2007 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, 2007.

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.

References

American Academy of Pediatrics. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. *Red Book: 2006 Report of the Committee on Infectious Diseases.* 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006.

Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases. Centers for Disease Control and Prevention, Atlanta, GA, 2008.

Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Wolfe S, Hamborsky J, McIntyre L, eds. 11th ed. Washington DC: Public Health Foundation, 2009.

Heyman, D.L. (2008). Control of Communicable Diseases Manual (19th ed.). American Public Health Association.

Websites

www.cdc.gov

Hantavirus

Hepatitis A

Hepatitis B

Hepatitis C

Hepatitis E

Histoplasmosis

La Crosse Encephalitis

Legionellosis

Leprosy

Leptospirosis

Listeriosis

Lyme Disease

Malaria

Measles

Meningitis (aseptic)

Meningococcal Disease

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

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 post-exposure 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. Post-exposure prophylaxis to prevent rabies may be recommended for the exposed person based on the rabies risk assessment.

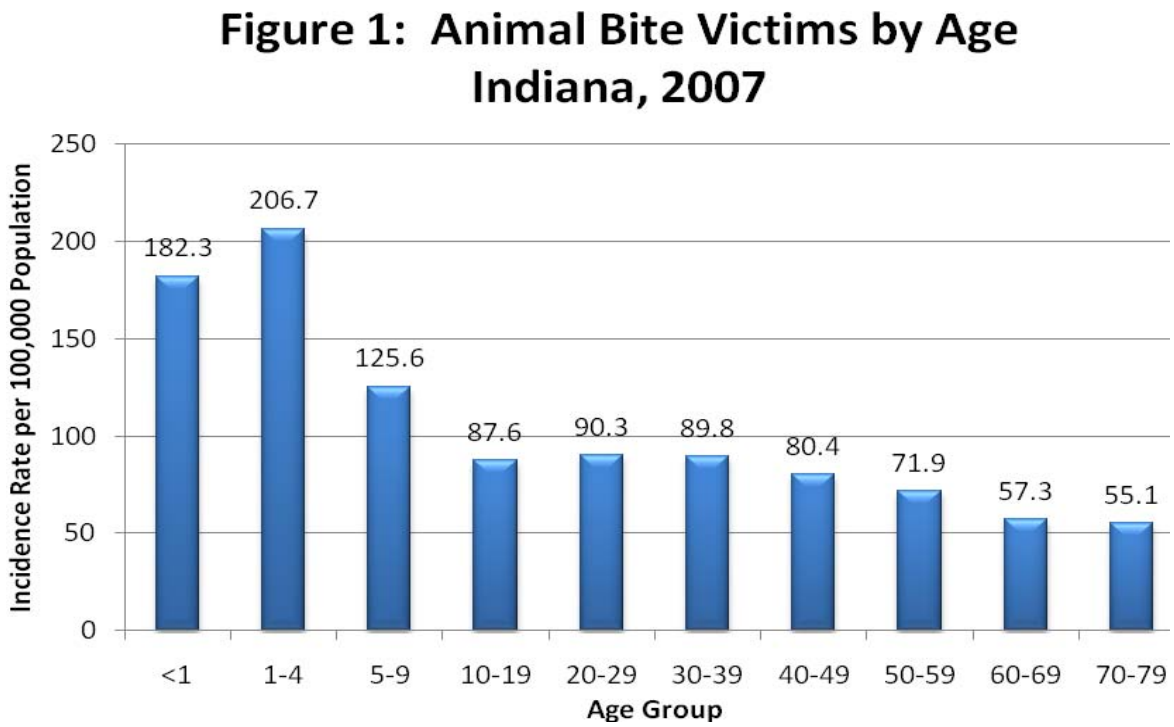
While any animal has the potential to bite, most bites come from dogs. According to the Centers for Disease Control and Prevention (CDC), each year approximately 800,000 people in the U.S. seek medical attention for dog bites. Of those injured, 386,000 require treatment in an emergency department. The 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 report stray dogs or dogs displaying unusual behavior to an adult.
- Avoid direct eye contact with a dog.
- Do not disturb a dog that 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. Figure 1 shows the incidence of animal bite victims by age. The rates of bite injury in children less than 1 year of age (182.3) and children 1 – 4 years of age (206.7) are higher than any other age group.
In 2007, 45 percent of reported bites in Indiana occurred to individuals less than 20 years of age.



Most animal bites are associated with animals that have the greatest interaction with humans. Of the 6797 animal bites analyzed, 5280 (77.7%) were committed by dogs and 1174 (17.3%) were committed by cats. The remaining small percentage of bites were committed by a variety of other wild and domestic animals.

Table 1 presents the number of reported bites by species.

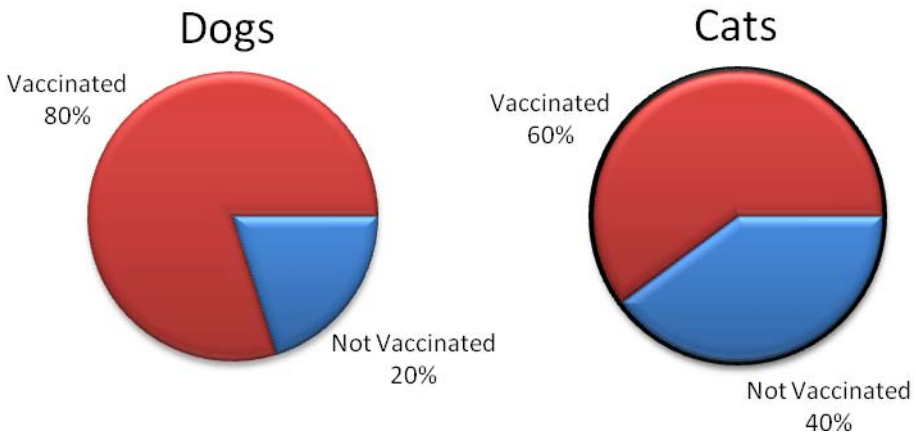
Table 1: Reported Animal Bites and Species, Indiana, 2007

Animal	Number
Dogs	5280
Cats	1174
Ferret	3
Raccoon or Fox	52
Bats	74
Other*	191
Unknown	23

*Other includes rodents and livestock.

Rabies vaccination status was reported for 79 percent of biting dogs and 63 percent of biting cats. Of those animals with a reported vaccination status, 80 percent of dogs and 60 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.

Figure 2: Rabies Vaccination Status of Biting Dogs and Cats -- Indiana, 2007



Two steps have been suggested to reduce animal bites: confinement and neutering. The 2007 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).

Figure 3: Animal Bites By Control Status -- Indiana, 2007

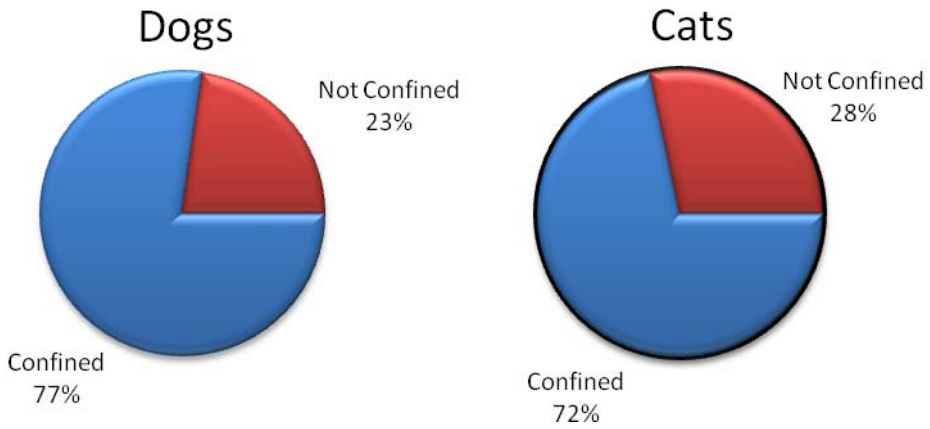


Figure 4: Neutered Status of Biting Dogs by Sex -- Indiana, 2007

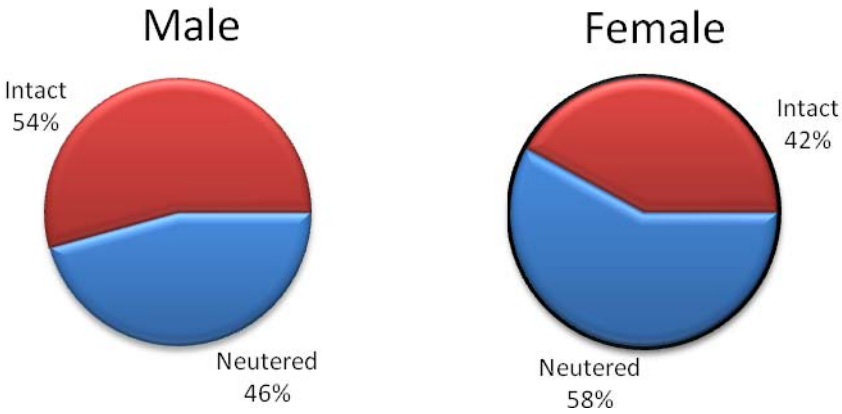
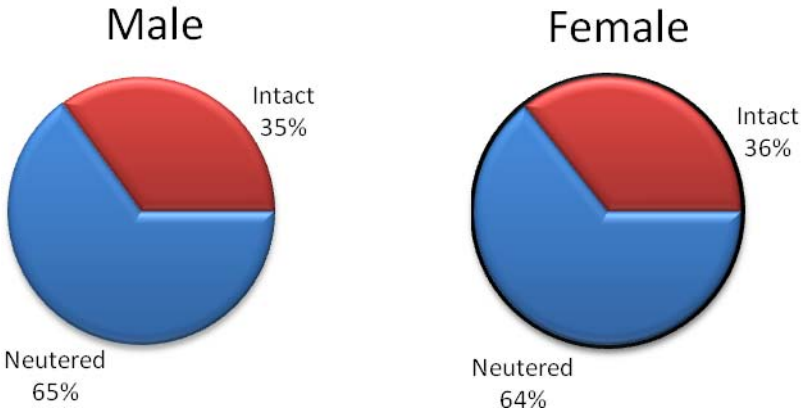


Figure 5: Neutered Status of Biting Cats by Sex -- Indiana, 2007



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

ANTHRAX

Anthrax is a bacterial disease of man and animals caused by the bacterium *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 2007 or during the five-year reporting period 2003-2007.

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

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, affecting 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 2002-2007.

There were no reported cases of SLE in Indiana in 2007, and only one reported case in the six-year reporting period 2002-2007.

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

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 deer ticks infected 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 2007, and only one reported case during the five-year reporting period 2003-2007.

You can learn more about babesiosis by visiting the following Web site:
http://www.cdc.gov/babesiosis/

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 intestines 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, and 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
In 2007, there were three reported cases of botulism in Indiana, for a rate of 0.05 cases per 100,000 population (Table 1). This represents an increase in reported cases compared to 2006 (0). Males (0.06) were more likely to be reported than females (0.03). All cases were of the white race (0.05).

Table 1: Botulism Case Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	3	0.05	3
Race			
Black	0	0.00	0
White	3	0.05	3
Other	0	0.00	0
Not Reported	0	-	0
Sex			
Female	1	0.03	1
Male	2	0.06	2
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

You can learn more about botulism by visiting the following Web sites:
www.cdc.gov/nczved/dfbmd/disease_listing/botulism_gi.html
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070000.htm

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 2007, and that was the only case reported during the five-year reporting period 2003-2007. 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. No treatment is generally recommended. However, persons with diarrhea should drink plenty of liquids. Antibiotics may be used to treat persons with severe cases.

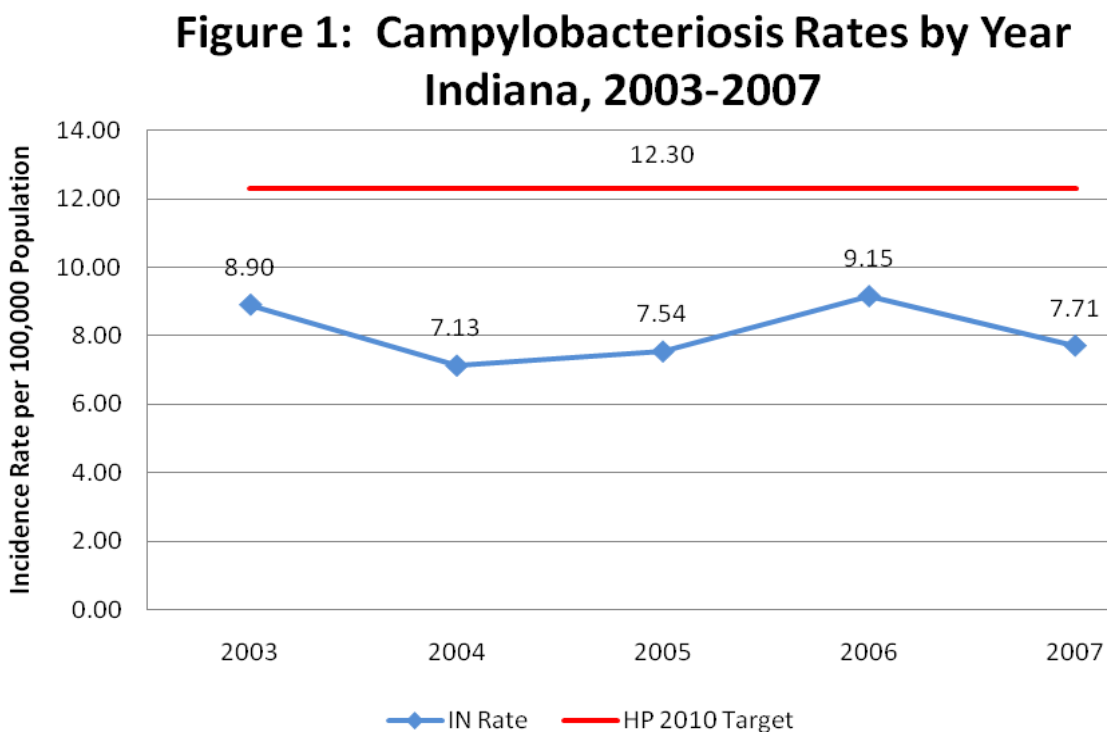
In general, campylobacteriosis can be prevented by strictly adhering to the following guidelines:

- 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 two 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.
- Travel safely 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 2003-2007 (Figure 1).



Epidemiology and Trends

In 2007, there were 489 reported cases of campylobacteriosis in Indiana, for a rate of 7.71 cases per 100,000 population (Table 1). This represents a slight decrease in reported cases compared to 2006 (578).

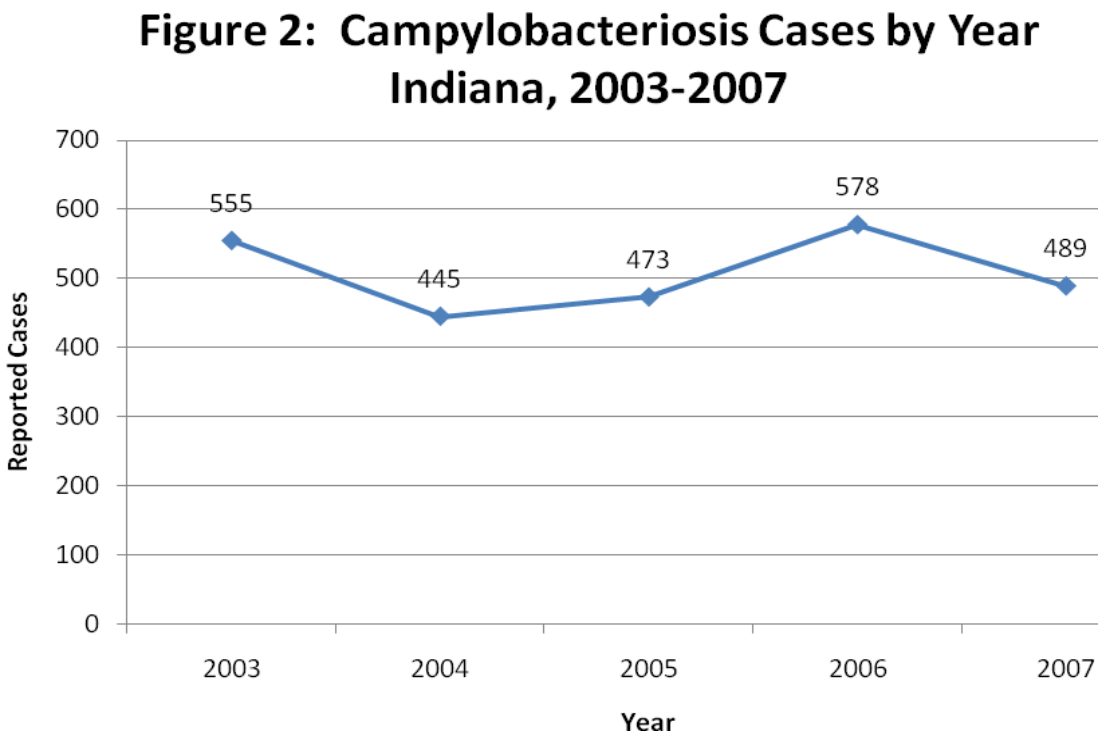
Males (8.54) were more likely to be reported than females (6.74). The rate for whites (6.54) was higher than that for blacks (3.67) or other races (3.87); however, 95 cases (19.5%) did not report race data.

Table 1: Campylobacteriosis Case Rate by Race and Sex, Indiana, 2007

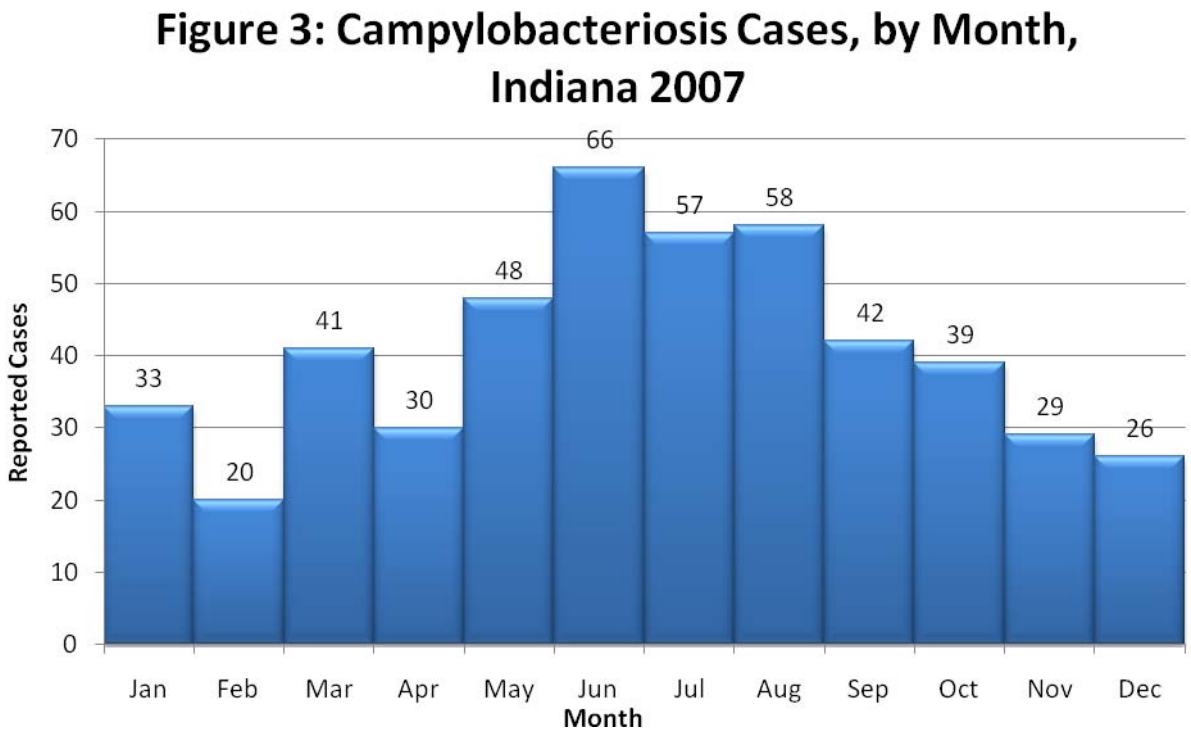
	Cases	Rate*	2003 - 2007 Total
Indiana	489	7.71	2540
Race			
Black	21	3.67	75
White	366	6.54	1823
Other	7	3.87	42
Not Reported	0	-	600
Sex			
Female	217	6.74	1136
Male	267	8.54	1388
Unknown	0	-	16

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

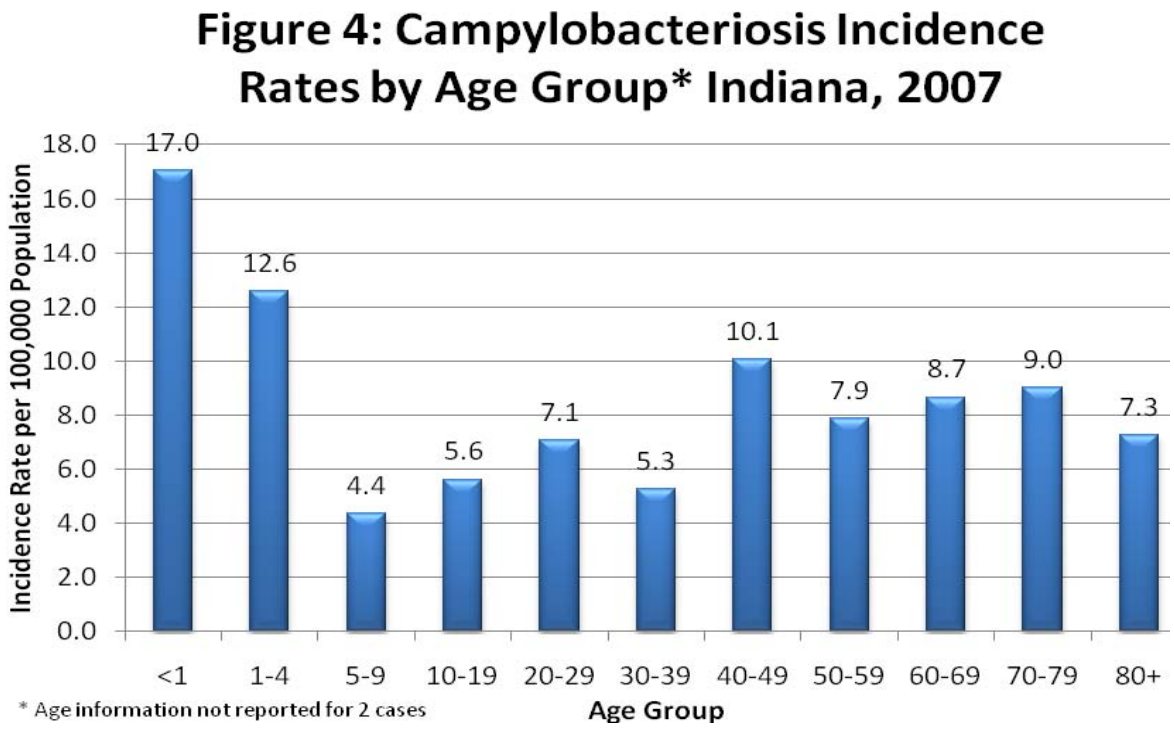
Figure 2 shows reported cases by year for 2003-2007.



Incidence of disease was greatest during the summer months. Figure 3 shows cases per month for 2007.



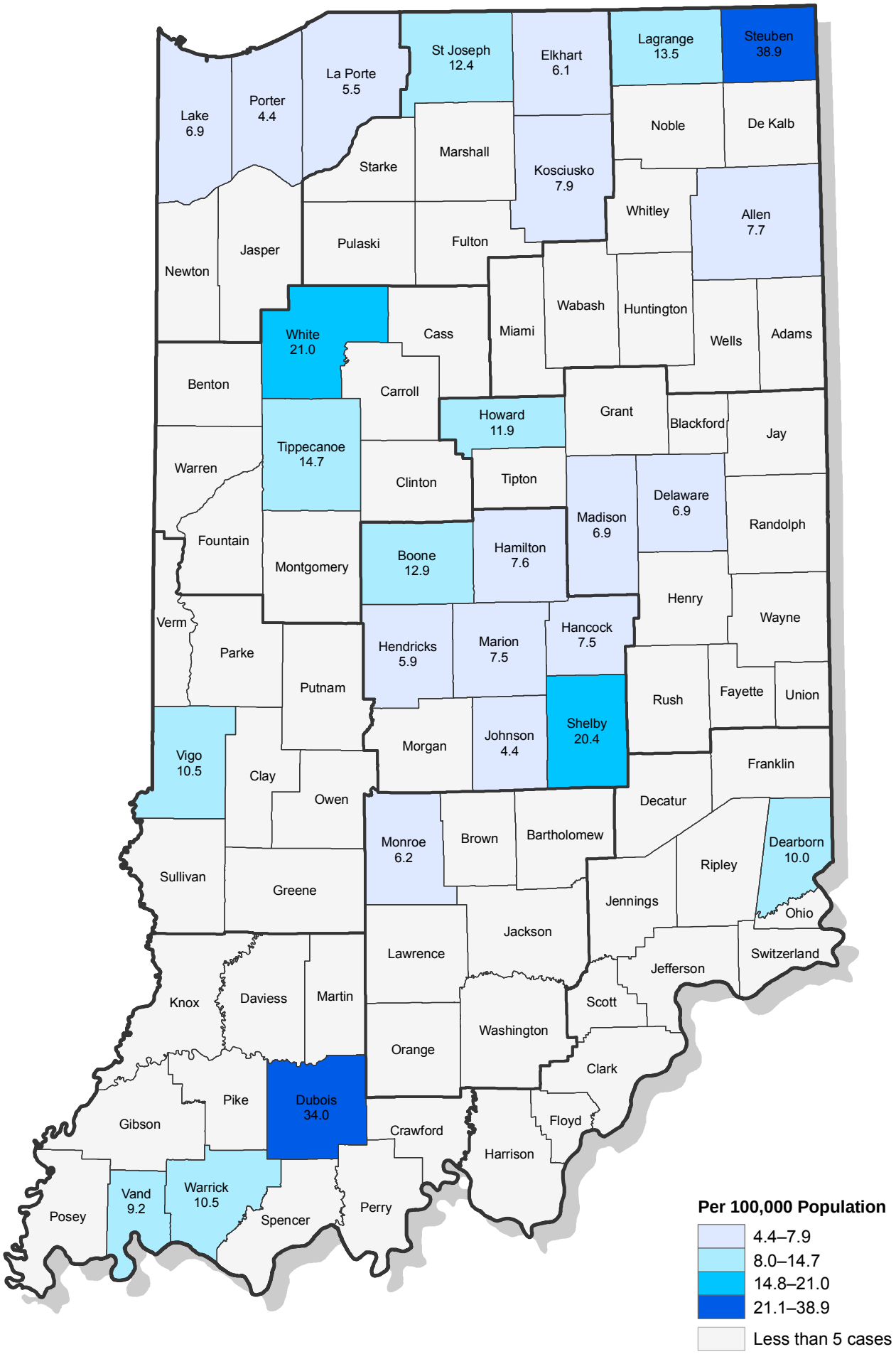
As shown in Figure 4, age specific rates were greatest for infants under the age of 1 year (17.0), followed by preschoolers aged 1-4 years (12.6), and adults aged 40-49 years (10.1).



The incidence rates were highest among the following counties reporting five or more cases: Steuben (38.9), Dubois (34.0), and White (21.0). Figure 5 shows counties reporting five or more cases of campylobacteriosis in 2007.

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

Figure 5: Campylobacteriosis Cases by County – Indiana, 2007



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:

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:
    - o Use treated water for washing, cooking, and drinking.
    - o Wash all produce before eating raw or cooking.
    - o Do not eat uncooked shellfish or fish, including ceviche.
• Protect others:
    - o 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.
    - o Persons with diarrhea and/or vomiting should not attend a daycare facility or school.
    - o Do not change diapers near recreational water.
    - o Do not go swimming or use hot tubs if you have diarrhea and for at least two weeks after diarrhea stops.
• Travel safely outside of the U.S.:
    - o Drink bottled beverages and water, even when brushing teeth.
    - o Do not consume local water or ice.
    - o Do not eat uncooked fruits or vegetables unless you peel them yourself.
    - o Do not eat foods or beverages from street vendors.
    - o 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 2003-2007 and no outbreaks associated with cholera in 2007.

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.
    - Engaging in sexual activity 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.
    - Have pets checked for parasites by your veterinarian, especially if they have diarrhea.
    - Do not clean pet or reptile cages in the kitchen sink or in the bathtub.
    - 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.
- Travel safely 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

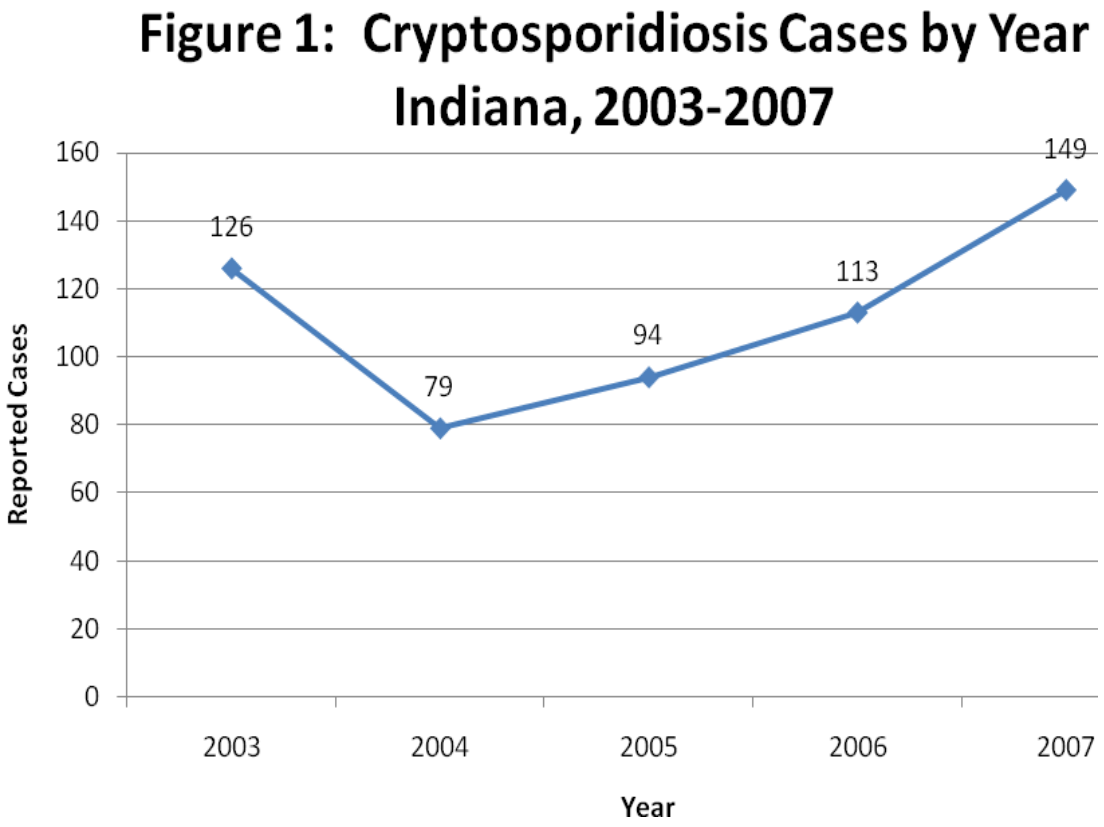
In 2007, 149 cases of cryptosporidiosis were reported in Indiana, for a rate of 2.35 cases per 100,000 population (Table 1). This represents a 31 percent increase from 2006 (1.79). Females (2.39) were slightly more likely to be reported than males (2.21). The rate for other races (2.21) was higher than that for blacks (1.75) and whites (2.00); however, 23 cases (15%) did not report race data.

Table 1: Cryptosporidiosis Case Rate by Race and Sex, Indiana, 2007

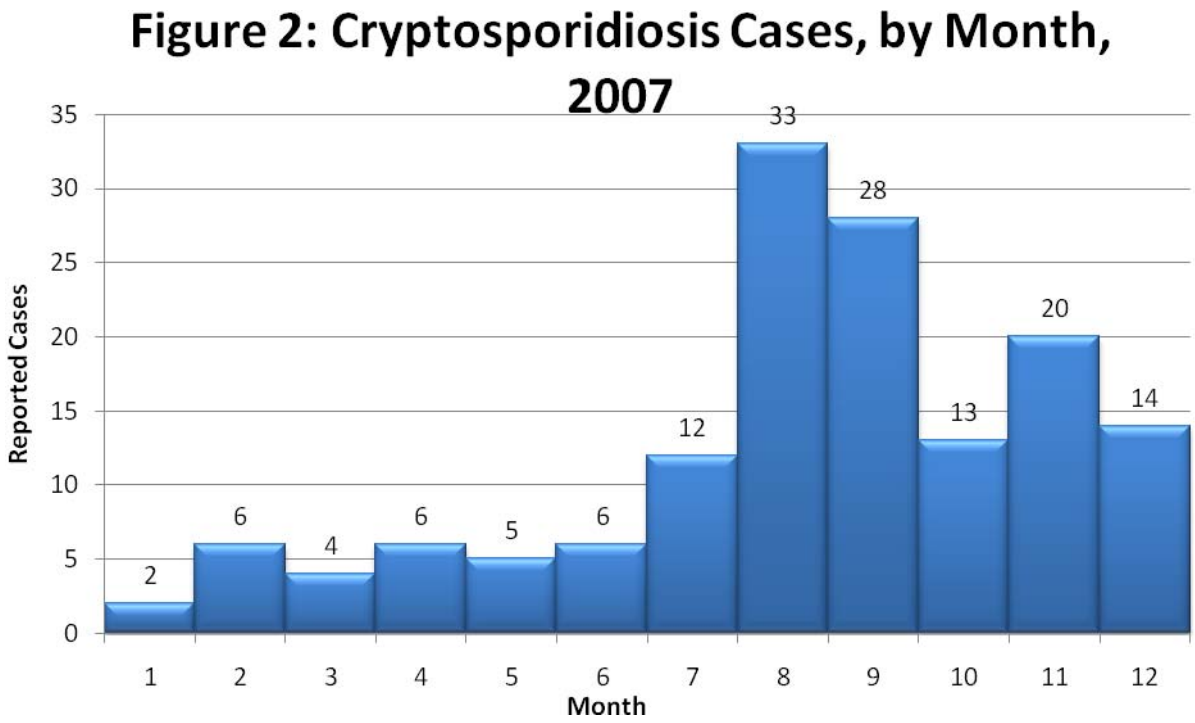
	Cases	Rate*	2003 - 2007 Total
Indiana	149	2.35	561
Race			
Black	10	1.75	22
White	112	2.00	432
Other	4	2.21	22
Not Reported	0	-	85
Sex			
Female	77	2.39	302
Male	69	2.21	255
Unknown	0	-	4

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

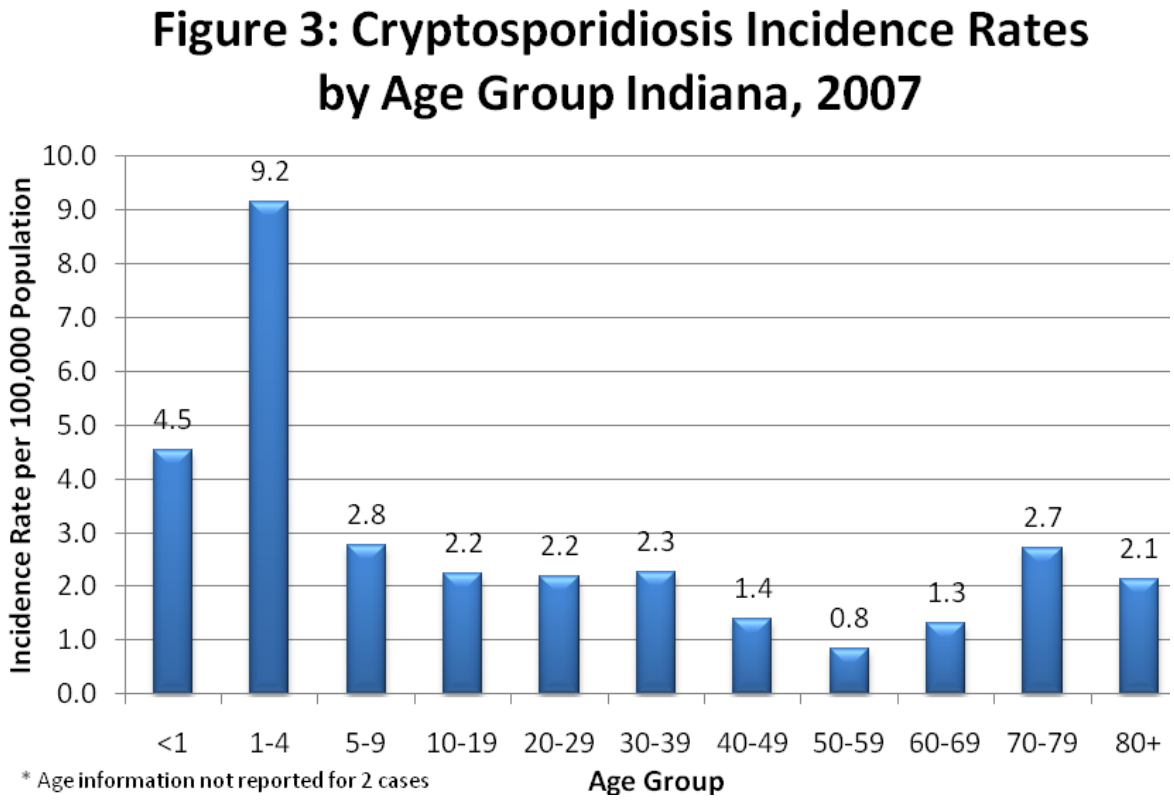
Figure 1 shows the number of reported cases each year for 2003-2007.



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 (9.2), followed by infants less than 1 year of age (4.5), and children aged 5-9 (2.8).

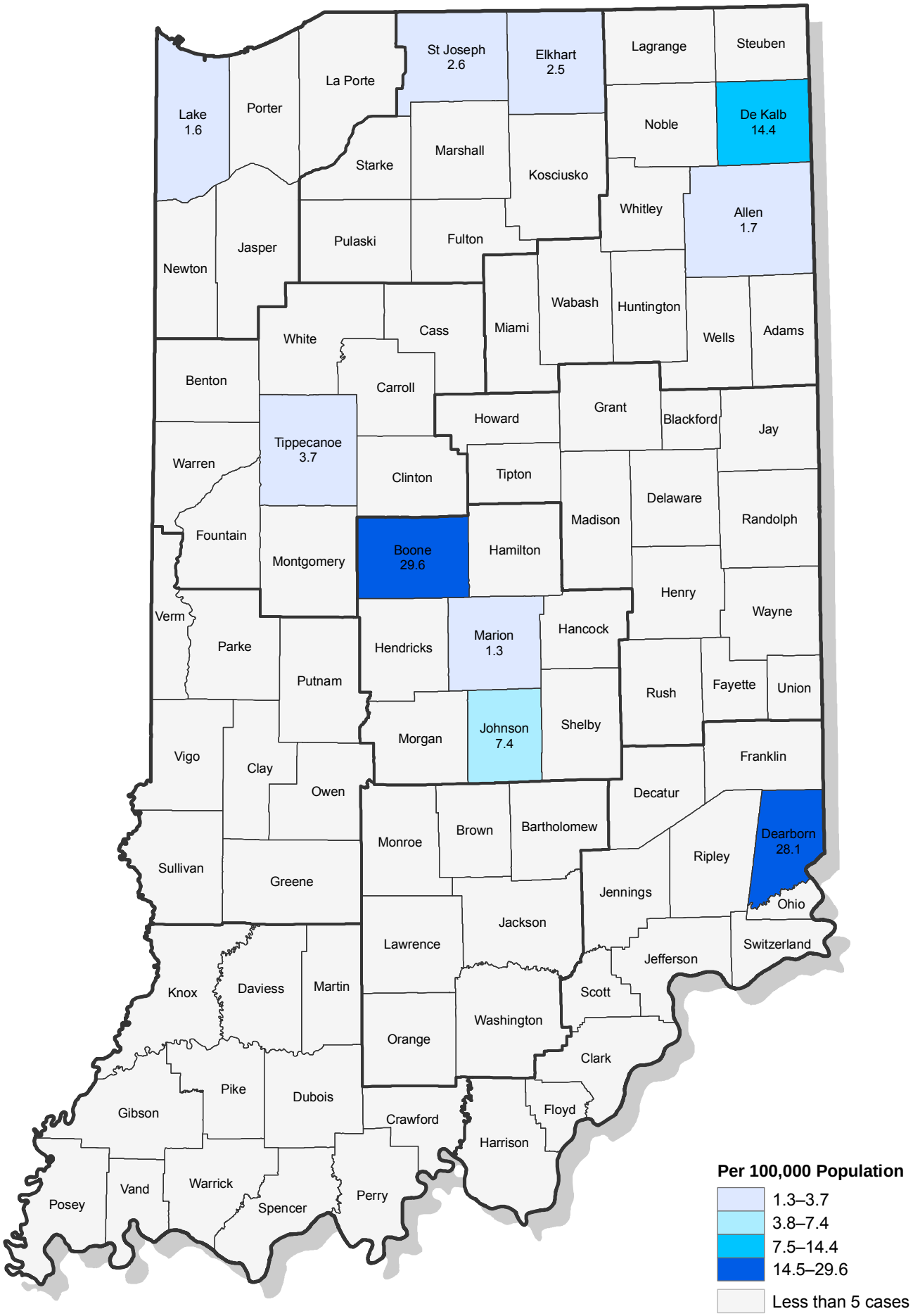


The incidence rates were highest among the following counties reporting five or more cases: Boone (29.6), Dearborn (28.1), and Dekalb (14.4). Figure 4 shows counties reporting five or more cases of cryptosporidiosis in 2007.

There were no outbreaks of cryptosporidiosis reported in Indiana in 2007.

You can learn more about cryptosporidiosis by visiting the following Web sites:
http://www.cdc.gov/crypto/
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070753.htm

Figure 4: Cryptosporidiosis Cases by County – Indiana, 2007



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 anti-parasitics, 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 medication 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.
- Travel safely 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 cyclosporiasis.

Epidemiology and Trends
There were two reported case of cyclosporiasis in Indiana in 2007 and only two during the five-year reporting period 2003 - 2007.

You can learn more about cyclosporiasis by visiting the following Web sites:
www.cdc.gov/ncidod/dpd/parasites/cyclospora/default.htm
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm122216.htm

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. Symptoms of HDV infection resemble those of HBV infection and usually occur 2-8 weeks after exposure.

Pubic Health Significance

Superinfection with HDV is usually more severe than HBV infection alone and more likely to result in severe disease. Since 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 2007 and no reported cases during the five-year period 2003-2007.

You can learn more about hepatitis D by visiting the following Web site
http://www.in.gov/isdh/files/HDV_QF.pdf

http://www.cdc.gov/ncidod/diseases/hepatitis/d/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 medication 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 2007. For the five-year period 2003-2007, three cases of dengue were reported in Indiana. All three 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 2003-2007.

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

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

DIPHTHERIA

Diphtheria is caused by the bacterium *Corynebacterium diphtheriae.* Diphtheria may occur in any mucous membrane and is classified based on the site of the infection: anterior nasal, pharyngeal, tonsillar, and laryngeal are all respiratory forms of the disease, while cutaneous infections also may occur. Humans are the reservoir of the organism. The more severe respiratory forms are caused by toxin-producing strains, while 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 can obstruct the respiratory tract and interfere with respiratory function. Medical treatment is dependent on the administration of diphtheria antitoxin, available only from the Centers for Disease Control and Prevention (CDC). Antibiotics are used along with antitoxin to treat diphtheria.

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 through 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 following completion of the primary series. Prior to routine vaccination, as many as 200,000 cases of diphtheria, responsible for as many as 15,000 deaths, occurred each year in the United States.

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/yellowbook/2008/ch4/diphtheria.aspx

EHRLICHIOSIS

Ehrlichiosis is a tick-borne disease that 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 known 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 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 was one reported case of ehrlichiosis in 2007 in Indiana. From 2003-2007, 13 cases of ehrlichiosis were reported in Indiana: 11 cases of HME, 1 case of HGE, and 1 case unspecified. 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/ticks/diseases/ehrlichiosis/.

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. Shiga-toxins are potent cytotoxins expressed by some E. coli. The most severe clinical manifestation of Shiga-toxin producing E. coli (STEC) infection is Hemolytic Uremic Syndrome (HUS).

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.
    - Engaging in sexual activity that involves contact with stool.

The most common sources of *E. coli* outbreaks are inadequately cooked hamburgers, contaminated 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 (bloody or non-bloody), 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; after swimming; before, during, and after food preparation; and after exposure to raw meat products.

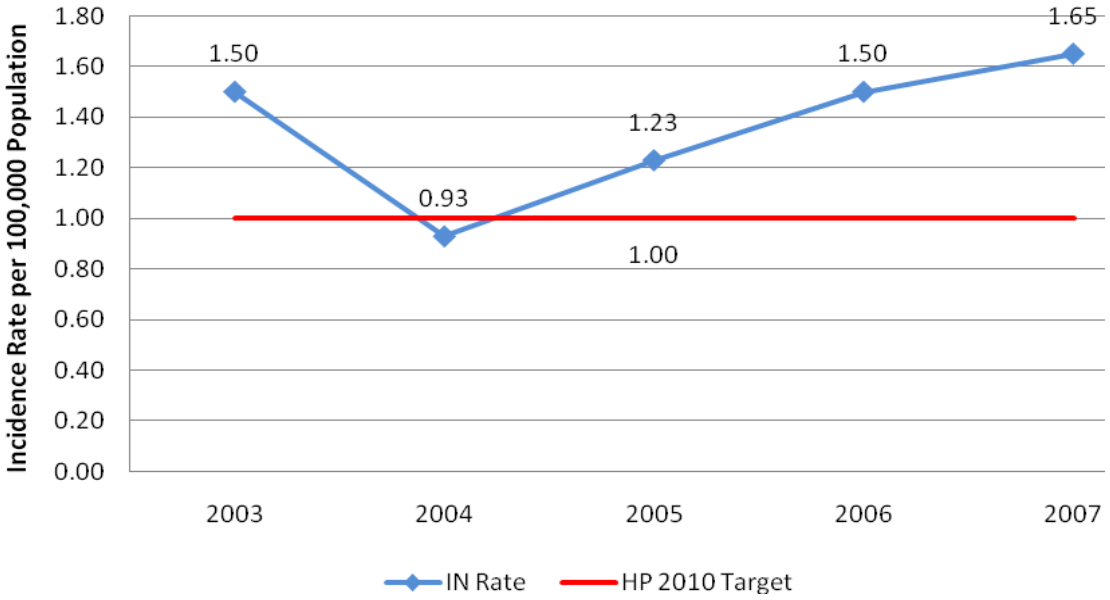
    - Clean food preparation work surfaces, equipment, and utensils with soap and water before, during, and after food preparation, especially after contamination with raw meat products.
- Separate raw and cooked foods:
    - Avoid cross-contamination by keeping uncooked meat products separate from produce, 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.

Figure 1: *Escherichia coli* Rates by Year Indiana, 2003-2007



Epidemiology and Trends

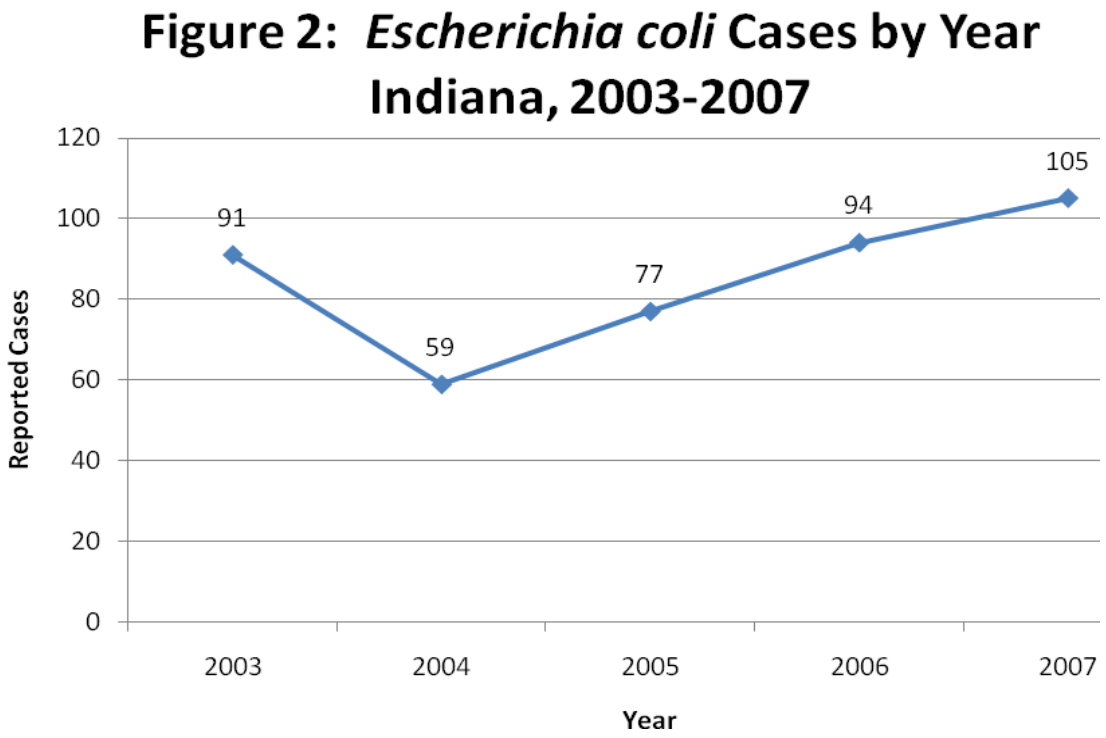
In 2007, 105 cases of *E. coli* O157:H7 infection were reported in Indiana, for a rate of 1.65 cases per 100,000 population (Table 1). Females (1.77) were slightly more likely to be reported than males (1.54). The rate for whites was higher (1.59) than that for blacks (0.87); however, 11 cases (10.5%) did not report race data.

Table 1. *E. coli* O157:H7 Cases by Race and Sex, Indiana, 2007.

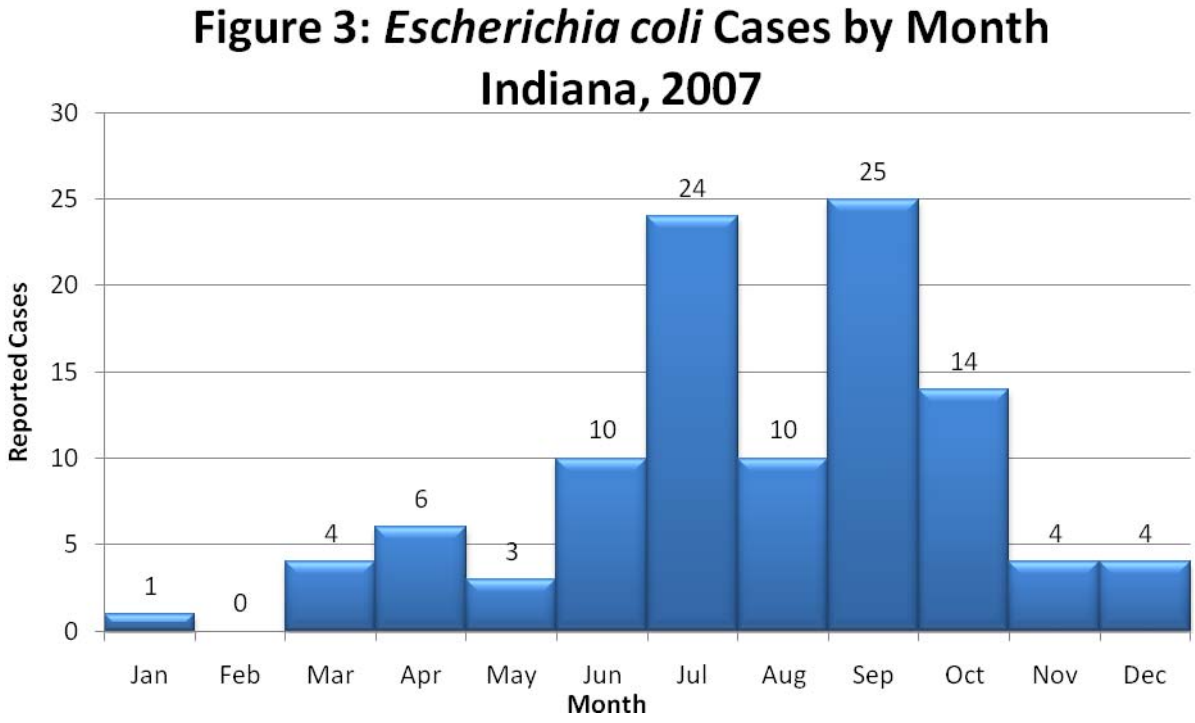
	Cases	Rate*	2003 - 2007 Total
Indiana	105	1.65	426
Race			
Black	5	0.87	14
White	89	1.59	325
Other	0	0.00	6
Not Reported	11	-	81
Sex			
Female	57	1.77	244
Male	48	1.54	182
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

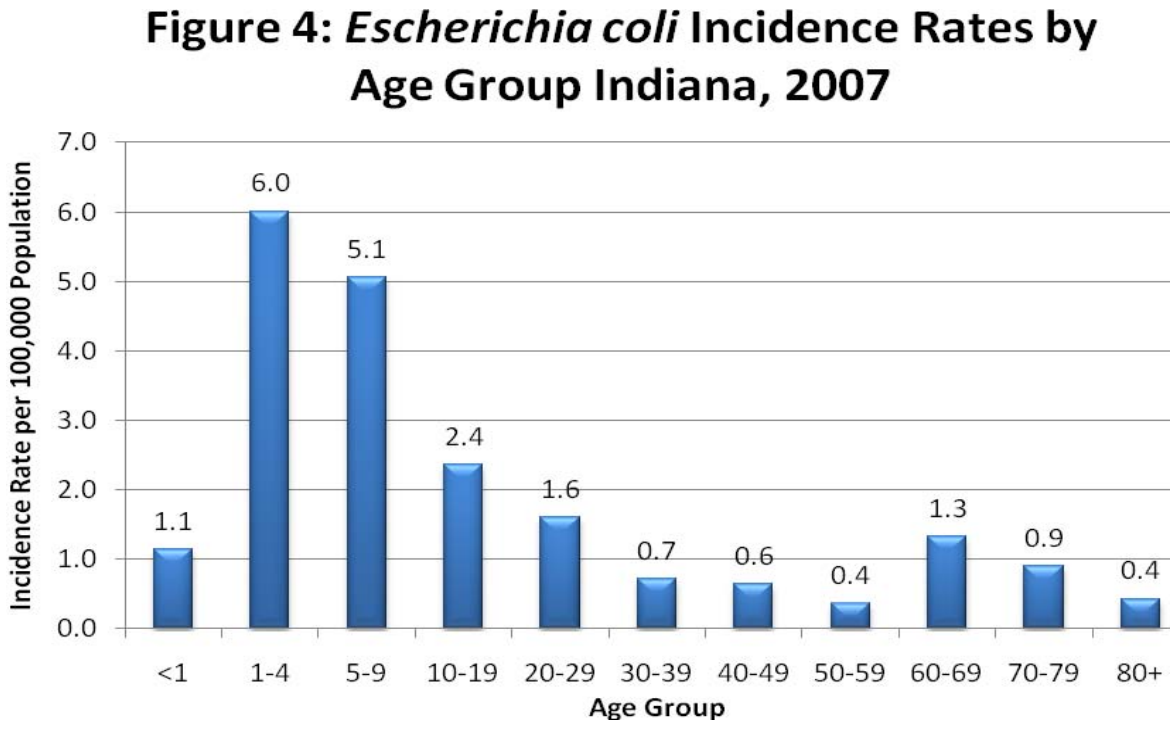
Figure 2 shows the number of reported cases per year for 2003-2007.



Incidence of disease was greatest during the summer and fall months. Figure 3 shows the number of cases per month in Indiana for 2007.



As shown in Figure 4, age-specific rates were highest among preschoolers aged 1-4 years (6.0), followed by children aged 5-9 years (5.1), and children aged 10-19 years (2.4).



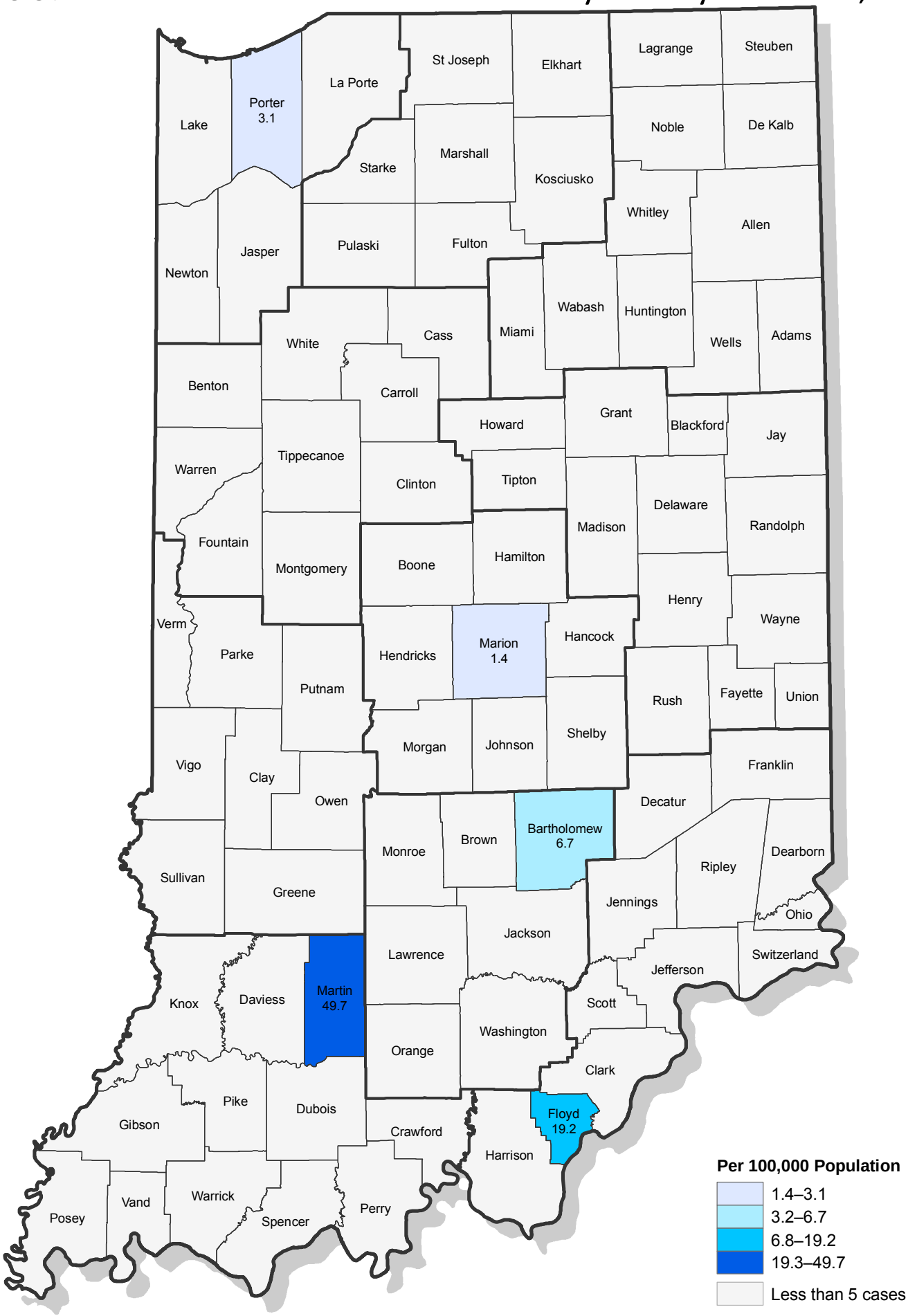
Although 40 counties reported cases of *E. coli* O157:H7, only 5 counties had 5 or more cases (Figure 5).

Sixteen cases of HUS were reported in 2007.

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 and other shiga-toxin producing strains.

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.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm071284.htm

Figure 5: *Escherichia Coli* O157:H7 Cases by County – Indiana, 2007



INVASIVE *HAEMOPHILUS INFLUENZAE*

Invasive *Haemophilus influenzae* (*H. influenzae*) is a disease caused by a bacterium of the same name. It can be typeable (encapsulated) or nontypeable (unencapsulated). The encapsulated form has been classified into 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

H. influenzae can cause a number of invasive infections, including bacteremia/sepsis, meningitis, pneumonia, epiglottitis, arthritis, and cellulitis. Symptoms of *H. influenzae* usually begin suddenly and can 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.

Infections caused by *H. influenzae* are commonly treated with antibiotics. Susceptibility tests can assist in the selection of appropriate treatment. Prevention of infection through immunization is the most effective way to reduce transmission of *Haemophilus influenzae* type b, which prior to routine immunization, accounted for 95% of all cases of invasive *H. influenzae*. All cases of invasive *H. influenzae* disease, regardless of age or serotype, are reportable in Indiana. Indiana requires laboratories to submit *H. influenzae* isolates for serotype analysis.

Before the widespread use of vaccines, *Haemophilus infleunzae* serotype b (Hib) was the leading cause of bacterial meningitis in children. 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. Since vaccine is available to protect against only type b *Haemophilus influenzae*, serotyping 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 also is needed to measure the sensitivity of the surveillance system and to detect the emergence of invasive disease caused by types of *Haemophilus influenzae* other than type b.

A Hib vaccine recall in December 2007 and resulting interim recommendations to defer the booster dose of Hib vaccine in healthy children highlights the importance of ongoing surveillance and serotyping for invasive *Haemophilus influenzae*.

Healthy People 2010 Goal

The Health People 2010 Goal for *Haemophilus influenzae* type b disease is to eliminate all *Haemophilus influenzae* type b disease in children less than 5 years of age. This task will require aggressive immunization education and campaigning, especially for populations that decline vaccinations. In 2007, fewer than 5 cases of *Haemophilus infleunzae* occurred in Indiana in children less than 5 years of age for whom isolates were submitted for testing.

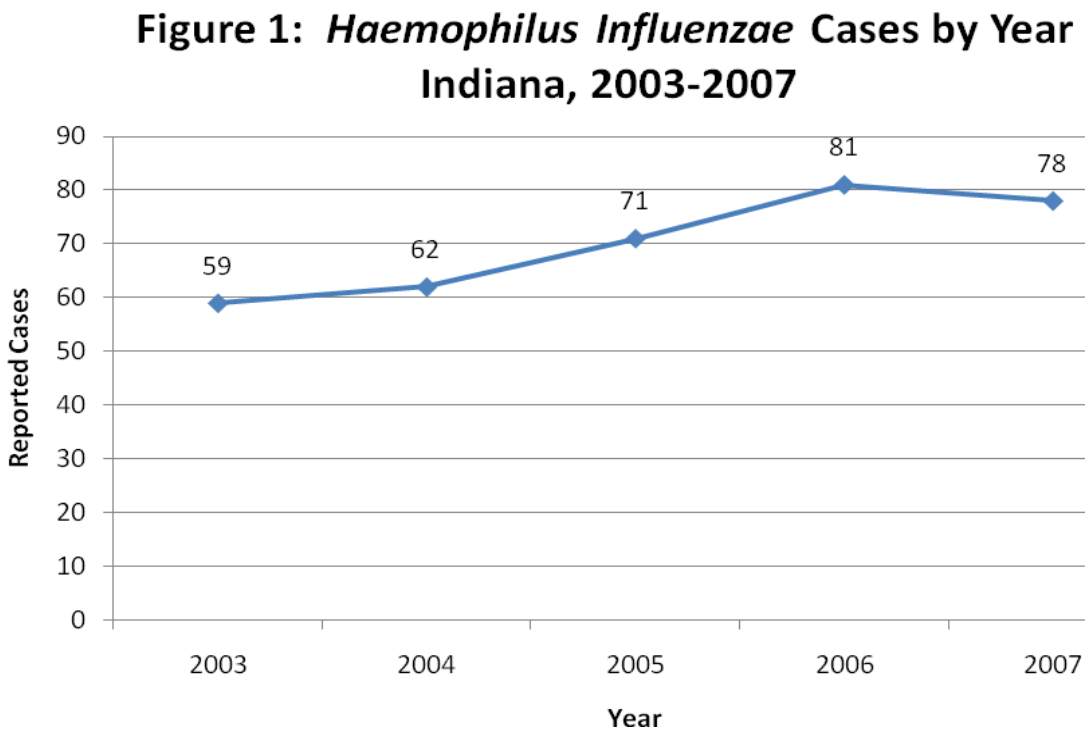
Epidemiology and Trends

Indiana had 78 reported cases of invasive *H. influenzae* (all serotypes) disease in 2007. Females (1.27) were slightly more likely than males (1.18) to acquire *H. influenzae*. The rate of illness for whites (1.14) was higher than that for blacks (1.05).

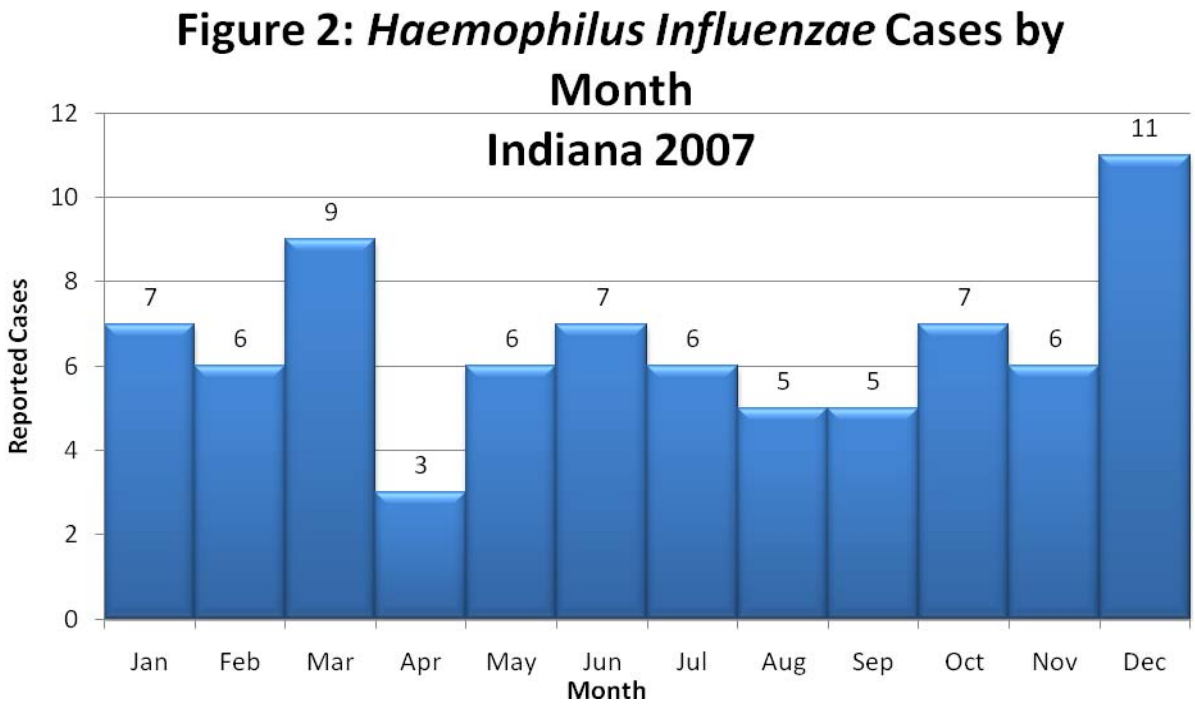
Table 1: *H. Influenzae* Case Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	78	1.23	351
Race			
Black	6	1.05	33
White	64	1.14	280
Other	0	0.00	3
Not Reported	8	-	35
Sex			
Female	41	1.27	195
Male	37	1.18	156
Unknown	0	-	0

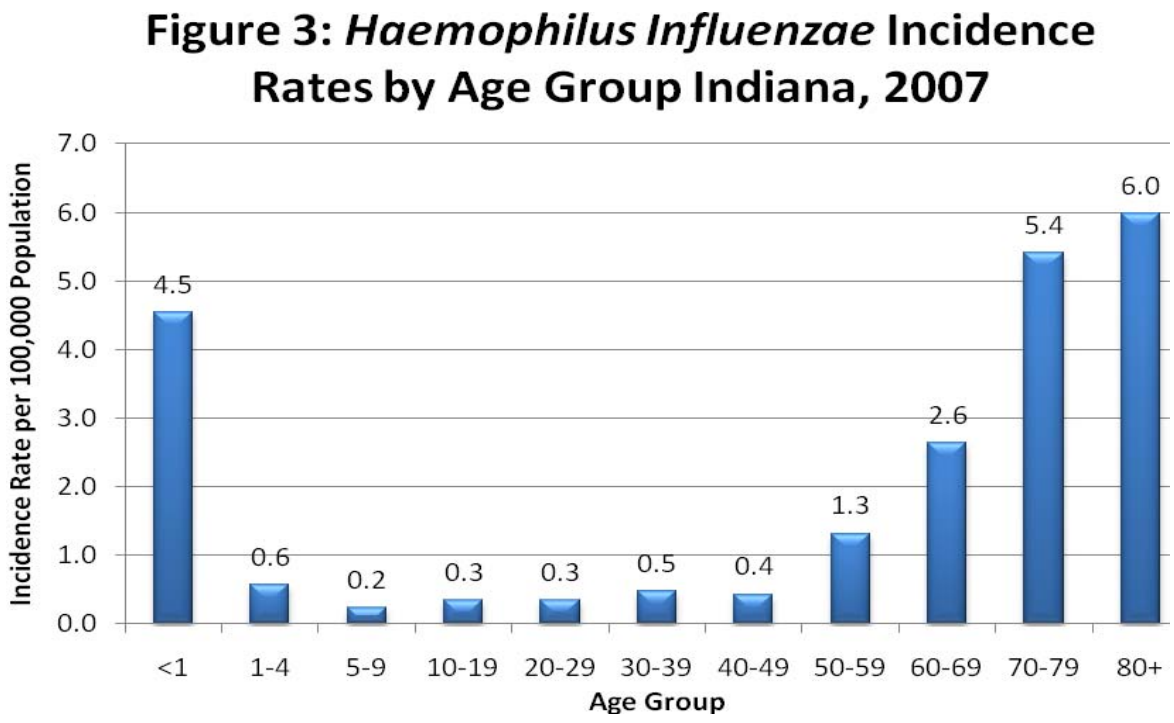
Figure 1 shows reported cases of *H. influenzae* for the five-year period 2003-2007.



H. influenzae cases occurred throughout the year in 2007, with the highest number of cases occurring in March and December (Figure 2).



Age-specific rates were greatest for older adults aged 80+ years (6.0), followed by adults ages 70 to 79 (5.4) and infants less than 1 year of age (4.5). 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). The highest incidence rate among counties reporting 5 or more cases was in LaPorte County (4.6).

Of the 78 cases reported in 2007, 58 (74%) 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 2007

Percent of Reported Cases by Serotype		
Type	**Number**	**Percent**
a	2	2.6
b	2	2.6
c	0	-
d	0	-
e	2	2.6
f	12	15.4
Nontypeable	40	51.3
Not Tested/Unknown	20	25.6
Total	78	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 4: Haemophilus Infleunzae Cases by County – Indiana, 2007

HANTAVIRUS

Hantavirus pulmonary syndrome (HPS) is an acute respiratory disease caused by the Sin Nombre virus. Deer mice are the most common carriers 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 was 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 2007 or during the five-year reporting period 2003-2007.

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 an inflammation of the liver caused by the hepatitis A virus (HAV). HAV is not normally found in animals. People become infected with hepatitis A virus 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 practiced. Persons are at risk for hepatitis A infection if they have:

- Exposure to contaminated food or water, such as:
  - 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 limited 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 or clay-colored stool, loss of appetite, and sometimes 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 two 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, and 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.

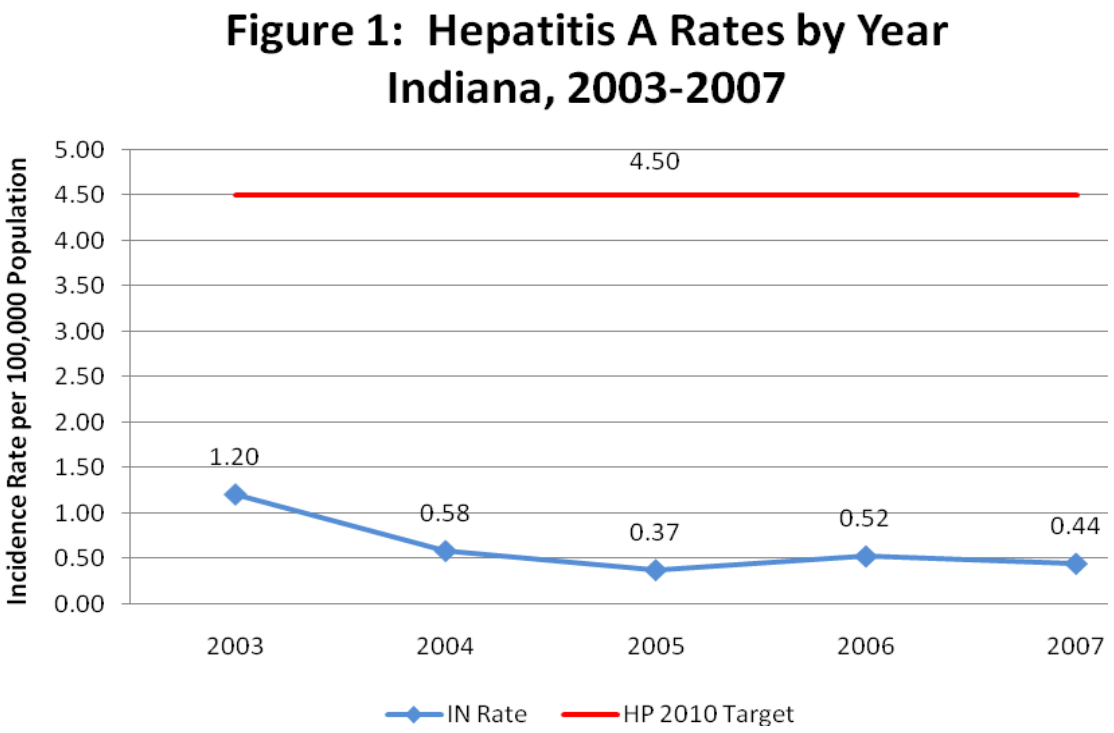
Hepatitis A can be prevented by a two-dose vaccination series. Candidates for vaccination include persons at increased risk for hepatitis A infection or its consequences including

- Persons with chronic liver disease or clotting factor disorders
- Men who have sex with men
- Injecting drug users
- Persons traveling to or working in countries where hepatitis A infection is endemic
- Persons who work with hepatitis A virus in a research setting
- Children who live in communities with consistently elevated rates of infection

Post-exposure prophylaxis with hepatitis A vaccine hepatitis A immune globulin is effective if received within two weeks of exposure. Indications for prophylaxis may include: people who consumed food or beverages contaminated with hepatitis A virus, household or sexual contacts of someone infected with hepatitis A virus, children and staff members in the same daycare room as an infected case, and residents and staff members in a health care center who have direct contact with someone infected.

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 2003-2007 (Figure 1).



Epidemiology and Trends

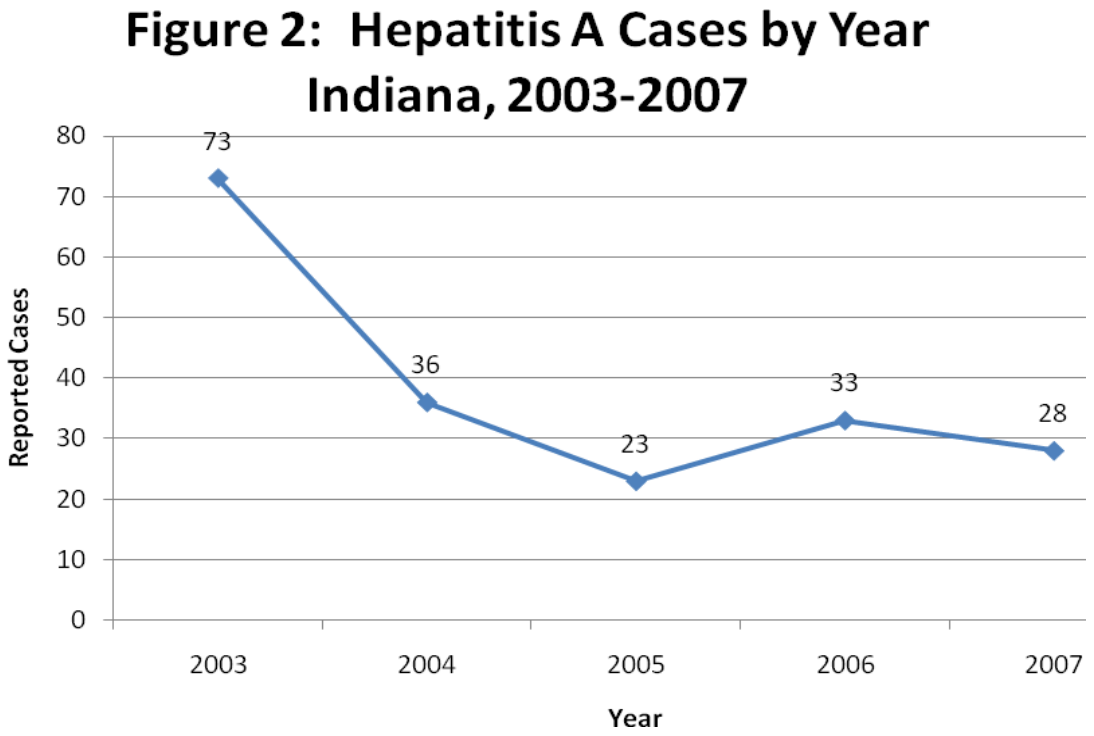
In 2007, 28 cases of hepatitis A were reported in Indiana for a rate of less than 1 case per 100,000 population (Table 1). Males (0.32) were less likely to be reported than females (0.56). The rate for other races (1.10) was higher than that for whites (0.36) or blacks (0.35); however, 4 cases (14.3%) did not report race data.

Table 1: Hepatitis A Case Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	28	0.44	193
Race			
Black	2	0.35	7
White	20	0.36	136
Other	2	1.10	17
Not Reported	4	-	33
Sex			
Female	104	0.56	104
Male	87	0.32	87
Unknown	2	-	2

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 2 shows the number of reported cases per year for 2003-2007.



Incidence of disease was greatest during the summer months (Figure 3).

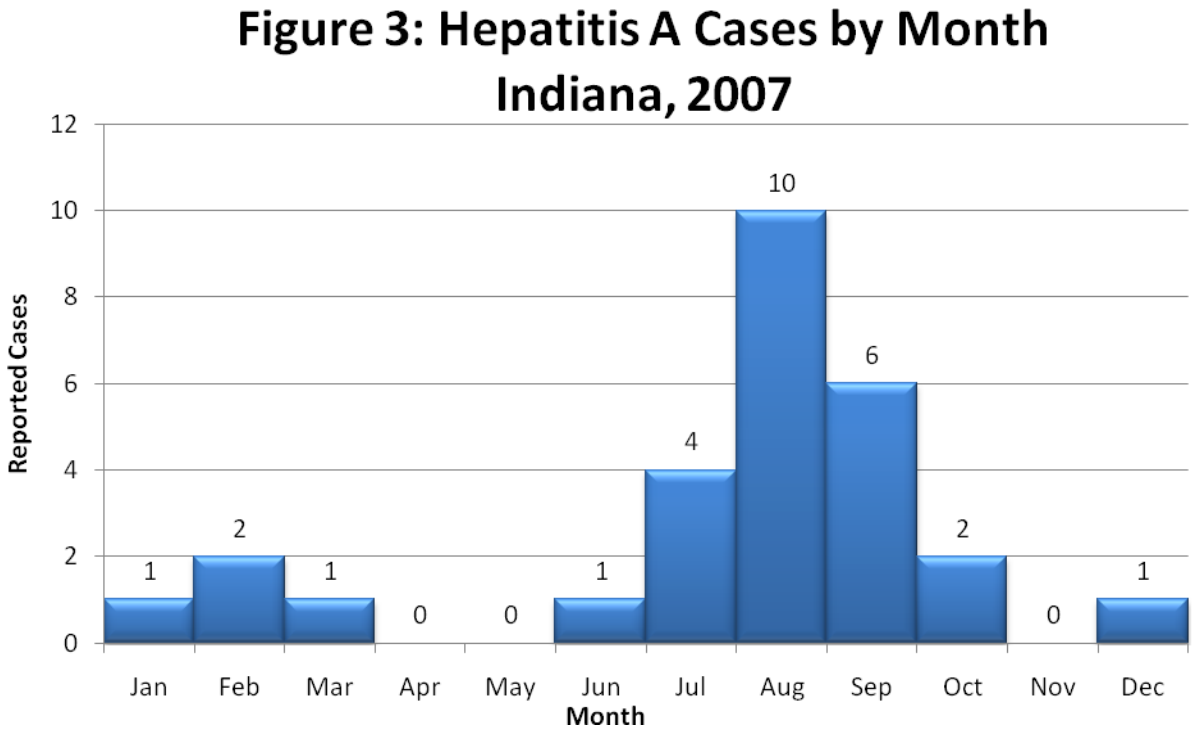
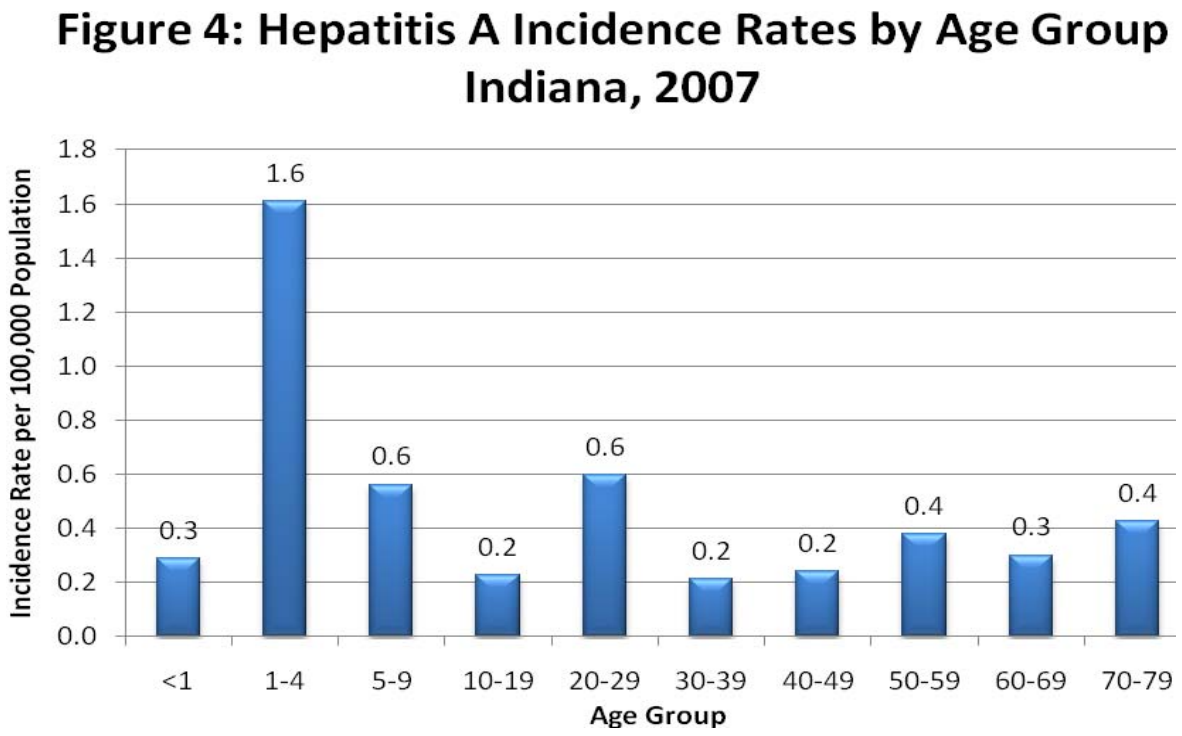


Figure 4 shows age-specific rates were greatest for children ages 5-9 (1.6), followed by adults aged 20-29 years (0.6).



In 2007, 16 Indiana counties reported cases of hepatitis A, but only one county reported 5 or more cases.

You can learn more about hepatitis A by visiting the following Web sites:
http://www.cdc.gov/hepatitis/hepatitisA.htm
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm071294.htm

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 hepatitis B virus (HBV) occurs through sexual or household contact with an infected person, injection drug use (IDU), perinatal transmission from mother to infant, and nosocomial exposure. Acute hepatitis B illness is characterized by nausea, anorexia, fever, malaise, headache, myalgia, right upper quadrant abdominal pain, dark urine, skin rash and jaundice.

Public Health Significance

Approximately 50% of adults with acute infection are asymptomatic. The incubation period of HBV 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 infection results in complete recovery and immunity from future infection. HBV can also produce a chronic infection that is associated with an increased risk for chronic liver disease, cirrhosis, liver failure, and liver cancer. Persons with chronic infection are often asymptomatic but capable of infecting others.

In 1991, a comprehensive strategy for the elimination of HBV transmission in the United States 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 the vaccination of high risk adults.

Safe and effective vaccines have been available for hepatitis B since 1981. After three intramuscular doses of hepatitis B vaccine, more than 90% of healthy adults and more than 95% of infants, children, and adolescents will develop adequate immunity. The dosage of vaccine varies with the age of the recipient and type of vaccine. In 2007, CDC launched the Adult Hepatitis B Vaccination Initiative.

Post-exposure 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, vaccination, and immune response 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 individuals, IDU, men who have sex with men (MSM), hemodialysis patients, and household

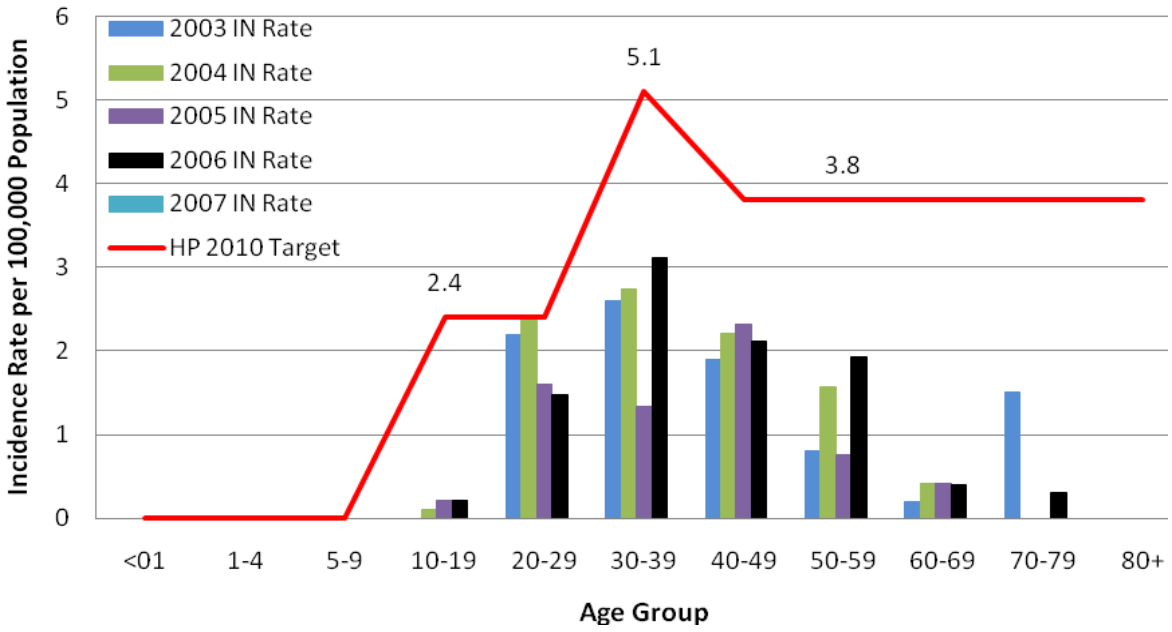
contacts of infected persons. Intermediate risk includes: prisoners, health care workers, staff for developmentally disabled, and heterosexuals with multiple partners.

Control measures used to prevent exposures to blood and body fluids include use of Universal Precautions and disinfection of contaminated equipment. Contacts should be immunized, and when appropriate, given HBIG.

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 2003-2007. Figure 1 shows incidence rates per 100,000 population per age group and the Healthy People 2010 Goal.

Figure 1: Hepatitis B Incidence by Age Group Indiana, 2003-2007



Epidemiology and Trends

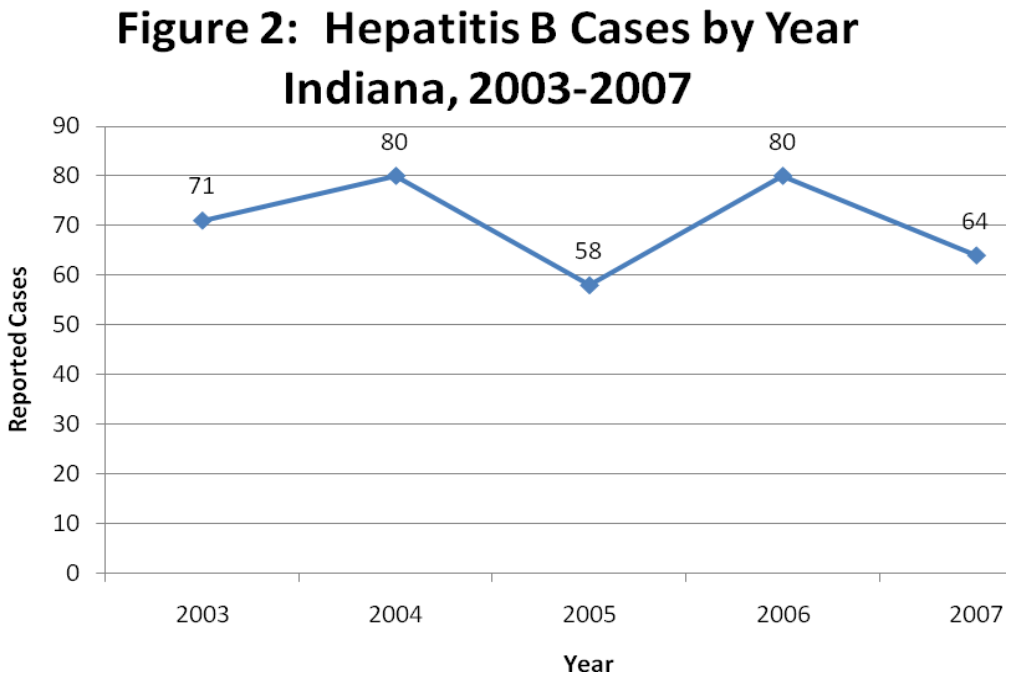
In 2007, there were 64 confirmed cases of acute hepatitis B disease in Indiana (Table 1). One case resulted in death, and 66% exhibited jaundice. The data presented in this report does not include the burden of disease caused by chronic infection with HBV, which is a substantial public health problem.

Table 1. Cases by Race and Sex, Indiana, 2007

	2007		2003-2007
	Cases	**Rate***	**Total**
Indiana	64	1.01	353
Race			
Black	14	2.45	68
White	46	0.82	245
Other	1	0.55	8
Not Reported	0	-	32
Sex			
Female	22	0.68	97
Male	42	1.34	256
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July, 1, 2007

Figure 2 shows reported cases of acute hepatitis B for the five-year period 2003-2007. In 2007, there was a 20% decrease in reported cases of acute hepatitis B compared to 2006 (80). Nationally, the incidence of HBV has declined 82% from the rate in 1990.



Cases occurred during each month without in 2007 without specific seasonality (Figure 3). Cases of acute hepatitis B varied with age. Figure 4 shows incidence rates of acute hepatitis B cases per 100,000 population by age group. In Indiana, as well as nationally, higher rates of hepatitis B disease continue among adults, particularly males 25-44 years of age and persons with identified risk factors (ie., IDU, MSM, and persons with multiple sex partners). This data emphasizes the need to vaccinate adults at risk for hepatitis B infection.

Figure 3: Hepatitis B Cases, by Month, 2007

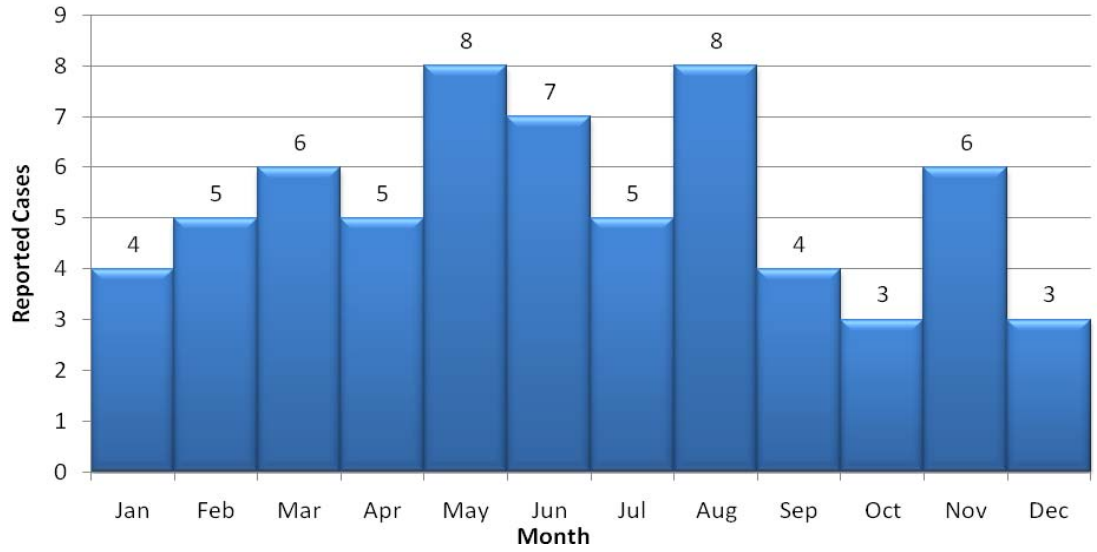


Figure 4: Hepatitis B Incidence Rates by Age Group Indiana, 2007

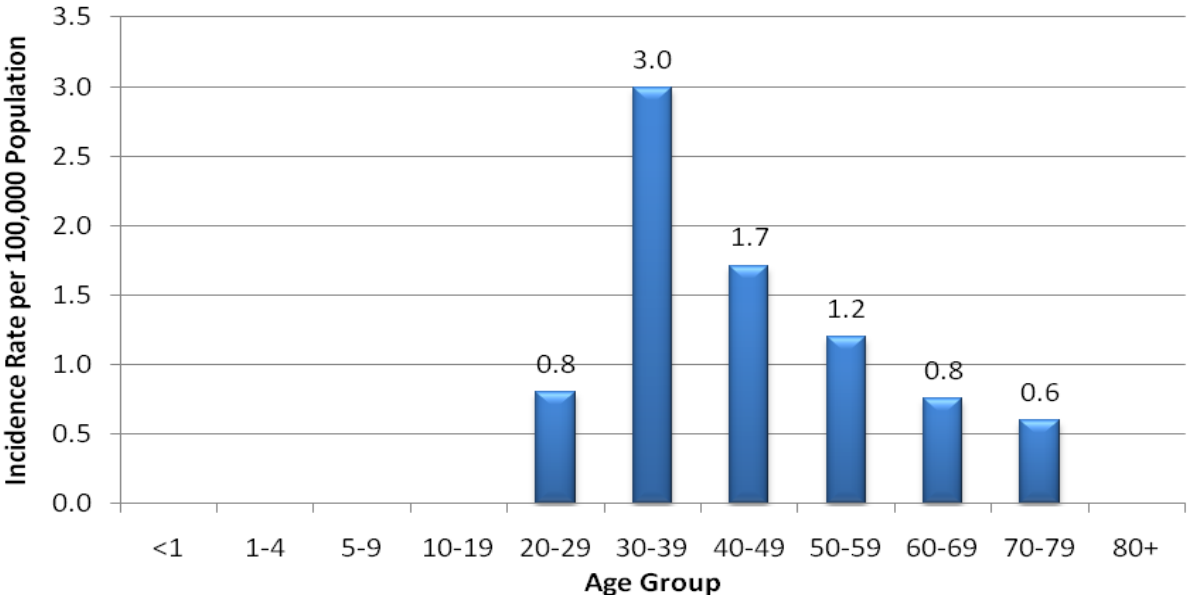


Table 2 highlights the risk factors identified for 2007 Indiana acute hepatitis B cases. Completeness of reporting risk factor information prior to infection varies. Nationally, the proportion of heterosexuals reporting multiple sex partners and self-identified MSM has increased in the past decade.

Table 2. Hepatitis B Risk Factors – Indiana, 2007

Risk Factor	Number of Cases (Percent of Cases)
Multiple Sex Partners	42 (60.0%)
Injection Drug Use	18 (25.7%)
Homosexual/Bisexual	12 (17.1%)
History of Dental Work	11 (15.7%)
Medical Employment	9 (12.9%)
History of Surgery	8 (11.4%)
Contact of a Case	7 (10.0%)
Application of a Tattoo	7 (10.0%)
Contact with a Contaminated Object	1 (1.4%)
Dialysis Association	0 (0%)

In 2007, 20 Indiana counties reported at least 1 case of acute hepatitis B, but only 3 reported five or more cases (Figure 5). The clinical case definition includes discrete onset of symptoms (eg. nausea, anorexia, fever, malaise, or abdominal pain) and jaundice or elevated serum aminotransferase levels. Laboratory criteria for confirming acute HBV includes an IgM antibody to hepatitis B core antigen (anti-HBc) positive or HBsAg positive and an IgM anti-HAV negative (if performed).

Indiana law requires the reporting of perinatal HBV infection. In 2007, no perinatal cases were reported.

You can learn more about hepatitis B by visiting the following Web sites
http://www.in.gov/isdh/files/HBV_QF.pdf
http://www.cdc.gov/hepatitis/ChooseB.htm
www.hepb.org

Figure 5: Hepatitis B Cases by County – Indiana, 2007

HEPATITIS C

Hepatitis C is an infectious bloodborne disease caused by the hepatitis C virus (HCV). The virus infects the liver, causing inflammation. Infections may range from mild illness lasting several weeks to serious, lifelong illness. Hepatitis C is the leading chronic bloodborne disease in the U.S. The number of reported cases is determined by the number of positive hepatitis C tests reported for the first time during that year. Cases are defined as either acute or chronic and are classified using case definitions published by the CDC. Only acute cases were reportable in 2007, but data is collected on chronic cases in order to assess risk factors.

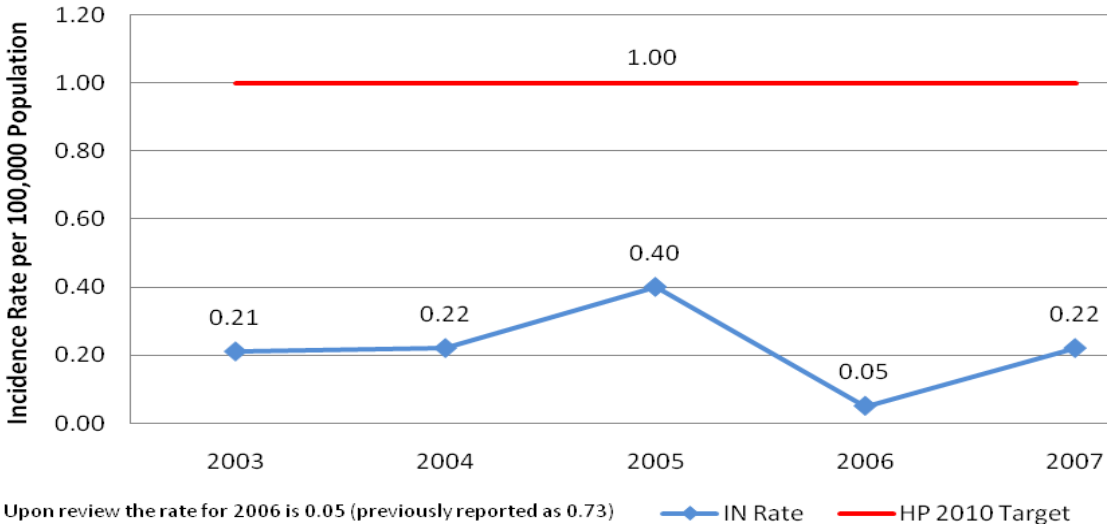
Public Health Significance

Clinically defined cases of acute hepatitis C do not occur often, making it difficult to identify these cases. Approximately 15 to 20 percent of these cases will spontaneously clear the virus and are no longer considered infected. The remaining infected individuals may be asymptomatic for years or even decades, becoming chronic cases. Symptoms that may be present during infection include abdominal pain, fatigue, fever, joint pain, jaundice, loss of appetite, dark urine, light stool, nausea, and/or vomiting. 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. Treatment for hepatitis C is available, but treatment is very rigorous and should be discussed thoroughly with a health care provider to determine candidacy. Populations most at risk include injection drug users, recipients of blood transfusions and organ transplants 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 last five-year reporting period 2003-2007 (Figure 1).

Figure 1: Acute Hepatitis C Rates by Year Indiana, 2003-2007



Epidemiology and Trends

Reporting positive test results for HCV was not required in Indiana until October 2000. In 2007, 14 cases of acute hepatitis C were reported for an incidence rate of 0.22 cases per 100,000 population while 5,894 cases of chronic hepatitis C were reported, for a rate of 92.89 cases per 100,000 population (Table 1). The most common reported risk factors for acute cases were injection drug use and street drug use. In acute cases, males (0.26) were more likely to be reported than females (0.19); the same finding was true for chronic case of hepatitis C (rate=115.01 per 100,000 males and 67.98 per 100,000 females) (Table 1). In 2007, race was not reported for 57 percent of hepatitis C cases; consequently, an accurate comparison is not possible.

Table 1. Hepatitis C Cases by Race and Sex, Indiana 2007

	Acute		Chronic		2003-2007
	Cases	Rate*	Cases	Rate*	Total Cases
Indiana	14	0.22	5,894	92.89	27,747
Race					
Black	1	0.17	558	**	3,660
White	11	0.20	1,936	**	11,234
Other	2	0.03	62	**	239
Not Reported	0	-	3,340	**	12,614
Sex					
Female	6	0.19	2,188	67.98	9,382
Male	8	0.26	3,596	115.01	17,893
Unknown	0	-	110	-	472

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2007

**Over 50% of cases did not have a race reported. Rates not calculated.

Figure 2 shows the number of total reported cases of hepatitis C for the five-year period 2003-2007.

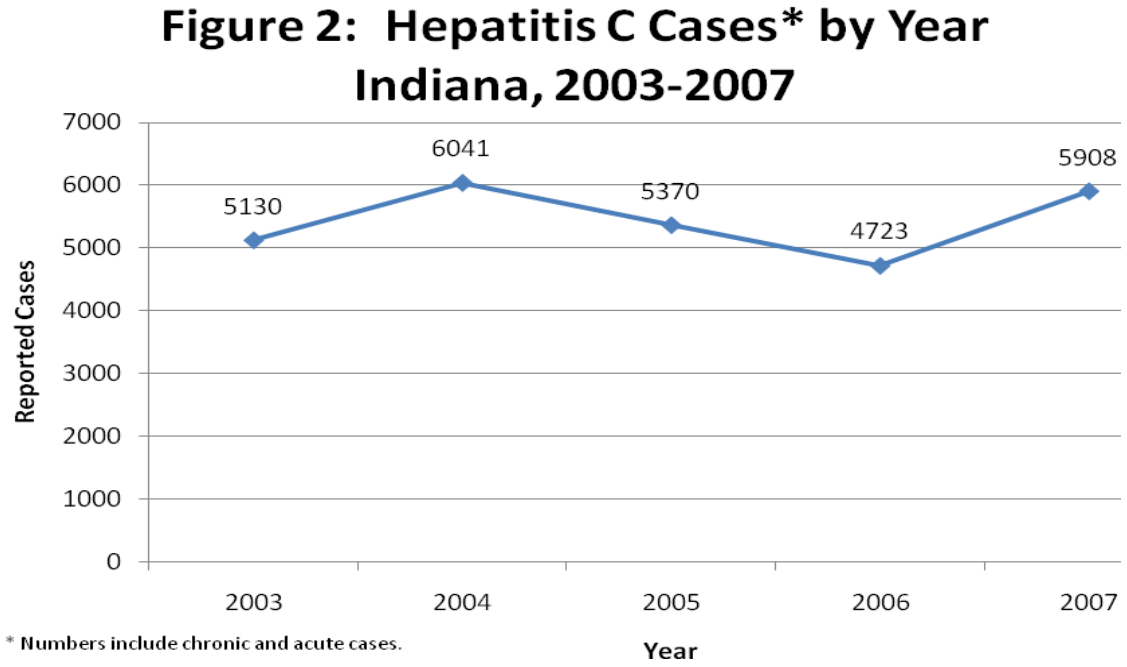
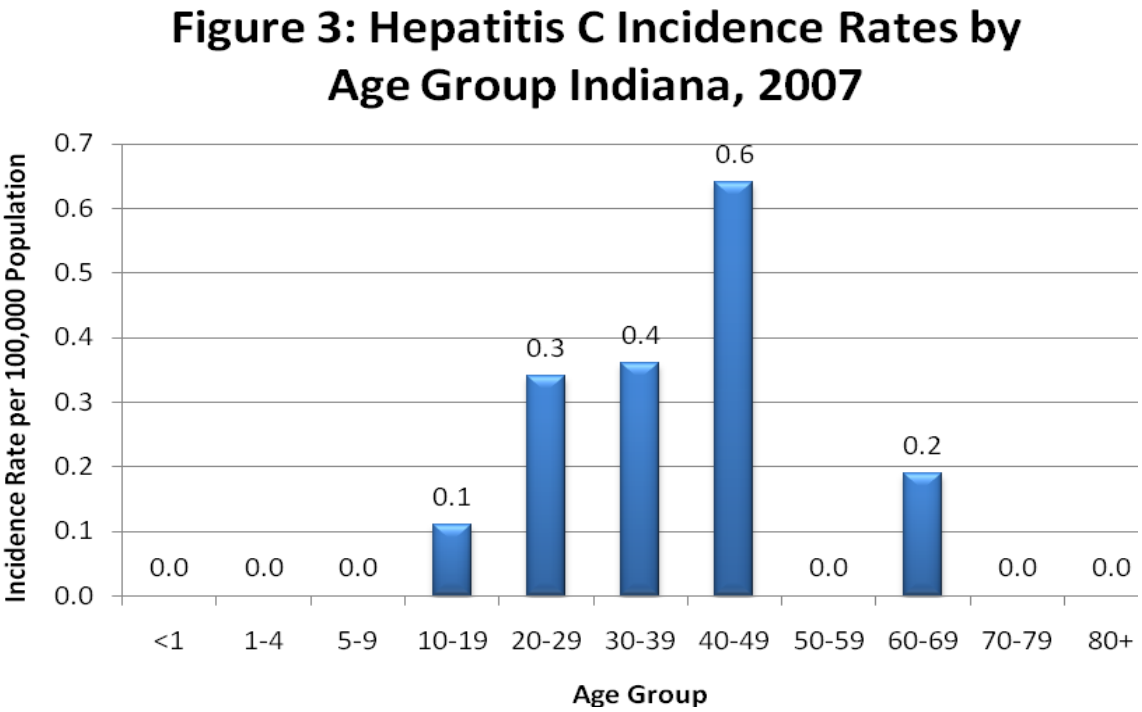


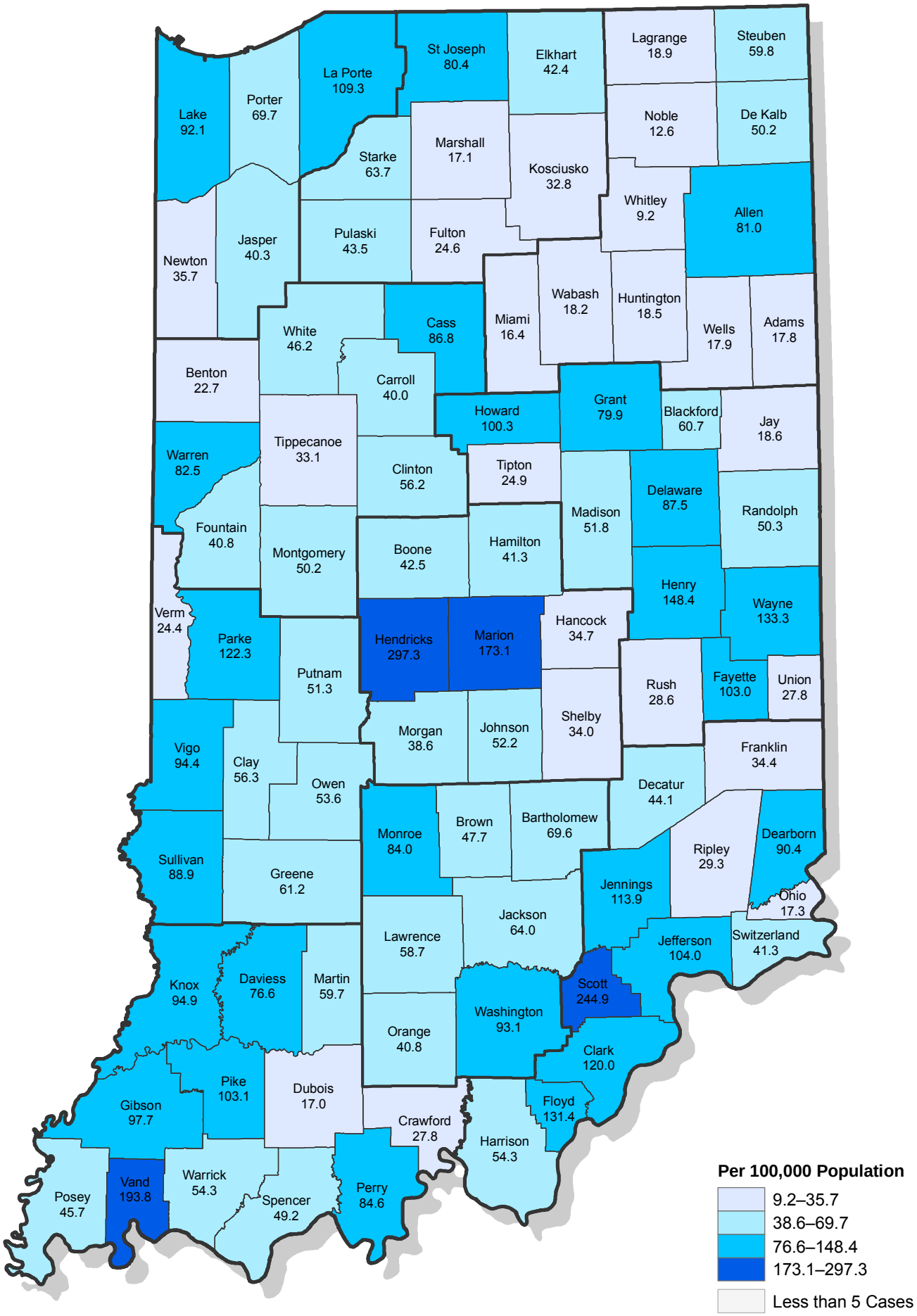
Figure 3 shows age-specific rates for acute cases. Rates were highest among adults age 40-49.



In 2007, cases of hepatitis C were reported in all counties (Figure 4).

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

Figure 4: Hepatitis C Cases by County – Indiana, 2007



The following counties include Indiana Department Of Correction (IDOC) facilities: Allen, Cass, Clark, Hendricks, Jefferson, Johnson, LaPorte, Madison, Marion, Miami, Noble, Parke, Perry, Putnam, St Joseph, and Wabash. IDOC cases were not separated prior to calculating county rates.

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, such as 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 practiced.

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 2007 and only two reported cases during the five-year period 2002-2007.

You can learn more about hepatitis E by visiting the following Web sites:
http://www.cdc.gov/hepatitis/index.htm
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm071311.htm

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 fromblackbirds, starlings, chickens, and pigeons. Birds are not carriers of histoplasmosis, but accumulation of bird feces provide the organic enrichment needed for *Histoplasma* growth. Bat guano may also contain the organism.

Public Health Significance:

Approximately 90 percent of *Histoplasma capsulatum* infections are asymptomatic. Clinically recognized histoplasmosis can be characterized into one of three forms: 1) acute, pulmonary histoplasmosis; 2) disseminated histoplasmosis; and 3) chronic, cavitary histoplasmosis.Symptoms of histoplasmosis cases are flu-like with nonproductive cough, chest pains, and difficult breathing (acute, pulmonary histoplasmosis). 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 (disseminated histoplasmosis). 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

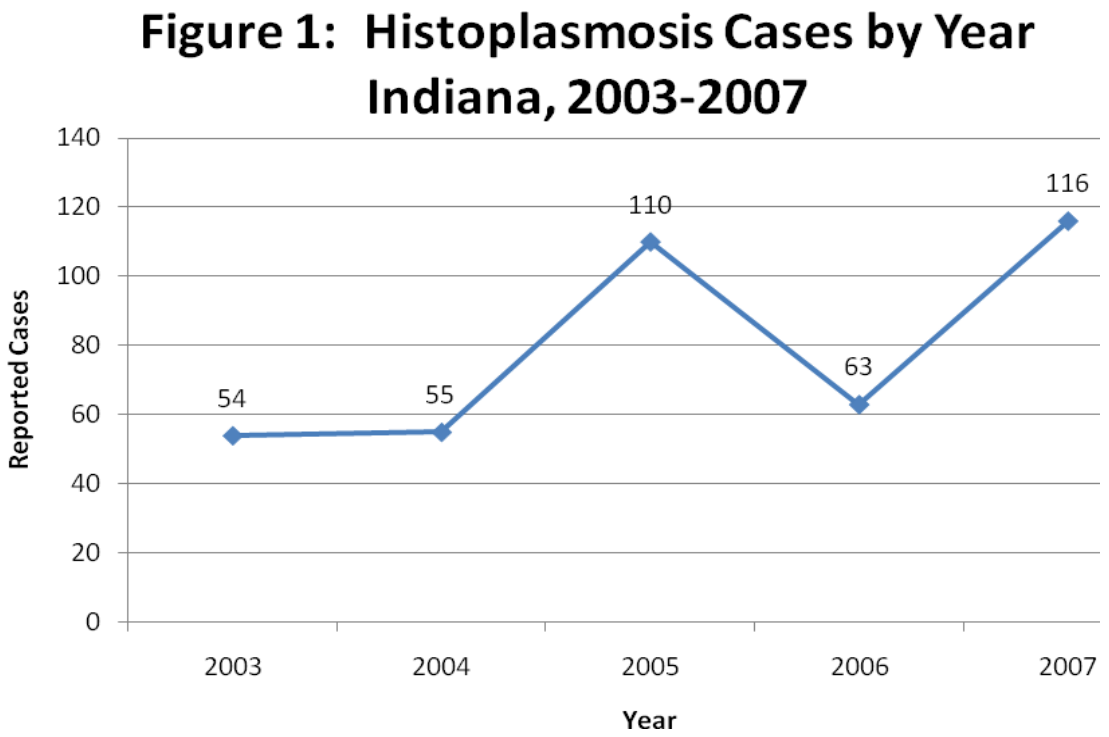
In 2007, 116 confirmed cases of histoplasmosis were reported in Indiana for an incidence rate of 1.83 case per 100,000 population (Table 1). This represents a 54 percent increase from 2006. However, in 2005, there were 110 cases. Males (2.08) were more likely to be reported with histoplasmosis infection than females (1.58).

Table 1: Histoplasmosis Case Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	116	1.83	398
Race			
Black	7	1.22	39
White	61	1.09	240
Other	3	1.66	11
Not Reported	0	-	108
Sex			
Female	51	1.58	168
Male	65	2.08	230
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 1 illustrates the number of cases by year for 2003-2007.



Histoplasmosis occurred throughout the year in 2007, with the largest number of cases occurring in the winter and fall months (Figure 2).

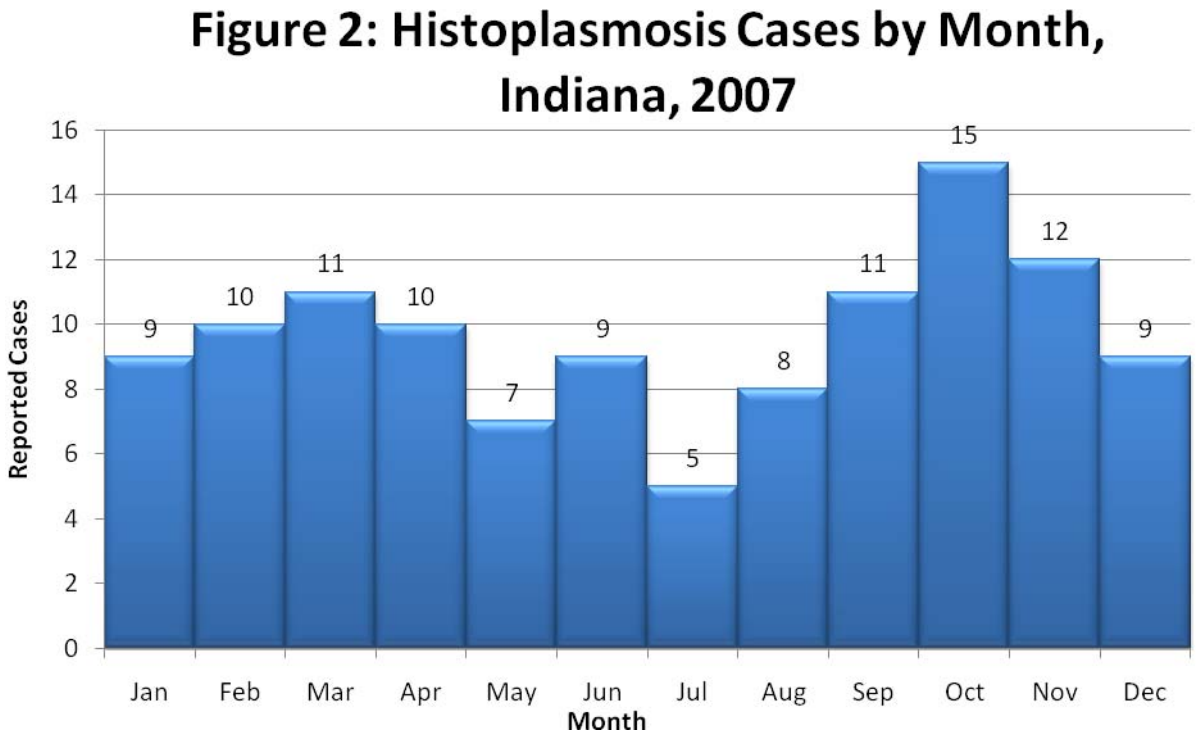
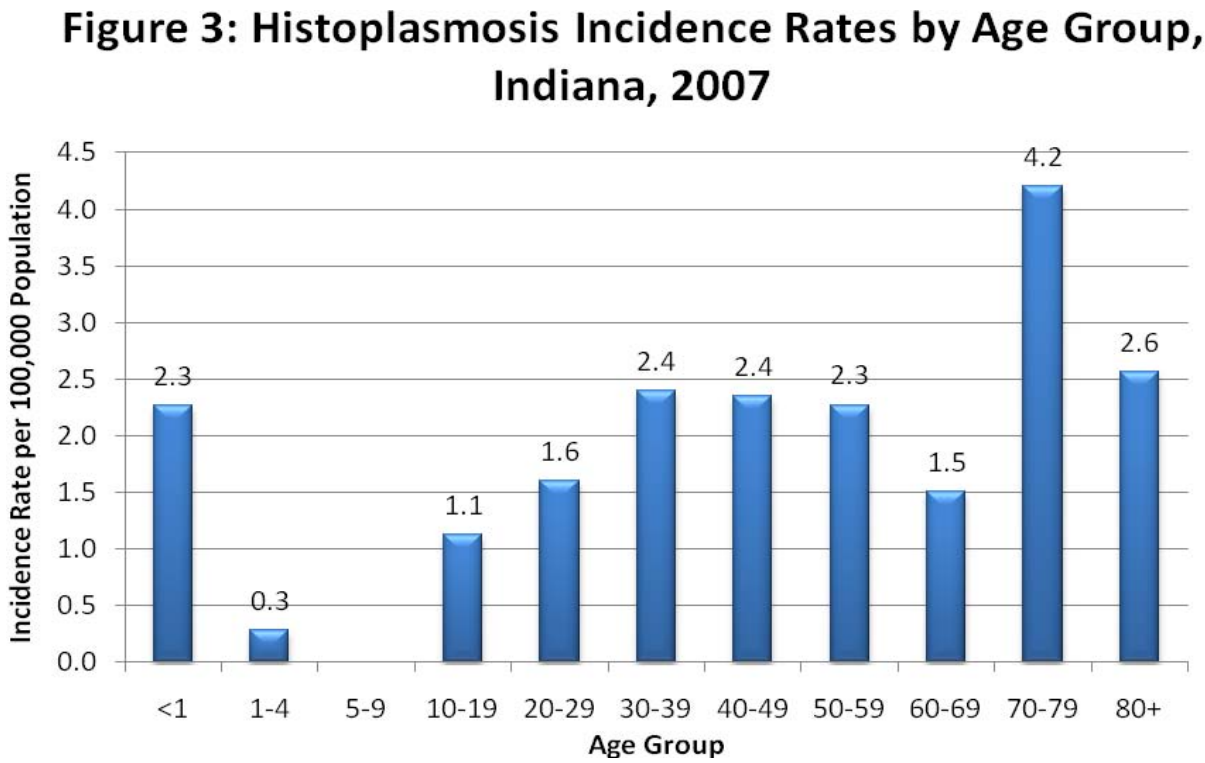


Figure 3 shows the distribution of cases by age group. Age-specific rates were greatest among adults aged 70+ years of age.



In 2007, 29 counties reported at least one case of histoplasmosis in Indiana. Clark, DeKalb, Delaware, Hamilton, Marion, and Wayne counties reported 5 or more cases.

There were no documented outbreaks of histoplasmosis in Indiana in 2007.

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

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, *Aedes triseriatus,* and small woodland mammals such as squirrels and chipmunks. Although La Crosse 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 approximately 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 six-year period 2002-2007, eight cases of La Crosse encephalitis were reported in Indiana, with no reported cases in 2007.

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. These bacteria are transmitted by contaminated water aerosols, which are then inhaled.

Public Health Significance:
Legionnaires' disease is a severe infection, most common characterized by pneumonia. Other symptoms include high fever, cough, chills, muscle aches, and headache. Symptoms usually begin about 2-14 days after exposure. Chest X-rays are needed to confirm the presence of pneumonia and other tests can be done on sputum (phlegm), as well as blood and urine to find evidence of the bacteria in the body.

People most at risk of getting sick from the bacteria are:

- older people (usually 65 years of age or older)
- smokers
- people with chronic lung disease (like emphysema)
- people with weakened immune systems from diseases like cancer, diabetes, or kidney failure
- people who take drugs that suppress (weaken) the immune system (such as organ transplants or chemotherapy)

A milder infection caused by the same type of Legionella bacteria is called Pontiac Fever. The symptoms of Pontiac Fever usually last for 2 to 5 days and may also include fever, headaches, and muscle aches; however, there is no pneumonia. Symptoms resolve on their own without treatment and without causing further problems. Neither infection is transmissible person-to-person. Pontiac Fever and Legionnaires' disease may both be called "Legionellosis."

Outbreaks occur when two or more people become ill in the same place at about the same time, such as hospitalized patients. Hospitals or large buildings have complex water systems, and many people in hospitals already have illnesses that increase their risk for Legionella infection. Other outbreaks have been linked to aerosol sources in the community, cruise ships, and hotels, with the most likely sources being whirlpool spas, cooling towers (air-conditioning units from large buildings), and water used for drinking and bathing.

Legionaires' disease can be treated with antibiotics. Supportive therapy may be needed to aid breathing function. There is no vaccine for legionellosis.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for legionellosis.

Epidemiology and Trends

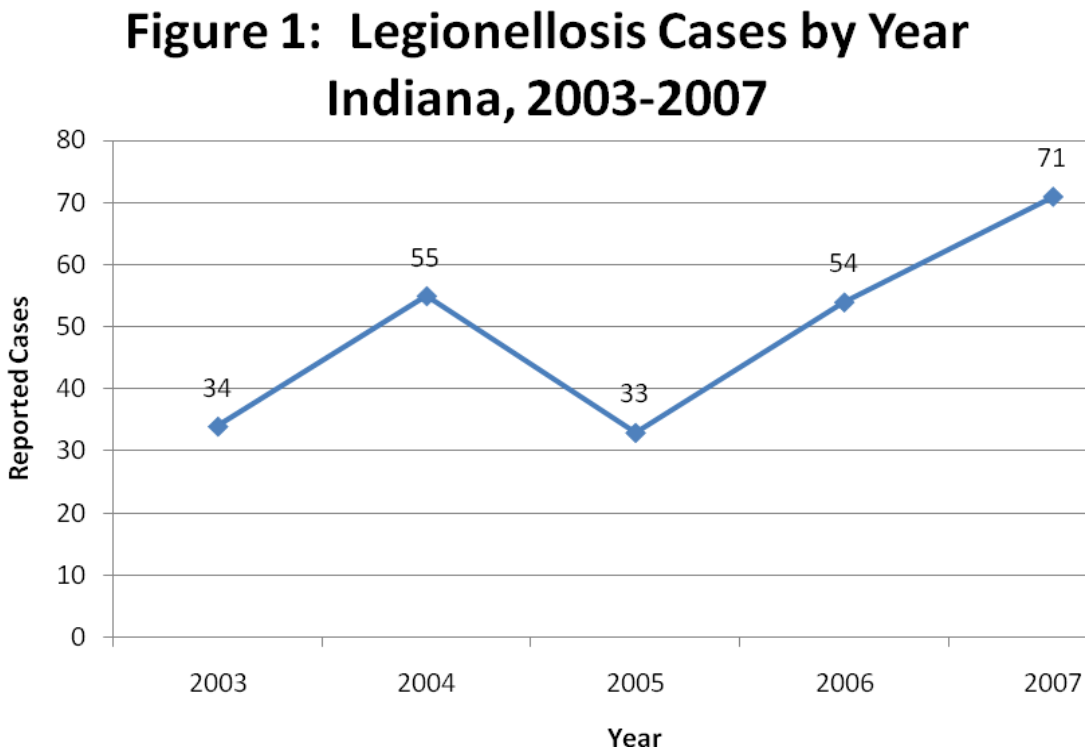
In 2007, there were 71 confirmed cases of Legionellosis in Indiana (Table 1). The legionellosis disease case rate for 2007 was 1.12 per 100,000.

Table 1: Legionellosis Case Rate by Race and Sex, Indiana, 2007

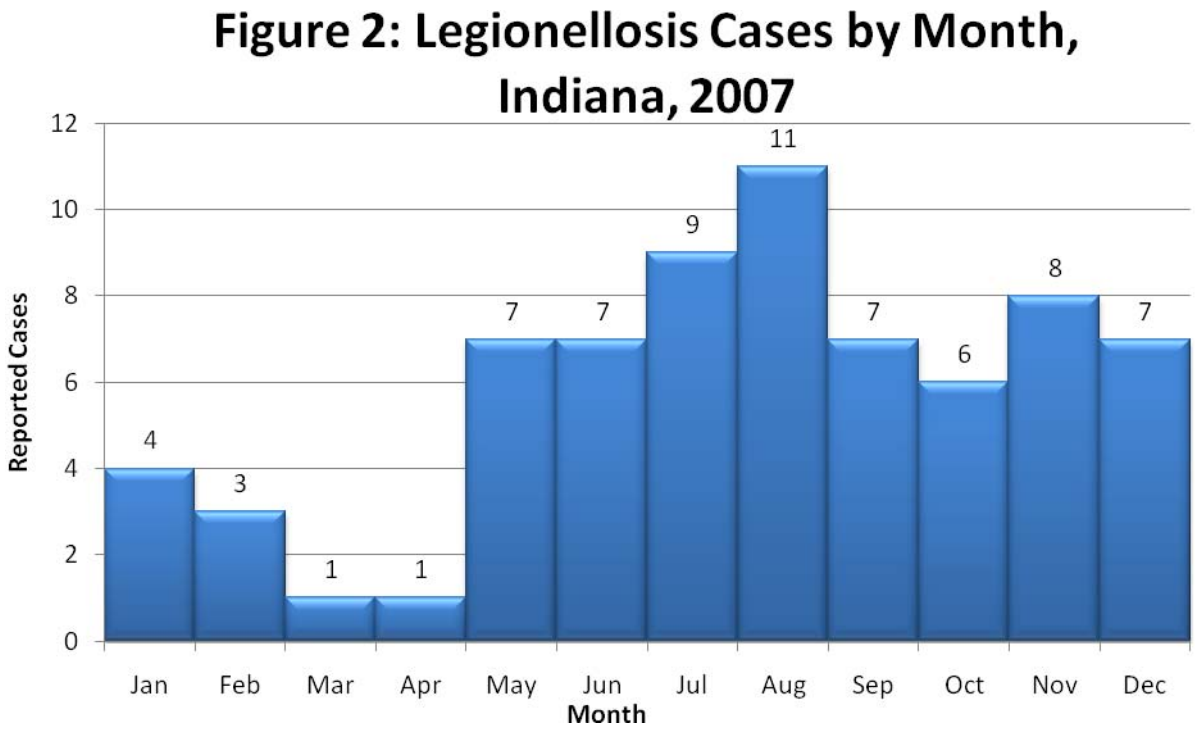
	Cases	Rate*	2003 - 2007 Total
Indiana	71	1.12	247
Race			
Black	7	1.22	23
White	58	1.04	196
Other	0	0.00	1
Not Reported	0	-	0
Sex			
Female	26	0.81	93
Male	45	1.44	154
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

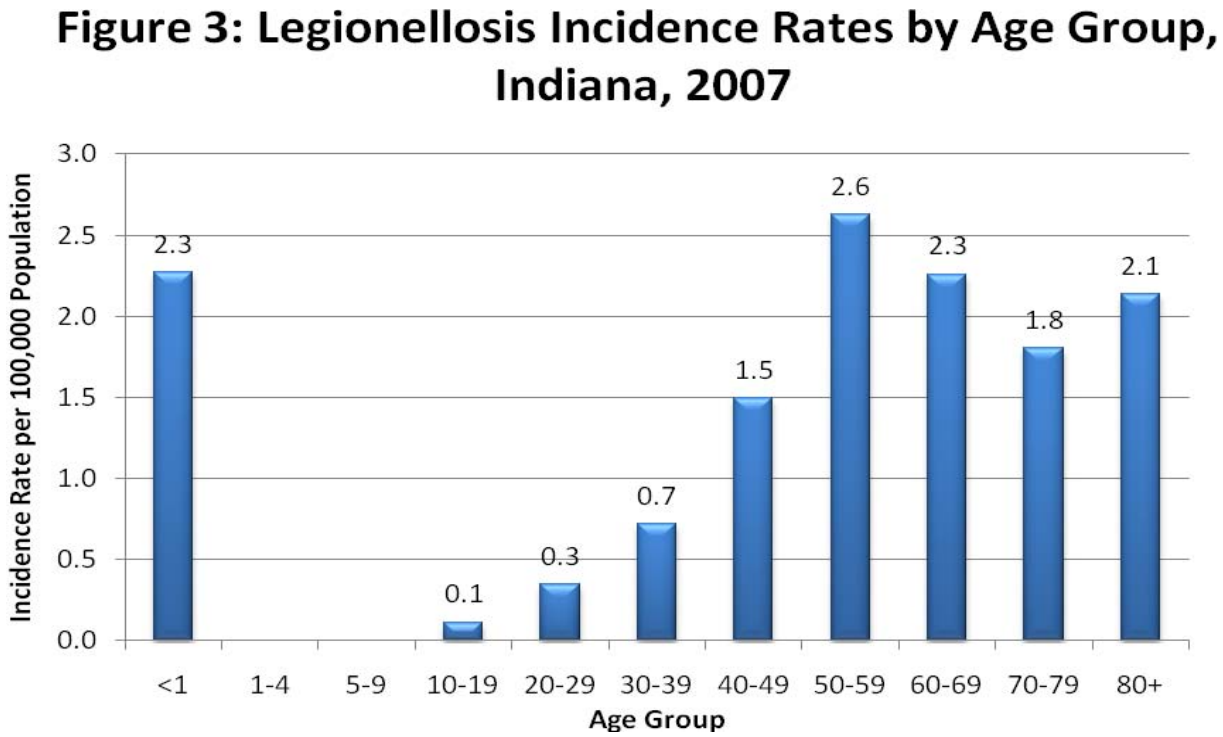
Figure 1 shows the case rates for 2003-2007. In Indiana, blacks (1.22) are at higher risk for legionellosis disease than whites (1.04). Additionally, males (1.44) are at higher risk than females (0.81).



Incidence of legionellosis disease climbs in late spring through fall. Figure 2 indicates an increase of incidence in the late spring through fall of 2007.



Cases of legionellosis disease tend to occur more frequently in adults 50-59, followed by <1 year of age, and 50-59 years of age, seen in Figure 3.



Of the 27 counties reporting cases in 2007, only Marion, Lake, Allen, Johnson and Tippecanoe Counties had 5 or more cases (Figure 4).

Surveillance Case Definitions:
Must meet clinical definition and one of the following laboratory requirements.

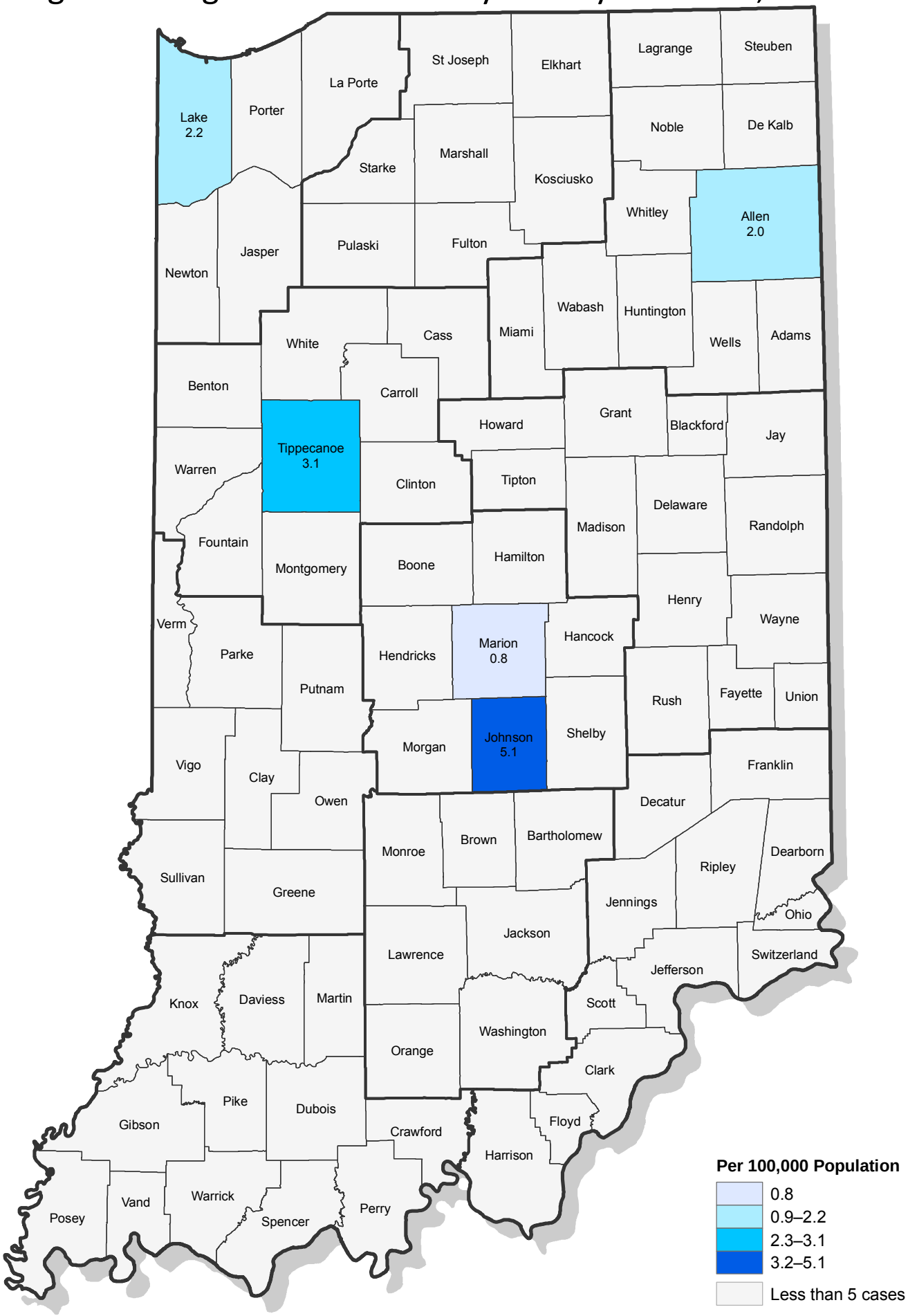
Confirmed:

- Culture: isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid.
- Urinary antigen: detection of specific *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents. This is the fastest way to confirm the diagnosis.
- Seroconversion: fourfold or greater rise in specific serum antibody titer to *Legionella pneumophila* using validated reagents. This is not recommended due to the time required to obtain both acute and convalescent sera.

You can learn more about legionellosis by visiting the following Web sites
http://www.in.gov/isdh/22111.htm

http://www.cdc.gov/legionella/patient_facts.htm

Figure 4: Legionellosis Cases by County – Indiana, 2007



LEPROSY (HANSEN'S DISEASE)

Leprosy, or Hansen's Disease, is a chronic disease caused by the bacterium *Mycobacterium leprae*, which affects the skin, mucous membranes, and peripheral nerves. The World Health Organization (WHO) classifies the disease based upon the number of skin patches involved: paucibacillary (1-5) and multibacillary (>5 patches). This classification system is used in the determination of the appropriate duration and type of antibiotic drug therapy used in treatment. Symptoms of leprosy include hypopigmented or reddish skin lesions that may appear as plaques or nodules that are not painful, as well as loss of sensation in the extremities and nose from peripheral nerve involvement and nasal congestion. Symptoms of the disease do not typically appear for several years after contact with an infected person. The mode of transmission is uncertain, but the bacteria are thought to be spread through the contact with nasal mucosa of infected persons. It is estimated that 95% of the world's population is naturally immune to the bacteria, as leprosy is not a highly transmissible disease.

Public Health Significance

Persons at greatest risk for the disease include household contacts of a case. Most cases in the United States occur in immigrants and refugees who acquired the disease in their native country. Leprosy is more common in temperate, tropical, and subtropical climates.

Early diagnosis and treatment of the disease is critical in curing the disease and in preventing permanent damage to the skin and nerves. A multi-drug regimen taken over an extended period is used to treat the disease, and it is recommended that direct observation therapy be utilized to ensure compliance with the medication regime. While prophylaxis of close contacts is not recommended, current household contacts should be examined immediately by a health care provider and then annually for five years following last contact with the infectious patient.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for leprosy.

Epidemiology and Trends

One case of leprosy was reported in Indiana in 2007. Only one other case (2004) was reported during the five year reporting period 2003 – 2007. In the United States, 101 cases were reported during 2007. Most cases occurred in the Southwestern regions of the country.

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

http://www.cdc.gov/nczved/dfbmd/disease_listing/leprosy_ti.html

LEPTOSPIROSIS

Leptospirosis is a bacterial disease of animals and humans caused by *Leptospira* bacteria, most commonly *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 2007, and only two cases were reported during the five-year reporting period 2003-2007.

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, such as 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 from 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.

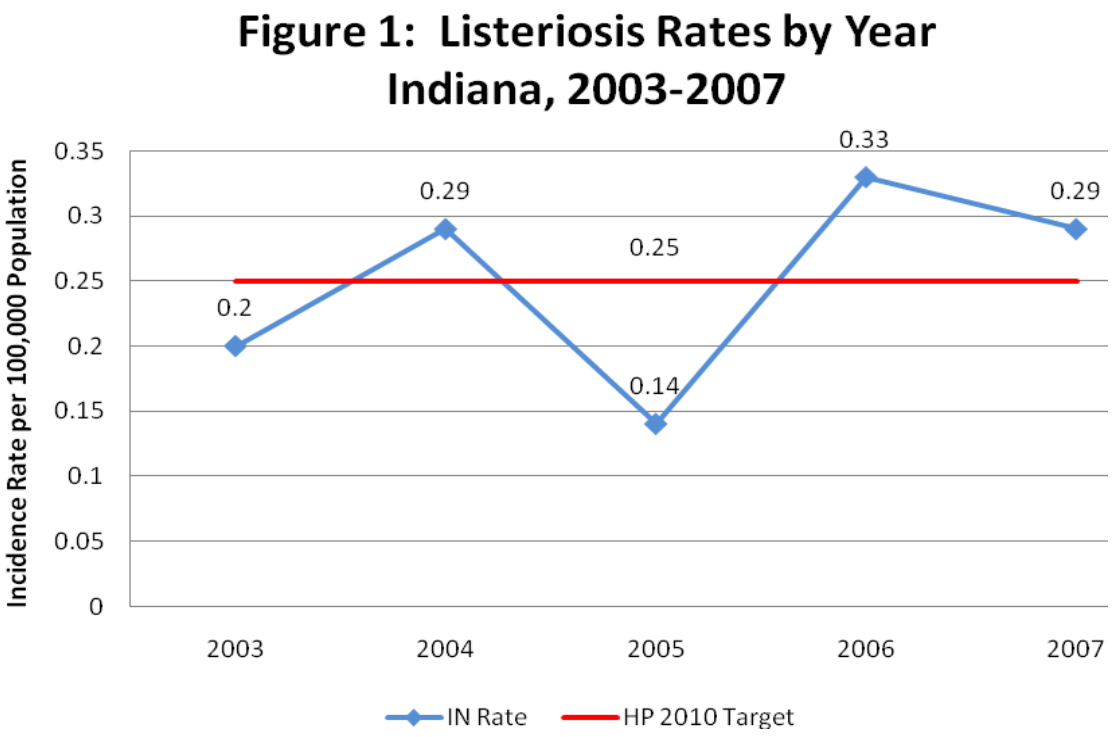
Public Health Significance

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. Pregnant women are about 20 times more likely than other healthy adults to get listeriosis. About one-third of listeriosis cases occur during pregnancy. If infection occurs when a woman is pregnant, antibiotics given promptly can often prevent infection of her baby. Otherwise, infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn. Illness can be very serious in pregnant women, newborns, elderly persons, and persons with weakened immune systems.

Antibiotics are available to treat the infection in all persons, regardless of age.

Healthy People 2010 Goal

The Healthy People 2010 Goal for listeriosis is 0.25 cases per 100,000 population. During the five-year reporting period, Indiana met the Healthy People 2010 goal in 2003 and 2005 (Figure 1). The increase in cases for 2004, 2006 and 2007 is unknown.



Epidemiology and Trends

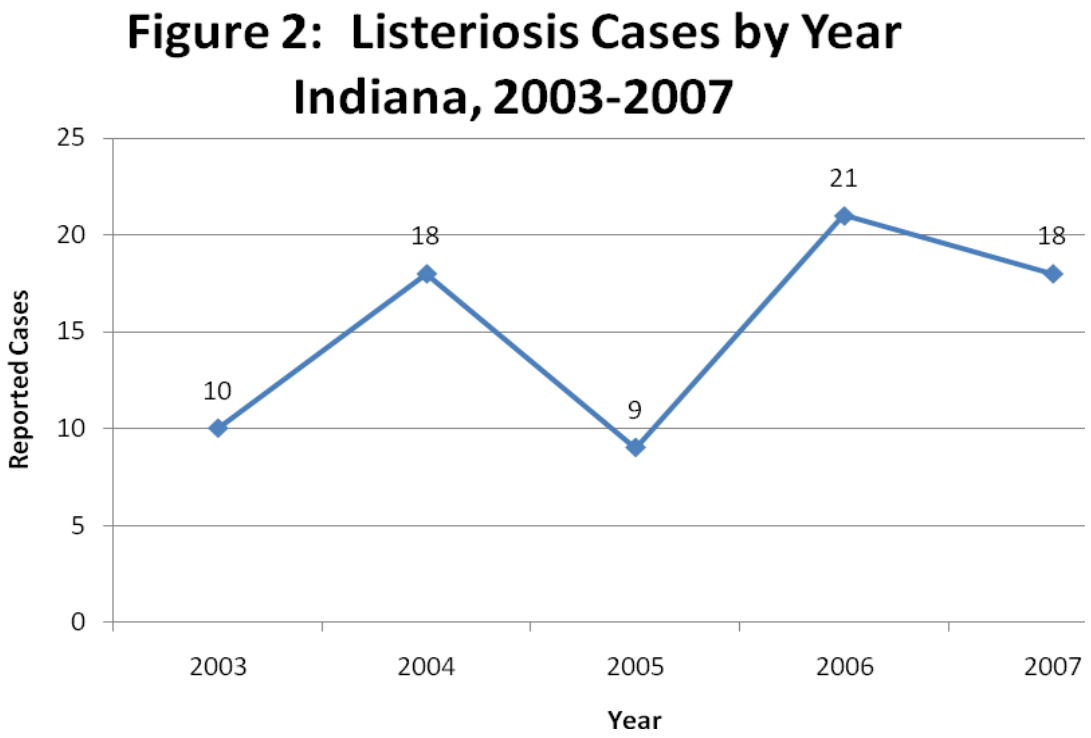
In 2007, 18 cases of listeriosis were reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1).

Table 1: Listeriosis Case Rate by Race and Sex, Indiana, 2007

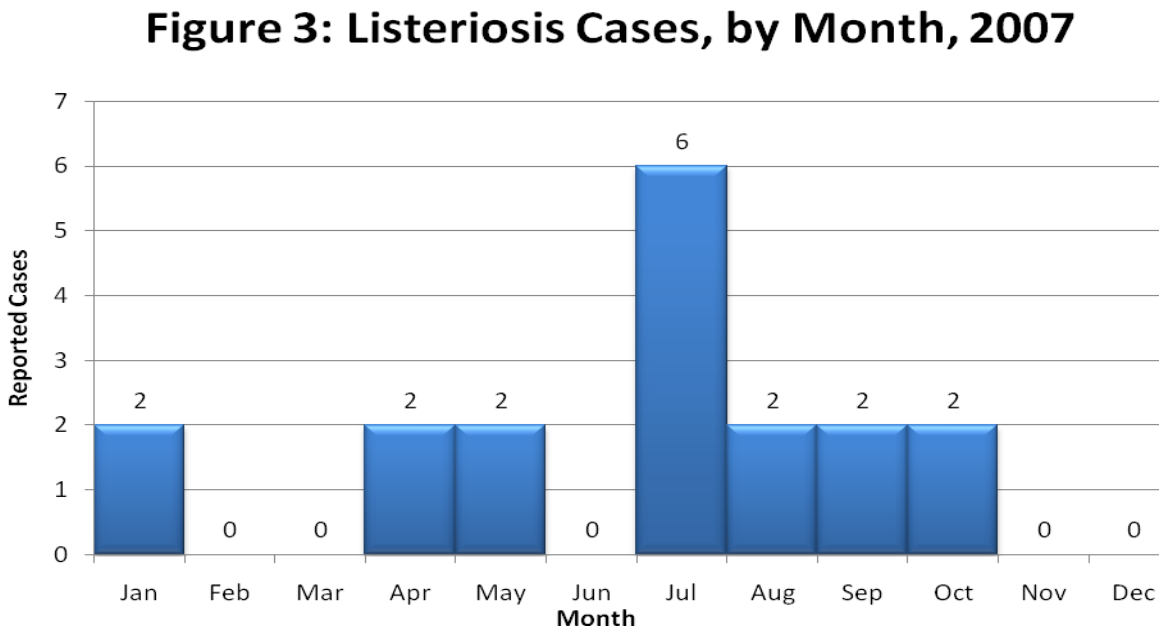
	Cases	Rate*	2003 - 2007 Total
Indiana	18	0.28	76
Race			
Black	1	0.17	4
White	13	0.23	53
Other	0	0.00	1
Not Reported	4	-	18
Sex			
Female	8	0.25	35
Male	10	0.32	41
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 2 shows reported listeriosis cases by year for 2003-2007.

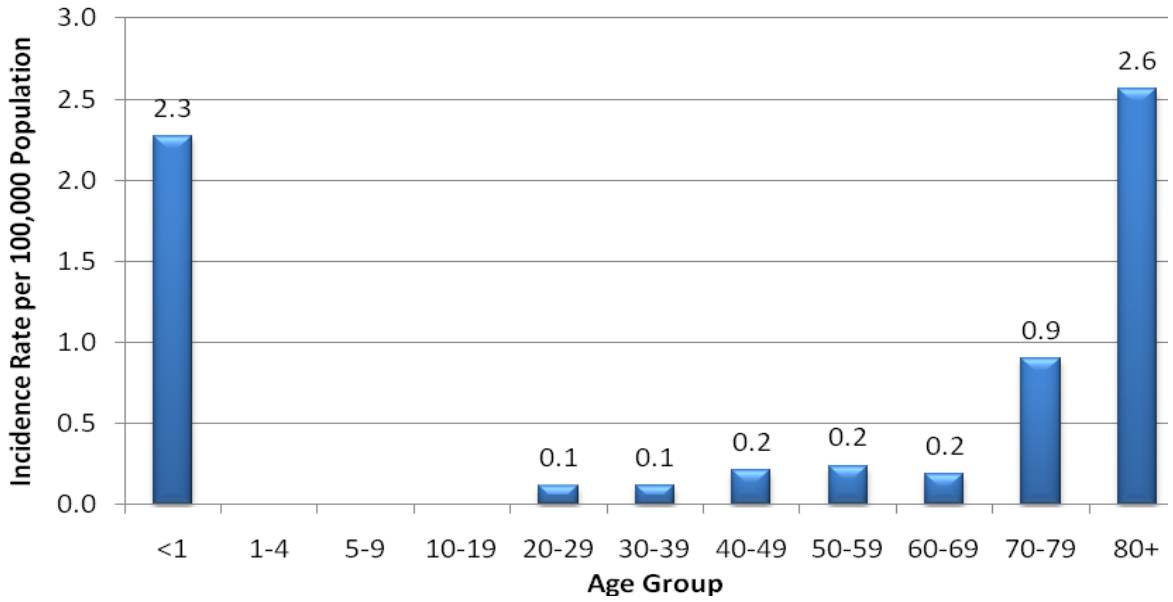


Incidence of disease was greatest during the summer months (Figure 3).



As shown in Figure 4, age specific rates were greatest for older adults 80+ years of age (2.6), followed by infants less than one year of age (2.3).

Figure 4: Listeriosis Incidence Rates by Age Group Indiana, 2007



Fourteen counties reported having at least one listeriosis case in 2006, and no county reported 5 or more cases.

There were no outbreaks of listeriosis reported in Indiana in 2007.

You can learn more about listeriosis by visiting the following Web sites:
www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070064.htm

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*), 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 "bullseye" 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.

Untreated infections of Borrelia burgdorferi can lead to various health problems including arthritis, neurologic disease, meningitis, loss of muscle tone (Bell's palsy) and/or dermatological (skin) conditions.

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

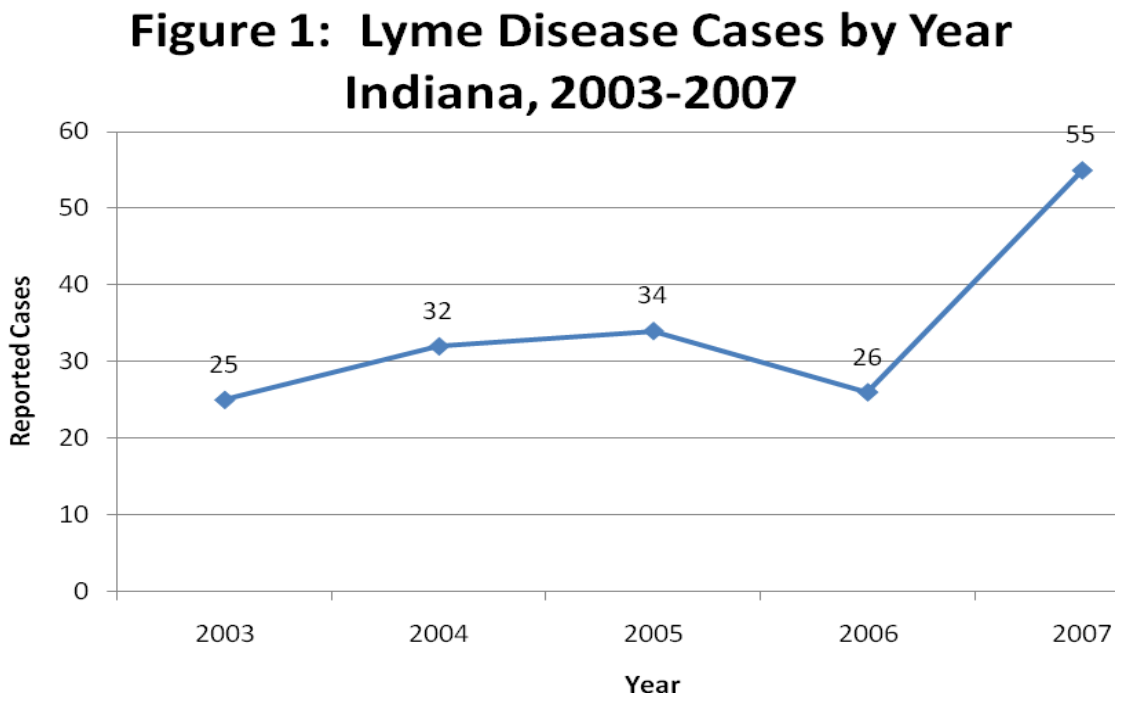
Epidemiology and Trends
In 2007, 55 cases of Lyme disease were reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1).

Table 1. Lyme Disease Cases by Race and Sex, Indiana, 2007

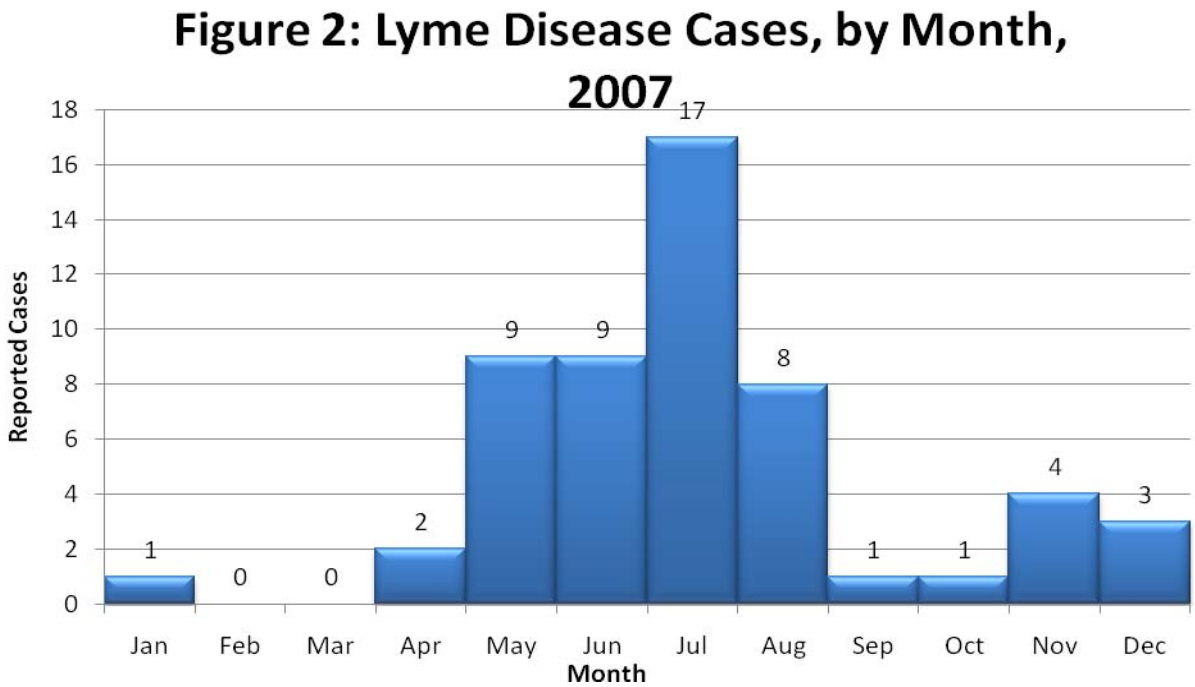
	Cases	Rate*	2003 - 2007 Total
Indiana	55	0.87	193
Race			
Black	1	0.73	3
White	41	0.17	143
Other	1	0.55	3
Not Reported	12	-	45
Sex			
Female	30	0.93	84
Male	25	0.80	107
Unknown	-	-	2

*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2007

Figure 1 shows the number of reported cases per year for 2002-2007.



Incidence of disease was greatest during the summer months (Figure 2). Eighty percent of reported cases occurred from May through September when ticks are most active.



Twenty-four counties reported Lyme disease cases in 2007; however, in past years most counties throughout the state have reported at least one case.

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

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. In the 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 risk areas, travelers should always see a health care provider to obtain anti-malarial medications to prevent malaria infection. The type of anti-malarial medication will vary depending on travel destination due to resistance to anti-malarial medication 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 by 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.

Epidemiology and Trends

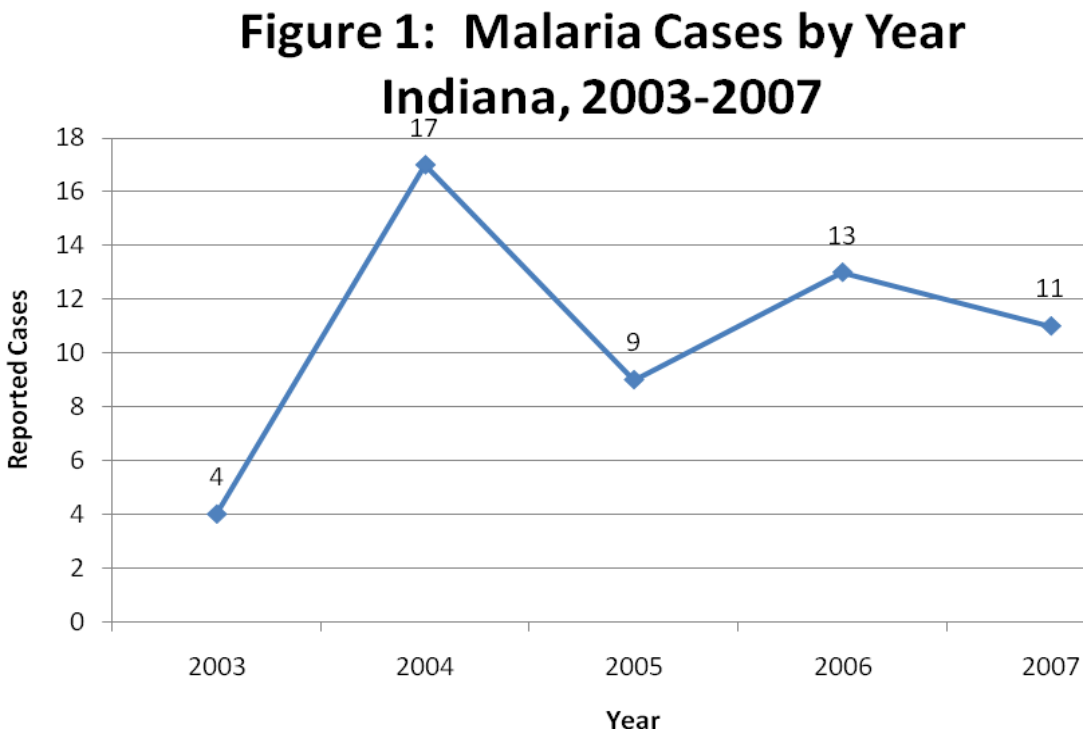
During the five-year period from 2003-2007, malaria cases were reported in Indiana following international travel to Sub-Saharan Africa, tropical (northern) South America, Central America, India, the Caribbean (Haiti and Dominican Republic), and parts of Asia.

Table 1. Malaria Cases by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	11	0.17	54
Race			
Black	3	0.05	11
White	2	0.35	23
Other	3	1.66	10
Not Reported	3	-	10
Sex			
Female	5	0.16	14
Male	6	0.19	40
Unknown	0	-	0

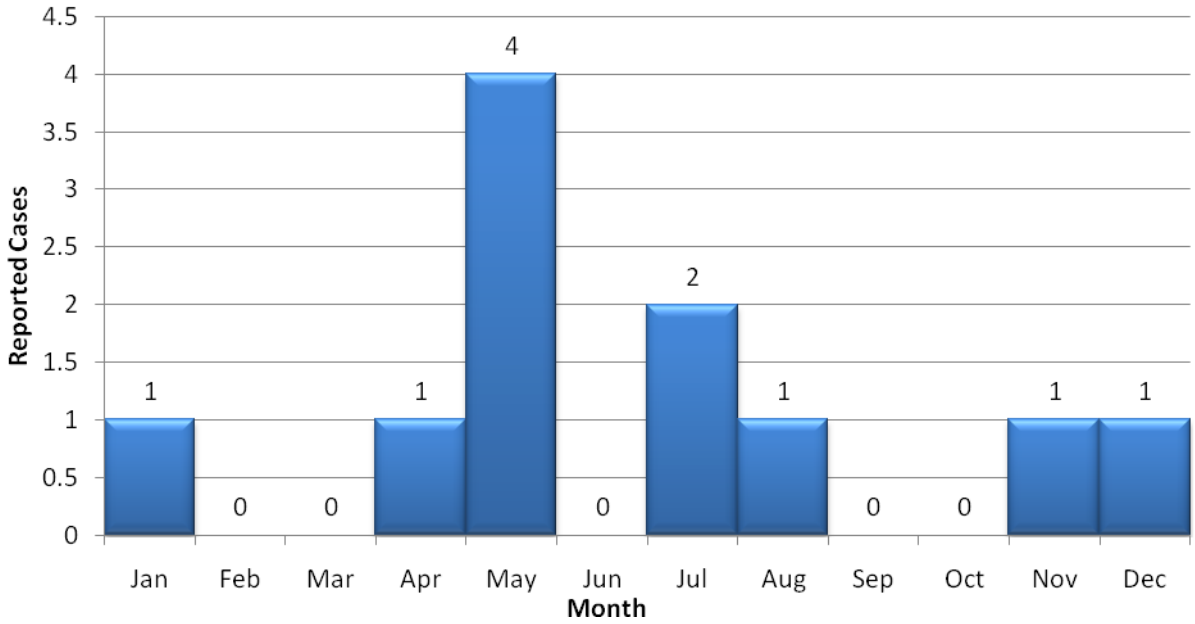
*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2007

As shown in Figure 1, the number of reported cases per year varied from 2003-2007.



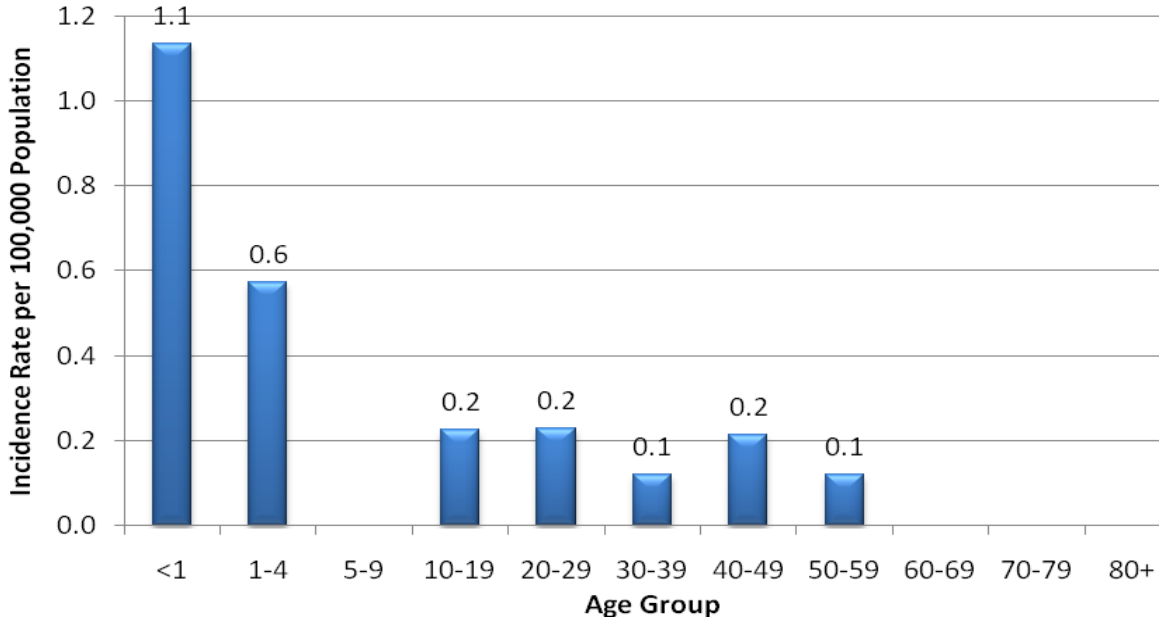
In 2007, the number of reported cases was variable by month (Figure 2).

Figure 2: Malaria Cases, by Month, 2007



As shown in Figure 3, age-specific rates were highest for infants aged less than 1 year (1.1), followed by toddlers aged 1-4 years (0.6).

Figure 3: Malaria Incidence Rates by Age Group Indiana, 2007



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

MEASLES

Measles is a highly contagious viral illness. Measles is transmitted through the air by droplets released when an infected person coughs or sneezes. It may also be spread by contact with nose or throat drainage of an infected person or articles contaminated by an infected person.

Public Health Significance

Symptoms of measles usually begin to appear 10-12 days after exposure to the virus. Symptoms of measles begin with tiredness, fever, cough, coryza (runny nose), and conjunctivitis. A maculopapular rash begins 3-4 days later, typically beginning at the hairline and gradually proceeding downward over the entire body. The rash lasts a minimum of 3 days, but on average lasts 4-7 days. Persons with measles usually appear to be very ill at least 2 days before to 2 days after rash onset. Though historically considered a mild childhood disease, it can lead to serious complications. Measles infection may cause ear infections, pneumonia, encephalitis, vision damage, and even death. Fever may last 2-4 days and can peak as high as 103-105 degrees Fahrenheit.

Measles virus is communicable prior to the appearance of the classical rash, thus following infection control guidelines and exclusion rules are important when exposed to an infected person.

No medications are currently used to treat measles. Vaccination is the most effective measure to prevent measles. Measles can spread quickly in unimmunized populations. Two doses of measles, mumps, and rubella (MMR) vaccine typically prevent infection. Children are administered the first dose of MMR at 12 months of age and the second dose of MMR at 4-6 years of age following the routine schedule. All adults should receive at least one dose of MMR vaccine, but two doses are recommended for health care workers, international travelers, and adults enrolled in secondary education.

Prior to routine measles vaccination, more than 500,000 measles cases and 500 associated deaths were reported annually in the United States. The actual number of measles cases per year was estimated to be 3-4 million. Measles incidence in the United States decreased more than 98% following the vaccine's licensure in 1963, but outbreaks still occur when the measles virus is introduced to unimmunized groups within the population.

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. The risk of importation of measles virus through international travel remains, thus prevention through vaccination is necessary until the virus is globally eradicated.

Epidemiology and Trends

There were 34 cases of measles reported in Indiana during the five-year period 2003-2007. No cases of measles were reported in 2007.

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

http://wwwn.cdc.gov/travel/yellowbook/2008/ch4/measles.aspx

MENINGITIS, (ASEPTIC)

Meningitis is an inflammation of the membranes surrounding the brain and spinal cord and can be caused by different types of microorganisms and non-infectious causes. Aseptic meningitis cases are those not caused by pus-producing bacteria, most commonly viral in nature. Viral meningitis is less severe than bacterial meningitis, as infected persons usually recover within 7-10 days with supportive therapy. Enterovirus is the most common cause of viral meningitis cases; however, other viruses including herpes simples viruses, varicella-zoster virus, measles, and arboviruses (spread by insects) can also cause meningitis. Fungi and parasites can cause meningitis in individuals who are immunocompromised. Non-infectious causes include drugs as well as systemic disease (including cancer).

Symptoms of meningitis include fever, severe headache, stiff neck, sensitivity to light, drowsiness and confusion. There is no specific treatment for viral meningitis attributed to enterovirus; however, anti-virals or other treatment may be recommended for other causes. Viral meningitis is spread from person-to-person through contact with nose and throat secretions during early stages of the infectious period and through fecal contamination for weeks after symptoms have resolved.

Public Health Significance

Most individuals who become infected with an enterovirus do not become ill or have only mild respiratory illness, making good personal hygiene, including frequent hand-washing very important.

Healthy People 2010 Goal

There is no Healthy People 2010 Goal for aseptic meningitis.

Epidemiology and Trends

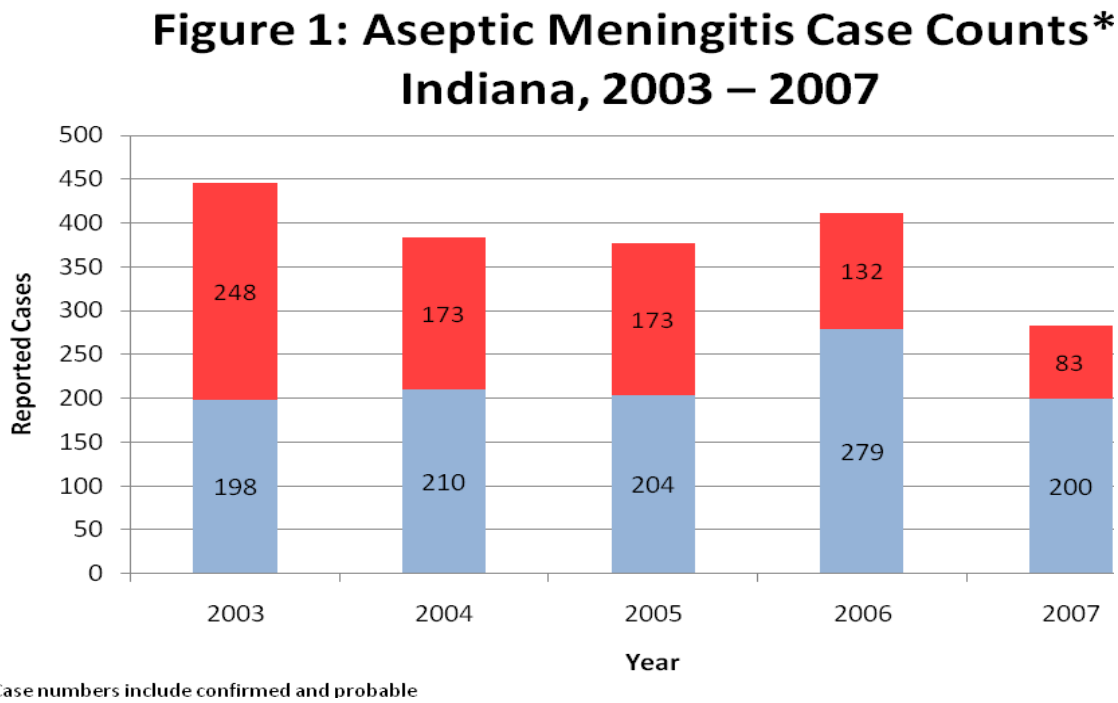
Beginning with the 2006 annual infectious disease report, both probable and confirmed cases were used to compile the data. In 2007, there were 200 confirmed cases and 83 probable cases reported for a total of 283 cases, resulting in a case rate of 4.46 per 100,000 population (Table 1). The rate for blacks (4.90) was 33% higher than for whites (3.68) and 10% higher than the overall state rates (4.46). The case rates for males (4.64) and females (4.26) were relatively close and have been during the five-year period 2003-2007.

Table 1: Aseptic Case Rate by Race and Sex, Indiana, 2007

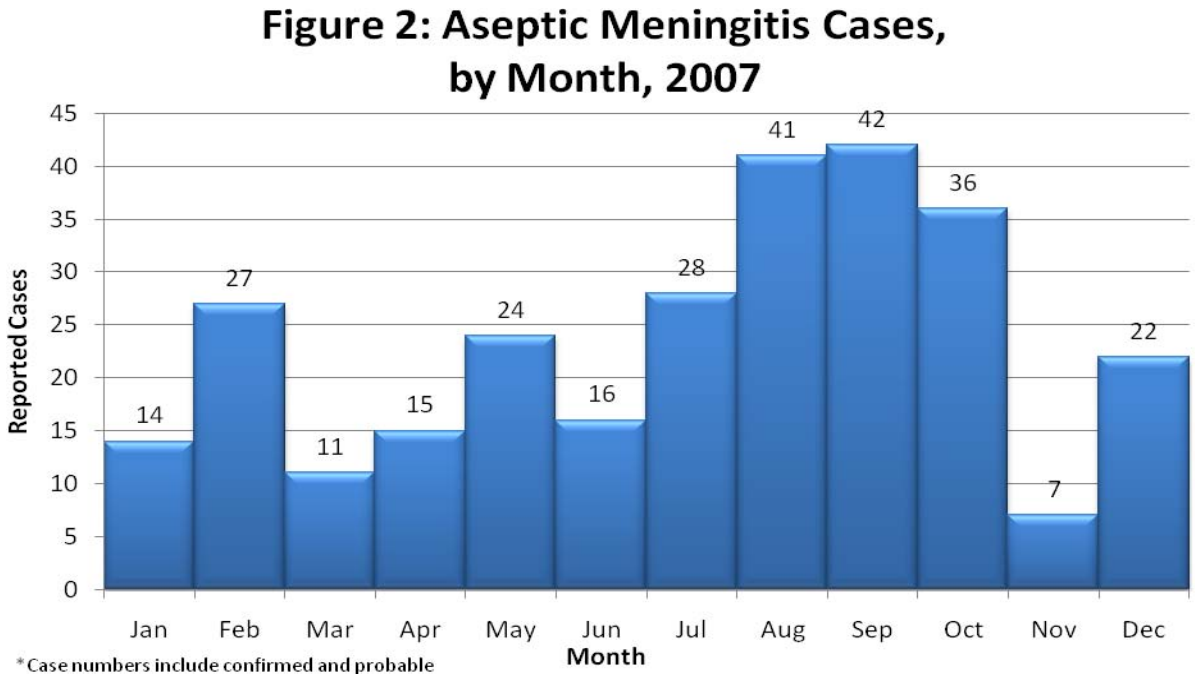
	Cases	Rate*	2003 - 2007 Total
Indiana	283	4.46	1,823
Race			
Black	28	4.90	174
White	206	3.68	1302
Other	1	-	40
Not Reported	48	-	308
Sex			
Female	137	4.26	907
Male	145	4.64	908
Unknown	1	-	8

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

During the previous five years, there is a slight increase in the number of confirmed cases and a slight decrease in the number of probable cases, most likely to due improved rapid identification of virus in the cerebrospinal fluid. Figure 1 shows confirmed and probable case counts during the five-year reporting period 2003–2007. There was a 32.5% decrease in the total number of cases (375) reported from 2006.

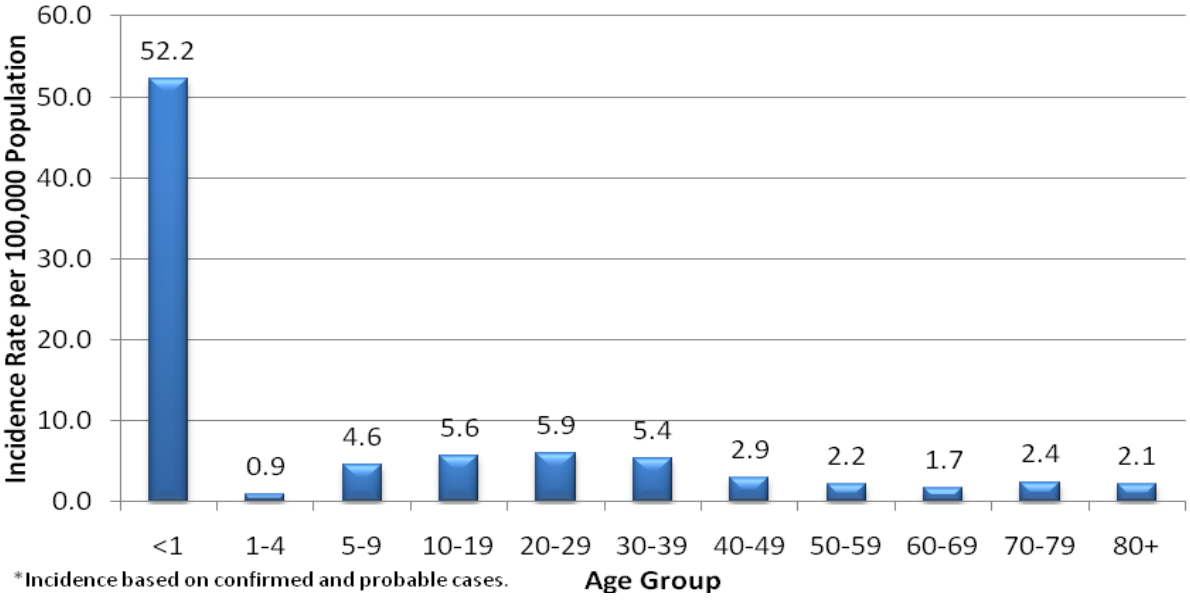


Typical of enterovirus seasonality, Figure 2 shows the incidence of viral meningitis was greatest during the late summer and early fall months, with the largest number of cases occurring in September (42). Fifty-two percent of all cases occurred in the four-month period from July – October.



As shown in Figure 3, age-specific rates were highest for infants < 1 year of age (52.2) followed by adults aged 20 – 29 years (5.9) and adults aged 30 – 39 years (5.4).

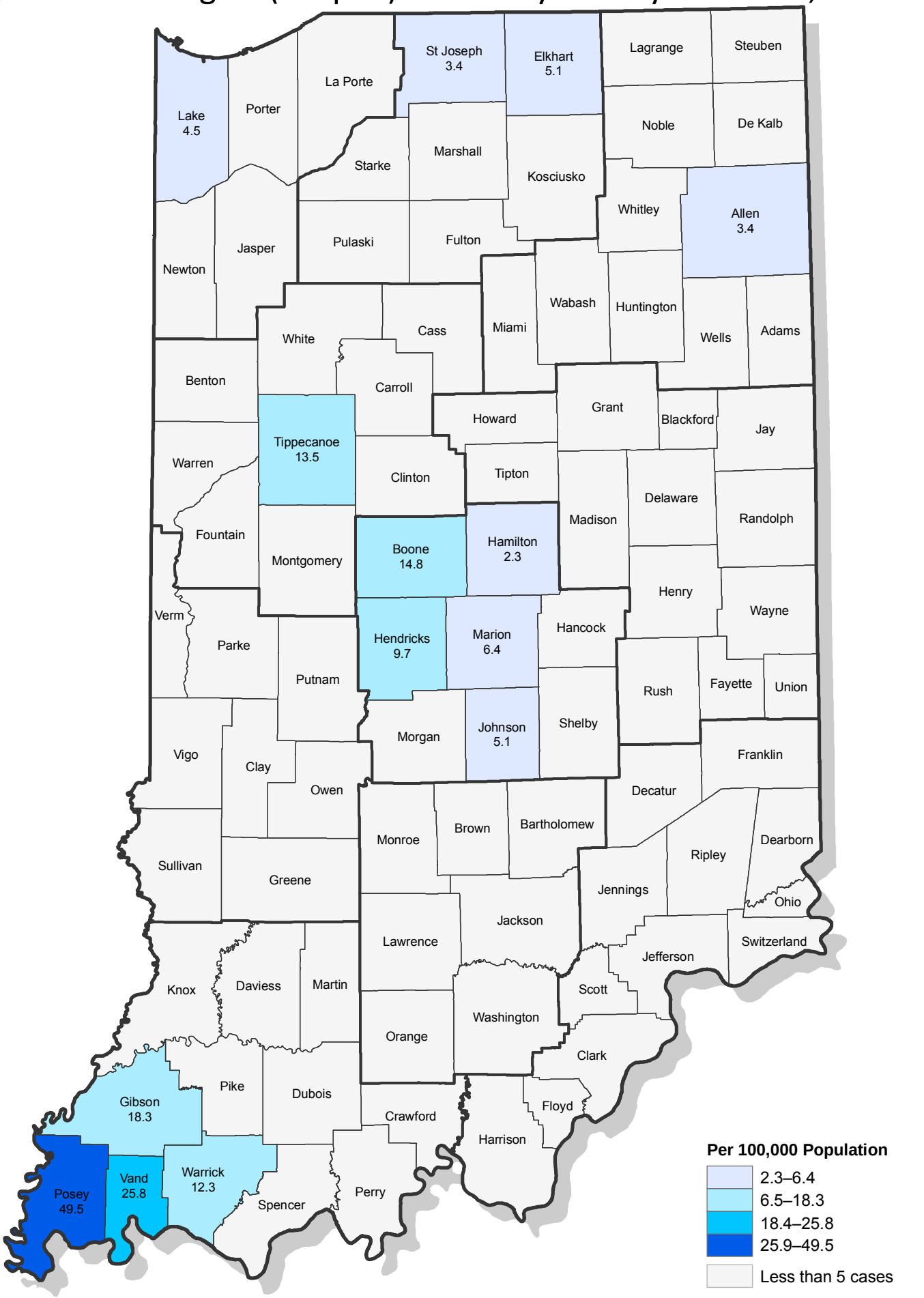
Figure 3: Aseptic Meningitis Incidence Rates by Age Group Indiana, 2007



Incidence rates were highest among the following counties reporting 5 or more cases during the year: Posey (49.4), Gibson (18.4), and Vanderburgh (25.8) (see Figure 4).

You can learn more about aseptic meningitis by visiting the following Web sites:
http://www.in.gov/isdh/22682.htm
http://www.cdc.gov/meningitis/about/index.html

Figure 4: Meningitis (Aseptic) Cases* by County – Indiana, 2007



* Includes Confirmed and Probable Cases

MENINGOCOCCAL DISEASE

Meningococcal disease is a life-threatening illness which occurs when *Neisseria meningitidis* bacteria invade a site in the body that is normally sterile, such as the blood or fluid surrounding the brain and spinal cord. The bacteria are transmitted from person-to-person through direct contact with nose and throat secretions of an infected person. It is estimated that at least 10% of U.S. residents may be colonized with the bacteria in the nasopharynx but have no symptoms of infection. Invasive disease is most commonly manifested as meningitis, bacteremia , meningococcemia (meningococcal sepsis), or septic arthritis, although the disease can also cause pneumonia in older adults. Meningococcal infections often begin with a sudden onset of fever, headache, stiff neck, rash, photophobia, nausea and vomiting. Prompt antibiotic therapy can reduce the risk of long-term effects and improve survival, although case-fatality rates range from 10-14%. Meningococcemia is the most severe form of the infection and is fatal in up to 40% of cases. Only cases of invasive disease are reportable in Indiana.

Public Health Significance

Certain segments of the population are at increased risk for the disease due to risk factors within the host or in the environment. These groups include:

- College freshmen living in dormitories
- Persons working in or attending child-care facilities
- Microbiologists
- U.S. military recruits
- Persons who travel to or reside in countries where *N. meningitidis* is epidemic, especially if there will be prolonged contact with the local population
- Persons who have certain immune system disorders
- Persons who do not have a functional spleen

Routine vaccination for children 11-18 years of age is recommended by the American Council on Immunization Practices (ACIP) and will become a requirement for school attendance in Indiana during the 2010–2011 school year. Vaccination is also recommended for other at-risk populations, and education on the importance of receiving the vaccine is a primary strategy for reducing incidence of the disease. Revaccination for individuals who remain at high risk is recommended. Two vaccines are currently available to protect against meningococcal disease. Both vaccines protect against four of the five encapsulated serogroups of the bacteria which cause invasive disease (A, B, C, Y, W135). No vaccine is available to protect against serogroup B or serogroup Z disease.

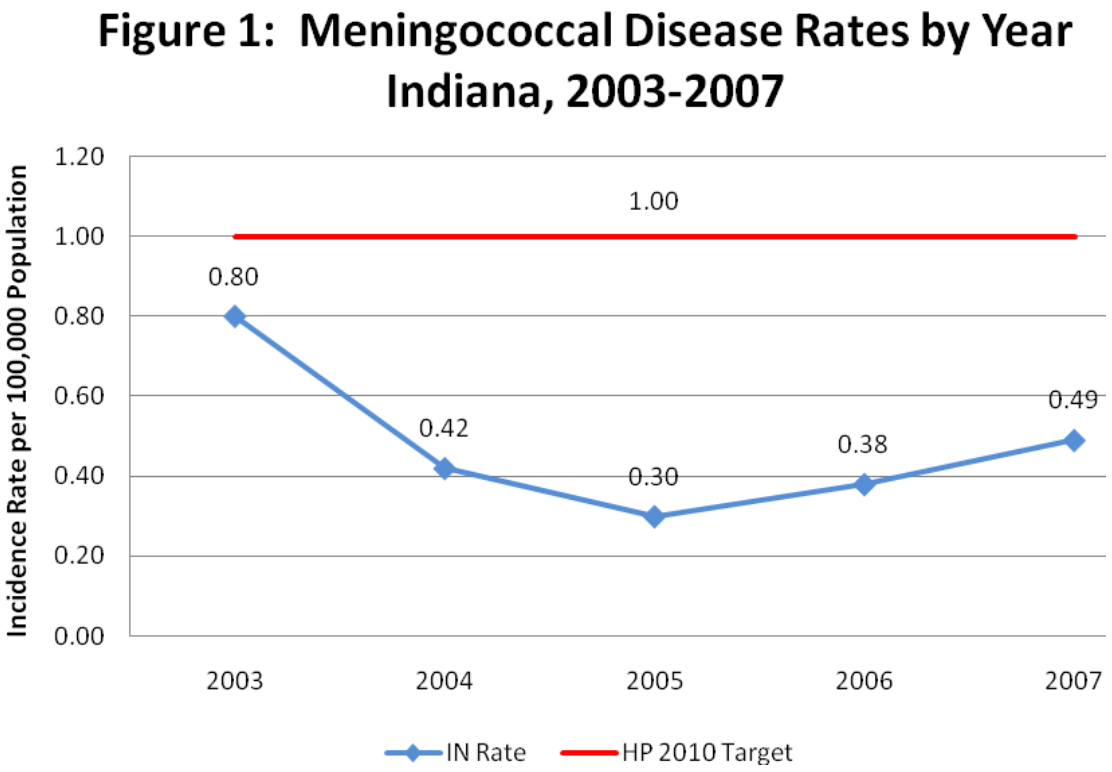
Increased hospital, provider, and laboratory awareness of the condition may improve clinical outcomes. Immediate recognition and treatment of suspected cases is crucial. Suspected cases should be treated prior to lab confirmation. Health care providers and local health departments must immediately reportsuspected and confirmed cases to ensure proper control measures can be implemented to prevent secondary cases. The Indiana State Department of Health should be immediately involved with each case investigation.

Individuals with direct exposure to the respiratory droplets of a case are at greater risk for contracting the disease within the few days following symptom onset. Antibiotic prophylaxis is recommended for all

high-risk close contacts and should be administered as soon as possible. Due to effective prophylaxis, secondary cases and outbreaks of meningococcal disease are rare, and as a result almost all cases in the U.S. are sporadic.

Healthy People 2010 Goal

The Healthy People 2010 Goal for meningococcal disease is an incidence of 1.0 case per 100,000 population per year. Indiana met the Healthy People 2010 Goal for the five year reporting period of 2003-2007 (see Figure 1).



Epidemiology and Trends

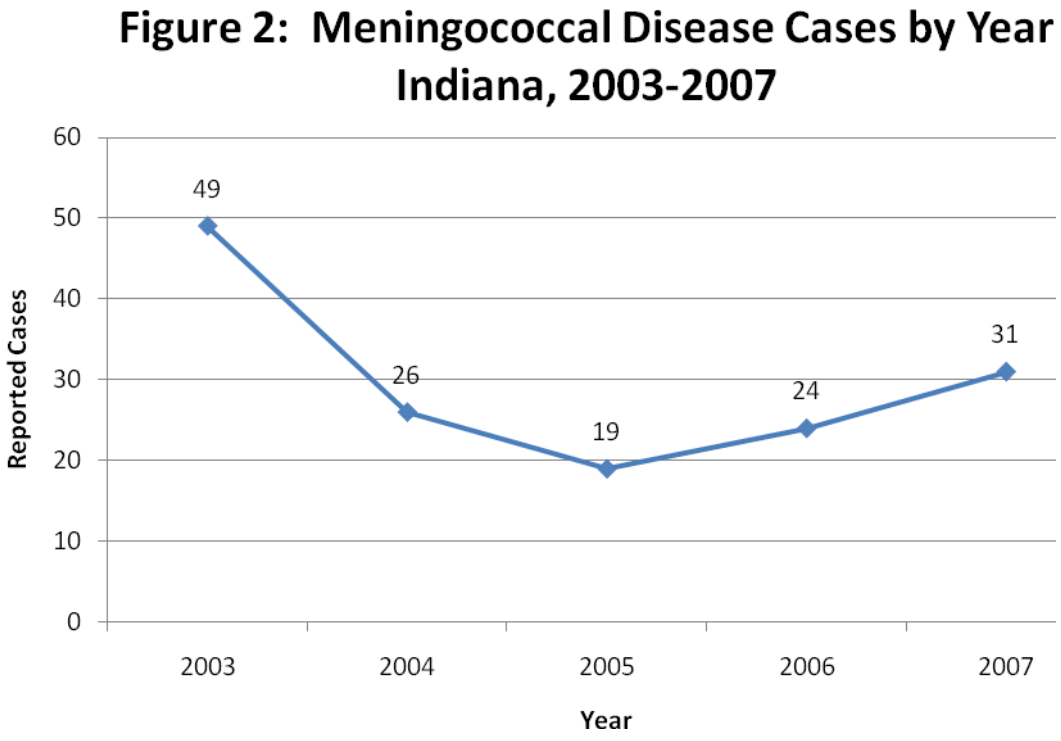
In 2007, there were 31 confirmed cases (Table 1) including 5 reported deaths (16 %) from invasive meningococcal disease in Indiana. Figure 2 displays the number of reported cases by year for the previous 5 years.

Table 1: Meningococcal Cases Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	31	0.49	149
Race			
Black	6	1.05	24
White	24	0.43	108
Other	1	0.55	4
Not Reported	0	-	13
Sex			
Female	19	0.59	75
Male	12	0.38	73
Unknown	0	-	1

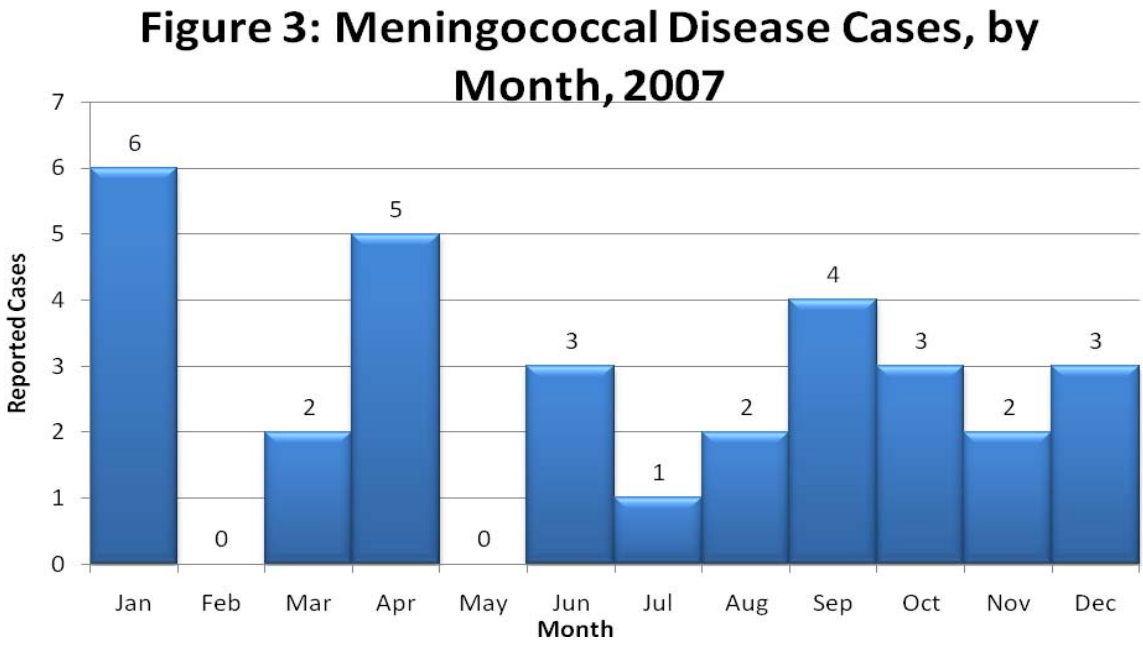
*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

The 2007 meningococcal incidence rate (0.49) was the second highest rate from the five year reporting period and was a 29 – 63% increase from 2004 – 2006 and 63% decrease from the 2003 incidence rate (see Figure 2).

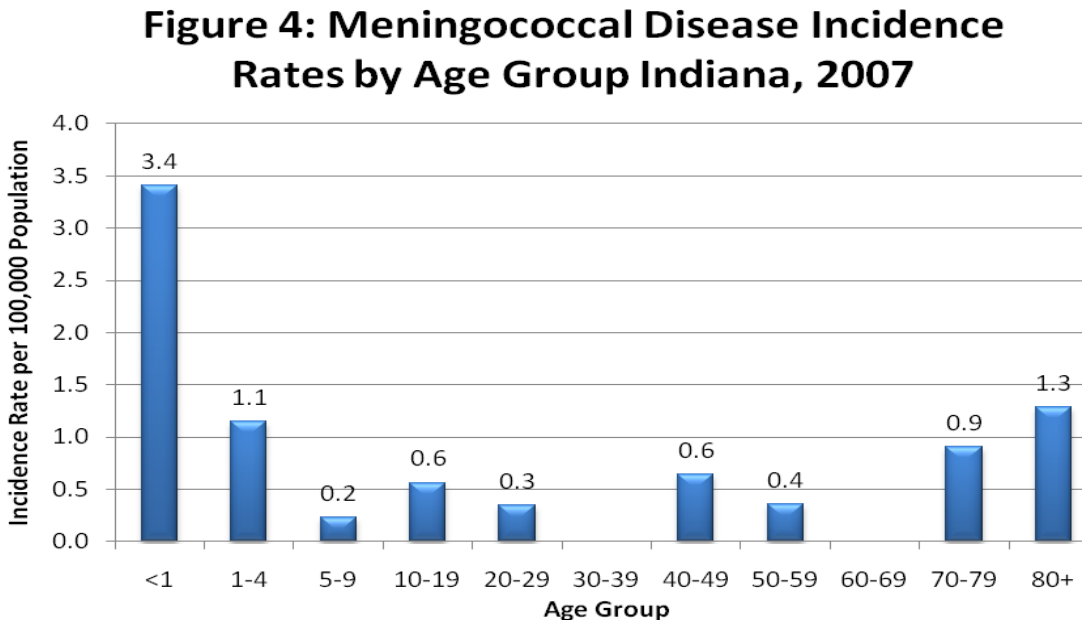


The rate for blacks (1.05) was higher than for whites (0.43), a pattern that has been consistent during the five year reporting period. Females (0.59) were reported more often than males (0.38), although the number of cases per 100,000 persons was the same during the five year reporting period. Of the 18 counties reporting cases in 2007, Lake County was the only county reporting 5 or more cases, with an incidence rate of 1.0 case per 100,000 persons.

There is some seasonality to meningococcal disease. Case rates in the U.S. are highest during the late winter and early spring. Figure 3 demonstrates this trend, as the number of cases increased during January and April of 2007.



The highest incidence of meningococcal disease occurs in infants and young children, young adults and the elderly. During 2007, incidence rates were the highest among infants < 1 year of age (3.4) followed by the elderly (1.3) and young children 1- 4 years of age (1.1). Youth aged 10 -19 years of age had a rate of 0.6 cases per 100,000 persons. Figure 4 shows meningococcal incidence rates for all age groups.



In the U.S., *Neisseria meningitidis* serogroups B, C, and Y are most frequently associated with invasive disease. The Indiana *Communicable Disease Reporting Rule for Physicians, Hospitals and Laboratories*, 410 IAC 1-2.3, requires laboratories to submit isolates from invasive sites to the ISDH Laboratory for confirmation, serogrouping, and susceptibility testing at the CDC. Molecular subtyping can be performed at the CDC on selected meningococcal isolates to identify clusters of cases in counties with high case rates.

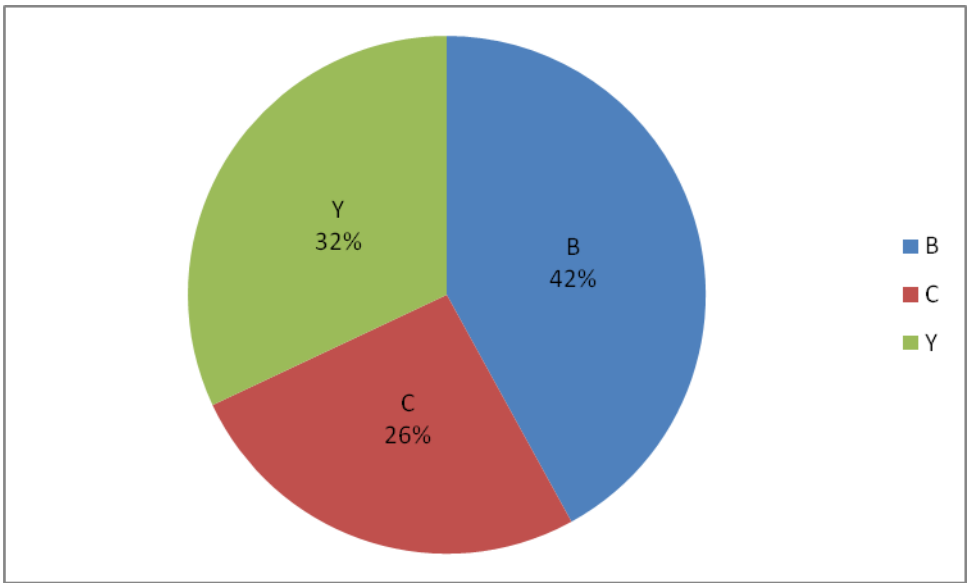
All isolates from 2007 were viable for confirmation and serogroup testing. In 2007, serogroup B accounted for 42% (13/31) of all cases compared to 26% (8/31) for serogroup C and 32% (10/31) for serogroup Y. Serogroup B had the highest proportion of cases from 2003 – 2007 (39.9%). These findings are relatively consistent with previous years as shown in Table 2.

Table 2 : Meningococcal Disease Serogroups (Number and % of Isolates), 2003 - 2007

Serogroup	2003	2004	2005	2006	2007	Total
A	-	-	-	-	-	-
B	22 (44.8%)	8 (31%)	4 (21%)	12 (50%)	13 (42%)	59 (39.9%)
C	6 (12.2%)	2 (8%)	6 (32%)	5 (21%)	8 (26%)	27 (18.2%)
Y	10 (20.4%)	5 (19%)	1 (5%)	2 (8%)	10 (32%)	28 (18.8%)
W135	-	-	-	-	-	-
Z	-	-	-	-	-	-
Not Groupable	2 (4.1%)	-	1 (5%)	-	-	3 (2%)
Unknown	9 (18.3%)	11 (42%)	7 (37%)	5 (21%)	-	32 (21.6%)

The proportion of cases attributed to each serogroup (Figure 5) varies with age. One hundred percent (3/3) of cases in infants < 1 year of age tested positive for serogroup B, whereas serogroup B accounted for only 33% of (3/9) cases in adults 50 years of age and older.

Figure 5: Percent of Meningococcal Isolates by Serogroup, Indiana, 2007



No unusual trends were seen among cases of meningococcal disease reported in 2007; however, it should be noted that small case rates make yearly comparisons problematic. It is best practice to observe trends over a 5-year reporting period.

More Information

To obtain more information on Meningococcal disease, please visit the following Web sites:
http://www.in.gov/isdh/22121.htm
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5407a1.htm
http://www.cdc.gov/ncidod/dbmd/abcs/publications-neis.htm

MUMPS

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

Public Health Significance

Mumps illness causes parotitis in approximately 30-40 percent of infected individuals. Swelling of the parotid glands 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.

The most effective means of preventing mumps virus is vaccination. Children should receive one dose of measles, mumps, rubella (MMR) vaccine at 12 months of age and a second dose at 4 - 6 years of age. All adults should have at least one dose of MMR vaccine; healthcare workers, international travelers, and students enrolled in secondary education should receive two doses of MMR vaccine at least 28 days apart.

It is difficult to distinguish mumps from other forms of parotitis. Therefore, appropriate laboratory testing is strongly recommended for all sporadically reported cases. Appropriate testing includes a serum specimen and a viral specimen (buccal, throat, or nasopharyngeal swab) collected as early as possible following onset of parotitis. Another serum specimen should be collected two weeks later. Although Indiana has a relatively low incidence of mumps cases, health care providers should consider mumps diagnoses and testing 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. International travel poses a risk of imported cases exposing travelers as well as residents; therefore, 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 2003-2007.

Epidemiology and Trends

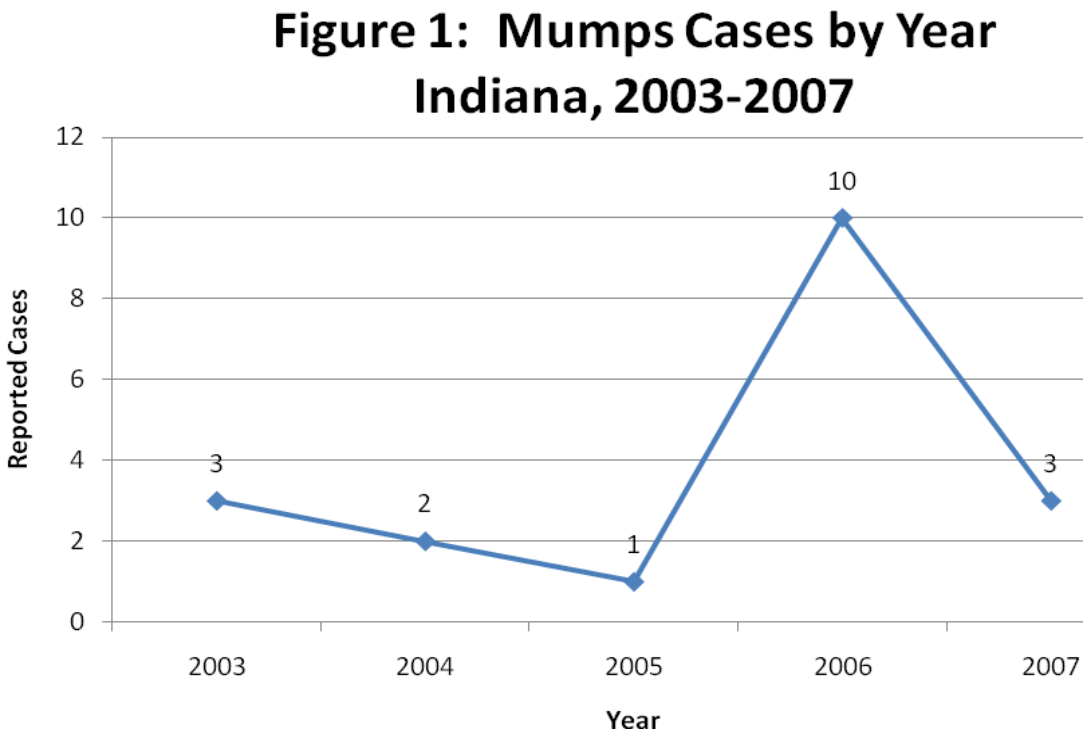
In 2007, three cases of mumps were reported in Indiana.

Table 1: Mumps Case Rate by Race and Sex, Indiana, 2007

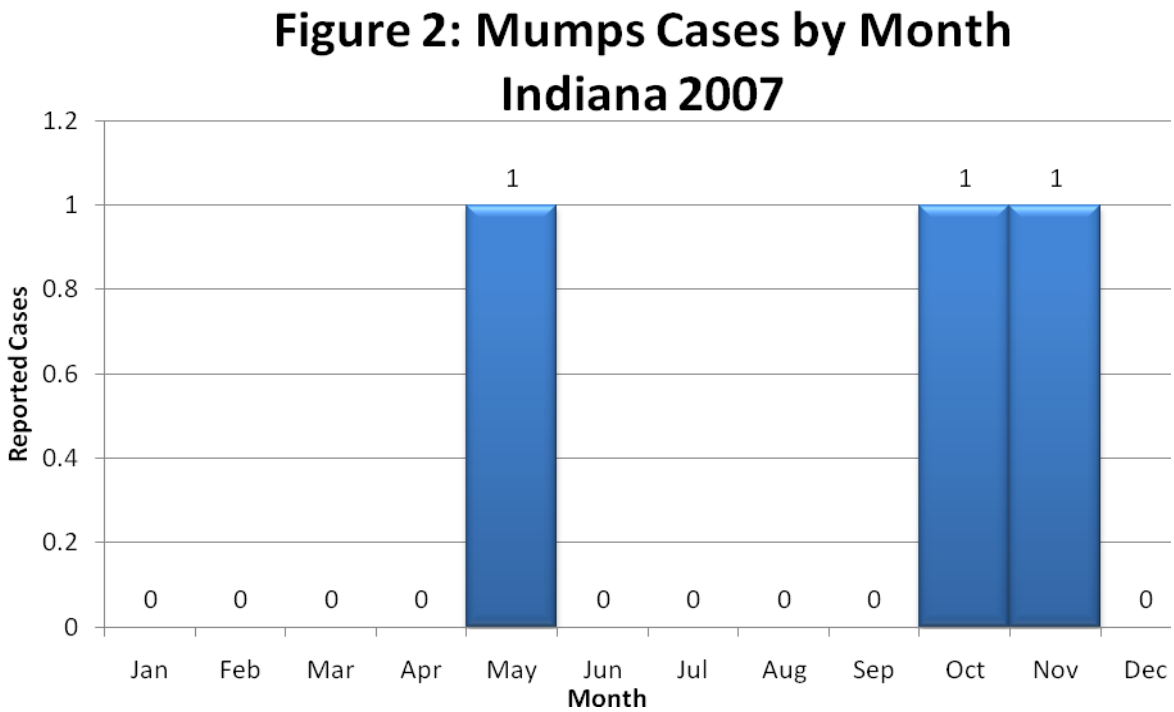
	Cases	Rate*	2003 - 2007 Total
Indiana	3	0.05	19
Race			
Black	0	-	0
White	2	0.04	16
Other	0	-	0
Not Reported	1	0.03	1
Sex			
Female	1	0.03	13
Male	2	0.06	6

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 1 shows reported cases by year for 2003-2007. Three reported cases in 2007 is comparable to case reports in recent years other than 2006, when 10 cases were reported. These may have been associated with a mumps outbreak in Iowa (the largest outbreak of mumps in the U.S. since 1988).



In 2007, cases were reported in May, October, and November (Figure 2).



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

PERTUSSIS

Pertussis (whooping cough) is an acute respiratory disease caused by the toxin-producing bacterium *Bordetella pertussis*. Transmission most commonly occurs through contact with respiratory droplets or airborne droplets of respiratory secretions. Pertussis is highly communicable, with a secondary household attack rate of 80% among susceptible persons.

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 with an additional dose administered between 4 and 6 years of age. The DTaP vaccine should not be administered to persons over 7 years of age. However, there are two Tdap vaccines currently available for adolescents and adults from ages 10 through 64. The introduction of the Tdap vaccine may help to reduce the rate of pertussis in adult and adolescent populations, which 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 cough symptoms.

Prior to routine vaccination, more than 200,000 cases of pertussis were reported in the United States each year. Pertussis incidence has decreased more than 80% since the prevaccine era. Serious complications of pertussis can include pneumonia, seizures, and encephalopathy.

Healthy People 2010 Goal

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

Epidemiology and Trends

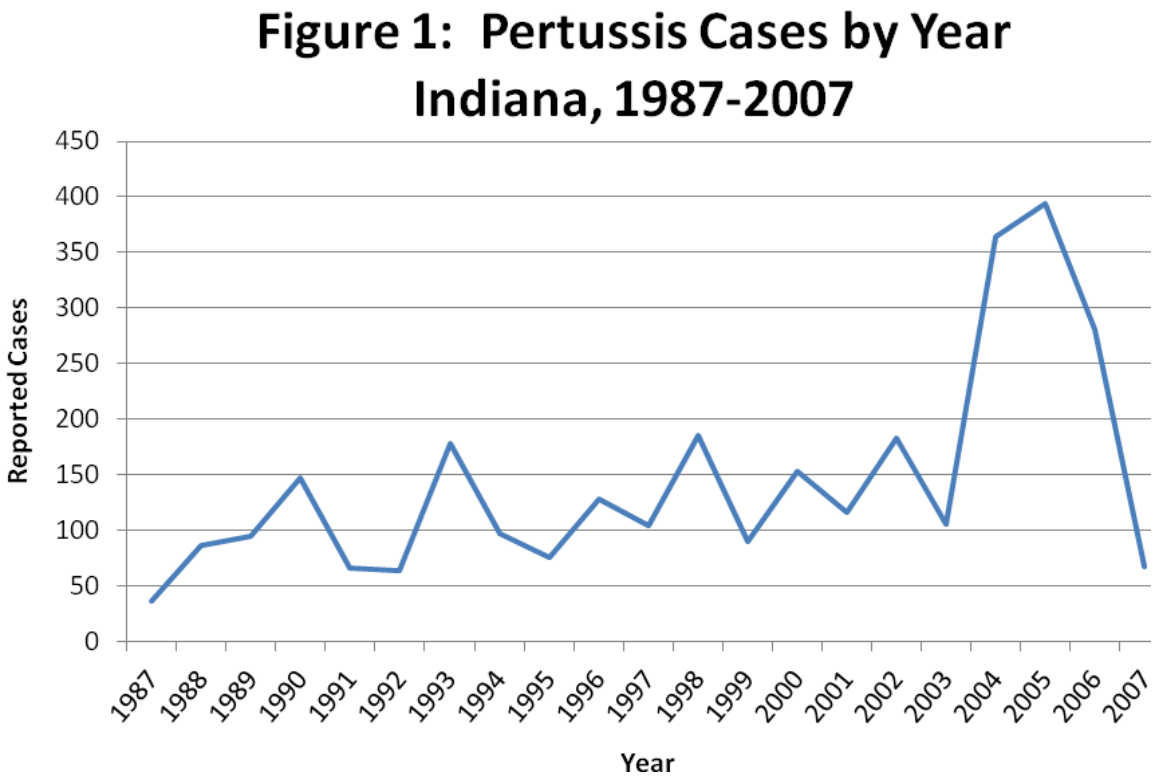
Indiana had 68 reported cases of pertussis in 2007, for a rate of 1.07 cases per 100,000 population (Table 1). Females (1.34) had a higher incidence rate than males (0.80). The rate for whites (1.14) was higher than for blacks (0.35) and for other races (0.00).

Table 1: Pertussis Case Rate by Race and Sex, Indiana, 2007

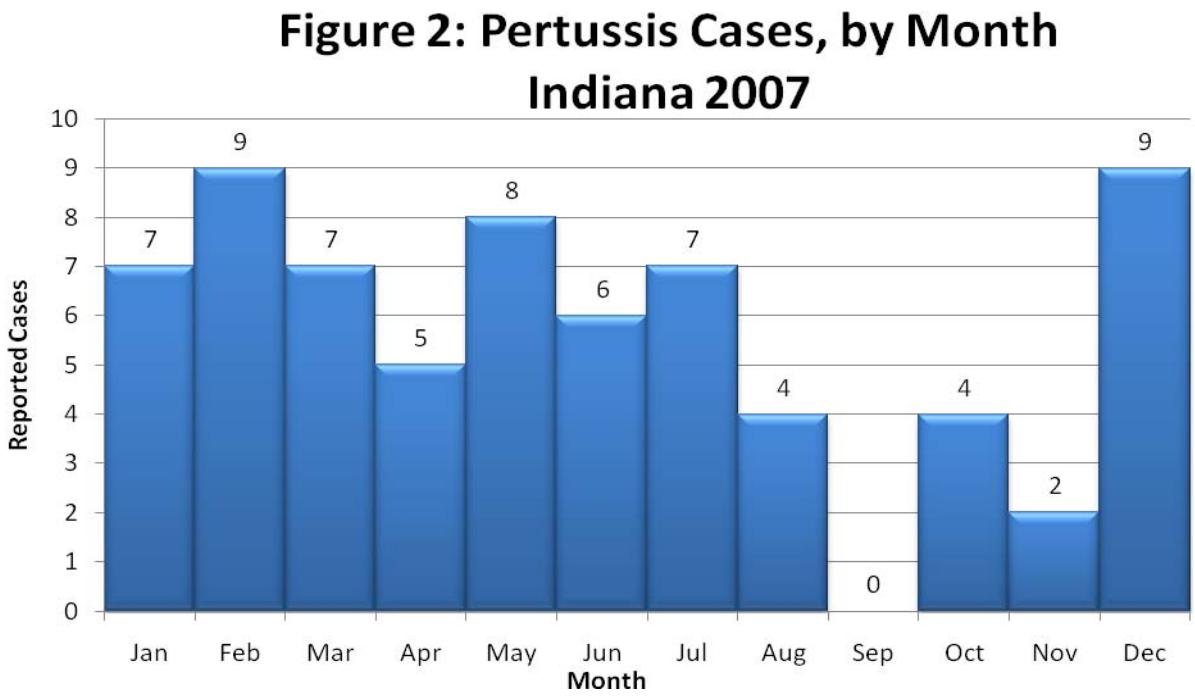
	Cases	Rate*	2003 - 2007 Total
Indiana	68	1.07	1212
Race			
Black	2	0.35	54
White	64	1.14	1122
Other	0	-	25
Not Reported	0	-	11
Sex			
Female	43	1.34	670
Male	25	0.80	542
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

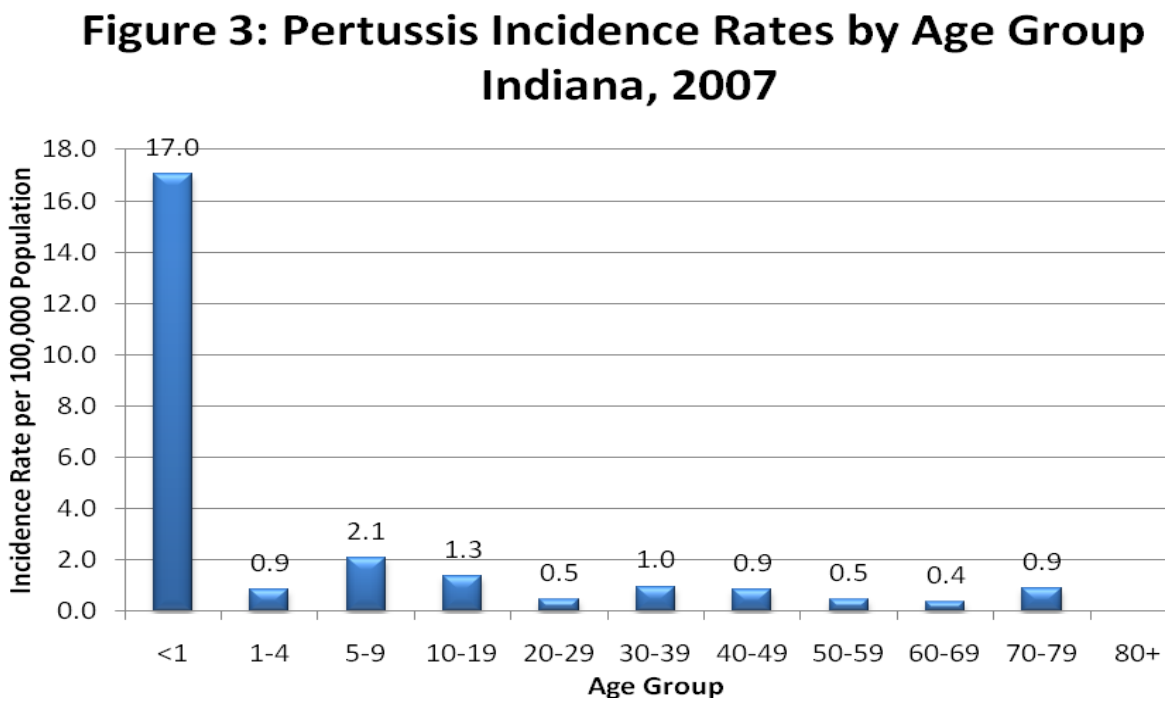
Pertussis incidence, unlike other vaccine-preventable diseases, has increased overall since the 1980s. Pertussis incidence occurs in a cycle, with increases and decreases every 3-5 years. Figure 1 illustrates this cycle. The decreased incidence in Indiana in 2007 is similar to incidence trends observed throughout the U.S and is believed to be part of the natural cycle of pertussis. It is premature to attribute the decrease in cases to the availability of the Tdap vaccine; pertussis incidence is greatly dependent on recognition and reporting of suspected cases.



In 2007, disease incidence was highest during the winter months, but pertussis can occur anytime during the year (Figure 2).



Pertussis is the most frequently reported vaccine-preventable disease among children under 5 years of age. In 2007, 26 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 (17.0). Figure 3 shows incidence rates for all age groups. Although the incidence rates for adolescents and adults were lower, persons aged 10 years and older accounted for 60 percent of all reported cases in 2007.



The incidence rates were highest among the following counties reporting five or more cases: Lake (2.2) and Allen (1.4) (Figure 4). Thirty-four counties reported at least one case during 2007.

In 2007, 16 of the 68 reported cases in Indiana were hospitalized with a diagnosis of pertussis (23.5 percent). Infants less than 1 year of age are at greatest risk for disease as evidenced by the proportion of cases hospitalized. In 2007, 11 of the 15 cases (73%) 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, 2007

Age Group	Number of Cases	Number (Percent) Not Appropriately Immunized	Unknown Vaccine History
7-11 Months	2	1 (50%)	0
1 Year	1	1 (100%)	0
2-4 Years	2	0 (0%)	0
5-9 Years	9	2 (22%)	1

Laboratory confirmation was obtained through either culture or PCR for 25 (36.8%) of the reported pertussis cases. Twenty-one cases were confirmed by PCR, and four cases were confirmed by culture.

No deaths were reported in Indiana in 2007 due to pertussis.

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

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

Figure 4: Pertussis Cases by County – Indiana, 2007

PLAGUE

Plague is caused by the *Yersinia pestis* bacteria. Bacteria are 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 does not occur naturally in Indiana.

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 bloodtream infection; or 3) pneumonic plague, an infection of the lungs. If not treated rapidly, bubonic or pneumonic plague can develop into septicemic plague. Mortality rates can be as high as 100% for both pneumonic and septecemic plague. Early treatment with appropriate 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.

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

PNEUMOCCOCAL 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 resistant to penicillin G, cefotaxime, ceftriaxone, and other antimicrobial agents.

Since the licensure of pneumococcal conjugate vaccine for children under 5 years of age in 2000, Indiana has seen a decrease in cases in this age group. The highest rate of invasive pneumococcal disease occurs among young children, especially those younger than 2 years of age. The pneumococcal conjugate vaccine routinely administered to children under 5 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 (PPSV23) is licensed for routine use in adults age 65 and older and may be used in other individuals with certain risk factors.

Pneumococcal disease is not easily spread from person to person; therefore, the control measures for contacts of a known case of invasive pneumococcal disease are minimal under most circumstances. 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 and sneezing, as well as 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 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 5 years of age in 2007, with an incidence rate of 16.7 per 100,000 population. Indiana also met the Healthy People 2010 Goal for adults aged 65 years and older in 2007 with an incidence rate of 33.9 per 100,000 population. Pneumococcal disease is a significant burden on adults aged 80 years and older. In 2007, adults aged 80 years and older exceeded the Healthy People 2010 Goal with an incidence rate of 53.38 per 100,000.

Epidemiology and Trends

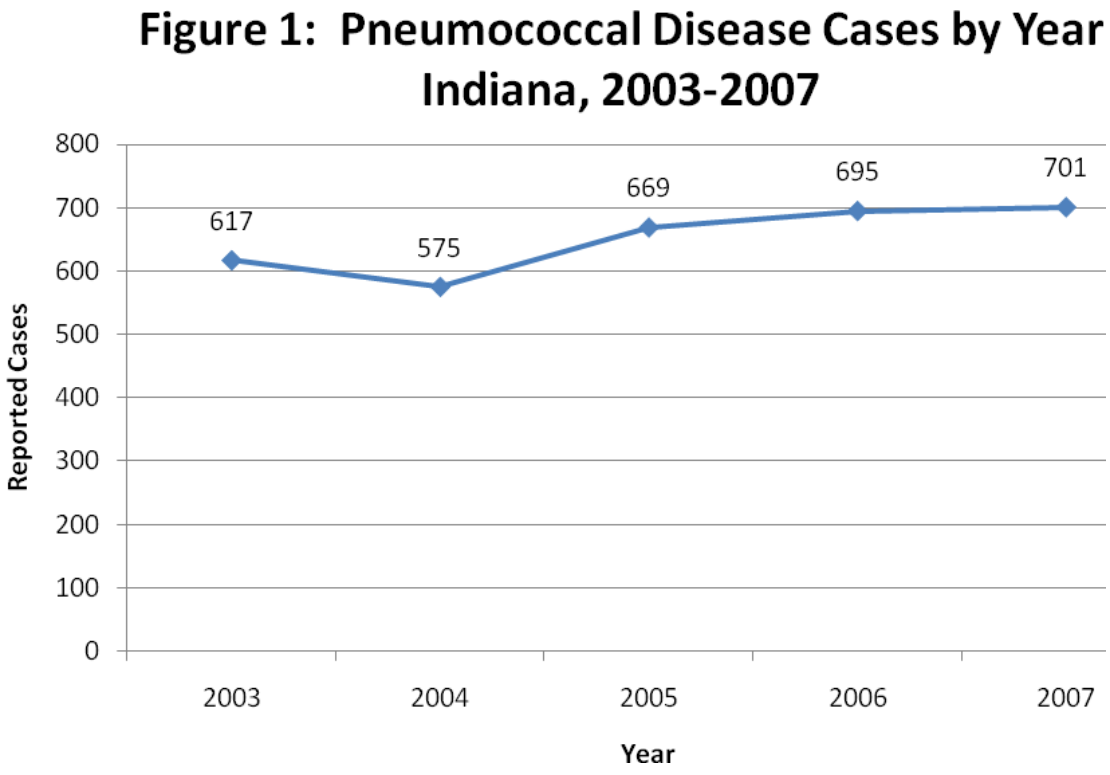
Surveillance of invasive pneumococcal disease has been ongoing in Indiana since the summer of 1998. In 2007, 701 cases of pneumococcal disease were reported in Indiana, for a case rate of 11.05 per 100,000 population. The number of invasive pneumococcal infections in 2007 represents the highest number of cases reported during 2003-2007 (Table 1). In 2007, the incidence rate among the black population (11.89) was higher than that of the white population (9.12). Males (11.58) were more likely to be reported than females (10.50).

Table 1. Pneumococcal Disease Cases by Race and Sex, Indiana, 2007

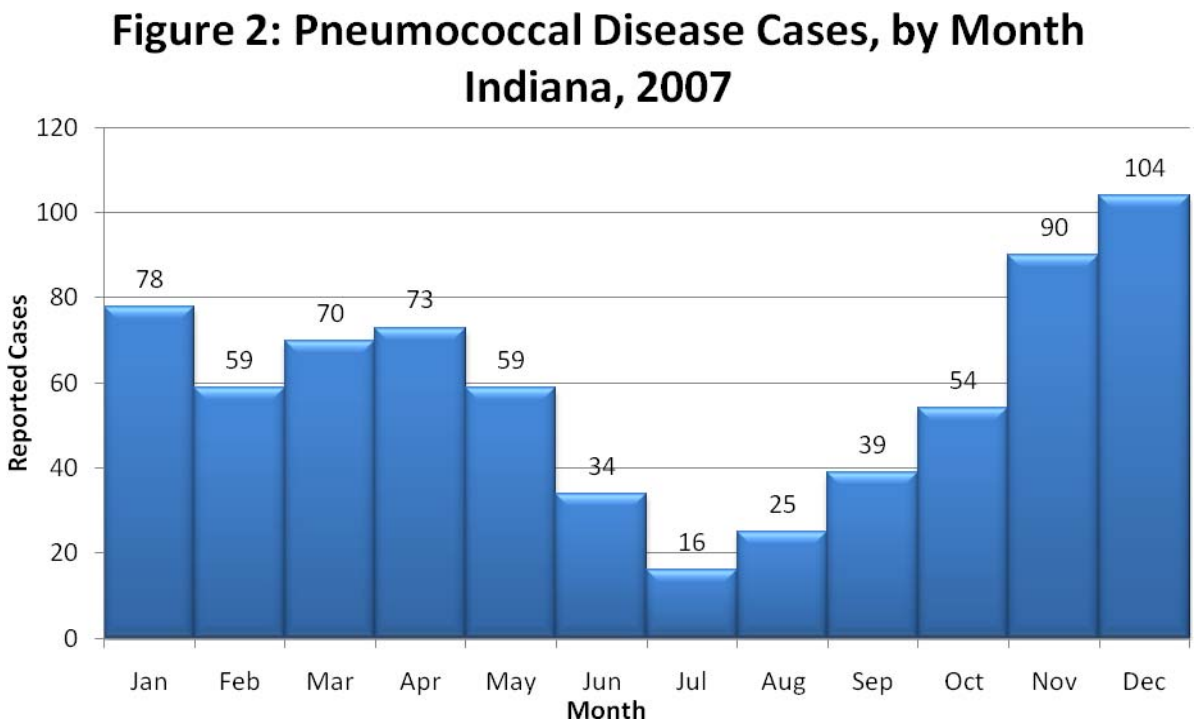
	Cases	Rate*	2003 - 2007 Total
Indiana	701	11.05	3,257
Race			
Black	68	11.89	412
White	510	9.12	2227
Other	7	3.87	17
Not Reported	116	-	601
Sex			
Female	338	10.50	1639
Male	362	11.58	1605
Unknown	1	-	13

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

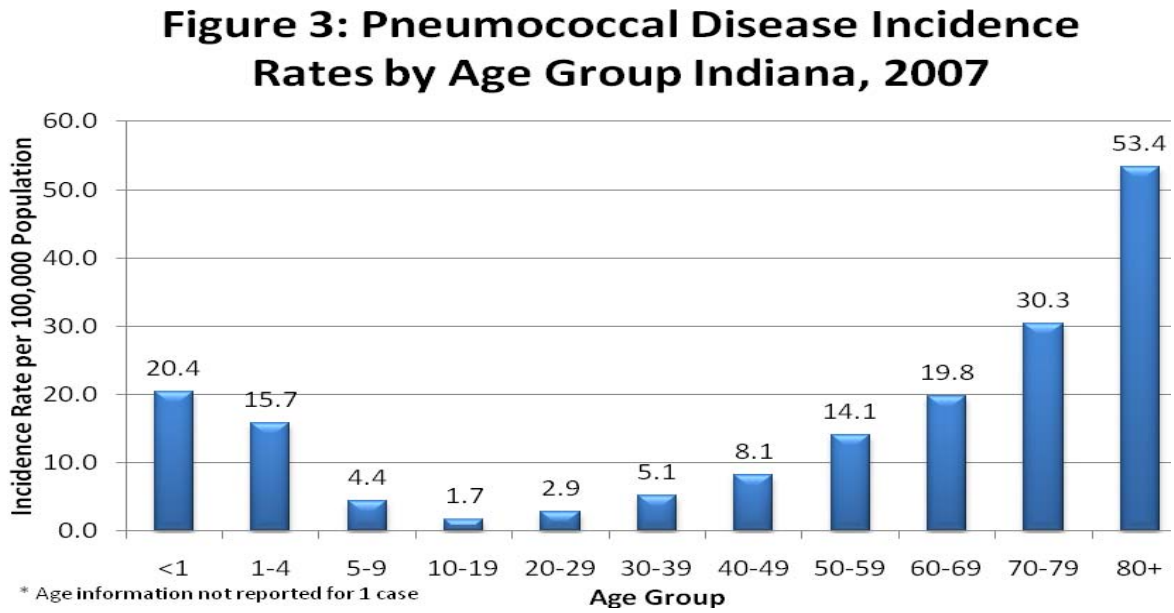
Figure 1 shows the number of reported cases per year for 2003-2007.



Disease incidence was greatest during the spring and winter months (Figure 2).



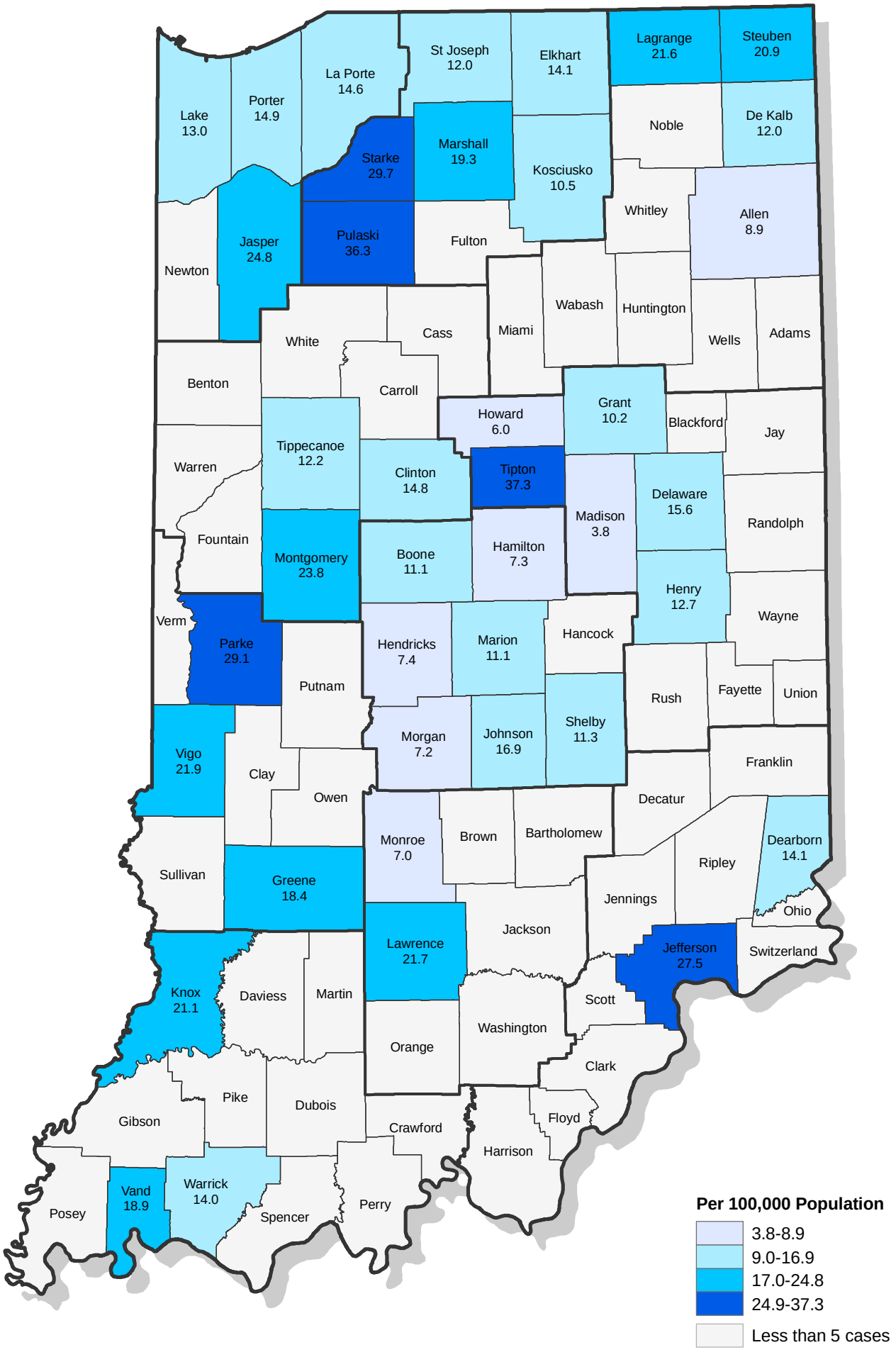
Incidence of invasive pneumococcal disease varies considerably with age. In 2007, the age-specific rates were highest for adults aged 80 years and older (53.4), followed by adults aged 70-79 years (30.3), and infants less than 1 year of age (20.4) (Figure 3).



In 2007, 76 counties reported at least one case of invasive pneumococcal disease, with 40 counties reporting 5 or more cases. The incidence rates were highest among the following counties reporting five or more cases (Figure 4): Tipton (37.3), Pulaski (36.3), Starke (29.7), Parke (29.1), and Jefferson (27.5).

You can learn more about pneumococcal infections by visiting the following Web site:
http://www.cdc.gov/vaccines/vpd-vac/pneumo/default.htm

Figure 4: Pneumococcal Cases by County – Indiana, 2007



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. Death may result if respiratory muscles are affected.

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 environments where hygiene is poor.

Public Health Significance
Approximately 95 percent of polio infections are asymptomatic, resulting in 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. Due to the severity of this potentially paralytic disease, timely reporting of suspected cases is extremely important, especially among unvaccinated groups. Disease reporting by clinicians is often delayed because the diagnosis of poliomyelitis is considered only after other differential diagnoses are ruled out. Efforts should be made to promote physicians' awareness of the importance of prompt reporting of suspected cases to the state and local health departments, as well as the need to obtain stool and serum specimens early in the course of the disease.

While transmission of wild poliovirus has been interrupted in most of the world, cases of polio still occur in Afghanistan, India, Nigeria, and Pakistan. Further spread of the illness into other unvaccinated groups is possible due to international travel.

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 oral polio vaccine (OPV) in the 1960s. Due to successful vaccination efforts, the world is almost polio free today. 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/yellowbook/2010/chapter-2/poliomyelitis.aspx
http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/polio-508.pdf

PSITTACOSIS

Psittacosis, often called parrot fever, is caused by the bacteria *Chlamydophila psittaci* (formerly *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 2003-2007.

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 bacterium *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, handling of birthing products from shedding animals, or drinking unpasteurized milk. Humans may have an asymptomatic, acute, mild, or 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 2007, no cases of Q fever were reported in Indiana. Eight cases of Q fever were reported during the five-year period 2003-2007.

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

RABIES, ANIMAL

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 2007, there were 1782 animals of various species tested for rabies in Indiana. Thirteen of those animals were found to be positive; all were bats.

In 2007, 49 states, the District of Columbia, and Puerto Rico reported 7,258 cases of animal rabies and one human case 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 4.6 percent from those reported in 2006 (6,940 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 progresses, 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 1-3 months after infection.

Vaccine and postexposure prophylaxis for rabies are available. Treatment has not been shown to be effective after the development of clinical signs. The vaccine must be given before clinical signs develop.

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, rehabilitation specialists, 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 2007; all 13 reported rabies cases occurred in bats. The horse diagnosed with rabies in 2002 was infected with a bat strain of rabies virus. The human rabies case in 2006 was also infected with the bat strain of the virus.

Table 1. Animal Rabies Cases by Species, Indiana, 2007

	2007	2003 - 2007 Total
Cases	13	126
Species		
Bat	13	121
Skunk	0	2
Horse	0	1
Human	0	1

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

http://www.cdc.gov/ncidod/dvrd/rabies/
http://www.in.gov/isdh/20518.htm
http://avmajournals.avma.org/doi/full/10.2460/javma.233.6.884

ROCKY MOUNTAIN SPOTTED FEVER

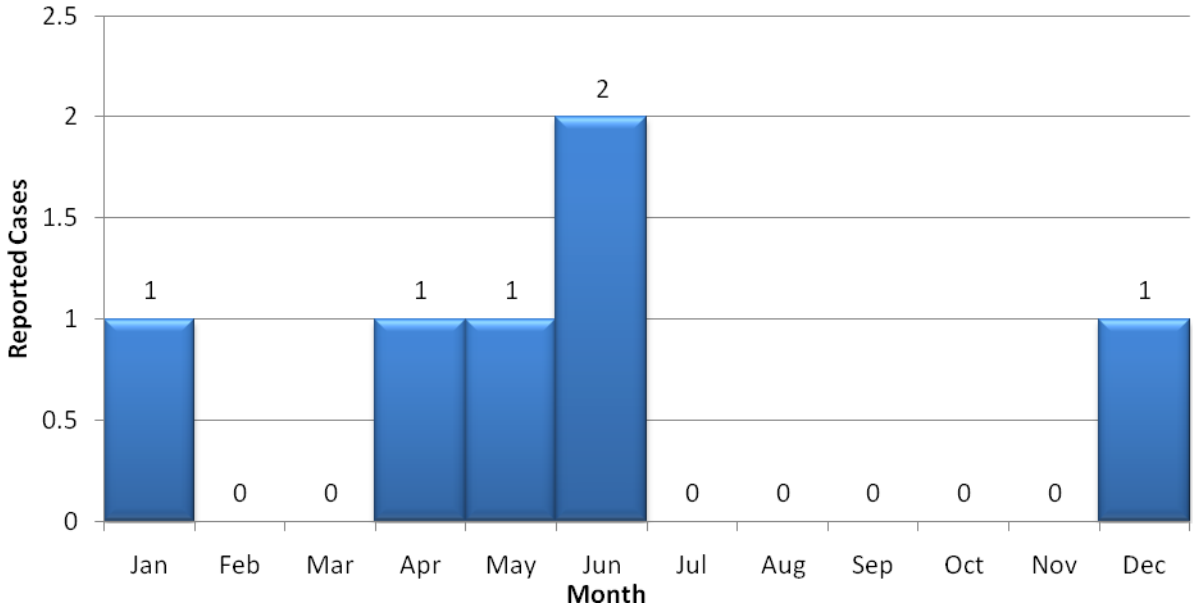
Rocky Mountain spotted fever (RMSF) is caused by the bacterium *Rickettsia rickettsii*. RMSF is transmitted in Indiana by the dog tick (*Dermacentor variabilis*), which lives in wooded areas and tall, grassy fields.

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 2003-2007, 21 cases of RMSF were reported in Indiana, including 6 cases in 2007 (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.

Figure 1: Rocky Mountain Spotted Fever Cases by Month Indiana, 2007



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/ticks/diseases/rocky_mountain_spotted_fever/

RUBELLA

Rubella, also known as German Measles, is an infectious viral disease caused by the rubella virus. Rubella is spread from person to person by 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. Symptoms of rubella typically appear 12-23 days after exposure, and as many as 50 percent of infections may be subclinical or inapparent. In children and adults, rubella generally is a mild illness.

Congenital rubella syndrome (CRS), however, can lead to severe, long-term outcomes. CRS can occur when a woman becomes infected with rubella during pregnancy. Prevention of CRS is the primary objective of rubella vaccination programs. CRS can affect virtually all organ systems with severity and long term sequelae largely dependent on the time of gestation at which infection occurs. Fetal death, spontaneous abortion, premature delivery, deafness, eye defects, cardiac defects, and neurologic abnormalities can occur.

At least one dose of rubella-containing vaccine is recommended for all children 12 months of age or older. The first dose of measles-mumps-rubella (MMR) vaccine is administered after 12 months of age, while a second dose is routinely administered at 4 to 6 years of age to improve immunity. Children and adults who have not received two doses of MMR vaccine should receive two doses 28 days apart.

Prior to routine vaccination, the United States experienced the greatest number of rubella cases in 1969 with 57,686 cases reported (58 cases per 100,000 population). The largest annual total of reported cases of CRS occurred in 1970 with 67 cases.

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 2003-2007.

Epidemiology and Trends
No cases of rubella were reported in Indiana in 2007 or during the five-year reporting period 2003-2007.

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.

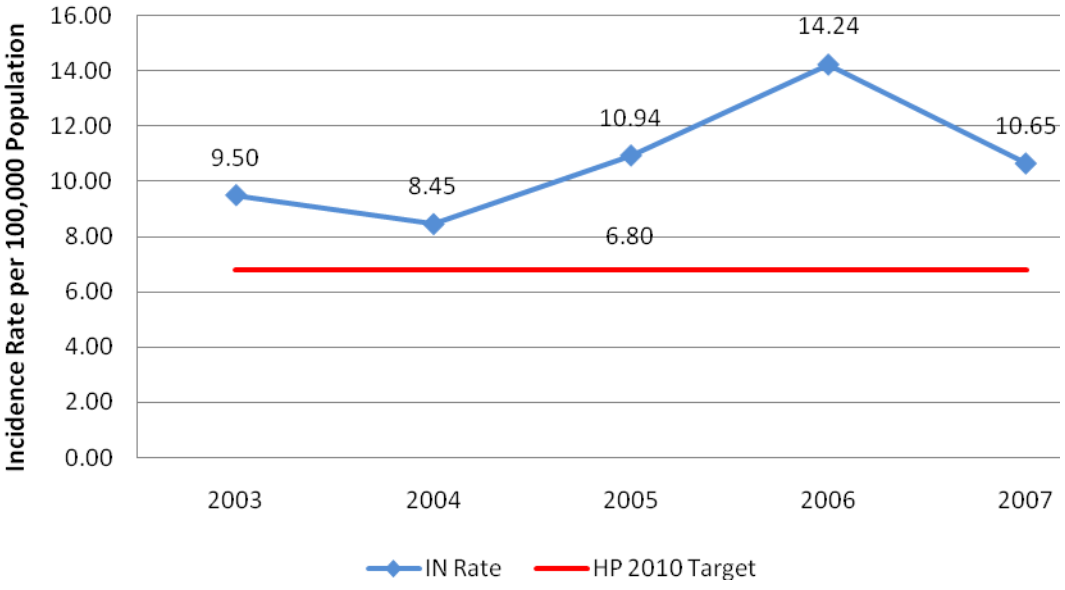
- Handle animals safely:
  - Wash hands after contact with livestock, petting zoos, pets (including reptiles and amphibians), especially if they are suffering from diarrhea, and after contact with pet food/treats (including live or frozen rodents).
  - Keep pets out of food-preparation areas.
  - Do not clean pet or reptile cages in the kitchen sink or in the bathtub.
  - 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 2003-2007 (Figure 1).

Figure 1: Salmonellosis Rates by Year Indiana, 2003-2007



Epidemiology and Trends

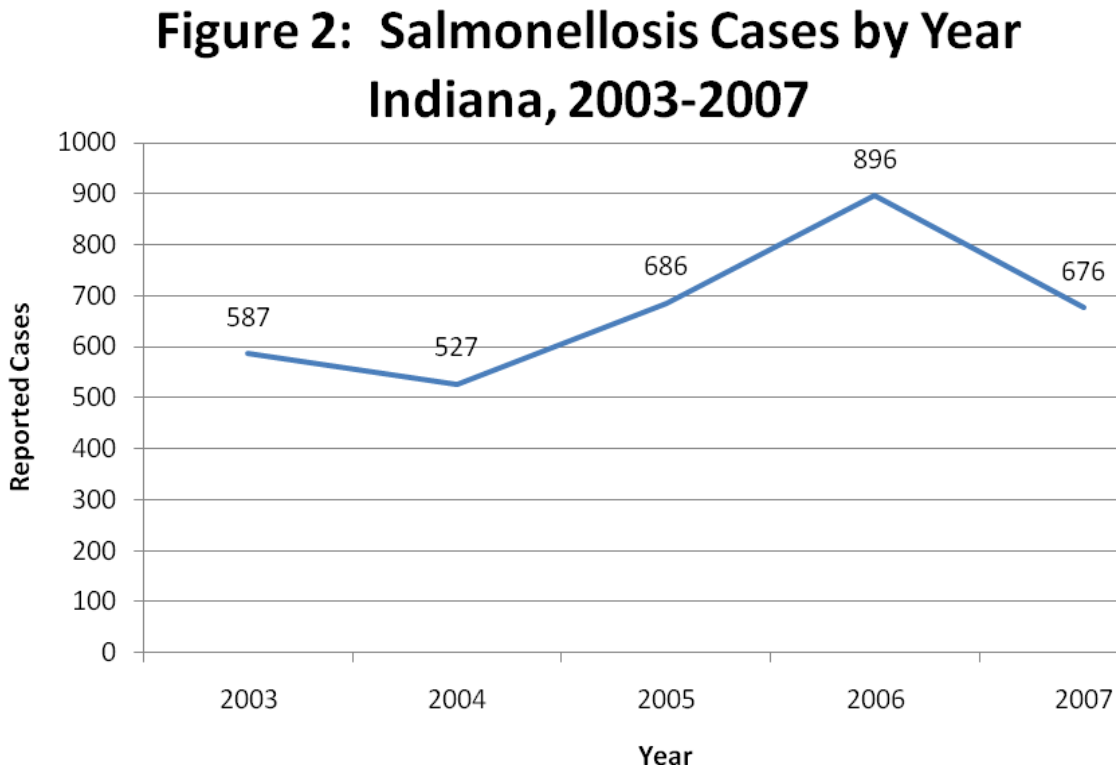
In 2007, there were 676 cases of salmonellosis reported in Indiana, for a rate of 10.65 cases per 100,000 population (Table 1). This represents a 33 percent decrease in the incidence rate from 2006 (14.24). Females (11.84) were more likely to be reported with salmonellosis than males (9.34). Other races (9.94) were more likely to be reported than whites (8.82) or blacks (5.95); however, 131 cases (19.4%) did not report race data.

Table 1: Salmonellosis Case Rate by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	676	10.65	3372
Race			
Black	34	5.95	177
White	493	8.82	2217
Other	18	9.94	72
Not Reported	131	-	906
Sex			
Female	381	11.84	1831
Male	292	9.34	1524
Unknown	3	-	17

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 2 shows the number of reported cases for 2003-2007.



The incidence was greatest during the summer months (Figure 3).

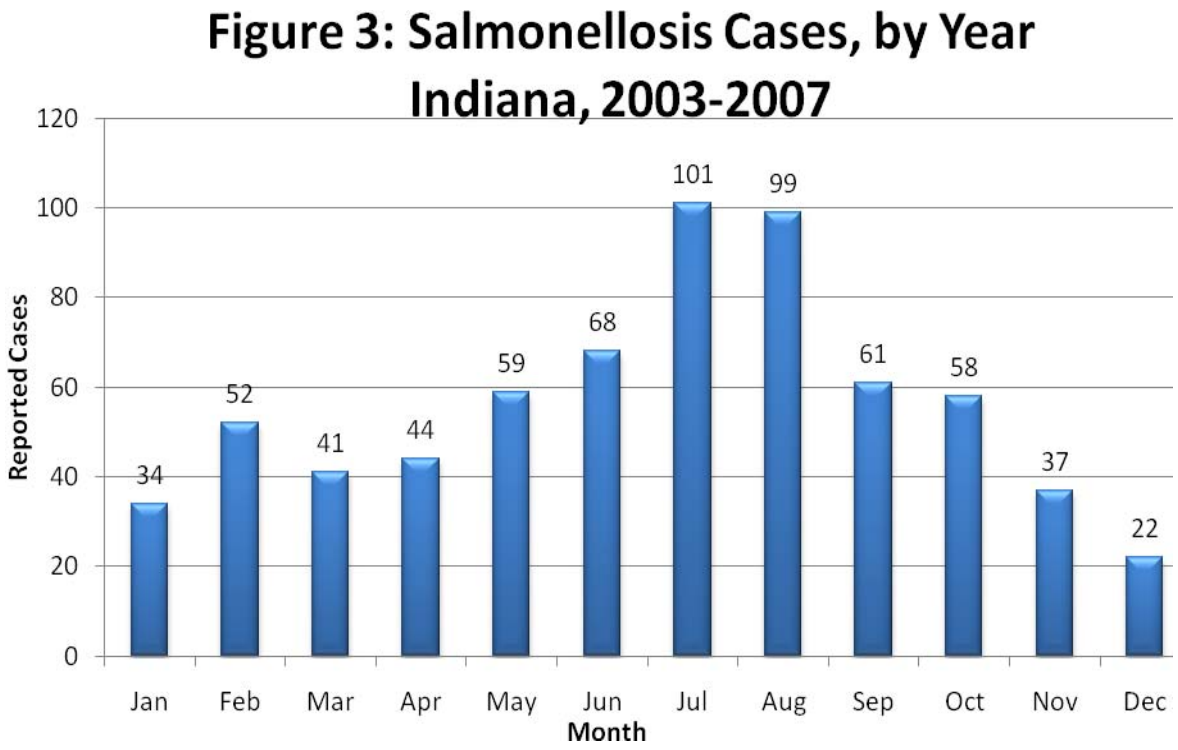
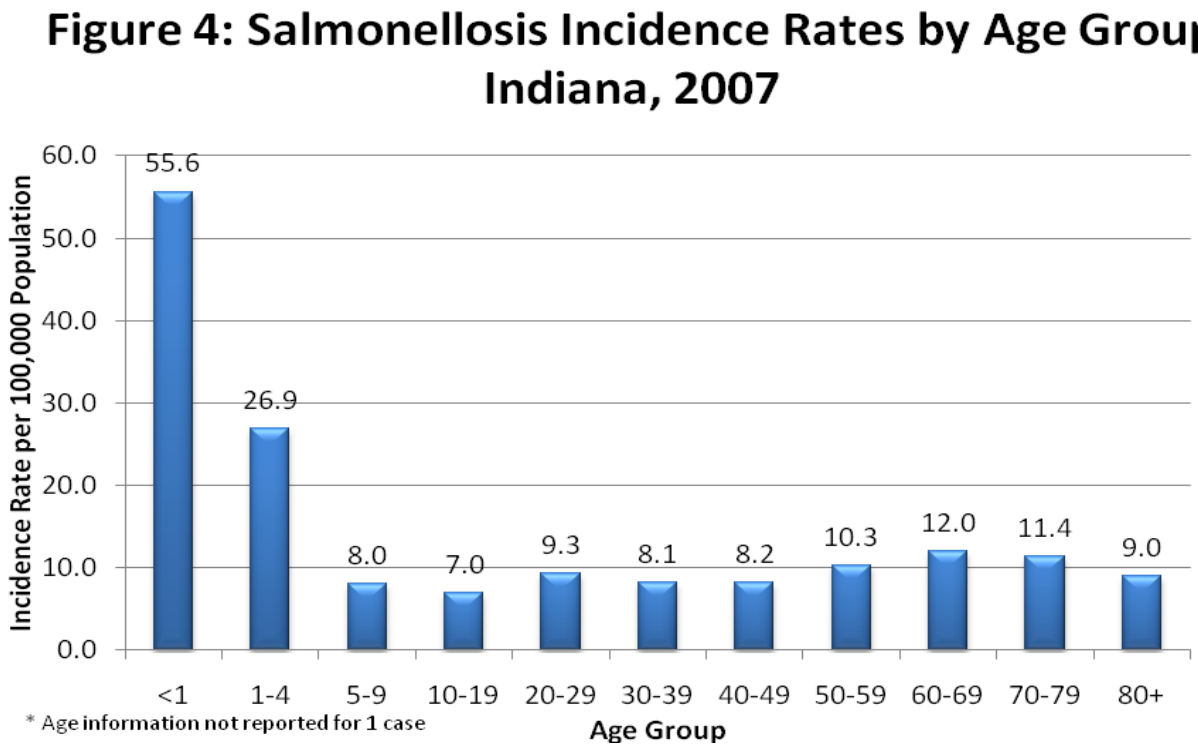


Figure 4 shows age-specific rates were greatest among infants less than 1 year of age (55.6), followed by preschoolers aged 1-4 years (26.9), and adults aged 60-69 years (12.1).



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 2007, serotypes were determined for approximately 57 percent of the 647 cases identified. Table 2 shows the 57 percent of the known serotypes for 2007.

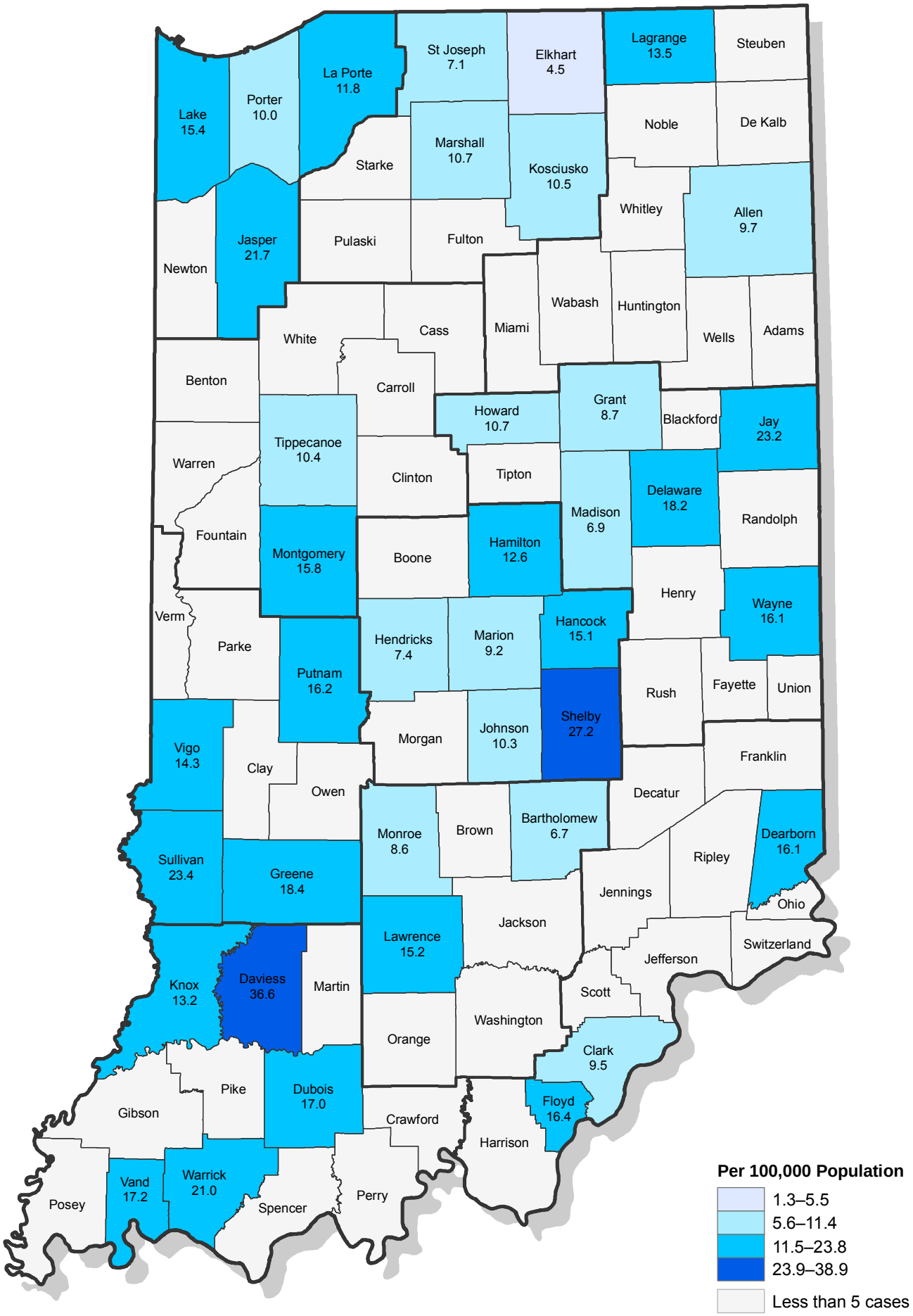
Table 2: Reported Serotypes for Salmonellosis Cases, Indiana, 2007

Serotype	Number	Percent
enteriditis	140	21.6
Heidelberg	43	6.6
Newport	39	6.0
typhimurium	120	18.5
Unknown	29	4.5

Figure 5 shows the incidence rates were highest among the following counties reporting five or more cases: Daviess (36.6) and Shelby (27.2). Figure 5 shows Indiana counties reporting five or more cases.

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.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm069966.htm

Figure 5: Salmonellosis Cases by County – Indiana, 2007



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.
    - Engaging in sexual activity 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

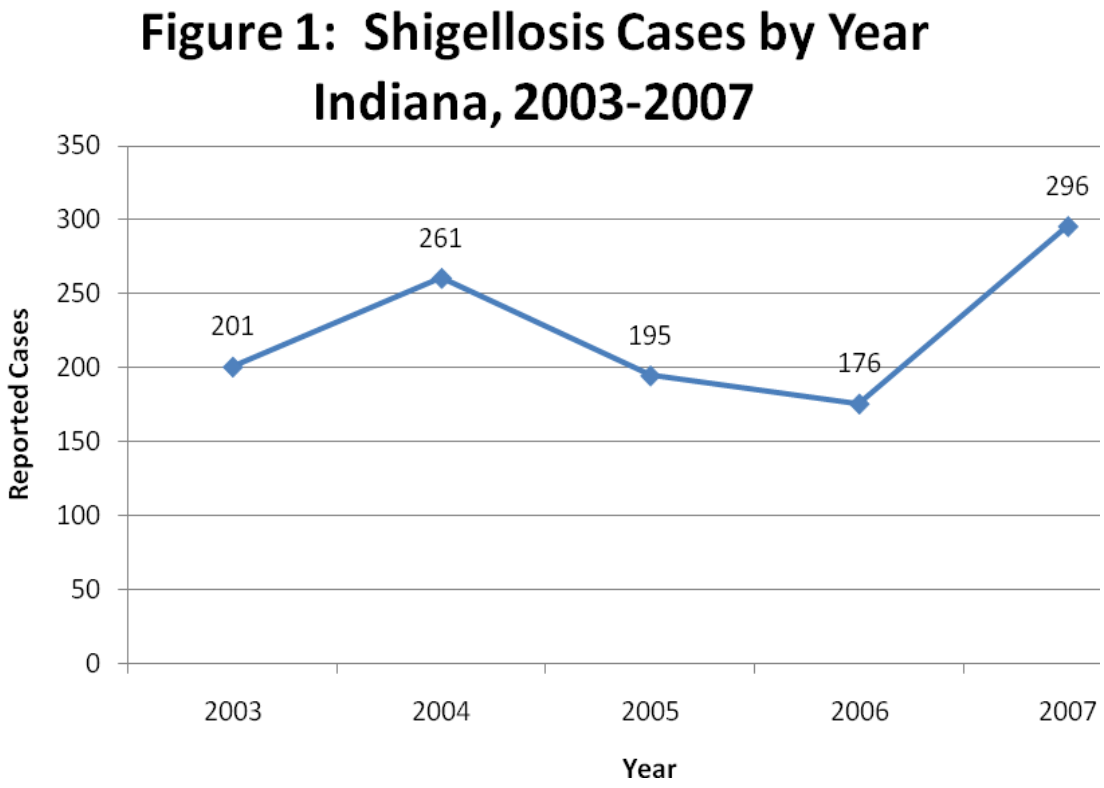
In 2007, 296 cases of shigellosis were reported in Indiana, for a case rate of 4.66 per 100,000 population (Table 1). This represents an increase from the incidence rate in 2006 (2.82). Females (5.44) were more likely to be reported than males (3.81). The rate of illness among blacks (23.96) was significantly higher than the rate for whites (1.95) and other races (6.07); however, 39 cases (13.2%) did not report race data.

Table 1: Shigellosis Case Rate by Race and Sex, Indiana, 2007

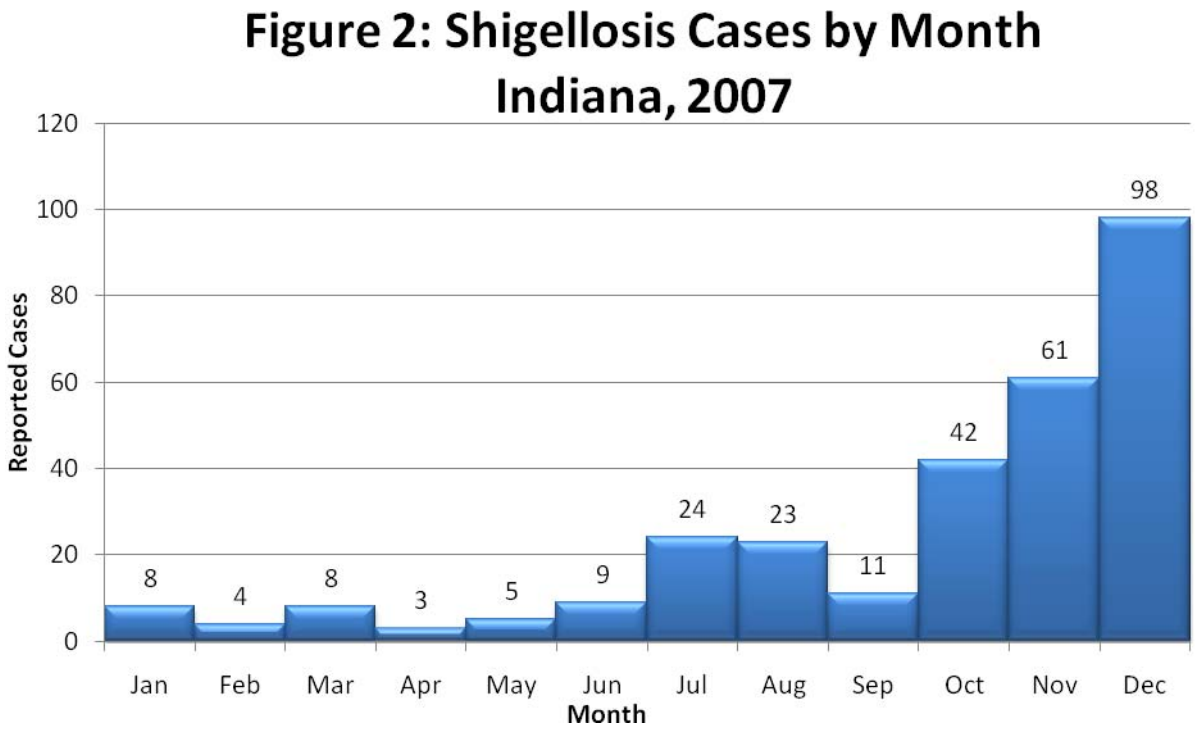
	Cases	Rate*	2003 - 2007 Total
Indiana	296	4.66	1129
Race			
Black	137	23.96	413
White	109	1.95	423
Other	11	6.07	46
Not Reported	39	-	247
Sex			
Female	175	5.44	650
Male	119	3.81	477
Unknown	2	-	2

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

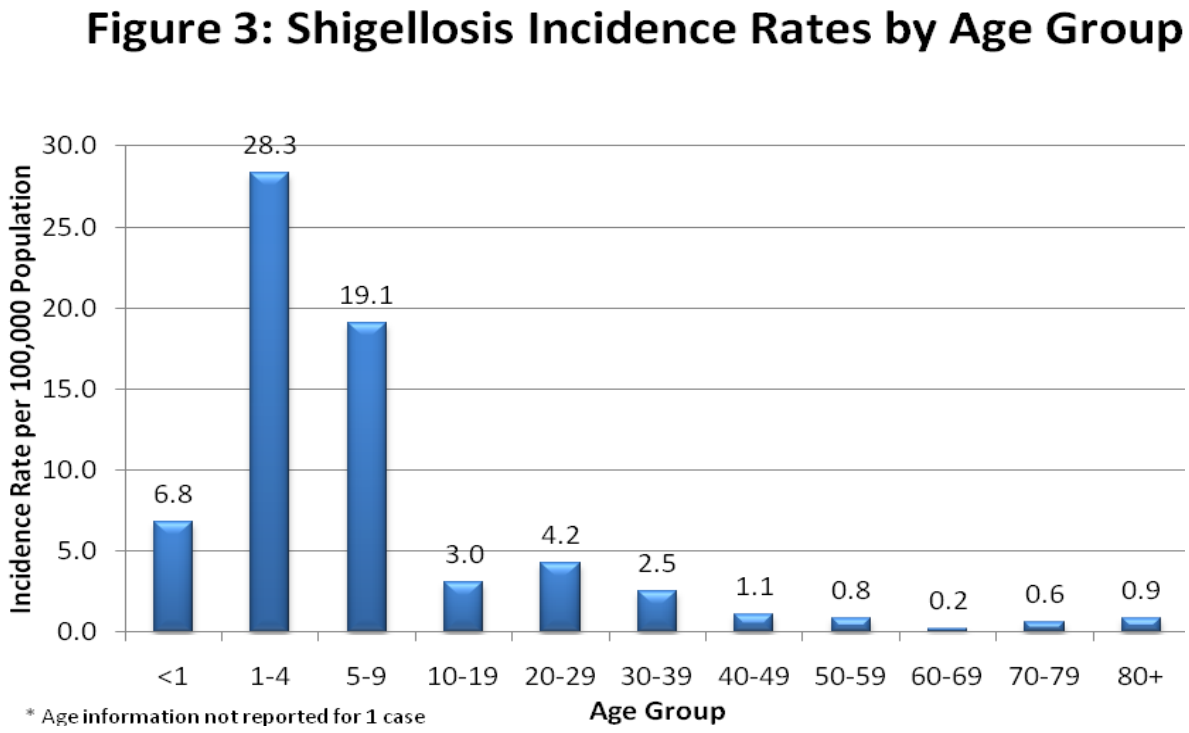
Figure 1 shows the number of reported cases per year for 2003-2007.



The incidence of shigellosis peaked in the winter in 2007 (Figure 2).



As shown in Figure 3, age-specific rates were highest among preschoolers ages 1-4 years (28.3), followed by children ages 5-9 years (19.1), and infants less than one year old (6.8).



In 2007, the serotype was determined for 283 (88%) of the 296 reported shigellosis cases. Table 2 shows the serotypes for 2007 shigellosis cases.

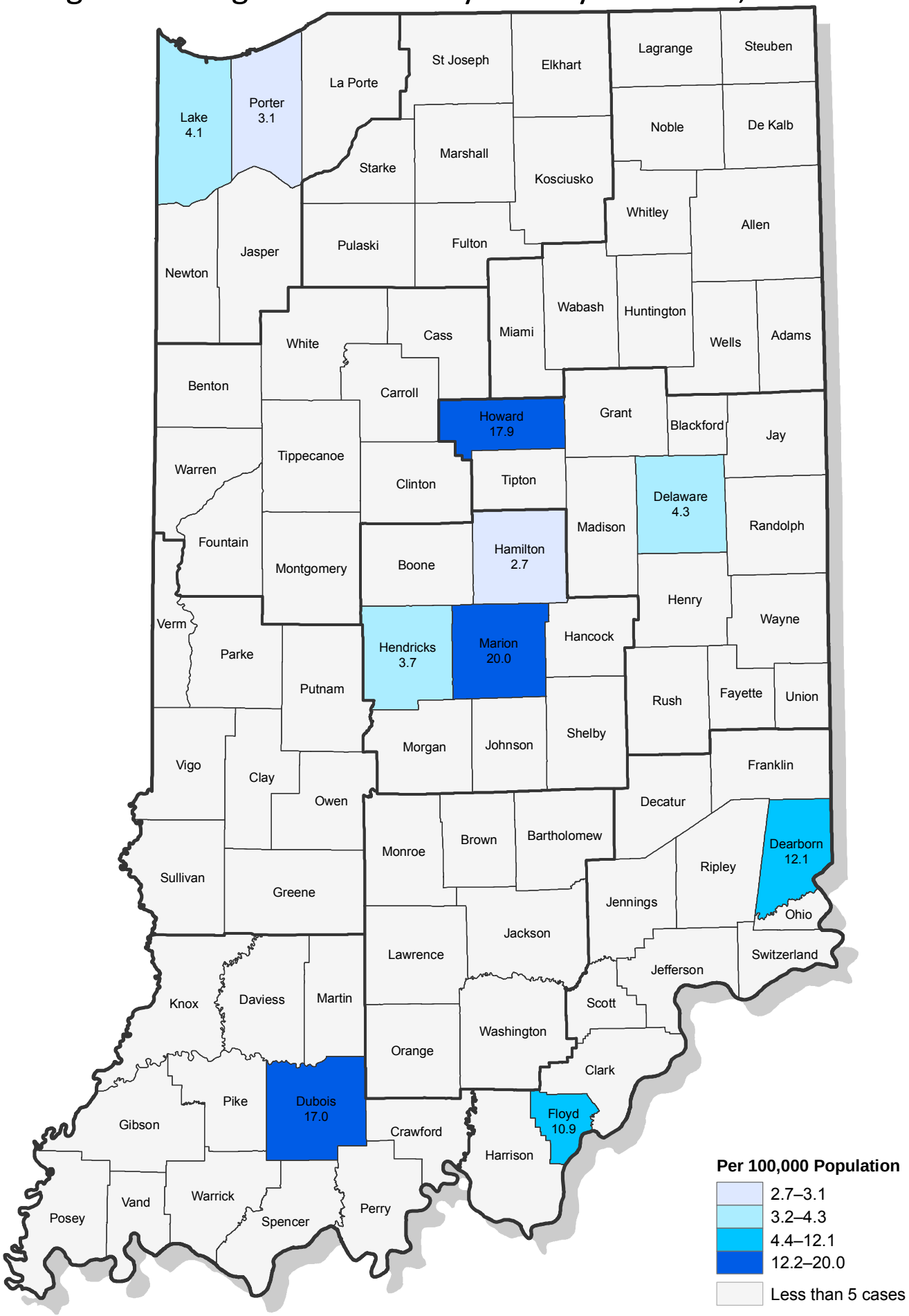
Table 2: Reported Serotypes for Shigellosis Cases, Indiana, 2007

Serotype	Number	Percent
Shigella boydii	1	0.3
Shigella flexneri	11	3.7
Shigella sonneis	271	91.6
No Species	1	0.3
Unknown	12	4.1

The incidence rates were highest among the following counties reporting five or more cases: Marion (20.0), Howard (17.9), and Dubois (17.0). Figure 4 shows Indiana counties reporting five or more cases.

You can learn more about shigellosis by visiting the following Web sites:
http://www.cdc.gov/nczved/dfbmd/disease_listing/shigellosis_gi.html
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070563.htm

Figure 5: Shigellosis Cases by County – Indiana, 2007



SMALLPOX

Smallpox is an acute infectious disease caused by the variola virus, which infects 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
Past use of smallpox in bioweapons programs and recent political instability in some areas of the world have led 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 that variola virus is released. In 2003, a national effort was made to vaccinate a corps of medical responders to provide care for initial cases in the event of a smallpox virus release. Routine vaccination of the public was discontinued in 1972 after smallpox was declared eradicated in the United States.

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 worldwide 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

STREPTOCOCCUS, GROUP A

Group A streptococcal (GAS) disease is caused by the bacterium *Streptococcus pyogenes* and is manifested as many types of illness including strep throat, scarlet fever, wound infections and impetigo. More serious and life-threatening illnesses such as streptococcal bacteremia/sepsis, streptococcal toxic shock syndrome, and necrotizing faciitis can occur when the bacteria invade a site in the body that is where bacteria are not normally found, such as the blood or muscle tissue. Necrotizing fasciitis ("the flesh-eating bacteria") is a rapidly progressive disease which destroys muscle, fat and skin tissue. Streptococcal toxic shock syndrome (STSS) is septic shock, resulting in a rapid drop in blood pressure and multi-organ failure. The bacteria are transmitted through direct contact with nose and throat secretions of persons who are infected or by touching infected hands. Spread may also occur by contact with infected wounds or sores on the skin, such as when a person has chickenpox lesions. Antibiotics are used to treat GAS disease. Only cases of invasive disease are reportable in Indiana.

Public Health Significance

Symptoms of GAS disease vary depending on the type of illness. Crowded settings, such as dormitories, barracks, child-care centers or correctional facilities, allow bacteria to spread more easily.

Persons at greatest risk for the disease include:

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

The risk 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 site. A person with signs of an infected wound, especially if fever is present, should seek medical attention immediately. Health care providers may recommend that people who are exposed to someone with invasive disease or those who are identified as carriers in outbreak situations take antibiotics to prevent the spread of infection.

According to the Centers for Disease Control and Prevention (CDC) Active Bacterial Core Surveillance (ABC's) Program, group A streptococcus invasive disease is estimated at a rate of 3.78 cases per 100,000 population.

Healthy People 2010 Goal

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

Epidemiology and Trends

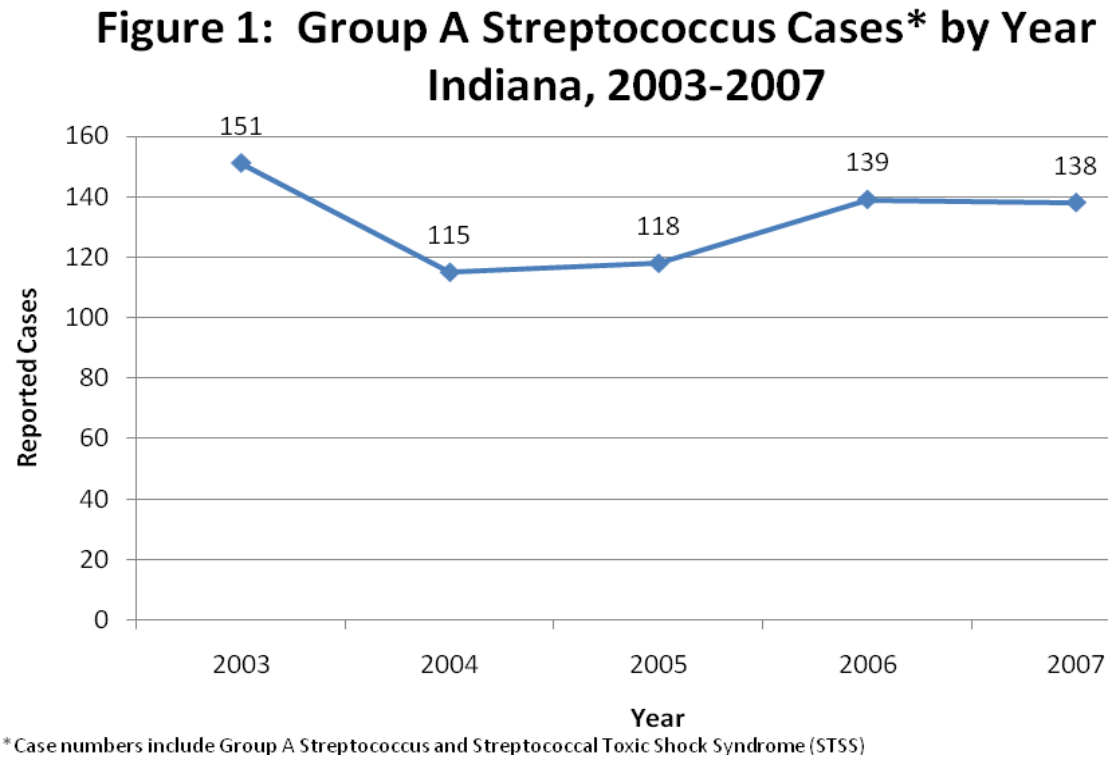
In 2007, there were 138 cases of invasive GAS disease for a rate of 2.17 cases per 100,000 persons (Table 1). Incidence rates for males (2.17) and females (2.14) were similar. Whites (1.84) had slightly higher rates than blacks (1.57), although low case numbers among minorities make rates comparisons problematic from year to year. Of these cases, over 7% (10/138) had manifestations of streptococcal toxic shock syndrome (STSS) and/or necrotizing faciitis. In previous years, confirmed cases of SSTS and necrotizing faciitis were not included in the annual report. In 2007, these most severe cases of GAS have been incorporated in the data and are included in the five-year reporting totals.

Table 1. Group A Streptococcus Cases by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	138	2.17	661
Race			
Black	9	1.57	76
White	103	1.84	461
Other	0	0.00	6
Not Reported	26	-	118
Sex			
Female	70	2.17	321
Male	67	2.14	339
Unknown	1	-	1

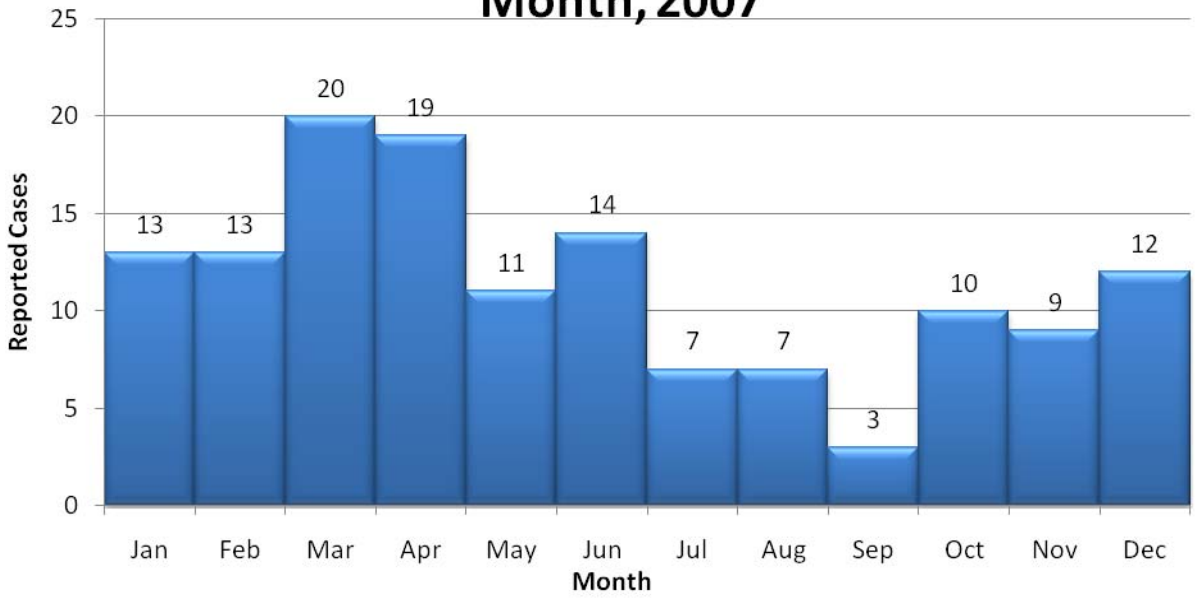
*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

Figure 1 shows reported cases by year for the five-year reporting period 2003-2007. Reported cases were highest in 2003 (151 cases).



There is seasonality with invasive GAS disease, with a peak in incidence occurring in late winter and early spring. Figure 2 displays the incidence of GAS disease was greatest in early spring, with 38 % (52/138) cases occurring between February and April.

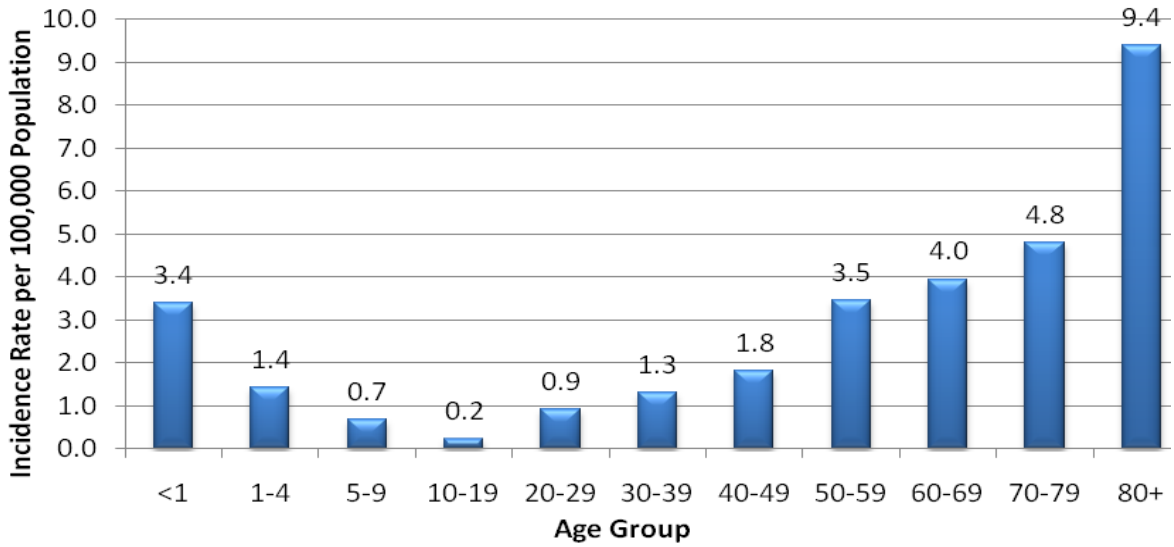
Figure 2: Group A Streptococcus Cases, by Month, 2007



*Case numbers include Group A Streptococcus and Streptococcal Toxic Shock Syndrome (STSS)

Very young infants and older adults are more likely to suffer from a compromised immune system or have underlying chronic medical conditions such as diabetes or cancer that predisposes them to GAS disease. As shown in figure 3, age-specific incidence rates were greatest for adults over the age of 80 (9.4) followed by adults 70-79 years of age (4.8).

Figure 3: Group A Streptococcus Incidence*+ Rates by Age Group Indiana, 2007



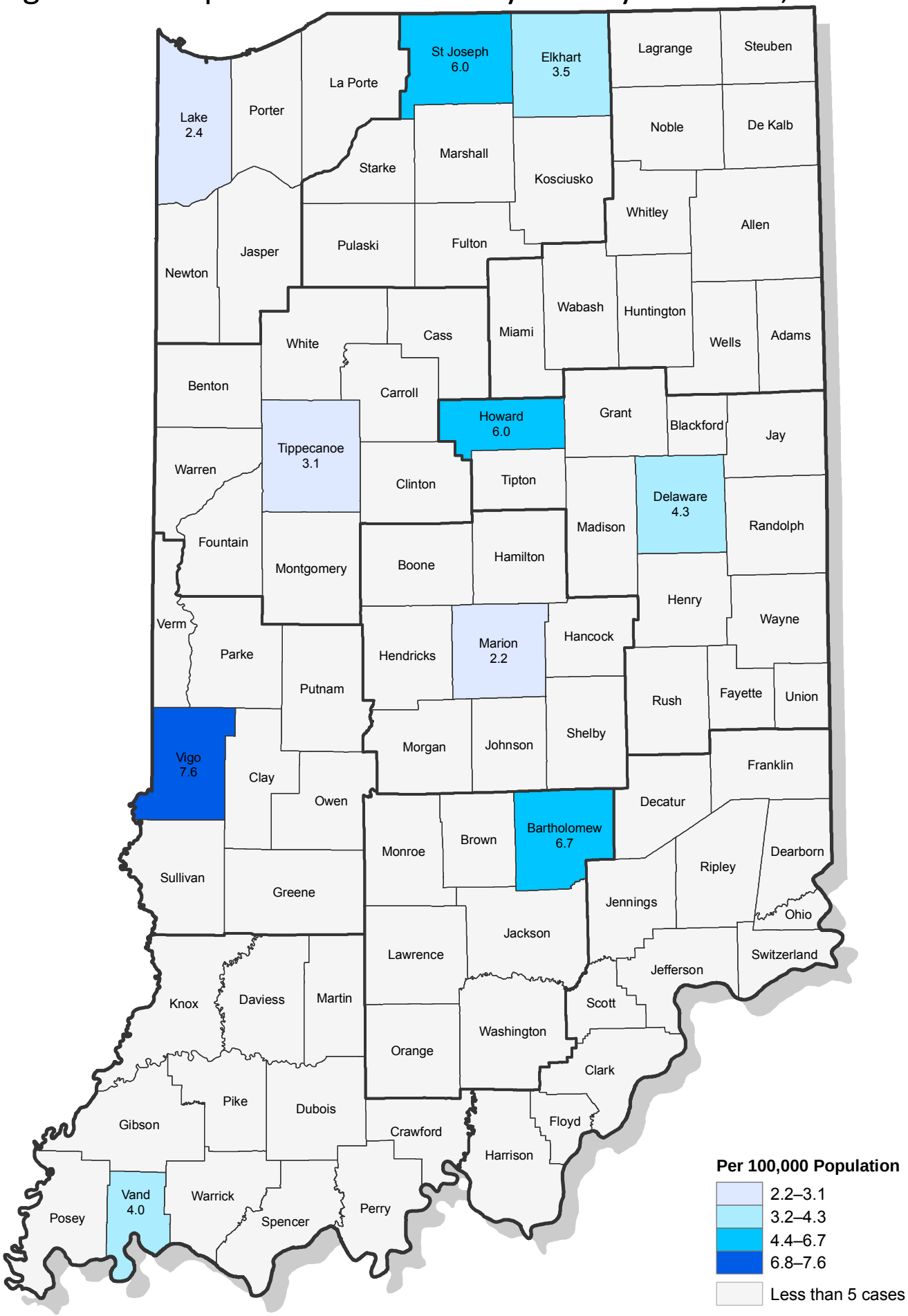
* Age information not reported for 1 case

+ Incidence based on Group A Streptococcus and Streptococcal Toxic Shock Syndrome (STSS) cases

Incidence rates were highest among the following counties reporting 5 or more cases during the year: Vigo (7.6), Bartholomew (6.7), St Joseph (6.0) and Howard (6.0) (see figure 4).

You can learn more about group A streptococcus disease by visiting the following Web sites:
http://www.in.gov/isdh/22434.htm
http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm

Figure 4: Streptococcus A Cases by County – Indiana, 2007



STREPTOCOCCUS, GROUP B

Group B streptococcal (GBS) disease is caused by the bacteria *Streptococcus agalactiae* and is manifested as many types of illness, such as urinary tract infections. More serious and life-threatening illness including meningitis, bacteremia, sepsis or joint infections can occur when the bacteria invade a site in the body that is sterile, such as the blood, cerebrospinal fluid or joint fluid. Cases most often occur in young infants and adults with chronic medical conditions. Symptoms of GBS for the newborn include sudden fever, difficulty feeding, fussiness and fatigue. It is estimated that 25% of women carry GBS in their rectum or vagina but show no signs of illness. Newborns (< 7 days of age) acquire the bacteria from their mother just before or during birth, but the transmission of GBS in adults and infants one week or older is not clearly understood. Antibiotics are used to treat GBS disease. Only cases of invasive disease are reportable in Indiana.

Public Health Significance
Cases occurring in infants less than 7 days of age are considered "early-onset" disease; cases occurring in infants 7 – 89 days old are considered "late-onset" disease.

Persons at greatest risk for the disease include:

- Infants born to mothers who are GBS carriers
- Adults with chronic medical conditions including cancer, liver failure, and diabetes

In 2002, the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) issued revised guidelines for the prevention of early-onset GBS disease. These guidelines include universal screening (consisting of a urogenital swab) of all women at 35 – 37 weeks gestation for group B colonization and the administration of intrapartum antibiotics to women identified as carriers. Although case rates have decreased due to appropriate screening and therapy, GBS is still the most common cause of life-threatening infections in newborns.

Following standard infection control practices, especially for patients in hospitals and healthcare facilities, will reduce the risk of patients or residents acquiring GBS disease.

According to the Centers for Disease Control and Prevention (CDC) Active Bacterial Core Surveillance (ABC's) Emerging Infections Programs Network for group B streptococcus in 2007, national estimates of disease are approximately 6.63 cases per 100,000 persons. This estimate includes all invasive cases of GBS. Live-birth data is used in the calculations of early-onset and late-onset disease. National estimates of early-onset disease were 0.34 cases per 1,000 live-births, estimates of late-onset disease were 0.29 cases per 1,000 live-births.

Healthy People 2010 Goal
The Healthy People 2010 Goal for early-onset (infants < 7 days of age) group B streptococcus disease is 0.5 cases per 1,000 live-births per year. Indiana met that Goal for 2007 with a rate of 0.36 cases of early-onset disease per 1,000 live-births.

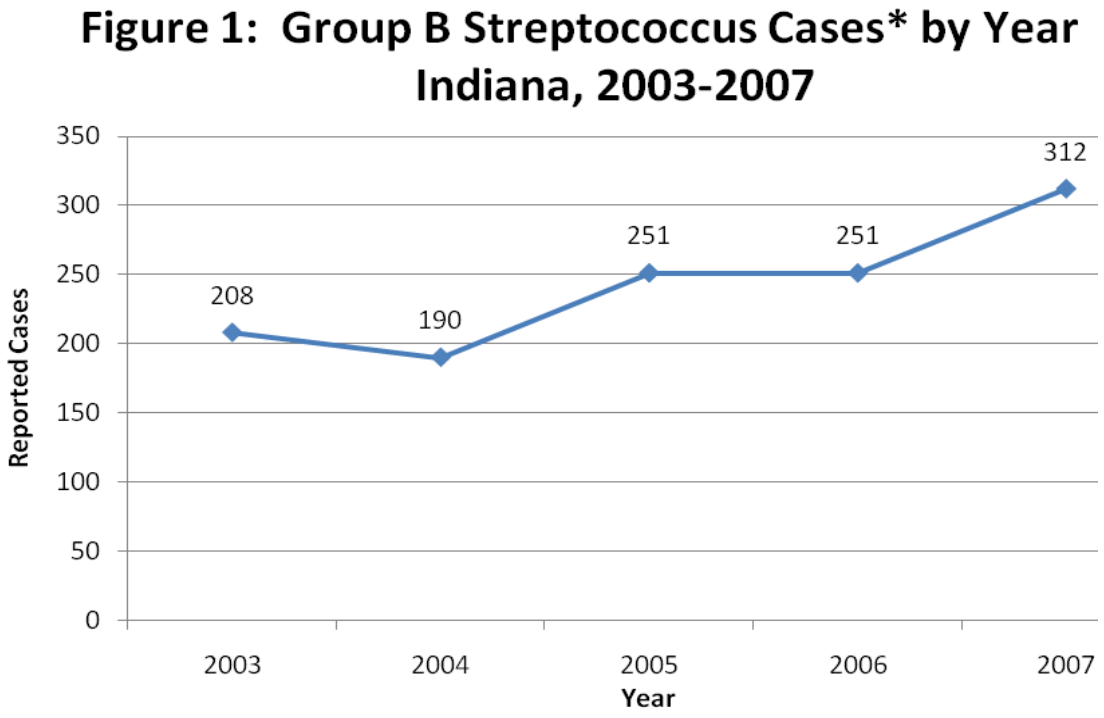
Epidemiology and Trends
In 2007, there were 312 cases of GBS reported in Indiana, for a rate of 4.92 cases per 100,000 persons (Table 1). Rates of disease in blacks (6.65) were almost twice that of whites (3.68). The rates of males (5.05) and females (4.72) were similar. Fifty-four of the 312 cases occurred in newborns less than 3 months of age, with 32 cases of early-onset disease. 16% of early-onset cases occurred in black infants. Small numbers of early and late onset disease cases each year make rate comparisons problematic.

Table 1: Group B Strep Cases by Race and Sex, Indiana, 2007

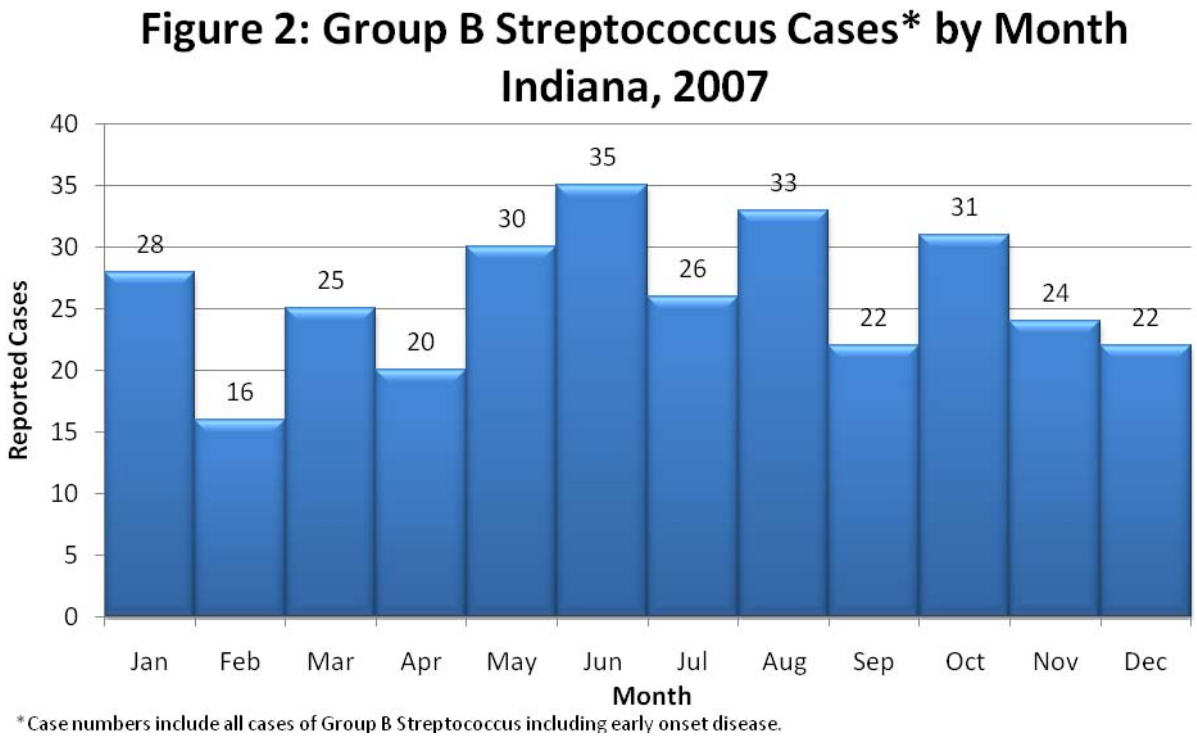
	Cases	Rate*	2003 - 2007 Total
Indiana	312	4.92	1212
Race			
Black	38	6.55	191
White	206	3.68	740
Other	4	2.21	16
Not Reported	64	-	265
Sex			
Female	152	4.72	602
Male	158	5.05	606
Unknown	0	-	4

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July, 1, 2007

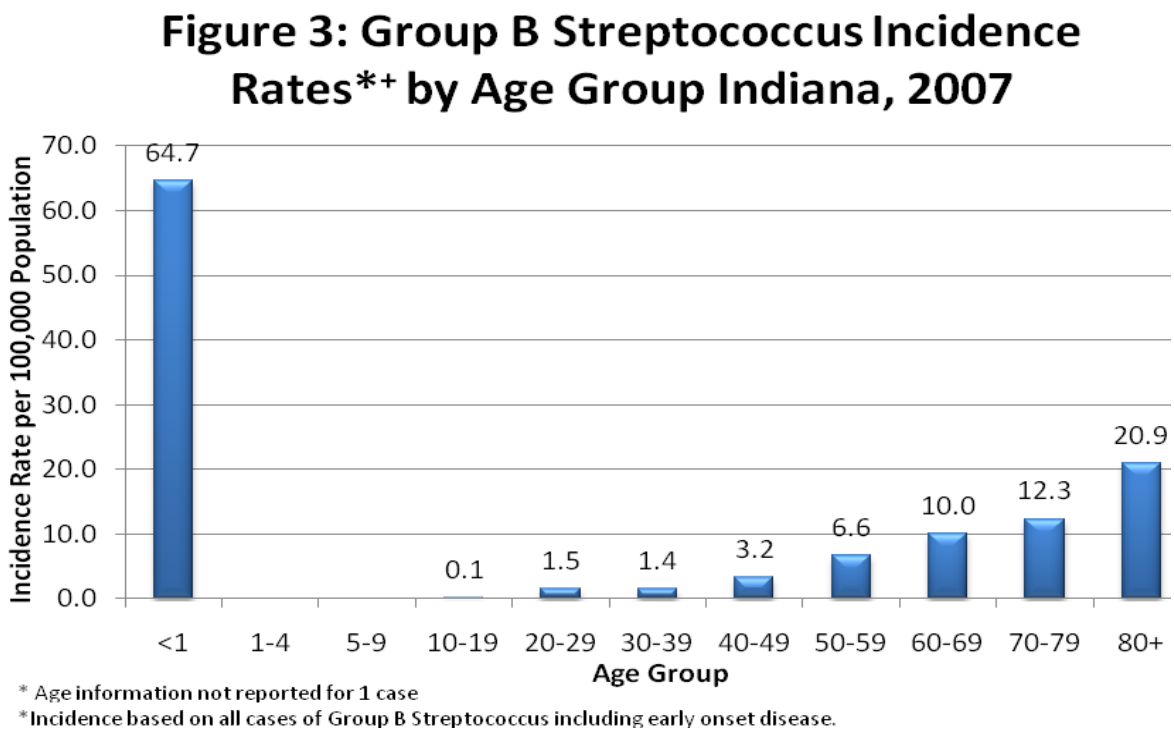
Figure 1 shows reported cases by year for 2003 – 2007 with 2007 having the most cases during the five - year reporting period. Low case numbers from 2003 – 2004 are likely due to GBS being a newly reportable disease in 2000.



GBS infections can occur anytime during the year, with peak incidence during the summer months as displayed in Figure 2.



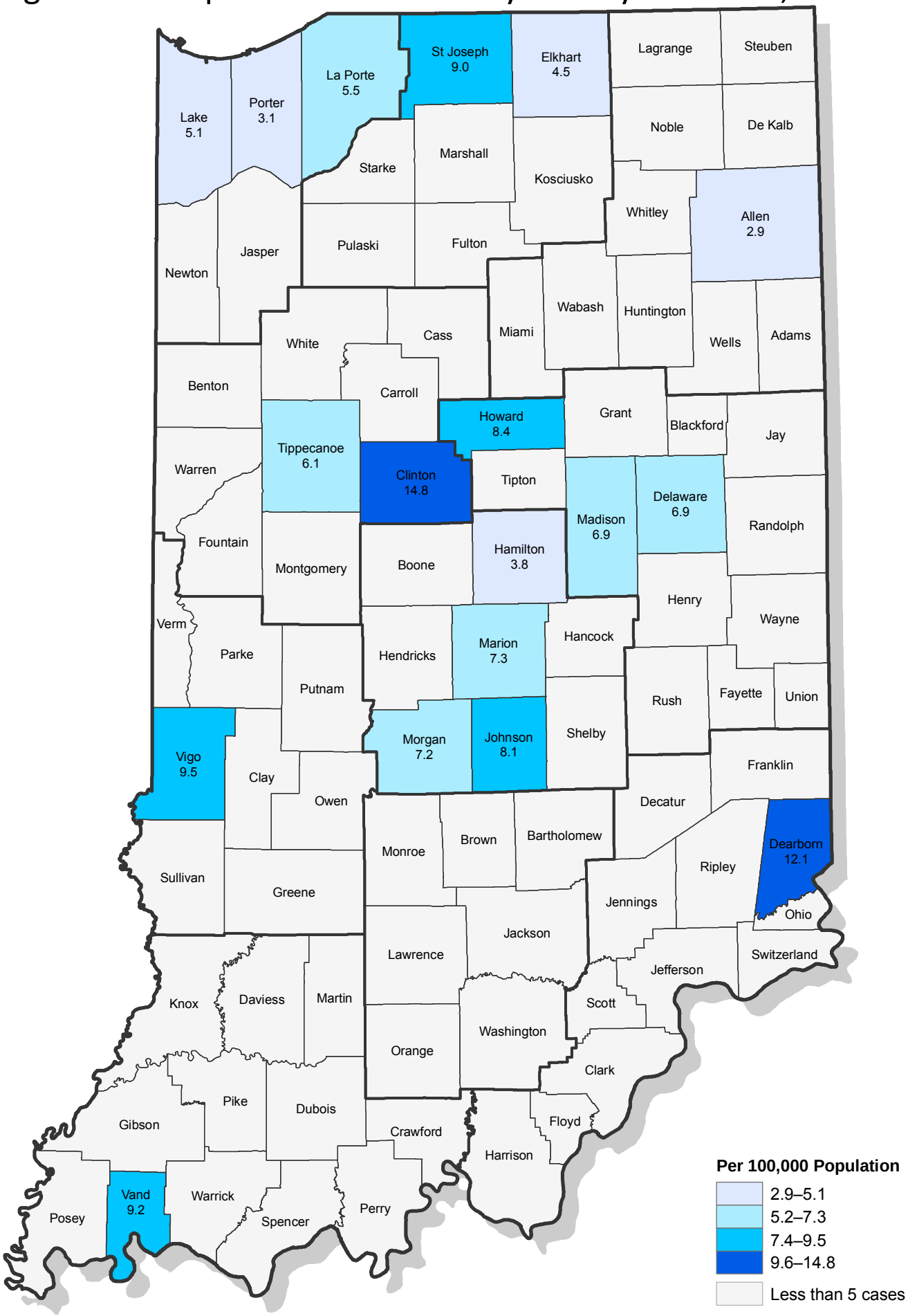
Rates of disease in 2007 were highest among at-risk groups and blacks. Age specific rates were highest for infants, less than 1 year of age (64.7) followed by older adults aged at least 80 years (20.9) and adults 70-79 years (12.3) as demonstrated in Figure 3.



Incidence rates were highest among the following counties reporting 5 or more cases during the year: Clinton (14.8), Dearborn (12.1), Vigo (9.5), and Vanderburgh (9.2) counties (see figure 4).

You can learn more about group B streptococcus by visiting the following Web sites:
http://www.in.gov/isdh/22435.htm
http://www.cdc.gov/groupbstrep/

Figure 4: Streptococcus B Cases by County – Indiana, 2007



TETANUS

Tetanus is an acute, often fatal disease caused by a toxin produced by the bacterium *Clostridium tetani*. It is characterized by generalized rigidity and convulsive spasms of skeletal muscles. The muscle contractions usually involve the jaw (lockjaw) and neck and then become generalized. Tetanus bacteria are found in the environment, primarily soil. Tetanus is not contagious from person to person; transmission is primarily through contaminated wounds, which can either be apparent or inapparent.

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. Antibiotics are available for the treatment of tetanus.

Tetanus is prevented through administration of a primary series of tetanus 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 following completion of the primary series. Prior to routine vaccination, 500-600 cases of tetanus were reported in the United States each year. An all-time low of 20 cases (0.01 cases per 100,000 population) were reported in 2003. In recent years, the case-fatality rate has decreased from 30 percent to approximately 10 percent.

Achieving high immunization 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.

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 2003-2007 except in 2006.

Epidemiology and Trends
No cases of tetanus were reported in Indiana in 2007. During the five-year period 2003-2007, four cases of tetanus were reported in Indiana. 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.

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 caused by staphylococcal bacteria and occurs when the bacteria invade a sterile site in the body and produce a toxin. Most cases of TSS are associated with *Staphylococcal aureus*. 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. A sun-burn like rash that peels may be present during the acute phase of illness. TSS is not spread from person to person; however, Staphylococcal bacteria colonize the nasopharynx and skin of healthy people. The bacteria are spread through contact with respiratory secretions of an infected person carrying a pathogenic strain or through contact with drainage from an infected wound. Antibiotics are available for the treatment of TSS.

Public Health Significance
TSS most often occurs in women of child-bearing age and is associated with the use of vaginal tampons, barrier contraceptive devices or infection following childbirth or abortion. Although rare, anyone can 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 or using tampons intermittently. Drainage of wounds or removal of wound packing may also decrease the risk of infection.

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

Epidemiology and Trends
There were only two reported cases of toxic shock syndrome in Indiana in 2007 and only six cases reported during the five-year period 2003-2007.

You can learn more about toxic shock syndrome by visiting the following Web sites:
http://www.in.gov/isdh/22439.htm
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 cysts of infective larvae. The parasite larva matures in the small intestine, releasing larvae 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 2003-2007.

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 include 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 when outdoors.

The tularemia bacterium is classified as a Category A potential bioterrorism agent,* since it is easily aerosolized and highly infective.

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

Epidemiology and Trends
There was one case of tularemia in Indiana in 2007, and only five reported cases during the five-year reporting period 2003-2007.

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 an area where typhoid fever is common, such as Asia, Africa, and Latin America.

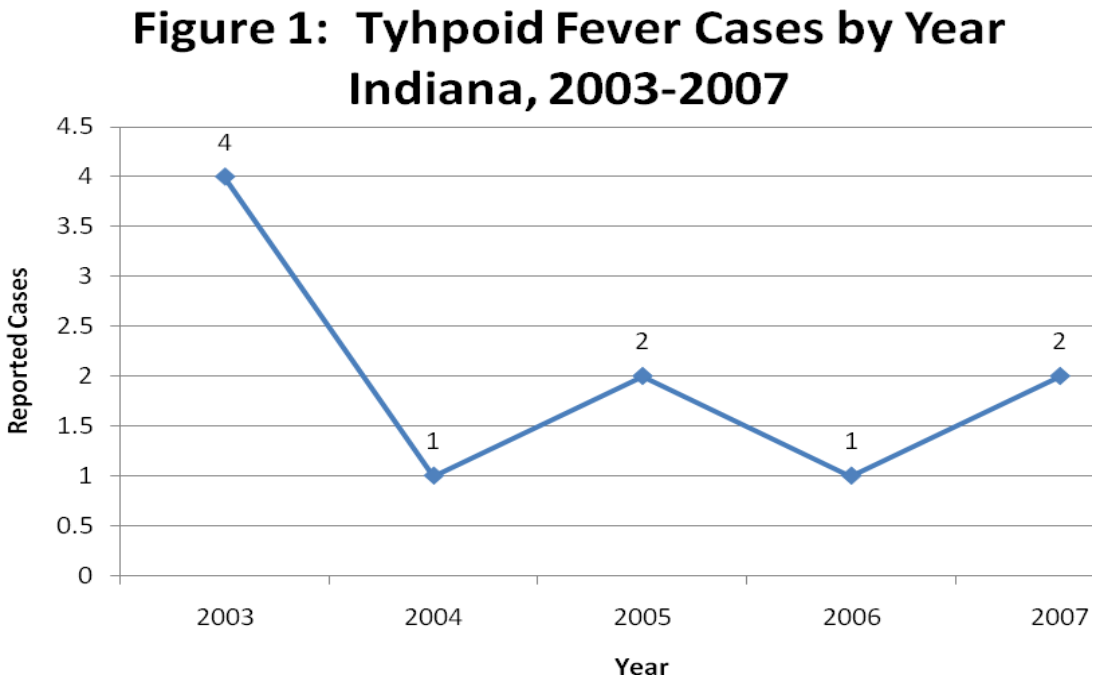
People become infected with *S. typhi* by ingesting feces from an infected person (fecal-oral route), usually because of poor hand hygiene after using the restroom. Transmission can occur through person-to-person contact, handling food, and touching items such as soiled diapers or linens and then touching 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 2007, there were two reported cases of typhoid fever in Indiana and only eight reported cases during the five-year period 2003-2007. Figure 1 shows the number of reported typhoid fever cases for the five-year period 2003-2007.



There were no outbreaks associated with typhoid fever in 2007.

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

TYPHUS FEVER

The term typhus fever refers to three different bacterial 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 that 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 opossums 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, fewer 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 2007 or during the five-year period 2003-2007.

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 a member of the herpesvirus family. The virus is transmitted from person-to-person through direct contact, droplet, or airborne spread of vesicle fluid or secretions of the respiratory tract. Though commonly considered a childhood illness, anyone who has not had varicella can become infected. Although varicella disease typically 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. Hospitalizations and death due to varicella still occur in Indiana.

Varicella is a vaccine-preventable disease. Some individuals as well as health care providers, view varicella as a mild childhood illness and choose not to vaccinate; thus it remains a challenge to increase immunization rates. Varicella vaccine not only provides protection from contracting the disease, but data reflect milder severity of cases 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

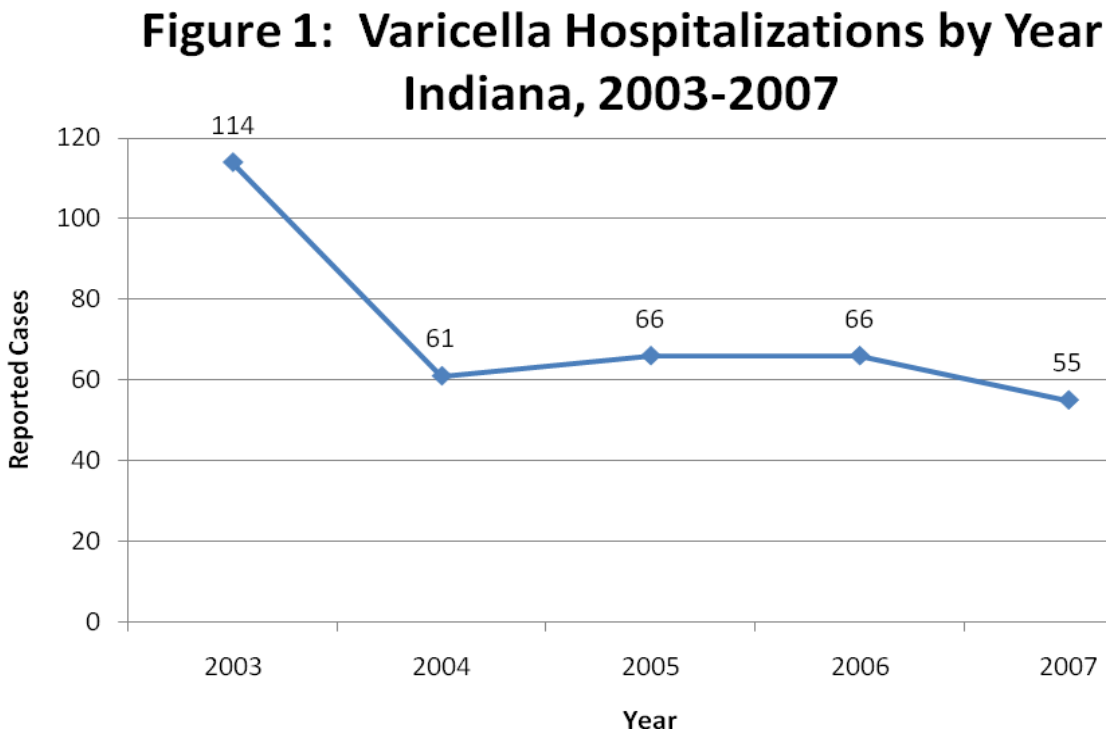
In 2007, there were 55 reported cases of varicella-associated hospitalizations in Indiana, for a rate of 0.87 cases per 100,000 population (Table 1). Females (0.93) were slightly more likely to be reported than males (0.80). The rate of varicella associated hospitalizations was higher for blacks (1.57) than for whites (0.64). There were no varicella deaths reported in 2007.

Table 1. *Hospitalized Varicella Cases by Race and Sex, Indiana 2007

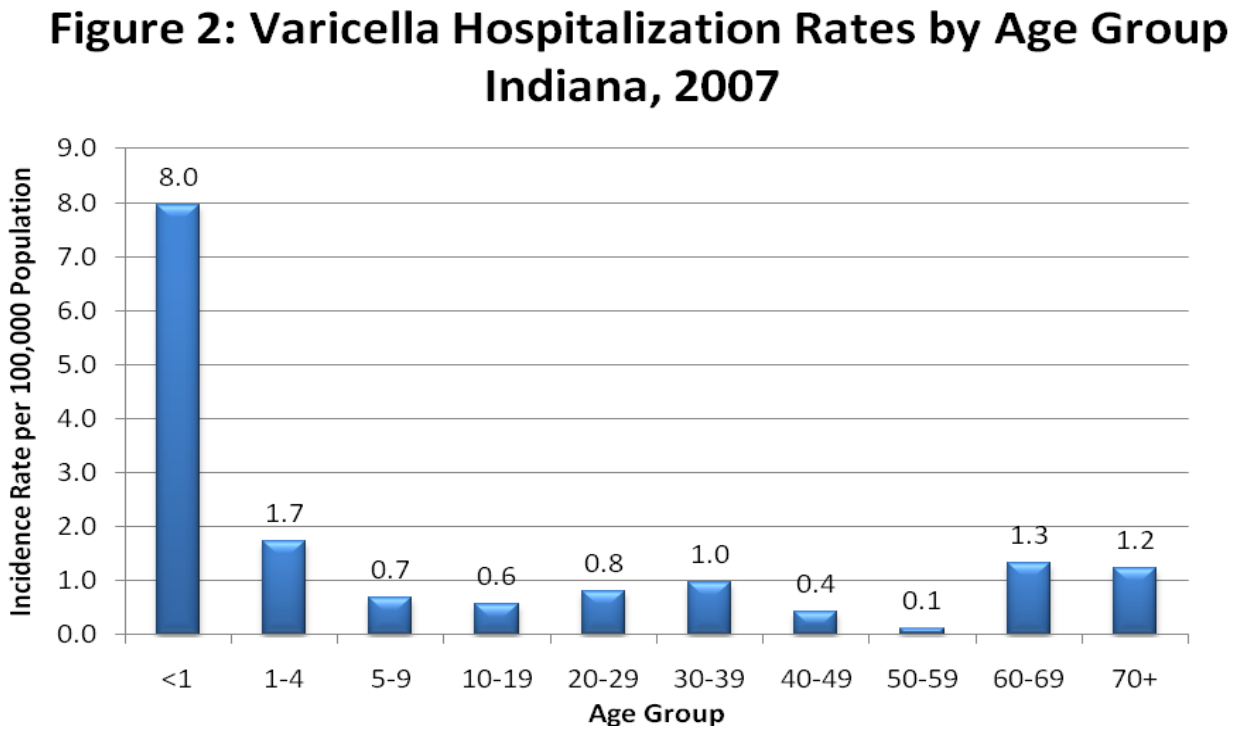
	Cases	Rate*	2003 - 2007 Total
Indiana	55	0.87	362
Race			
Black	0	0.00	0
White	9	1.57	48
Other	36	0.64	245
Not Reported	0	0.00	59
Sex	10	-	10
Female	30	0.93	184
Male	25	0.80	178
Unknown	0	-	0

*Data provided by Indiana Hospital and Health Association

Figure 1 shows reported cases by year from 2003-2007.



As Figure 2 shows, age-specific rates were greatest for infants aged less than 1 year (8.0), followed by children aged 1-4 years (1.7) and adults aged 60 to 69 years (1.3).



Varicella Sentinel Surveillance System
As of 2007, Indiana does not require reporting of individual varicella cases. Therefore, a voluntary sentinel surveillance reporting systemis used 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 2007, there were 317 cases reported by sentinel sites. School-age children (ages 5 through 19) have 80 percent of the disease burden reported in the sentinel data. These data may reflect inherent biases due to several factors, such as, the schools being the most common reporters, and volunteer reporters possibly not reflecting 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 317 cases reported, 2.2 percent (7) were of unknown severity. Although 239 cases of breakthrough disease were reported in individuals who received vaccine, 73 percent (174) were categorized as mild disease. Only 3 percent (7) of cases of breakthrough disease were classified as severe disease, whereas nearly 4 percent (3) of cases in the unimmunized population were considered severe.

Table 2. Summary of Varicella Cases by Vaccination Status and Severity
(2007 Data Collected from the Indiana Varicella Sentinel Surveillance System)

Immune Status	Mild Cases	Moderate Cases	Severe Cases	Unknown
Immunized	174	57	7	1
Unimmunized	30	39	3	6

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

You can learn more about varicella by visiting the following Web site:
http://www.cdc.gov/vaccines/vpd-vac/varicella/default.htm

VIBRIOSIS

Vibriosis is an illness caused by a variety of *Vibrio* bacteria, the most common being *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 2007, there were three reported cases of vibriosis in Indiana and only three reported cases during the five-year period 2003-2007.

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) infection was first identified in Indiana in 2001, when WNV was confirmed in 7 counties (47 birds and 1 horse). In 2007, Indiana was one of 44 states, to report human WNV cases. Nationally in 2007, there were 3,630 human cases, with 117 deaths. Indiana had 24 reported cases with one death. 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 practices:

- 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.
- 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 birdbaths weekly. Drill holes in tire swings so water drains out. Keep children's wading pools empty and upright 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

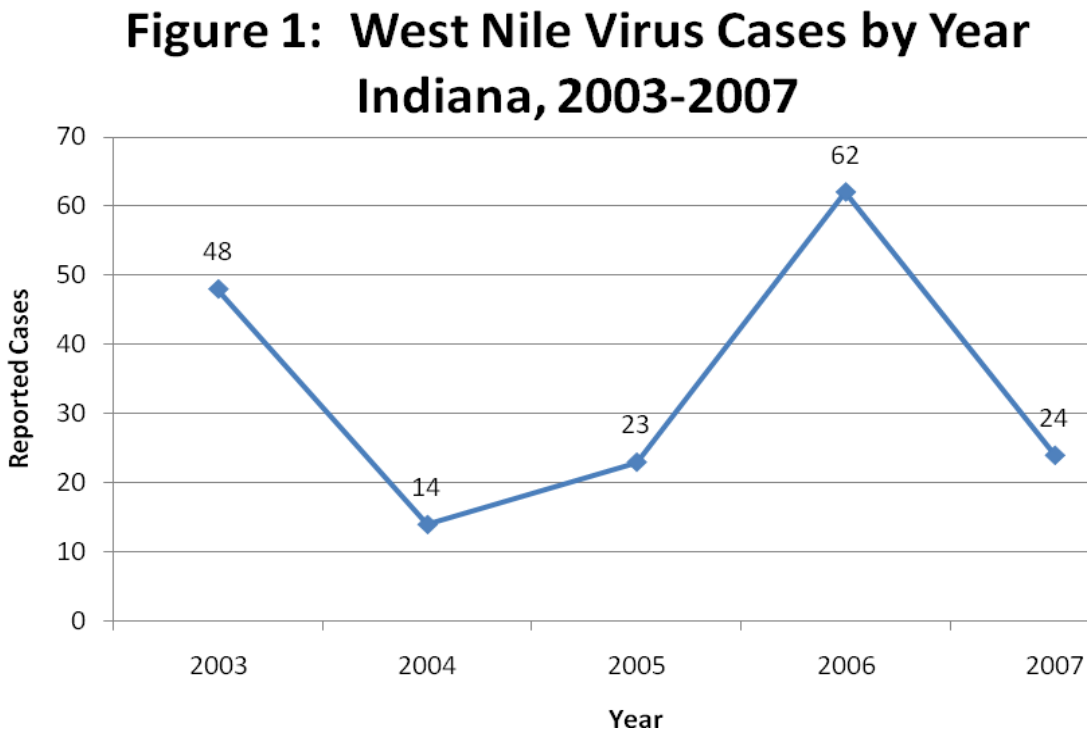
In 2007, the 24 reported cases of WNV in Indiana represented a rate of less than 1 case per 100,000 population (Table 1).

Table 1. WNV Cases by Race and Sex, Indiana, 2007

	Cases	Rate*	2002 - 2007 Total
Indiana	24	0.38	464
Race			
Black	3	0.52	24
White	20	0.36	363
Other	0	0.00	3
Not Reported	1	-	73
Sex			
Female	9	0.28	213
Male	15	0.48	250
Unknown	0	-	1

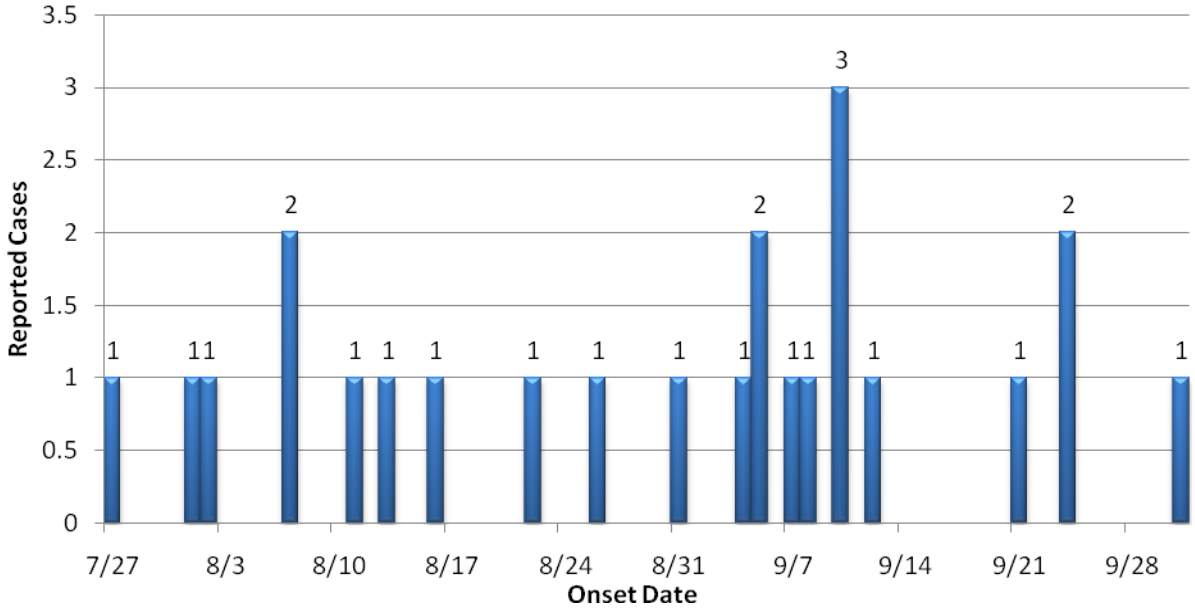
*Rate per 100,000 population based on the U.S. Census Bureau's population data as of July 1, 2007

Figure 1 shows reported cases by year for 2003-2007.



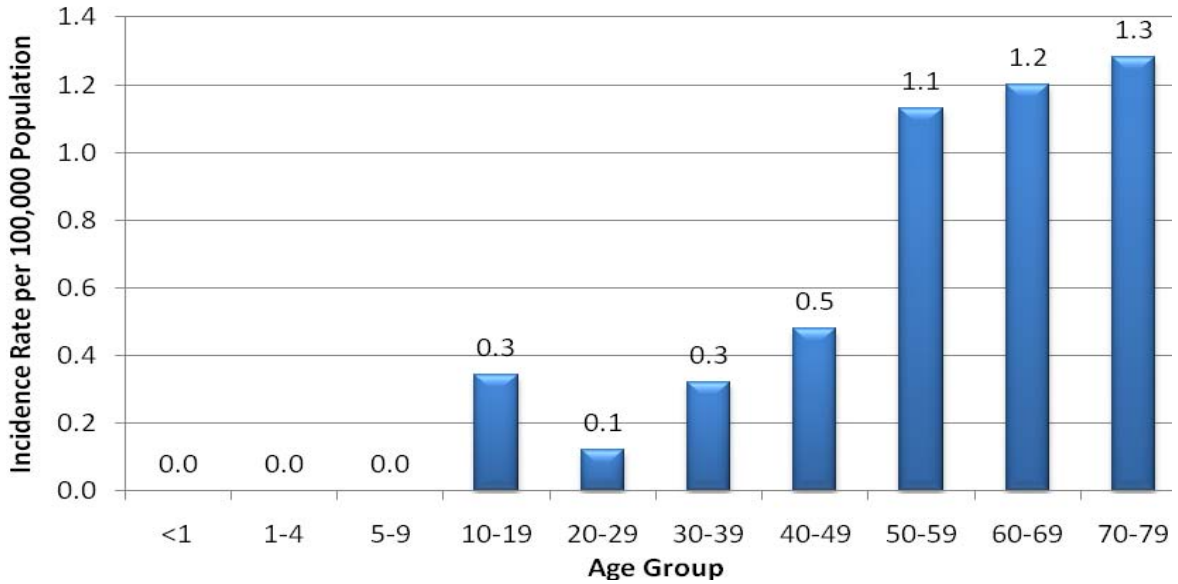
In 2007, the initial case had an onset of illness date starting in late July. (Figure 2). Most cases of WNV occurred in August-September. The last reported case occurred on October 1st.

Figure 2: West Nile Virus Cases by Onset Date Indiana, 2007



Eighty-three percent of reported cases occurred in individuals aged 40 years and older (Figure 3). During 2007, incidence rates of West Nile virus were the highest among those 50 years and older.

Figure 3: West Nile Virus Incidence Rates by Age Group Indiana, 2007



Thirteen Indiana counties reported human West Nile virus cases in 2007. However, only Lake county reported five or more cases.

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

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 2003-2007.

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.

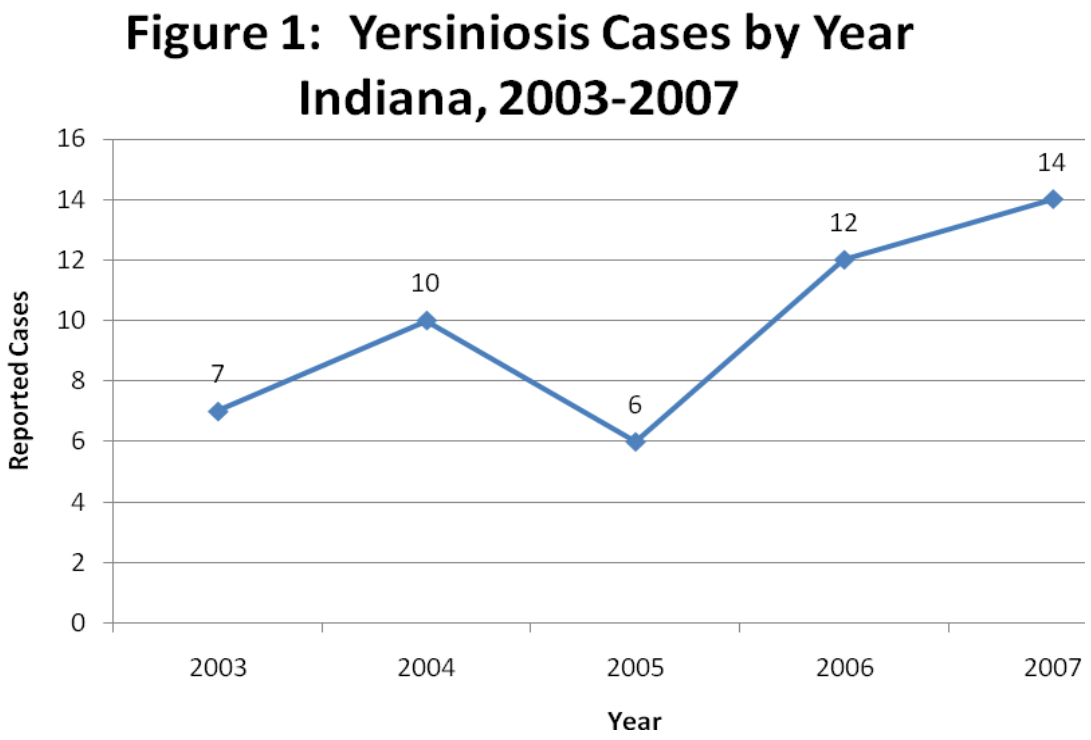
Epidemiology and Trends
In 2006, there were 14 cases of yersiniosis reported in Indiana, for a rate of less than 1 case per 100,000 population (Table 1).

Table 1. Yersiniosis Cases by Race and Sex, Indiana, 2007

	Cases	Rate*	2003 - 2007 Total
Indiana	14	0.22	49
Race			
Black	1	0.17	6
White	9	0.16	27
Other	0	0.00	5
Not Reported	4	-	11
Sex			
Female	7	0.22	26
Male	7	0.22	23
Unknown	0	-	0

*Rate per 100,000 population based on U.S. Census Bureau's population data as of July 1, 2007

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).

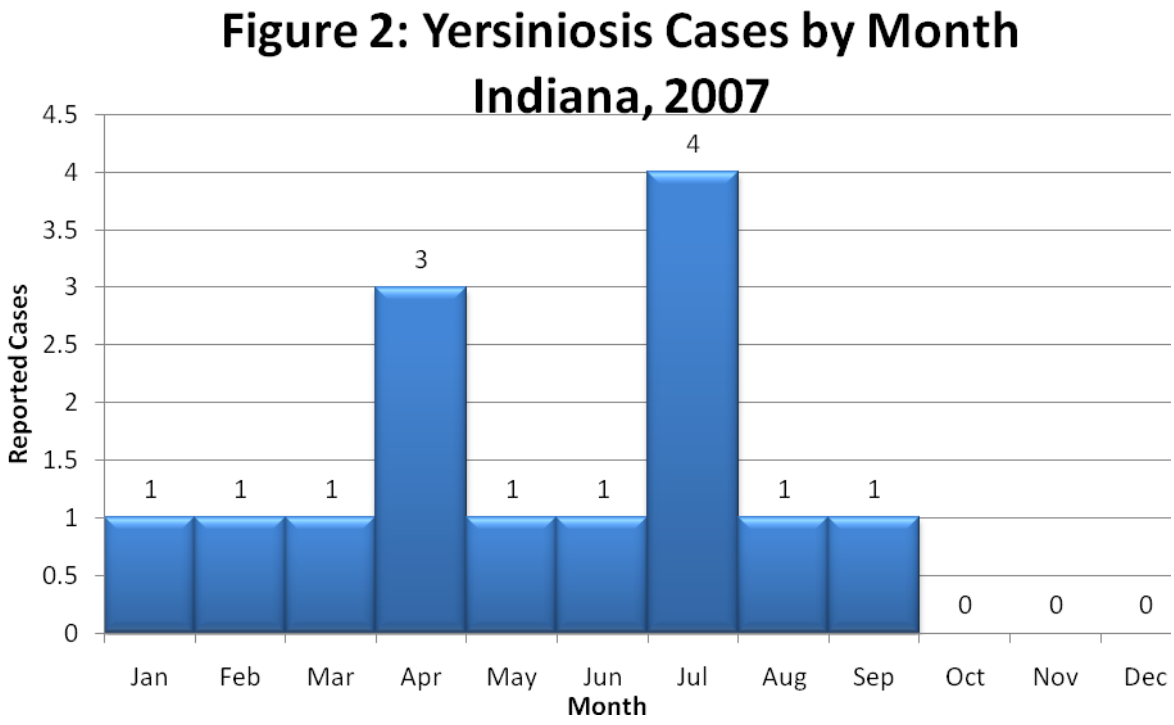
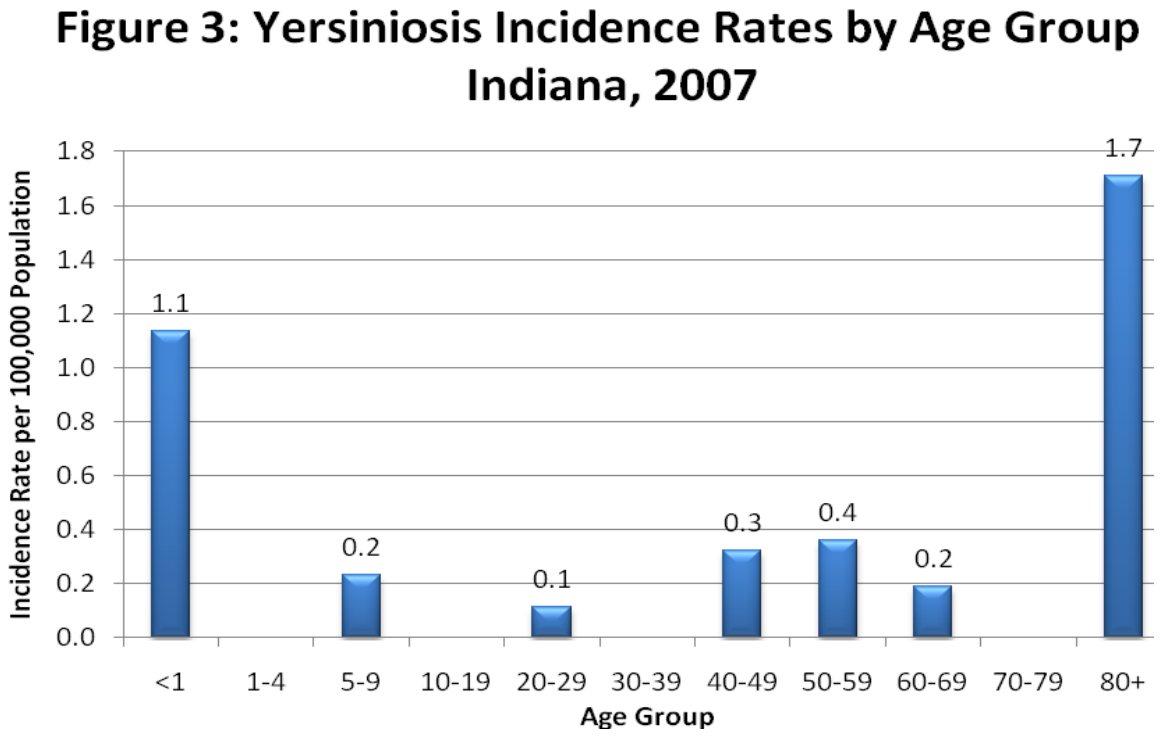


Figure 3 shows age-specific rates were greatest for those over 80 years old (1.7), followed by infants less than 1 year of age (1.1).



Eleven Indiana counties reported yersiniosis cases in 2007. 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
http://www.fda.gov/Food/FoodSafety/FoodborneIllness/FoodborneIllnessFoodbornePathogensNaturalToxins/BadBugBook/ucm070040.htm