stool from a contaminated surface or diaper/linen and ingesting the bacteria.
    - Having sex that involves contact with stool.

The most common sources of *Cryptosporidium* outbreaks are contaminated drinking water, recreational water parks, pools, lakes, and contaminated beverages.

Public Health Significance

Symptoms of cryptosporidiosis can include watery diarrhea, stomach cramps, upset stomach, slight fever, weight loss, and vomiting (more common in children). Symptoms usually begin seven days (range of 1-12 days) after a person becomes infected. In healthy people, symptoms usually last about two weeks or less. However, it is common for symptoms to fade and then return. This relapse of illness can continue for up to 30 days.

Some people with cryptosporidiosis may not have any symptoms, but they can still pass the disease to others. After infection, people can shed *Cryptosporidium* in their stool for months. People with weakened immune systems may not be able to clear the infection. This may lead to prolonged disease and even death. Being infected with *Cryptosporidium* and recovering from the infection does not provide any immunity against reinfection.

Antiparasitic drugs are available for treatment. Also, there are over-the-counter medications that can ease the symptoms. Since diarrhea can cause dehydration, an infected person should drink plenty of fluids.

In general, cryptosporidiosis can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after contact with animals

and reptiles; after swimming; before, during, and after food preparation; and after exposure to raw meat products.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.
- Separate raw and cooked foods:
    - Avoid cross-contamination by keeping uncooked meat products and marinades separate from produce, ready-to-eat foods, and cooked foods.
    - Use separate equipment and utensils to handle raw foods.
- Eat safe foods and drink safe water:
    - Do not consume unpasteurized dairy products or juices.
    - Wash all produce before cooking or eating raw.
    - Use treated chlorinated water for washing, cooking, and drinking.
    - Avoid swallowing recreational water.
    - Test your well if:
        - Members of your family or others who use the same water are becoming ill,
        - The well is located at the bottom of a hill or it is considered shallow, or
        - The well is in a rural area where animals graze.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care services for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.
    - Do not change diapers near recreational water.
    - Do not go swimming or use hot tubs if you have diarrhea and for at least two weeks after diarrhea stops.
- Handle animals safely:
    - Wash hands after contact with livestock, petting zoos, pets (including reptiles and amphibians), especially if they are suffering from diarrhea, and after contact with pet food/treats (including live or frozen rodents).
    - Keep pets out of food-preparation areas.
    - Do not clean pet or reptile cages in the kitchen sink or in the bathtub.
    - Have pets checked for parasites by your veterinarian, especially if they have diarrhea.
    - Reptile safety:
        - Reptiles should not be allowed to roam the house.
        - Reptiles should not be kept in daycare facilities or classrooms.
        - Children less than five years of age, pregnant women, and persons with weakened immune systems should not handle reptiles.
- Safe travel outside of the U.S.:
    - Drink bottled beverages and water, even when brushing teeth.
    - Do not eat uncooked fruits or vegetables unless you peel them yourself.
    - Do not eat foods or beverages from street vendors.
    - Do not consume local water or ice.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for cryptosporidiosis.

Epidemiology and Trends
In 2006, 113 cases of cryptosporidiosis were reported in Indiana, for a rate of 1.79 cases per 100,000 population. This represents a 19 percent increase from 2005 (1.50). Females (1.94) were slightly more likely to be reported than males (1.61). The rate for whites (1.54) was higher than that for blacks (0.89) and other races (0.57); however, 21 cases (19%) did not report race data.

Table 1. Cryptosporidiosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	113	1.79	483
Race			
Black	5	0.89	15
White	86	1.54	375
Other	1	0.57	18
Not Reported	21	-	75
Sex			
Female	62	1.94	264
Male	50	1.61	218
Unknown	1	-	1

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows the number of reported cases each year for 2002-2006. Disease incidence was greatest during the late summer and fall months (Figure 2). As shown in Figure 3, age-specific rates were greatest for preschoolers aged 1-4 years (6.09), followed by infants less than 1 year of age (3.48), and children aged 5-9 (3.04). The incidence rates were highest among the following counties reporting five or more cases: Dearborn (16.1), Porter (7.5), and Lake (3.8). Figure 4 shows counties reporting five or more cases of cryptosporidiosis in 2006. There were no outbreaks of cryptosporidiosis reported in Indiana in 2006.

You can learn more about cryptosporidiosis by visiting the following Web sites:
http://www.cdc.gov/crypto/
www.cfsan.fda.gov/~mow/chap24.html

Figure 1. Cryptosporidiosis Cases by Year Indiana, 2002-2006

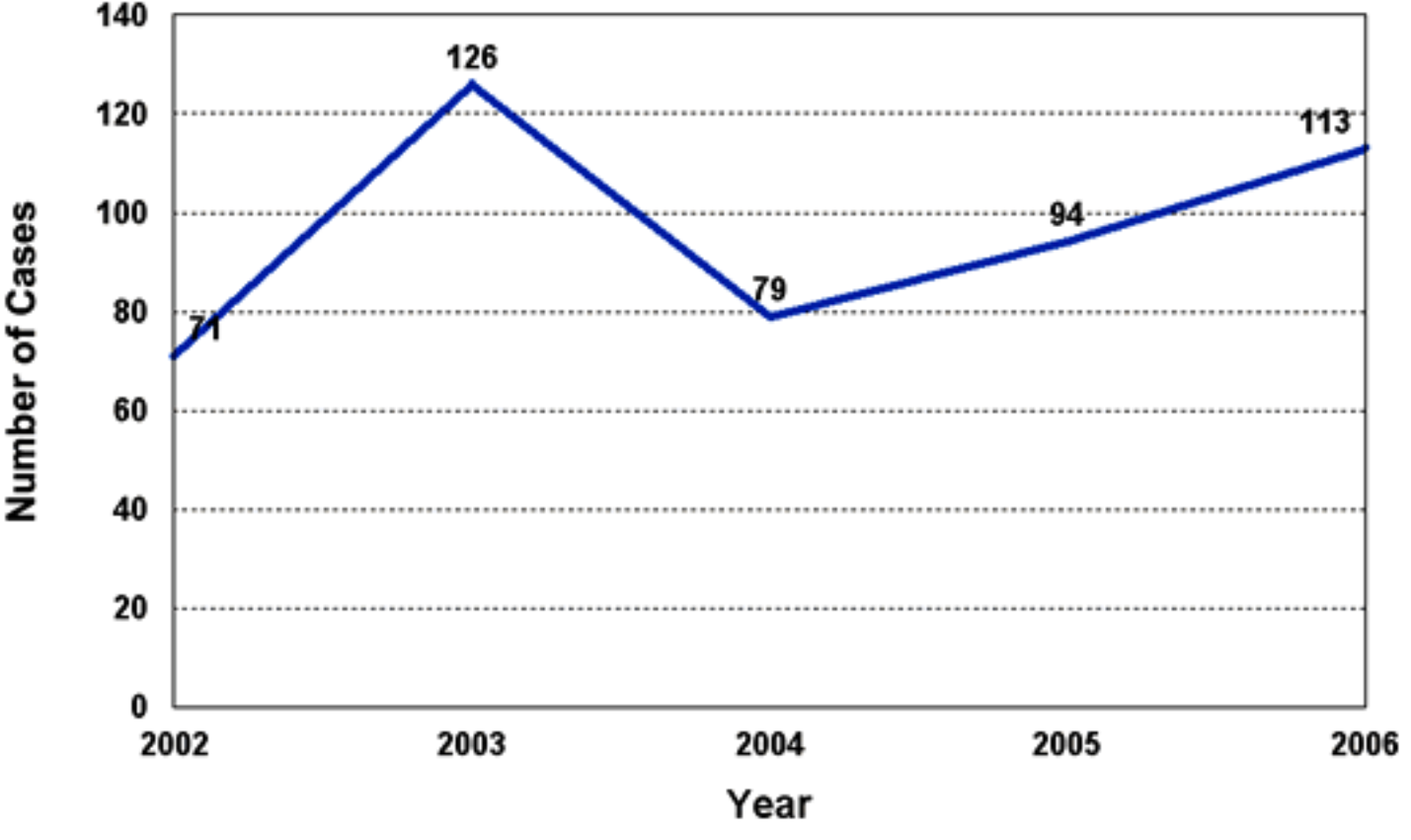


Figure 2. Cryptosporidiosis Cases by Month Indiana, 2006

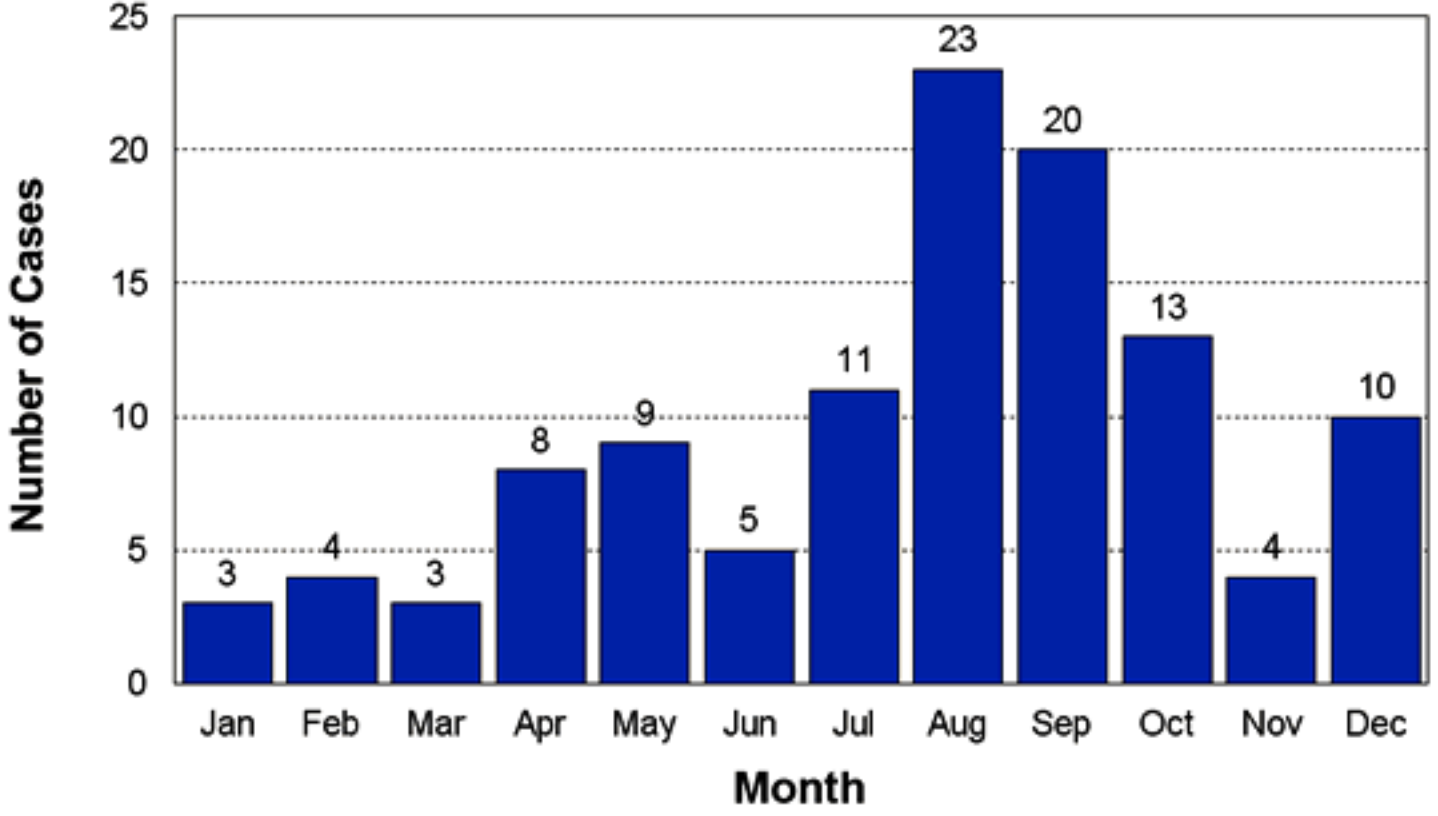
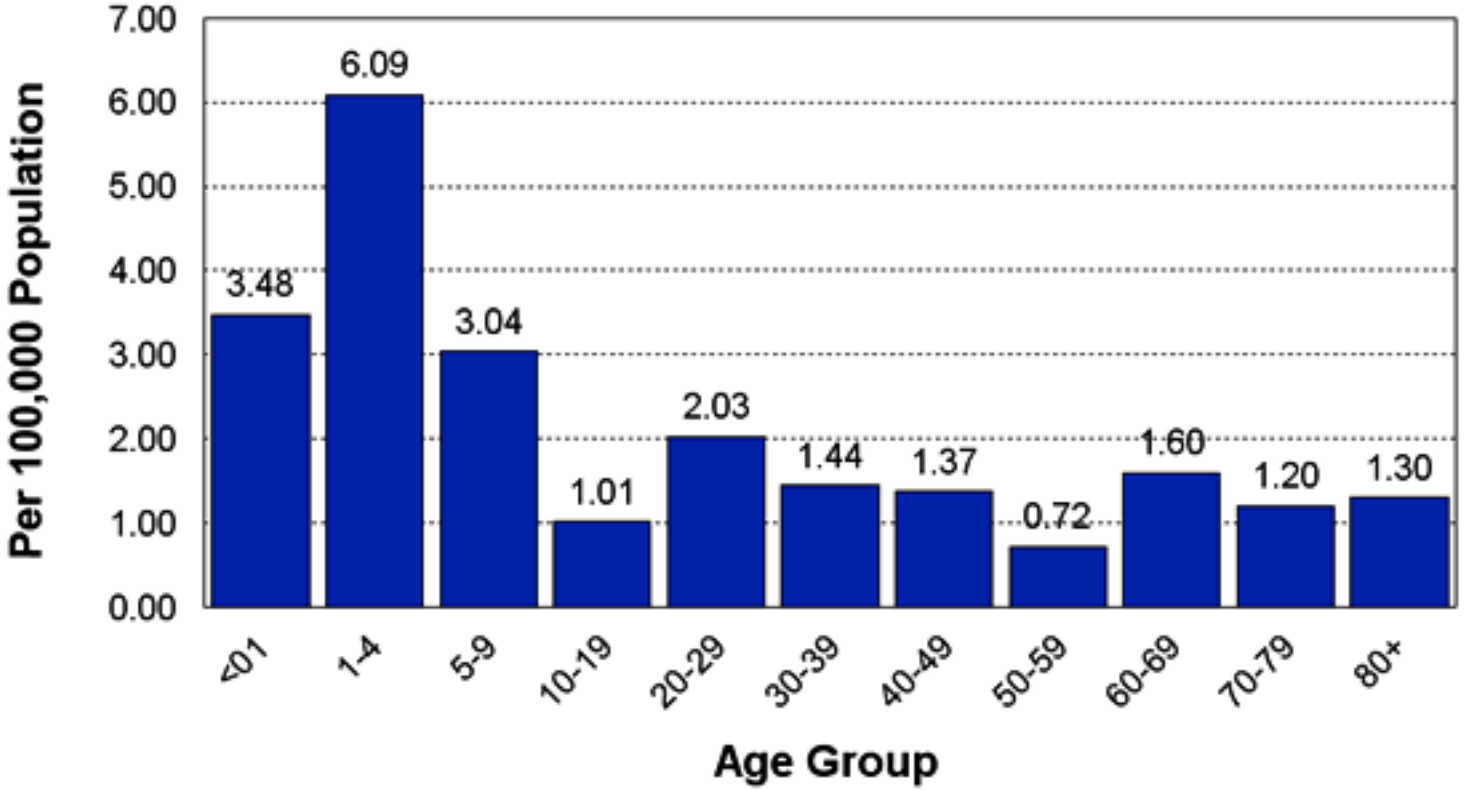
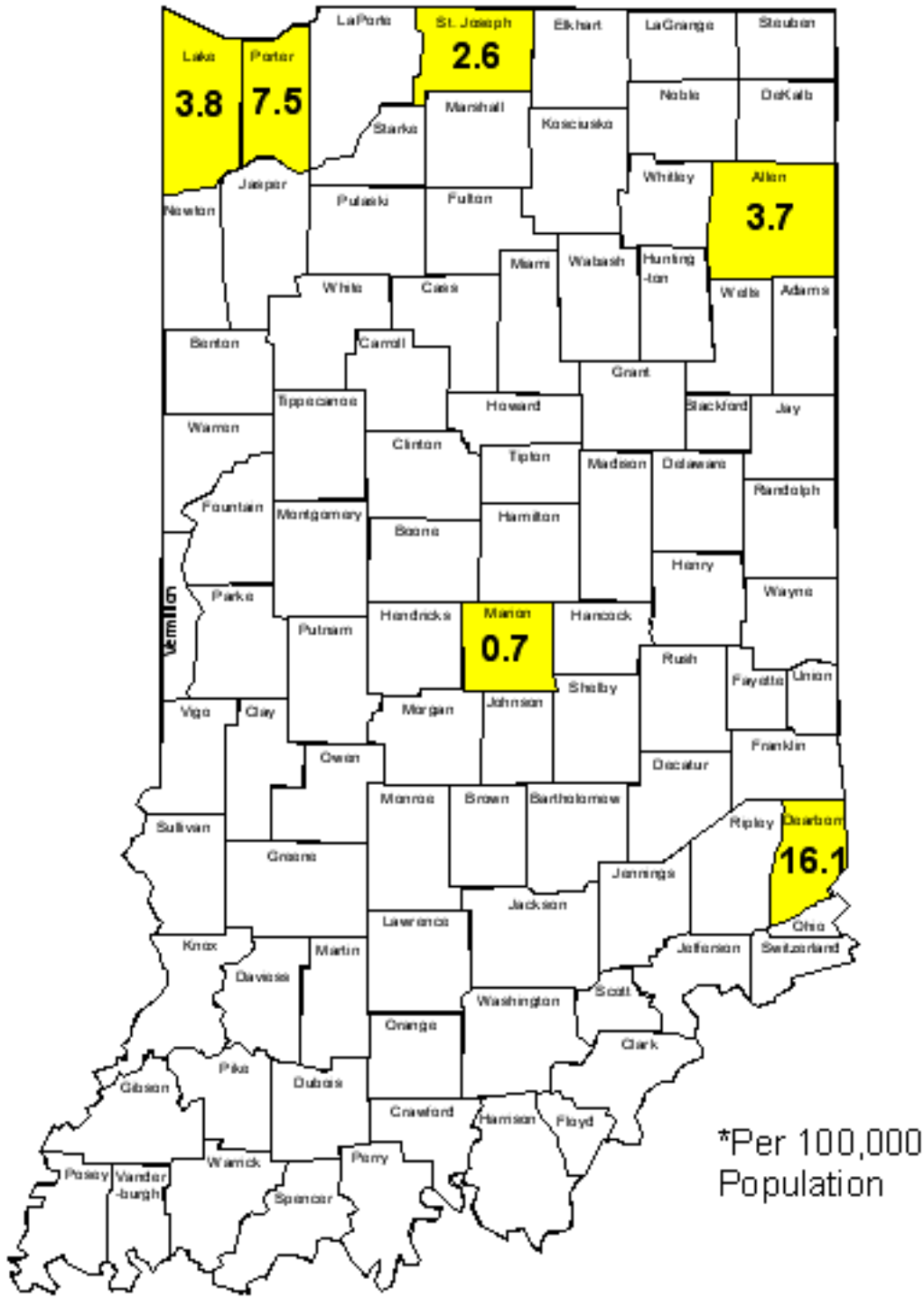


Figure 3. Cryptosporidiosis Incidence by Age Group*
Indiana, 2006



*Age information not reported for three cases.

Figure 4. Cryptosporidiosis Cases* by County -- Indiana, 2006



CYCLOSPORIASIS

Cyclosporiasis is an infection caused by a one-celled parasite, *Cyclospora cayetanensis*. Cyclosporiasis is usually found in developing countries, but in the last several years, infection rates have increased in the U.S. Cyclosporiasis remains a common cause of "traveler's diarrhea". Because the parasite is protected by an outer shell (cyst), it can survive outside the body and in the environment for long periods of time. Concentrations of chlorine used in routine water treatment do not kill *Cyclospora* cysts.

People become infected with *Cyclospora* by ingesting feces from an infected animal or person (fecal-oral route). *Cyclospora* needs time (days or weeks) after being passed in a bowel movement to become infectious. Therefore, it is unlikely that *Cyclospora* is passed directly from one person to another. It is not known if animals can be infected and pass the infection to humans.

There are two main ways to become infected with *Cyclospora*:

- Eating contaminated food, such as fresh produce, or drinking water, usually while traveling to countries where the parasite is common.
- Swallowing contaminated water from lakes, rivers, or streams.

The most common sources of *Cyclospora* outbreaks have been linked to various types of imported fresh produce and recreational water.

Public Health Significance

Symptoms of cyclosporiasis can include watery diarrhea (sometimes explosive), loss of appetite, increased gas, stomach cramps, nausea, vomiting, fatigue, and weight loss. Symptoms usually begin one week after exposure and last from a few days to a month or longer. If not treated with antibiotics, symptoms can be prolonged and can fade and then return (relapse). Some people infected with *Cyclospora* may not have any symptoms. Being infected with *Cyclospora* and recovering from the infection does not provide any immunity against reinfection.

A health care provider can prescribe antibiotics to treat cyclosporiasis. Since diarrhea can cause dehydration, an infected person should also drink plenty of fluids.

In general, cyclosporiasis can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after swimming; before, during, and after food preparation.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation.
- Separate raw and cooked foods:
    - Avoid cross-contamination by separating produce, ready-to-eat foods, and cooked foods.
    - Use separate equipment and utensils to handle raw foods.
- Eat safe foods and drink safe water:
    - Do not consume unpasteurized dairy products or juices.
    - Wash all produce before cooking or eating raw.

    - Use treated water for washing, cooking, and drinking.
    - Avoid swallowing untreated water.
    - Test your well if:
        - Members of your family or others who use the same water are becoming ill,
        - The well is located at the bottom of a hill or it is considered shallow, or
        - The well is in a rural area where animals graze.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.
    - Do not change diapers near recreational water.
    - Do not go swimming or use hot tubs if you have diarrhea and for at least 2 weeks after diarrhea stops.
- Safe travel outside of the U.S.:
    - Drink bottled beverages and water, even when brushing teeth.
    - Do not eat uncooked fruits or vegetables unless you peel them yourself.
    - Do not eat foods or beverages from street vendors.
    - Do not consume local water or ice.

Healthy People 2010 Goal
The Healthy People 2010 Goal for cyclosporiasis is in the developmental stage. More information, such as the proportion of infections that are foodborne, is needed before a goal can be set.

Epidemiology and Trends
There was one reported case of cyclosporiasis in Indiana in 2006 and only two during the five-year reporting period 2002-2006.

You can learn more about cyclosporiasis by visiting the following Web sites:
www.cdc.gov/ncidod/dpd/parasites/cyclospora/default.htm
www.cfsan.fda.gov/~mow/cyclosp.html

DELTA HEPATITIS

Delta hepatitis is a liver disease caused by the hepatitis D virus (HDV). HDV is a defective virus that requires the helper function of the hepatitis B virus (HBV) to replicate. People may become infected with HDV at the same time they acquire HBV (co-infection), or people may acquire the virus after infection with HBV (superinfection). The modes of transmission are similar to those for HBV. HDV is transmitted by percutaneous exposure or sexually through contact with infected blood. Most cases are acquired by exposure to contaminated needles.

Public Health Significance

Symptoms of HDV infection resemble those of HBV infection and usually occur 2-8 weeks after exposure. Superinfection with HDV is usually more severe than HBV infection alone and more likely to result in severe disease. HDV is transmitted by similar methods as HBV, e.g., exposure to infected blood and contaminated needles. Those most at risk of becoming infected with HDV are chronic HBV carriers and those who have not been immunized against HBV.

Although there is a vaccine for HBV, there is no vaccine for HDV. Since HDV is dependent on HBV infection, preventing HBV infections will prevent HDV infections. There is currently no treatment for HDV.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for delta hepatitis.

Epidemiology and Trends

There were no reported cases of delta hepatitis in Indiana in 2006, and only one reported case during the five-year reporting period 2002-2006.

You can learn more about delta hepatitis by visiting the following Web site:

http://www.cdc.gov/hepatitis/index.htm

DENGUE FEVER AND DENGUE HEMORRHAGIC FEVER (DHF)

Dengue fever and dengue hemorrhagic fever (DHF), two of the most important mosquito-borne viral diseases of humans, occur in most tropical areas of the world. The disease is caused by one of four virus serotypes (DEN-1 through DEN-4) of the genus *Flavivirus*. The primary vector, the *Aedes aegypti* mosquito, is rarely seen in Indiana. However, another competent vector, *Aedes albopictus*, has been seen in at least 37 Indiana counties. DHF is a more severe form of dengue and can be fatal if not properly treated.

Public Health Significance

Symptoms of dengue occur 3-14 days after the infective bite. Symptoms include fever, headache, muscle aches, nausea and vomiting, and rash. Symptoms of DHF are similar to dengue but manifest into hemorrhagic symptoms, bleeding nose or gums, and possibly internal bleeding. There is no vaccine or specific antiviral medications for dengue. Although dengue viruses may be introduced into areas by travelers who become infected while visiting tropical areas where dengue is endemic, the risk for outbreaks in the U.S. is relatively small.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for dengue or dengue hemorrhagic fever.

Epidemiology and Trends

No cases of dengue or dengue hemorrhagic fever were reported in Indiana in 2006. For the five-year period 2002-2006, five cases of dengue were reported in Indiana. All five cases were acquired while traveling overseas to tropical and subtropical areas. There were no reported cases of dengue hemorrhagic fever during the five-year reporting period 2002-2006.

You can learn more about dengue and dengue hemorrhagic fever by visiting the following Web sites:

http://www.cdc.gov/ncidod/dvbid/dengue/
http://wwwn.cdc.gov/travel/yellowBookCh4-denguefever.aspx

DIPHTHERIA

Corynebacterium diphtheriae, a gram-positive bacillus, is the causative agent of diphtheria, which may occur in one of two forms: respiratory or cutaneous. Humans are the reservoirs of the organism. The respiratory form is caused by toxin producing strains. The cutaneous form may be caused by either toxin or non-toxin producing strains.

The respiratory form of diphtheria is characterized by the formation of a membrane in the throat and/or on the tonsils which interferes with respiratory functions. Medical treatment is dependent on the administration of diphtheria antitoxin, available only from the Centers for Disease Control and Prevention (CDC).

Public Health Significance

Symptoms of diphtheria include sore throat, fever, and enlarged lymph nodes located in the neck. Symptoms usually begin 2-5 days after infection but may take as long as 10 days to appear. Most complications, including death, can be attributed to the toxin being absorbed into organs and tissues of the body. Myocarditis and neuritis are the most frequent complications from the infection. The overall case-fatality rate is 5-10 percent.

Diphtheria is prevented by administration of a primary series of diphtheria toxoid injections. Adults and children 7 years of age and older require three injections. Infants and children less than 7 years of age require four injections. Both adults and children should receive boosters every 10 years. Medication is also available to treat diphtheria.

Due to global travel, potential exposure to diphtheria is still possible. Although rare in the U.S. due to vaccination, diphtheria can infect unimmunized or partially immunized travelers visiting endemic countries.

Healthy People 2010 Goal

The Healthy People 2010 Goal for diphtheria is total elimination. Indiana has met that goal since 1996.

Epidemiology and Trends

No cases of diphtheria have been reported in Indiana since 1996.

You can learn more about diphtheria by visiting the following Web site:

http://wwwn.cdc.gov/travel/yellowbookCh4-diphtheria.aspx

ESCHERICHIA COLI

Escherichia coli is a bacterium that lives in the intestines of most healthy warm-blooded animals, including humans. There are hundreds of strains of *E. coli*, and most are harmless. However, several types of *E. coli*, such as O157 and other shiga-toxin producing strains, can cause severe and contagious illness in humans.

People become infected with *E. coli* by ingesting feces from an infected animal or person (fecal-oral route). There are many ways to become infected with *E. coli*:

- Eating contaminated foods:
    - Undercooked beef products, particularly ground beef.
    - Drinking unpasteurized milk and fruit juices, including apple cider.
    - Unwashed raw fruits, vegetables, or herbs that have been contaminated by feces, raw meats, fertilizers, or untreated water.
- Swallowing untreated water, e.g., from lakes or streams.
- Having direct contact with the stool of infected cattle, livestock, and animals at petting zoos.
- Having contact with an infected person's stool:
    - Not washing hands after contact with stool from a contaminated surface or diaper/linen and ingesting the bacteria.
    - Having sex that involves contact with stool.

The most common sources of *E. coli* outbreaks are inadequately cooked hamburgers, produce (such as melons, lettuce, spinach, coleslaw, apple cider, and alfalfa sprouts), and unpasteurized milk. Persons who work in certain occupations, such as food handlers, daycare providers, and health care providers, have a greater risk of transmitting infection to others.

Public Health Significance

Symptoms of *E. coli* include diarrhea, abdominal cramps, and little to no fever. Symptoms usually begin 3-4 days (range of 2-10 days) after exposure and last for approximately 5-10 days. Some people may have only mild diarrhea or no symptoms at all. The bacteria can be passed in the stool for up to 3 weeks after symptoms have stopped.

Approximately 8 percent of people infected with *E. coli* (O157 and other shiga-toxin producing strains) develop a condition called hemolytic uremic syndrome (HUS). This condition is very serious and can lead to kidney failure and death. Children less than 5 years of age and the elderly are more likely to develop HUS.

Most people recover without medical treatment. The use of antibiotics or over-the-counter antidiarrheal agents is not recommended, as the use of these can lead to greater likelihood of developing HUS. Serious infections that affect the kidneys will require hospitalization and extensive medical care.

In general, *E. coli* infection can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after contact with animals and reptiles; after swimming; before, during, and after food preparation; and after exposure to raw meat products.

    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.
- Separate raw and cooked foods:
    - Avoid cross-contamination by keeping uncooked meat products separate from produce, ready-to-eat foods, and cooked foods.
    - Use separate equipment and utensils for handling raw foods, especially for marinades or barbeque sauce.
    - Clean food-preparation work surfaces and utensils with soap and water before, during, and after food preparation, especially after contact with raw meat products.
- Maintain safe food temperatures:
    - Ensure proper temperatures are maintained during refrigeration (<40˚F), freezing (<2˚F), holding (keep food hot or at room temperature for no longer than 2 hours), and chilling (chill immediately and separate into smaller containers if needed).
    - Thoroughly cook all food items to USDA-recommended safe minimum internal temperatures:
        - 145˚F – steaks and roasts
        - 160˚F – pork and ground beef (should not be eaten pink)
- Eat safe foods:
    - Do not eat undercooked meat.
    - Do not eat foods past the expiration date.
    - Do not eat unpasteurized dairy products and fruit juices, including apple cider; it is illegal to sell unpasteurized dairy products in Indiana.
    - Wash all produce before eating raw or cooking.
    - Use treated water for washing, cooking, and drinking.
- Handle animals safely:
    - Wash hands after contact with livestock, petting zoos, and pets, especially if they are suffering from diarrhea.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.

Healthy People 2010 Goal

The Healthy People 2010 Goal for *Escherichia coli* is 1.0 case per 100,000 population per year. Indiana did not meet this goal during the five-year reporting period except for 2004 (Figure 1). There was a nationwide decrease of *E. coli* cases in 2004. The decrease is likely due to the USDA's Food Safety and Inspection Service implementing new safety recommendations to combat *E. coli* 0157 in ground beef. Since 2004, several national outbreaks of *E. coli* have occurred which validate the need for continuous education on effective control measures and enhanced food safety systems.

Epidemiology and Trends

In 2006, 95 cases of *E. coli* O157:H7 infection were reported in Indiana, for a rate of 1.50 cases per 100,000 population. Females (1.59) were slightly more likely to be reported than males (1.41). The rate for whites was higher (1.36) than that for blacks (0.18); however, 18 cases (19%) did not report race data.

Table 1. *E. coli* O157:H7 Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	95	1.50	408
Race			
Black	1	0.18	13
White	76	1.36	300
Other	0	0.00	6
Not Reported	18	-	89
Sex			
Female	51	1.59	233
Male	44	1.41	175
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows the number of reported cases per year for 2002-2006. Incidence of disease was greatest during the summer months. Figure 3 shows the number of cases per month in Indiana for 2006. As shown in Figure 4, age-specific rates were highest among preschoolers aged 1-4 years (4.64), followed by infants less than 1 year of age (3.48), and children aged 5-9 years (2.81). Although 45 counties reported cases of *E. coli* O157:H7, only 4 counties had 5 or more cases (Figure 5).

Of the 95 confirmed *E. coli* O157:H7 cases reported in 2006, no cases reported developing HUS.

Clinical laboratories should routinely screen all stool specimens for sorbitol-negative *E. coli* strains. Lack of sorbitol fermentation in *E. coli* bacteria is a biochemical marker for the O157:H7 serotype.

One outbreak of *E. coli* O157:H7 occurred in Indiana in 2006. The outbreak was part of a nationwide outbreak involving bagged fresh spinach. There were 10 confirmed cases in Indiana and 205 cases throughout the United States. Illness was statistically significant for those who ate fresh spinach. Illness association with the fresh spinach was further confirmed by 13 bags of product testing positive for the outbreak strain by PFGE and MLVA. The origin of the outbreak was traced back to one farm at Natural Selection Foods LLC of San Juan Bautista, California.

You can learn more about *Escherichia coli* by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html
http://www.cfsan.fda.gov/~mow/chap15.html

Figure 1. *Escherichia Coli* O157:H7 Rates by Year Indiana, 2002-2006

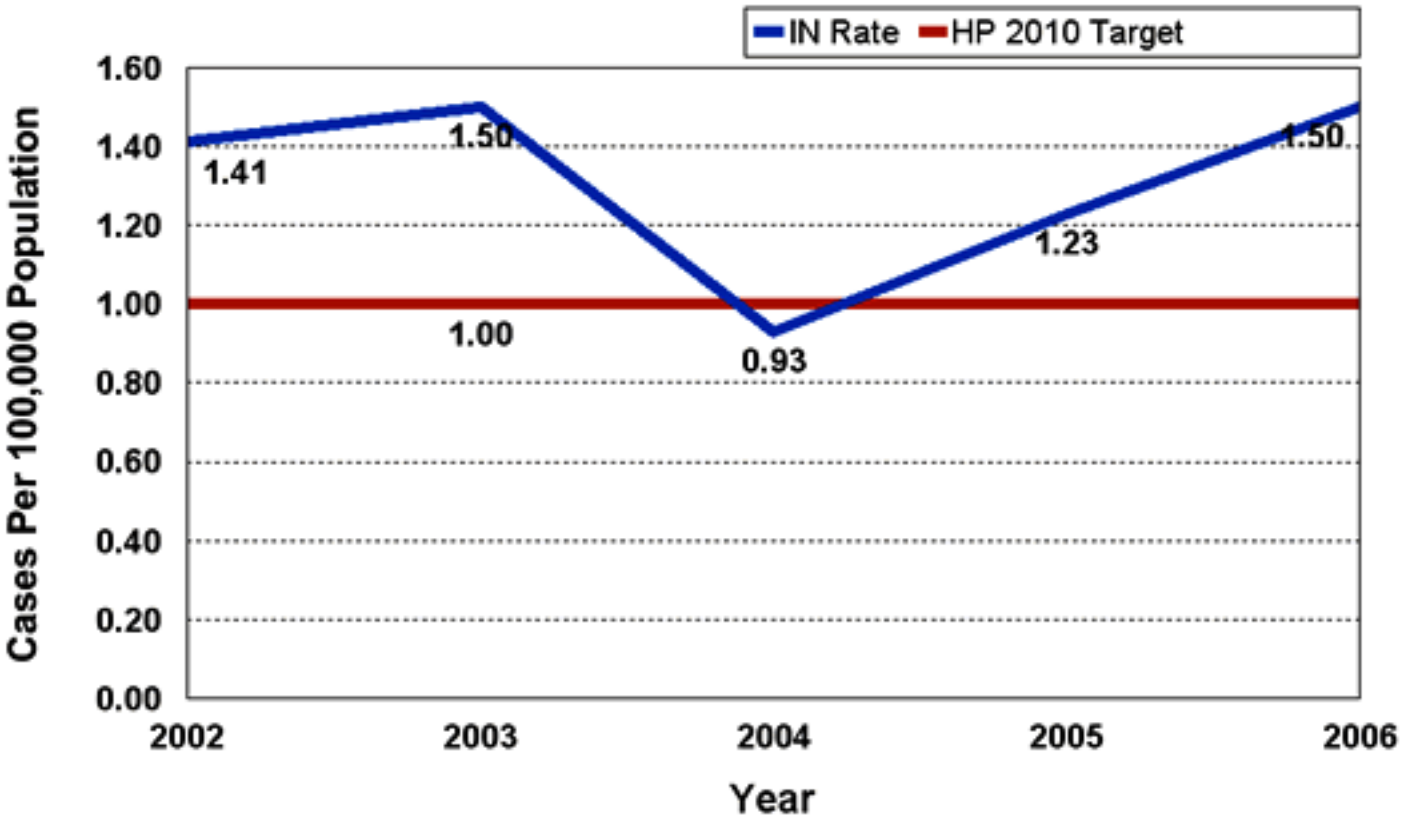


Figure 2. *Escherichia Coli* O157:H7 Cases by Year Indiana, 2002-2006

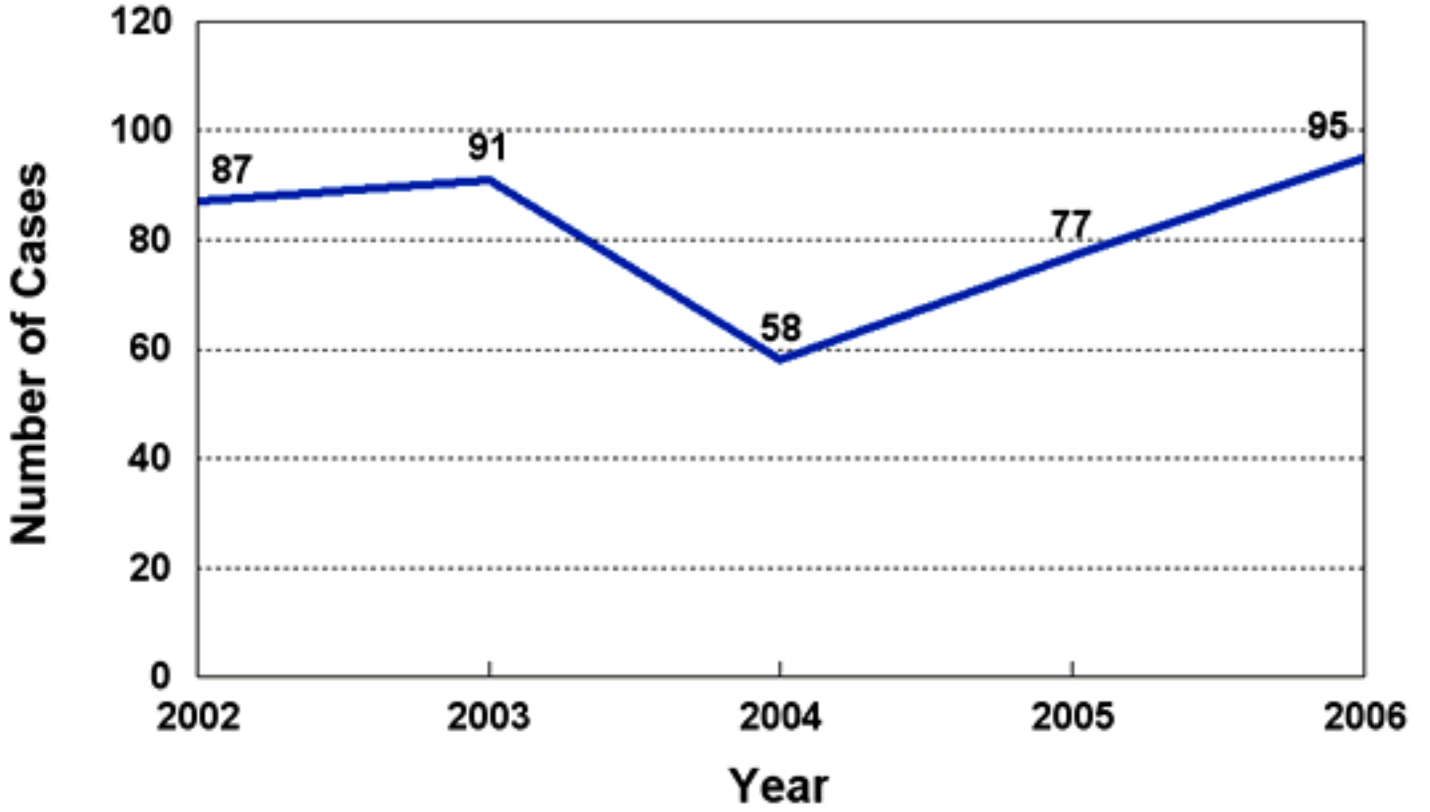


Figure 3. *Escherichia Coli* O157:H7 Cases by Month
Indiana, 2006

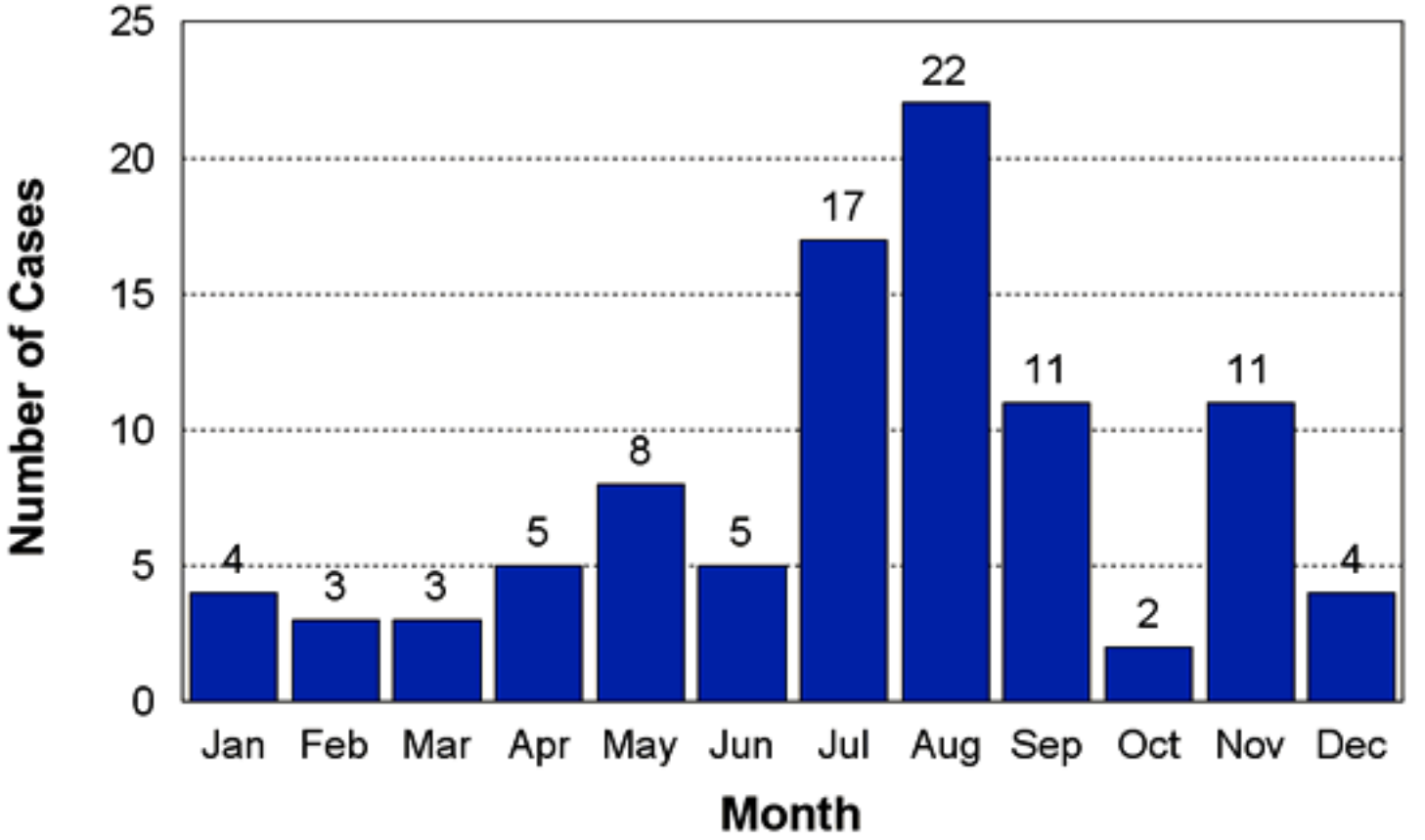


Figure 4. *Escherichia Coli* O157:H7 Incidence by Age Group -- Indiana, 2006

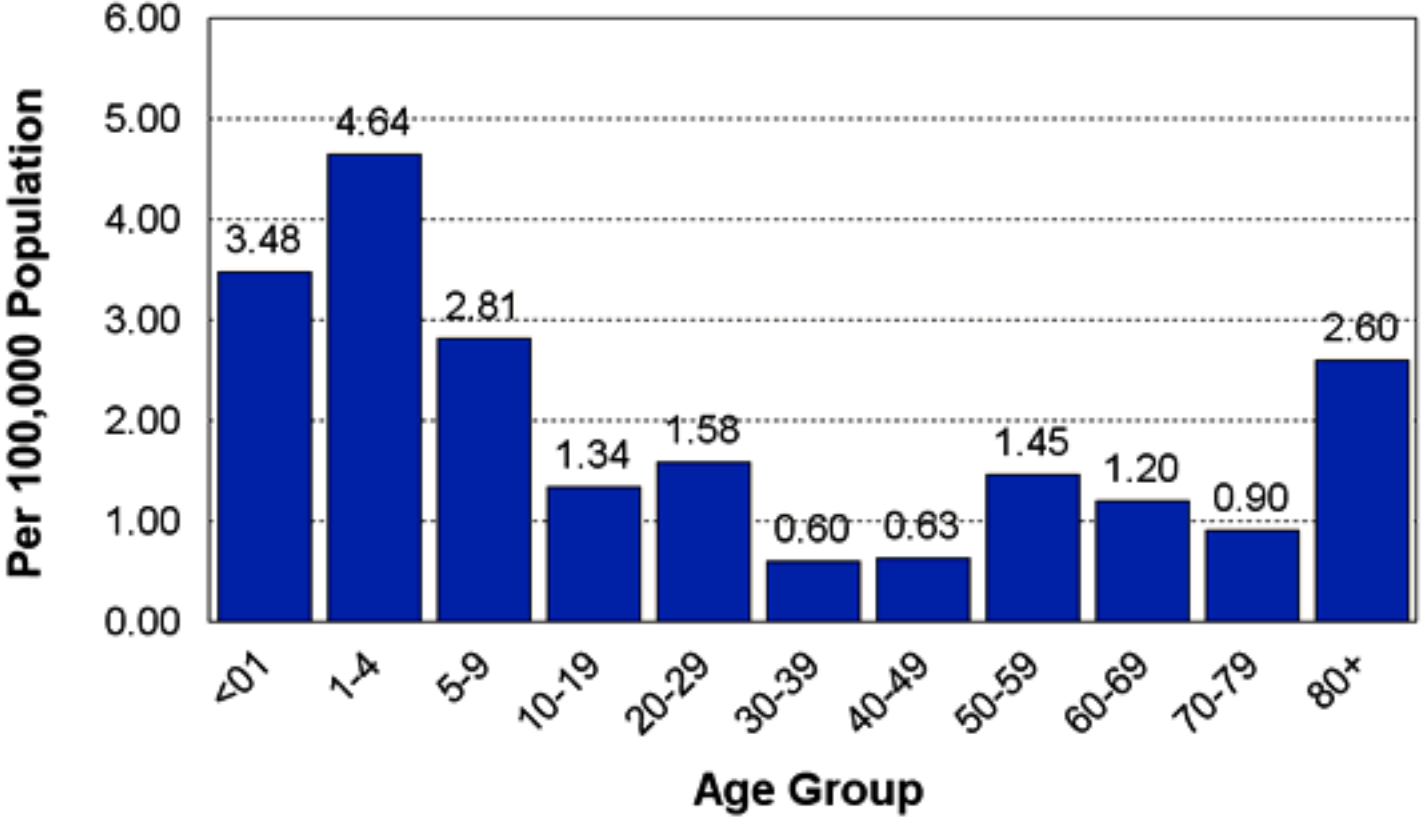
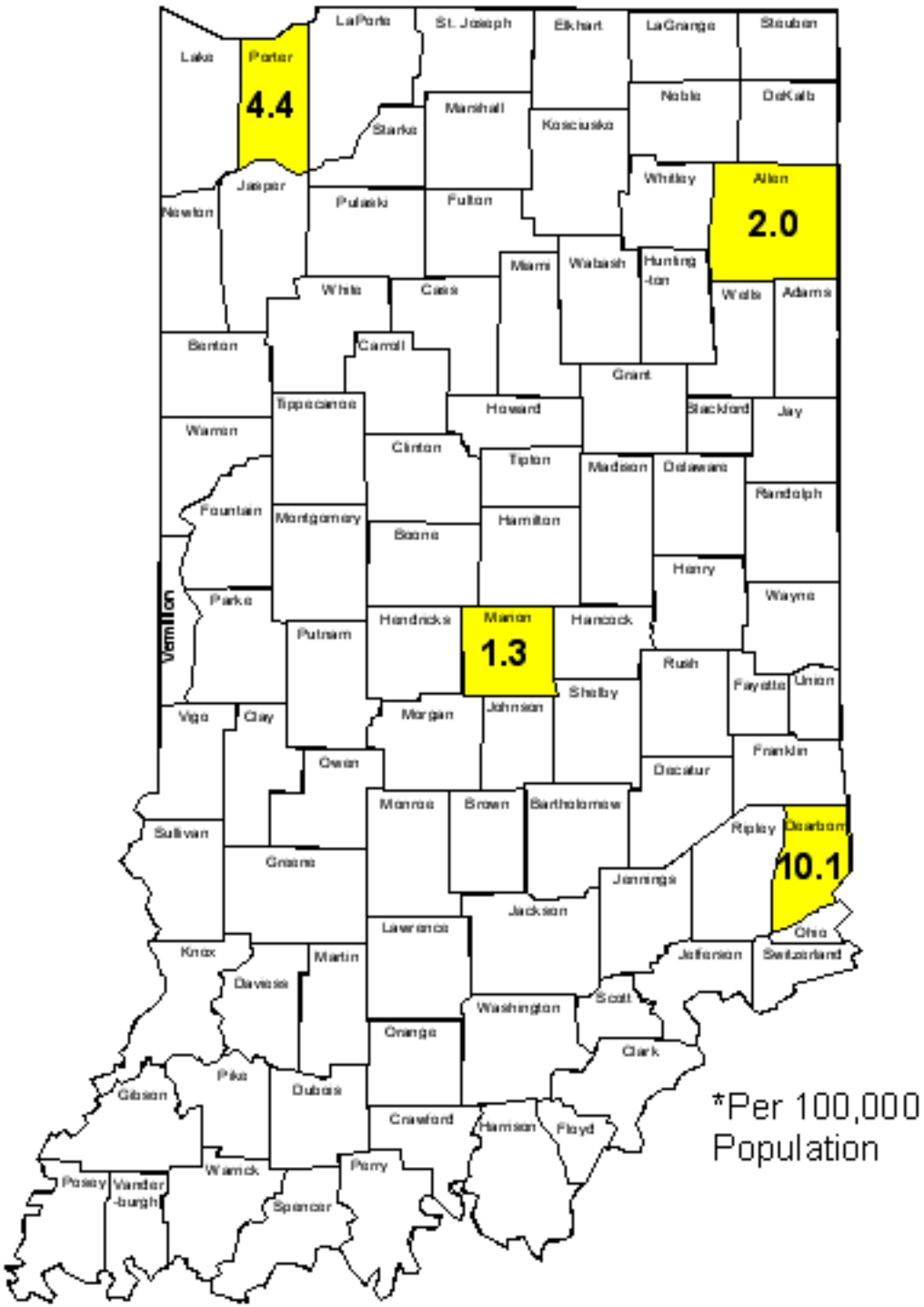


Figure 5. *Escherichia Coli* O157:H7 Cases* by County -- Indiana, 2006



EHRLICHIOSIS

Ehrlichiosis is a tick-borne disease and has been recognized in the U.S. since the mid-1980s. Human monocytic ehrlichiosis (HME) is caused by the bacteria *Ehrlichia chaffeensis* and is transmitted to humans by the lone star tick, *Amblyomma americanum*. The disease occurs mostly in the southeastern and south central parts of the U.S. Human granulocytic anaplasmosis (HGA), previously know as human granulocytic ehrlichiosis (HGE), is caused by the bacteria *Anaplasma phagocytophilum* and is transmitted to humans by the deer tick, *Ixodes scapularis*.

Public Health Significance
Symptoms of ehrlichiosis are similar to Rocky Mountain spotted fever and include sudden high fever, muscle aches, headache, and tiredness. Symptoms are generally mild and usually appear 3-16 days after a tick bite. People most at risk of getting ehrlichiosis are people who spend time outdoors and in tick-infested areas from April until October when ticks are most active.

There is no vaccine for ehrlichiosis, but the disease can be treated with antibiotics.

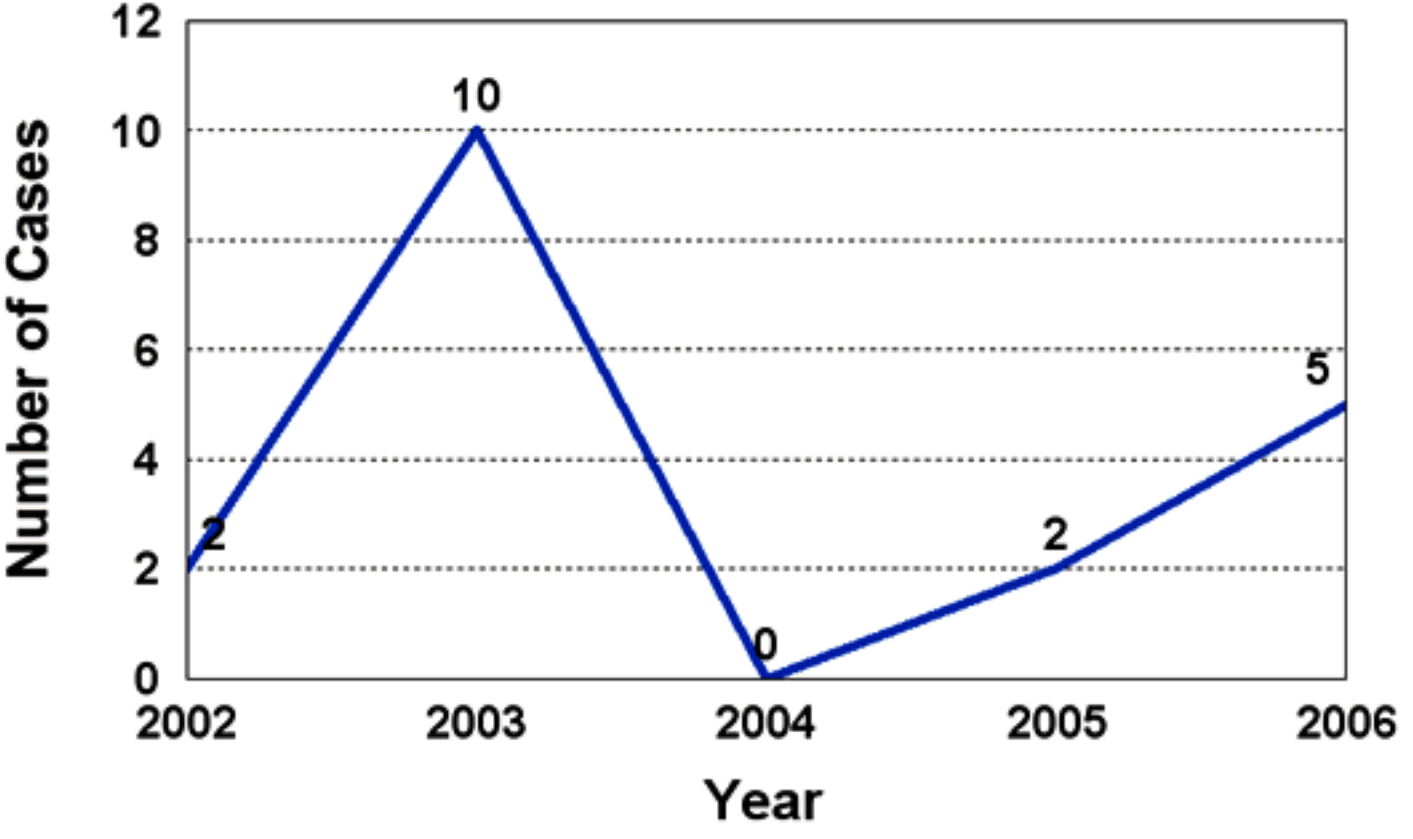
Healthy People 2010 Goal
There is no Healthy People 2010 Goal for ehrlichiosis.

Epidemiology and Trends
There were five reported cases of ehrlichiosis in 2006 in Indiana, four of which were HME. From 2002-2006, 19 cases of ehrlichiosis were reported in Indiana: 17 cases of HME and 2 cases of HGE. Figure 1 shows the number of reported cases by year for 2002-2006.

All cases of HME occurred in residents of Southwestern Indiana counties, where the lone star tick is most prevalent. All cases for which race was reported were white.

You can learn more about ehrlichiosis by visiting the following Web site:
http://www.cdc.gov/ncidod/dvrd/ehrlichia/index.htm.

Figure 1. Ehrlichiosis Cases by Year Indiana, 2002-2006



INVASIVE *HAEMOPHILUS INFLUENZAE*

Invasive *Haemophilus influenzae* (*H. influenzae*) is a disease caused by a bacterium. It can be typeable (encapsulated) or nontypeable (unencapsulated). The encapsulated form has been classified as serotypes a through f. Humans are the natural host with up to 80 percent of healthy individuals colonized with the nontypeable form.

Public Health Significance

Symptoms usually begin suddenly and include fever, vomiting, lethargy, and meningeal irritation, with bulging fontanelle (soft spot) in infants or stiff neck and back in older children. As the infection progresses, stupor or coma are not uncommon.

H. influenzae infections are commonly treated with antibiotics. Susceptibility tests can assist in the selection of appropriate antibiotics. Prevention of infection through immunization is the most effective way to reduce transmission of type b. Invasive disease caused by *H. influenzae* type b and other serotypes can affect many organ systems. The most common types of invasive disease are bacteremia/sepsis, meningitis, epiglottitis, pneumonia, arthritis, and cellulitis. All cases of invasive *H. influenzae* disease, regardless of age or serotype, is reportable in Indiana. Indiana requires laboratories to send isolates for serotype analysis.

Before the widespread use of vaccines, *Haemophilus influenzae* serotype b (Hib) was the leading cause of bacterial meningitis in children (greater than 95%). Since the introduction of the conjugate Hib vaccine in 1990, the incidence of Hib disease in children has decreased dramatically in both the U.S. and Indiana. Because Hib vaccines protect against type b and other strains of *H. influenzae*, serotyping of all *H. influenzae* isolates from patients (especially from children less than 5 years of age) with invasive disease is necessary to monitor the effectiveness of the vaccination program and national progress towards Hib elimination. Serotype information is also needed to measure the sensitivity of the surveillance system and to detect the emergence of invasive disease from nontype b *H. influenzae* strains.

Healthy People 2010 Goal

The Healthy People 2010 Goal for *Haemophilus influenzae* type b disease is to eliminate all *Haemophilus influenzae* type b disease in children under age 5 years. This task will require aggressive immunization education and campaigning, especially for populations that refuse vaccinations. Currently, information for type b *H. influenzae* by age group is not available for Indiana. Therefore, the Goal cannot be assessed for Indiana.

Epidemiology and Trends

Indiana had 81 reported cases of invasive *H. influenzae* (all serotypes) disease in 2006. Females (1.40) were slightly more likely than males (1.16) to become ill with *H. influenzae*. The rate for whites (1.20) was higher than that for blacks (0.71).

Table 1. *H. influenzae* Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	81	1.28	317
Race			
Black	4	0.71	31
White	67	1.20	255
Other	0	0	3
Not Reported	10	-	28
Sex			
Female	45	1.40	177
Male	36	1.16	140
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases of *H. influenzae* for the five-year period 2002-2006. *H. influenzae* occurred throughout the year in 2006, with the highest number of cases occurring in March and June (Figure 2). Age-specific rates were greatest for older adults aged 80+ years (11.29), followed by infants aged less than 1 year (4.64). Figure 3 shows *H. influenzae* incidence by age group. Although 33 counties reported cases of *H. influenzae*, only 4 counties had 5 or more cases (Figure 4).

Of the 81 reported cases in 2006, 73 (90%) were serotyped. Table 2 provides a breakdown of *H. influenzae* cases by serotype.

Table 2. Percent of Cases by Serotype, *Haemophilus influenzae* (invasive disease), Indiana 2006

Percent of Reported Cases by Serotype		
Type	**Number**	**Percent**
a	0	-
b	5	6.0
c	0	-
d	0	-
e	2	2.5
f	18	22.0
Nontypeable	48	59.0
Not Tested/Unknown	8	10.0
Total	81	100.0

You can learn more about *H. influenzae* by visiting the following Web site:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/haeminfluserob_t.htm

Figure 1. *Haemophilus Influenzae* Cases by Year Indiana, 2002-2006

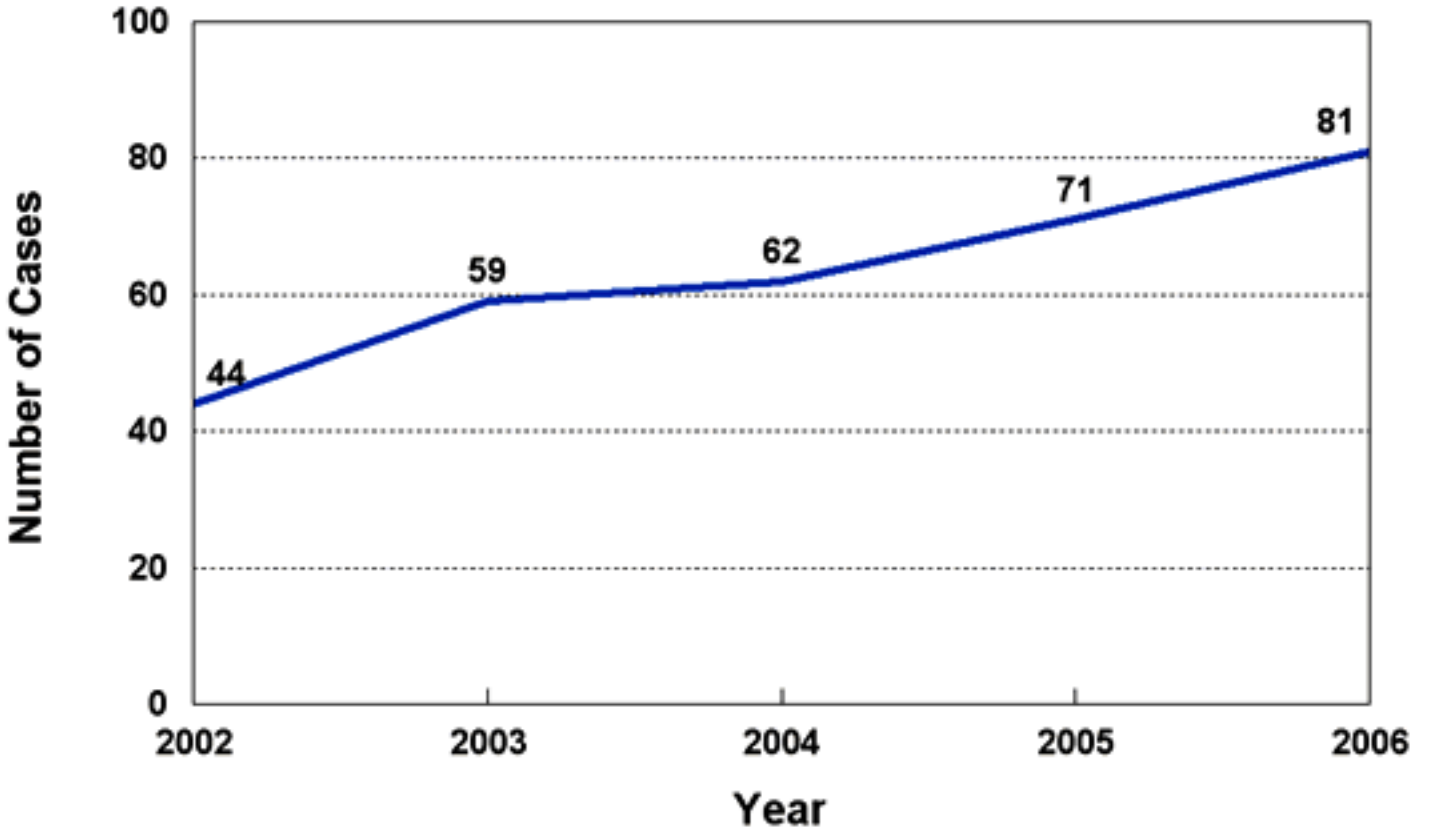


Figure 2. *Haemophilus Influenzae* Cases by Month Indiana, 2006

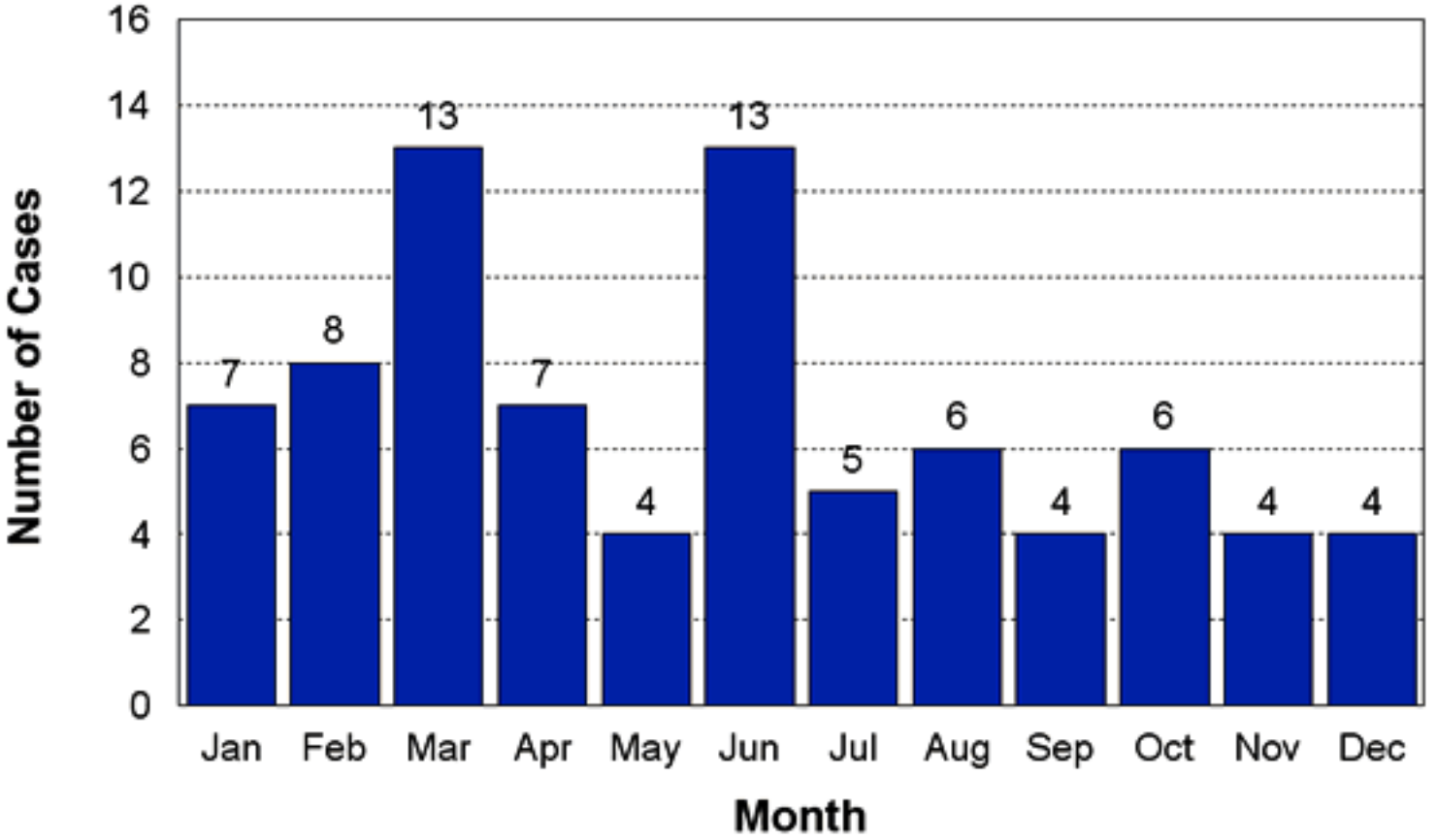


Figure 3. *Haemophilus Influenzae* Incidence by Age Group -- Indiana, 2006

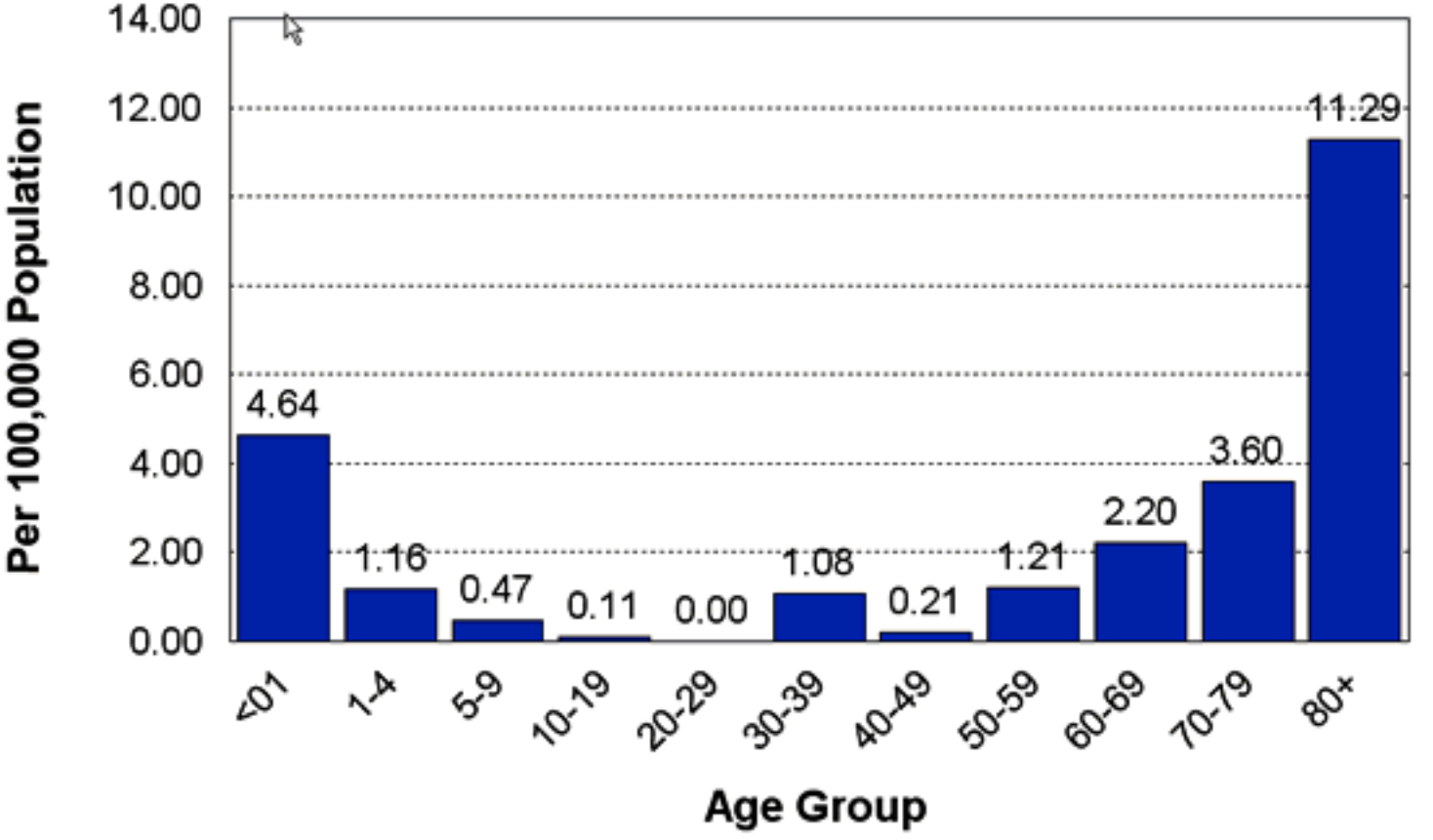
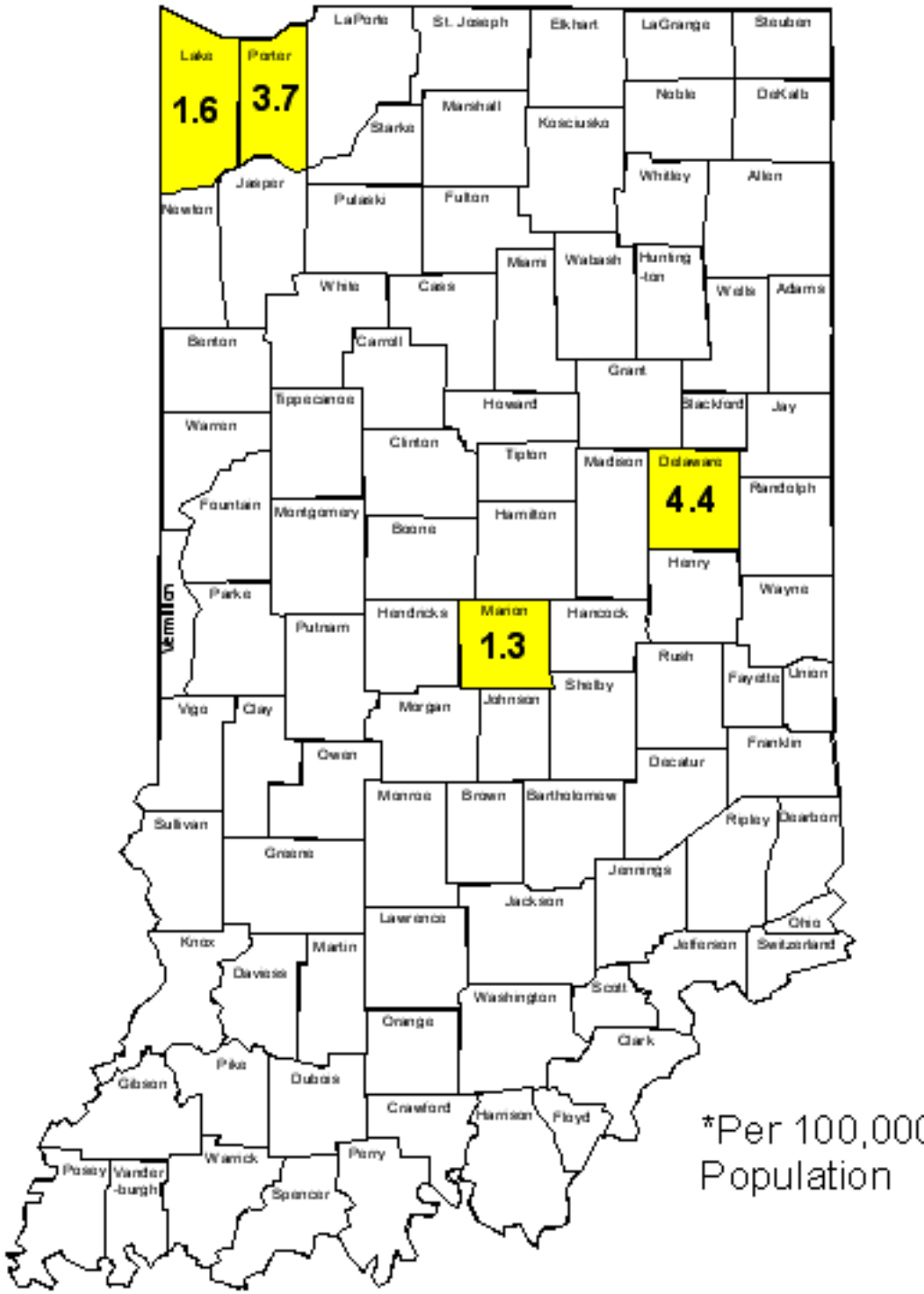


Figure 4. *Haemophilus Influenzae* Cases* by County -- Indiana, 2006



HANTAVIRUS

Hantavirus pulmonary syndrome (HPS) is an acute respiratory disease caused by the Sin Nombre virus. Deer mice are the most common carrier of the virus. Rodents shed the virus in their urine, droppings, and saliva. The main route of transmission for humans is breathing air contaminated with the virus. The disease was first described as a clinical syndrome and the causative agent identified as the Sin Nombre virus in the Four Corners area (Utah, New Mexico, Colorado, Arizona) in 1993. Most cases have been reported from states west of the Mississippi River. However, 12 states east of the Mississippi have reported cases, including Indiana. Since 1993, two hantavirus cases have been reported in Indiana, resulting in one death.

Public Health Significance

The initial symptoms of hantavirus include fever, tiredness, headache, and fatigue. As the disease progresses, symptoms may include shortness of breath and coughing due to lungs filling with fluid. Symptoms occur 1-6 weeks after exposure to the virus. There is no vaccine for hantavirus.

People most at risk for becoming infected with hantavirus include those who visit or reside in closed spaces where infected rodents live including campers and hikers and those who work or play outdoors. In addition, housecleaning activities such as sweeping or vacuuming can release contaminated particles into the air.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for hantavirus.

Epidemiology and Trends

No hantavirus cases were reported in Indiana in 2006 or during the five-year reporting period 2002-2006.

You can learn more about hantavirus by visiting the following Web site:

http://www.cdc.gov/ncidod/diseases/hanta/hps/index.htm

HEPATITIS A

Hepatitis A is a vaccine-preventable disease that causes inflammation of the liver. It is not found in animals. People become infected with hepatitis A by coming in contact with the stool of an infected person (fecal-oral route). For this reason, the virus is easily spread in areas where there are poor sanitary conditions or where good personal hygiene is not observed. Persons are at risk for hepatitis A infection if they have:

- Exposure to contaminated food or water:
  - Consuming untreated water.
  - Consuming food prepared by an infected person.
  - Consuming raw produce or raw shellfish (e.g., oysters).
  - Traveling to countries where hepatitis A is common and where there is little clean water or proper sewage disposal.
- Exposure to the stool or blood of an infected person who is a(n):
  - Household member or sexual partner (men who have sex with men are at higher risk).
  - Child or staff member of a daycare center (including centers for the disabled).
  - Resident or staff member of a health care center.
  - Injection drug user.

Public Health Significance

Symptoms of hepatitis A include diarrhea, nausea, vomiting, tiredness, stomach pain, fever, dark urine, pale clay-colored stool, loss of appetite, and jaundice. Symptoms usually occur suddenly. People are most contagious from about two weeks before symptoms begin until two weeks after. Some people, especially children, may have no symptoms but can still spread the virus to others.

Symptoms usually begin 28-30 days (range of 15-50 days) after exposure and usually last less than 2 months. Sometimes a person can recover and become ill again (relapse) for as long as 12 months. However, people will eventually recover, and there is no long-term carrier state with hepatitis A infection. Death from hepatitis A is rare, 0.1-0.3 percent, but is more common in adults over 50.

There is no specific treatment for hepatitis A other than treating symptoms. People who have had hepatitis A develop lifelong immunity and cannot get hepatitis A again.

Healthy People 2010 Goal

The Healthy People 2010 Goal for hepatitis A is 4.5 cases per 100,000 population per year. Indiana met this goal for the five-year reporting period 2002-2006 (Figure 1).

Epidemiology and Trends

In 2006, 33 cases of hepatitis A were reported in Indiana for a rate of less than 1 case per 100,000 population (Table 1). Males (0.58) were more likely to be reported than females (0.47). The rate for other races (0.57) was higher than that for whites (0.38) or blacks (0.18); however, 10 cases (30%) did not report race data.

Table 1. Hepatitis A Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	33	0.52	215
Race			
Black	1	0.18	8
White	21	0.38	151
Other	1	0.57	16
Not Reported	10	-	40
Sex			
Female	15	0.47	105
Male	18	0.58	108
Unknown	0	-	2

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows the number of reported cases per year for 2002-2006. As shown in Figure 3, hepatitis A occurs throughout the year. Figure 4 shows age-specific rates were greatest for adults aged 80 years and older (2.17), followed by adults aged 60-69 years (1.20). In 2006, 19 Indiana counties reported cases of hepatitis A, but no county reported 5 or more cases.

There were no outbreaks of hepatitis A in 2006 in Indiana. However, Allen County Health Department (ACHD) conducted a large mass prophylaxis clinic in August. An unvaccinated restaurant worker contracted hepatitis A while on vacation in Mexico and worked during a portion of the infectious period. The ACHD was able to provide immune globulin (IG) to over 3,800 persons thought to be exposed at the restaurant. There were no secondary cases identified.

You can learn more about hepatitis A by visiting the following Web sites:

http://www.cdc.gov/hepatitis/hepatitisA.htm
http://www.cfsan.fda.gov/~mow/chap31.html

Figure 1. Hepatitis A Rates by Year
Indiana, 2002-2006

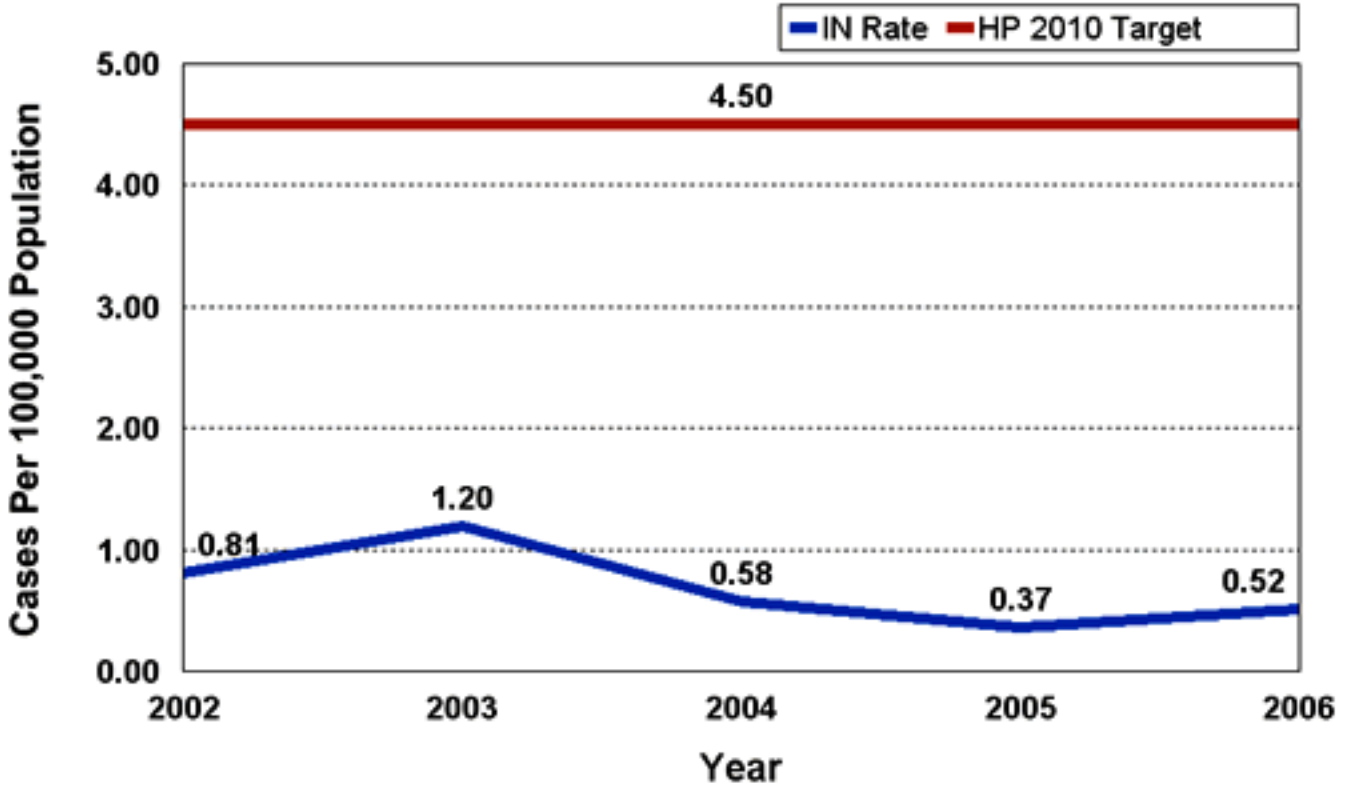


Figure 2. Hepatitis A Cases by Year
Indiana, 2002-2006

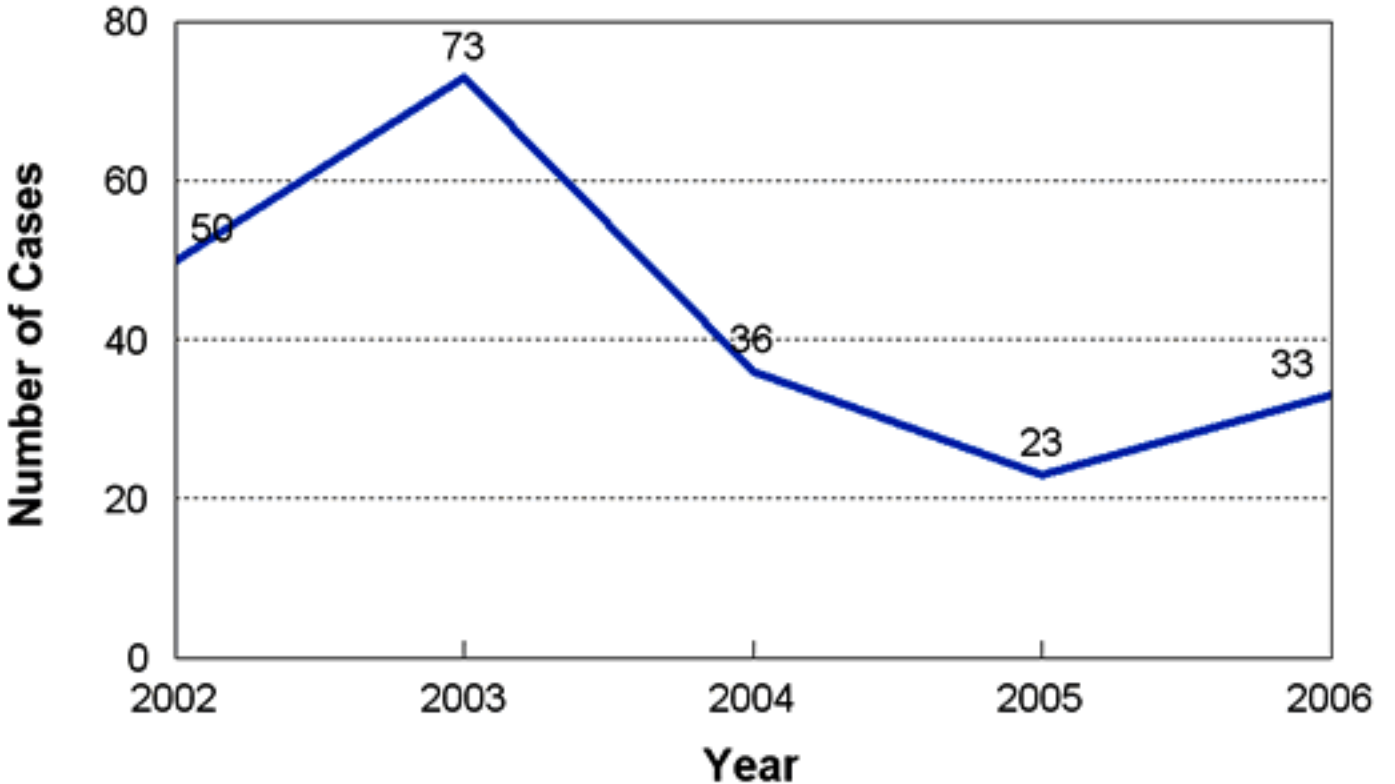


Figure 3. Hepatitis A Cases by Month
Indiana, 2006

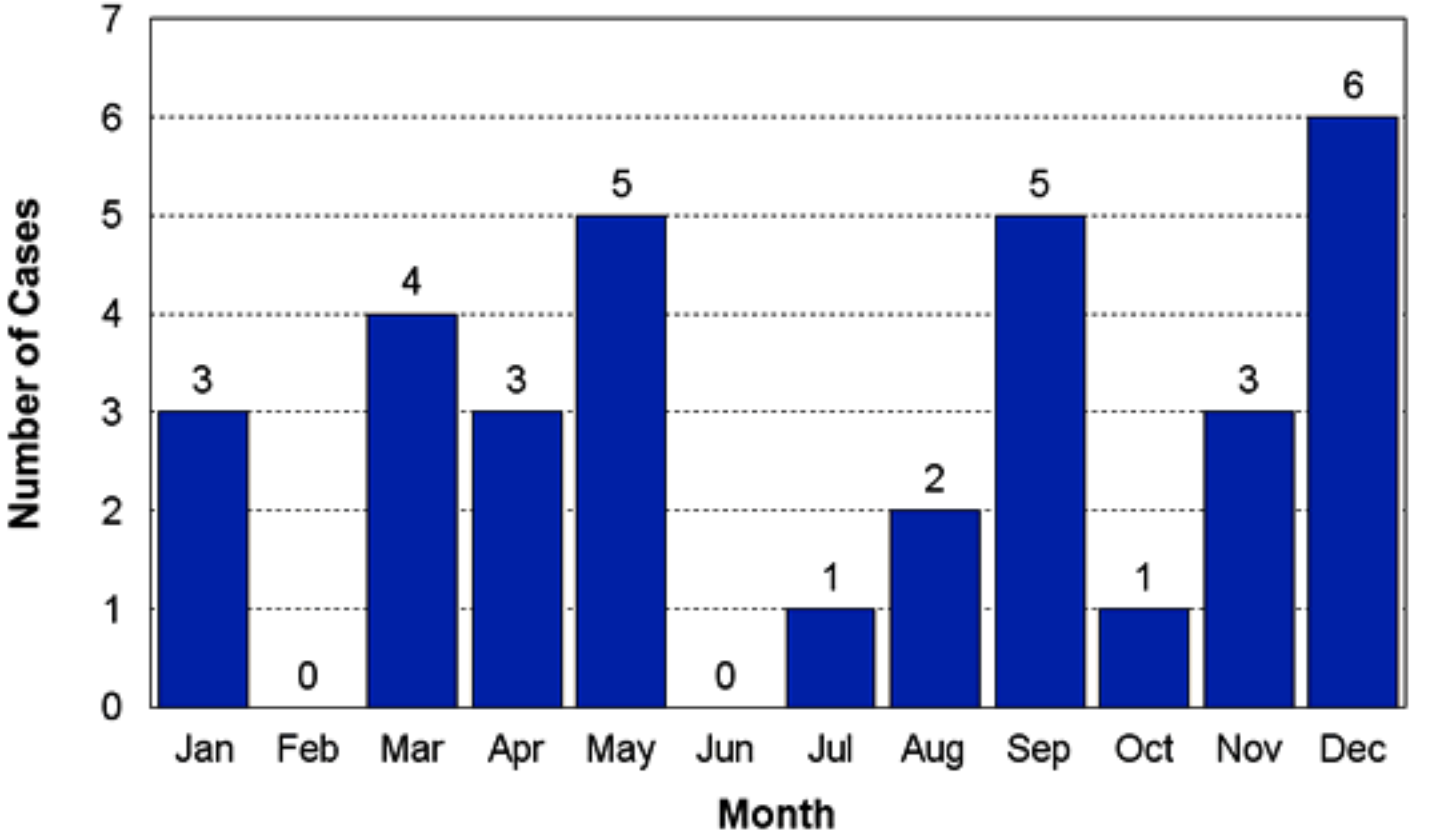
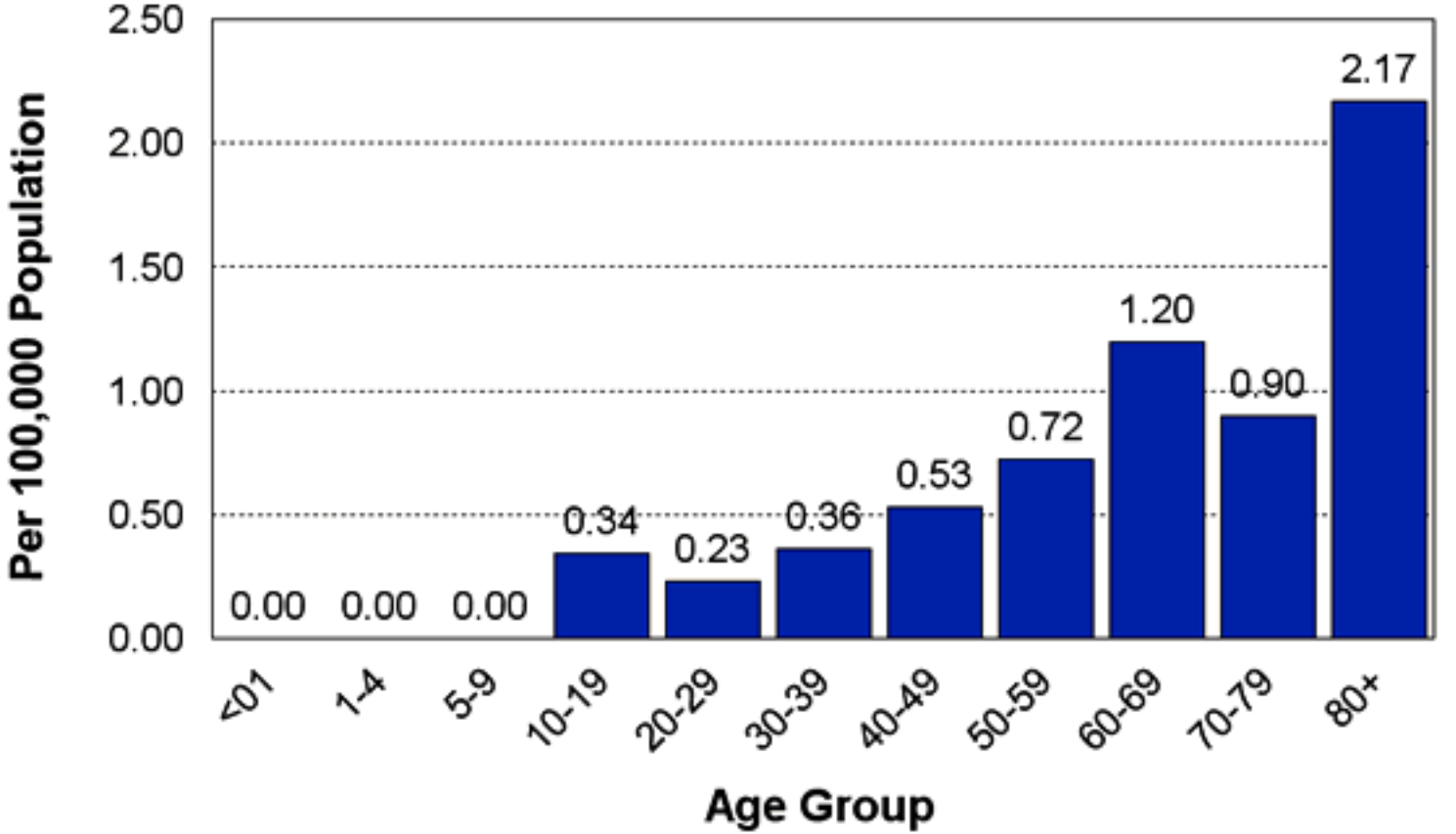


Figure 4. Hepatitis A Incidence by Age Group Indiana, 2006



HEPATITIS B

Hepatitis B is a serious viral disease of the liver transmitted through parenteral or mucosal exposure to blood or body fluids of an infected person. Transmission of the virus occurs through sexual or household contact with an infected person, injection drug use, perinatal transmission from mother to infant, and nosocomial exposure.

Public Health Significance

Acute hepatitis B illness is characterized by nausea, anorexia, fever, malaise, headache, muscle pain, right upper quadrant abdominal pain, dark urine, skin rash, and jaundice. Approximately 50 percent of adults with acute infection are asymptomatic. Persons with chronic infection are often asymptomatic as well and capable of infecting others. The incubation period of hepatitis B virus ranges from 6 weeks to 6 months, with an average of 120 days. The time variation is related to the amount of virus, the mode of transmission, and host factors. All persons who are hepatitis B surface antigen (HBsAg) positive are potentially infectious. Most adult acute hepatitis B infections result in complete recovery and immunity from future infection. Chronic infection is associated with an increased risk for chronic liver disease, cirrhosis, liver failure, and hepatocellular carcinoma. There is no specific treatment for acute hepatitis B infection other than supportive.

In 1991, a comprehensive strategy for the elimination of hepatitis B transmission in the U.S. was implemented. The strategy includes: universal vaccination of infants beginning at birth, routine screening of all pregnant women for hepatitis B infection and immunoprophylaxis to infants born to infected women or women of unknown status, routine vaccination of previously unvaccinated children and adolescents, and vaccination of high-risk adults.

After three intramuscular doses of hepatitis B vaccine, more than 90 percent of healthy adults and more than 95 percent of infants, children, and adolescents will develop adequate antibody responses. The dosage of vaccine varies with the age of the recipient and type of vaccine.

Postexposure prophylaxis with hepatitis B vaccine may be started at the same time as treatment with hepatitis B immune globulin (HBIG). Indications for prophylaxis may include: infants born to HBsAg positive mothers, women whose HBsAg status is unknown at delivery, sexual and household contacts of persons with acute infection, and after percutaneous or mucous membrane exposure. Management of the exposed person depends on the HBsAg status of the source, as well as the vaccination and anti-HBs response status of the exposed person.

Ongoing hepatitis B vaccination programs will ultimately eliminate domestic hepatitis B transmission, and increased vaccination of adults who have risk factors will accelerate progress toward elimination.

Risk for hepatitis B infection varies with occupation, lifestyle, or environment where there is contact with blood from infected persons. Populations at high risk for hepatitis B infection include: immigrants from areas with endemic rates, institutionalized developmentally disabled, injection drug users, homosexually active men, hemodialysis patients, and household contacts.

Healthy People 2010 Goal

The Healthy People 2010 Goal for hepatitis B is to reduce cases of vaccine-preventable hepatitis B disease in persons aged 2-18 years to 9 cases nationally (99% decrease) and to reduce cases per 100,000 population in the following age groups: people aged 19-24 years to 2.4 cases, people aged 25-39 years to 5.1 cases, and people aged 40 years and older to 3.8 cases. Indiana met this goal during the five-year reporting period 2002-2006. Figure 1 shows incidence rates per 100,000 population per age group and the Healthy People 2010 Goal.

Epidemiology and Trends

In 2006, there were 80 reported cases of acute hepatitis B in Indiana: 63 percent exhibited jaundice and 39 percent were hospitalized. No cases resulted in death.

Table 1. Hepatitis B Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	80	1.27	374
Race			
Black	14	2.49	70
White	58	1.04	262
Other	1	0.57	8
Not Reported	7	-	34
Sex			
Female	16	0.50	92
Male	64	2.06	282
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows reported cases of hepatitis B for the five-year period 2002-2006. In 2006, there was a 38 percent increase in reported cases of acute hepatitis B compared to 2005 (58). Cases occurred throughout the year in 2006 (Figure 3). Cases of acute hepatitis B infection varied with age. Figure 4 shows incidence rates of acute hepatitis B cases per 100,000 population by age group. Nationally, higher rates of hepatitis B disease continue among adults, particularly males 25-38 years of age and persons with identified risk factors (i.e., injection drug users, men who have sex with men, and persons with multiple sex partners).

In 2006, 78 persons with acute hepatitis B were interviewed about risk factors for contracting the disease. Not all of those interviewed responded to each question asked. Table 2 highlights identified risk factors for 2006 Indiana cases. Nationally, the proportion of heterosexuals reporting multiple sex partners and self-identified men who have sex with men has increased in the past decade.

In 2006, 25 Indiana counties reported at least 1 case of acute hepatitis B, but only 3 reported five or more cases (Figure 5).

Indiana law requires the reporting of both acute and chronic hepatitis B infections during pregnancy and perinatally exposed infants. However, data for 2006 are not currently available.

You can learn more about hepatitis B by visiting the following Web sites
http://www.cdc.gov/hepatitis/hepatitisB.htm
http://www.hepb.org

Figure 1. Hepatitis B Incidence by Age Group Indiana, 2002-2006

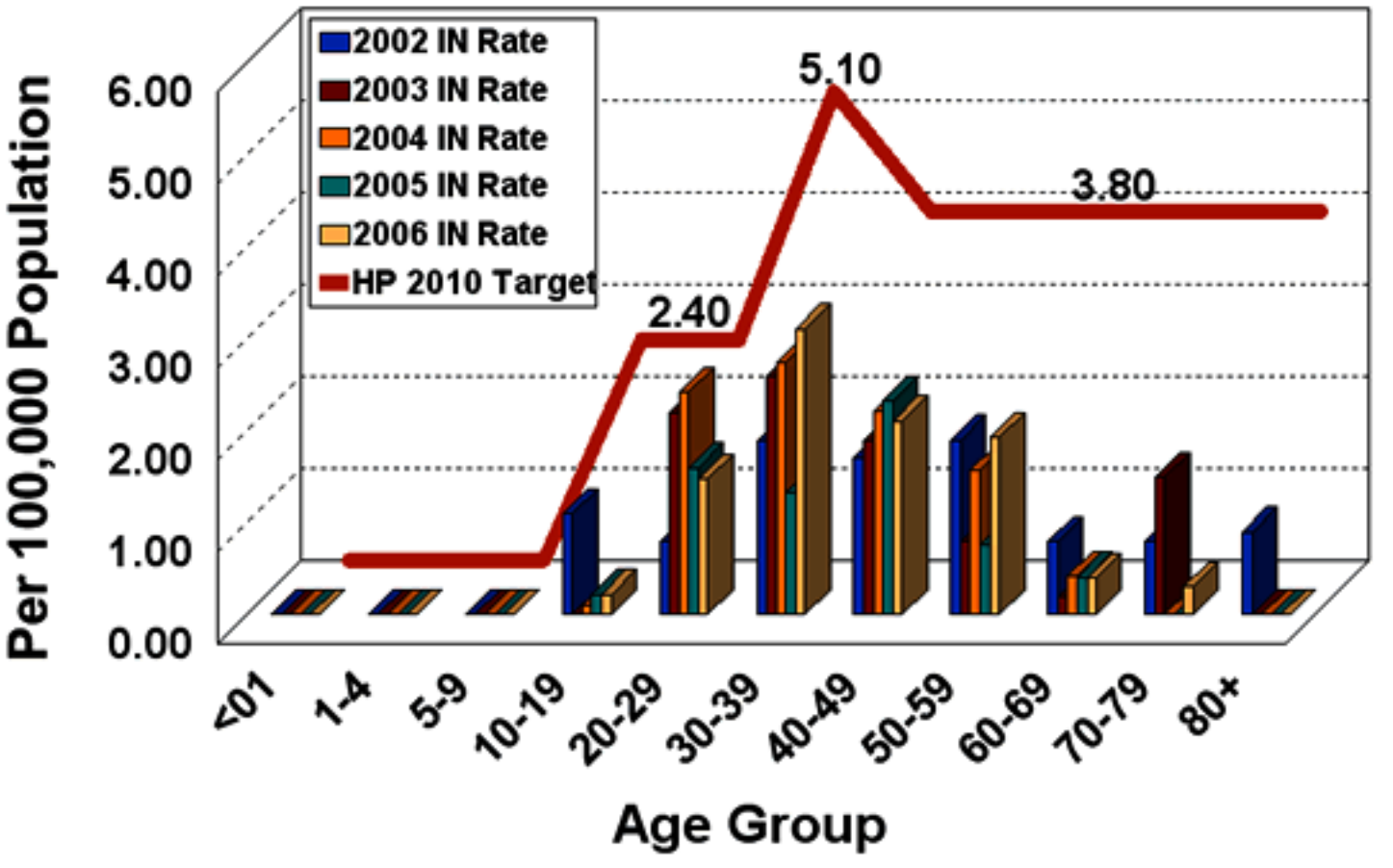
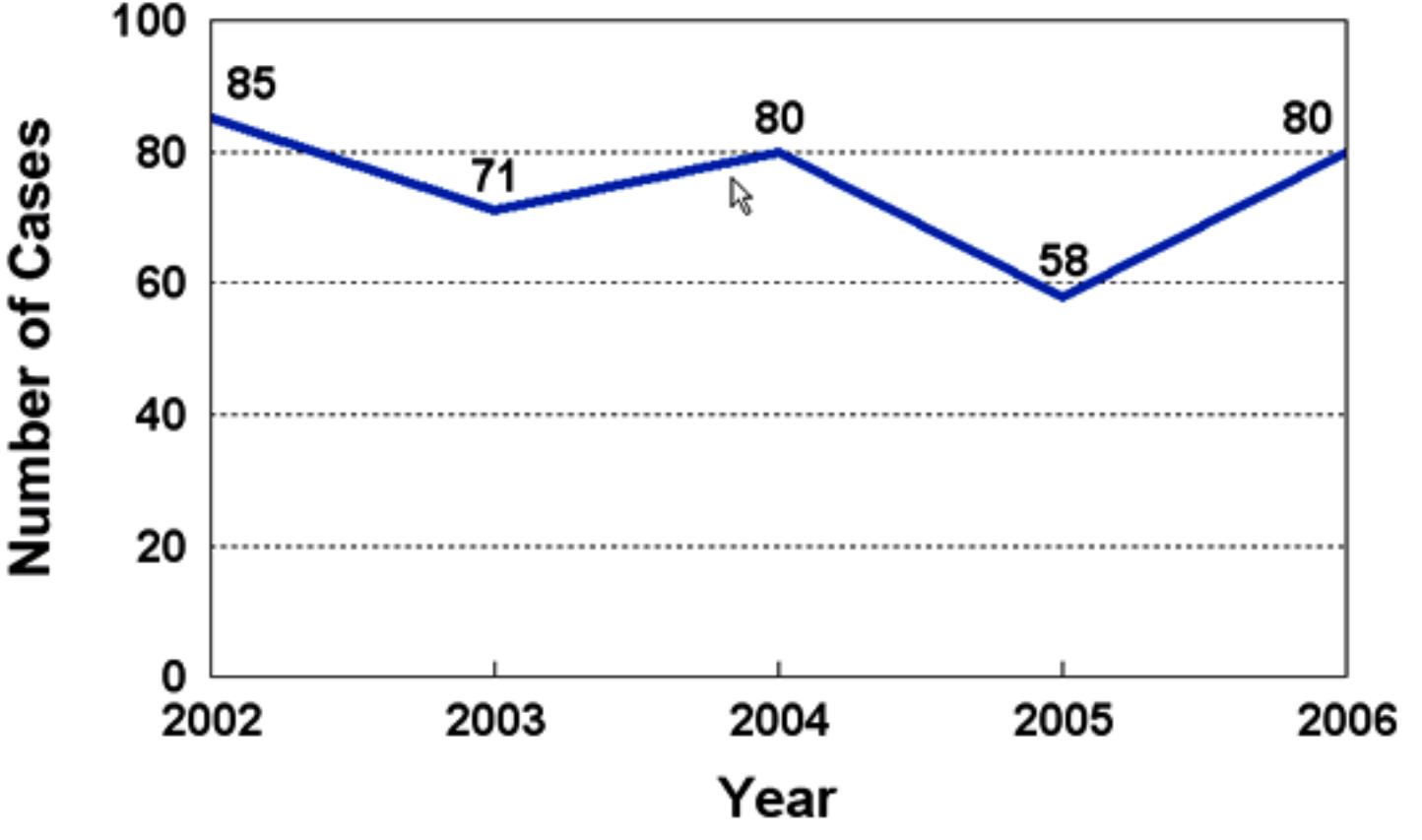


Figure 2. Hepatitis B Cases by Year*
Indiana, 2002-2006



*2005 case totals were updated from 57 to 58

Figure 3. Hepatitis B Cases by Month Indiana, 2006

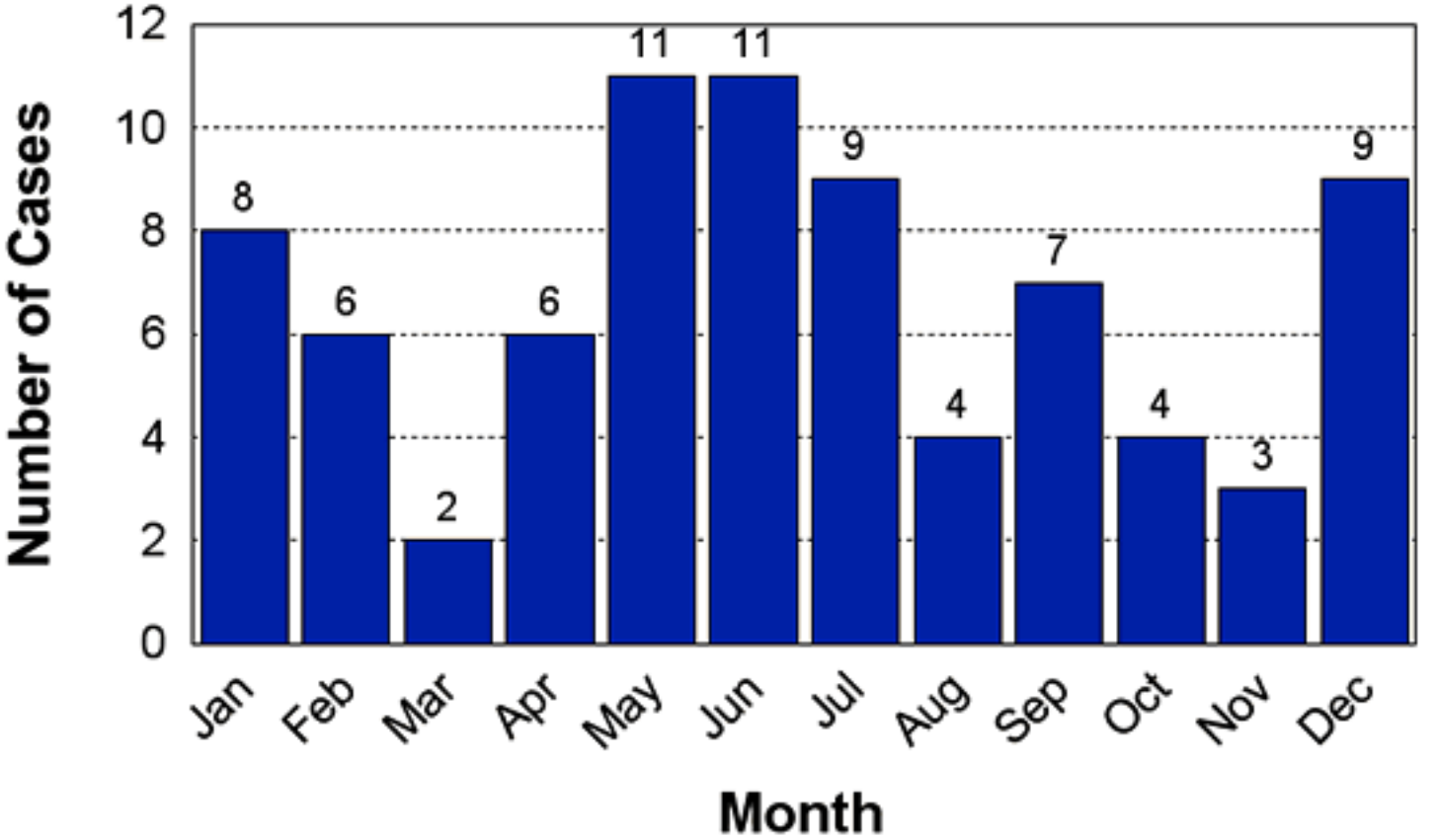


Figure 4. Hepatitis B Incidence by Age Group Indiana, 2006

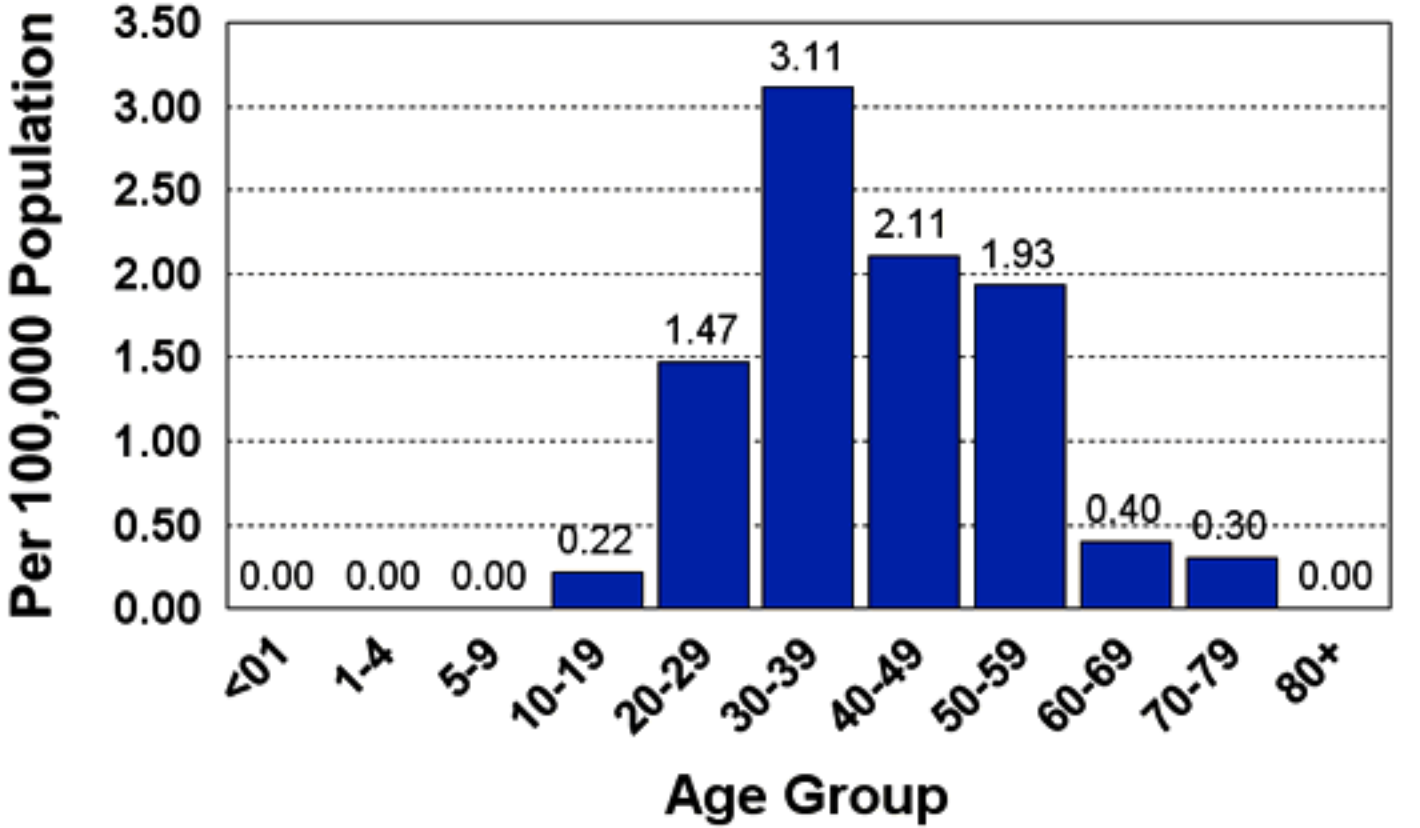


Figure 5. Hepatitis B Cases* by County -- Indiana, 2006

*Per 100,000 Population

Table 2. Hepatitis B Risk Factors -- Indiana, 2006

Risk Factor	Number of Cases (Percent of Cases)
Homosexual/Bisexual	21 (26)
Multiple Sex Partners	33 (41)
Contact of a Case	9 (11)
History of Dental Work	11 (14)
Injection Drug Use	9 (11)
History of Surgery	10 (13)
Contact with a Contaminated Object	6 (8)
Medical Employment	5 (6)
Application of a Tattoo	7 (9)
Dialysis Association	1 (1)

HEPATITIS C

Hepatitis C is a bloodborne infectious disease caused by the hepatitis C virus (HCV). The virus infects the liver, causing inflammation. Hepatitis C is the leading chronic bloodborne infection in the U.S. The number of reported cases is actually the number of positive hepatitis C tests reported for the first time during that year. Fifteen to 20 percent of these cases can spontaneously clear the virus and no longer be infected.

Public Health Significance

Clinically defined cases of acute hepatitis C do not occur often. Eighty-five percent of infected individuals will be asymptomatic for decades. Symptoms that can be present during acute infection include nausea, vomiting, fever, chills, abdominal pain, and jaundice. Twenty percent of cases will develop serious liver damage from hepatitis C, and 25 percent of those will need a liver transplant, develop liver cancer, or die. Antibodies can be found in 7 out of 10 persons when symptoms begin and in 9 out of 10 people within 3 months after symptoms begin. There is no vaccine for hepatitis C, but treatment is available if indicated.

Populations most at risk include intravenous drug users, recipients of organ transplants and blood transfusions prior to 1992, and those who have acquired tattoos and piercings from non-commercial facilities.

Healthy People 2010 Goal

The Healthy People 2010 Goal for hepatitis C is 1 new case per 100,000 population per year. Indiana met this goal for the five-year reporting period 2002-2006 (Figure 1).

Epidemiology and Trends

Reporting positive hepatitis C cases was not required in Indiana until October 2000. In 2006, there were 4,723 reported cases of chronic and acute hepatitis C, for a rate of 74.81 cases per 100,000 population (Table 1). Males (89.50) were more likely to be reported than females (53.67). Laboratory reports often do not include racial information. In 2006, race was not reported for 49.5 percent of hepatitis C cases; consequently, an accurate comparison is not possible.

Table 1. Hepatitis C Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	4,723	74.81	27,578
Race			
Black	505	89.69	4,134
White	1,846	33.11	12,166
Other	35	19.99	241
Not Reported	2,337	-	11,037
Sex			
Female	1,719	53.67	18,548
Male	2,784	89.50	8,584
Unknown	220	-	446

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows reported cases of chronic and acute hepatitis C for the five-year period 2002-2006. Figure 3 shows age-specific rates were greatest for adults aged 50-59 years (171.05), followed by adults aged 40-49 years (149.54).

In 2006, 78 Indiana counties reported at least 1 case of hepatitis C. The case rates were highest for the following counties reporting five or more cases: Hendricks (174.9), Wayne (153.2), and Henry (143.9). Figure 4 shows counties reporting five or more cases of hepatitis C in 2006.

You can learn more about hepatitis C by visiting the following Web site:
http://www.cdc.gov/hepatitis/HepatitisC.htm

Figure 1. Acute Hepatitis C Rates by Year Indiana, 2002-2006

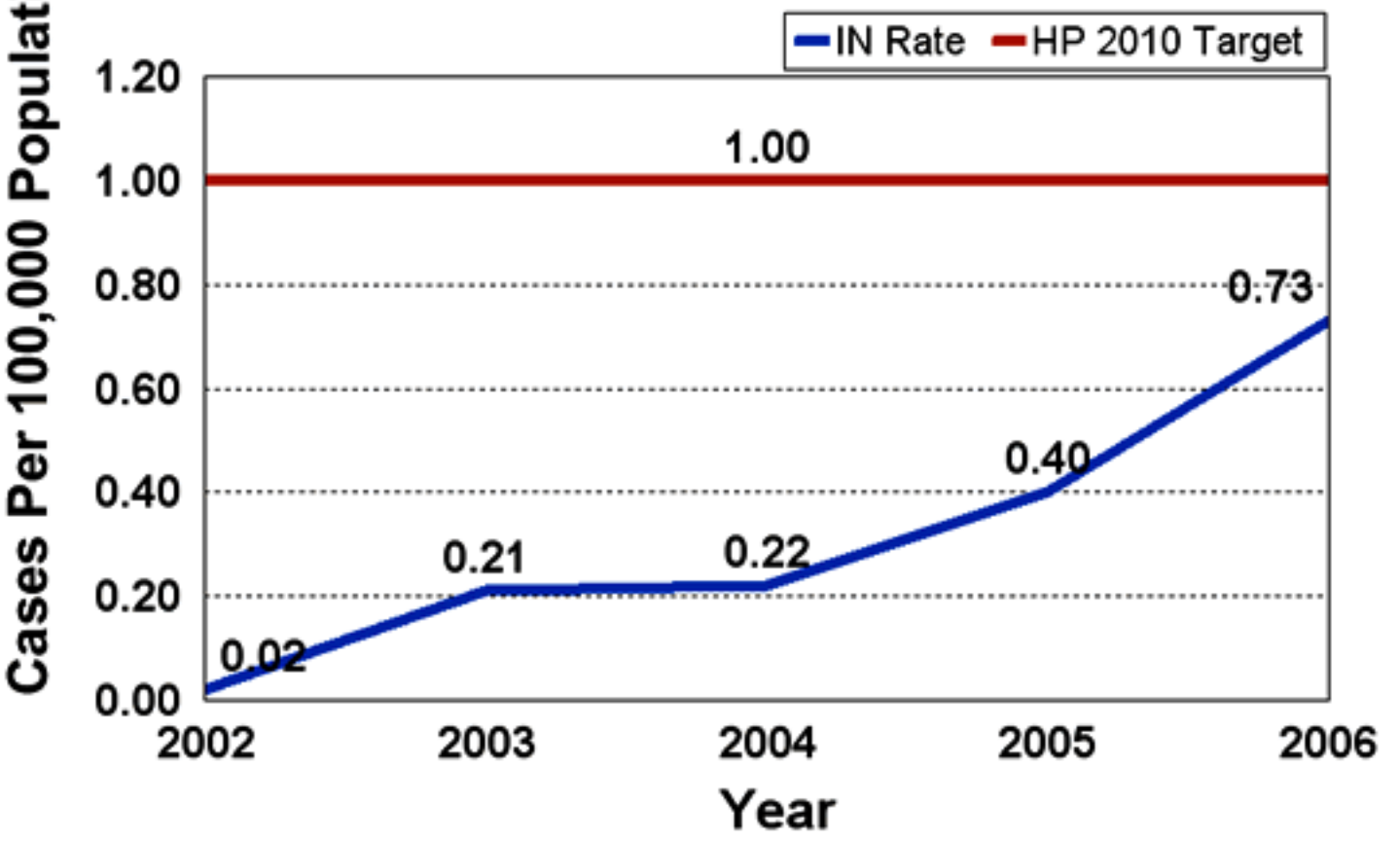
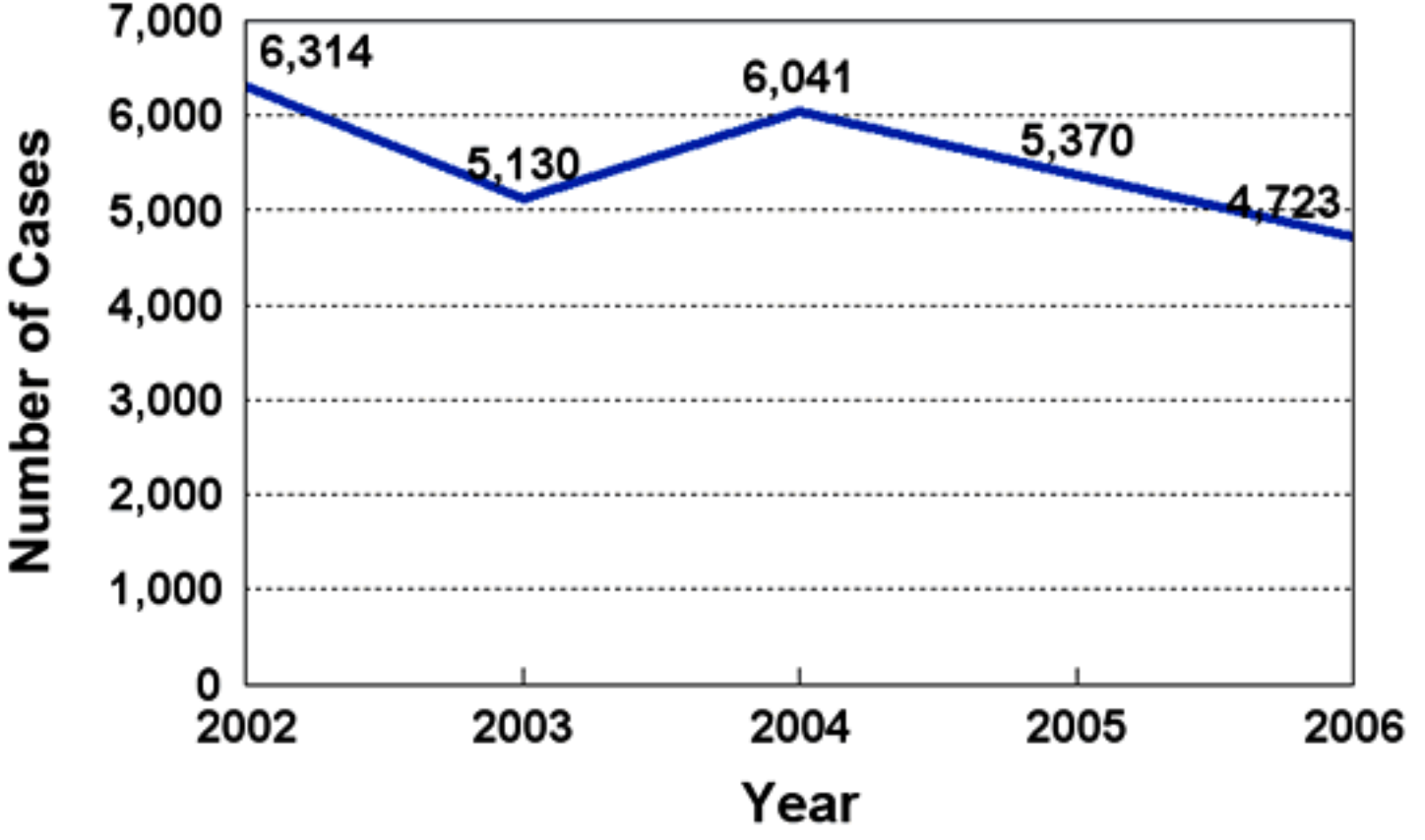
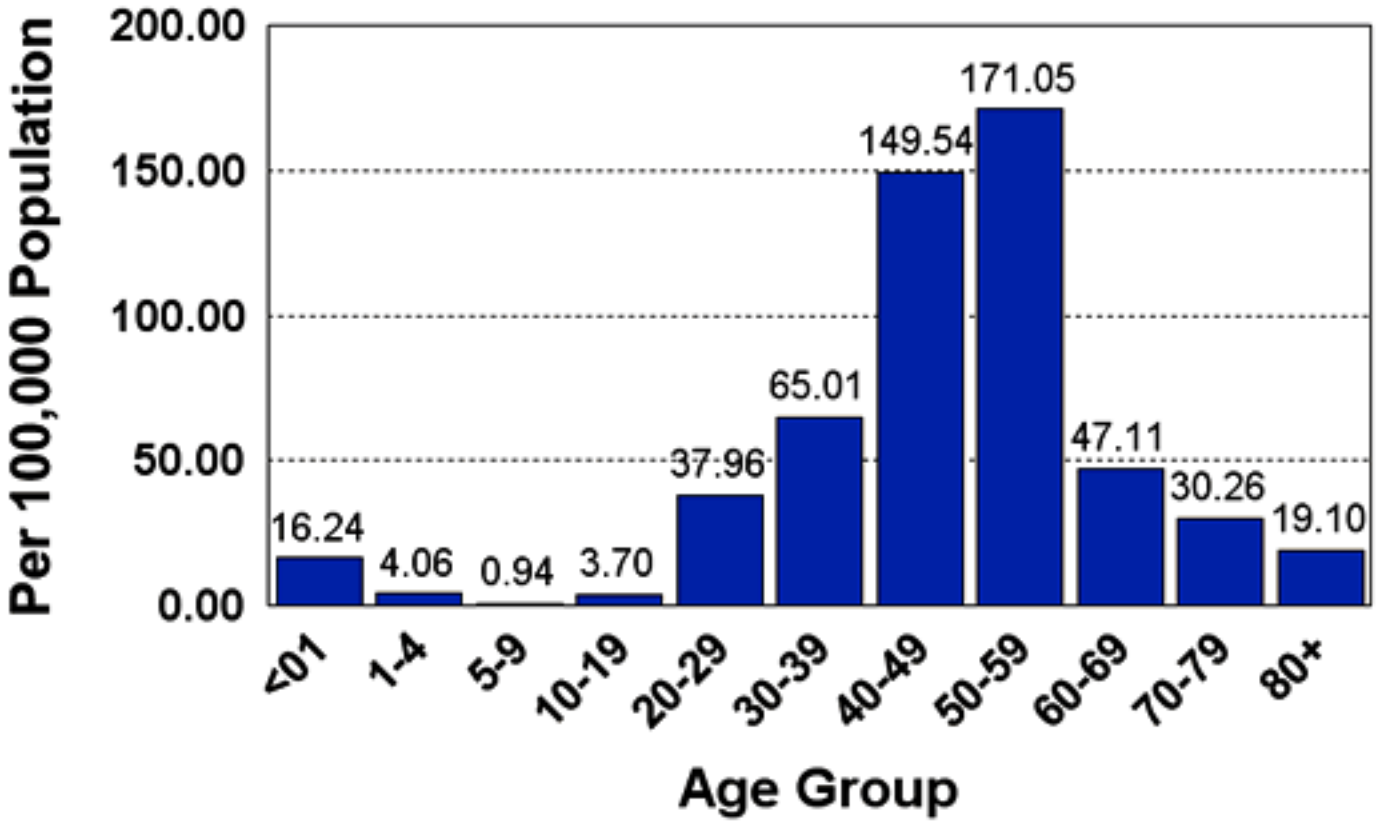


Figure 2. Hepatitis C Cases* by Year Indiana, 2002-2006



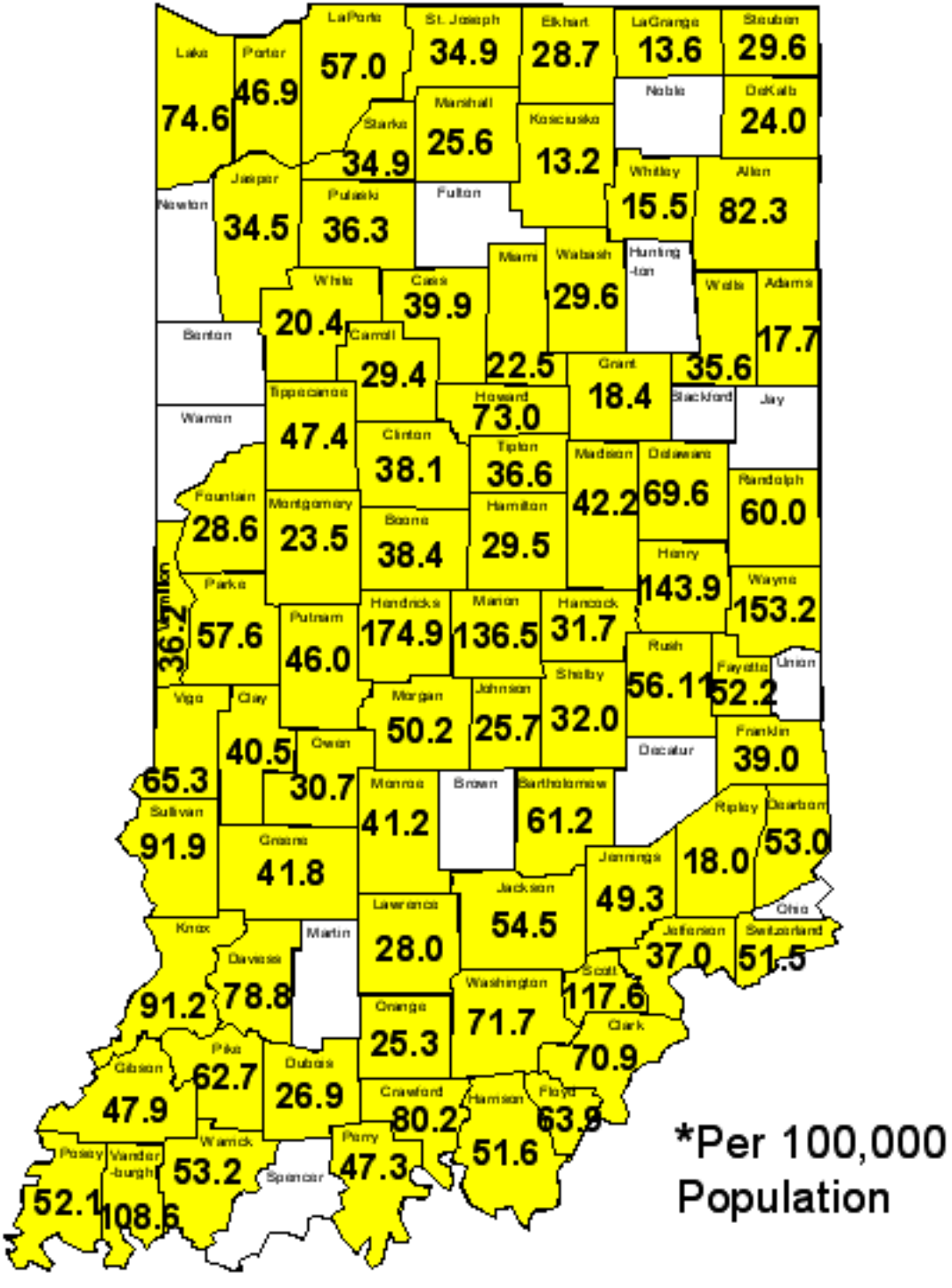
*Numbers include chronic and acute cases.

Figure 3. Hepatitis C Incidence by Age Group*+ Indiana, 2006



*Age information not reported for 564 cases.
+Age group numbers include chronic and acute cases.

Figure 4. Hepatitis C Cases* by County -- Indiana, 2006



HEPATITIS E

Hepatitis E is an inflammation of the liver caused by the hepatitis E virus. Hepatitis E rarely causes long-term liver damage or death but can cause very serious infection in pregnant women, especially during the last three months of pregnancy. Hepatitis E is rare in the U.S. and is almost always related to travel to a country where hepatitis E is common, e.g., Mexico, Africa, the Middle East, India, and China.

People become infected with hepatitis E by coming in contact with the stool of an infected person (fecal-oral route). Most outbreaks have been associated with contaminated drinking water. For this reason, the virus is easily spread in areas where there are poor sanitary conditions or where good personal hygiene is not observed.

Public Health Significance

Symptoms of hepatitis E include diarrhea, nausea, vomiting, tiredness, stomach pain, fever, dark urine, pale/clay-colored stool, loss of appetite, and jaundice. Symptoms usually occur suddenly. Some people, especially children, may have no symptoms but can still spread the virus to others. Symptoms usually begin 26-42 days (range of 15-64 days) after exposure. Death from hepatitis E is rare but may be as high as 20 percent among pregnant women in their third trimester. Premature deliveries due to infection have a 33 percent infant mortality rate. People are most contagious from about two weeks before symptoms begin until two weeks after symptoms begin.

There is no cure for hepatitis E. However, people infected with the virus develop lifelong immunity. Unlike hepatitis A, there is no vaccine or immune globulin (IG) to prevent infection.

Persons are at risk for hepatitis E infection if they have:

- Exposure to contaminated food or water:
    - Consuming untreated water.
    - Consuming food prepared by an infected person.
    - Consuming raw produce or raw shellfish (e.g., oysters).
    - Traveling to countries where hepatitis E is common and where there is little clean water or proper sewage disposal.
- Exposure to the stool or blood of an infected person who is a:
    - Household member or sexual partner (men who have sex with men are at higher risk).
    - Child or staff member of a daycare center (including centers for the disabled).
    - Resident or staff member of a health care center.

Casual contact, as in the usual workplace or school setting, does not spread the hepatitis E virus. However, most cases of hepatitis E have an unknown exposure, due to the length of time from exposure to the time symptoms begin (range of 15-64 days).

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for hepatitis E.

Epidemiology and Trends
There was one reported case of hepatitis E in Indiana in 2006 and only one reported case during the five-year period 2002-2006.

You can learn more about hepatitis E by visiting the following Web sites:
http://www.cdc.gov/hepatitis/index.htm
www.cfsan.fda.gov/~mow/chap32.html

HISTOPLASMOSIS

Histoplasmosis is caused by *Histoplasma capsulatum*, a saprophytic soil fungus. The primary route of transmission is inhalation of infectious spores made airborne by the disturbance of contaminated soil. The presence of *Histoplasma capsulatum* has been associated with soil enriched with bird feces especially blackbirds, starlings, chickens, and pigeons. However, birds are not carriers of histoplasmosis, but accumulation of bird feces provide the organic enrichment needed for *Histoplasma* growth. Bat guano may also carry the organism.

Clinically recognized histoplasmosis can be characterized into one of three forms: 1) acute, pulmonary histoplasmosis; 2) disseminated histoplasmosis; and 3) chronic, cavitary histoplasmosis.

Public Health Significance

Approximately 90 percent of *Histoplasma capsulatum* infections are asymptomatic. Symptoms of histoplasmosis cases are flu-like with nonproductive cough, chest pains, and difficult breathing. More severe disease may result in fever, night sweats, weight loss, and bloody sputum. Severe cases may result in *Histoplasma* organisms being disseminated to many body organs. Symptoms occur within 3-17 days after exposure to the fungus. Antifungal medication is available for histoplasmosis, although mild infections usually resolve without medication.

People most at risk for developing histoplasmosis include poultry workers, farmers, landscapers and gardeners, and those who have contact with bats or bat caves.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for histoplasmosis.

Epidemiology and Trends

In 2006, 63 confirmed cases of histoplasmosis were reported in Indiana for an incidence rate of 1 case per 100,000 population (Table 1). This represents a 75 percent decrease from 2005 (1.75). An outbreak of histoplasmosis in 2005 contributed to the rate difference. Males (1.19) were more likely to be reported with histoplasmosis infection than females (0.81).

Table 1. Histoplasmosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	63	1.00	362
Race			
Black	10	1.78	39
White	40	0.72	238
Other	2	1.14	7
Not Reported	11	-	78
Sex			
Female	26	0.81	156
Male	37	1.19	206
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 illustrates the number of cases by year for 2002-2006. Histoplasmosis occurred throughout the year in 2006, with the largest number of cases occurring in the winter and summer months (Figure 2). Figure 3 shows the distribution of cases by age group. Age-specific rates were greatest among adults aged 30-69 years of age. In 2006, 34 counties reported at least 1 case of histoplasmosis in Indiana. Marion County was the only county reporting 5 or more cases with a case rate of 2 cases per 100,000 population.

There were no outbreaks of histoplasmosis in Indiana in 2006.

You can learn more about histoplasmosis by visiting the following Web site:
http://www.cdc.gov/nczved/dfbmd/disease_listing/histoplasmosis_gi.html

Figure 1. Histoplasmosis Cases by Year Indiana, 2002-2006

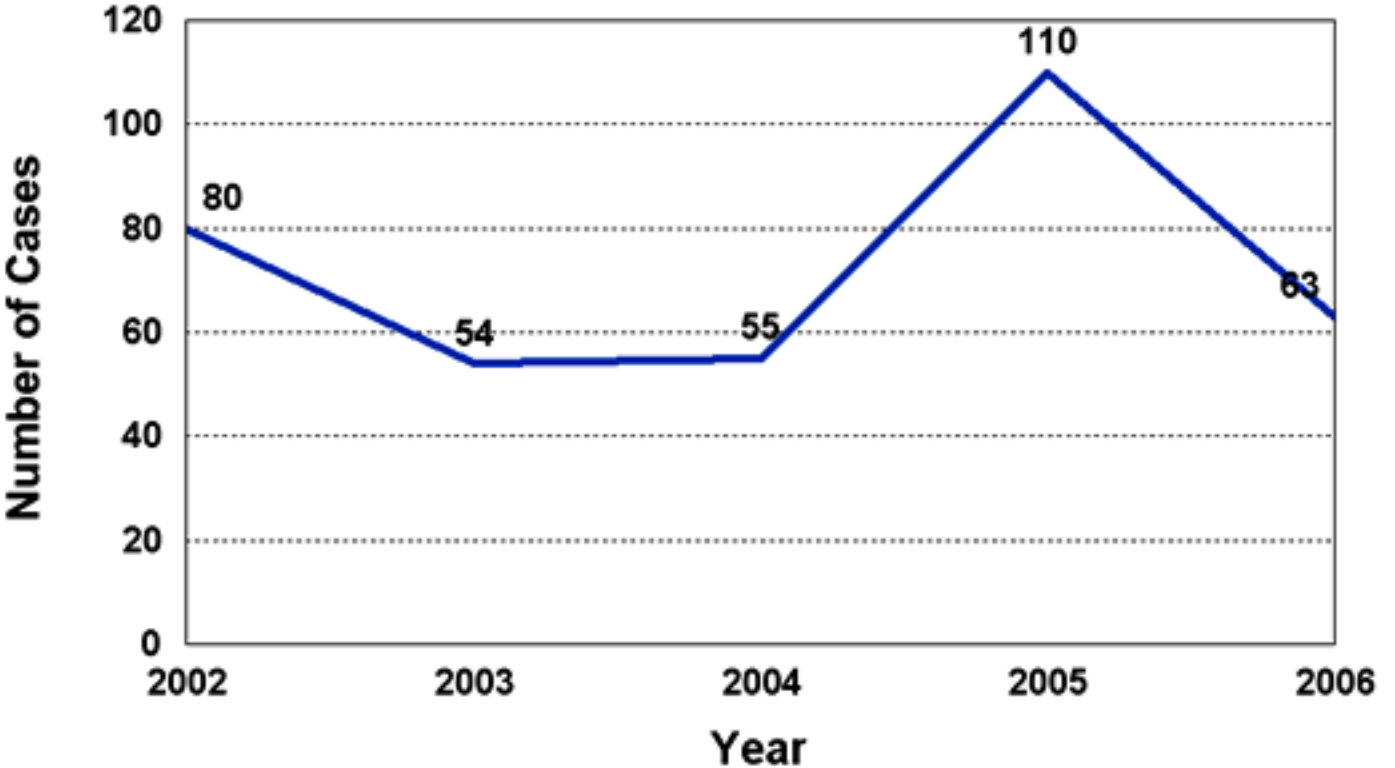


Figure 2. Histoplasmosis Cases by Month Indiana, 2006

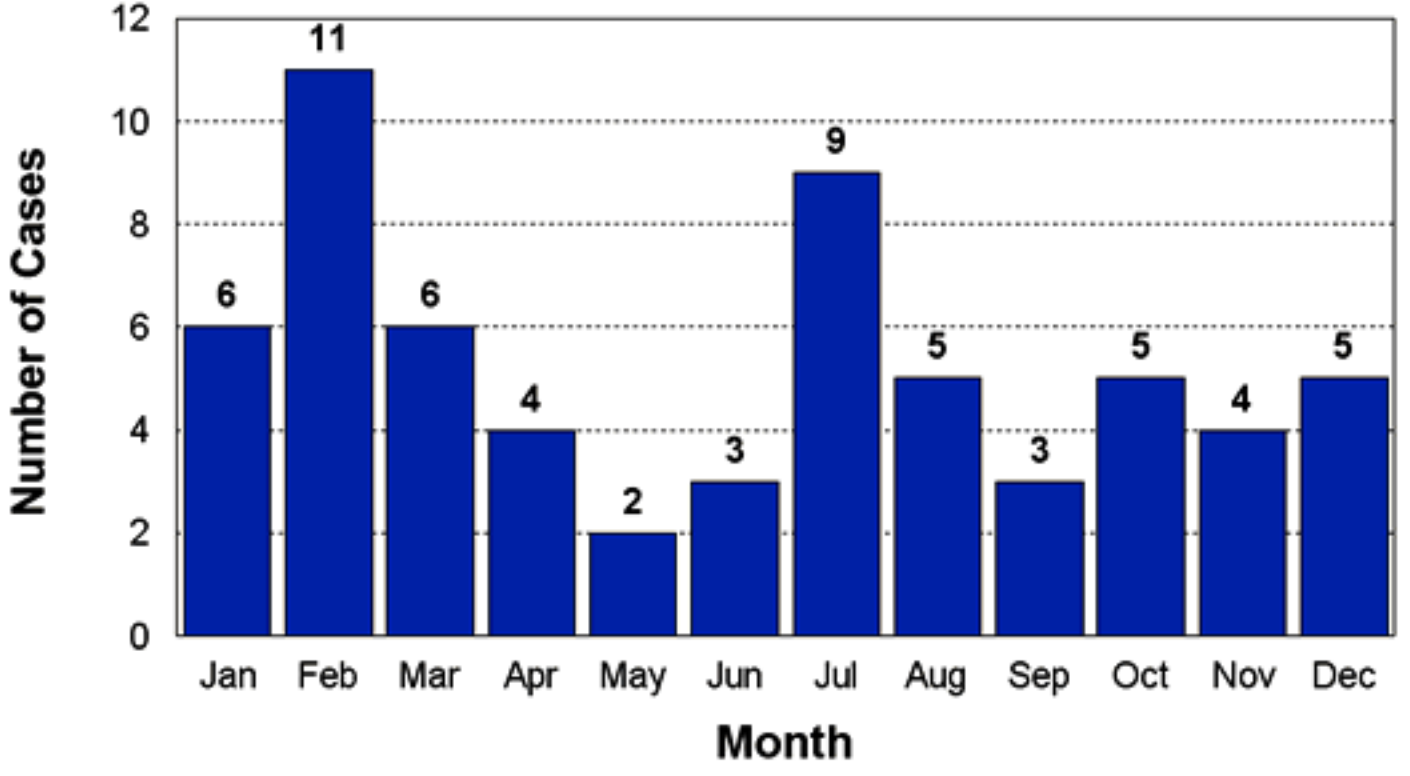
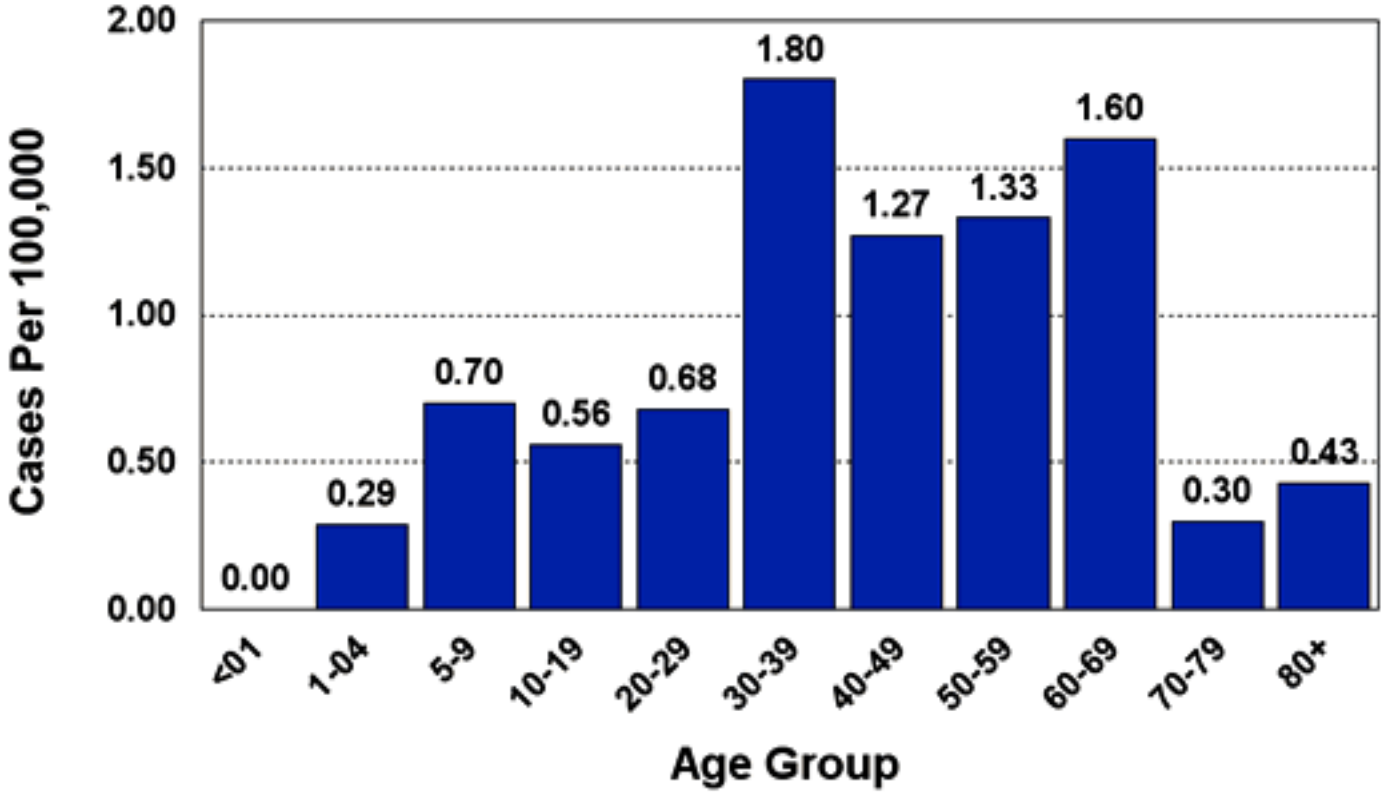


Figure 3. Histoplasmosis Incidence by Age Group Indiana, 2006



LA CROSSE ENCEPHALITIS

La Crosse encephalitis is a mosquito-borne viral infection found primarily in the eastern United States where hardwood forests exist. The disease is maintained in nature in a cycle between the tree-hole mosquito, *Ochlerotatus triseriatus*, and small woodland mammals such as squirrels and chipmunks. Although La Crosse encephalitis virus is endemic in Indiana, the disease is relatively rare, because humans are not an essential component of the viral life cycle.

Public Health Significance
Symptoms of La Crosse encephalitis include headache, fever, nausea, vomiting, drowsiness, and disorientation. Severe cases may result in seizures or coma. Symptoms appear 5-15 days after a bite from an infected mosquito. Cases are rarely fatal but may result in learning disabilities in recovered individuals. For every symptomatic case, there are 1,500 asymptomatic cases. Clinically recognized infections occur mainly in children under 16 years of age. No specific treatment exists for La Crosse encephalitis. People most at risk for developing La Crosse encephalitis include children younger than 16 years of age, those residing in or near woodlands where tree-hole mosquitoes reside, and those involved in outdoor water activities.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for La Crosse encephalitis.

Epidemiology and Trends
During the five-year period 2002-2006, eight cases of La Crosse encephalitis were reported in Indiana, with no reported cases in 2006.

You can learn more about La Crosse encephalitis by visiting the following Web site:
http://www.cdc.gov/ncidod/dvbid/arbor/lacfact.htm

LEGIONELLOSIS

Legionellosis is a respiratory infection caused by *Legionella* bacteria, most commonly *Legionella pneumophila*, and transmitted by inhalation of contaminated water aerosols. These bacteria are found naturally in the environment and grow best in warm water. Outbreaks have been linked to artificial water sources such as hot tubs, hot-water tanks, and air-conditioning systems.

Public Health Significance

Symptoms of legionellosis are similar to pneumonia and include fever, headache, chills, cough, and muscle aches. Symptoms usually appear 2-14 days after exposure to the bacteria. A milder form of infection, known as Pontiac Fever, is characterized by fever, cough, and body aches. Symptoms of Pontiac Fever last for 2-5 days and go away without treatment. Neither infection is transmissible person to person. Legionellosis can occur as individual sporadic cases or as an outbreak related to a point-source exposure.

People over 50 years of age, especially those with a history of smoking and weakened immune system, are at the greatest risk of acquiring infection. People with chronic lung disease and those who take drugs to suppress their immune system are also at an increased risk.

Legionellosis can be treated with antibiotics. There is no vaccine for this disease.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for legionellosis.

Epidemiology and Trends

In 2006, 54 cases of legionellosis were reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1). The rate for whites (.77) was higher than that for other races (0.57) or blacks (0.53). Additionally, males (1.25) were more likely to be reported than females (0.47).

Table 1. Legionellosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	54	0.86	198
Race			
Black	3	0.53	18
White	43	0.77	155
Other	1	0.57	1
Not Reported	7	-	24
Sex			
Female	15	0.47	72
Male	39	1.25	126
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows the number of reported cases of legionellosis for 2002-2006. The number of reported cases increased during the late spring through early fall months (Figure 2). The impact of *Legionella* infections was most notable when comparing cases by age group. The age group with the highest incidence rate was persons aged 60-69 years (2.00), followed by those aged 40-49 years (1.58) (Figure 3). Legionellosis occurred throughout Indiana in 2006; however, only three counties, Delaware (4.4), Marion (1.5), and Lake (1.2) reported five or more cases (Figure 4). No outbreaks of legionellosis occurred in Indiana in 2006.

You can learn more about legionellosis by visiting the following Web site:
http://www.cdc.gov/legionella/patient_facts.htm

Figure 1. Legionellosis Cases by Year
Indiana, 2002-2006

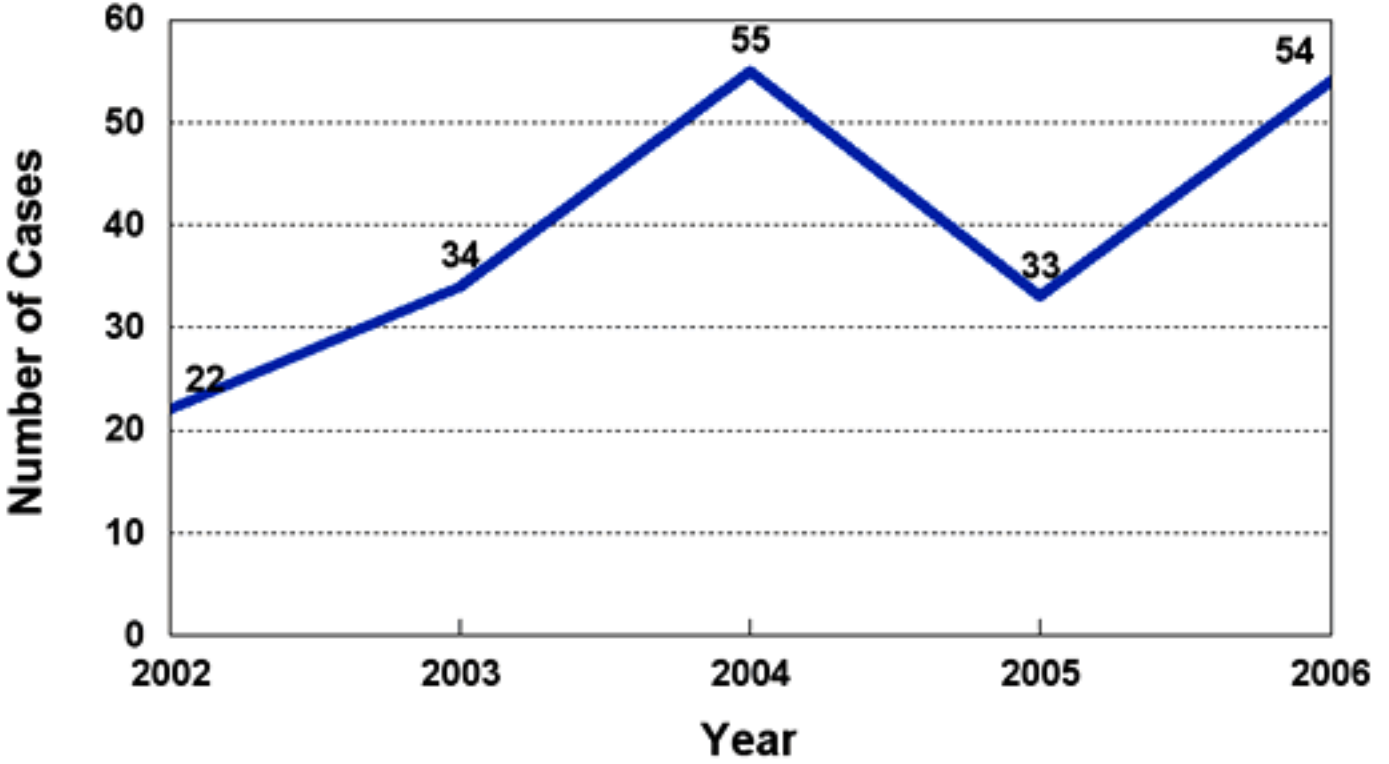


Figure 2. Legionellosis Cases by Month Indiana, 2006

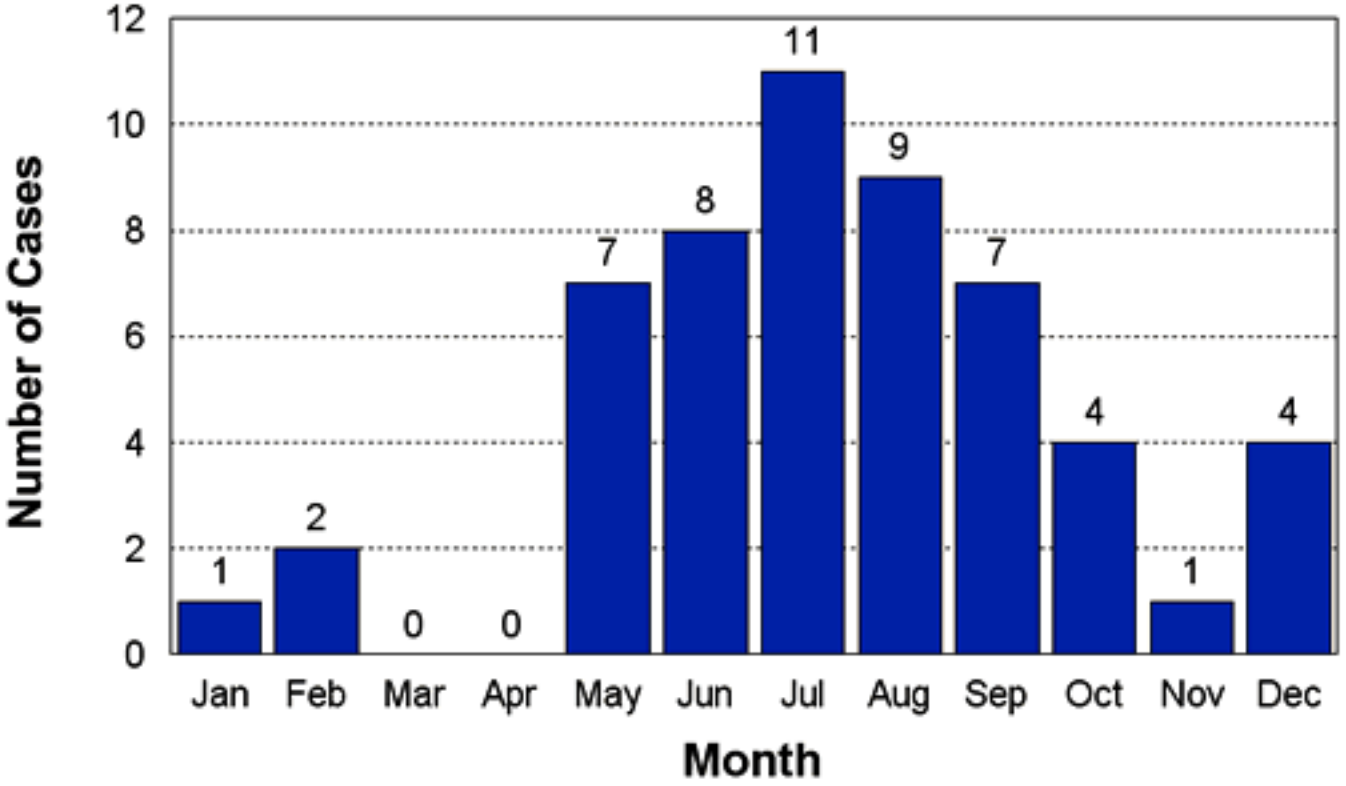


Figure 3. Legionellosis Incidence by Age Group Indiana, 2006

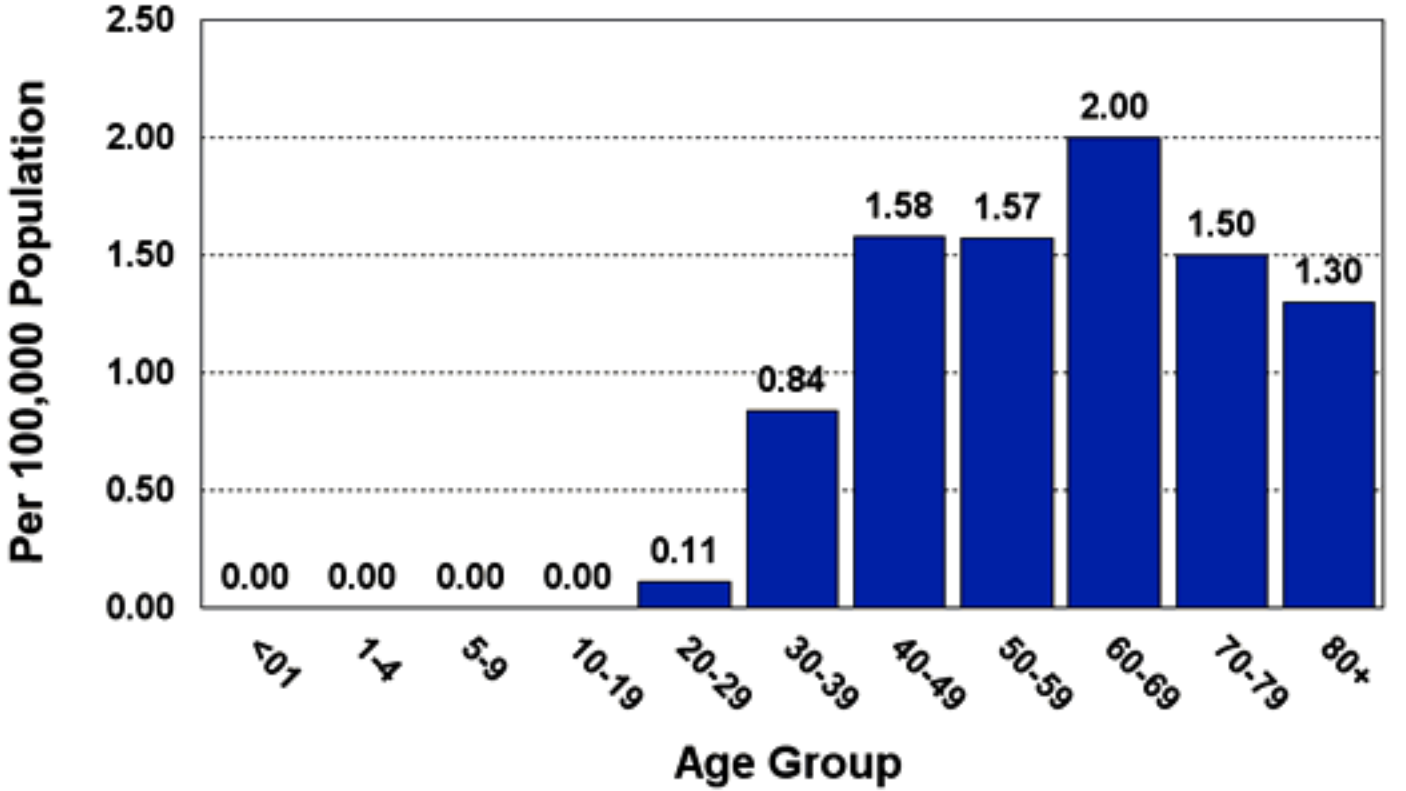
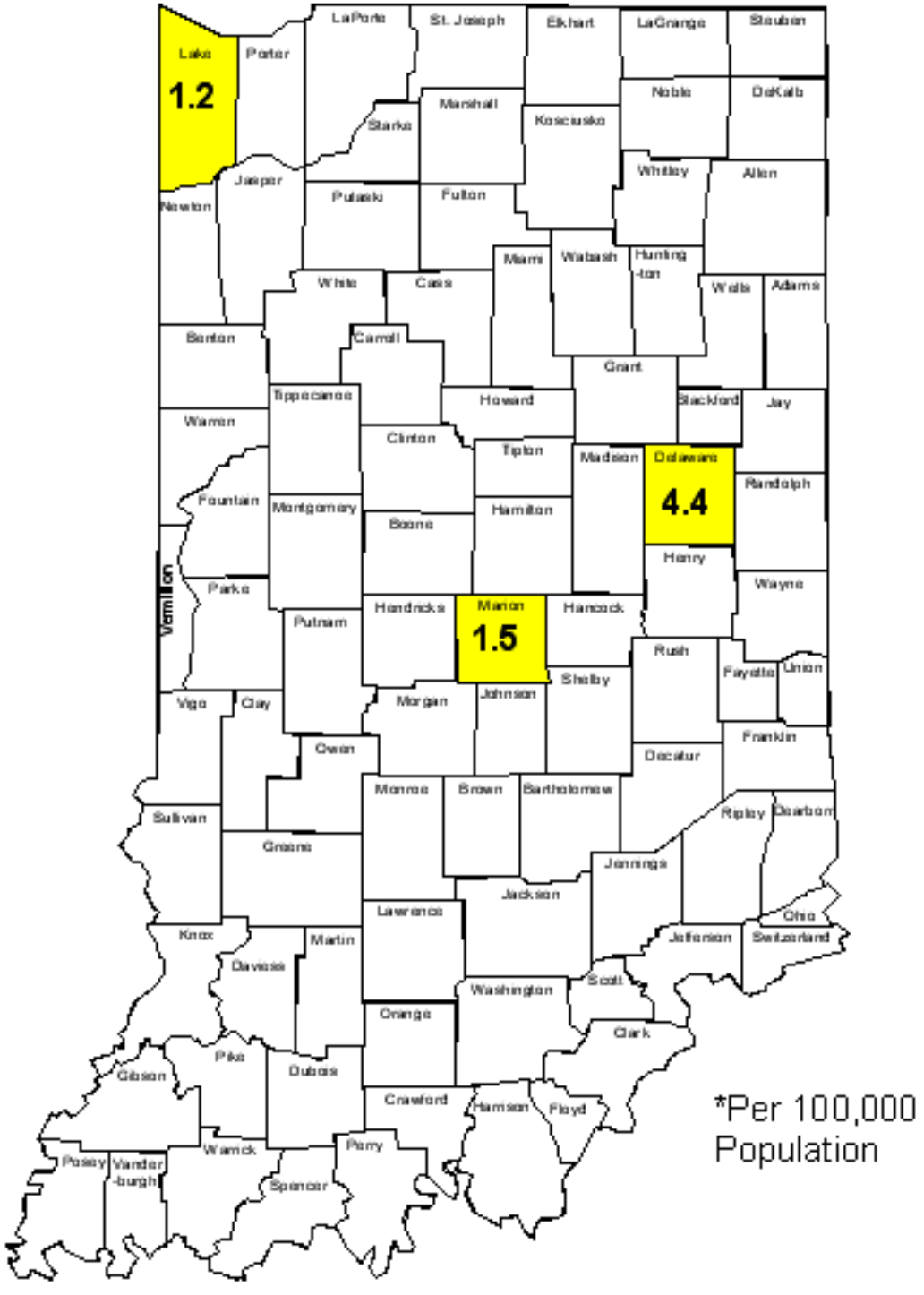


Figure 4. Legionellosis Cases* by County -- Indiana, 2006



LEPROSY (HANSEN'S DISEASE)

Leprosy is a chronic bacterial disease caused by *Mycobacterium leprae*, which affects the skin, mucous membranes, and peripheral nerves. Leprosy is more common in temperate, tropical, and subtropical climates. In 2006, 66 cases were reported in the U.S., with most cases occurring in California, Texas, and Hawaii.

Public Health Significance
Symptoms of leprosy include skin lesions that are usually numb, muscle weakness, and numbness in the extremities. Symptoms usually do not appear until several years after contact with a person with leprosy. The mode of transmission is uncertain.

Although feared as a highly contagious and devastating disease, leprosy has been well established as not highly transmissible, very treatable, and, with early diagnosis and treatment, not disabling. Most U.S. cases of leprosy are in immigrants and refugees who acquired the disease in their native country. The disease remains endemic in California, Hawaii, Louisiana, Texas, and Puerto Rico due to increased numbers of immigrants and refugees. Early detection of cases is critical to the control of leprosy. The availability of effective multi-drug therapy has changed patient management from social isolation to ambulatory treatment without hospitalization (except in special situations). Health education along with counseling for the patient and for the patient's close contacts should stress the availability of effective multi-drug therapy, the absence of infectivity of patients under continuous treatment, and the prevention of physical and social disabilities.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for leprosy.

Epidemiology and Trends
No cases of leprosy were reported in Indiana in 2006, and only one case (2004) was reported during the five-year reporting period 2002-2006.

You can learn more about leprosy by visiting the following Web site:
http://www.cdc.gov/nczved/dfbmd/disease_listing/leprosy_ti.html

LEPTOSPIROSIS

Leptospirosis is a bacterial disease of animals and man and is caused by bacteria in the genus *Leptospira* and primarily in the species *Leptospira interrogans*. The primary reservoir of the bacteria is rodents. However, infected domestic animals such as cattle, sheep, goats, pigs, dogs, and cats can pose an additional threat to humans. Humans generally become infected by direct contact with infected animals or from exposure to water contaminated with urine from infected animals.

Public Health Significance
Symptoms of leptospirosis may appear abruptly and include fever, chills, severe headache, body aches, and vomiting. If leptospirosis is left untreated, kidney damage, liver failure, and respiratory distress can occur. Symptoms occur 2-28 days after exposure to the bacteria. Antibiotics are used to treat the infection.

Leptospirosis can be an occupational disease risk for individuals who work with animals or who have exposure to contaminated soil or water. Groups at increased risk include farmers, veterinarians, coal miners, meat handlers, and sewer workers. At least one large leptospirosis outbreak in the U.S. has been linked to the recreational use of a lake.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for leptospirosis.

Epidemiology and Trends
No cases of leptospirosis were reported in Indiana in 2006, and only two cases were reported during the five-year reporting period 2002-2006.

You can learn more about leptospirosis by visiting the following Web site:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm

LISTERIOSIS

Listeriosis is a contagious disease caused by *Listeria monocytogenes* bacteria. These bacteria are found in soil, untreated water, and the intestines of some animals. These animals are not sick but can pass the bacteria into the soil through manure. Most often, people get listeriosis by eating food contaminated with *Listeria* bacteria. *Listeria* is killed by pasteurization and cooking. However, in certain ready-to-eat foods, e.g., luncheon meats, contamination may occur after cooking but before packaging. Raw produce may become contaminated by contact with soil or manure. Unlike other bacteria found in food, *Listeria* can multiply in food even while refrigerated. Foods at high risk for listeriosis include: raw vegetables, uncooked meats and seafood, ready-to-eat meats, soft cheeses, and unpasteurized dairy products. The only way listeriosis can be spread person to person is from mother to baby during pregnancy. It cannot be spread by other person-to-person contact.

Outbreaks of listeriosis have been attributed to unpasteurized dairy products, soft cheeses, raw vegetables, and ready-to-eat meats.

Public Health Significance

Symptoms of listeriosis include fever, headache, muscle aches, nausea, vomiting, abdominal cramps, and diarrhea. Symptoms usually begin 21 days (range of 3-70 days) after exposure. Duration of symptoms depends on the health of the infected person; symptoms can last several days or several weeks. Healthy people usually do not have any symptoms, while others may have a mild illness.

Antibiotics are available to treat the infection in all persons, regardless of age. If infection occurs when a woman is pregnant, antibiotics given promptly can often prevent infection of her baby. Illness can be very serious in pregnant women, newborns, elderly persons, and persons with weakened immune systems.

Healthy People 2010 Goal

The Healthy People 2010 Goal for listeriosis is 0.25 cases per 100,000 population. Indiana met the Healthy People 2010 goal for the five-year reporting period 2002-2006, except for 2004 and 2006 (Figure 1). The increase in cases for 2004 and 2006 is unknown.

Epidemiology and Trends

In 2006, 21 cases of listeriosis were reported in Indiana, indicating a rate of less than 1 case per 100,000 population (Table 1).

Table 1. Listeriosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	21	0.33	71
Race			
Black	1	0.18	5
White	16	0.29	47
Other	1	0.57	1
Not Reported	3	-	18
Sex			
Female	8	0.25	36
Male	13	0.42	35
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows reported listeriosis cases by year for 2002-2006. Incidence of disease was greatest during the late summer to early fall months (Figure 3). As shown in Figure 4, age-specific rates were greatest for older adults 80+ years of age (2.17), followed by adults 70-79 years of age (1.80). Fifteen counties reported having at least 1 listeriosis case in 2006, but only Lake County had 5 or more reported cases for a rate of 1 case per 100,000 population. There were no outbreaks of listeriosis reported in Indiana in 2006.

You can learn more about listeriosis by visiting the following Web sites:
www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html
www.cfsan.fda.gov/~mow/chap6.html

Figure 1. Listeriosis Rates by Year
Indiana, 2002-2006

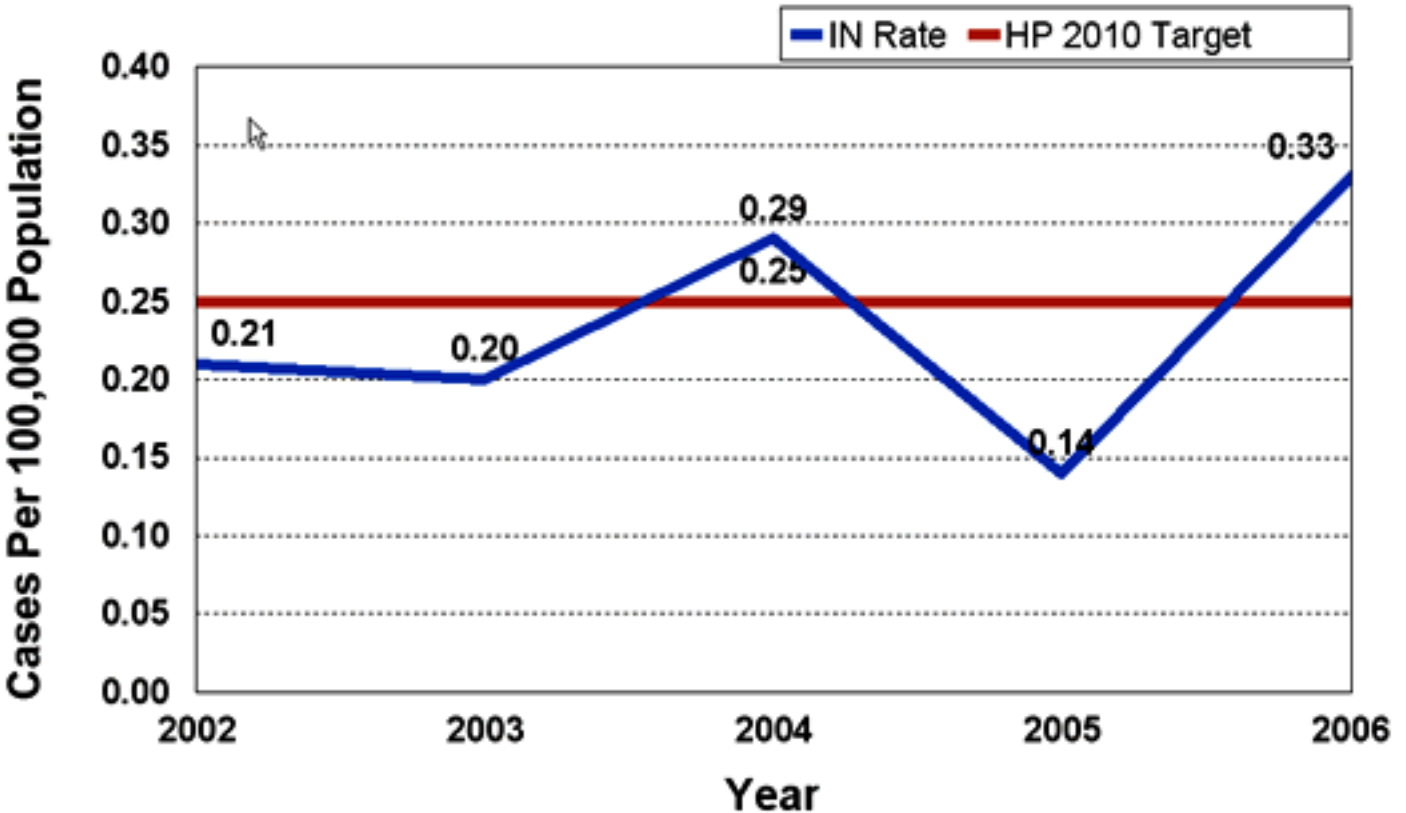


Figure 2. Listeriosis Cases by Year
Indiana, 2002-2006

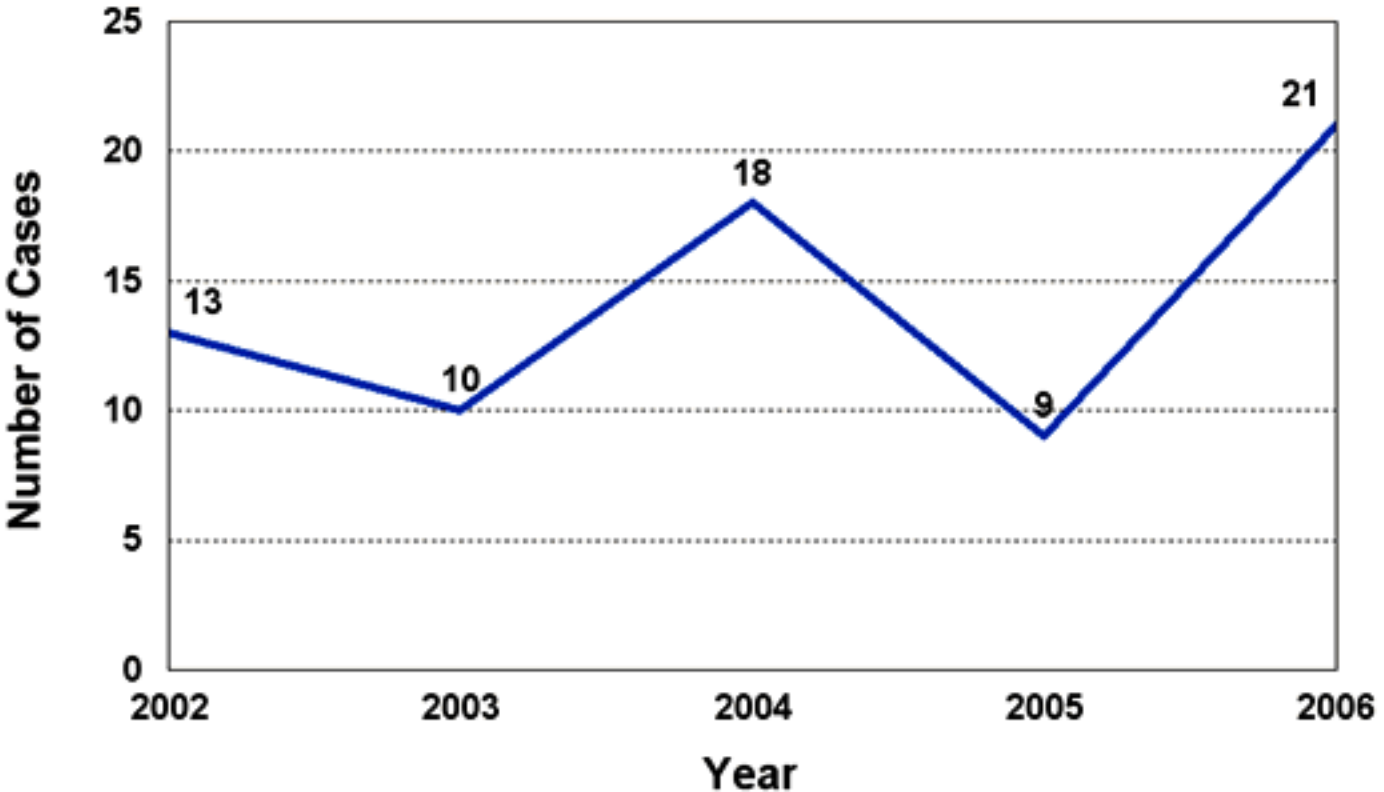


Figure 3. Listeriosis Cases by Month
Indiana, 2006

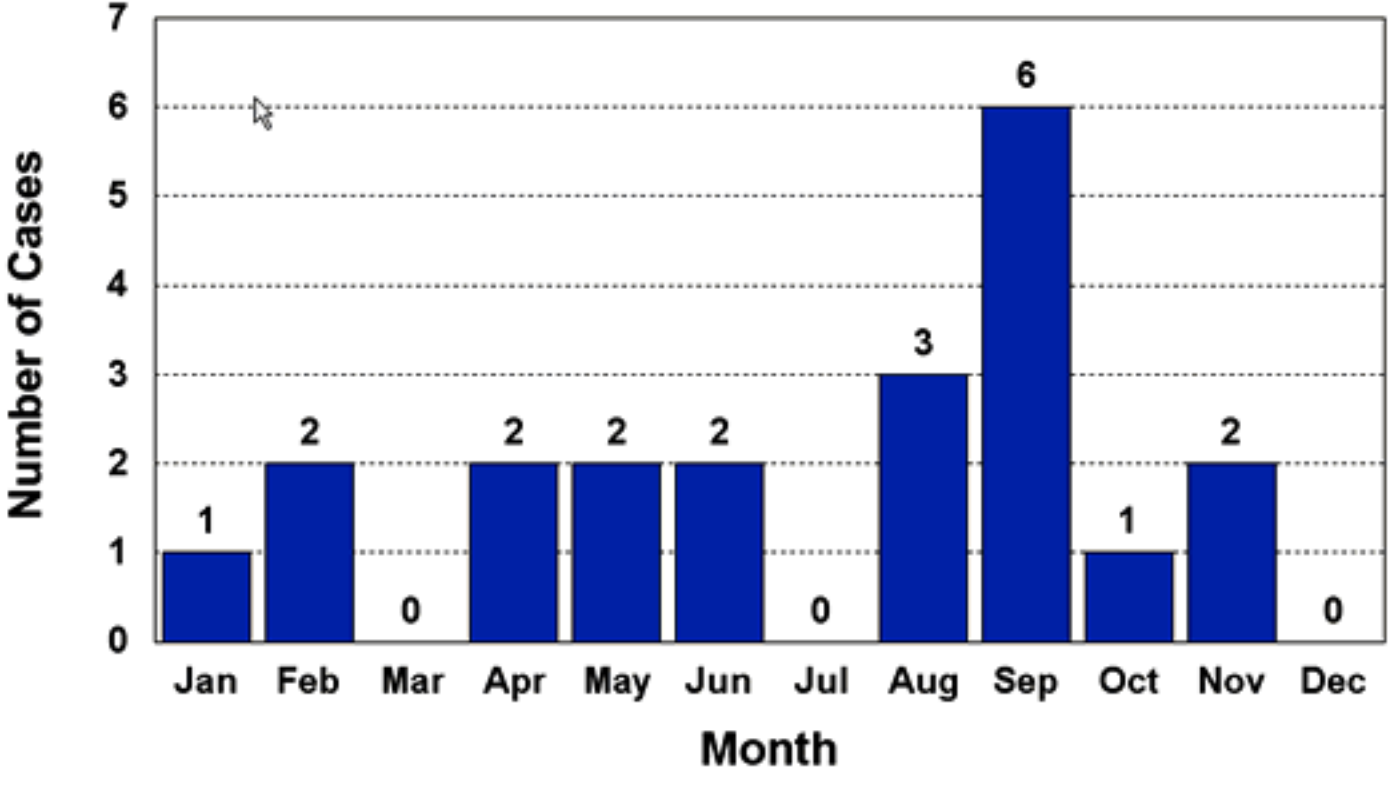
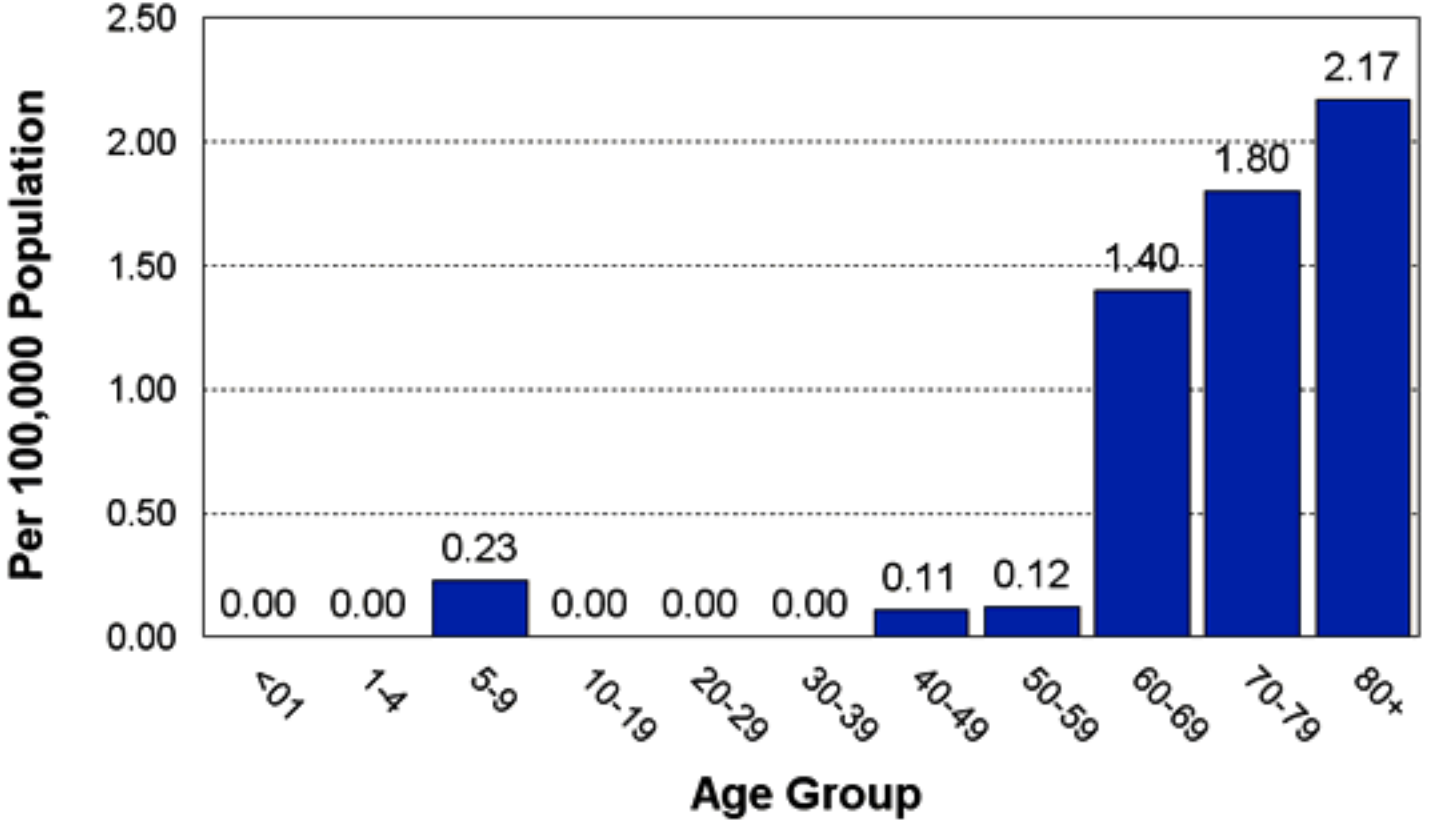


Figure 4. Listeriosis Incidence by Age Group Indiana, 2006



LYME DISEASE

Lyme disease is caused by the bacterium *Borrelia burgdorferi* and is the most commonly diagnosed tick-borne disease in Indiana. It is transmitted by the deer tick (*Ixodes scapularis*) by using small wild rodents as its reservoir. Transmission can occur after the tick has been attached and feeding for approximately 36 hours.

Public Health Significance
Symptoms of Lyme disease appear 3-30 days after exposure to the infected tick but generally occur 7-14 days after exposure. Symptoms can include fever, tiredness, headache, and a skin rash known as erythema migrans. In some cases, more severe symptoms of joint pain, arthritis, and insomnia can last from months to years. Lyme disease can be successfully treated with antibiotics, especially if treatment is started early.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for Lyme disease.

Epidemiology and Trends
In 2006, 26 cases of Lyme disease were reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1).

Table 1. Lyme Disease Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	26	0.41	138
Race			
Black	1	0.18	2
White	19	0.34	102
Other	0	0	2
Not Reported	6	-	32
Sex			
Female	10	0.31	54
Male	15	0.48	82
Unknown	1	-	2

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows the number of reported cases per year for 2002-2006. Incidence of disease was greatest during the summer months (Figure 2). Over 70 percent of reported cases occurred from June through September when ticks are active. As shown in Figure 3, age-specific rates were highest among adults aged 40-49 years (0.74), followed by children aged 5-9 years (0.70). Lyme disease cases were reported more in the northwestern part of the state. Fifteen counties reported Lyme disease cases; however, no county reported five or more cases.

You can learn more about Lyme disease by visiting the following Web site:
http://www.cdc.gov/ncidod/dvbid/lyme/index.htm

Figure 1. Lyme Disease Cases by Year Indiana, 2002-2006

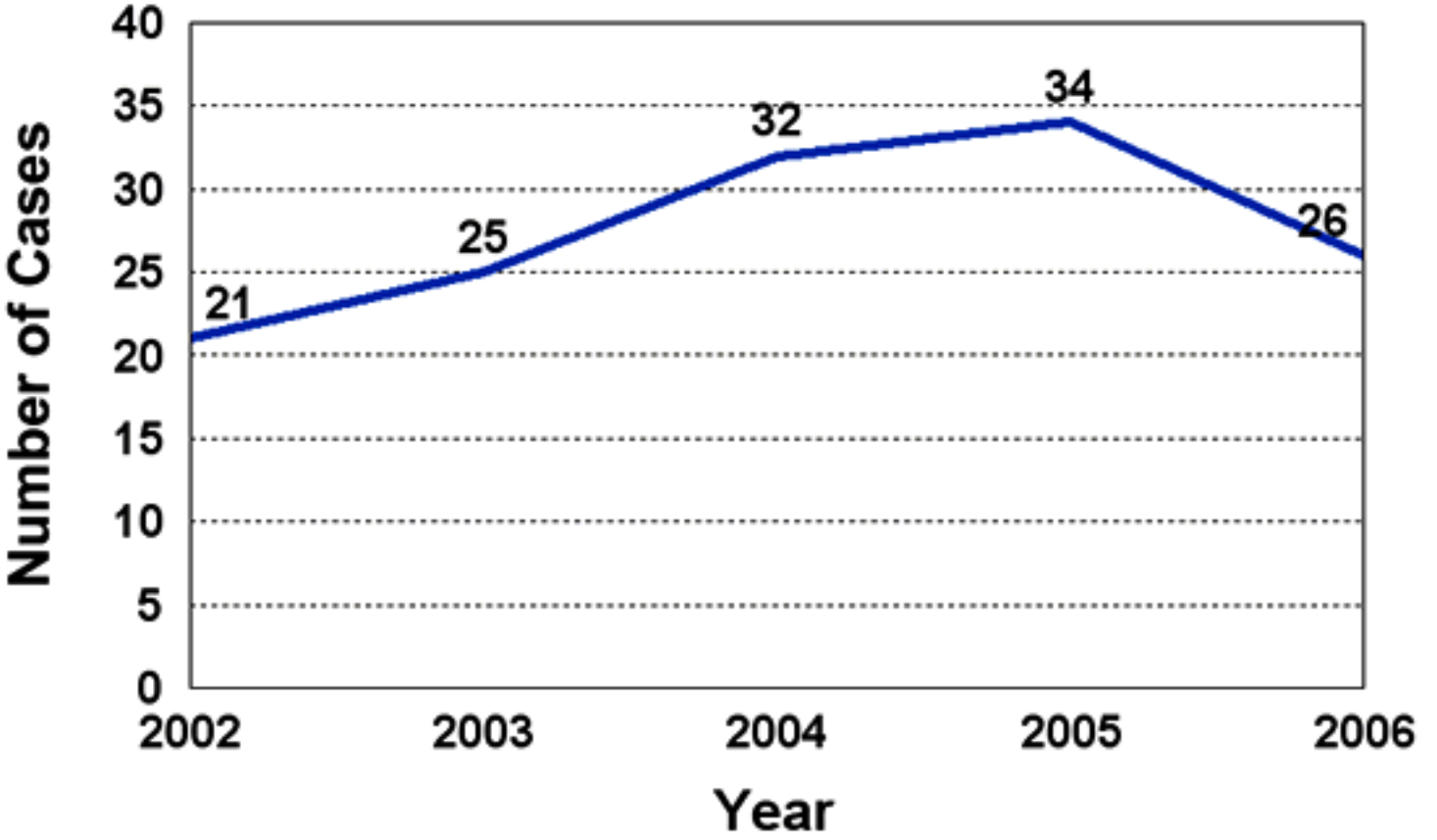


Figure 2. Lyme Disease Cases by Month Indiana, 2006

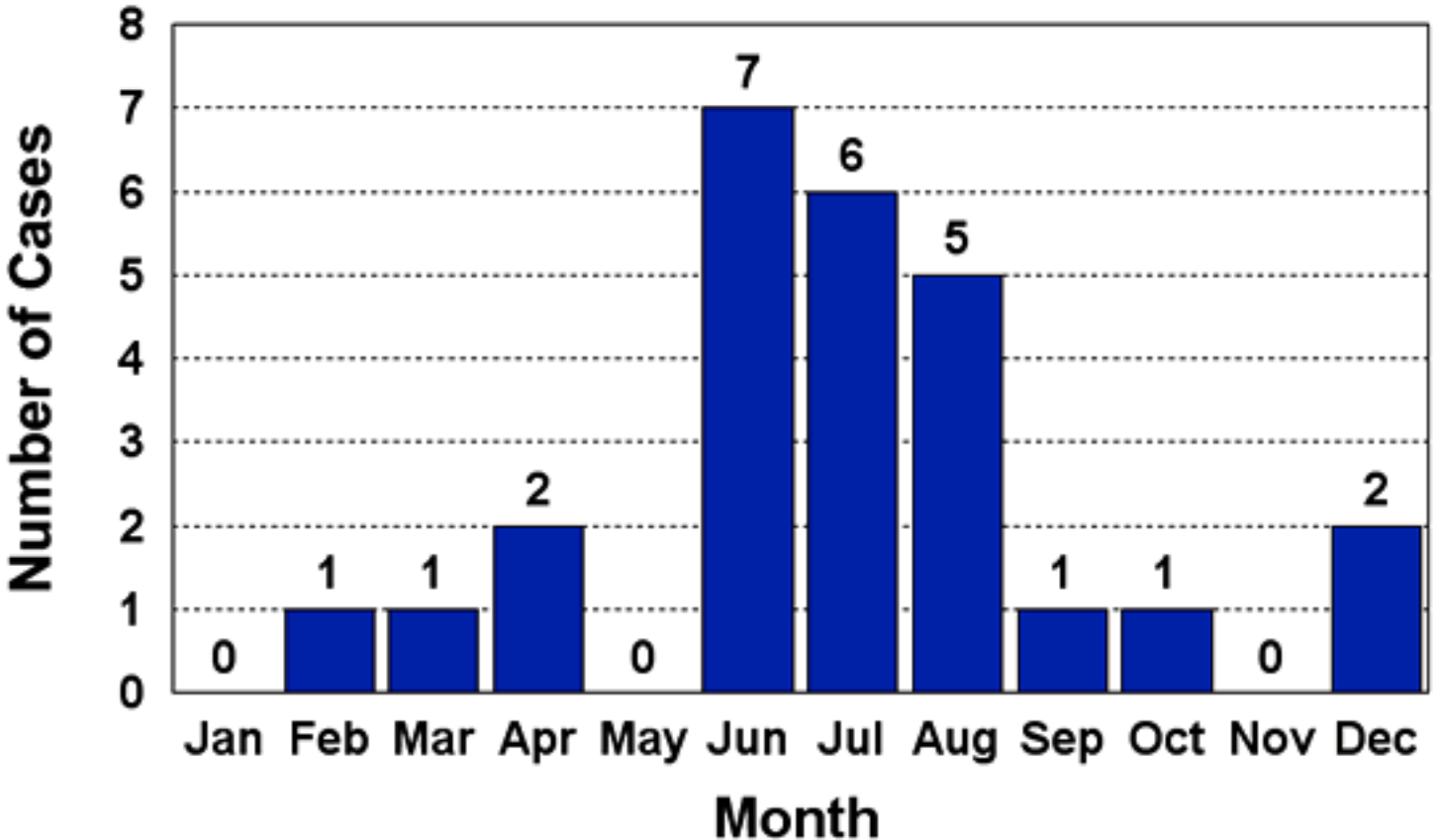
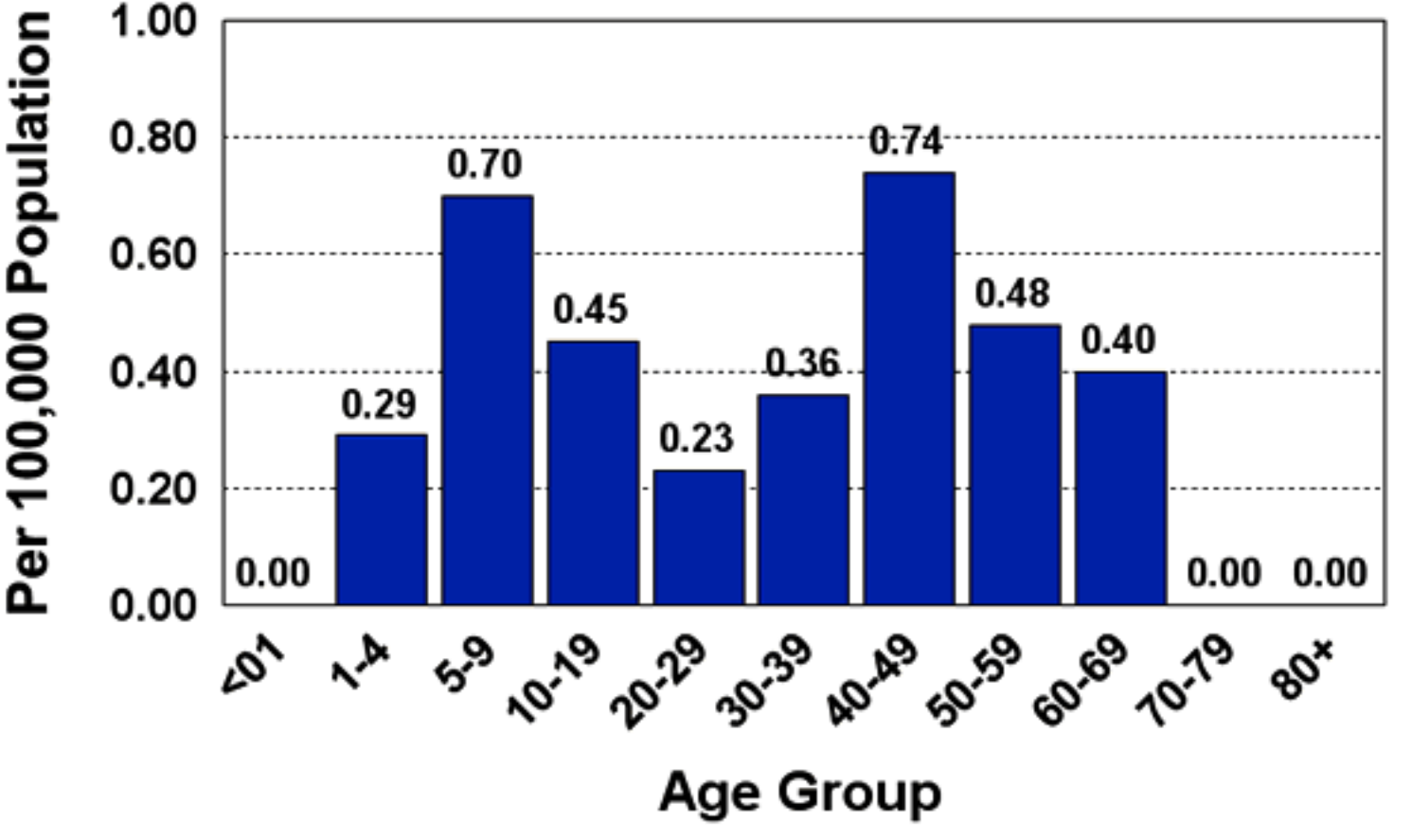


Figure 3. Lyme Disease Incidence by Age Group -- Indiana, 2006



MALARIA

Malaria is a serious, sometimes fatal, blood disease caused by one of four *Plasmodium* parasite species (*falciparum, vivax, ovale, malariae*) and transmitted by the bite of an infected female *Anopheles* mosquito. U.S. cases of malaria are acquired by international travel to malaria risk areas. Malaria risk in specific countries is dependent on various factors that can change rapidly and from year to year, such as local weather conditions, mosquito vector density, and prevalence of infection, which can markedly affect local malaria transmission patterns. In general, malaria transmission occurs in large areas of Central and South America, the island of Hispaniola (the Dominican Republic and Haiti), Africa, Asia (including South Asia, Southeast Asia, and the Middle East), Eastern Europe, and the South Pacific.

Public Health Significance

Malaria symptoms are similar to influenza and may include chills, headache, muscle aches, and tiredness. The indicative symptoms of malaria are cyclic fevers and chills. Symptoms develop 7-30 days after the infective bite. However, antimalarial drugs taken for prophylaxis can delay malaria symptoms. Delays between exposure and development of symptoms can result in misdiagnosis or delayed diagnosis because of reduced clinical suspicion by the health care provider.

Prior to traveling to malaria-infected areas, travelers should always see a physician to obtain anti-malarial medications to prevent malaria infection. The selection of anti-malarial medications will vary depending on travel destination due to anti-malarial medication resistance in many parts of the world. No vaccine is currently available.

Healthy People 2010 Goal

The Healthy People 2010 Goal for malaria is to increase the proportion of international travelers who receive recommended preventive services when traveling in areas of risk for select infectious diseases. The number of international travelers from the U.S. has increased an average of 3 percent each year for the past decade. Malaria is one of three diseases that accounts for a large proportion of illness and disability for international travelers. Indiana does not have prevention data on international travelers.

Epidemiology and Trends

During the five-year period 2002-2006, malaria cases were reported in Indiana following international travel to Sub-Saharan Africa, Tropical (northern) South America, Central America, India, the Caribbean (Haiti and Dominican Republic), and parts of Asia.

Table 1. Malaria Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	13	0.21	58
Race			
Black	6	1.07	17
White	4	0.07	23
Other	1	0.57	6
Not Reported	2	-	12
Sex			
Female	3	0.009	13
Male	10	0.32	44
Unknown	0	-	1

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

As shown in Figure 1, the number of reported cases per year varied. In 2006, the number of reported cases was highest during the winter and summer months (Figure 2). As shown in Figure 3, age-specific rates were highest for infants aged less than 1 year (1.16), followed by children aged 10-19 years (0.45).

You can learn more about malaria by visiting the following Web sites:
http://www.cdc.gov/malaria/
http://wwwn.cdc.gov/travel/default.aspx

Figure 1. Malaria Cases by Year -- Indiana, 2002-2006

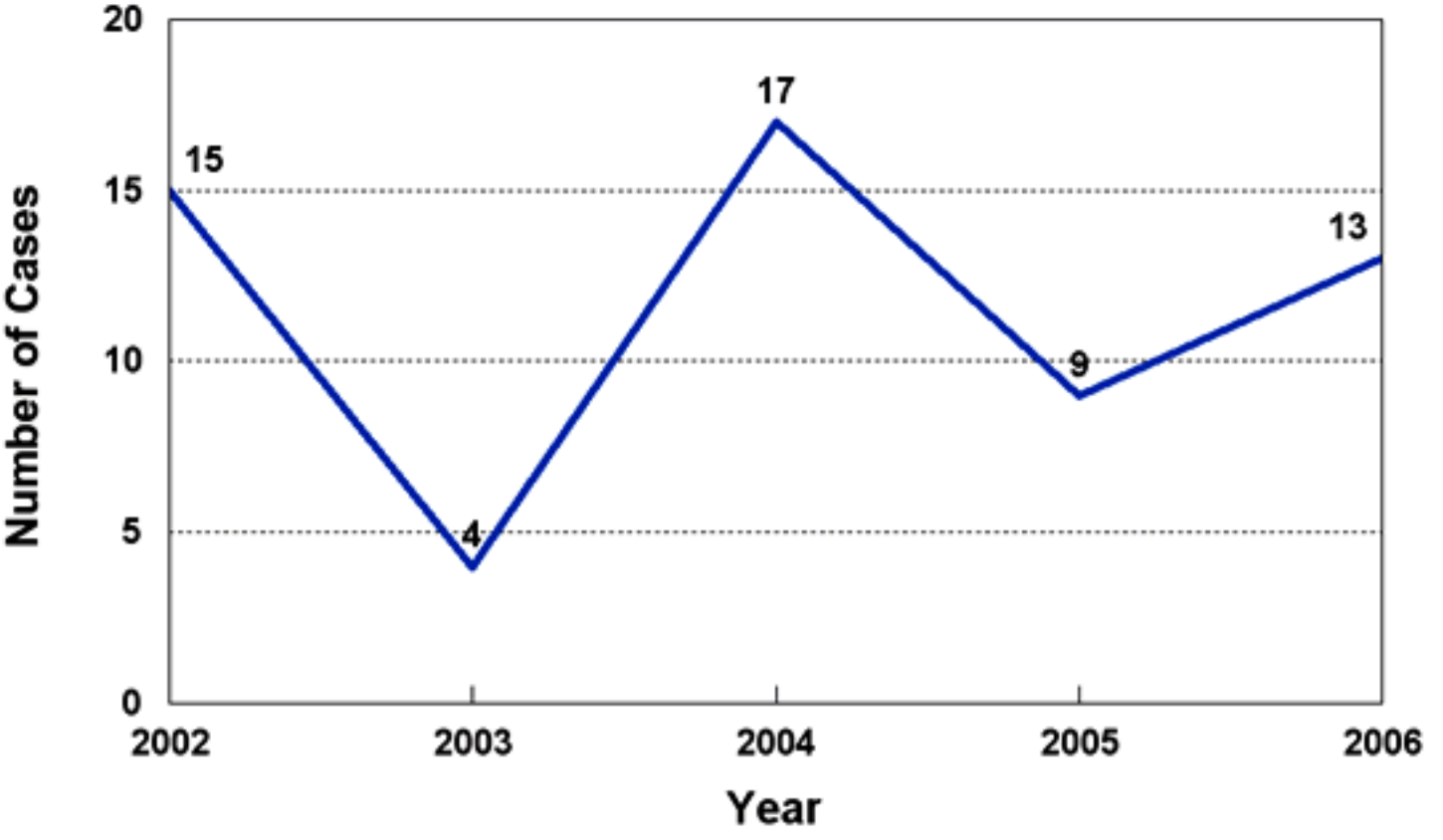


Figure 2. Malaria Cases by Month -- Indiana, 2006

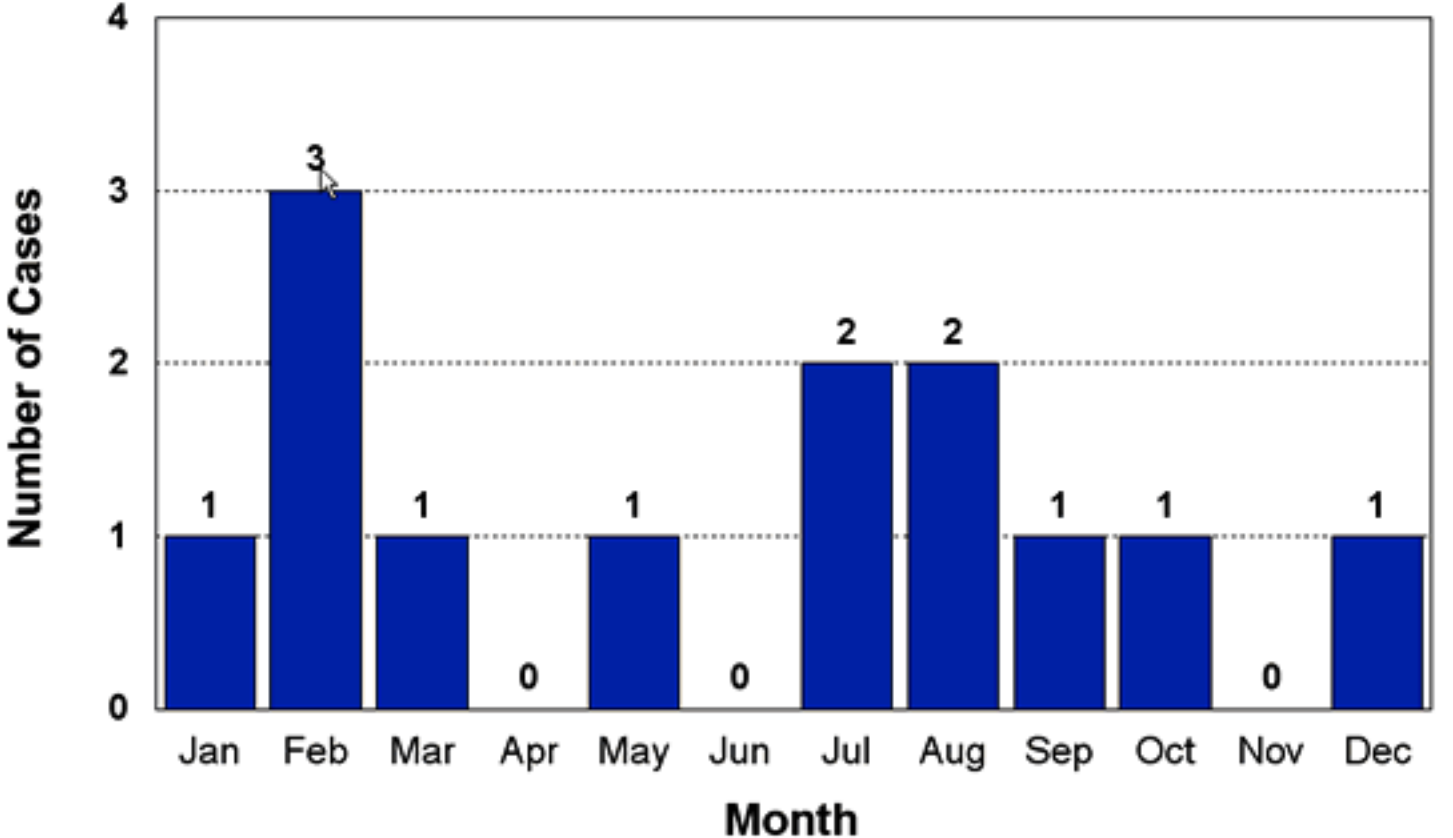
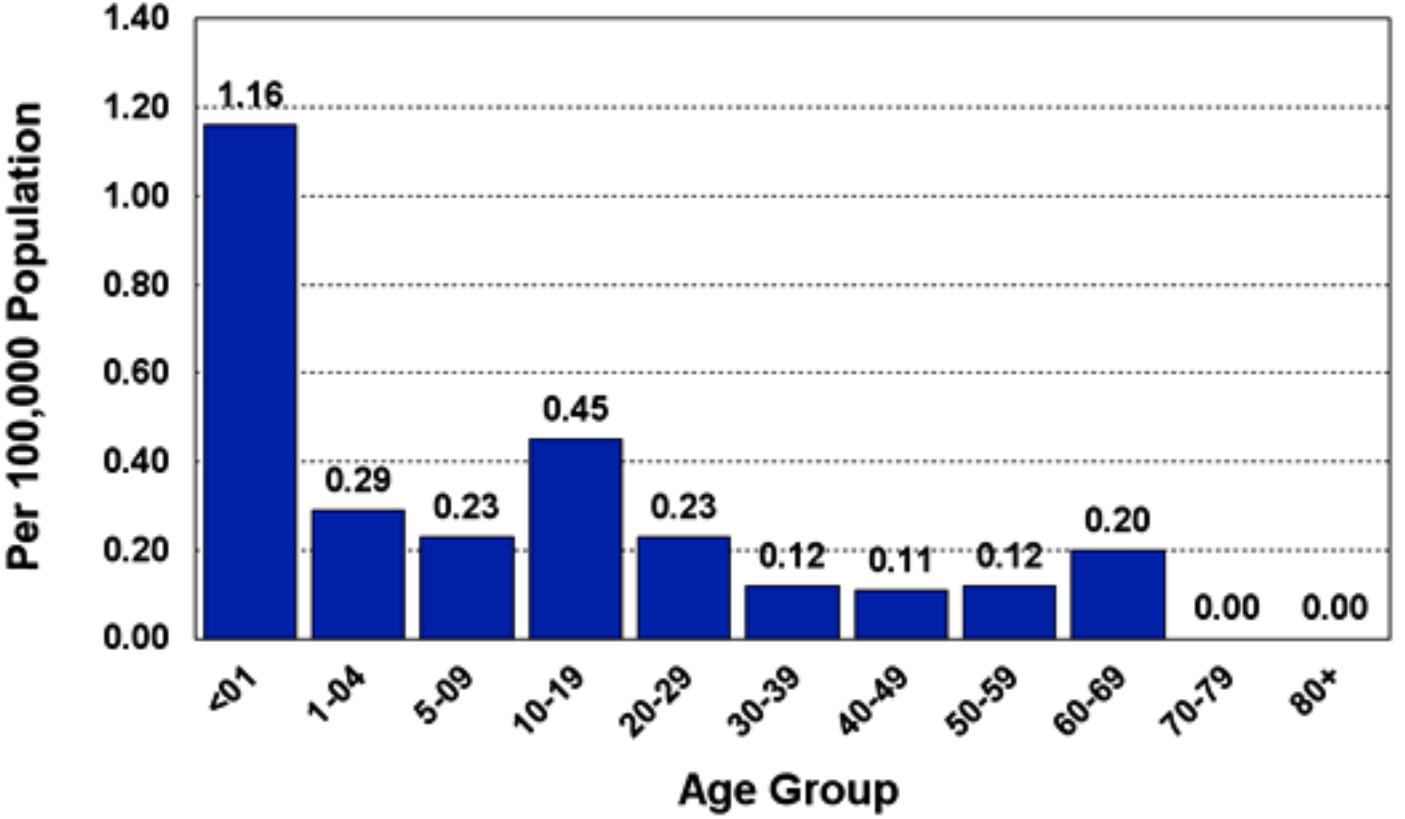


Figure 3. Malaria Incidence by Age Group Indiana, 2006



MEASLES

Measles is an acute viral illness that is highly contagious. Measles is transmitted through the air when an infected person coughs or sneezes. It may also be spread from touching nose or throat drainage of an infected person or articles contaminated by an infected person.

Public Health Significance

Symptoms of measles include fever, tiredness, cough, coryza, and conjunctivitis, followed by a maculopapular rash. Although measles may present as a mild disease at times, it may also lead to serious complications. Measles infection may cause ear infections, pneumonia, encephalitis, vision damage, and even death. Measles usually begins to appear 10-12 days after exposure to the virus. The fever may last 2-4 days and can peak as high as 103-105° F. The rash usually appears 14 days after exposure and lasts 4-7 days. The rash typically begins at the hairline of the forehead and then gradually proceeds downward over the entire body.

There are no medications currently used to treat measles. Vaccination is the most effective measure to prevent measles. Measles can spread quickly especially in unimmunized populations. Because the measles virus is communicable prior to the appearance of the classical rash, following infection control guidelines and exclusion rules is important when exposed to an infected person.

Healthy People 2010 Goal

The Healthy People 2010 Goal for measles is total elimination of the disease. Indiana has not met this goal. Achieving and maintaining high levels of vaccination coverage in Indiana is an effective way to accomplish this goal. Because of the risk of imported cases exposing travelers as well as residents, prevention through vaccination is necessary until the virus is globally eradicated.

Epidemiology and Trends

There were 36 cases of measles reported in Indiana during the five-year period 2002-2006, including 1 case in 2006. The 2006 case had no documentation of prior measles vaccination and was attending a large university in Indiana. The case had recently traveled to a country where a measles outbreak had been reported. Measles was confirmed by laboratory testing.

You can learn more about measles by visiting the following Web site:

http://wwwn.cdc.gov/travel/yellowBookCh4-Measles.aspx

MENINGOCOCCAL DISEASE

Meningococcal infection most commonly manifests as meningitis or meningococcemia and is caused by multiple serogroups of *Neisseria meningitidis*. It is transmitted person to person via respiratory droplets from the nose and throat secretions of a person infected with *N. meningitidis*. Up to 10 percent of U.S. residents may be colonized with *N. meningitidis* in the nasopharynx and have no symptoms of illness. Only invasive meningococcal disease is reportable in Indiana.

Public Health Significance

Meningococcal infection often starts with a sudden fever, headache, stiff neck, rash, and possibly photophobia, nausea, and vomiting. Antibiotics are used for the treatment of meningococcal disease.

The fatality rate for meningococcal disease ranges from 10-14 percent. Improved clinical outcomes can be enhanced by increased awareness for meningococcal disease by health care providers and seeking medical care early in the course of illness. In addition, educating adolescents and their parents about the benefits of receiving vaccine is a primary strategy for reducing the incidence of meningococcal disease. Meningococcal vaccine is now routinely recommended for all children aged 11-18 years.

The following populations are at increased risk for meningococcal disease:

- College freshmen living in dormitories
- Persons in child-care facilities
- Microbiologists who are routinely exposed to isolates of *N. meningitidis*
- U.S. military recruits
- Persons who travel to or reside in countries in which *N. meningitidis* is hyperendemic or epidemic, particularly if contact with the local population will be prolonged
- Persons who have terminal complement component deficiencies
- Persons who have anatomic or functional asplenia

Measures that would decrease the likelihood of transmission of meningococcal disease include:

- employing good hand-washing practices
- avoid sharing beverage containers, cigarettes, lipstick, or eating utensils
- avoid smoking and smoky environments
- consulting a health care provider about the available vaccines

In the U.S., almost all cases of meningococcal disease are sporadic. Chemoprophylaxis, given to persons directly exposed to the oral secretions of a case and other high-risk contacts, helps eliminate the spread of disease and reduces the number of outbreaks due to *N. meningitidis*. However, since 1991, the frequency of localized outbreaks has increased. Serogroups B, C, and Y are the major causes of meningococcal disease in the U.S., each being responsible for approximately one third of cases. The proportion of cases caused by each serogroup varies by age group. Among infants less than 1 year of age, more than 50 percent of cases are caused by serogroup B. No vaccine is licensed for group B.

Healthy People 2010 Goal
The Healthy People 2010 Goal for meningococcal disease is 1.0 new case per 100,000 population per year. Indiana met the Healthy People 2010 Goal for the five-year reporting period 2002-2006 (Figure 1).

Epidemiology and Trends
In 2006, there were 24 confirmed cases including 1 death (4%) of invasive meningococcal disease in Indiana (Table 1). The 2006 meningococcal disease case rate (0.38) is consistent with rates from 2004 and 2005, a 33-52 percent decrease from 2002-2003. The rate for blacks (.89) was higher than that for whites (0.29). Males (.45) were reported slightly more than females (.31). Small case numbers make rate comparisons problematic.

Table 1. Meningococcal Disease Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	24	0.38	153
Race			
Black	5	0.89	24
White	16	0.29	111
Other	0	0	3
Not Reported	3	-	15
Sex			
Female	10	0.31	70
Male	14	0.45	82
Unknown	0	-	1

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows reported cases by year for 2002-2006. Incidence of meningococcal disease usually climbs in late winter and early spring. Figure 3 indicates an increase of incidence in the late winter, spring, and fall of 2006. Cases of meningococcal disease tend to occur more frequently in infants less than 1 year, children aged 1-4 years, and young adults aged 10-19. In Indiana, age-specific rates were greatest for infants less than 1 year (6.96), followed by adults aged 20-29 years (0.56) and children aged 10-19 years (0.45). Figure 4 shows meningococcal rates by age group. Of the 11 counties reporting cases in 2006, Marion was the only county reporting 5 or more cases with an incidence of 1 case per 100,000 population.

Serogroups B, C, and Y are most frequently associated with invasive disease in the U.S. As of October 2000, laboratories are required to submit *N. meningitidis* isolates from normally sterile sites to the Indiana State Department of Health (ISDH) Laboratories for serogrouping. Additionally, molecular subtyping can be performed by pulse-field gel electrophoresis (PFGE) on selected meningococcal isolates that may indicate a cluster of cases. Of the isolates with a known serogroup in 2006, group B accounted for 63 percent (12/19) of meningococcal isolates confirmed in the ISDH Laboratory. Serogroup B also had the highest incidence, 46 percent (71/154) of known serogroups from 2001-2006. Eighty-three percent (5/6) of cases less than 1 year of age tested positive for serogroup B. Twenty-one percent (5

isolates) of isolates were not typed in 2006. An increased effort to submit isolates for serogrouping is essential in order to provide more meaningful data.

Table 2. Meningococcal Disease Serotypes, Number and Percent of Isolates, Indiana, 2001-2006

Serogroup	2001	2002	2003	2004	2005	2006	Total
A	--	--	--	--	--	--	--
B	17 (36.2%)	8 (22.8%)	22 (44.8%)	8 (31%)	4 (21%)	12 (50%)	**71 (35.5%)**
C	8 (17.0%)	7 (21.2%)	6 (12.2 %)	2 (8%)	6 (32%)	5 (21%)	**34 (17.0%)**
Y	12 (25.5%)	9 (27.7%)	10 (20.4%)	5 (19%)	1 (5%)	2 (8%)	**39 (19.5%)**
W-135	--	--	--	--	--	--	--
Z	1 (2.1%)	1 (2.8%)	--	--	--	--	**2 (1%)**
Not Groupable	1 (2.1%)	4 (11.4%)	2 (4.1%)	--	1 (5%)	--	**8 (4%)**
Not Typed/ Unknown	8 (17.0%)	6 (17.1%)	9 (18.3%)	11 (42%)	7 (37%)	5 (21%)	**46 (23%)**
Total	**47**	**35**	**49**	**26**	**19**	**24**	**200**

You can learn more about meningococcal disease by visiting the following Web sites:
http://www.cdc.gov/meningitis/index.htm
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5407a1.htm

Figure 1. Meningococcal Disease Rates by Year -- Indiana, 2002-2006

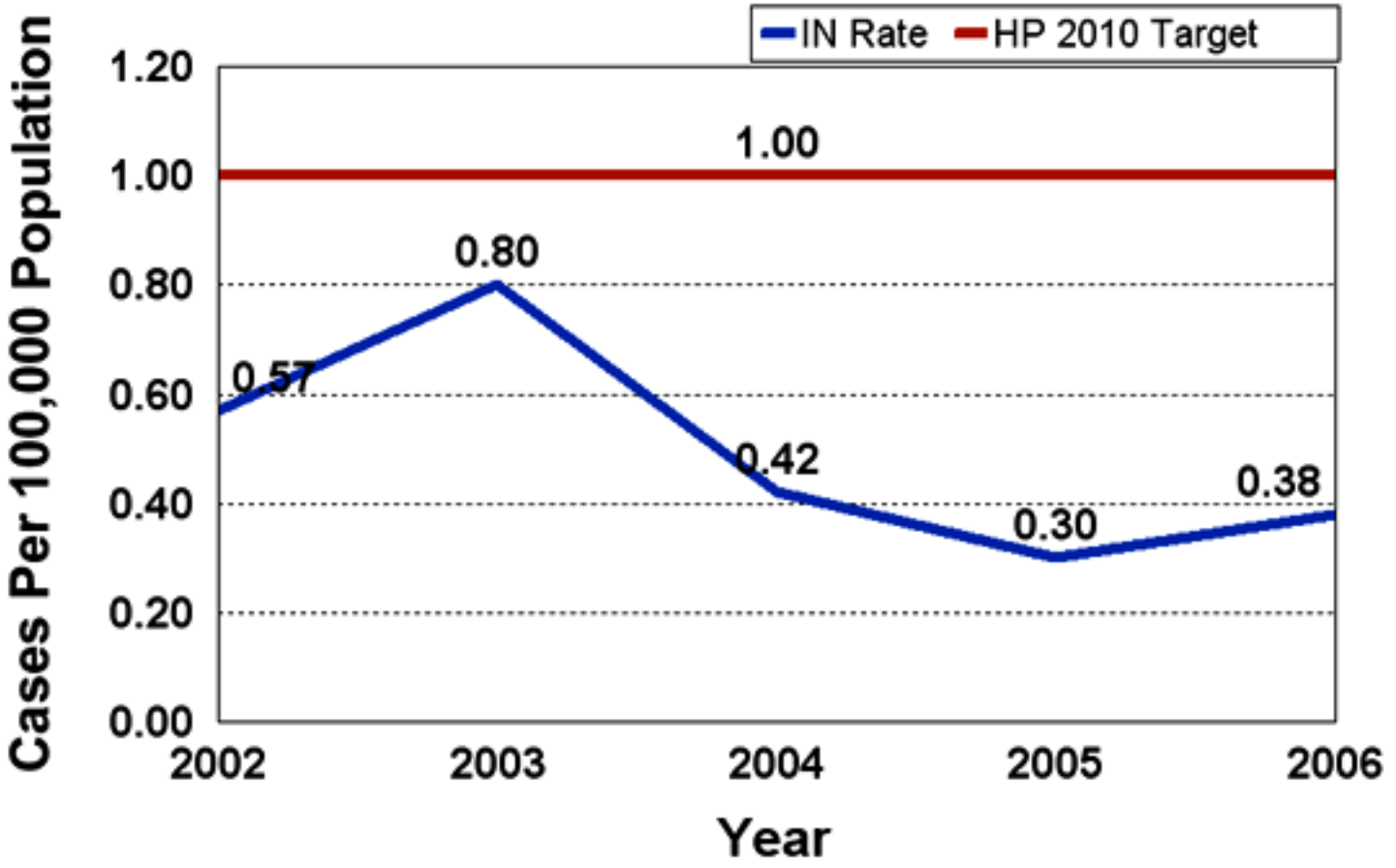


Figure 2. Meningococcal Disease Cases by Year -- Indiana, 2002-2006

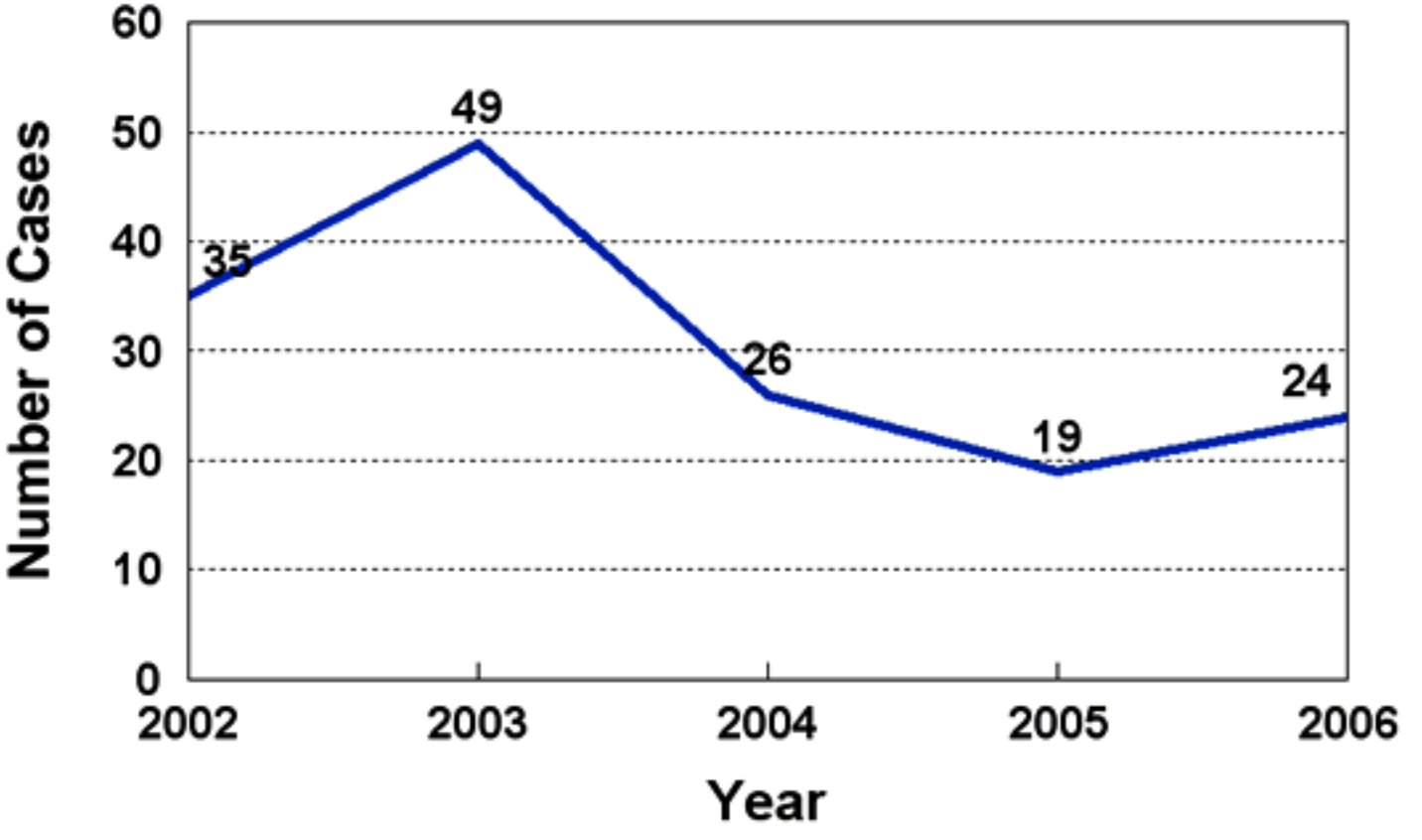


Figure 3. Meningococcal Disease Cases by Month -- Indiana, 2006

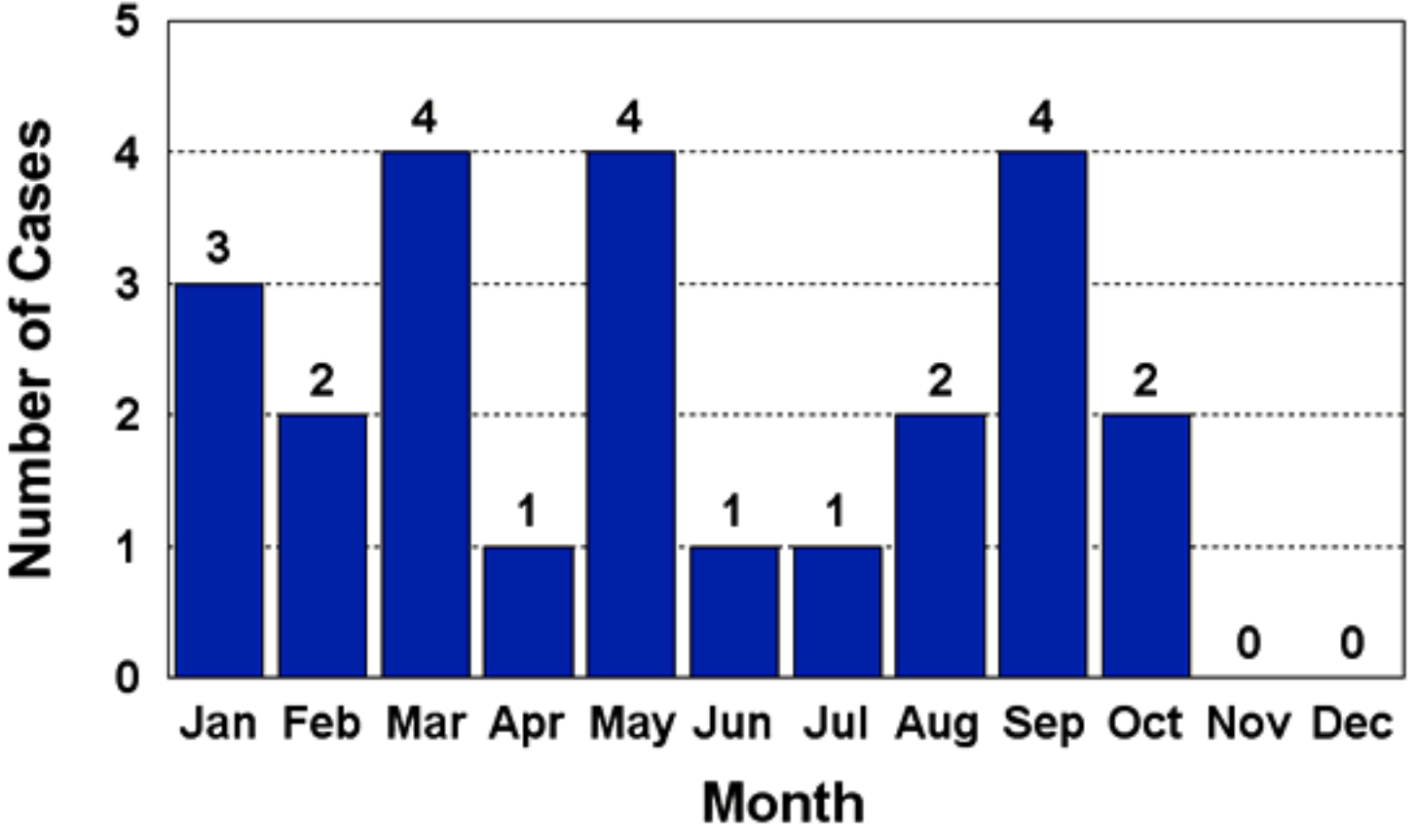
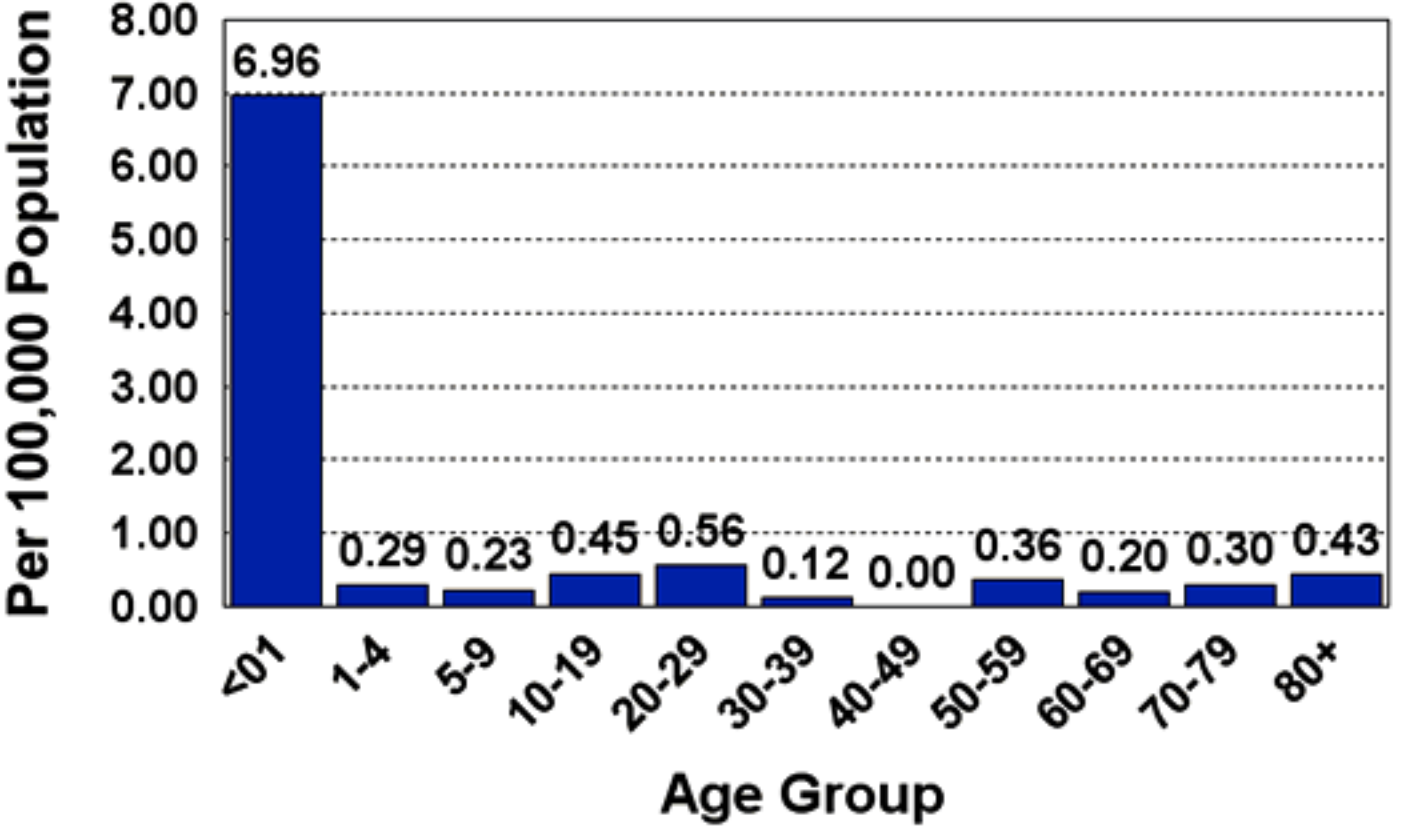


Figure 4. Meningococcal Disease Incidence by Age Group -- Indiana, 2006



ASEPTIC MENINGITIS

Meningitis is an inflammation of the membranes covering the brain and spinal cord and can be caused by different types of microorganisms. Aseptic meningitis is the most common type of meningitis, with most cases being caused by enteroviruses. Viral meningitis is typically less severe than bacterial meningitis, and infected persons usually fully recover within 7-10 days. Aseptic meningitis can be spread through direct contact with nose and throat secretions and transmitted by fecal contamination.

Public Health Significance

Symptoms of all types of meningitis include fever, severe headache, stiff neck, sensitivity to light, and drowsiness or confusion. While aseptic meningitis can occur at any time of the year, it occurs most often in late summer and early fall. There is no treatment for viral meningitis.

Everyone is at risk for aseptic meningitis infection. Infants, children, and adolescents are more susceptible to illness, because they are less likely to have antibodies and be immune from previous exposures to the viruses which cause most cases of aseptic meningitis. Because most persons who are infected with enteroviruses do not become sick, preventing transmission of the viruses that cause aseptic meningitis can be difficult. General cleanliness and frequent hand washing are the best means of reducing spread.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for aseptic meningitis.

Epidemiology and Trends

In previous years, only confirmed cases of aseptic meningitis were used to compile data for the annual Infectious Disease report. In 2006 (for the first time), both confirmed and probable cases are being used. In 2006, there were 279 confirmed cases and 96 probable cases reported for a total of 375 cases, resulting in a case rate of 5.94 per 100,000 population (Table 1). The rate for blacks (6.57) was 35 percent higher than the rate for whites (4.88) and 11 percent higher than the state rate (5.94).

Table 1. Aseptic Meningitis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	375	5.94	1,894
Race			
Black	37	6.57	188
White	272	4.88	1,356
Other	3	1.71	36
Not Reported	63	-	314
Sex			
Female	186	5.81	939
Male	187	6.01	947
Unknown	2	-	8

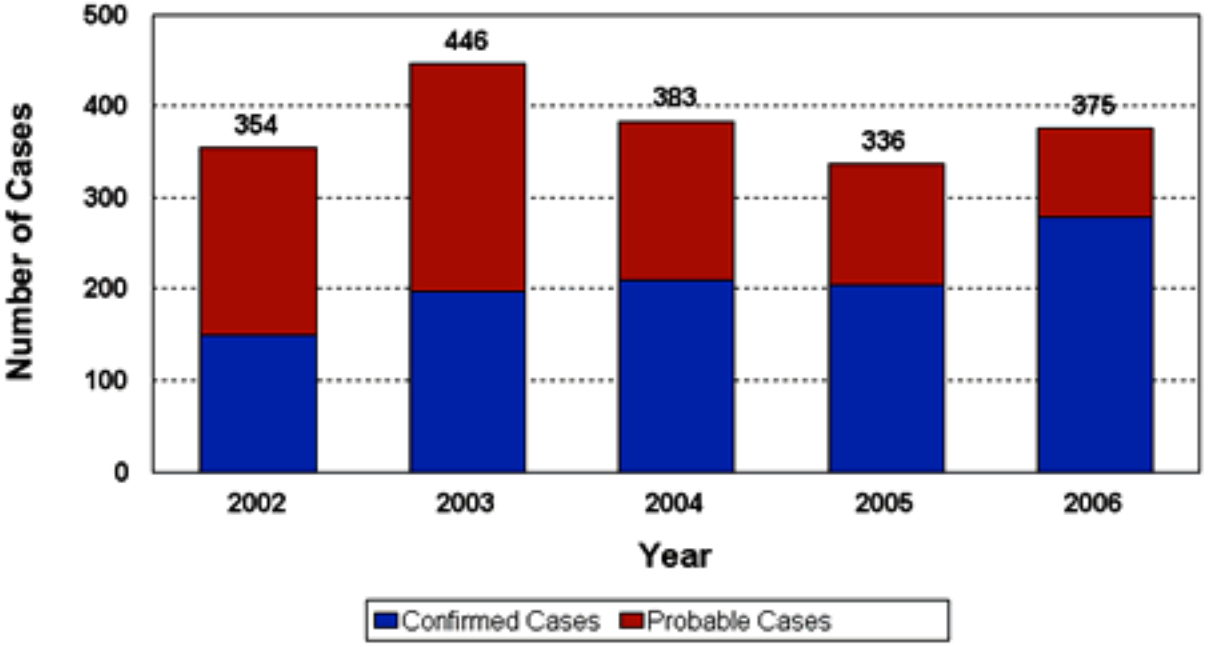
*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows confirmed and probable cases during the five-year reporting period 2002-2006. The slight increase in the number of confirmed cases and the decrease of probable cases over the five-year period is likely due to more testing of cerebrospinal fluid for viral presence.

Typical of enteroviral seasonality, incidence was greatest during the late summer and early fall months, with the largest number of cases (74) occurring in September. Over 56 percent (211) of cases occurred in the four-month period July-October (Figure 2). As shown in Figure 3, age-specific rates were highest for infants less than one year of age (59.15), followed by adults aged 20-29 years (8.25) and adults aged 30-39 years (7.18). The incidence rates were highest among the following counties reporting five or more cases: Gibson (44.9), Posey (18.7), and Vanderburgh (15.6). Figure 4 shows counties reporting five or more cases of aseptic meningitis in 2006.

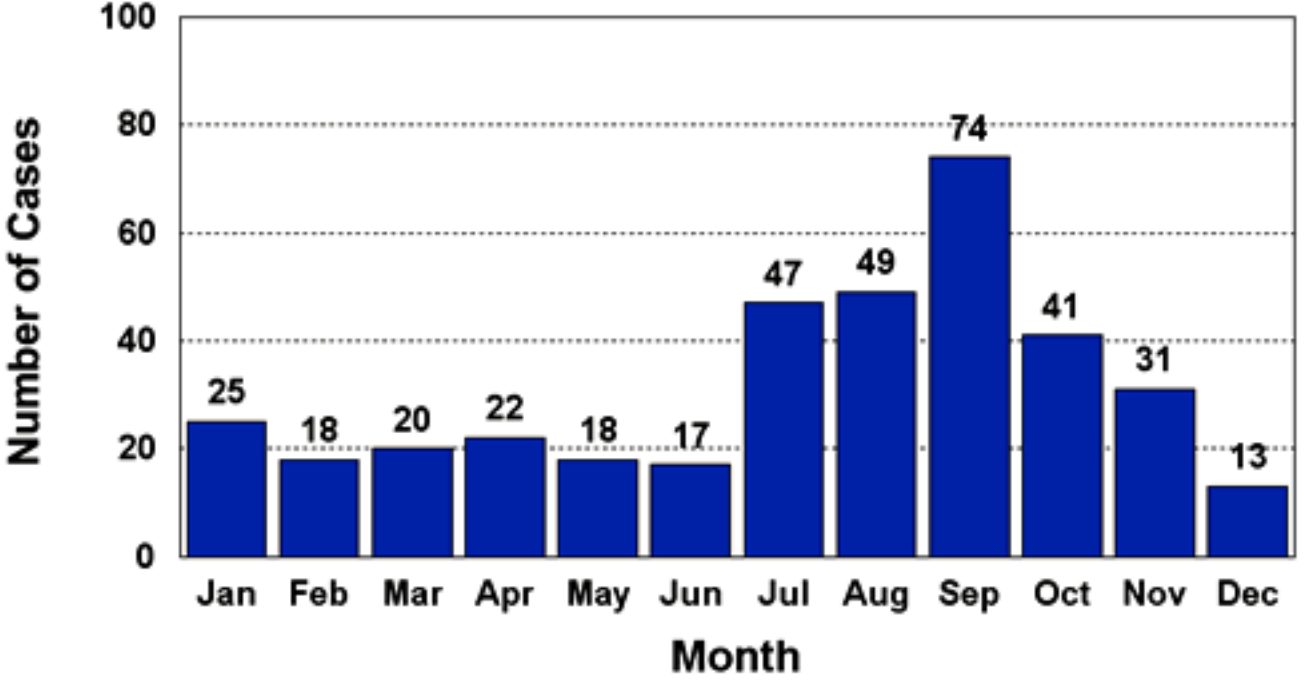
You can learn more about aseptic meningitis by visiting the following Web site:
http://www.cdc.gov/meningitis/index.htm

Figure 1. Aseptic Meningitis Cases* by Year Indiana, 2002-2006



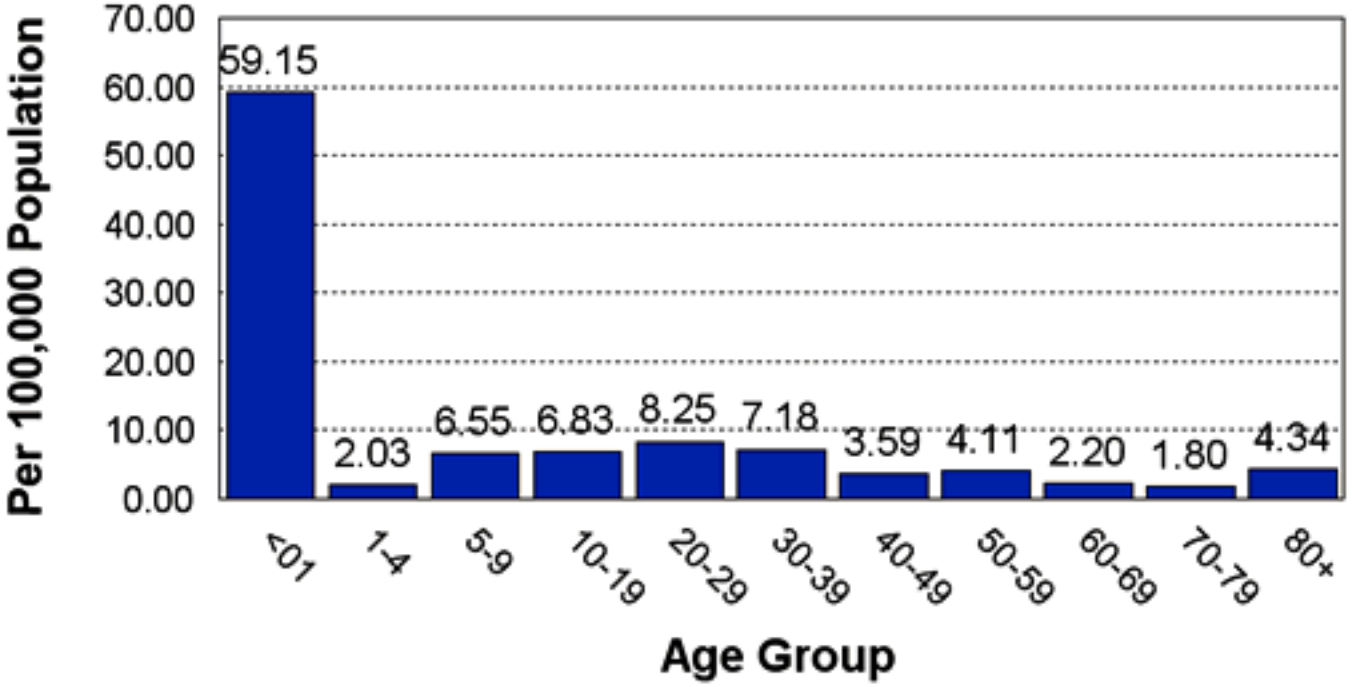
*Case numbers include confirmed and probable.

Figure 2. Aseptic Meningitis Cases* by Month Indiana, 2006



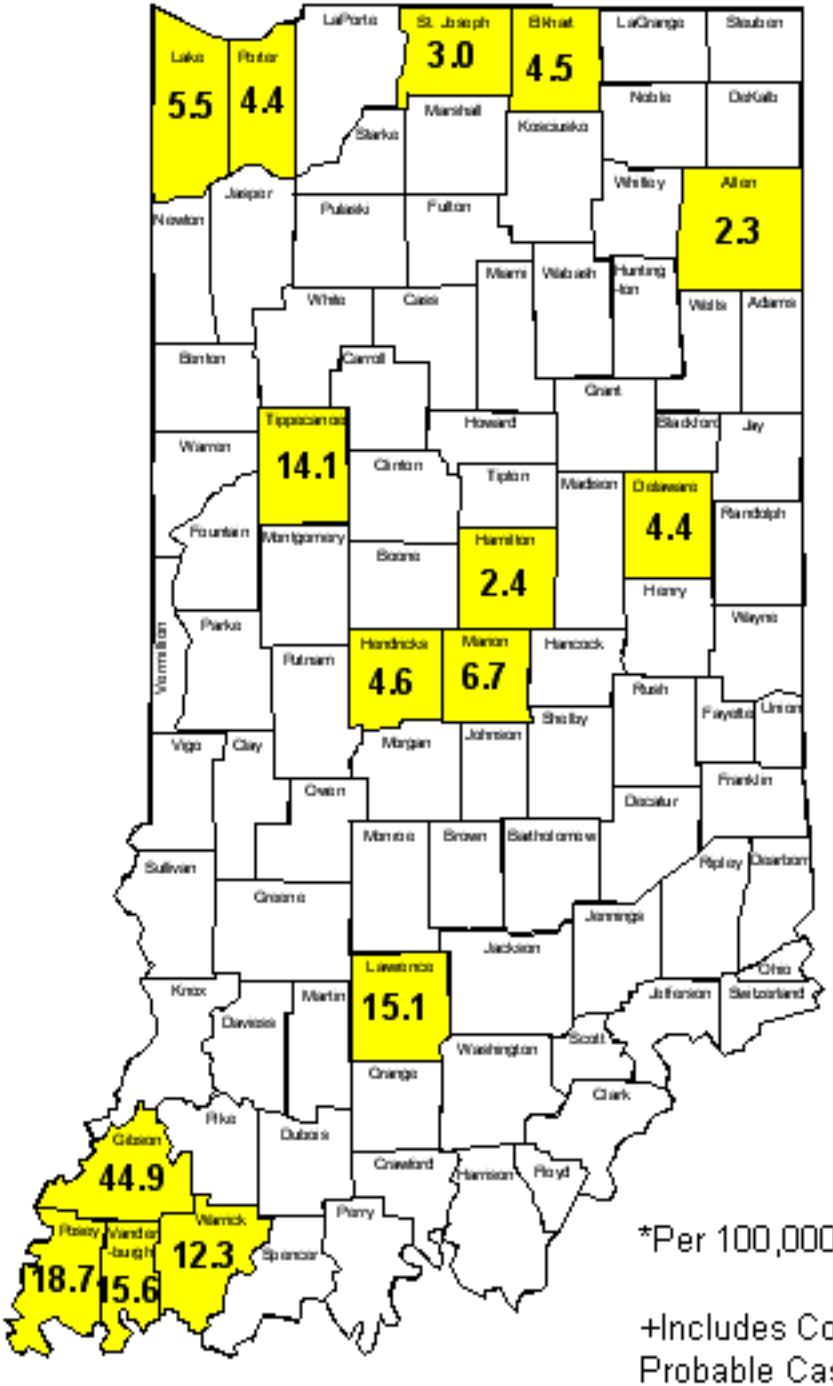
*Case numbers include confirmed and probable.

Figure 3. Aseptic Meningitis Incidence by Age Group* Indiana, 2006



*Incidence based on confirmed and probable cases.

Figure 4. Aseptic Meningitis Cases*+ by County -- Indiana, 2006



MUMPS

Mumps is an acute viral illness caused by the mumps virus. Transmission of mumps occurs through airborne transmission or direct contact with infected droplet nuclei or saliva.

Public Health Significance

Mumps illness usually results in parotitis in approximately 30-40 percent of infected individuals. The swelling of the parotid glands caused by the infection can be unilateral or bilateral when it is present. Common symptoms of mumps include muscle pain, loss of appetite, malaise, headache, and low-grade fever. Up to 20 percent of mumps infections may be asymptomatic. Although mumps may present as a mild disease, it may also lead to severe complications. More severe complications that have been documented include hearing loss, encephalitis, pancreatitis, sterility, permanent sequelae, and death.

Mumps is a vaccine-preventable disease. Because the complications from mumps can be serious, it is important to reduce the risk of contracting the disease through prevention.

Because of the difficulty in distinguishing mumps from other forms of parotitis, IgM mumps-specific serologic testing is strongly recommended on all sporadically reported cases. The specimen should be drawn at least three days following onset of parotitis. Although Indiana has a relatively low number of mumps cases, health care providers should consider mumps diagnosis and serologic analysis when parotitis of two days or longer has occurred.

Healthy People 2010 Goal

The Healthy People 2010 Goal for mumps is total elimination of the disease in people of all ages. Achieving and maintaining high levels of vaccination coverage is an effective way to accomplish this goal. Because of the risk of imported cases exposing travelers as well as residents, prevention through vaccination is necessary until the virus is globally eradicated. Indiana did not meet the Healthy People 2010 Goal during the five-year reporting period 2002-2006.

Epidemiology and Trends

In 2006, 10 cases of mumps were reported in Indiana. This is the highest number of reported mumps cases in Indiana since 1997.

Table 1. Mumps Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	10	0.16	18
Race			
Black	0	0	0
White	10	0.18	16
Other	0	0.00	1
Not Reported	0	-	1
Sex			
Female	7	0.22	14
Male	3	0.10	4
Unknown	0	-	0

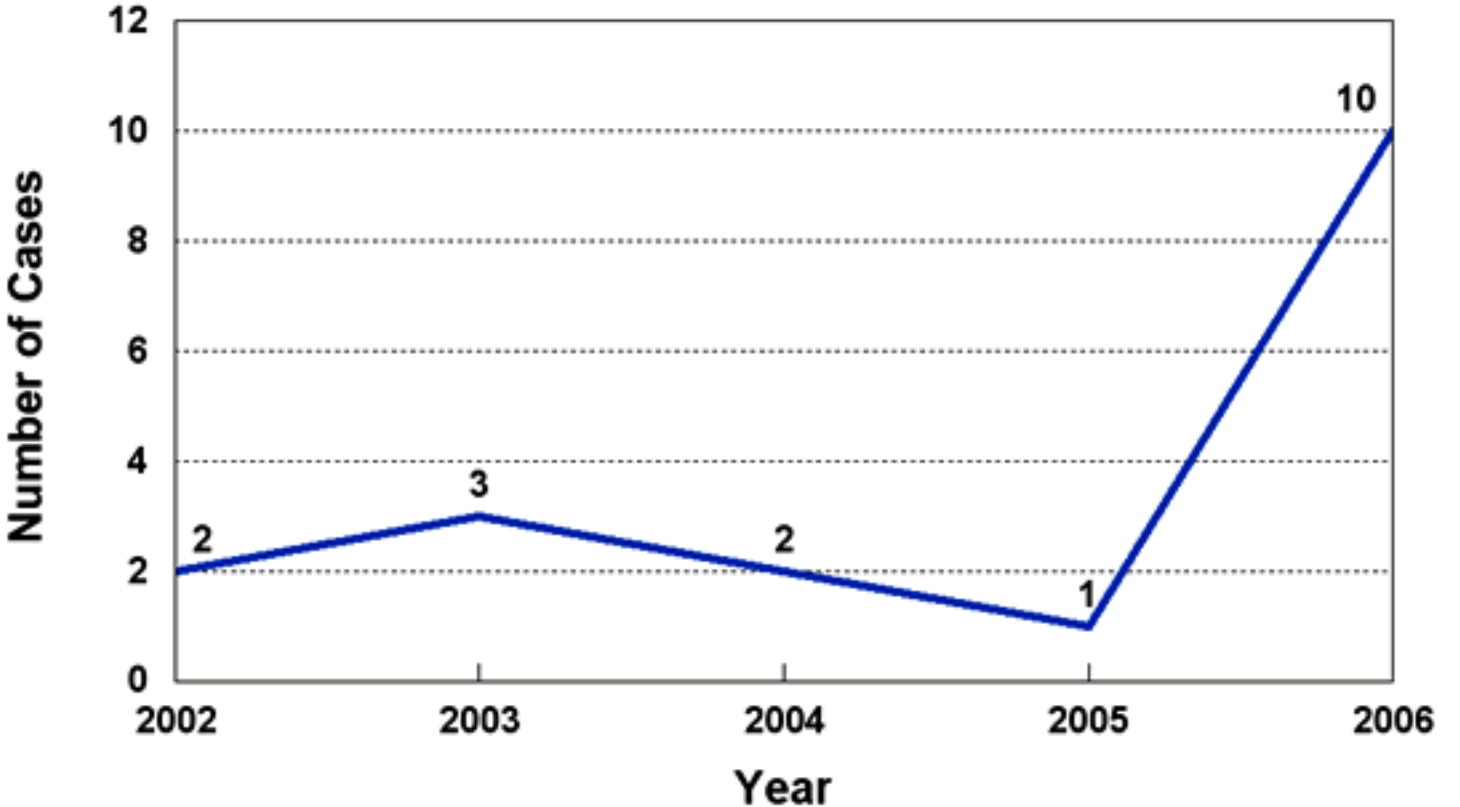
*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases by year for 2002-2006. The cases were reported between March and May of 2006. Laboratory confirmation was not obtained in 50 percent of cases in 2006. Of those cases that were laboratory confirmed (5), three met the CDC clinical case definition and had +IgM serology results. Two of the five cases that had supportive laboratory confirmation were confirmed by PCR analysis and also met the CDC case definition of mumps.

The increased reporting of mumps in 2006 could have been associated with the mumps outbreak in Iowa. By March 2006, Iowa had a total of 219 reported mumps cases (on average the U.S. has 265 reported cases and Iowa has 5 reported cases). This was the largest outbreak of mumps in the U.S. since 1988. The source of the Iowa outbreak is unknown.

You can learn more about mumps by visiting the following Web sites:
http://www.cdc.gov/vaccines/vpd-vac/mumps/default.htm
http://www.cdc.gov/MMWR/preview/mmwrhtml/mm5513a3.htm

Figure 1. Mumps Cases by Year -- Indiana, 2002-2006



PERTUSSIS

Pertussis (whooping cough) is an acute respiratory disease caused by the bacterium *Bordetella pertussis*. Transmission most commonly occurs by the respiratory route through contact with respiratory droplets or by contact with air-borne droplets of respiratory secretions.

Public Health Significance

The illness is characterized by the onset of coryza (common cold), sneezing, low-grade fever, and a mild cough. The cough usually becomes more severe during the second week of illness as the patient experiences bursts, or paroxysms, of numerous, rapid coughs. During these attacks, the patient may become cyanotic. Vomiting and exhaustion commonly follow such an episode. Following this paroxysmal phase, which may last 1-10 weeks, a convalescent stage occurs where the coughing spells become less severe and less frequent.

Pertussis incidence, unlike other vaccine-preventable diseases, has increased in recent years. Infants are at increased risk for severe complications including hospitalization and death. The vaccines currently available that provide protection from pertussis disease are DTaP and Tdap. The DTaP vaccine is licensed to be administered at 2, 4, 6, and 15-18 months of age for infants. The DTaP vaccine should not be administered to persons over 7 years of age. No pertussis vaccines are approved for children 7-9 years of age or for persons older than 64 years. However, there are two Tdap vaccines currently available for adolescents and adults. The introduction of the Tdap vaccine may help to reduce the rate of pertussis in adult and adolescent populations, who tend to be responsible for infecting most infants.

While antibiotics are used to reduce the transmission of pertussis, they often have little impact on reducing the intensity of the coughing symptoms.

Healthy People 2010 Goal

The Healthy People 2010 Goal for pertussis is less than 2,000 cases of pertussis nationwide in children under age 7 years. Current data are not available to assess progress toward this goal.

Epidemiology and Trends

Indiana had 280 reported cases of pertussis in 2006, for a rate of 4.43 cases per 100,000 population (Table 1). Females (5.06) had a higher incidence rate than males (3.79). The rate for whites (4.72) was higher than that for other races (1.71) and blacks (1.60).

Table 1. Pertussis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	280	4.43	1,326
Race			
Black	9	1.60	64
White	263	4.72	1227
Other	3	1.71	25
Not Reported	5	-	10
Sex			
Female	162	5.06	735
Male	118	3.79	591
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

As stated earlier, pertussis incidence, unlike other vaccine-preventable diseases, has increased since the 1980s. Figure 1 illustrates this increase as well as the cyclic nature of pertussis. The increase in Indiana is similar to incidence trends observed throughout the U.S. and is generally believed to be attributable to better recognition and reporting of suspected cases. In 2006, disease incidence was greatest during the fall and winter months, but pertussis can occur anytime during the year (Figure 2).

Pertussis is the most frequently reported vaccine-preventable disease among children under age 5. In 2006, 32 percent of all cases occurred in children less than 5 years of age. Incidence rates were highest for infants less than 1 year of age (48.71). Figure 3 shows incidence rates for all age groups. Although the incidence rate for adolescents and adults was lower, persons aged 10 years and older accounted for 57 percent of all reported cases in 2006.

The incidence rates were highest among the following counties reporting five or more cases: Starke (99.7), LaGrange (64.4), and Scott (29.5). Forty-five counties reported at least one case during 2006. Figure 4 shows Indiana counties with five or more reported cases for 2006.

In 2006, 30 of the 280 reported cases in Indiana were hospitalized with a diagnosis of pertussis (10.7 percent). Infants less than 1 year of age are also at greatest risk for severe disease as evidenced by the proportion of cases hospitalized. In 2006, 19 of the 42 cases (45%) in infants less than 1 year of age were hospitalized.

Unvaccinated children are at highest risk for severe disease, but fully or appropriately immunized children may also develop illness. Table 2 reflects the number and percent of cases that were not up-to-date for pertussis vaccination at time of illness for selected age groups.

Table 2: Vaccination History of Selected Age Groups and Number (Percent) of Incomplete Vaccinations, Indiana, 2006

Age Group	Number of Cases	Number (percent) Not Appropriately Immunized	Unknown Vaccine History
7-11 Months	3	2 (67%)	0
1 Year	4	3 (75%)	0
2-4 Years	41	21 (51%)	1
5-9 Years	32	13 (41%)	2

Laboratory confirmation was reported by either culture or PCR for 61 (22%) of the reported pertussis cases. Nineteen cases were culture confirmed, and 10 of those were in infants less than 1 year of age.

Indiana reported two deaths due to pertussis disease in 2006. Both deaths occurred in infants younger than six months of age. Both infants were laboratory confirmed and hospitalized at the time of their deaths.

You can learn more about pertussis by visiting the following Web site:
http://www.cdc.gov/doc.do/id/0900f3ec80228696

Figure 1. Pertussis Cases by Year
Indiana, 1987-2006

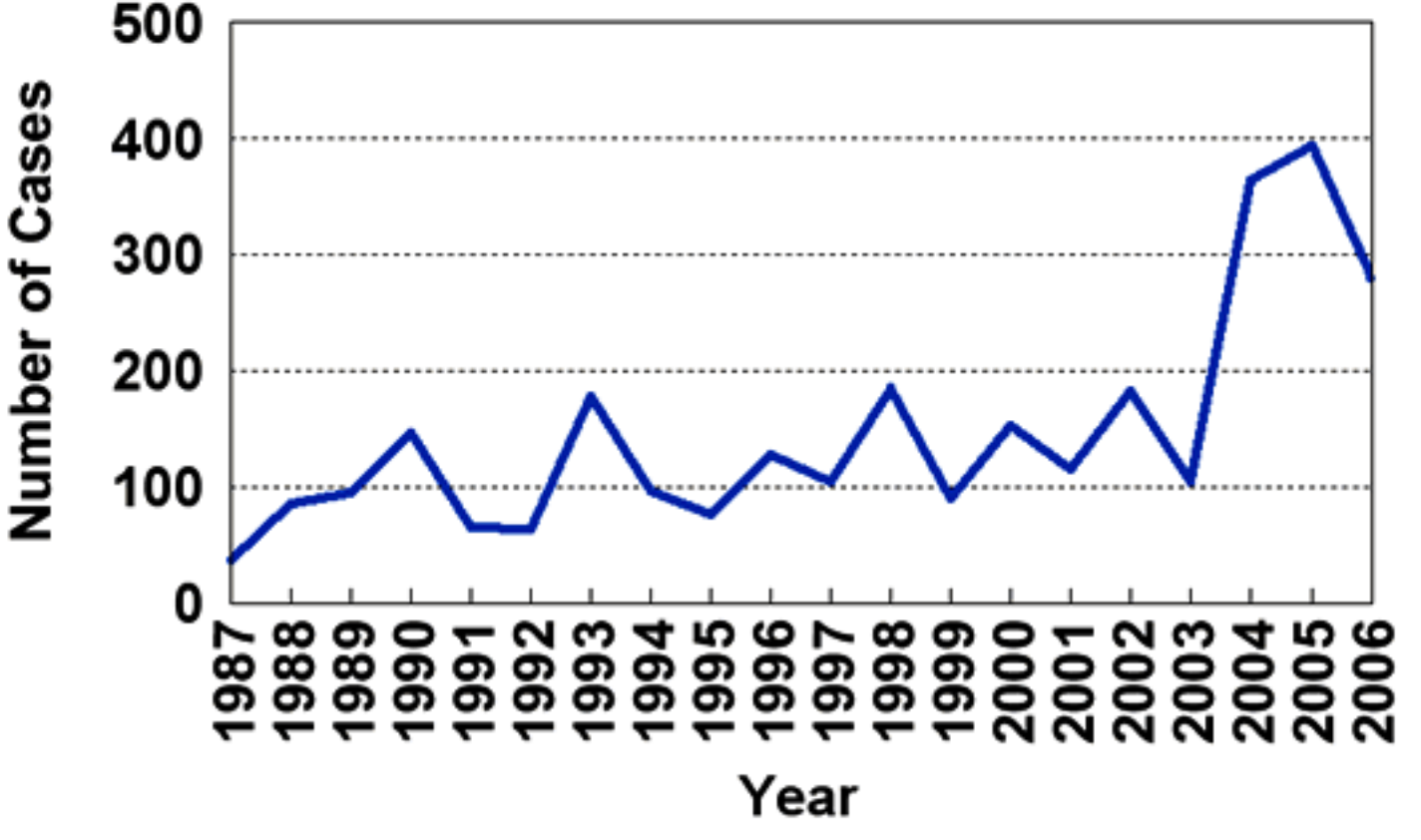


Figure 2. Pertussis Cases by Month Indiana, 2006

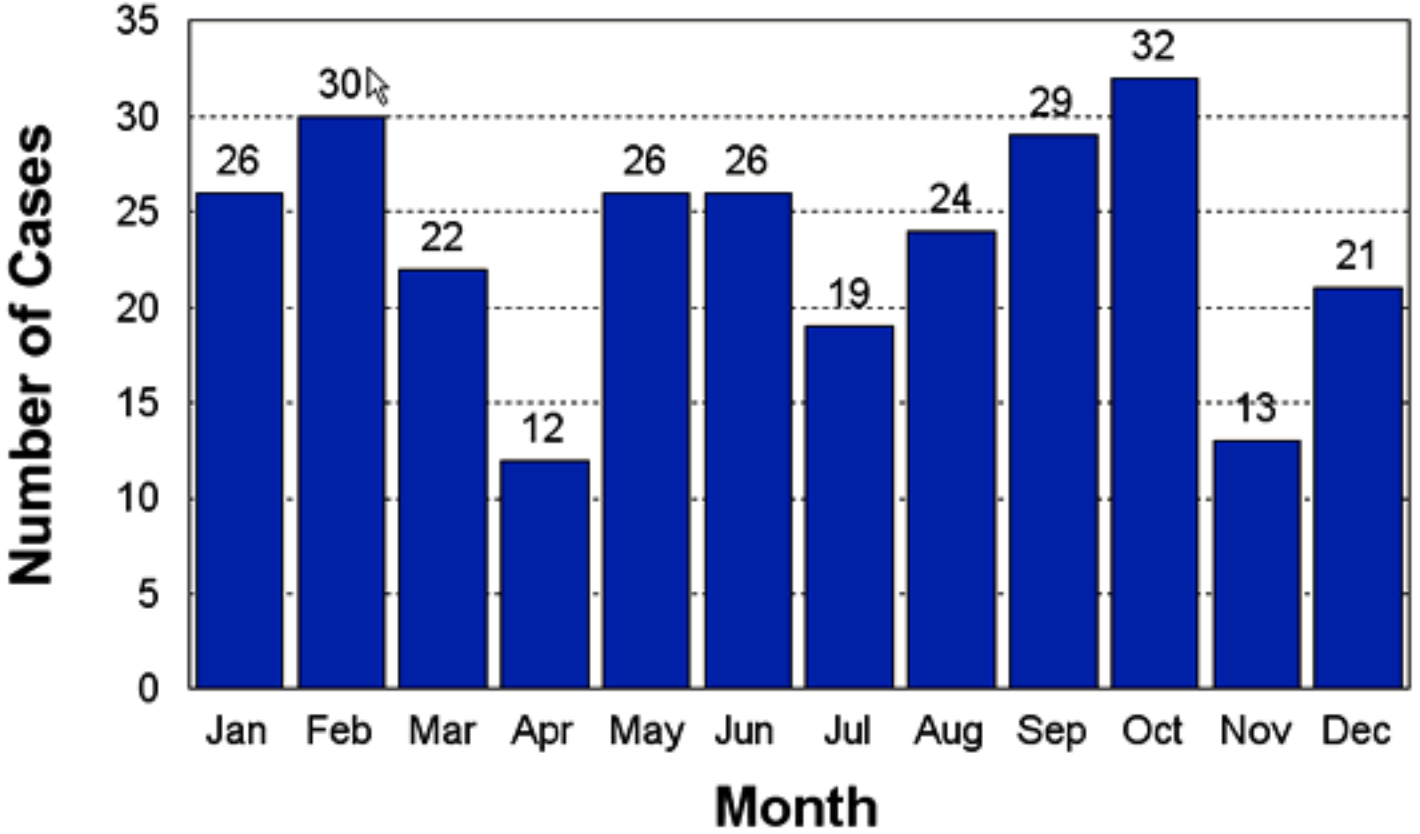


Figure 3. Pertussis Incidence by Age Group Indiana, 2006

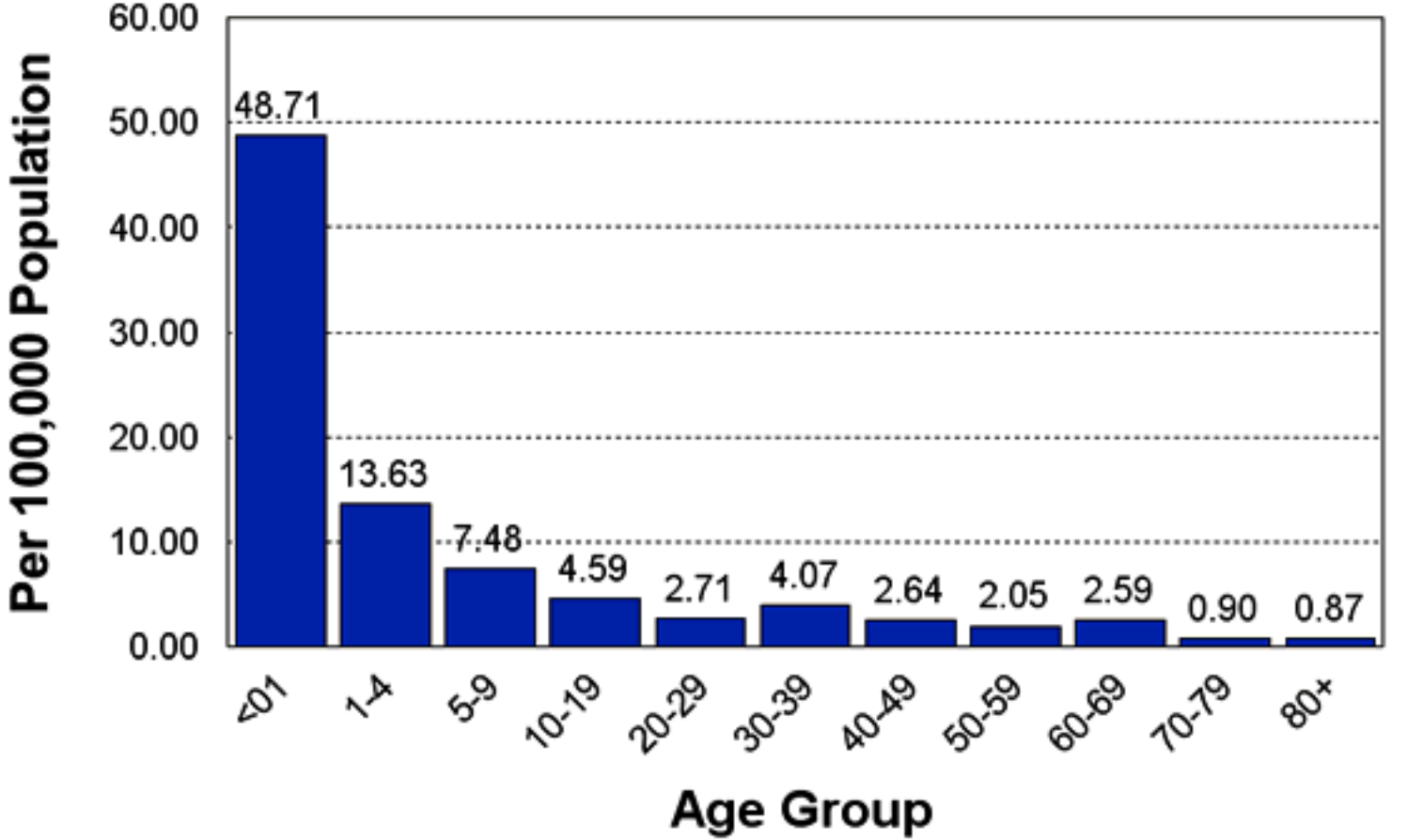
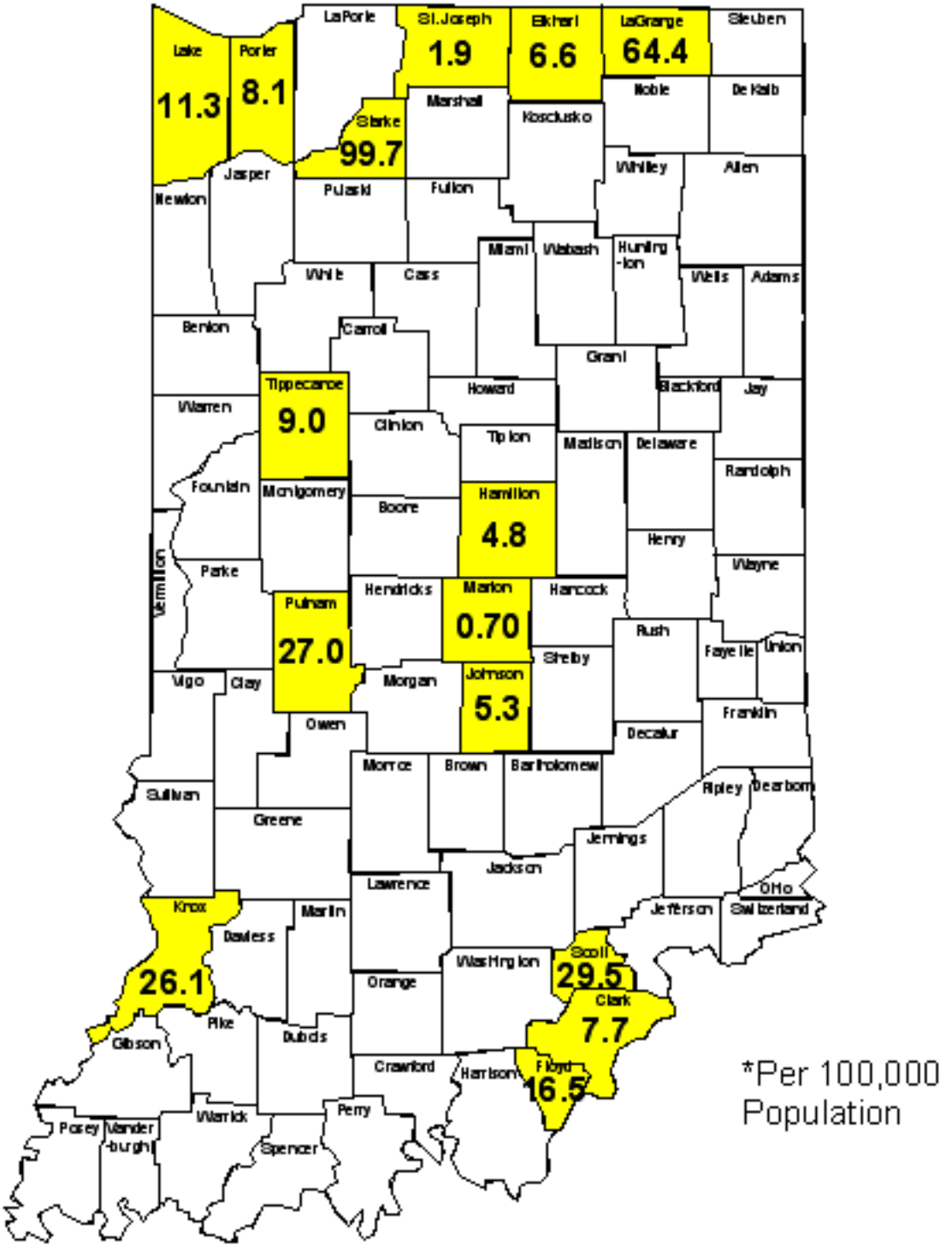


Figure 4. Pertussis Cases* by County -- Indiana, 2006



*Per 100,000 Population

PLAGUE

Plague is caused by the bacteria, *Yersinia pestis*, whose normal reservoir is rodent fleas. Plague does not occur naturally in Indiana. It is present in the fleas of wild rodents (ground squirrels, prairie dogs, and other burrowing rodents) of the western U.S., where 10-15 cases of human plague occur annually. Plague is transmitted by an infected flea bite, direct contact with a sick or dead animal, or from respiratory droplets from a sick animal. There are three forms of the disease: 1) bubonic plague, an infection of lymph nodes; 2) septicemic plague, a systemic infection; or 3) pneumonic plague, an infection of the lungs. If not treated rapidly, bubonic or pneumonic plague can develop into septicemic plague. Early treatment with antibiotics prevents the high mortality previously associated with plague.

Public Health Significance
Each form of plague has different symptoms. Bubonic plague symptoms appear suddenly and include swollen lymph nodes (called "bubo"), high fever, chills, malaise, muscle pain, and headache. The incubation period is 2-5 days after exposure to bacteria. The bacteria can invade the bloodstream if not treated. Septicemic plague is a more severe form of the plague and results when infection spreads directly to the bloodstream. Symptoms include nausea, vomiting, diarrhea, abdominal pain, and organ failure. Death may result before symptoms occur. Pneumonic plague is the most dangerous and the least common. Symptoms appear suddenly and include severe cough, bloody sputum, and difficulty breathing.

Populations at increased risk for infection include veterinarians, pet owners, hunters, and campers or hikers in areas with outbreaks of animal plague. Most cases of the plague occur in the southwestern U.S.

Effective antibiotics are used to treat plague.

Plague is classified as a Category A potential bioterrorism agent* because of its ability to be transmitted via aerosolization as a weapon and secondarily by respiratory droplets from infected individuals. Plague was used as a weapon of mass destruction during WWII.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for plague.

Epidemiology and Trends
There have been no reported cases of plague in Indiana to date.

You can learn more about plague by visiting the following Web sites:
http://www.cdc.gov/ncidod/dvbid/plague/index.htm

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/agentlist-category.asp

PNEUMOCOCCAL DISEASE

Pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae* and results in widespread illness and death in the U.S. The major clinical syndromes of pneumococcal disease include pneumonia, bacteremia, and meningitis. Pneumococcal bacteria, of which there are over 90 serotypes, are common inhabitants of the respiratory tract.

Public Health Significance

Symptoms of pneumococcal disease generally include an abrupt onset of fever, chills or rigors, pleuritic chest pain, a productive cough, rusty sputum, difficulty breathing, rapid heart rate, and tiredness.

The treatment for pneumococcal disease is the administration of appropriate antibiotics. Treatment for pneumococcal infections is based on the specific susceptibility of the strain acquired. Strains have been identified that are not susceptible to penicillin G, cefotaxime, ceftriaxone, and other antimicrobial agents. Vancomycin resistance has not been reported in the U.S.

Since the licensure of pneumococcal conjugate vaccine for children under the age of 5 in 2000, Indiana has seen a decrease in cases in this age group. The highest rates of invasive pneumococcal disease occur among young children, especially those younger than 2 years of age. The pneumococcal conjugate vaccine licensed for children younger than 6 years of age is PCV7. The vaccine contains capsular polysaccharide from seven *S. pneumoniae* serotypes which are known to cause the majority of bacteremia, meningitis, and otitis media associated with invasive pneumococcal infections. The 23-valent polysaccharide vaccine (PPV23) was licensed for adults aged 65 or older. Persons with various risk factors may also be candidates to receive a dose of PPV23.

Because pneumococcal disease is not easily spread from person to person, the control measures for contacts of a known case of invasive pneumococcal disease are minimal in most situations. On rare occasions, outbreaks have occurred in settings where close contact is common such as daycare centers and correctional facilities. Proper hygiene habits when coughing, sneezing, and hand washing will help prevent the spread of infection.

Healthy People 2010 Goal

The Healthy People 2010 Goal for pneumococcal disease is 46 cases per 100,000 population for children under age 5 years and 42 cases per 100,000 population for adults aged 65 years and older. Indiana met the Healthy People 2010 Goal for children under age 5 years for the five-year reporting period 2002-2006. However, Indiana did not meet the Healthy People 2010 Goal for adults aged 65 years and older. Pneumococcal disease is a significant burden on adults aged 80 years and older. During the five-year reporting period 2002-2006, reported cases of pneumococcal disease for adults aged 80 years and older exceeded the HP target of 42 cases per 100,000 population.

Epidemiology and Trends

Surveillance of invasive pneumococcal disease has been ongoing in Indiana since the summer of 1998. In 2006, 695 cases of pneumococcal disease were reported in Indiana, for a case rate of 11.01 per 100,000 population. The number of invasive pneumococcal infections in 2006 represents the highest number of cases reported during 2002-2006. In 2006, the

incidence rate among the black population (16.52) was significantly higher than that of the white population (8.09). Females (11.55) were more likely to be reported than males (10.35).

Table 1. Pneumococcal Disease Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	695	11.01	3,226
Race			
Black	93	16.52	440
White	451	8.09	2,184
Other	3	1.71	11
Not Reported	148	-	591
Sex			
Female	370	11.55	1,632
Male	322	10.35	1,580
Unknown	3	-	14

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows the number of reported cases per year for 2002-2006. Disease incidence was greatest during the spring and winter months (Figure 2). Incidence of invasive pneumococcal disease varies considerably with age. In 2006, the age-specific rates were highest for adults aged 80 years and older (49.49), followed by adults aged 70-79 years (29.06), and adults aged 60-69 years (23.35) (Figure 3).

In 2006, 79 counties reported at least 1 case of invasive pneumococcal disease, with 36 counties reporting 5 or more cases. The incidence rates were highest among the following counties reporting five or more cases: Jefferson (36.7), Wells (35.5), and Spencer (24.3). Cases were distributed throughout Indiana as can be seen in Figure 4. Only counties reporting five or more cases are represented.

You can learn more about pneumococcal infections by visiting the following Web site:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/drugresisstreppneum_t.htm

Figure 1. Pneumococcal Disease Cases by Year -- Indiana, 2002-2006

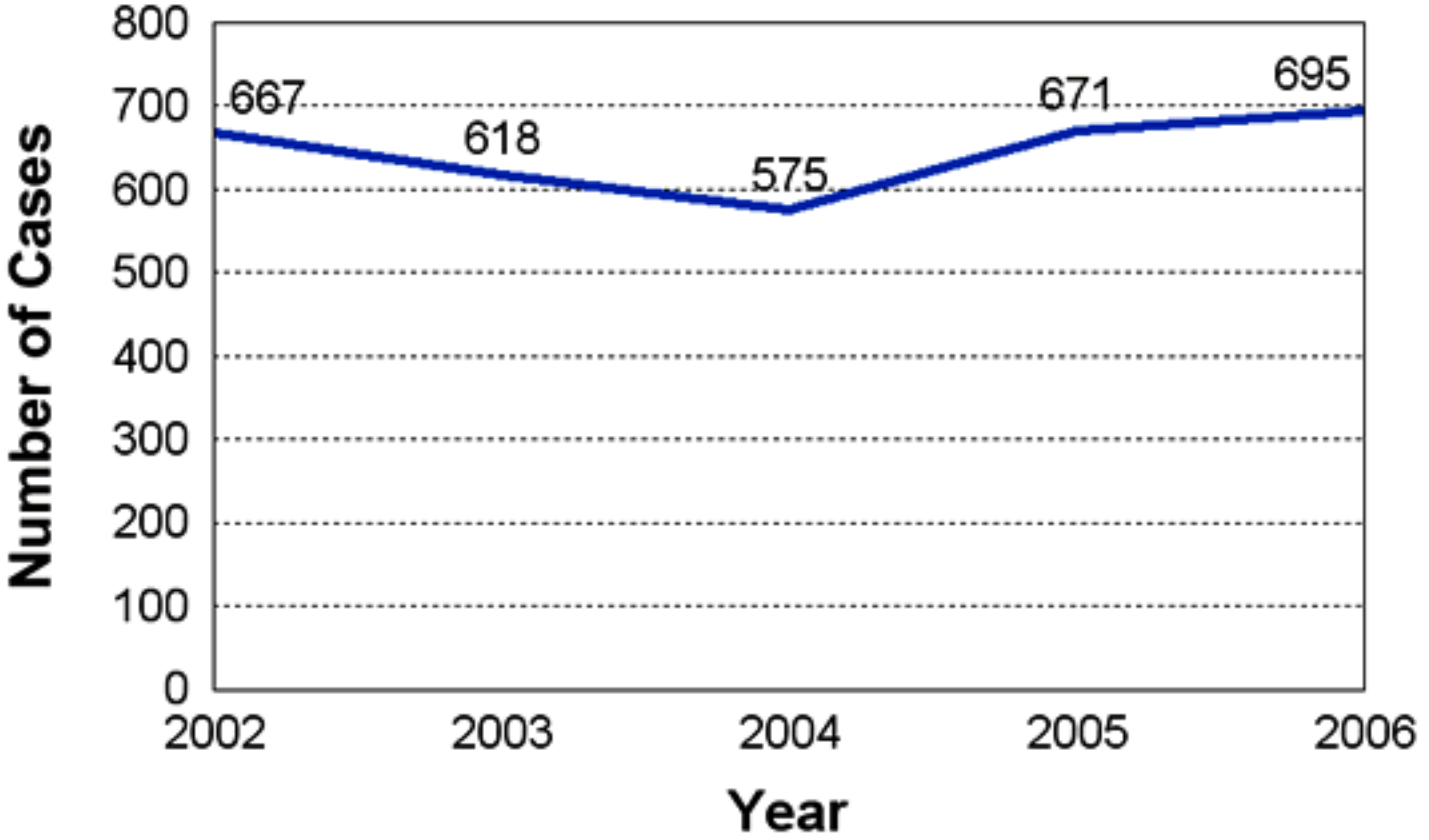


Figure 2. Pneumococcal Disease Cases by Month -- Indiana, 2006

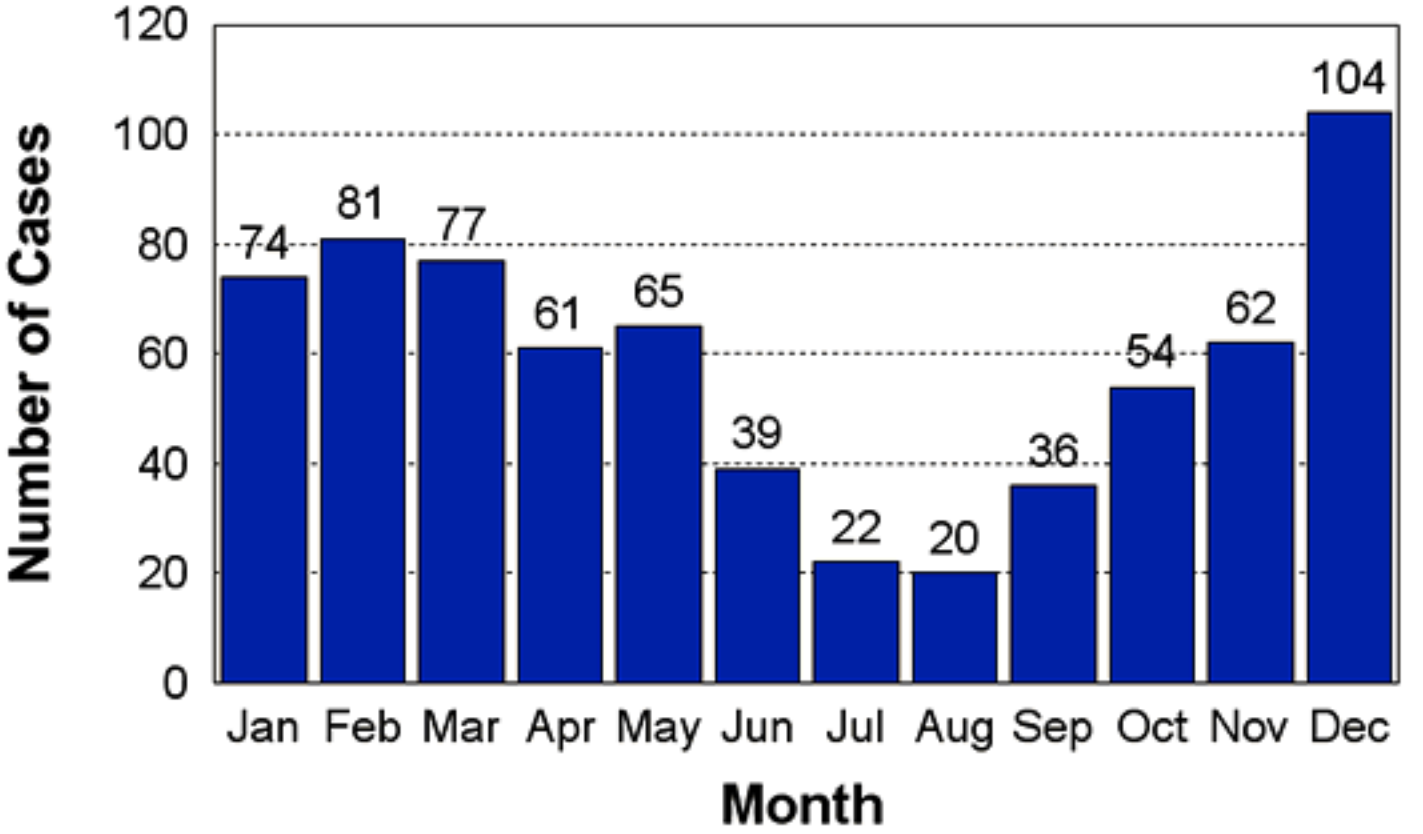
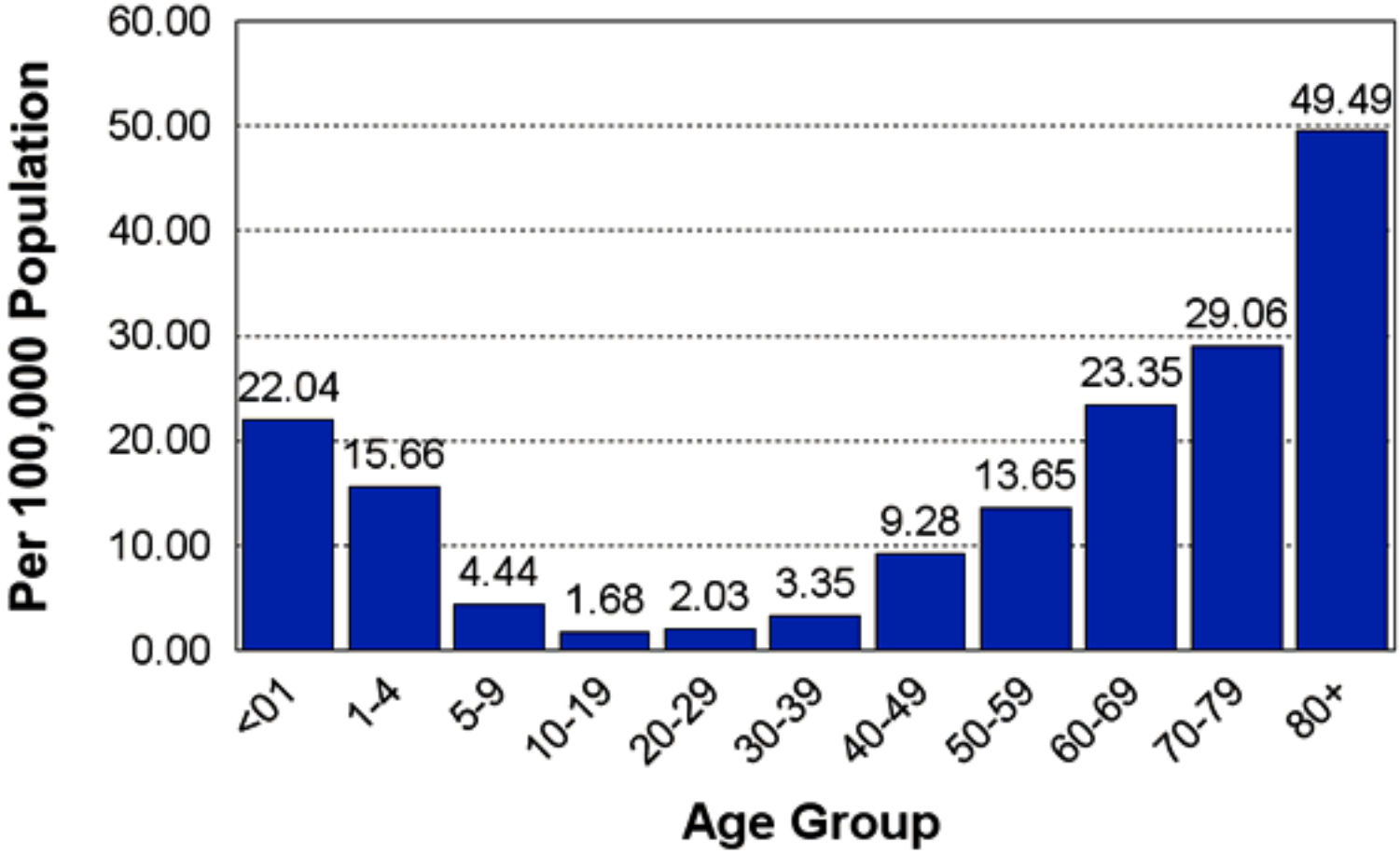
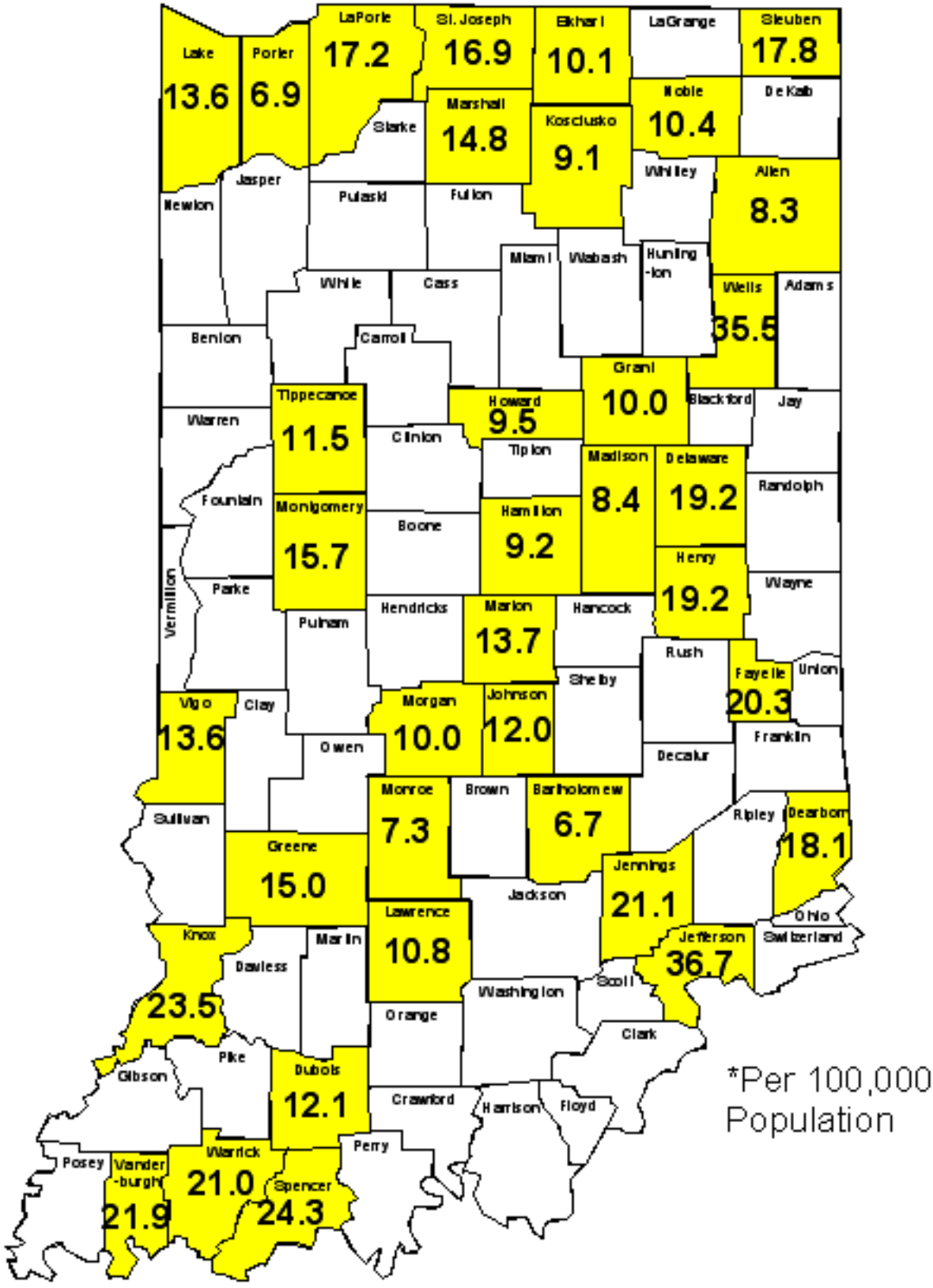


Figure 3. Pneumococcal Disease Incidence by Age Group* -- Indiana, 2006



*Age information not reported for 13 cases.

Figure 4. Pneumococcal Disease Cases* by County -- Indiana, 2006



*Per 100,000 Population

POLIOMYELITIS

Poliomyelitis (polio) is a viral disease that infects the intestinal tract, destroys nerve cells and, in the most severe cases, causes acute flaccid paralysis. The virus replicates in the motor neurons of the anterior horn and brain stem resulting in cell destruction causing the typical manifestations of polio and sometimes resulting in death.

Poliovirus is mainly transmitted by fecal-oral and respiratory routes. The virus enters the environment through feces and throat secretions of infected people and then is passed to others, especially in situations with poor hygiene.

Public Health Significance

Because approximately 95 percent of polio infections are asymptomatic, the virus has the ability to spread undetected unless confirmed by laboratory analysis. Once it is introduced into largely unvaccinated populations, polio spreads easily.

Poliomyelitis reporting serves to: 1) detect importation of wild poliovirus into the U.S. and 2) detect the presence of vaccine-derived poliovirus in the U.S. Because of the severity of poliomyelitis disease (it is a paralytic disease), timely reporting of suspected cases is extremely important, especially among unvaccinated groups. Disease reporting by clinicians is often delayed, because it is only after other differential diagnoses are ruled out that the diagnosis of poliomyelitis is considered. Efforts should be made to promote physicians' awareness of the importance of prompt reporting of suspected cases to the state and local health department and the Centers for Disease Control and Prevention (CDC), as well as the need to obtain stool and serum specimens early in the course of the disease.

Healthy People 2010 Goal

The Healthy People 2010 Goal for polio is to eliminate all wild-type polio from persons of all ages. Indiana has met this goal since the late 1950s.

Epidemiology and Trends

Polio incidence fell rapidly following the introduction of the inactivated polio vaccine, IPV, in 1955 and the live polio vaccine, OPV, in the 1960s. Because of successful vaccination efforts, the world is almost polio free now. The last indigenous case of wild poliovirus in the U.S. occurred in 1979. The Americas were declared polio free in 1994.

You can learn more about polio by visiting the following Web sites:

http://wwwn.cdc.gov/travel/yellowBookCh4-Poliomyelitis.aspx
http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/polio.pdf

PSITTACOSIS

Psittacosis, often called parrot fever, is caused by the bacteria *Chlamydophila psittaci* (formally *Chlamydia psittaci*) and acquired in humans through inhalation of dried secretions from infected birds. Wild and domestic birds are the natural reservoirs of this agent and are most often involved in transmission to humans. Cattle, sheep, goats, and cats can also become infected with a mammalian strain and develop severe debilitating disease. Large outbreaks of psittacosis in humans have been associated with infected feces and respiratory excretions from domestic poultry flocks.

Public Health Significance

Human symptoms of psittacosis include fever, nonproductive cough, headache, and malaise. More severe illness may result in heart inflammation, hepatitis, and encephalopathy. The incubation period is 5-19 days with symptoms persisting for 7-10 days. Bird symptoms include ruffled appearance, diarrhea, and poor appetite. Some birds may be asymptomatic. Groups most at risk for contracting psittacosis are bird owners, pet shop employees, and veterinarians. It may also be found in farmers and slaughterhouse workers who process turkeys. Psittacosis can be diagnosed with blood antibody tests and treated with antibiotics.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for psittacosis.

Epidemiology and Trends

There were no reported cases of psittacosis in Indiana during the five-year period 2002-2006.

You can learn more about psittacosis by visiting the following Web site:

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/psittacosis_t.htm

Q FEVER

Q fever is caused by the bacteria *Coxiella burnetii* and is a zoonotic disease affecting several species of animals including humans. Ticks are the primary reservoir and maintain disease cycles in rodents, other mammals, and birds. Cattle, sheep, and goats can carry the infection without signs or symptoms and shed high levels of bacteria when birthing. Birth products (placenta and fluids) are often highly contaminated. The bacteria are highly resistant to natural degradation and can persist in the environment for weeks to months. Q fever may result from infection by a single organism and the low infectious dose enhances transmission efficiency.

Human infections generally occur through inhalation of aerosols of contaminated barnyard dust, by handling of birthing products from shedding animals, or by drinking unpasteurized milk. Humans may have an asymptomatic, acute, mild to severe disease that can be highly fatal or result in chronic infection that can cause significant morbidity, if untreated.

Public Health Significance
Symptoms of Q fever usually appear 2-3 weeks after exposure and can include high fever, severe headache, muscle aches, chills, nausea and vomiting, and a non-productive cough. Fifty percent of those infected may not have any symptoms. Antibiotics are available for the treatment of Q fever. Treatment is most effective when initiated within the first three days of illness.

People most at risk of becoming infected with Q fever are veterinarians, meat processing plant workers, livestock and dairy farmers. While there is a vaccine for Q fever, it is not available is the U.S.

Q fever is classified as a Category B potential bioterrorism agent* because of its ability to cause infection with a low number of organisms, resistance to environmental degradation, and the ability to cause infection via aerosolization.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for Q fever.

Epidemiology and Trends
In 2006, 1 case of Q fever was reported in Indiana, for a rate of less than 1 case per 100,000 population. Eight cases of Q fever were reported during the five-year period 2002-2006.

You can learn more about Q fever by visiting the following Web sites:
http://www.cdc.gov/ncidod/dvrd/qfever/index.htm

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/agentlist-category.asp

ANIMAL RABIES

Clinical rabies is caused by a virus from the genus *Lyssavirus*. Within the *Lyssavirus* genus, a number of other viruses have been identified that infect mammalian hosts (animal and human) causing fatal encephalitis. Rabies virus is the *Lyssavirus* associated with rabies in bats and terrestrial mammals around the world. The other *Lyssaviruses* have been identified in bats in Europe, Africa, Asia, and Australia.

Rabies is transmitted from animal to animal through transfer of virus-contaminated saliva by bites or mucous-membrane exposures. In the U.S., rabies virus subtypes have become associated with the mammalian species in which the subtype is generally found. In Indiana, the North Central Skunk virus and numerous bat subtypes of rabies virus have been identified.

In 2006, 49 states, the District of Columbia, and Puerto Rico tested over 113,000 animals and reported 6,940 cases of animal rabies and 3 human cases to the Centers for Disease Control and Prevention (Hawaii is the only state that is rabies free). The total number of reported cases increased by 8.2 percent from those reported in 2005 (6,418 cases).

Public Health Significance
Early symptoms of rabies infection are similar to influenza (the flu) and may include headache, fever, and malaise. As the disease advances, symptoms include anxiety, confusion, hallucinations, excessive salivation, and difficulty swallowing. The virus infects the central nervous system resulting in death usually within days of symptom onset. Symptoms usually occur 1 to 3 months after infection.

A vaccine and postexposure prophylaxis for rabies does exist. Treatment has not shown effective after the development of clinical signs.

Although anyone can be at risk for rabies, people who work with rabies virus in research laboratories and vaccine production facilities are at the highest risk. Other groups at risk include veterinarians, animal control and wildlife officers, and bat handlers.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for rabies.

Epidemiology and Trends
Since 1990, bats have been the predominate species diagnosed with rabies at the Indiana State Department of Health (ISDH) Laboratory (the only Indiana laboratory that does rabies testing). Bats continued that trend in 2006; 12 of the 13 reported rabies cases were bats. The horse diagnosed with rabies in 2002 was infected with a bat strain of the rabies virus. Figure 1 shows animal rabies cases by species in Indiana for 2002-2006. In 2006, 7 percent of bats submitted to the ISDH Laboratory tested positive for rabies.

Table 1. Animal Rabies Cases by Species, Indiana, 2006

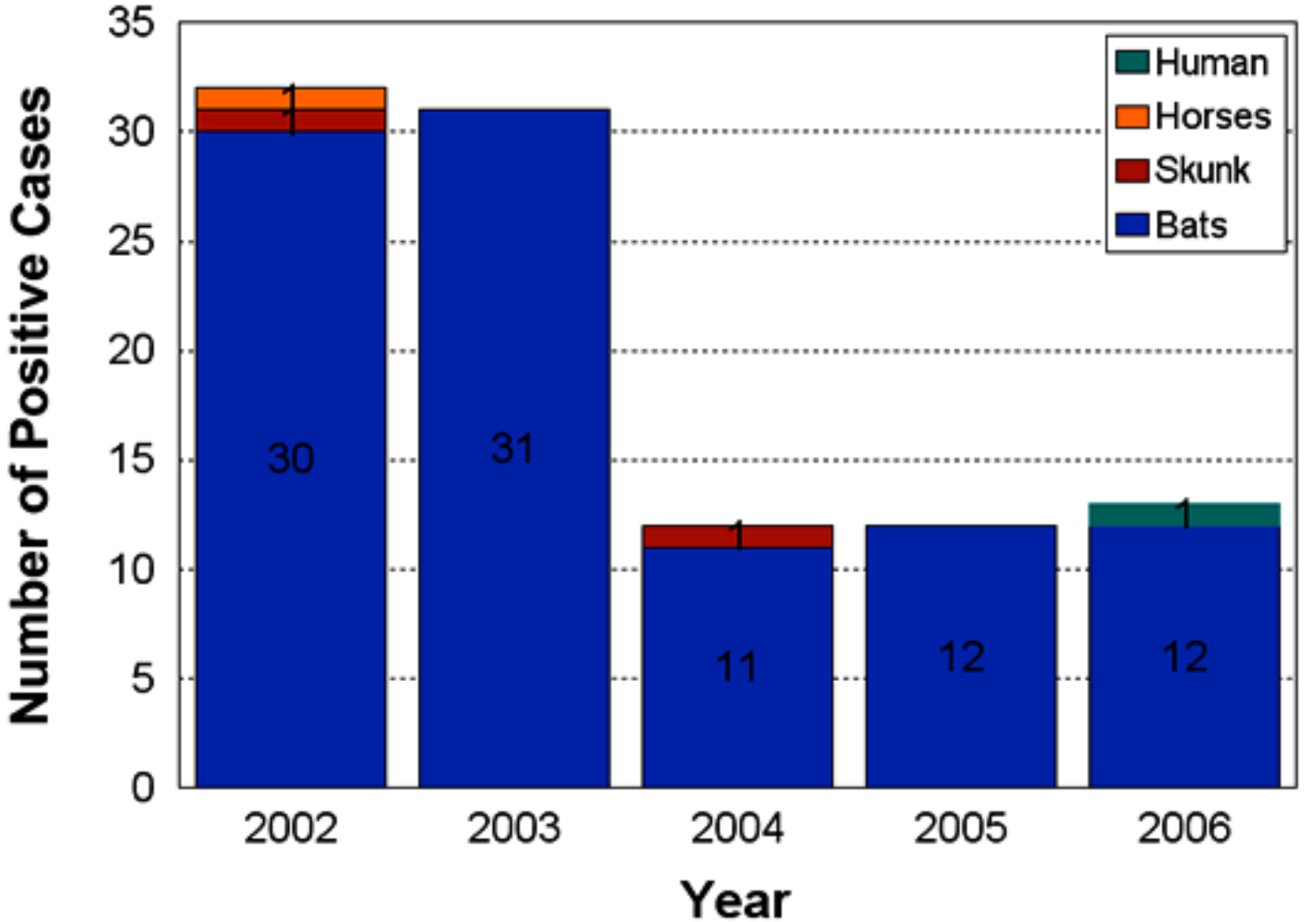
	2006	2001-2005
Cases	13	100
Species		
Bat	12	96
Skunk	0	2
Horse	0	1
Human	1	1

For the first time since 1959, a human rabies case was reported in Indiana in 2006. On October 4, 2006, a 10-year-old girl presented to a primary health care provider with vomiting and arm numbness. On October 7, the patient was hospitalized where she was found to have difficulty swallowing. Initial interviews with family members indicated no abnormal exposures except to healthy cats and dogs. After the third day of hospitalization, the hospital staff learned that the patient had been scratched or bitten by an unknown animal in June 2006. After a brief discussion with the patient, it was determined that the animal was a bat. The patient was tested and found positive for rabies. The Wisconsin rabies treatment protocol was initiated, but the patient never regained consciousness. The patient died in November 2006. Rabies virus antigen was detected in brain tissue.

The public health investigation revealed the girl was bitten by a silver-haired bat infected with the rabies virus. The bat was able to enter her home through an open window with no screen.

You can learn more about rabies by visiting the following Web sites:
http://www.cdc.gov/ncidod/dvrd/rabies/
http://www.cdc.gov/rabies/docs/rabies_surveillance_us_2006.pdf
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5615a1.htm

Figure 1. Animal Rabies Cases by Year and Species -- Indiana, 2002-2006



ROCKY MOUNTAIN SPOTTED FEVER

Rocky Mountain spotted fever (RMSF) is caused by the bacteria *Rickettsia rickettsii*. RMSF is transmitted in Indiana by the dog tick (*Dermacentor variabilis*), which lives in wooded areas and tall, grassy fields.

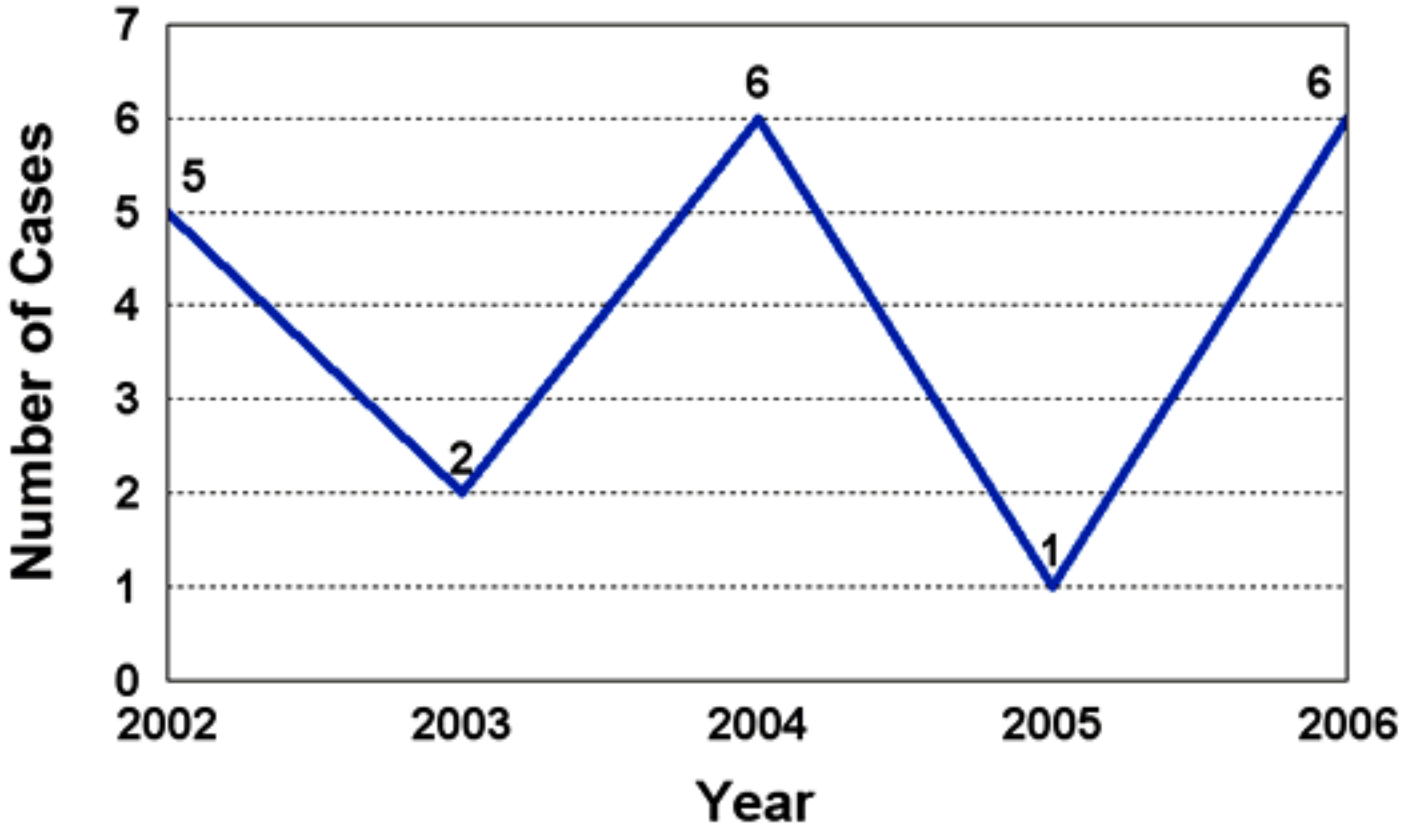
Public Health Significance
RMSF occurs 5-10 days after a bite from an infected tick. Symptoms of RMSF include high fever, severe headache, nausea, vomiting, muscle and joint pain, and lack of appetite, followed by a rash. Early treatment with antibiotics ensures recovery.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for RMSF.

Epidemiology and Trends
During the five-year period 2002-2006, 20 cases of RMSF were reported in Indiana, including 6 cases in 2006 (Figure 1). While the disease is most common in the spring and summer months when ticks are active, RMSF can occur anytime during the year when the weather is warm. In Southern Indiana, ticks may be active into the late fall. RMSF can occur in all areas of Indiana, but most cases occur in the southern portion of the state. Cases are reported by county of residence and may not always reflect the site of tick exposure.

You can learn more about Rocky Mountain spotted fever by visiting the following Web site:
http://www.cdc.gov/ncidod/dvrd/rmsf/index.htm

Figure 1. RMSF Cases by Year
Indiana, 2002-2006



RUBELLA

Rubella is an infectious viral disease caused by the Rubella virus. Rubella is spread from person to person via airborne transmission or droplets shed from respiratory secretions of infected persons.

Public Health Significance
Symptoms of rubella include rash, low-grade fever, malaise, lymphadenopathy, and upper respiratory symptoms.

While there is no specific treatment for rubella, a vaccine is available. Prevention of Congenital Rubella Syndrome (CRS) is the primary objective of rubella vaccination programs. CRS can cause serious damage to virtually all organ systems in utero.

Healthy People 2010 Goal
The Healthy People 2010 Goal for rubella disease is to eliminate all cases of CRS from children less than one year of age. Indiana met this goal during the five-year reporting period 2002-2006.

Epidemiology and Trends
No cases of rubella were reported in Indiana in 2006 or during the five-year reporting period 2002-2006.

You can learn more about rubella by visiting the following Web site:
http://www.vaccineinformation.org/rubella/qandadis.asp

SALMONELLOSIS

Salmonellosis is a contagious disease caused by *Salmonella* bacteria, which are found in the intestines of many healthy animals, including poultry, farm animals (cattle, pigs, chicks, and ducklings), domestic animals (dogs, cats, and birds), wild birds, reptiles, and amphibians. There are thousands of types of *Salmonella* bacteria, most of which can infect humans. People become infected with *Salmonella* by ingesting feces from an infected animal or person (fecal-oral route).

The most common sources of *Salmonella* outbreaks are raw or undercooked eggs and poultry, unpasteurized dairy products, untreated water, and contaminated raw fruits, vegetables, or herbs. Pet food and treats have also been implicated in outbreaks. Persons who work in certain occupations, such as food handlers, daycare providers, and health care providers, have a greater risk of transmitting infection to others.

Public Health Significance:
Symptoms of *Salmonella* can include diarrhea, stomach cramps, fever, nausea, or vomiting. Symptoms usually begin 12-36 hours (range of 6-72 hours) after exposure and last 4-7 days. Infected people may carry *Salmonella* in their bodies for weeks or months without symptoms and unknowingly infect others. Rarely, *Salmonella* can get into the blood and infect organs such as the heart, lungs, and bones. Death from salmonellosis is rare. Children less than 5 years of age, the elderly, and people with weakened immune systems are at the greatest risk for severe complications. Most people recover within 5-7 days without medical treatment, but antibiotics are available if indicated. Since diarrhea can cause dehydration, an infected person should drink plenty of fluids. There is no vaccine for salmonellosis.

In general, salmonellosis can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after contact with animals, amphibians, and reptiles; after swimming; before, during, and after food preparation; and after exposure to raw meat products.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.
- Separate raw and cooked foods:
    - Avoid cross-contamination by keeping uncooked meat products separate from produce, ready-to-eat foods, and cooked foods.
    - Use separate equipment and utensils for handling raw foods.
    - Clean food-preparation work surfaces and utensils with soap and water before, during, and after food preparation, especially after contact with raw meat products.
- Maintain safe food temperatures:
    - Ensure proper temperatures are maintained during refrigeration (<40˚F), freezing (<2˚F), holding (keep food hot or at room temperature for no longer than 2 hours), and chilling (chill immediately and separate into smaller containers if needed).
    - Thoroughly cook all food items to USDA recommended safe minimum internal temperatures:

        - 145˚F – steaks, roasts, and fish
        - 160˚F – pork, ground beef, and egg dishes
        - 165˚F – chicken breasts and whole poultry
- Eat safe foods and drink safe water:
    - Do not eat undercooked meat, poultry, or eggs.
    - Do not eat foods past the expiration date.
    - Do not eat unpasteurized dairy products; it is illegal to sell unpasteurized dairy products in Indiana.
    - Wash all produce before eating raw or cooking.
    - Use treated water for washing, cooking, and drinking.
- Handle animals safely:
    - Wash hands after contact with livestock, petting zoos, pets (including reptiles and amphibians), especially if they are suffering from diarrhea, and after contact with pet food/treats (including live or frozen rodents).
    - Keep pets out of food-preparation areas.
    - Do not clean pet or reptile cages in the kitchen sink or in the bathtub.
    - Reptile safety:
        - Reptiles should not be allowed to roam the house.
        - Reptiles should not be kept in daycare facilities or classrooms.
        - Children less than 5 years of age, pregnant women, and persons with weakened immune systems should not handle reptiles.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.

Healthy People 2010 Goal

The Healthy People 2010 Goal for salmonellosis is 6.8 cases per 100,000 population per year. Indiana did not meet this goal during the five-year reporting period 2002-2006 (Figure 1).

Epidemiology and Trends

In 2006, there were 899 cases of salmonellosis reported in Indiana, for a rate of 14.24 cases per 100,000 population (Table 1). This represents a 30 percent increase in the incidence rate from 2005 (10.94). Females (14.92) were more likely to be reported with salmonellosis than males (13.44). Whites (10.76) were more likely to be reported than other races (8.00) or blacks (7.64); however, 242 cases (27%) did not report race data.

Table 1. Salmonellosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	899	14.24	3,298
Race			
Black	43	7.64	186
White	600	10.76	2,106
Other	14	8.00	60
Not Reported	242	-	946
Sex			
Female	478	14.92	1,773
Male	418	13.44	1,508
Unknown	3	-	17

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 2 shows the number of reported cases for 2002-2006. The incidence was greatest during the summer months (Figure 3). Figure 4 shows age-specific rates were greatest among infants less than 1 year of age (70.75), followed by preschoolers aged 1-4 years (37.70), and children aged 5-9 years (20.34). The incidence rates were highest among the following counties reporting five or more cases: Johnson (75.8), Crawford (44.9), and Posey (37.4). Figure 5 shows Indiana counties reporting five or more cases.

There are over 3,000 different *Salmonella* serotypes that differ in somatic and flagellar antigens. The Indiana State Department of Health (ISDH) requests that clinical laboratories submit all positive *Salmonella* isolates to the ISDH Laboratories for free confirmation and serotyping. During 2006, serotypes were determined for approximately 56 percent of the 899 cases identified. Of the 500 isolates of known serotype, 106 (21%) were *enteriditis*; 95 (19%) were *typhimurium*; 52 (10.5%) were *monophasic*; 40 (8%) were *Newport*; 22 (4.5%) were *Heidelberg*; and 185 (37%) were other serotypes.

Two salmonellosis outbreaks occurred in Indiana in 2006. The first outbreak involved 15 Indiana counties and 2 other states. A total of 199 cases were identified over a 4-month period (May-October) that matched a 2-enzyme PFGE pattern. A unique MLVA pattern was confirmed in all isolates submitted to the Centers for Disease Control and Prevention. Illness was statistically associated with consumption of foods purchased at a local retail store in the southwest suburb of Indianapolis, Indiana. A knife block, which held knives used to serve and prepare ready-to-eat items, harbored the *Salmonella* I 4,[5],12:i:- outbreak strain. The likely mode of transmission was environmental contamination, possibly from raw chicken preparation within the deli area of the store.

The second outbreak was a national outbreak involving Peter Pan and Great Value peanut butter. The ISDH confirmed 27 PFGE-matched cases to the national *Salmonella tennessee* outbreak. The outbreak totaled 628 cases from 47 states. The multi-state outbreak of *Salmonella tennessee* was confirmed by matching PFGE patterns of clinical cases and *Salmonella* isolates from 21 opened and unopened peanut butter jars. The matched case-control study indicated that cases had 10.9 greater odds of consuming Peter Pan or Great Value peanut butter compared to controls, a statistically significant finding. Once the peanut butter was recalled on February 14, 2007, the outbreak declined over the next few months.

Cases continued due to failures of the public to discard recalled products and the long shelf life of the recalled product.

You can learn more about salmonellosis by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/salmonellosis_gi.html
http://www.cfsan.fda.gov/~mow/chap1.html

Figure 1. Salmonellosis Rates by Year Indiana, 2002-2006

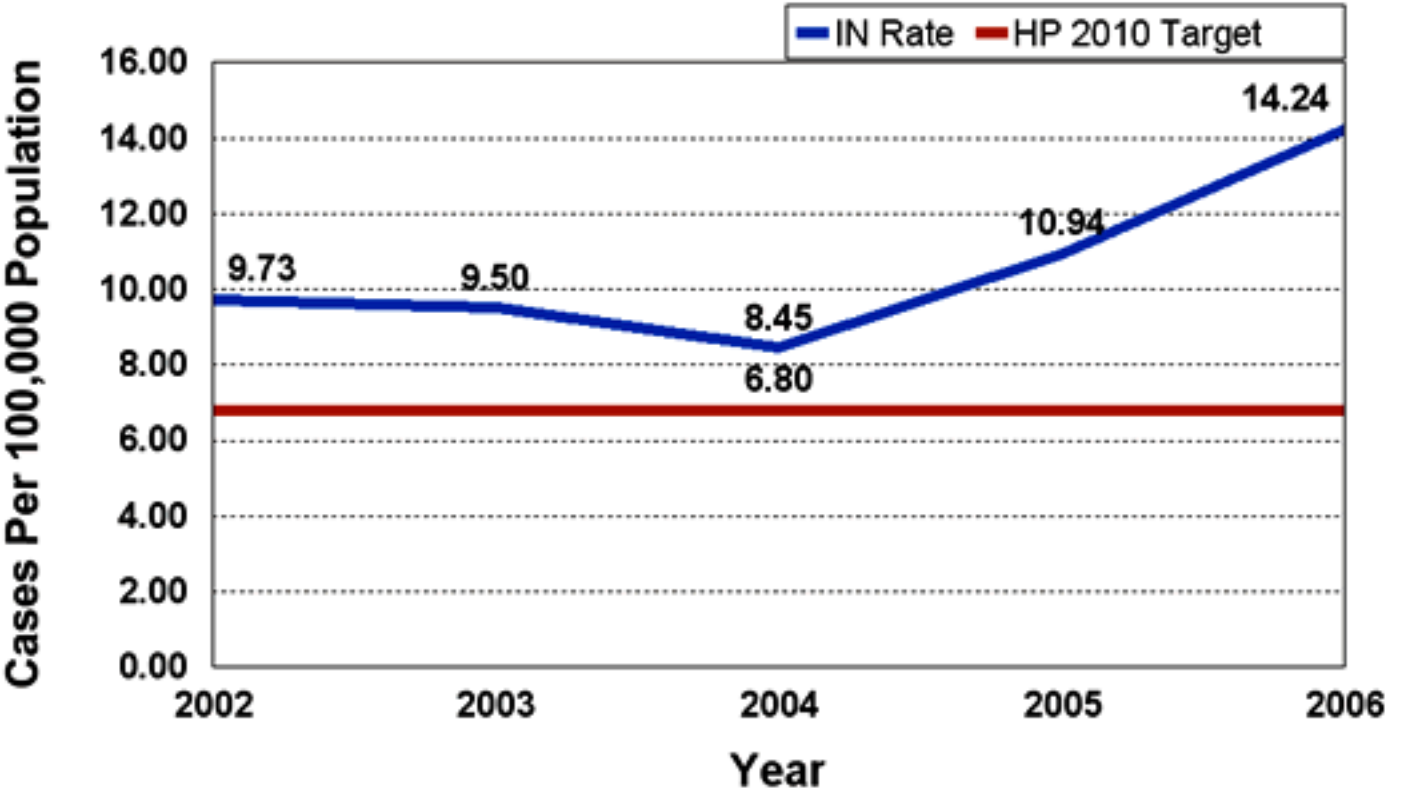


Figure 2. Salmonellosis Cases by Year Indiana, 2002-2006

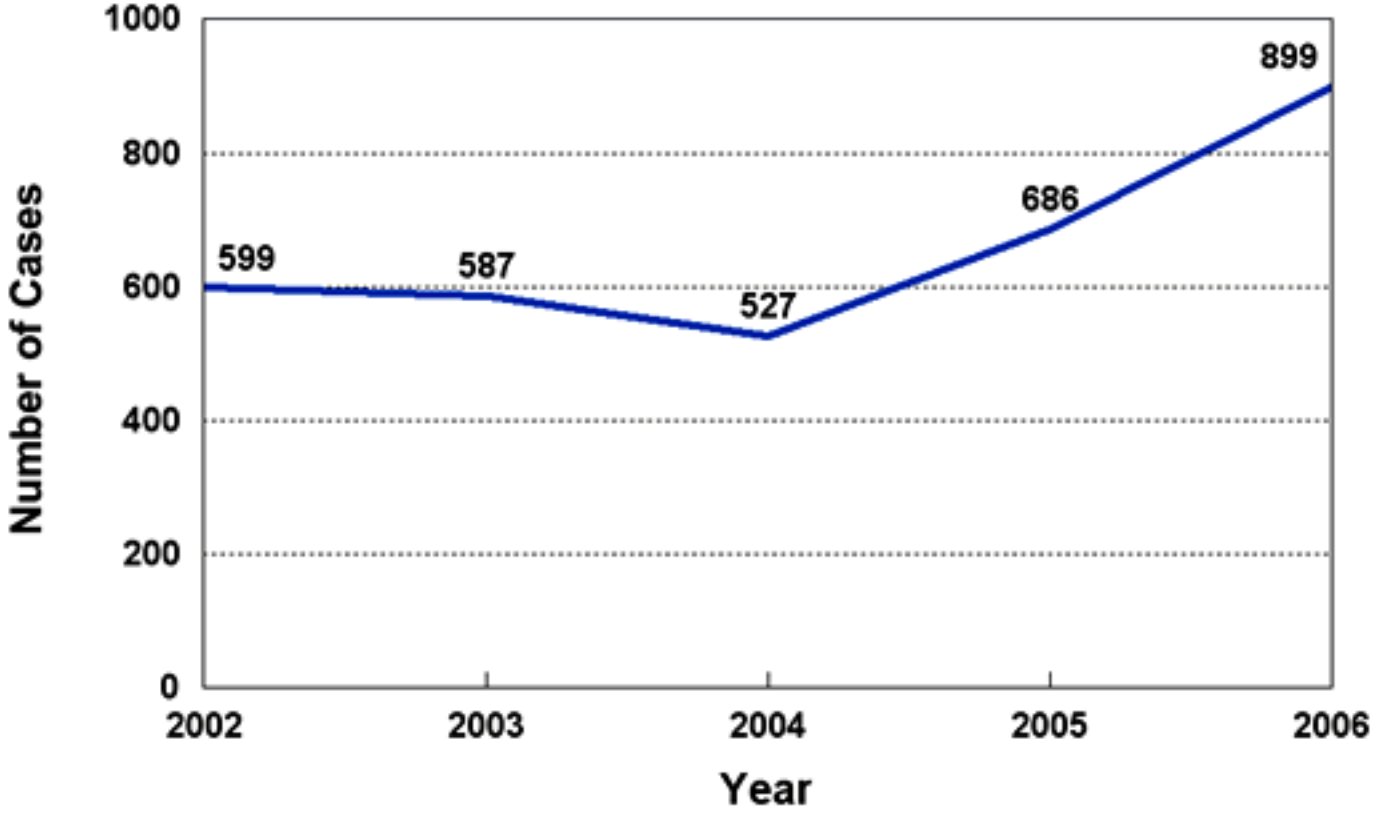


Figure 3. Salmonellosis Cases by Month Indiana, 2006

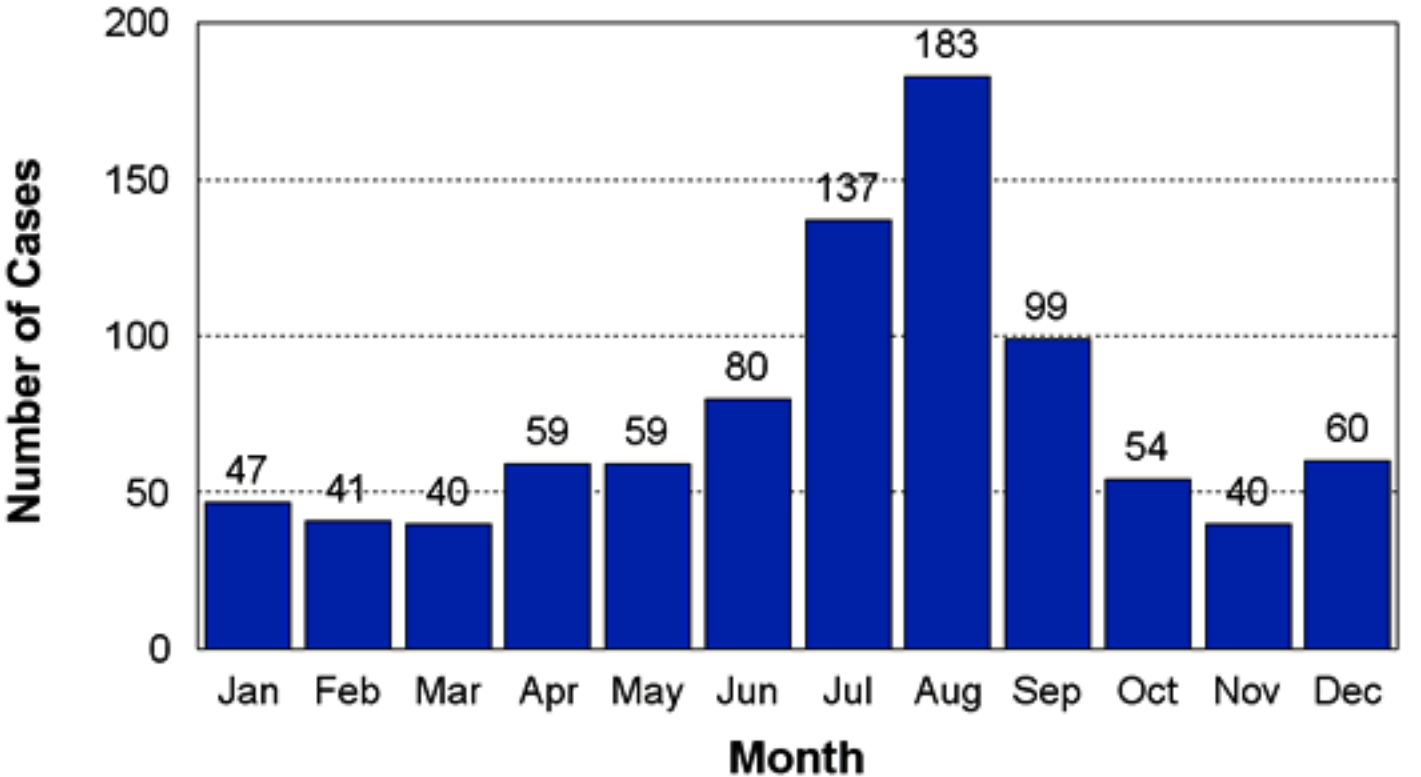
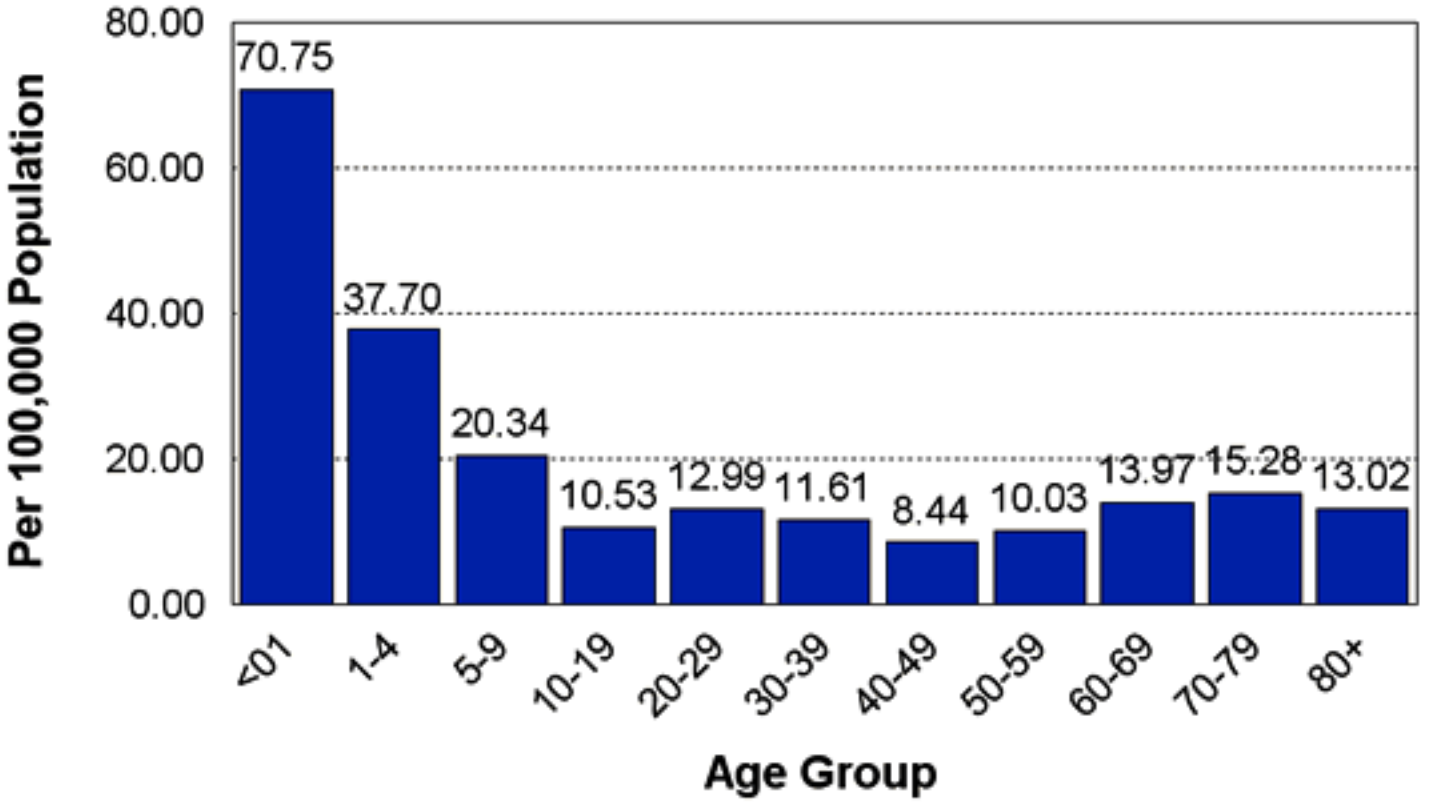
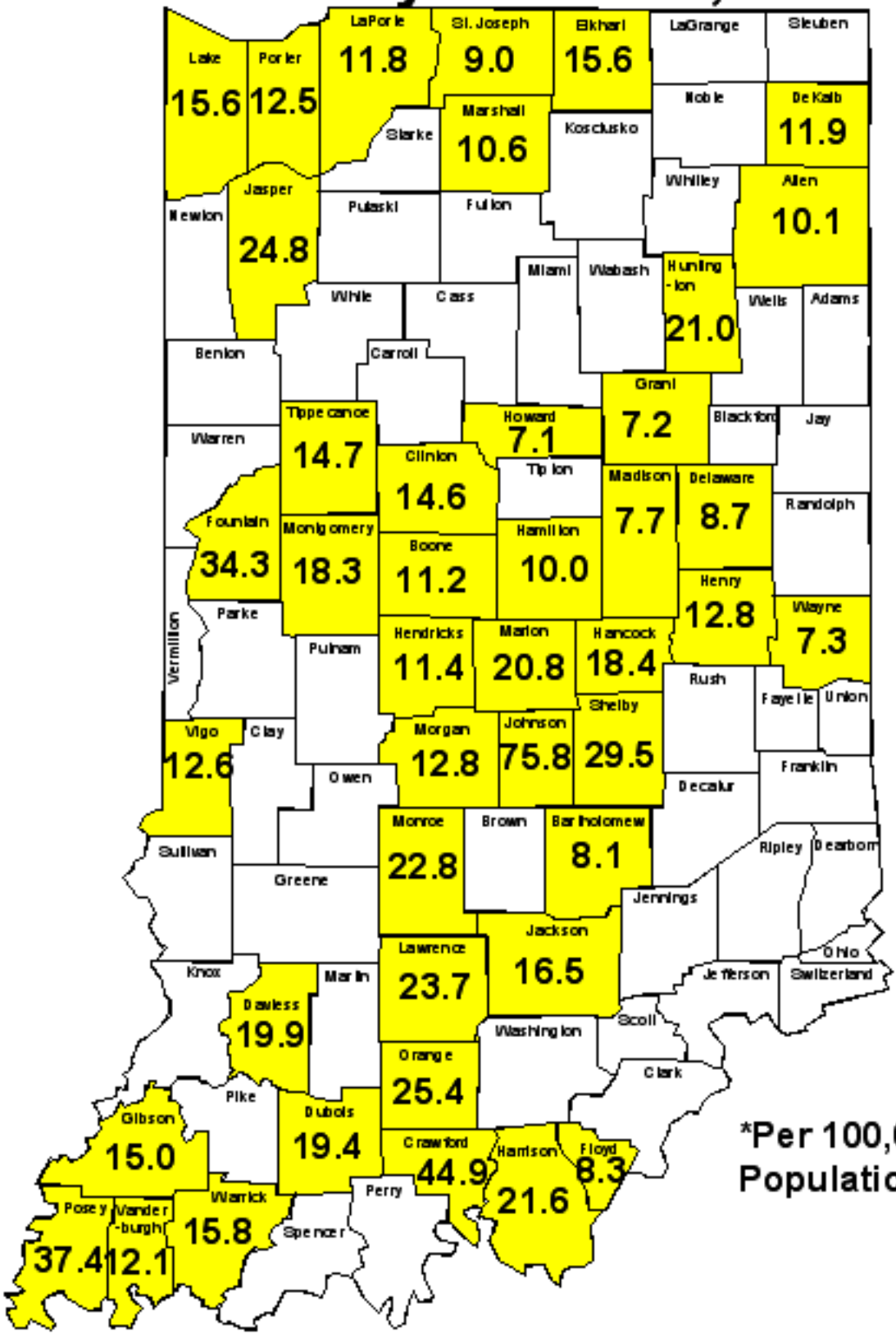


Figure 4. Salmonellosis Incidence by Age Group* -- Indiana, 2006



*Age information not reported for one case.

Figure 5. Salmonellosis Cases* by County -- Indiana, 2006



*Per 100,000 Population

SHIGELLOSIS

Shigellosis is a contagious diarrheal illness caused by *Shigella* bacteria. There are four types of *Shigella* bacteria: *sonnei*, *flexneri*, *boydii*, and *dysenteriae*. *Shigella* bacteria are found mainly in humans, and the infection is very easily passed from person to person. Shigellosis is very serious in babies, the elderly, and people with weakened immune systems.

People become infected with *Shigella* by having contact with stool from an infected person (fecal-oral route). Infection may be transmitted in several ways:

- Consuming food or beverages prepared by an infected person.
- Hand-to-mouth exposure to the stool or vomit of an infected person, such as:
    - Handling or cleaning up stool or vomit.
    - Touching a contaminated surface or object.
    - Having close contact with an ill household member.
    - Having sexual contact that involves contact with stool.

Public Health Significance

Symptoms of shigellosis include diarrhea, sudden stomach pain, cramps, fever, and vomiting. Symptoms usually begin 24-72 hours (range of 12 hours to 5 days) after exposure and last about 4-7 days. Some people may have no symptoms but can still spread the infection to others. Antibiotics are usually used to treat shigellosis. However, some strains of *Shigella* bacteria are resistant to certain antibiotics.

Persons who work in certain occupations, such as food handlers, daycare providers, and health care providers, have a greater risk of transmitting infection to others. *Shigella* bacteria are not naturally found in foods of animal origin.

In general, shigellosis can be prevented by strictly adhering to the following guidelines:

- Practice good hygiene:
    - Thoroughly wash hands with soap and water after using the restroom; after assisting someone with diarrhea and/or vomiting; after swimming; and before, during, and after food preparation.
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation.
- Eat safe foods and drink safe water:
    - Wash all produce before eating raw or cooking.
    - Use treated water for washing, cooking, and drinking.
- Protect others:
    - Persons with diarrhea and/or vomiting should not prepare food or provide health care for others and should limit direct contact with others as much as possible.
    - Persons with diarrhea and/or vomiting should not attend a daycare facility or school.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for shigellosis.

Epidemiology and Trends

In 2006, 178 cases of shigellosis were reported in Indiana, for a case rate of 2.82 per 100,000 population (Table 1). This represents a decrease from the incidence rate in 2005 (3.11). Females (3.31) were more likely to be reported than males (2.31). The rate of illness among blacks (8.88) was over 8 times higher than the rate for whites (1.09) and 1.5 times the rate for other races (5.71); however, 57 cases (32%) did not report race data.

Table 1. Shigellosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	178	2.82	973
Race			
Black	50	8.88	303
White	61	1.09	385
Other	10	5.71	37
Not Reported	57	-	248
Sex			
Female	106	3.31	552
Male	72	2.31	421
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows the number of reported cases per year for 2002-2006. The incidence of shigellosis peaked during the late summer (Figure 2). As shown in Figure 3, age-specific rates were highest among preschoolers aged 1-4 years (14.21), followed by children aged 5-9 years (9.59), and adults aged 20-29 years (3.39). The incidence rates were highest among the following counties reporting five or more cases: Delaware (18.3), Clark (8.7), and Lake (7.7). Figure 4 shows Indiana counties reporting five or more cases.

In 2006, the serotype was determined for 157 (88%) of the 178 reported shigellosis cases. *Shigella sonnei* accounted for 137 (87%) of the serotyped cases. Nineteen cases were serotyped as *Shigella flexneri*, and one case was serotyped as *Shigella boydii*. There were no reported cases of *Shigella dysenteriae* in 2006.

There was one outbreak of shigellosis in Indiana in 2006. The outbreak started in August 2006 in Delaware County. From August to December, the county had 19 confirmed cases among children and adults. Delaware County had no reported cases for the entire year of 2005. Several of the 2006 reported cases were among family members, but very little common exposures were found among cases outside of the family. Children were restricted from attending several daycare centers and schools. The outbreak resolved without further investigation.

You can learn more about shigellosis by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/shigellosis_gi.html
www.cfsan.fda.gov/~mow/chap19.html

Figure 1. Shigellosis Cases by Year
Indiana, 2002-2006

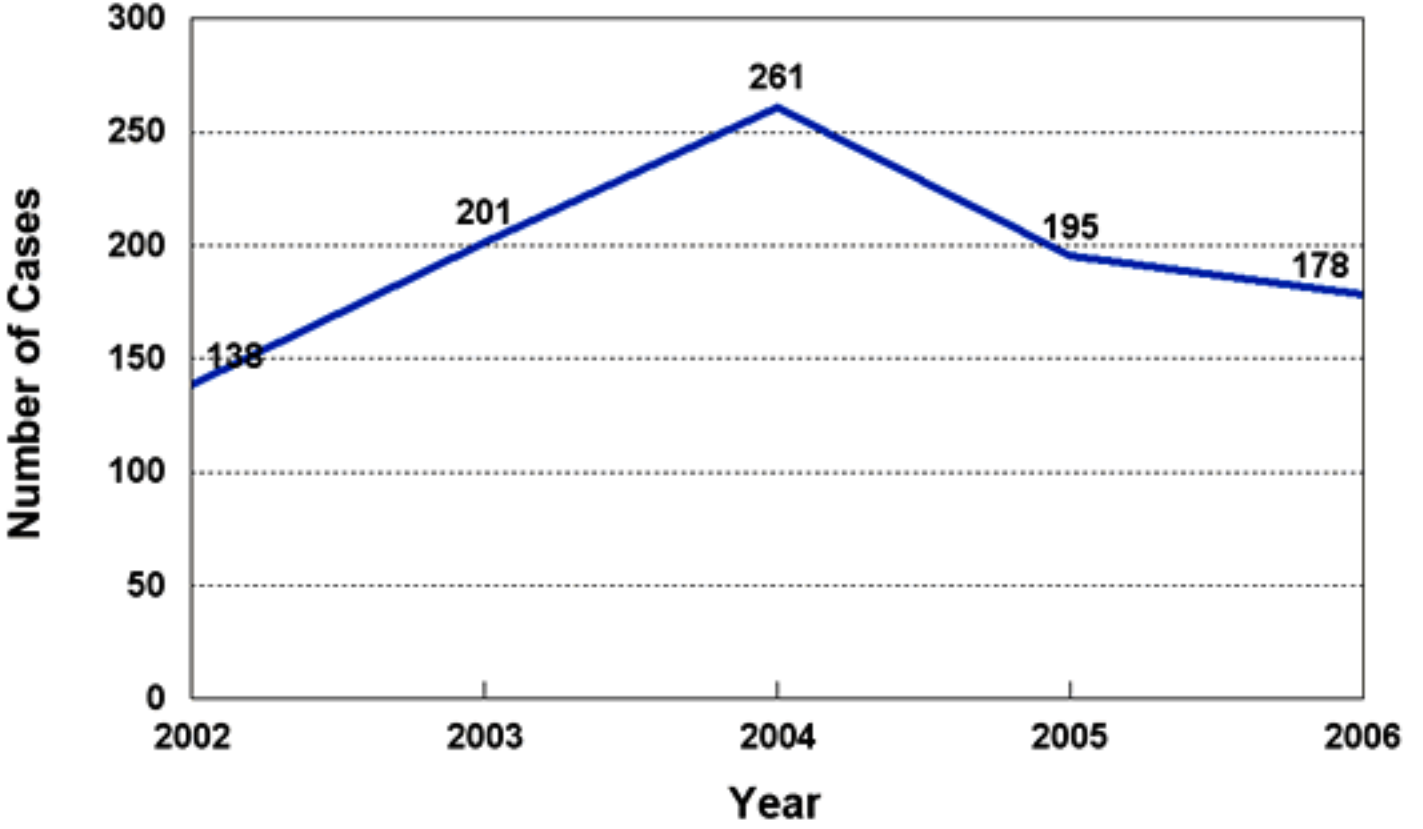


Figure 2. Shigellosis Cases by Month
Indiana, 2006

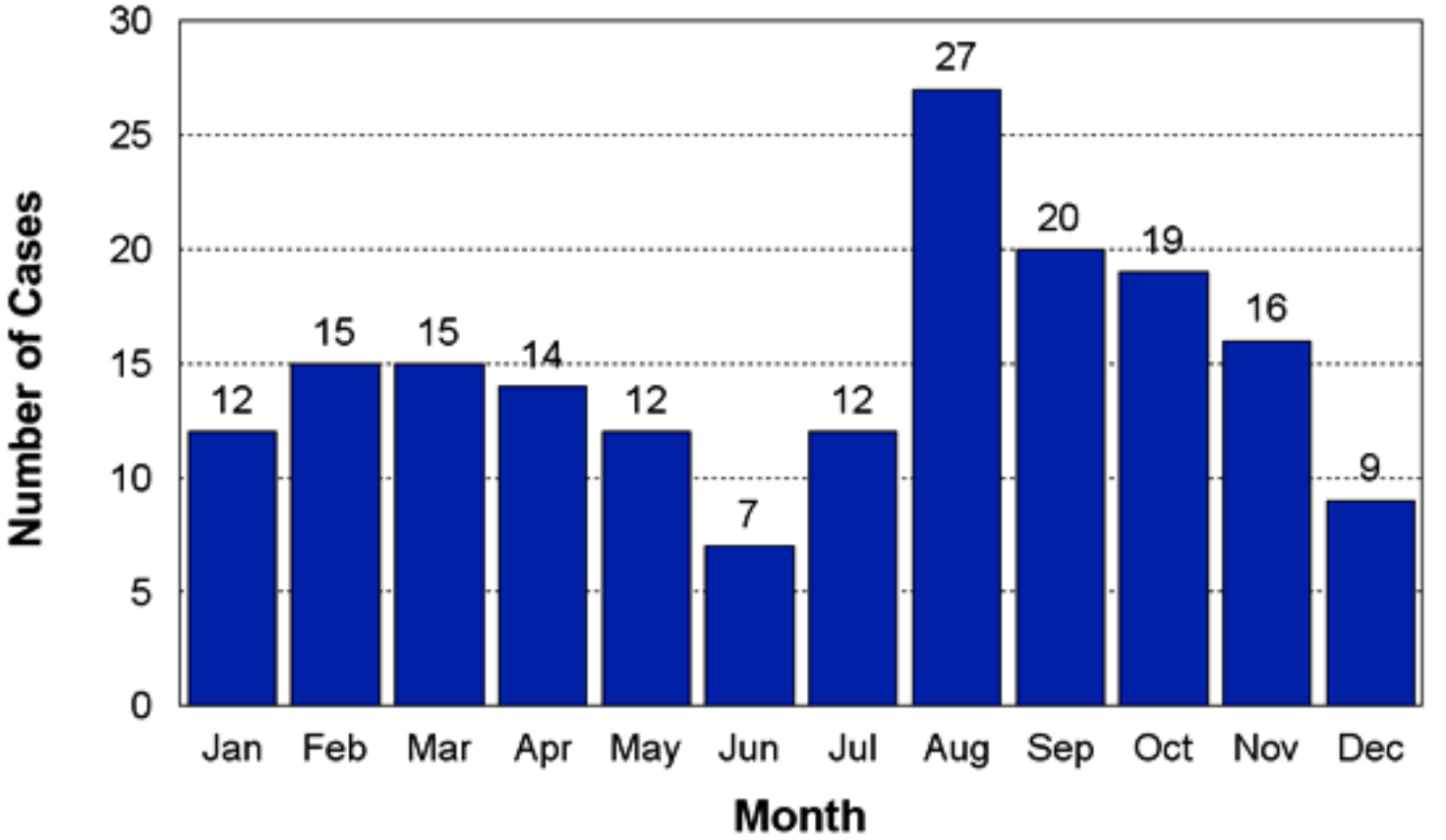
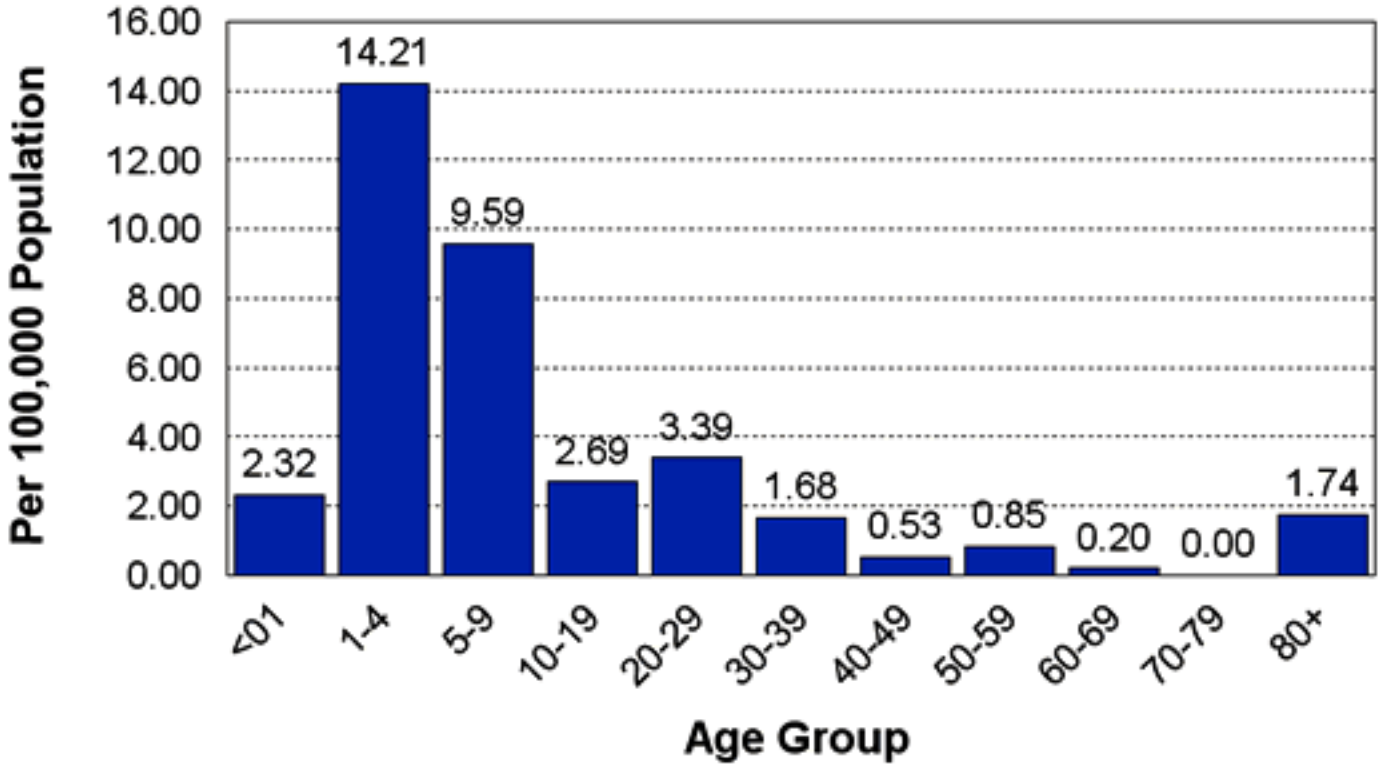
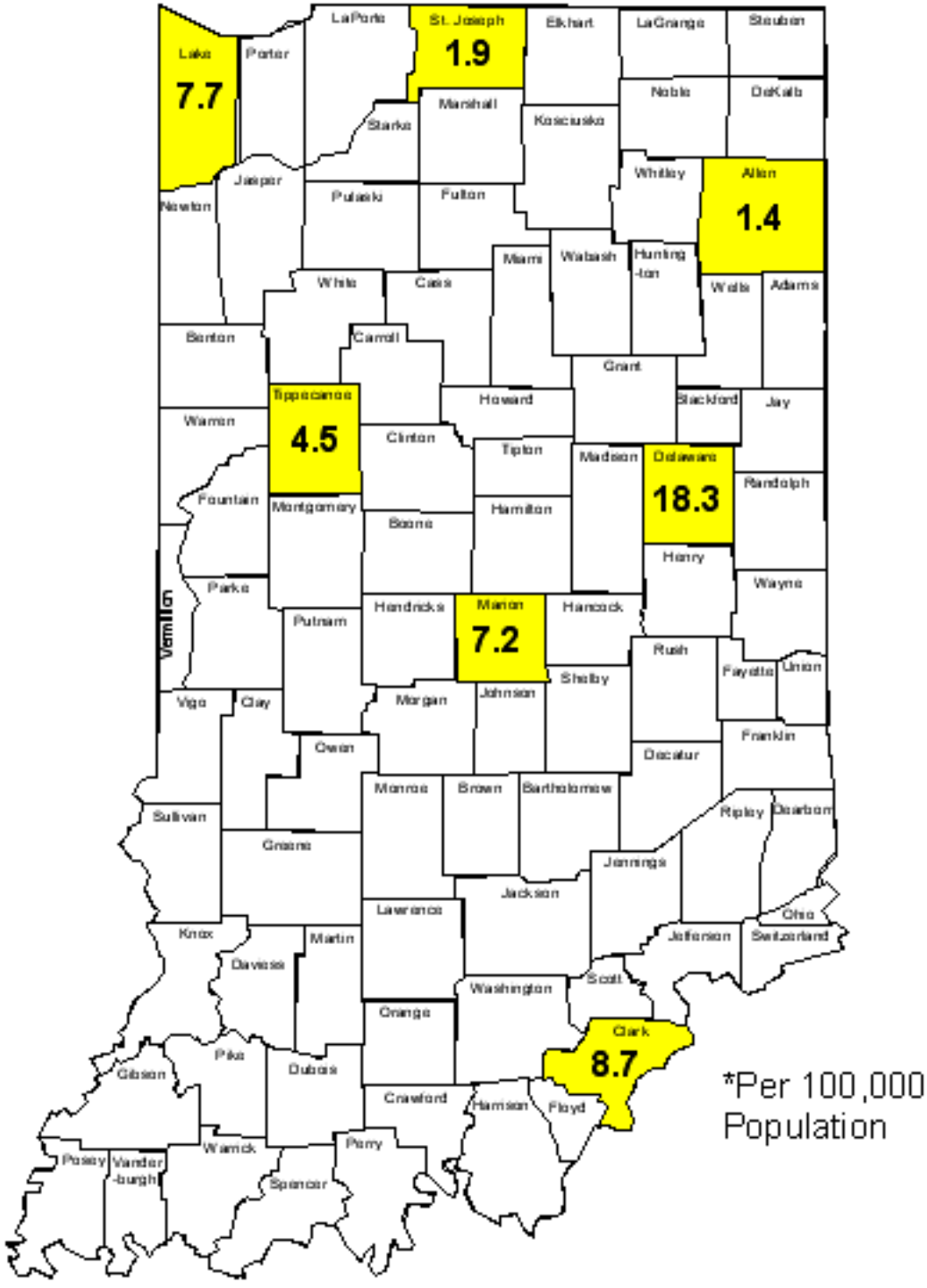


Figure 3. Shigellosis Incidence by Age Group*
Indiana, 2006



*Age information not reported for one case.

Figure 4. Shigellosis Cases* by County -- Indiana, 2006



*Per 100,000 Population

SMALLPOX

Smallpox is an acute infectious disease caused by the variola virus. Variola virus infection is initiated when the virus comes into contact with the oropharyngeal or respiratory mucosa. The virus localizes in the blood vessels of the dermis and oral and pharyngeal mucosa, resulting in the characteristic maculopapular rash, which evolves into vesicles, then pustules. The overall fatality rate for ordinary-type smallpox is about 30 percent. Other more severe types of smallpox have 90 percent and higher fatality rates.

Public Health Significance
Recent events have caused political and scientific leaders to consider the possibility that smallpox virus could be utilized as a Category A biological weapon*. Therefore, extensive national and state plans have been adopted in the event the variola virus is released. In 2003, a national effort was made to have a core of medical personnel vaccinated and ready to provide medical care for initial cases in the event of a smallpox virus release.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for smallpox.

Epidemiology and Trends
The last case of smallpox in the U.S. was reported in 1949. In Indiana, there have been no reported cases of smallpox in over 50 years. Smallpox disease was declared to be eradicated in 1980.

You can learn more about smallpox by visiting the following Web sites:
http://www.bt.cdc.gov/agent/smallpox/disease/

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/agentlist-category.asp#a

GROUP A STREPTOCOCCUS

Group A streptococcus (GAS) disease is caused by the bacteria *Streptococcus pyogenes* and manifests itself in many types of illness including strep throat, impetigo, and scarlet fever. Other forms of GAS disease, such as streptococcal bacteremia/sepsis, necrotizing faciitis, and streptococcal toxic shock syndrome are serious illnesses which can be life threatening. Crowded settings, such as dormitories, barracks, child-care centers, or correctional facilities, make it easier for these germs to spread. Spread may also occur by contact with infected wounds or sores on the skin, such as when a person has chickenpox.

Public Health Significance

Symptoms of GAS disease vary depending on the manifestation of the illness. GAS is spread through direct contact with the fluids from the nose or throat of persons who are infected, or by hands that have GAS on them.

Persons at greatest risk of developing severe GAS infections include:

- Children with chickenpox
- People with suppressed immune systems
- Burn victims
- Elderly people with cellulitis, diabetes, blood vessel disease, or cancer
- People taking steroid treatments or chemotherapy
- Intravenous drug users

The risk for any type of GAS infection can be reduced by good personal hygiene. Proper hand cleaning is one of the best ways to prevent GAS infections. All wounds should be kept clean and watched for signs of redness, swelling, drainage, and pain at the wound site. A person with signs of an infected wound, especially if fever is involved, should seek medical care right away. Antibiotics are used to treat GAS disease and health care providers may recommend that people who are exposed to someone with invasive GAS take antibiotics to help prevent infection.

According to the Centers for Disease Control and Prevention (CDC) Annual Summary of Notifiable Diseases, the annual incidence of invasive GAS disease in the U.S. from 2001-2005 ranged from 1.6 cases/100,000 to 2.04 cases/100,000. Studies have suggested that 85 percent of cases occur sporadically in the community, 4 percent occur in long-term care facilities, and 1 percent occur after close contact with a case.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for invasive group A streptococcus infections.

Epidemiology and Trends

In 2006, there were 127 reported cases of invasive group A streptococcus in Indiana, indicating a rate of 2.01 cases per 100,000 population (Table 1). Males (2.31) were more likely to be reported than females (1.72). The rate for blacks (3.55) was over twice the rate for whites (1.54).

Table 1. GAS Disease Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	127	2.01	548
Race			
Black	20	3.55	68
White	86	1.54	373
Other	0	0	3
Not Reported	21	-	104
Sex			
Female	55	1.72	263
Male	72	2.31	285
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases by year for 2002-2006. Reported cases were lower in 2002 due to GAS being a new reportable disease (October 2000). Invasive GAS disease occurs year-round with a peak incidence normally reported from December through March. As seen in Figure 2, incidence of disease was greatest during the winter months with 66 cases (52%) occurring during December-March. As shown in Figure 3, age-specific rates were greatest for adults aged 70-79 years (6.89), followed by older adults aged 80+ years, and adults aged 60-69 years (2.99). The elderly are more likely to have chronic conditions (cancer, diabetes, blood vessel disease, immune suppression, etc.) that may predispose them to GAS infection. The incidence rates were highest among the following counties reporting five or more cases: Delaware (6.1), Vanderburgh (4.6), and Tippecanoe (3.8). Figure 4 shows counties reporting five or more cases of GAS in 2006.

You can learn more about group A streptococcus disease by visiting the following Web site:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

Figure 1. Group A Streptococcus Cases by Year -- Indiana, 2002-2006

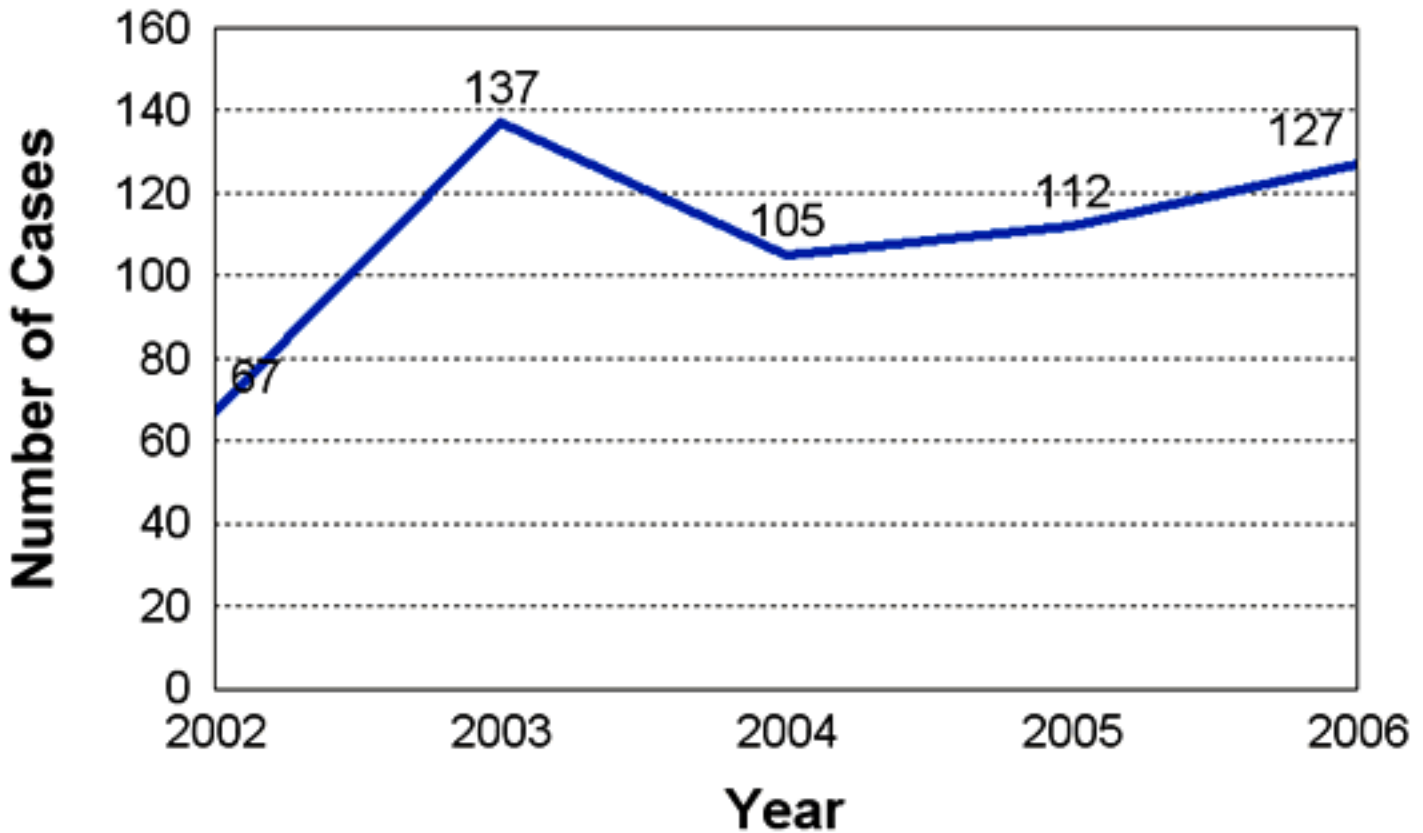


Figure 2. Group A Streptococcus Cases by Month -- Indiana, 2006

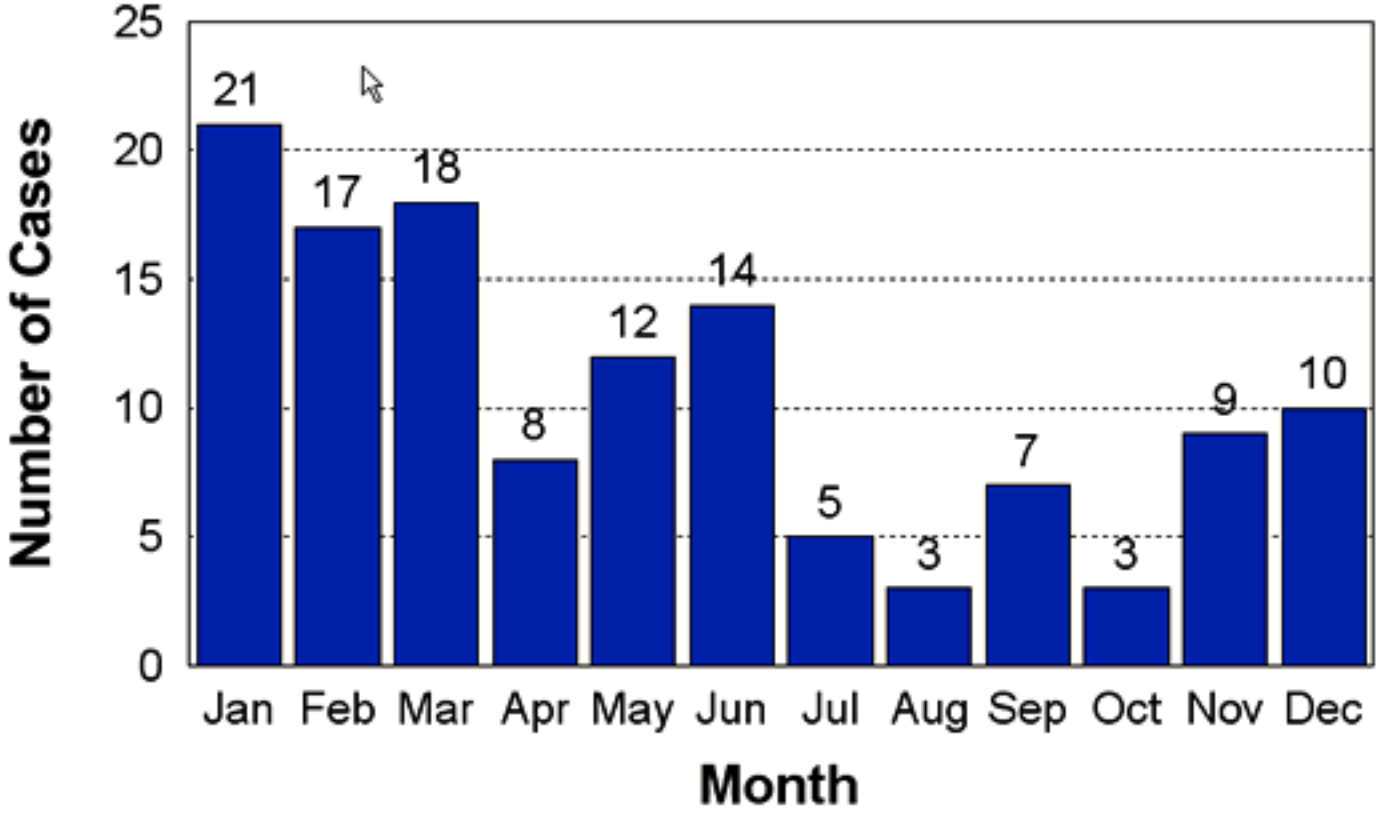


Figure 3. Group A Streptococcus Incidence by Age Group -- Indiana, 2006

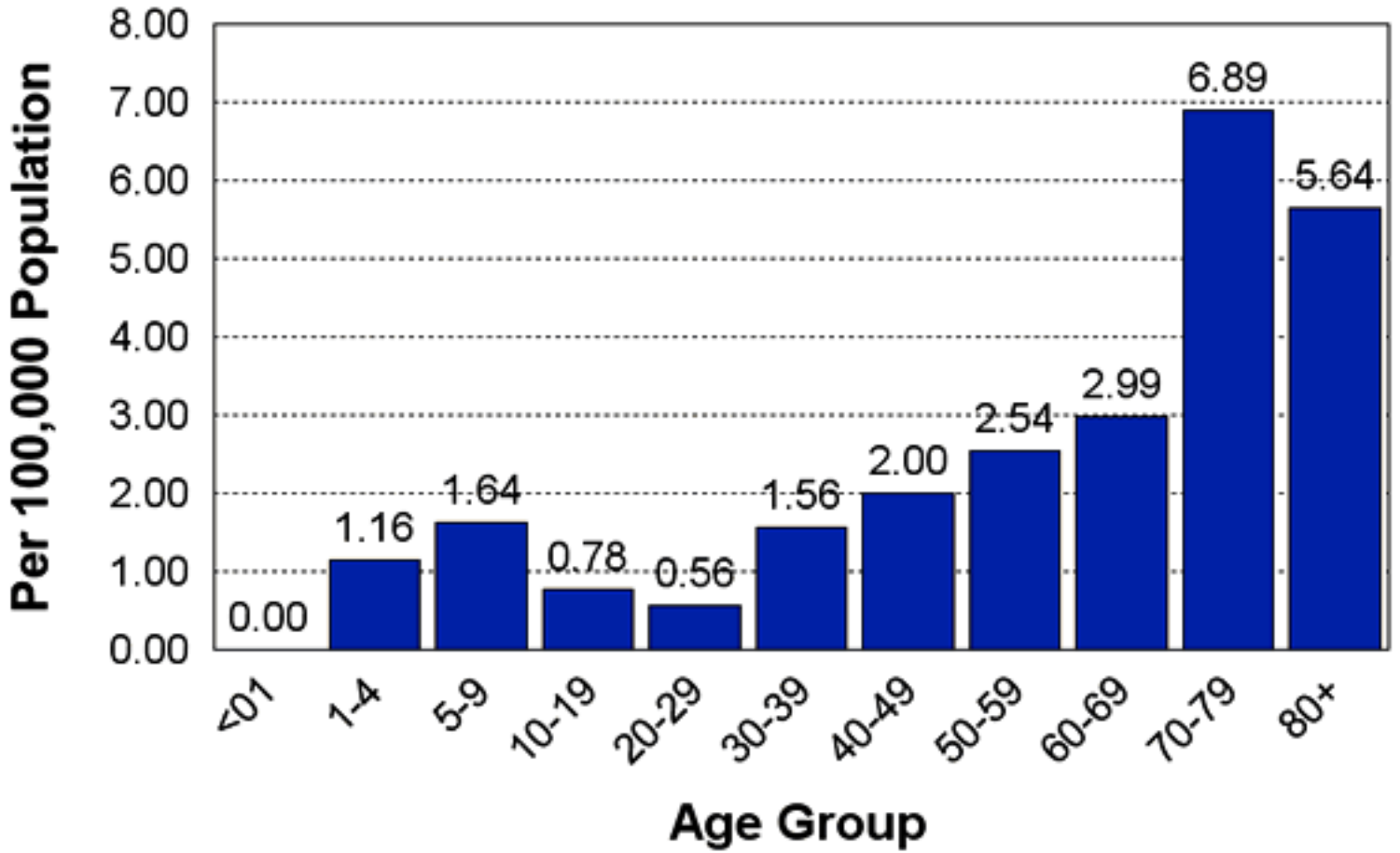
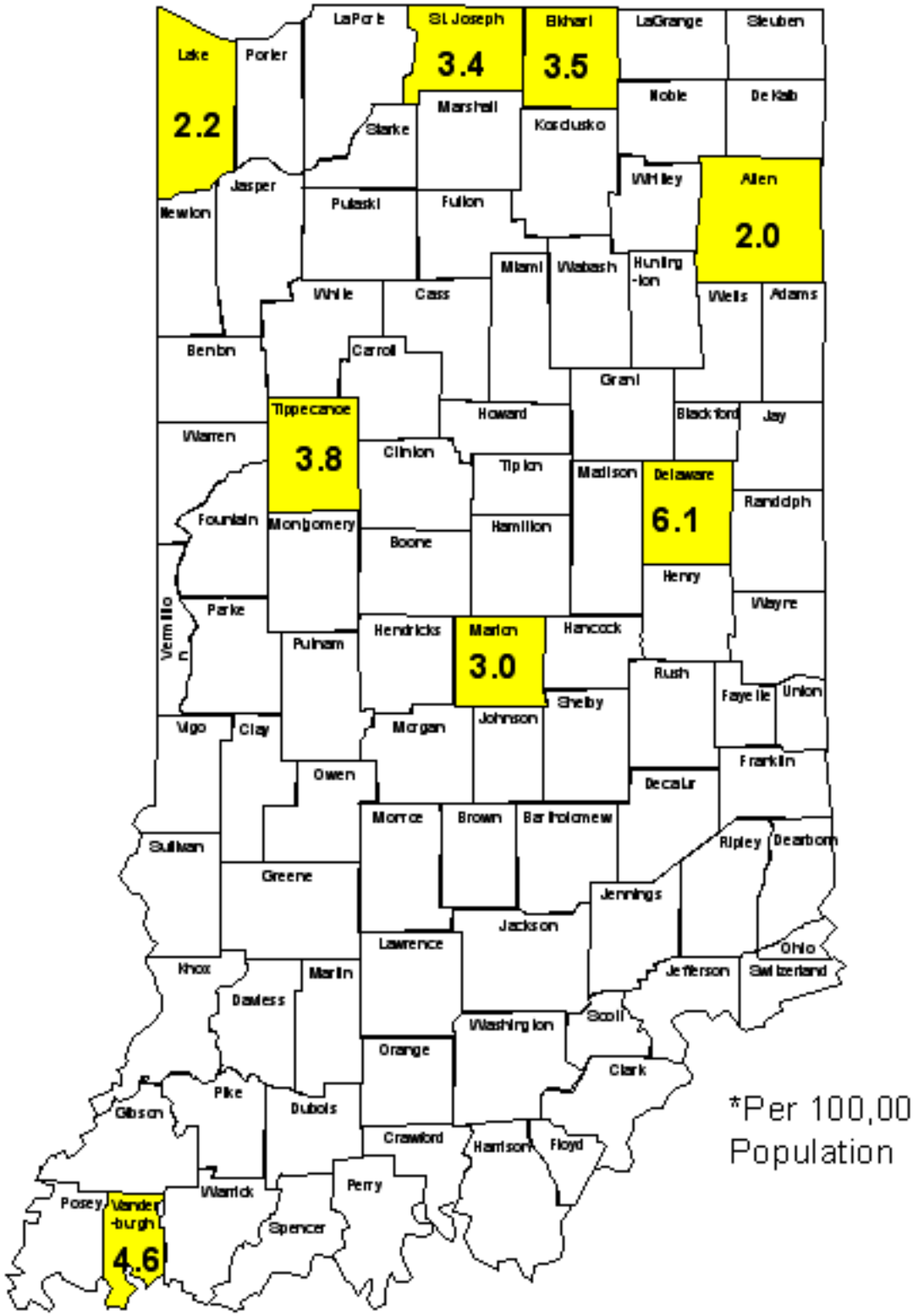


Figure 4. Group A Streptococcus Cases* by County -- Indiana, 2006



*Per 100,00 Population

GROUP B STREPTOCOCCUS

Group B streptococcus (GBS) is caused by the bacteria *Streptococcus agalactiae* and can result in severe illness in babies as well as in adults with certain medical conditions. Transmission of GBS in adults, children, and older infants (one week or older) is not clearly understood. Only invasive GBS is reportable in Indiana.

Public Health Significance

Symptoms of GBS for newborns include fever, difficulty feeding, fussiness, tiredness, or difficulty waking up. In adults, GBS infection can cause mild illness, such as urinary tract infections, but more serious disease in adults can include blood infections and bone and joint infections. Antibiotics are used to treat GBS. Newborns acquire GBS from their mother just before or during the birthing process. Early-onset GBS is defined as invasive cases occurring less than seven days after birth.

Although rare now due to appropriate screening and therapy, GBS is still the most common cause of life-threatening infection in newborns. About 25 percent of pregnant women carry GBS in their rectum or vagina and most of these women show no signs of illness. Persons at risk for GBS infection include newborns whose mothers are infected. Others at greatest risk are persons with chronic diseases such as diabetes, liver failure, and history of stroke or cancer. Rates of disease are higher among African Americans and the elderly (especially if living in a health care facility or confined to bed). Preventing GBS disease in newborns is accomplished by testing women for GBS between 35-37 weeks of pregnancy. If the test is positive, the disease can be prevented in newborns by giving the pregnant women antibiotics during labor. Standard infection control practices, especially for patients in hospitals and health care facilities, help reduce the risk of acquiring GBS.

GBS is not reportable nationally, but the Active Bacterial Core Surveillance (ABCs) Emerging Infections Program Network reported an overall rate of GBS of 7.5 per 100,000 population in the surveillance area. (See the following Web site for a detailed report: http://www.cdc.gov/ncidod/dbmd/abcs/survreports/gbs05.pdf). Blacks were at highest risk in the ABC report, with a rate of 12.8 compared to 6.5 for whites, and infants less than 1 year of age were at highest risk with a rate of 76.8. The ABCs surveillance areas reported a rate for early onset GBS of .35 per 1,000 live births.

Healthy People 2010 Goal

The Healthy People 2010 Goal for group B streptococcus disease is 0.5 cases per 1,000 live births per year. Indiana met that Goal for 2006. No data are currently available to assess prior years.

Epidemiology and Trends

In 2006, there were 233 cases of invasive group B streptococcus disease reported in Indiana, indicating a rate of 3.69 cases per 100,000 (Table 1). The rate for blacks (6.57) was more than twice the rate for whites (2.51). Males (3.73) were more likely to be reported than females (3.62).

Table 1. GBS Disease Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	233	3.69	989
Race			
Black	37	6.57	154
White	140	2.51	605
Other	3	1.71	9
Not Reported	53	-	221
Sex			
Female	116	3.62	494
Male	116	3.73	492
Unknown	1	-	3

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases by year for 2002-2006. Low case numbers from 2002-2004 are due to GBS being a newly reportable disease (October 2000) and not being fully reported during the first years of implementation. A general increase in electronic laboratory reporting in 2005 and 2006 may have contributed to the higher number of reported cases. Although GBS can occur anytime during the year, the incidence of disease was greatest during the late spring months Figure 2. As shown in Figure 3, age-specific rates were highest for infants aged less than 1 year (20.88), followed by older adults aged 80+ years (15.19), and adults aged 70-79 years (14.68). Thirty-four counties reported at least one case of invasive GBS. The incidence rates were highest among the following counties reporting five or more cases: Delaware (9.6), Vigo (8.7), and Madison (8.4). Figure 4 shows counties reporting five or more cases of GBS in 2006.

Eighteen cases of invasive newborn (infants <7 days) GBS disease occurred in 2006, for a rate of 0.20 case per 1,000 live births, which is below the Healthy People 2010 Goal of 0.50 per 1,000 live births. Seventy-two percent (13/18) of newborn cases occurred among blacks.

You can learn more about group B streptococcus by visiting the following Web site:
http://www.cdc.gov/groupbstrep/

Figure 1. Group B Streptococcus Cases by Year -- Indiana, 2002-2006

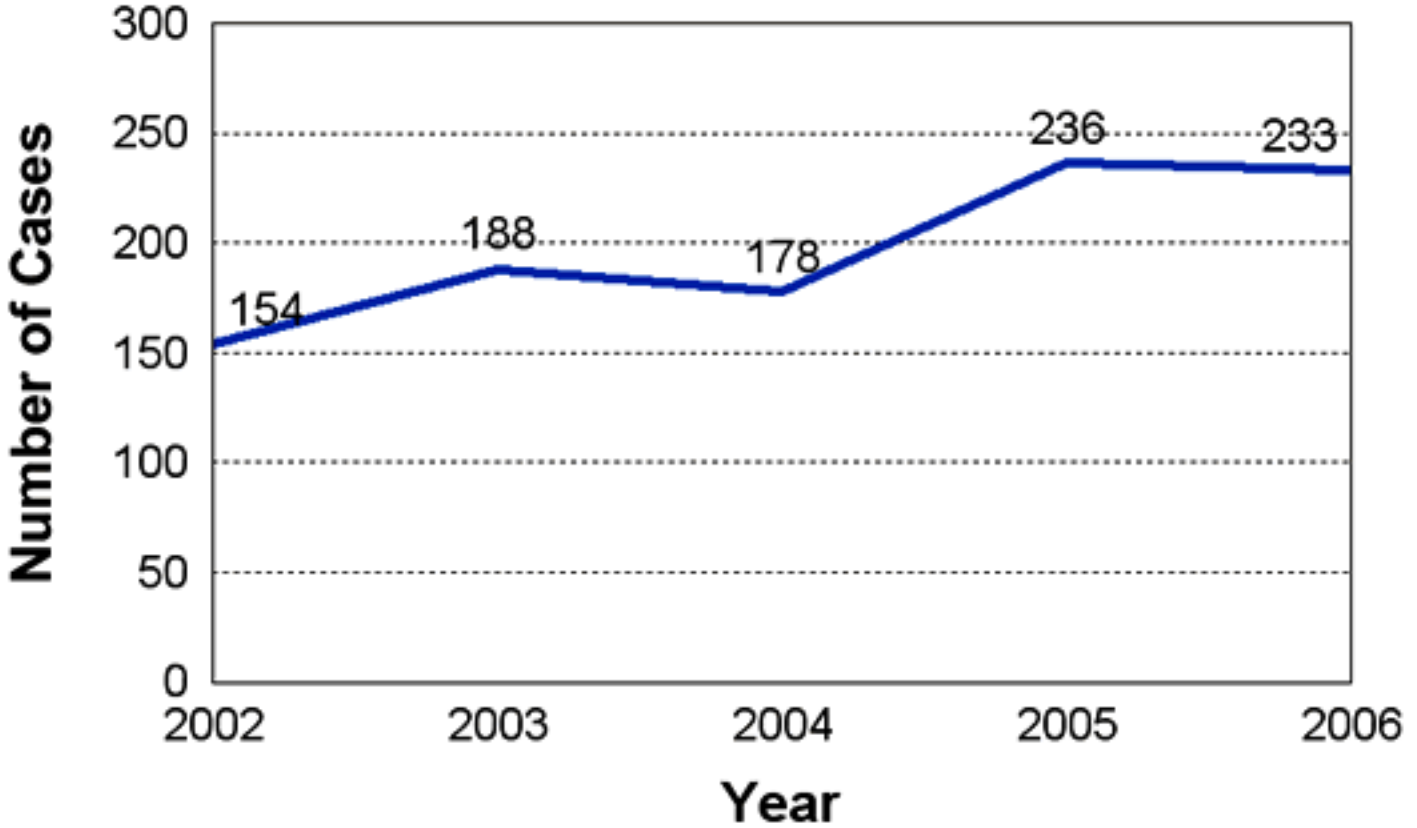


Figure 2. Group B Streptococcus Cases by Month -- Indiana, 2006

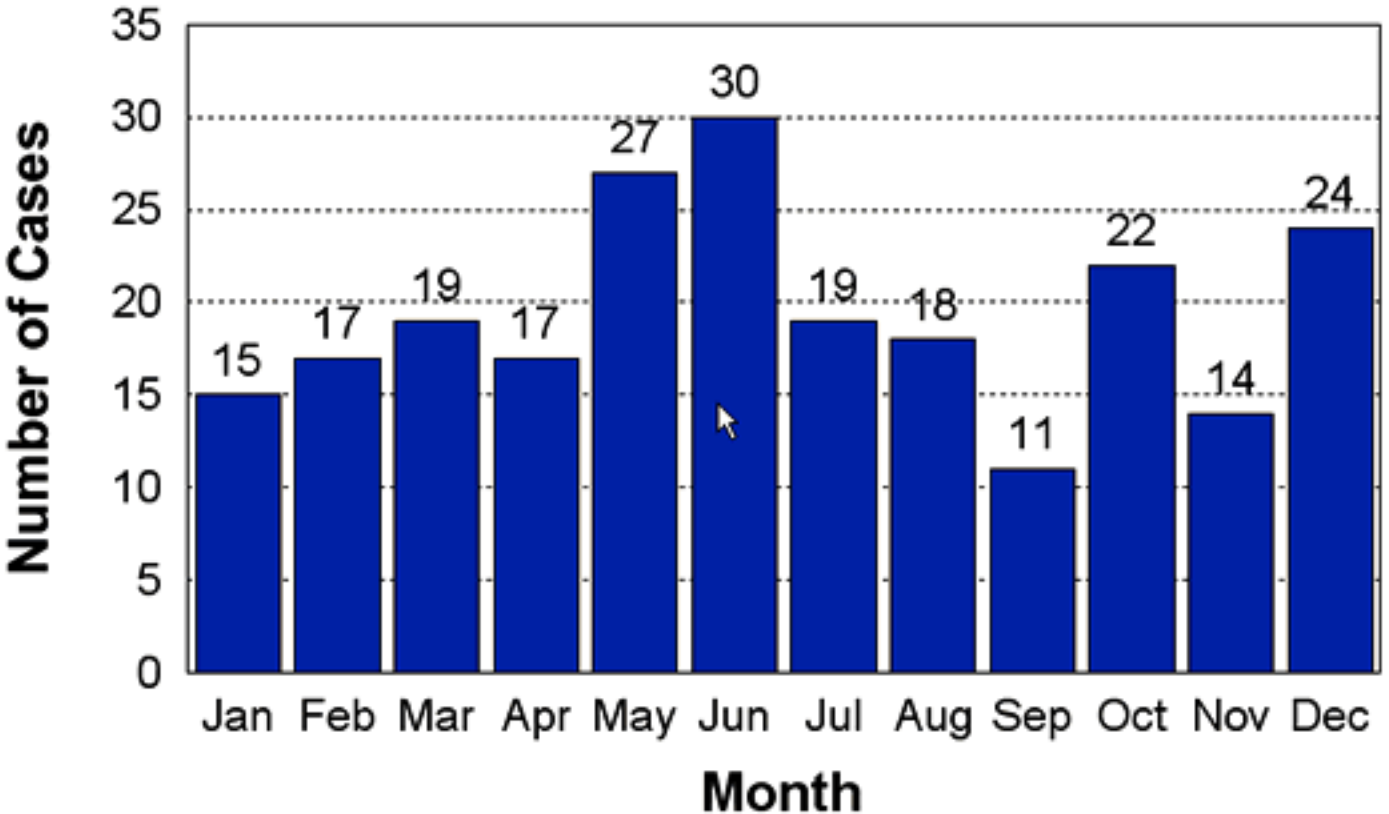
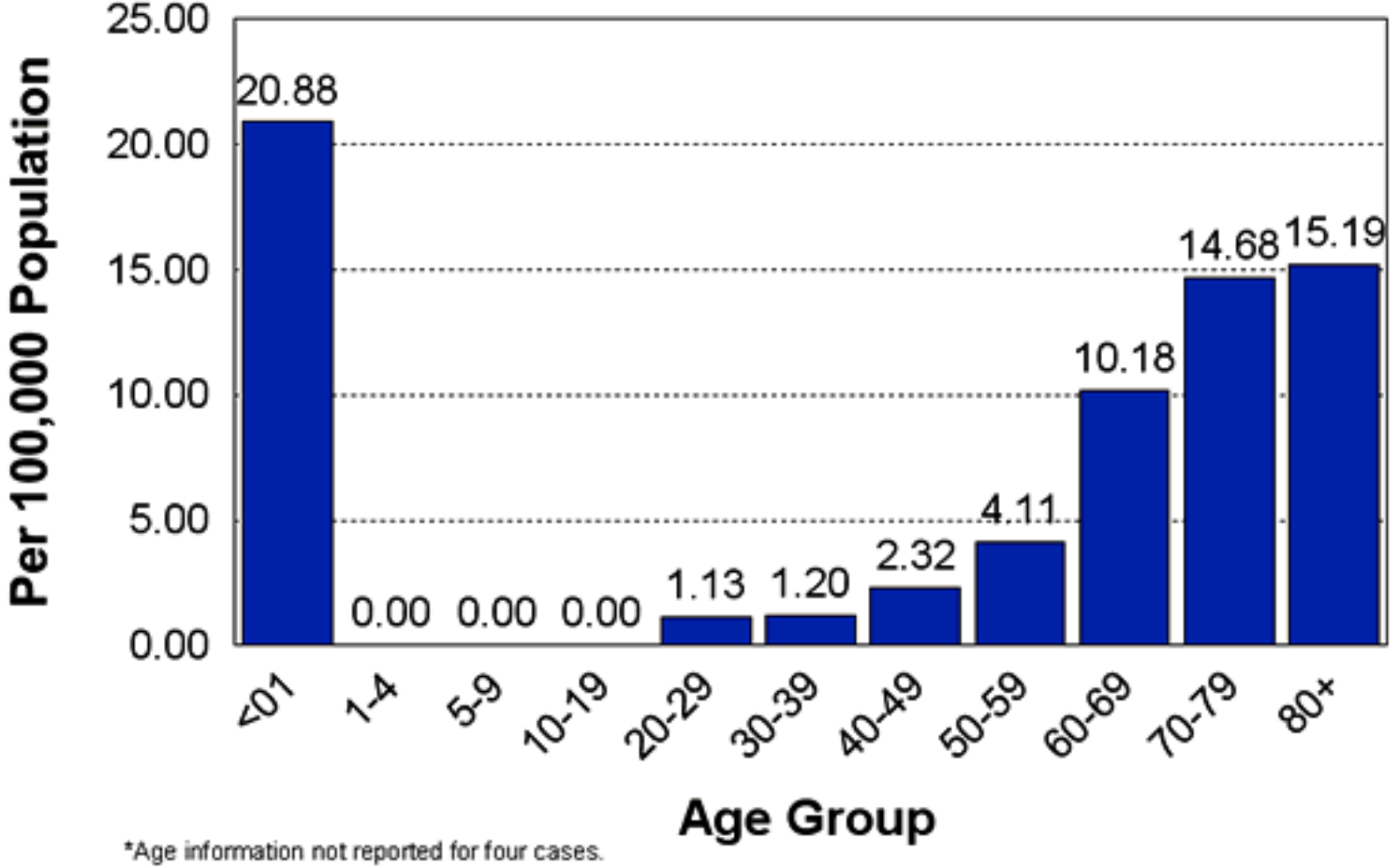
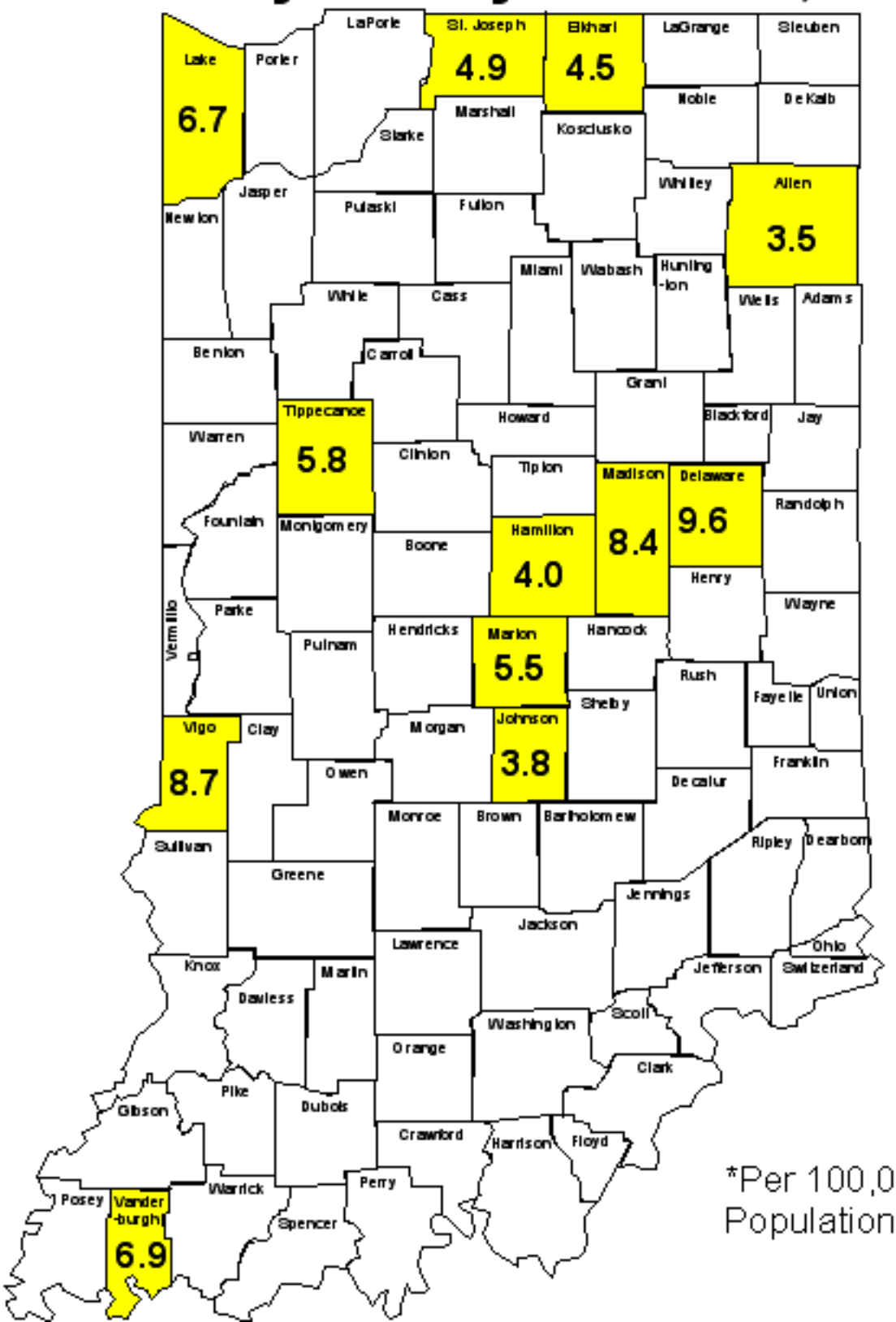


Figure 3. Group B Streptococcus Incidence by Age Group* -- Indiana, 2006



*Age information not reported for four cases.

Figure 4. Group B Streptococcus Cases* by County -- Indiana, 2006



TETANUS

Tetanus is an acute, often fatal disease caused by an exotoxin produced by the bacterium *Clostridium tetani*. It is characterized by generalized rigidity and convulsive spasms of skeletal muscles. The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized. Tetanus bacteria are commonly found in the environment. Transmission is primarily via contaminated wounds, which can either be apparent or unapparent.

Public Health Significance

The initial symptoms of tetanus are lockjaw and facial spasms, followed by neck stiffness, difficulty swallowing, stiff abdominal muscles, fever, and elevated blood pressure. Symptoms appear 3-21 days after infection.

Tetanus is a vaccine-preventable illness. Achieving and maintaining high vaccination rates for adults as well as infants and children will help to eliminate tetanus. Although the illness is rare in the U.S., it is still common in some countries. Antibiotics are available for the treatment of tetanus.

Healthy People 2010 Goal

The Healthy People 2010 Goal for tetanus is total elimination of the disease in people less than 35 years of age. Indiana met that Goal during the five-year reporting period 2002-2006, except in 2006.

Epidemiology and Trends

In 2006, two cases of tetanus were reported in Indiana. One case was younger than 35 years of age. Both cases of tetanus reported in 2006 occurred in persons who had either never been vaccinated or had not received a booster of the tetanus vaccine in the 10 years preceding the illness. Almost all cases of tetanus reported nationally occur in persons who have either never been vaccinated or have not had a booster in the 10 years preceding the illness. During the five-year period 2002-2006, four cases of tetanus were reported in Indiana.

You can learn more about tetanus by visiting the following Web site:

http://www.cdc.gov/vaccines/vpd-vac/tetanus/default.htm

TOXIC SHOCK SYNDROME

Toxic Shock Syndrome (TSS) is a severe illness caused by a bacterial toxin. Most cases of TSS have been associated with strains of *Staphylococcus aureus* producing toxic shock syndrome toxin-1.

Public Health Significance
Symptoms of toxic shock syndrome include sudden onset of high fever, vomiting, profuse watery diarrhea, and muscle pain followed by hypotension and, in severe cases, shock.

Although most early cases (1980s) of TSS occurred in women during menstruation, and most with vaginal tampon use, only 50 percent are now associated with menses. Other risk factors include use of contraceptive diaphragms and vaginal contraceptive sponges and infection following childbirth or abortion. Although very rare, it is possible for anyone to develop TSS in the course of a *Staphylococcus aureus* infection. The risk of menstrual TSS can be reduced by avoiding the use of highly absorbent vaginal tampons, using tampons intermittently, and using less absorbent tampons.

Antibiotics are available for treatment of toxic shock syndrome.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for toxic shock syndrome.

Epidemiology and Trends
There was one reported case of toxic shock syndrome in Indiana in 2006 and only four reported cases during the five-year period 2002-2006.

You can learn more about toxic shock syndrome by visiting the following Web site:
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/toxicshock_t.htm

TRICHINOSIS

Trichinosis is caused by parasites from the genus *Trichinella*. There are a number of species in this genus, but the one with the most historical association with human illness is *T. spiralis*. *T. spiralis* is widely disseminated and has been reported in up to 150 species. Human infections have been traditionally related to consumption of undercooked pork products containing the cyst of infective larva. The parasite larva matures in the small intestinal tract, releasing larva that penetrate the intestinal wall and migrate to muscle tissue where they encyst.

Public Health Significance
Symptoms of trichinosis in humans are nausea, vomiting, fatigue, fever, and abdominal discomfort. Symptoms of muscle infection include headache, fever, chills, cough, eye swelling, aching joints, muscle pain, and itchy skin. Antiparasitic medication can be used to treat the infection in the early stages; however once the parasite has invaded the muscles, treatment is limited to supportive care. Modern swine farming practices have reduced the presence of this parasite in pork, and with education on proper cooking and/or freezing of pork, the incidence of trichinosis has been greatly reduced.

Prevention can be accomplished by cooking meat products to an internal temperature of 170 degrees Fahrenheit or by freezing pork products less than 6 inches thick at 5 degrees Fahrenheit for 20 days. Cooking of garbage fed to swine as well as preventing swine from consuming rat carcasses are important practices in reducing the infection in swine. Salting, drying, smoking, and/or microwaving are not reliable methods of destroying infective cysts.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for trichinosis.

Epidemiology and Trends
No cases of trichinosis were reported in Indiana during the five-year period 2002-2006.

You can learn more about trichinosis by visiting the following Web site:
http://www.cdc.gov/ncidod/dpd/parasites/trichinosis/default.htm

TULAREMIA

Tularemia is caused by the bacterium *Francisella tularensis* and can be transmitted by ticks; biting flies; handling tissues of infected animals; contaminated water, soil, and vegetation; and by inhalation of aerosols. The normal reservoirs are a variety of small mammals such as rabbits, hares, squirrels, voles, mice, and rats. Although rare, tularemia is highly contagious and as few as 10 organisms are thought to be capable of establishing an infection.

Public Health Significance
Tularemia can infect the skin, mucous membranes, gastrointestinal tract, lungs, or disseminate throughout the body. It is not transmissible from person to person. Symptoms of tularemia include sudden fever, chills, headache, joint pain, diarrhea, and dry cough. Most people experience symptoms of tularemia within 2-10 days of exposure to the bacteria. Treatment with antibiotics is available for tularemia. No vaccine is currently available in the U.S.

Tularemia occurs in the rural western and south-central states. Although anyone can develop tularemia, people most at risk include hunters, wildlife management personnel, landscapers, and veterinarians. Tick season (usually June–September) and hunting season are peak times for infection. The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents, avoid ingesting uncooked wild game and untreated water sources, and wear long-sleeved clothing and use insect repellent.

The tularemia bacteria is classified as a Category A potential bioterrorism agent*. It is easily aerosolized and highly infective.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for tularemia.

Epidemiology and Trends
There were no reported cases of tularemia in Indiana in 2006, and only four reported cases during the five-year reporting period 2002-2006.

You can learn more about tularemia by visiting the following Web sites:
http://www.bt.cdc.gov/agent/tularemia/index.asp

*Bioterrorism Agent List:
http://www.bt.cdc.gov/agent/agentlist-category.asp#a

TYPHOID FEVER

Typhoid fever is a life-threatening highly contagious disease caused by *Salmonella typhi* bacteria, which are found in the stool of infected persons. Unlike other *Salmonella* bacteria, *S. typhi* is not found in animals. Typhoid fever is extremely rare in the U.S. and is almost always related to travel to a country where typhoid fever is common, such as Asia, Africa, and Latin America.

People become infected with *S. typhi* by ingesting feces from an infected person (fecal-oral route), usually because of poor hand hygiene after using the restroom. Transmission can be through person-to-person contact, handling food to be eaten by others, and touching items such as soiled diapers or linens and then touching your mouth. Water can also be contaminated with *S. typhi* by raw sewage and, thus, contaminate raw produce.

Public Health Significance
Symptoms of typhoid fever include fever, chills, weakness, headache, abdominal pain, loss of appetite, nausea, vomiting, diarrhea or constipation, and flat, rose-colored rash. Symptoms usually begin within 8-14 days (range of 3-60 days) after exposure. The illness can be mild with a low-grade fever or severe with multiple complications. Persons given antibiotics usually begin to feel better within 2-3 days. Infected people may carry *S. typhi* in their bodies for weeks or months without symptoms and unknowingly infect others.

Antibiotics are available to treat the illness. Most people who take medication recover completely.

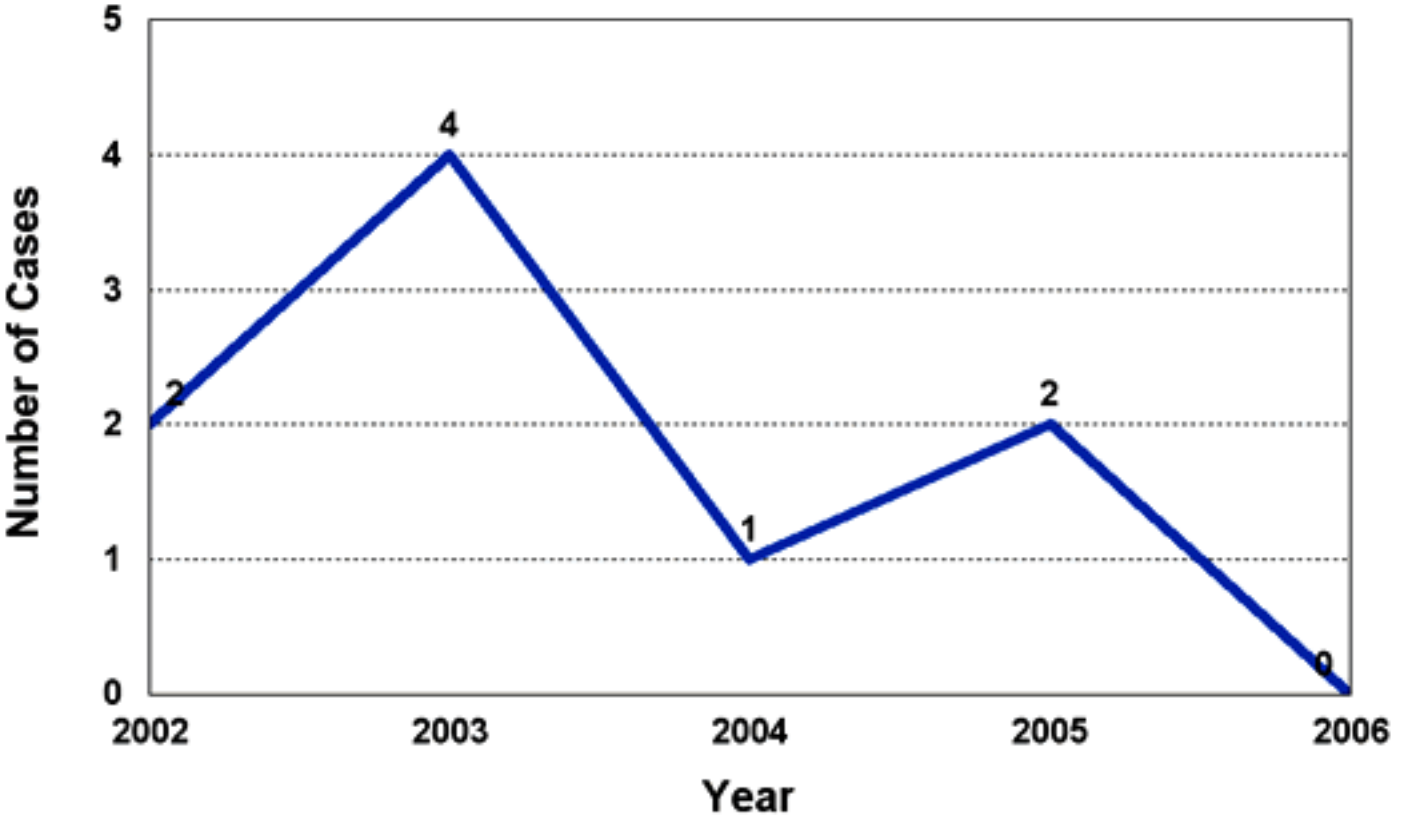
Healthy People 2010 Goal
There is no Healthy People 2010 Goal for typhoid fever.

Epidemiology and Trends
In 2006, there were no reported cases of typhoid fever in Indiana and only nine reported cases during the five-year period 2002-2006. Figure 1 shows the number of reported typhoid fever cases for the five-year period 2002-2006.

There were no outbreaks associated with typhoid fever in 2006.

You can learn more about typhoid fever by visiting the following Web sites:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm
www.cdc.gov/vaccines/vpd-vac/typhoid/default.htm

Figure 1. Typhoid Fever Cases by Year
Indiana, 2002-2006



TYPHUS FEVER

The term typhus fever refers to three different diseases: epidemic, scrub, and murine typhus. Epidemic typhus fever is caused by *Rickettsia prowazekii* and is transmitted human to human by the human body louse, *Pediculus humanus corporis*. Scrub typhus, which occurs in Southeast Asia, is caused by *Rickettsia tsutsugamush*i and is transmitted to humans by certain mites who also serve as the reservoir. Murine typhus (also called "endemic typhus") occurs in Indiana and is caused by *Rickettsia typhi*.

Traditionally, murine typhus has been transmitted from the natural reservoir, rats, by the rat flea. Fleas from other animals such as opossum and cats may also be involved in the transmission of typhus. Prior to eliminating and controlling rats in the U.S., murine typhus was frequently reported. Now, less than 100 typhus cases are reported per year in the U.S.

Public Health Significance
Symptoms of murine typhus include headache, muscle pain, high fever, rash, and dry cough and usually last 2-3 weeks. People at greatest risk for murine typhus include those exposed to infected rat fleas and feces, or exposure to other infected animals such as cats, opossum, raccoons, and skunks. There is no available vaccine in the U.S. Murine typhus can be successfully treated with antibiotics.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for typhus.

Epidemiology and Trends
There were no reported cases of typhus in Indiana in 2006 or during the five-year period 2002-2006.

You can learn more about typhus by visiting the following Web sites:
http://wwwn.cdc.gov/travel/yellowBookCh4-Rickettsial.aspx

VARICELLA

Varicella infection (also known as chickenpox) is caused by the varicella-zoster virus, which is part of the herpesvirus family. The virus is transmitted from person to person by direct contact, droplet, or airborne spread of vesicle fluid or secretions of the respiratory tract. Though commonly associated with children, anyone who has not had varicella can become infected. Varicella is a vaccine-preventable disease. Although varicella disease often presents as a mild infection, it can cause serious complications including pneumonia, encephalitis, bacterial infections, and even death.

Public Health Significance

Varicella causes red, itchy blister-like spots that appear as a rash first on the abdomen or back. Other symptoms of varicella include fever, abdominal pain, sore throat, and headache. Onset of symptoms usually occurs 10-21 days after initial exposure.

Deaths due to varicella still occur in Indiana. As long as individuals as well as health care providers view varicella as a mild disease, it will be a challenge to increase immunization rates. Varicella vaccination not only provides protection from contracting the disease, but data reflect milder cases of severity in individuals with breakthrough disease.

Healthy People 2010 Goal

The Healthy People 2010 Goal for varicella is less than 400,000 cases nationally for persons less than 18 years of age. Data are currently unavailable to assess Indiana's progress.

Epidemiology and Trends

In 2006, there were 66 reported cases of varicella associated with hospitalization in Indiana, for a rate of 1.05 cases per 100,000 population (Table 1). Females (1.09) were slightly more likely to be reported than males (1.00). The rate for other races (7.43) was higher than that for blacks (2.13) or whites (0.74). There were no deaths in 2006 and only one death during the five-year reporting period from 2002-2006.

Table 1. **Hospitalized Varicella Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Total	66	1.05	436
Deaths	0		4
Race			
Black	12	2.13	68
White	41	0.74	272
Other	13	7.43	96
Not Reported	0	-	0
Sex			
Female	35	1.09	208
Male	31	1.00	228
Not reported	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

**Data provided by Indiana Hospital and Health Association

Figure 1 shows reported cases by year from 2002-2006. As Figure 2 shows, age-specific rates were greatest for infants aged less than 1 year (6.96), followed by children aged 5-9 years (2.57), and older adults aged 70+ years (2.48).

Varicella Sentinel Surveillance System

Because Indiana does not require reporting for varicella, a voluntary sentinel surveillance reporting system has been in place to assist in data collection for varicella disease. This information is collected from 329 volunteer reporting sites throughout Indiana. The sentinel sites include 167 schools, 128 physicians, 19 child-care centers, and 15 sites listed as "other". In 2006, there were 932 varicella cases reported by sentinel sites. School-age children carry over 84 percent of the disease burden reported in the sentinel data. These data may reflect inherent biases due to several factors, e.g., the schools were the most common reporters, and volunteer reporters may not reflect disease incidence throughout Indiana as a whole.

The severity of disease reported in the sentinel system was categorized in three groups: mild, moderate, and severe. Mild cases were defined as 50 or fewer spots. Moderate was defined as 50-500 spots. Severe cases were considered to be more than 500 spots or "spots clumped so closely together that little normal skin is visible." Of the 932 cases reported, 6.2 percent (58) were of unknown severity. Although 537 cases of breakthrough disease were reported in individuals who received the vaccine, 68 percent (367) were categorized as mild disease. Less than 1 percent (5) of breakthrough disease was classified as severe disease, whereas 14 percent (49) of the unimmunized population had reported severe disease.

Table 2. Summary of Varicella Cases by Vaccination Status and Severity
(2006 Data Collected from the Indiana Varicella Sentinel Surveillance System)

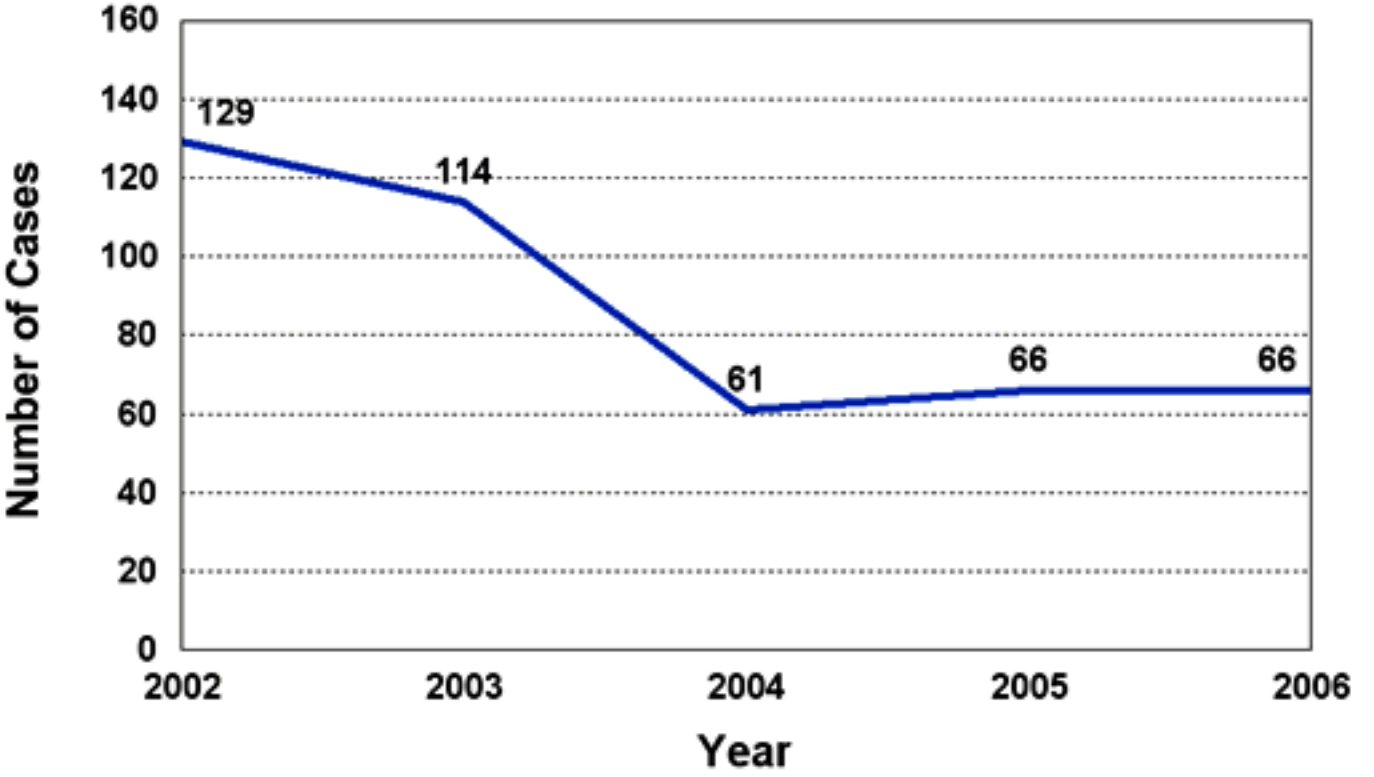
Immune Status	Mild Cases	Moderate Cases	Severe Cases	Unknown
Immunized	367	183	5	32
Unimmunized	91	179	49	26

The cases reported from the sentinel reporting system did not require a physician's diagnosis.

You can learn more about varicella visit the following Web sites:

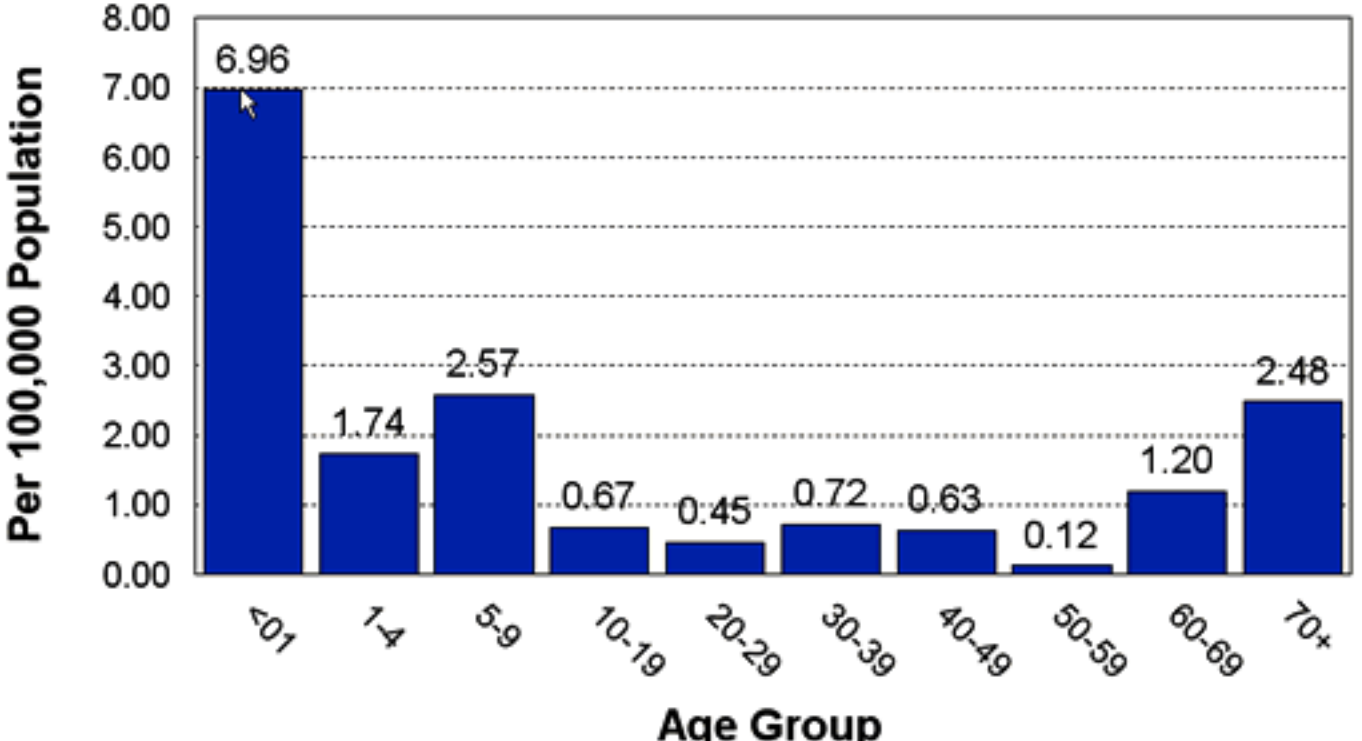
http://www.medhelp.org/NIHlib/GF-664.html
http://www.cdc.gov/vaccines/vpd-vac/varicella/default.htm

Figure 1. Varicella* Cases by Year
Indiana, 2002-2006



*Hospitalizations only

Figure 2. Varicella* Incidence by Age Group Indiana, 2006



*Hospitalizations only

VIBRIOSIS

Vibriosis is an illness caused by the bacterium *Vibrio parahaemolyticus*. The bacteria normally live in warm seawater and cause disease in those who eat contaminated seafood or have an open wound exposed to seawater. The bacteria are more common in warmer months; thus, fish and shellfish are more likely to be contaminated in the summer.

Public Health Significance
Ingestion of *Vibrio parahaemolyticus* can cause vomiting, diarrhea, fever, and abdominal cramps. The illness is usually mild or moderate and runs its course in 2-3 days. In severe cases, hospitalization may be required. Symptoms usually occur 12-24 hours after eating contaminated food. Most cases of vibriosis are self-limited; however, antibiotics are available for severe cases. Although anyone can become infected with the bacterium, people who eat seafood, especially fish and shellfish, are at greatest risk for infection.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for vibriosis.

Epidemiology and Trends
In 2006, there were no reported cases of vibriosis in Indiana and only six reported cases during the five-year period 2002-2006.

You can learn more about vibriosis by visiting the following Web site:
http://www.cdc.gov/nczved/dfbmd/disease_listing/vibriop_gi.html

WEST NILE VIRUS

West Nile virus (WNV) is a viral infection that was first identified in Indiana in 2001, when WNV was confirmed in 7 counties (47 birds and 1 horse). In 2006, Indiana was one of 44 states, including Washington, D.C., to report human WNV cases. Nationally in 2006, there were 4,269 human cases with 177 deaths. Indiana had 62 reported cases with 2 deaths. Most infections are contracted through the bite of an infected mosquito.

Public Health Significance

Symptoms of WNV include fever, headache, body aches, and skin rash. Although rare, WNV can enter the brain and cause inflammation either of the brain or the tissue that surrounds the brain. Most people infected with WNV usually have very mild or no symptoms. Symptoms of WNV usually appear 3-14 days after exposure. There is no specific treatment or vaccine for WNV.

According to the Centers for Disease Control and Prevention, the easiest and best way to avoid WNV is to prevent mosquito bites by adhering to the following:

- Use insect repellent.
- Wear long sleeves and long pants when mosquitoes are most active, usually at dusk and dawn, or consider staying indoors during these hours.
- Keep window and door screens free from tears and in good working condition to help keep mosquitoes out.
- Get rid of mosquito-breeding sites by emptying standing water from flower pots, buckets, and barrels. Change the water in pet dishes and replace the water in bird baths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and on their sides when not in use.

West Nile virus is endemic in Indiana, and virus activity will continue to occur during the mosquito-breeding season in future years. The extent of activity will depend on the weather, presence of mosquito and bird populations for virus amplification, equine vaccination rates, and human activities to prevent transmission.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for West Nile virus.

Epidemiology and Trends

In 2006, the 62 reported cases of WNV in Indiana represented a rate of about 1 case per 100,000 population (Table 1).

Table 1. WNV Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	62	0.98	440
Deaths	2		18
Race			
Black	4	0.71	21
White	52	0.93	343
Other	1	0.57	3
Not Reported	5	-	73
Sex			
Female	19	0.59	204
Male	43	1.38	235
Unknown	0	-	1

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases by year for 2002-2006. In 2006, the initial case had an onset of illness date starting in late May, followed by a four-week period without any reported cases (Figure 2). Reported cases reoccurred with onset dates in early July. Most cases of WNV occurred in August-September. The last reported case occurred in mid-October. Seventy-nine percent of reported cases were in individuals aged 40 years and older (Figure 3). Nineteen Indiana counties reported human West Nile virus cases in 2006. However, only four counties reported five or more cases. Figure 4 shows counties reporting five or more cases of WNV in 2006.

You can learn more about West Nile virus by visiting the following Web site:
http://www.cdc.gov/ncidod/dvbid/westnile/index.htm

Figure 1. West Nile Virus Cases by Year Indiana, 2002-2006

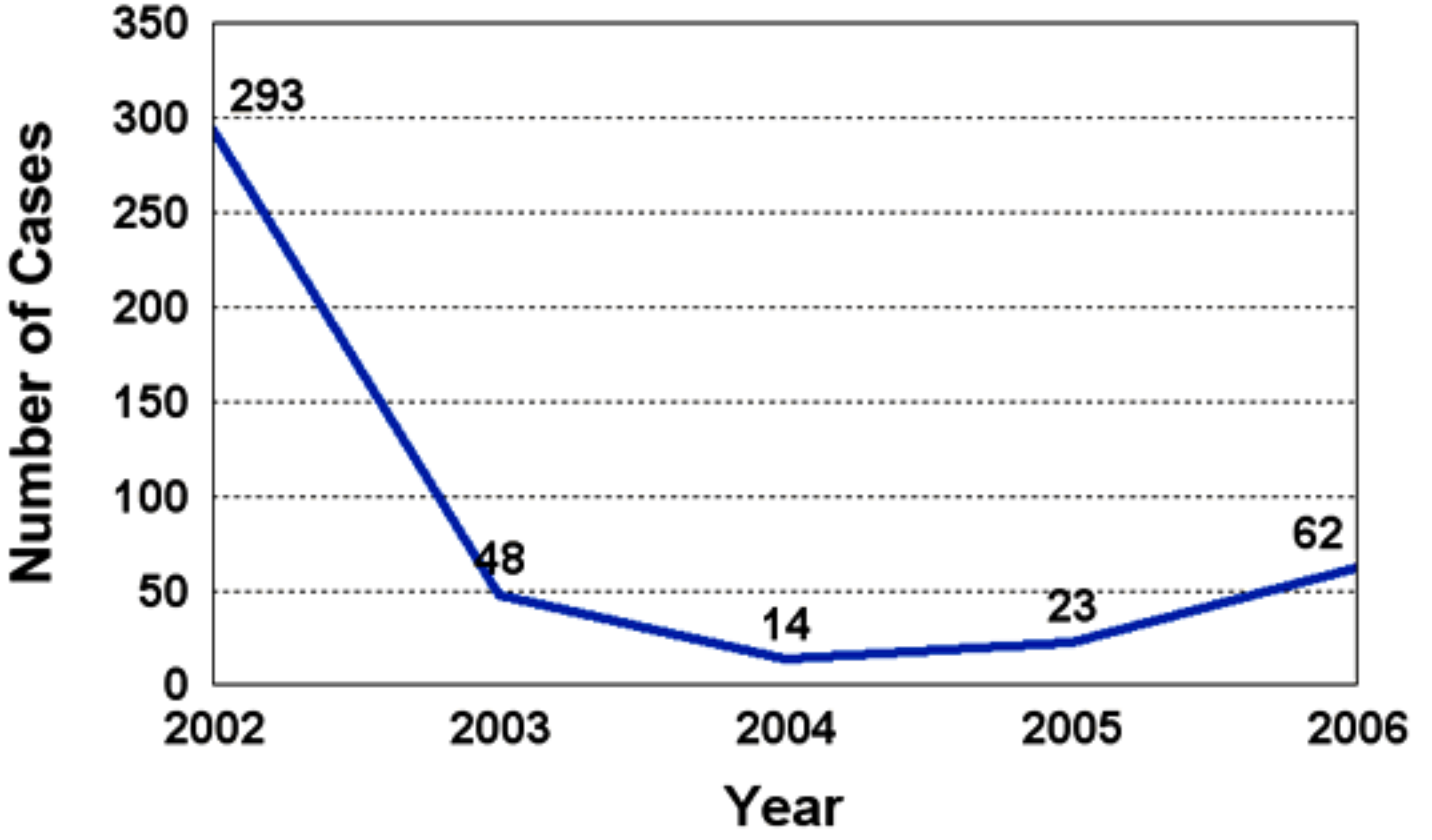
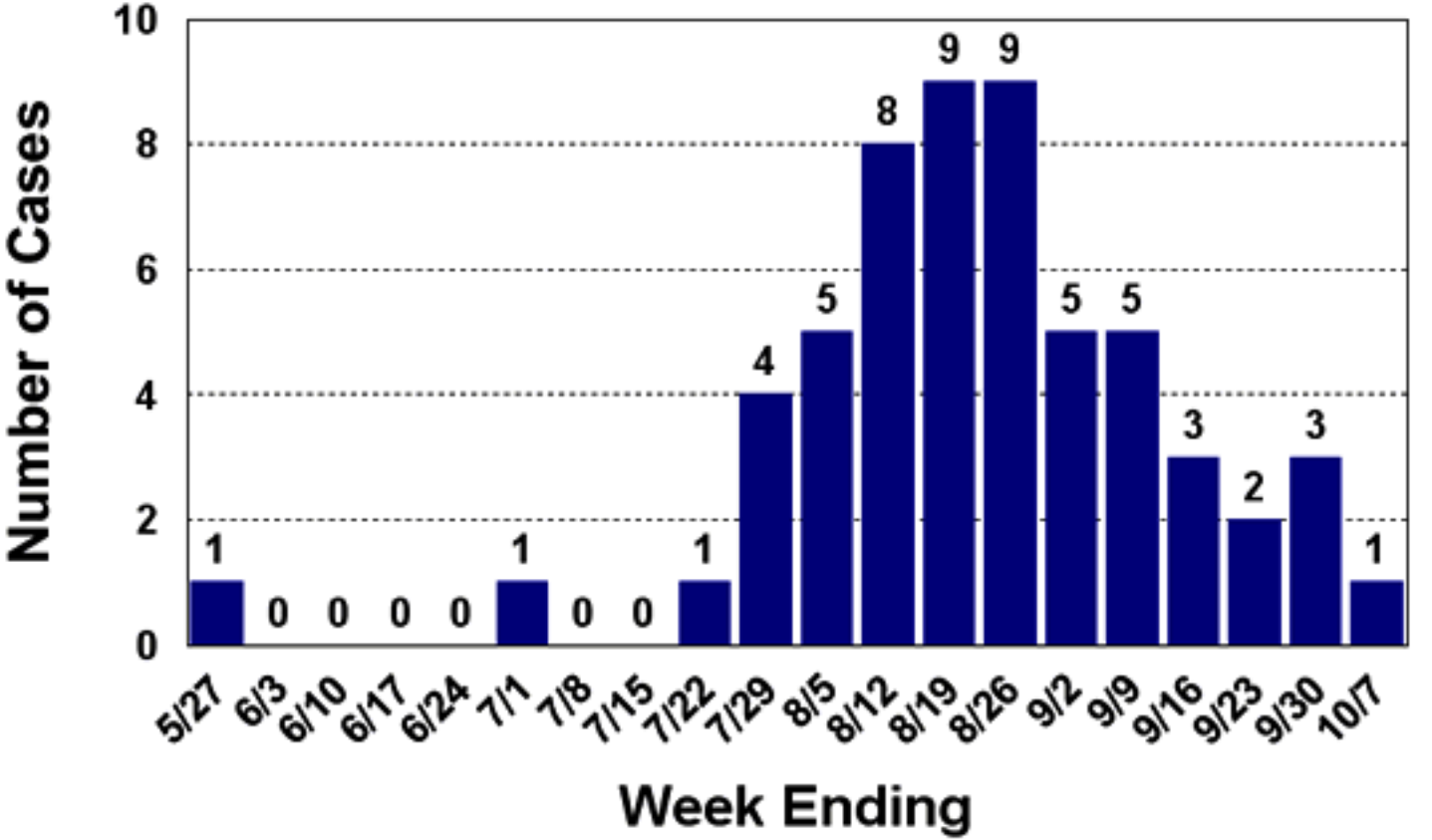


Figure 2. West Nile Virus Cases by Onset Date* -- Indiana, 2006



*Onset date not reported for five cases.

Figure 3. West Nile Virus Cases by Age Group -- Indiana, 2006

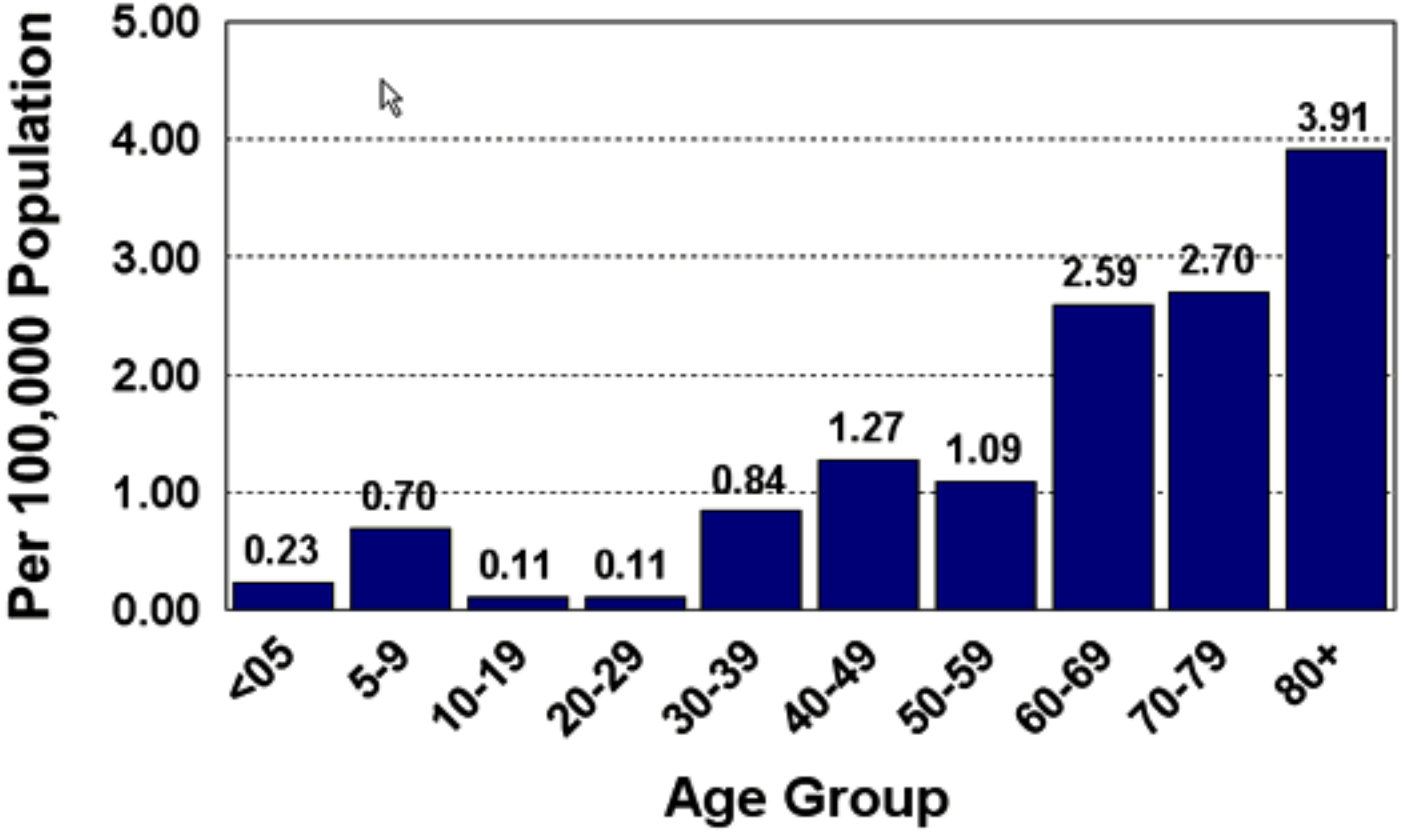
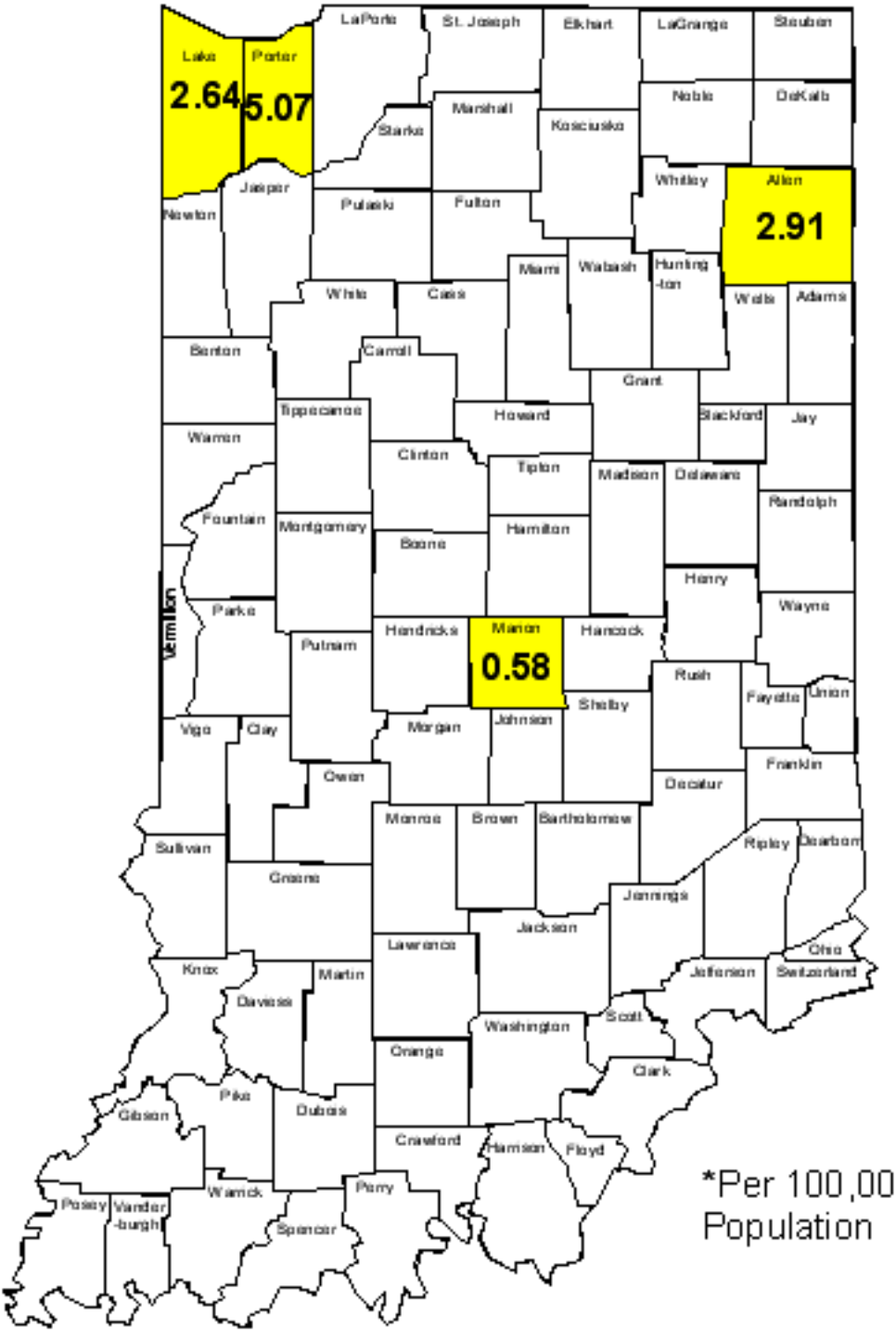


Figure 4. West Nile Virus by County -- Indiana, 2006



YELLOW FEVER

Yellow fever is a viral disease transmitted to humans by infected mosquitoes. The disease occurs in tropical and subtropical areas including West and Central Africa and in parts of South America. Yellow fever is a very rare cause of illness in U.S. travelers.

Public Health Significance
Symptoms of yellow fever may include influenza-like symptoms such as fever, headache, and vomiting to more severe symptoms such as shock, liver and kidney failure, and bleeding. Symptoms usually appear 3-6 days after becoming infected.

The vaccine for yellow fever is only administered in designated vaccination centers, and people traveling to countries where yellow fever infection occurs should be vaccinated. Many countries have regulations and vaccine requirements that must be met before travelers are allowed to enter.

Healthy People 2010 Goal
There is no Healthy People 2010 Goal for yellow fever.

Epidemiology and Trends
No cases of yellow fever were reported in Indiana during the five-year period 2002-2006.

You can learn more about yellow fever by visiting the following Web site:
http://www.cdc.gov/ncidod/dvbid/yellowfever/index.htm

YERSINIOSIS

Yersiniosis is a disease caused by *Yersinia enterocolitica* bacteria, which live in livestock and domestic animals and can be found in untreated water. The bacteria are also found in unpasteurized milk, and raw or undercooked meat. People become infected with *Yersinia* by consuming (fecal-oral route) water and raw produce contaminated with animal or human feces. Infection can also occur after contact with symptomatic infected animals. Children are infected more often than adults.

Transmission of *Yersinia* can be through person-to-person contact, handling food to be eaten by others, and touching items such as soiled diapers or linens and then touching your mouth. Infected persons can shed the bacteria in their stool for several months if untreated.

Public Health Significance

Symptoms of yersiniosis include fever, abdominal pain, diarrhea, and vomiting. Symptoms usually begin 3-7 days (up to 10 days) after exposure and last 1-3 weeks. In older children and adults, pain in the lower right side and fever can be the main symptoms and may be confused with appendicitis. Some people may also have a sore throat. Most people recover within 5-7 days without medical treatment. A doctor may prescribe antibiotics for people with severe infection.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for yersiniosis.

Epidemiology and Trends

In 2006, there were 12 cases of yersiniosis reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1).

Table 1. Yersiniosis Cases by Race and Sex, Indiana, 2006

	2006		2002-2006
	Cases	**Rate***	**Total**
Indiana	12	0.19	46
Race			
Black	2	0.36	6
White	6	0.11	26
Other	3	1.71	5
Not Reported	1	-	9
Sex			
Female	6	0.19	25
Male	6	0.19	21
Unknown	0	-	0

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2006

Figure 1 shows reported cases by year for 2002-2006. Although yersiniosis has a winter seasonal pattern, incidence of disease can occur at any time (Figure 2). Figure 3 shows age-specific rates were greatest for infants less than 1 year of age (2.32), followed by preschoolers aged 1-4 years (0.58). Nine Indiana counties reported yersiniosis cases in 2006. However, no county reported five or more cases.

There were no outbreaks of yersiniosis reported in Indiana in 2006.

You can learn more about yersiniosis by visiting the following Web sites:
www.cdc.gov/ncidod/dbmd/diseaseinfo/yersinia_g.htm
www.cfsan.fda.gov/~mow/chap5.html

Figure 1. Yersiniosis Cases by Year
Indiana, 2002-2006

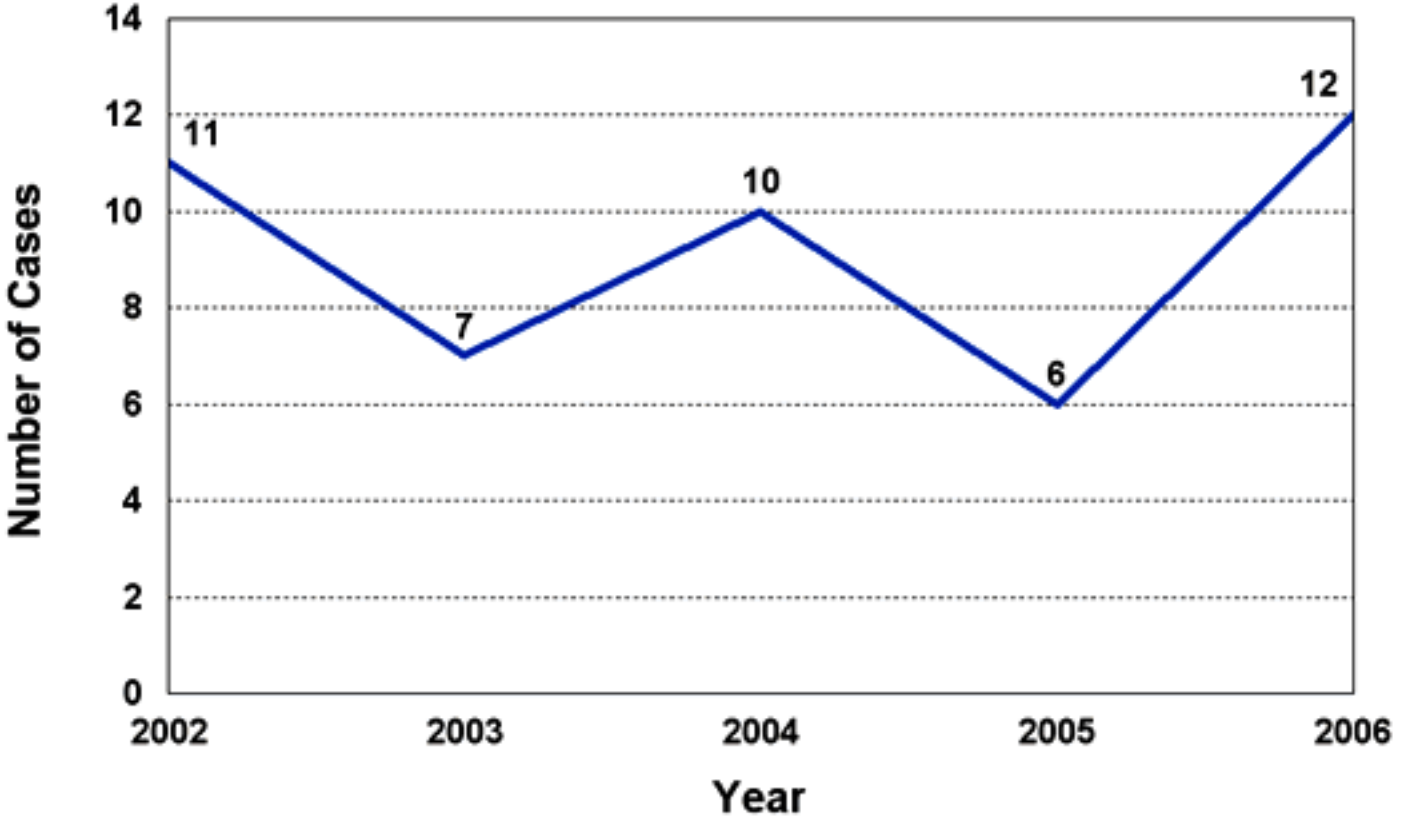


Figure 2. Yersiniosis Cases by Month Indiana, 2006

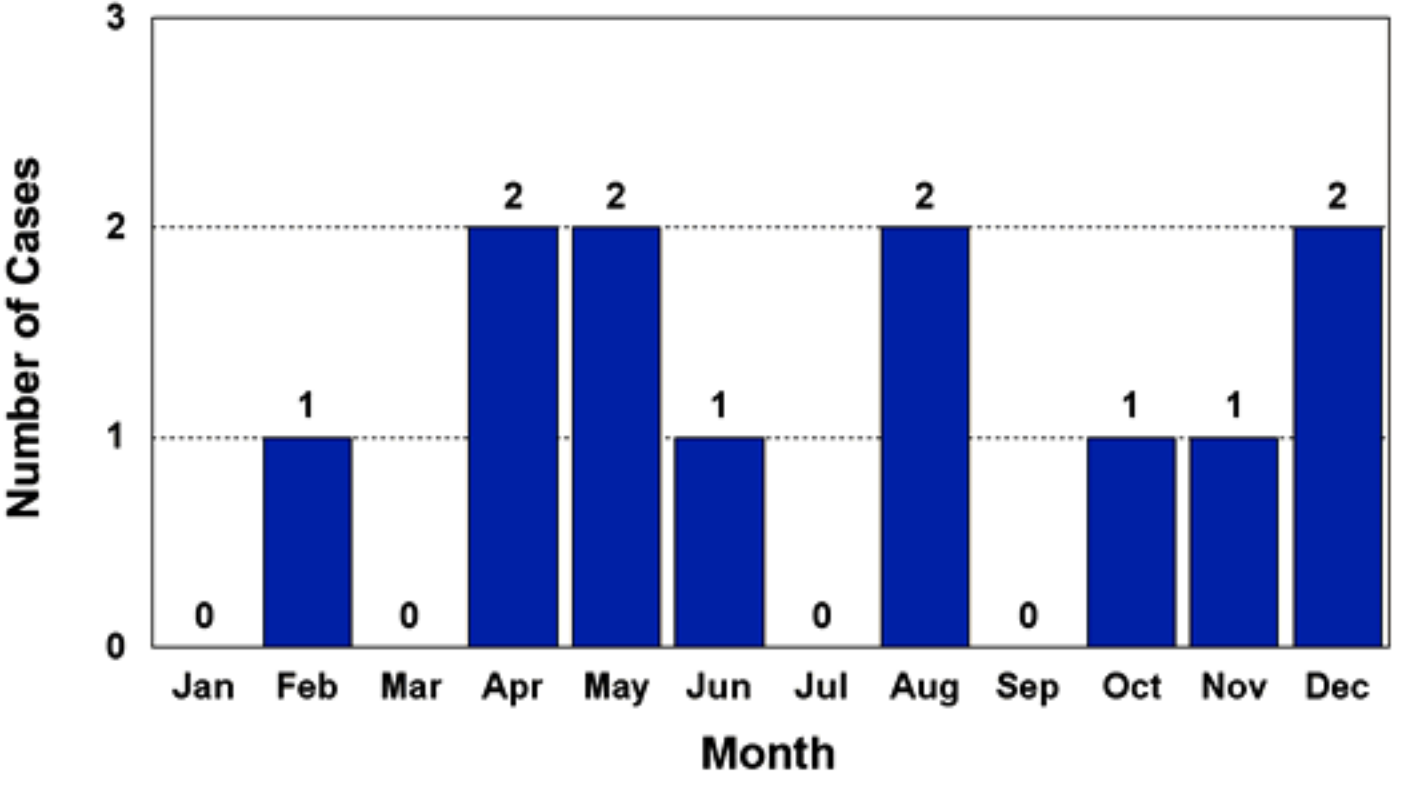


Figure 3. Yersiniosis Incidence by Age Group Indiana, 2006