The Epidemiology of Infectious Diseases in Illinois

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Reportable Communicable Diseases in Illinois
The following diseases must be reported to local health authorities in Illinois (those in bold are also nationally notifiable, which means reportable by the state health department to the U.S. Centers for Disease Control and Prevention):

CLASS 1(a)- The following diseases are reportable by telephone immediately (within three hours):
1. Anthrax
2. Botulism, foodborne
3. Plague
4. Q-fever
5. Smallpox
6. Tularemia
7. Any suspected bioterrorist threat or event

CLASS 1(b)-The following diseases are reportable within 24 hours of diagnosis:
1. Botulism, infant, wound, and other
2. Cholera
3. Diarrhea of the newborn
4. Diphtheria
5. Foodborne or waterborne illness
6. Hemolytic uremic syndrome, post-diarrheal
7. Hepatitis A
8. Any unusual case or cluster of cases that may indicate a public health hazard
9. *Haemophilus influenzae*, meningitis and other invasive disease
10. *Neisseria meningitidis*. Meningitis and invasive disease
11. Streptococcal infections, Group A, invasive (Including toxic shock syndrome) and sequelae to group A streptococcal infections (rheumatic fever and acute glomerulonephritis)
12. Measles
13. Pertussis
14. Poliomyelitis
15. Rabies, human
16. Rabies, potential human exposure
17. Typhoid fever
18. Typhus
19. Enteric *Escherichia coli* infections (*E. coli*0157:H7 and other enterohemorrhagic *E. coli*, enterotoxigenic *E. coli*) enteropathogenic *E. coli*)
20. *Staphylococcus aureus* infections with intermediate or high level resistance to vancomycin

(Continued on attached page)
CLASS II-The following diseases shall be reported as soon as possible during normal business hours, but within seven days (exceptions to the seven-day notification requirement are marked with an asterisk; see note below.)

1. AIDS
2. Amebiasis
3. Blastomycosis
4. Brucellosis
5. Campylobacteriosis
6. Chancroid*
7. Chickenpox
8. Chlamydia*
9. Cryptosporidiosis
10. Cyclosporiasis
11. Ehrlichiosis, human granulocytic
12. Ehrlichiosis, human monocytic
13. Encephalitis
14. Giardiasis
15. Gonorrhea*
16. Hantavirus pulmonary syndrome
17. Hepatitis B
18. Hepatitis C
19. Hepatitis, viral, other
20. Histoplasmosis
21. HIV infection ¹
22. Legionnaires’ disease
23. Leprosy
24. Leptospirosis
25. Listeriosis
26. Lyme disease
27. Malaria
28. Meningitis, aseptic (including arbovirus infection)
29. Mumps
30. Ophthalmia neonatorum (gonococcal)*
31. Psittacosis
32. Reye’s syndrome
33. Rocky Mountain spotted fever
34. Rubella, including congenital
35. Salmonellosis (other than typhoid)
36. Shigellosis
37. Staphylococcus aureus infection, toxic shock syndrome
38. Staphylococcus aureus infections occurring in infants under 28 days of age (within a health care institution or with onset after discharge)
39. Streptococcal infections, group B, invasive disease, of the newborn
40. Streptococcus pneumoniae, invasive disease (including antibiotic susceptibility test results)
41. Syphilis*
42. Tetanus
43. Trichinosis
44. Tuberculosis
45. Yersiniosis

*Must be reported by mail or by telephone to the local health authority within five days

¹HIV is reported by patient code number, not by name.

The occurrence of any increase in incidence of disease of unknown or unusual etiology should be reported, with major signs and symptoms listed.

When an epidemic of a disease dangerous to the public health occurs and present rules are not adequate for its control or prevention, more stringent requirements shall be issued by the Illinois Department of Public Health.
2004 Summary of Selected Illinois Infectious Diseases

In Illinois, the communicable disease (CD) surveillance system relies on the passive reporting of cases required by state law. Diseases are made reportable because regular and timely information is necessary for prevention and control efforts. Lists of notifiable diseases are revised to include new pathogens or delete those with declining importance. The current reportable disease list mandates reporting, within specific time frames, of certain diseases and of selected positive laboratory tests. The effectiveness of the surveillance system relies heavily on the cooperation and support of health care providers, laboratories and local health departments in submitting information on reportable disease cases. In Illinois, regulations require reporting by physicians, nurses, nurses aides, dentists, health care practitioners, laboratory personnel, school personnel, long-term care personnel, day care personnel and university personnel. Notifiable disease data are submitted by the Illinois Department of Public Health (IDPH) on a weekly basis to be included with national data in the Morbidity and Mortality Weekly Report (MMWR). CD rules also include laboratory reporting. Some isolates are required to be forwarded to IDPH. For selected agents and situations, pulse field gel electrophoresis may be performed to subtype isolates.

There are 56 diseases or conditions listed as nationally reportable to the U.S. Centers for Disease Control and Prevention (CDC). The number reflects certain combinations; for example, HIV and AIDS are combined under one category (human immunodeficiency virus/acquired immune deficiency syndrome [HIV/AIDS]) as are invasive group A streptococcus (GAS) and toxic shock syndrome due to GAS. Diseases reportable to CDC but not reportable in Illinois include animal rabies, coccidioidomycosis, and yellow fever. Animal rabies testing is only performed by state laboratories so reporting is complete through state laboratory reporting. In 2004, the 10 most frequently reported notifiable infectious diseases in the United States were AIDS, chlamydia, giardiasis, gonorrhea, Lyme disease, pertussis, salmonellosis, shigellosis, syphilis and varicella.

In 2004, 65 different types of infectious diseases were reportable to IDPH (see page 1 and 2). Many of the reportable diseases are included in this annual report along with some non-reportable diseases of importance in 2004. Case numbers for the various infectious diseases listed in this summary should be considered minimum estimates. There are several reasons why reported numbers are lower than the actual incidence of disease: Many individuals do not seek medical care and thus are not diagnosed; some cases are diagnosed on a clinical basis without confirmatory or supportive laboratory testing; and among diagnosed cases, some are not reported. These surveillance data are used to evaluate disease distribution trends over time rather than to identify precisely the total number of cases occurring in the state.

The five most frequently reported nationally notifiable infectious diseases in Illinois were chlamydia, gonorrhea, AIDS, Salmonella and syphilis. Diseases with increased reporting in 2004 over the previous five-year median included amebiasis, blastomycosis, Campylobacter, Chlamydia, cryptosporidiosis, ehrlichiosis, H. influenzae, histoplasmosis, legionellosis, Lyme, pertussis and invasive S. pneumoniae. The number of reported cases of hepatitis A and B, malaria, N. meningitidis, shiga toxin producing E. coli,
Shigella, tuberculosis and varicella have been decreasing compared to the previous five-year median.

Highlights of 2004 in Illinois included:

- A very large increase in pertussis occurred with 44 outbreaks reported within the state.
- Nine waterborne outbreaks were reported, which is a large number for a single year.
- Cases of Ross River virus, Haff’s disease, cholera, orf, Dengue fever and babesiosis were reported.
- One horse tested positive for the skunk strain of rabies in LaSalle County indicating that the skunk strain of rabies virus is circulating in this area of the state.
- An increase in Lyme disease was noted in Jo Daviess County in northern Illinois.
- Salmonella ser. Typhimurium var. Copenhagen was identified in hamsters in a northern Illinois pet store. A multi-state outbreak of this pathogen was linked to pocket pets such as hamsters and rats.
- Giant African snails can carry the rat lungworm and are illegal in the United States. These snails were identified in a classroom in Cook County in 2004.
- Unusual foodborne outbreaks included an enterotoxigenic E. coli outbreak in Lake County and a Cyclospora outbreak reported from DuPage County.

Studies mentioned in the text of this report will be referred to in the selected readings sections. The reporting of infectious diseases by physicians, laboratory and hospital personnel, and local health departments is much appreciated. Without the support of the local health departments in following up on disease reports, it would not be possible to publish this annual report. IDPH hopes you find this information useful and welcomes any suggestions on additional information that would be of use to you.

Useful Contact/Surveillance Information
IDPH Web site www.idph.state.il.us

To report cases: Contact your local health department.

To refer isolates to the IDPH lab ship to one of three locations:
Public Health Laboratory; 825 N. Rutledge St., Springfield IL 62761
Public Health Laboratory; 1155 S. Oakland Ave., P.O. Box 2797, Carbondale IL 62901
Public Health Laboratory; 2121 W. Taylor St., Chicago, IL 60612
Illinois Counties
Acquired Immune Deficiency Syndrome/Human Immunodeficiency Virus

Background
Since the first cases were reported in the summer of 1981, acquired immune deficiency syndrome (AIDS) has become one of the major health problems to emerge in the past 25 years. In 1984, the human immunodeficiency virus (HIV) was identified as the causative agent of AIDS. The disease is spread by the exchange of blood, semen or vaginal secretions between individuals. The most common routes of transmission are 1) having sex (anal, oral or vaginal) with an infected person, 2) sharing drug injection equipment with an infected person (including insulin or steroid needles), and 3) from mother to infant (perinatal) before or at the time of birth or through breastfeeding.

Within weeks to months after infection with HIV, some individuals develop a flu-like illness. After this initial illness, individuals with HIV may remain free of clinical signs for months to years. Since the progression of HIV to AIDS is as high as 50 percent among untreated infected adults monitored for 10 years, assessing the impact of the epidemic in Illinois has relied mainly on the reporting of cases that met the AIDS definition.

Clinical indicators of HIV infection may include lymphadenopathy, chronic diarrhea, weight loss, fever and fatigue followed by opportunistic infections. HIV may progress to AIDS, which includes a variety of late-term clinical manifestations including low T-cell counts. Opportunistic infections associated with AIDS include *Pneumocystis carinii* pneumonia, chronic cryptosporidiosis, central nervous system toxoplasmosis, candidiasis, disseminated cryptococcosis, tuberculosis, disseminated atypical mycobacteriosis and some forms of cytomegalovirus infection. Some cancers also may be associated with AIDS (e.g., Kaposi sarcoma, primary B-cell lymphoma of the brain, invasive cervical cancer and non-Hodgkin’s lymphoma).

Increased knowledge of the disease and improved diagnostic and treatment methods have led to significant advances in the clinical management of HIV and resulted in a delay in the progression from HIV to AIDS and a reduction in AIDS morbidity and mortality. A number of antiretroviral agents are available for treatment of HIV/AIDS, and combination therapies have been shown to prolong and improve the quality of life for those who are infected.

Case definition
In the state of Illinois, AIDS has always been reported by name, while HIV reporting was without patient identifiers until July 1, 1999. For HIV reporting, this meant that individuals with multiple positive test results for HIV were counted as new HIV cases each time they tested positive. On July 1, 1999, reporting of HIV by a patient code number (PCN) became mandatory in Illinois. The PCN is a coding system that permits duplicate reports to be identified but is not specific enough to permit identification of an individual person. Prevalent cases of HIV treated in Illinois are also reportable using the PCN system.
The case definition for AIDS has changed three times, which should be taken into account when reviewing trends over time. The changes can be referred to as pre-1987, the 1987 revision and the 1993 revision. To review the case definitions and how they have changed over time, the following *Morbidity and Mortality Weekly Reports* (MMWR) should be reviewed:

1) Review of the CDC surveillance case definition for acquired immunodeficiency syndrome. MMWR 1987;36 (Suppl):1-15s.
3) 1994 revised classification system for human immunodeficiency virus infection in children less than 13 years of age. MMWR 1994;43(RR-12): 1-19.
4) Case definitions for infectious conditions under public health surveillance. MMWR 1997;46(RR-10): 5-6.

Additional changes, including a revised case definition for HIV infection in adults and children, became effective January 1, 2000. For information about this latest revision, see “Guidelines for national human immunodeficiency virus case surveillance, including monitoring for human immunodeficiency virus infection and acquired immunodeficiency syndrome; MMWR 1999; 48 (No. RR-13).

**Descriptive epidemiology**

- Number of AIDS cases reported in calendar year 2004 – 1,424. The number of reported AIDS cases declined from 2003 to 2004 (See Figure 1). The number of reported HIV cases was 2,796, an increase over the 2,358 reported in 2003.
- Mode of transmission among all AIDS cases reported in Illinois in 2004 is shown in Figure 2 and for HIV in Figure 3.
- The majority of reported AIDS cases in 2004 were in males (1,117 cases or 78 percent). For all cases reported among males, men who have sex with men (MSM) accounted for the largest number of AIDS cases (635 cases or 57 percent), followed by injection drug use (IDU) with 149 cases or 13 percent (Figure 4). The majority of reported HIV cases in 2004 with information available were in males (75 percent). For all cases reported among males, MSM accounted for the largest number of HIV cases (61 percent), followed by IDUs with 10 percent (Figure 5).
- Reported cases of AIDS among females accounted for 307 cases or 22 percent of the total AIDS cases reported in 2004. Among females, heterosexual contact accounted for 148 cases or 48 percent of the total, with IDU accounting for 77 cases or 25 percent. Reported cases of HIV among females accounted for 25 percent of the total reported HIV cases in 2004. Among females, heterosexual contact accounted for 37 percent of the total HIV cases reported, with IDU accounting for 21 percent (Figure 6).
- African Americans, who represent 15 percent of the state’s population, accounted for 56 percent, or 791 of the AIDS cases reported in 2004. This represents an increase since 2003 when 50 percent of cases reported were among African
Americans (Figure 7).

- Heterosexual contact as the mode of transmission accounted for 16 percent, or 226 of all the reported AIDS cases in 2004. This represents an increase since 1994 when 9 percent of all AIDS cases reported heterosexual contact as the mode of transmission (Figure 8).
- In 2004, Cook County and the collar counties (Dupage, Kane, Lake, McHenry and Will) comprised 88 percent of the total. Reported AIDS cases residing outside of the Cook and collar counties represented 12 percent of the state total.

Summary

In 2004, 1,424 AIDS cases and 2,796 HIV cases were reported in Illinois between January 1 and December 31, 2004. Most reported AIDS and HIV cases were reported in males. The most common risk factor for transmission for HIV and AIDS in males was MSM. Heterosexual contact was the most common risk factor for females for HIV and AIDS, followed by IDU.

![Figure 1. Reported AIDS Cases in Illinois, 2000-2004](image)

![Figure 2. Reported AIDS Cases in Illinois by Mode of Transmission, 2004](image)
Figure 6. Reported HIV Cases in Illinois Females by Mode of Transmission, 2004

- Heterosexual: 42%
- IDU: 37%
- Undetermined/other: 21%

Figure 7. Reported AIDS Cases in Illinois by Race, 2000-2004

- African Americans
- Other races

Figure 8. Reported AIDS Cases in Illinois by Mode of Transmission, 2000-2004

- Heterosexual
- Other/Unknown
Amebiasis

Background

*Entamoeba histolytica* is a protozoan parasite that exists in two forms: the cyst and the trophozoite. It is an important health risk to travelers to the Indian subcontinent, southern and western Africa, the Far East, and areas of South and Central America. Intestinal disease can range from mild diarrhea to dysentery with fever, chills, weight loss and bloody or mucoid diarrhea. Extraintestinal amebiasis also can occur. Persons can develop amebic liver abscess which is more common in males than females. This may occur within two to four weeks of infection and include fever, cough and dull aching abdominal pain. Some persons are asymptomatic. Humans are the reservoir for *Entamoeba histolytica*. Infection occurs when a person ingests fecally contaminated food or water that contains the cyst or through oral-anal contact. The incubation period ranges from two to four weeks. In the United States, amebiasis is most commonly seen in immigrants and travelers to foreign countries.

When examination of stool for ova and parasites is often done, these tests cannot differentiate *E. histolytica* from nonpathogenic species like *E. dispar* and *E. moshkovskii*. There are now polymerase chain reaction (PCR) and antigen detection tests which can be used for differentiation.

Case definition

The CDC case definition used by IDPH for a confirmed intestinal amebiasis case is as follows: a clinically compatible illness that is laboratory confirmed (demonstration of cysts or trophozoites of *E. histolytica* in stool, or demonstration of trophozoites in tissue biopsy, or ulcer scraping by culture or histopathology). The definition for a case of extraintestinal amebiasis is a parasitologically confirmed infection of extraintestinal tissue; or, among symptomatic persons with clinical and/or radiographic findings consistent with extraintestinal infection, demonstration of specific antibody against *E. histolytica* as measured by indirect hemagglutination or enzyme-linked immunosorbent assay (ELISA). Asymptomatic cases should not be reported.

Cases were selected in INEDSS with the following criteria: disease=amebiasis, asymptomatic=unknown, no or null; year counted=2004.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 75 (five-year median=65). This excludes asymptomatic cases per the CDC case definition. An additional 49 persons were laboratory confirmed with amebiasis but were asymptomatic. From 1999 to 2004, the number of cases reported per year ranged from 49 to 86 (Figure 9).
- Age - Cases ranged from four years to 77 years of age (mean = 37) (Figure 10).
- Gender - Males accounted for 42 of 73 (58 percent) of cases.
- Race/ethnicity – Twenty-seven of 39 (69 percent) of cases were white, four of 39 (10 percent) were African American, with six of 39 (15 percent) reporting some other racial identity; 23 of 53 (43 percent) for whom a response is known identified themselves as Hispanic, a significantly higher proportion than in the total Illinois population (12 percent).
- Seasonal variation – Cases occurred in all months of the year (Figure 11).
- Geographic location – Fifty-five of the 75 cases (73 percent) resided in Cook County.
• Symptoms – Detailed information was collected on 26 cases. Diarrhea was reported by 81 percent of cases and vomiting by 21 percent of cases. Ten of 29 (34 percent) of cases were hospitalized. No fatalities were reported.
• Treatment – Treatment information was collected on 31 cases. Only one case reported no treatment for their illness. Twenty-two of 31 (71 percent) reported treatment with metronidazole.

Summary
The number of cases in 2004 was higher than the five-year median. Amebiasis was significantly more common in those reporting Hispanic ethnicity. About a third of cases were hospitalized.
Babesiosis

Background
Babesiosis is a tick-borne infection that can cause fever, myalgia, fatigue and hemolytic anemia leading to jaundice. Several species can cause infection including \textit{B. microti} that is common in the Midwest and East coast. \textit{Babesia} isolate type WA1 is more common on the west coast and \textit{B. divergens} in Europe. \textit{Ixodes scapularis} is the vector in the United States. Rodents are the reservoir for \textit{B. microti}. The parasite invades red blood cells. The incubation period ranges from one week to eight weeks. Diagnosis is by examination of blood films for parasites within red blood cells. Supportive antibody testing can also be performed.

In the United States, babesiosis is endemic in Wisconsin and Minnesota as well as some Eastern coastal islands and in southern Connecticut. \textit{Babesia} isolate type WA1 has been found in California, Washington and Missouri.

Five cases have been voluntarily reported in Illinois prior to this case. Four of the five cases had a history of travel: Connecticut (one case), Massachusetts (one), Wisconsin and Minnesota (one), other state, not identified (one). The fifth case had a history of blood transfusions and sharing of needles during IV drug use. Cases ranged in age from 44 to 84. Two were female and three were male. Onsets occurred in July (three), August (one) and October (one). The October onset was due to bloodborne transmission.

Case definition
CDC does not have a case definition for babesiosis. The Illinois case definition for a confirmed case is a clinically compatible case and smear positive for \textit{Babesia}. A probable case is a clinically compatible case that has positive serology for \textit{Babesia}.

Descriptive epidemiology
One case was reported in 2004. The case was a female in her 20's from Chicago who had onset in August of rash, headache and joint pain. She had prior travel to Massachusetts and tested positive by PCR.

Summary
One case of babesiosis was reported in 2004. Prior to this year, five cases of babesiosis had been reported in the state. No Illinois resident cases have yet been reported where exposure to infected ticks in Illinois was suspected to be the mode of transmission.
Blastomycosis

Background

*Blastomyces dermatitidis* is the agent causing blastomycosis, a fungal disease found in both Canada and the United States. Blastomycosis is a zoonotic disease endemic in the midwestern United States. The incidence in endemic areas ranges from 1.3 to 1.4 per 100,000. Occasionally, outbreaks occur in areas outside the endemic areas. The organism may be associated with environmental conditions such as sandy soil, organic matter, waterways and earth disturbing activities. Recreational activities along waterways are considered to be a major risk factor for infection. Transmission is usually through inhalation of spore-laden dust. Blastomycosis most commonly presents as a subacute pulmonary disease but can range from asymptomatic to disseminated disease. For symptomatic infections, the incubation period ranges from 30 to 45 days.

Case definition

The case definition for confirmed blastomycosis in Illinois is culture confirmation of *Blastomyces dermatitidis*. If the diagnosis was based on a needle aspirate or other diagnostic specimen with demonstration of organism resembling *Blastomyces* or a presumptive *Blastomycosis* culture, it is considered a probable case.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 – 92 (previous five-year median=65). From 1999 to 2004, cases per year ranged from 47 to 92 (Figure 12). The 2004 incidence rate was 0.73 per 100,000 population in Illinois.
- Age - The mean age was 45 years (range 2 to 84) (Figure 13).
- Gender – Sixty-four percent were male.
- Race/ethnicity - Sixty-two percent of the cases were white, 31 percent were African American and 5 percent were other; 14 percent were Hispanic.
- Geographic distribution – Sixty percent of the cases had residential addresses in Cook, Kane or Lake counties.
- Clinical syndrome - All cases were hospitalized; no cases were fatal.

Summary

A higher number of blastomycosis cases were reported in 2004 (92 cases) as compared to the five-year median of 65. This is the highest number of cases reported since at least 1996. Blastomycosis cases occur predominantly in adults. Among reported cases, more than 50 percent of cases reported living in Cook, Kane or Lake counties.

Suggested readings

Figure 12. Blastomycosis Cases in Illinois, 1999-2004

Year

Number of cases

1999 | 2000 | 2001 | 2002 | 2003 | 2004
---|---|---|---|---|---
50 | 65 | 47 | 87 | 89 | 92

Figure 13. Blastomycosis Cases By Age in Illinois, 2004

Age in years

Number of cases

<1 yr | 1-4 yr | 5-9 yr | 10-19 yr | 20-29 yr | 30-39 yr | 40-49 yr | 50-59 yr | >60 yr
---|---|---|---|---|---|---|---|---
15 | | | | | | | | |
Botulism

Background

Botulism is classified as a category A terrorism agent. There are three forms of botulism: foodborne, wound and intestinal (adult and infant). Foodborne botulism is caused by a neurotoxin produced by Clostridium botulinum. C. botulinum strains produce seven neurotoxins (types A-G), with A, B and E causing most human cases. Botulinum intoxication results in cranial neuropathy and symmetric descending flaccid paralysis. Respiratory failure can last months until nerve endings regenerate. C. botulinum spores are common in the environment but toxin production occurs mainly under conditions of anaerobic, low-salt, low-sugar and low-acid conditions at non-refrigeration temperatures.

Intestinal botulism is the most common form of botulism reported in the United States with about 110 cases reported annually. Infant botulism, a form of intestinal botulism, results when swallowed spores germinate and temporarily colonize the large intestine. C. botulinum spores exist in soil and dust. Honey is an avoidable source of spores for infants. Botulism in infants less than 12 months of age should be suspected when constipation, lethargy, poor feeding, weak cry, bulbar palsies and failure to thrive are present. Diagnosis of infant botulism involves detection of botulinum toxin in stool or serum by using a mouse neutralization assay or the isolation of toxigenic C. botulinum in the feces by enrichment culture techniques. This testing of food and human specimens is performed at the CDC laboratory. A request for this testing requires coordination with the local and state health departments. Treatment of infant botulism is intensive care with mechanically assisted ventilation if necessary. Treatment may include botulinal immune globulin-IV.

Foodborne botulism results from ingestion of preformed toxin present in contaminated food. Diagnostic clues for foodborne botulism are primary neurologic symptoms including descending paralysis, normal body temperature, diplopia, blurred vision and ptosis with no altered mental status. Differential diagnoses include myasthenia gravis and Guillain-Barré syndrome. These can be differentiated using electromyography (EMG), the pattern of paralysis and reaction to Tensilon. The paralysis of botulism is flaccid, symmetrical and descending. Treatment for foodborne botulism is prompt administration of polyvalent equine source antitoxin which can decrease progression of paralysis but not reverse existing paralysis. Equine botulinum antitoxin for types A, B and E can prevent progression of neurologic disease if administered early in the course of illness.

Wound botulism occurs after the causative organism contaminates a wound that is anaerobic.

Sixteen cases of foodborne botulism were reported in 2004 to CDC. There were also 87 cases of infant botulism and 30 cases of other types of botulism.

If botulism is suspected, public health officials should be contacted immediately. This will allow for rapid investigation to identify the source. If the source was a commercial product, it should be removed promptly from the market.

Case definition
Botulism, infant

Clinical illness may include poor feeding, constipation, failure to thrive, and respiratory failure. The case definition for infant botulism is a clinically compatible case
that is laboratory confirmed, occurring in a child younger than 1 year of age. Laboratory confirmation is isolation of \textit{C. botulinum} from stool or detection of botulinum toxin in stool or serum.

Botulism, foodborne
Clinical illness includes diplopia, blurred vision and bulbar weakness. Symmetric paralysis may progress quickly. Laboratory confirmation consists of detection of botulinum toxin in stool, serum or patient’s food or isolation of \textit{C. botulinum} from stool. A probable case is a clinically compatible case with an epidemiologic link (ingestion of home-canned food within the previous 48 hours). A confirmed case is a clinically compatible case that is laboratory confirmed or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism.

Botulism, wound
Common symptoms include diplopia, blurred vision and bulbar weakness as well as symmetric paralysis. Laboratory confirmation is by detection of botulinum toxin in serum or isolation of \textit{C. botulinum} from wound. A confirmed case is a clinically compatible illness that is laboratory confirmed in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the two weeks before symptom onset.

**Descriptive epidemiology**
- There were no cases of any type of botulism reported in the state in 2004.
Brucellosis

Background

Brucellosis is a systemic bacterial infection caused by *Brucella* species that can cause intermittent or continuous fever and headache, sweating and arthralgia. The incubation period varies from one to two months. Symptoms can last from days to years. *Brucella* species considered of importance in human disease include *B. abortus* (cattle are the primary reservoir), *B. melitensis* (sheep and goats are the primary reservoir) and *B. suis* (swine are the primary reservoir). Dogs are reservoirs of *B. canis*. Transmission is by contact with animal tissues, such as blood, urine, vaginal discharges, aborted fetuses and placentas and by ingestion of raw milk or other dairy products. Investigation of *Brucella* cases could reveal foci of infection in United States livestock that should be investigated and eliminated. The disease is most common in residents or travelers to the Mediterranean, Middle East, Mexico, and Central and South America. The large majority of human *Brucella* cases are thought to be due to travel outside the country and consumption of contaminated products from those countries. *Brucella* is also a Class A bioterrorism agent.

In some developing countries the incidence of brucellosis may be as high as 200 per 100,000 but the disease is rare in the United States. In the United States in 2004, 114 human brucellosis cases were reported to CDC. Most were in international travelers or immigrants. Illinois was third in the nation in the number of *Brucella* cases reported.

Case definition

Illinois uses the CDC case definition for brucellosis. The case definition for a confirmed case of brucellosis is a clinically compatible illness with one of the following laboratory findings: isolation of *Brucella* from a clinical specimen, a four-fold or greater rise in *Brucella* agglutination titer between acute and convalescent phase serum specimens obtained greater than or equal to two weeks apart and studied at the same laboratory or demonstration of *Brucella* species in a clinical specimen by immunofluorescence. A probable case is defined as a clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (i.e., *Brucella* agglutination titer of ≥ 160 in one or more serum specimens obtained after symptom onset). Brucella ELISA tests cannot be accepted for laboratory confirmation of *Brucella* infection per CDC’s case definition.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 – Nine (seven were confirmed and two were probable) (See Figure 14).
- Age - Median age was 28 years (range 2 to 55 years).
- Gender - Seven cases were male and two were female
- Race/ethnicity – Six of seven cases with known race were white; five of six cases with ethnicity known were Hispanic.
- Geographic distribution by residence – Cases resided in Cook (six cases), Kane (two cases) and Lake (one case).
- Case investigations - Available on five cases
  - Case one - This Lake County resident ate unpasteurized dairy products while overseas in multiple countries. The clinical syndrome was unknown but the
case was not admitted to the hospital.
  o Case two – This Kane County resident ate goat cheese brought into the United States by a friend. He had fever and pain in the joints and was admitted to the hospital. Blood culture was positive and *Brucella* species is unknown.
  o Case three – This Kane County case reported consuming fresh cow’s milk and goat cheese in Mexico. She had fever and was admitted to the hospital. Blood culture was positive for *B. melitensis* biovar 3.
  o Case four – This Chicago resident had consumed cheese and unpasteurized milk while in Mexico. He had fever and weight loss and was hospitalized and tested positive by IgM EIA. This case was accidentally counted with only an EIA positive.
  o Case five – This Chicago resident had fever, chills, sweats and body aches and was not interviewed. Polymerase chain reaction (PCR) testing was positive for *Brucella*.
  o Case six – This Cook County resident was positive for *B. melitensis* biovar 3 from a blood culture. No other information is available.
  o Case seven – This Chicago resident consumed cheese and milk in Mexico. He had fever, chills and sweats and was positive for *B. melitensis* biovar 3 from blood.
  o Case eight – This Chicago resident ate cheese imported from Mexico and had febrile illness. Blood culture was positive for *B. melitensis* biovar 3.
  o Case nine – This Cook County resident was blood culture positive for *B. melitensis* biovar 2.

- **Diagnosis** - Cases were identified through culture (five), single IgM serology (one), PCR (one) and unknown method at the time of this report (three). Four isolates were identified as *B. melitensis* biovar 3 and one was identified as *B. melitensis* biovar 2.
- **Epidemiology** – Three cases reported eating unpasteurized dairy products in Mexico, two reported eating unpasteurized dairy products in the United States brought in from Mexico, one ate unpasteurized dairy products in multiple countries and three had unknown histories.

**Summary**

In Illinois, brucellosis is an uncommon disease and tends to occur primarily in individuals who have recently traveled to foreign countries and consumed unpasteurized dairy products or who have consumed unpasteurized dairy products imported from foreign countries. In 2004, there were nine brucellosis cases reported in Illinois residents. This was the third highest number of cases among the states reporting cases.
Figure 14. Brucellosis Cases in Illinois, 1999-2004
Campylobacteriosis

Background
Campylobacteriosis is a zoonotic bacterial enteric disease caused primarily by *Campylobacter jejuni* and occasionally by *Campylobacter coli*. *Campylobacter* organisms are motile, gram-negative bacilli with a curved shape. The infectious dose is large. The incubation period is two to five days. Symptoms, may last up to 10 days and include diarrhea, abdominal pain and fever; however, many infections are asymptomatic. Sequelae may include reactive arthritis, febrile convulsions, a typhoid-like syndrome, Guillain-Barré syndrome or meningitis. *C. jejuni* infection is the most frequently identified infection preceding Guillain-Barre syndrome. Reactive arthritis can occur seven to 10 days after diarrheal illness. Excretion of the organism can occur for two to seven weeks.

Approximately 1 percent of the population acquires *Campylobacter* each year in the United States. Among all 10 diseases under active surveillance in the federal FoodNet sites (*Campylobacter, Cryptosporidium, Cyclospora, E. coli O157:H7, HUS, Listeria monocytogenes, Salmonella, Shigella, Vibrio* and *Yersinia enterocolitica*), infection with *Campylobacter* comprised 35 percent of all of those reported in 2004. The overall incidence for this infection from the 10 FoodNet sites was 12.8 per 100,000. The 2010 national health objective is for less than 12 cases per 100,000. *Campylobacter* decreased 31 percent from 2004 to baseline data from the FoodNet sites.

The reservoir for *Campylobacter* is in animals, most commonly poultry and cattle. The most important mode of transmission to humans is the consumption and handling of raw poultry products. *Campylobacter* is found in approximately 80 percent of retail chicken meat. *Campylobacter* is also a cause of traveler’s diarrhea. A study in Norway found that drinking undisinfected water, eating at barbecues, eating poultry bought raw, having occupational exposure to animals and eating undercooked pork were risk factors for sporadic campylobacteriosis.

Prevention of campylobacteriosis includes cooking meat thoroughly, avoiding cross-contamination between foods and hand washing after animal handling.

Case definition
The case definition for a confirmed case of campylobacteriosis in Illinois is isolation of *Campylobacter* from any clinical specimen. A probable case is a clinically compatible illness that is epidemiologically linked to a confirmed case.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 1,401 (previous five-year median=1,204); incidence rate of 11 per 100,000 (Figure 15).
- Gender – 733 of 1,343 (54 percent) were males.
- Age - Mean age of reported cases was 47; highest incidence rate occurred in those younger than 5 years of age: 11 per 100,000 (Figure 16).
- Race/ethnicity - The majority of cases were in whites (90 percent). The percentage of cases in other races were African Americans (4 percent), Asians (3 percent) and other races (2 percent). Those indicating Hispanic ethnicity accounted for 126 of 830 (15 percent) of the cases. There was a significantly higher proportion of whites with campylobacteriosis and a lower proportion of African Americans with the disease than in the total Illinois population.
- Seasonal variation - Campylobacteriosis was reported more often in the warmer months of the year in Illinois (June through August) (Figure 17).

**Summary**

This was the fourth full year of mandatory reporting of campylobacteriosis in Illinois and the incidence of the disease increased between 2003 (10 per 100,000) and 2004 (11 per 100,000). This rate was slightly below the 2010 national objectives of 12 per 100,000. *Campylobacter* infections occur more commonly from June through September. The incidence is highest in those less than five years of age. Whites are more likely to be reported with campylobacteriosis than other races.
Central Nervous System Infections

General
Both aseptic meningitis and acute encephalitis are reportable in Illinois. The purpose of this reporting is to identify arboviral infections. Control measures for arboviruses are possible and include public education and mosquito control activities.

Aseptic meningitis is usually a self-limiting illness characterized by sudden onset of fever, headache and stiff neck. A rash may be present along with vomiting, photophobia and nausea. In the United States, enteroviruses cause most cases with known etiology. Some arboviral infections may present as aseptic meningitis.

Acute infectious and post-infectious encephalitis are reportable in Illinois. Infections are characterized by headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, convulsions or paralysis.

Aseptic meningitis and encephalitis are combined into an unknown etiology and known etiology category. Arbovirus infections were put in a third section. Cases of each type of CNS infection are shown in Table 1 and the number of reported CNS infections by year is shown in Figure 18.

Table 1. Number of reported CNS infections reported in Illinois, 2004

<table>
<thead>
<tr>
<th>Type of CNS Infection</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aseptic meningitis, unknown etiology</td>
<td>975</td>
</tr>
<tr>
<td>Aseptic meningitis, known virus, not arboviral</td>
<td>134</td>
</tr>
<tr>
<td>Encephalitis, acute, known virus, not arboviral</td>
<td>22</td>
</tr>
<tr>
<td>Encephalitis, acute, unknown etiology</td>
<td>281</td>
</tr>
<tr>
<td>WNV</td>
<td>60</td>
</tr>
<tr>
<td>California encephalitis</td>
<td>8</td>
</tr>
<tr>
<td>SLE</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,480</td>
</tr>
</tbody>
</table>

Figure 18. Reported Non-bacterial CNS Infections by Year in Illinois, 1999-2004
Aseptic Meningitis or Encephalitis of Unknown Etiology

Background
Both aseptic meningitis and encephalitis are reportable in Illinois. One of the purposes of this reporting is to identify arboviruses. Although virus isolation and serologic testing for arboviruses (during the appropriate season) is offered for free to health care providers for all persons in the state with aseptic meningitis or encephalitis, the etiology of many cases of aseptic meningitis and encephalitis remains unknown.

Case definition
The case definition for aseptic meningitis in Illinois is a clinically compatible illness diagnosed by a physician as aseptic meningitis with elevated white blood cells in the CSF but no laboratory evidence of bacterial or fungal meningitis. For aseptic meningitis of unknown etiology, no virus could be isolated from the person and testing for arboviruses was negative or testing was not done.

The case definition for primary encephalitis is a clinically compatible illness diagnosed by a physician as primary encephalitis. For encephalitis of unknown etiology, no virus could be isolated from the patient and there were no positive tests for arboviruses.

The 2004 Epi Info files were used to compile the following information along with the 2004 INEDSS files.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 1,256 (975 meningitis cases and 281 encephalitis cases).
- Age - Annual incidence rate highest in those younger than five years of age (24 per 100,000) (Figure 19). In all other age groups, the incidence rate was below 13 per 100,000. The mean age of reported cases was 27.
- Gender – Forty-seven percent were male.
- Race/ethnicity - 79 percent white, 18 percent African American and 2 percent other races; 19 percent Hispanic.
- Seasonal variation - Most common July through October (Figure 20); 924 cases had onsets between May 15 and October 31 (332 had onsets outside of this time frame).
- Geographic distribution - Highest annual incidence rates per 100,000 population for 2004 were in Whiteside (40), Lee (28), White (26), Marshall (23), Grundy (21) and Kane (21) counties.

Summary
Cases of aseptic meningitis and acute encephalitis with no known cause occur with greater frequency in the summer months and in those younger than 1 year of age.
Figure 19. Incidence of Aseptic Meningitis and Encephalitis, Unknown Etiology in Illinois by Age, 2004

Figure 20. Aseptic Meningitis and Encephalitis, Unknown Etiology by Month, 2004
Aseptic Meningitis or Encephalitis of Known Etiology, Excluding Arboviruses

Background
Both aseptic meningitis and encephalitis are reportable in Illinois. One of the purposes of this reporting is to identify arboviruses. Virus isolation is offered to all health care providers of persons in the state with aseptic meningitis or encephalitis, and this helps to identify the etiology of some cases. Herpes simplex is a common cause of acute encephalitis that occurs most frequently in children and the elderly.

Encephalitis can be caused by infectious, postinfectious and postimmunization causes. Pathogens causing infectious encephalitis include herpes simplex virus, arboviruses, lymphocytic choriomeningitis, mumps, cytomegalovirus, Epstein-Barr virus, human herpesvirus 6 and enteroviruses. Many encephalitis cases in the United States and Illinois are not identified as to the etiology.

In a study of 1,570 encephalitis cases from 1998 through 2005 in a California study, an etiologic agent was identified for 16 percent of patients. Sixty-nine percent were viral, 20 percent were bacterial, 7 percent were prion, 3 percent were parasitic and 1 percent had fungal etiologies. The most common viral agents were enteroviruses (25 percent of cases) and herpes simplex 1 (24 percent of cases).

Aseptic meningitis is an inflammation of the meninges that cover the brain and spinal cord. It is often caused by a virus, frequently an enterovirus. Enterovirus activity usually peaks during summer and early fall. Enterovirus illness is usually mild and only a small proportion result in aseptic meningitis. Children are at greater risk of severe manifestations with enteroviruses. Adults with enterovirus are more likely to experience upper respiratory symptoms. Enterovirus is shed in saliva and feces of infected persons. Persons should wash their hands thoroughly after using the bathroom and avoid sharing drinks and utensils during an outbreak.

Case definition
The case definition for aseptic meningitis in Illinois is a clinically compatible illness diagnosed by a physician as aseptic meningitis with elevated white blood cells (greater than 4 cells) in the CSF but no laboratory evidence of bacterial or fungal meningitis. For aseptic meningitis of known etiology, a virus could be isolated from the person and no arbovirus testing was positive in specimens from the person.

The case definition for primary encephalitis is a clinically compatible illness diagnosed by a physician as primary encephalitis. For encephalitis of known etiology, a virus could be isolated from the patient and there was no positive test for arboviruses.

Both 2004 Epi Info and INEDSS data were used to compile this report.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 156 cases were reported (134 meningitis, 22 encephalitis).
- Age - Median age was 13 years.
- Gender – Forty-nine percent of cases were male.
- Race/ethnicity – Eighty-five percent were white, 13 percent African American and 2 percent other races; 15 percent were Hispanic.
- Seasonal variation - Aseptic meningitis or encephalitis of known etiology, excluding arboviruses were most common from July through September. Of
the 156 cases, 135 cases (86 percent) had onsets during arbovirus season from May 15 through October 31.

- **Diagnosis** – For 57 cases, the etiologies were known at the time of this report. Viruses identified as the etiologic agent were echovirus 9 (16), herpes simplex (19), enterovirus, not specified further (nine), echovirus 30 (three), echovirus 4 (two) and one each for echovirus 6 and echovirus, not further specified. Other viruses identified as the etiologic agents were varicella zoster virus (three) and coxsackie B (two) and coxsackie B4 (one). Ninety-nine cases were due to viruses unknown at the time of this report.

**Summary**

In 224 of 1,480 (15 percent) of encephalitis and aseptic meningitis cases, an etiologic agent (including arboviruses) was identified as the cause of illness. Herpes simplex and Echovirus 9 were the most common non arboviruses viruses identified as the causative agents for aseptic meningitis and encephalitis cases. Arbovirus cases are described in a later section.

**Suggested readings**

Arboviral Infections

Background

Arboviruses that cause encephalitis are members of the Togaviridae, Flaviviridae or Bunyaviridae families. Humans and domestic animals, such as horses, can develop clinical disease but are usually dead-end hosts because they do not develop sufficient viremia to contribute to the transmission cycle. Arboviral infections that have ever been reported in Illinois residents due to exposure in Illinois include those due to St. Louis encephalitis (SLE), California encephalitis (CE) encephalitis and Western equine encephalitis (WEE) viruses. WEE has not been seen in Illinois since the 1960s. The most likely mosquito-borne diseases to occur in people in Illinois as of 2004 are WNV and CE.

WNV is a flavivirus in the Japanese encephalitis antigenic complex. Birds become infected from mosquitoes. Infected ticks and bird-bird transmission also may occur. WNV is maintained in a bird-mosquito-bird cycle with passerine birds as the primary amplifiers. Mosquitoes from the Culex genus are the primary WNV vectors.

The incubation period for WNV is three to 14 days in people. WNV can cause a wide variety of clinical syndromes, including fever, meningitis, encephalitis and a flaccid paralysis characteristic of a poliomyelitis-like syndrome. About 80 percent of human infections are asymptomatic. Febrile illness (fever, headache, fatigue, backache, myalgia) is not uncommon. Gastrointestinal symptoms and a rash may also occur. The rash is usually maculopapular and appears between days five to 12 of illness. WNV produces a viremia that tends to disappear with the onset of clinical symptoms. IgM antibodies can persist for up to a year following infection. Screening of blood donations began in June 2003. A study of long-term effects on patients with WNV fever showed that patients had clinical abnormalities even at one year after illness.

In the United States, total human cases reported to CDC by year are as follows 1999 (62), 2000 (21), 2001 (66), 2002 (4,156), 2003 (9,862) and 2004 (1,604). Forty states reported human WNV cases in 2004. The focus of transmission in the United States was the southwest including Arizona, California and Texas. Onsets of human cases were April 23 through December 30. Peak activity occurred from July to October. In 2004, 1,142 neuroinvasive WNV cases were reported in the United States with 48 deaths. Forty-five percent of cases were neuroinvasive, 54 percent were WNV fever (WNF) and 5 percent were clinically unspecified. Eight percent of reported neuroinvasive cases were fatal. A total of 224 presumptively viremic blood donors were identified through blood screening.

In addition, 47 states reported WNV-infected dead birds, 38 states reported WNV-infected horses and other WNV-infected animals. Culex mosquitoes accounted for 94 percent of WNV positive pools.

In 2004, Illinois was eighth in the nation in the number of cases of WNV. In Illinois, 65 of 102 counties had evidence of WNV circulation in mammals, birds or mosquitoes.

CE virus is the main cause of pediatric encephalitis in the United States. The illness occurs most commonly in children younger than 15 years of age (the elderly are at greatest risk of SLE). In Illinois, cases of CE virus infection are most often reported from Peoria, Tazewell and Woodford counties. The main vector is thought to be Ochlerotatus triseriatus (treehole mosquitoes). Illinois was one of 13 states reporting cases and had the fifth highest number of cases in the United States. A total of 112 cases were reported in the United States.
SLE also can be identified in persons in Illinois. In 2004, 12 cases of SLE were reported from five states.

Some arboviruses are acquired overseas including Dengue fever and Ross river virus. Ross river virus is an epidemic polyarthritis that can be acquired in Australia. Occasionally, Illinois travelers may acquire this infection.

Arboviral encephalitis prevention includes limiting mosquito bites in humans and reducing mosquito habitat. Mosquito bites can be minimized by using appropriate repellents, by avoiding the outdoors during peak mosquito feeding times and by repairing screens on windows and doors. The use of repellents provides the best protection against mosquitoes. Prevention involves personal protective behaviors and mosquito control activities. People can eliminate breeding areas for mosquitoes such as standing water in clogged rain gutters.

During the period May 15 through October 31, physicians and laboratories in Illinois are encouraged to submit cerebrospinal fluid (CSF) from aseptic meningitis and encephalitis cases to the IDPH laboratory for further testing. In addition, serum samples are requested for testing for arboviral antibody from clinically compatible cases. The CSF is examined for antibodies to CE, SLE and Eastern equine encephalitis viruses and cultured for enteroviruses.

Case definition
The case definition for a confirmed case of arboviral encephalitis in Illinois is a clinically compatible illness that is laboratory confirmed at a public health laboratory. The laboratory criteria are a fourfold or greater rise in serum antibody titer; or isolation of virus from, or demonstration of viral antigen in, tissue, blood, CSF or other body fluid; or specific IgM antibody in CSF. A probable case of arboviral encephalitis is a clinically compatible illness occurring during the season when arbovirus transmission is likely to occur and with the following supportive serology: a stable (twofold or smaller change) elevated antibody titer to an arbovirus, e.g., > 320 by hemagglutination inhibition, ≥ 128 by complement fixation (CF), ≥ 256 by IF, ≥ 160 by neutralization, or a positive serologic result by enzyme immunoassay (EIA) or MAC ELISA. Information on California encephalitis cases included in this review was acquired from the 2004 Epi Info database using confirmed or probable as case status.

Descriptive epidemiology
From May 15, 2004 through November 2004, the IDPH laboratory tested 4,068 serum and CSF human specimens for WNV, Saint Louis encephalitis, Eastern Equine encephalitis and California encephalitis.

California Encephalitis Surveillance
- Occurrence – Eight cases were reported.
- Age - Cases ranged in age from 2 to 53 years of age. Four cases were younger than the age of 13.
- Sex – Six were female and two were male.
- Clinical presentation – One case presented with aseptic meningitis, four cases with encephalitis and three had an unknown presentation type. Symptoms reported by five cases with symptom information were fever (three), headache (five), stiff neck (one), seizures (one), change in consciousness (two), tremor
(one) and gastrointestinal signs (four). All five cases with information available were hospitalized. No CE cases were fatal.

- **Case status** - All cases were confirmed.
- **Onset** – The first case onset was in July and the last onset in September. Two cases had onset in July, two cases in August and four cases in September.
- **Geographic location** - The eight CE encephalitis cases resided in Peoria (three cases), Carroll (one), Cook (one), Fulton (one), Jo Daviess (one), and Rock Island (one) counties. All were reported local exposure sites.
- **Environmental surveys** to identify mosquito breeding sites are conducted in some counties.
  - Around the residence of the Carroll County case multiple artificial containers such as old tires were identified and removed. The Carroll County Health Department worked with the Illinois Environmental Protection Agency to conduct a county-wide tire cleanup.
  - An environmental inspection was conducted in Jo Daviess County and wooded areas with tree holes present. After a previous year’s case in the same area an environmental cleanup was conducted.
  - Three cases in Peoria county occurred, the site around one case residence had tires used as a retaining wall but most were filled with dirt, one case residence had tires in a wooded ravine nearby and one case residence had no notable risks near by that would explain where transmission occurred.
  - In the Cook county case, there were some containers in the area around the case residence and a swimming pool.
  - In Fulton county two properties near the residence of the case were inspected and some tires were identified in the area and removed.
  - In Rock Island County no risky exposure sites were identified.
- **Past incidence** - The reported cases of CE in Illinois are as follows: 1990 (one), 1991 (15), 1992 (seven), 1993 (two), 1994 (six), 1995 (five), 1996 (13), 1997 (three), 1998 (four), 1999 (three), 2000 (three), 2001 (five), 2002 (eight) and 2003 (eight) (Figure 21).

**SLE Surveillance**

**Occurrence** - No cases of SLE were reported in 2004.

**Dengue**

- **Occurrence** – Three cases were reported in 2004.
- **Age** - Cases ranged in age from 24 to 52 years of age.
- **Sex** – All were female.
- **Clinical presentation** – Clinical presentation was available on two cases. One case reported fever, rash, profound muscle weakness, vomiting and diarrhea. The second case reported fever, headache, stiff neck, change in consciousness, tremors and photophobia. All cases were hospitalized. No cases were reported to be fatal.
- **Case status** - All cases were confirmed.
- **Onset** – Case onsets were in June, August and September.
• Geographic location - The three cases resided in Bureau, Champaign and Logan Counties. One reported travel to Haiti and one reported travel to the Philippines. No travel history was obtained on the third case.

• Past incidence - The reported cases of Dengue in Illinois residents are as follows: 1993 (one), 1994 (two), 1995 (two), 1996 (none), 1997 (four), 1998 (one), 1999 (two), 2000 (two), 2001 (two) and 2002 (none) and 2003 (none) (Figure 23).

Ross River Virus

• A 26-year-old male resident of McHenry County was reported with Ross River virus. His symptoms included fever, rash and severe joint pain. He had traveled to Australia, mainly New South Wales before his onset.

West Nile Virus Surveillance

Human

• Number of cases reported in Illinois – 60; 26 (43 percent) were confirmed and 34 (57 percent) were classified as probable. The incidence in Illinois was 0.48 cases per 100,000 population (Figure 22).

• Age – Ages ranged from 14 years to 97 years of age (mean=58)

• Gender – Thirty-one (52 percent) were male.

• Race/ethnicity – Fifty (93 percent) were white, two (4 percent) were African American and two (4 percent) were other.

• Clinical Presentation – Cases were classified as: WNF (30) and central nervous system infection (30) (Figure 25). For individuals older than 59 years of age, 68 percent had neurologic disease while only 32 percent had WNF. In all other age groups, neurologic disease comprised 37 percent of cases while 63 percent had WNF.

• Fatalities – Four cases were fatal. All four fatal cases had encephalitis and ranged in age from 58 to 74 years of age.

• Diagnosis – The IDPH laboratory performed the MAC ELISA test on all submitted specimens. All cases were tested at public health laboratories before being counted as cases. Of the 60 reported cases, positive tests occurred as follows: both serum and CSF (19), CSF only (6) and serum only (35).

• Seasonal Distribution – Onset of cases ranged from June 11 (Jackson County) through October 5 (Cook County). Figure 23 shows the number of WNV infections by week.

• Geographic Distribution – Twenty-two counties had evidence of WNV activity in humans (Figure 28). The largest number of cases per county (23 of 60, 38 percent) occurred in Cook County (incidence in Cook County 0.42 per 100,000 population). The highest incidence rates per 100,000 occurred in the following counties: Lasalle (4.5), Sangamon (1.6), St. Clair (1.2), DuPage (0.6) and Will (0.6).

Bird testing

A total of 430 suitable dead birds were submitted for WNV testing in 2004. To be considered suitable, birds had to be the correct species (blue jays and crows) and could not be too decomposed for testing. Birds were necropsied at the Illinois Department of
Agriculture (IDA) laboratory in Galesburg, Illinois, and at the University of Illinois in Urbana. Birds were testing using immunohistochemistry testing (IHC). A total of 235 birds tested positive (55 percent).

The first WNV positive bird collection was from May 10 in DuPage County. The last positive bird of the season was collected on October 13. Fifty-seven counties had positive birds identified (Figure 24).

**Mosquito Pool Testing**

In 2004, 1,385 of 17,139 mosquito pools (8 percent) pools tested positive. Thirty-two counties had positive mosquito pools. The first positive mosquito pool was collected on May 6 from DuPage County which was after the collection date (May 10) of the first positive bird which was also from DuPage County. The last positive mosquito pool was collected on October 23.

In Cook County, mosquito pool testing results were as follows: May 1-June 15 (six of 501, 1.2 percent positive), June 16 to July 15 (40 of 1471, 3 percent positive), July 16 to August 9 (221 of 1,728;13 percent positive).

**WNV Horse testing**

In 2004, 11 horses and donkeys tested positive for WNV. Positives were identified in 10 counties (Figure 32). The first positive was identified on August 3 in Sangamon County and the last positives on September 29 from Cook, Iroquois, Macoupin, and Winnebago counties. The counties of origin for the 11 horses were two from Iroquois County and one each from Madison, Mason, Mclean, Sangamon, Cook, Macoupin, Winnebago, Ogle, and Vermilion. Testing was by IgM ELISA.

**Other species**

There were 2 other mammals that were positive for WNV. One was a wolf from Kane County with neurologic disease including ataxia. The other animal was a 4-year-old alpaca from Champaign County identified on August 4. The alpaca had to be euthanized on July 21 due to a fractured neck.

**Summary**

Because encephalitis cases are more commonly reported in the summer months in Illinois, IDPH asks physicians to increase testing to establish the etiology and to report individuals with acute encephalitis from May 15 to October 31 each year. This was the third year for humans to test positive for WNV in Illinois. Dead crows and blue jays tested positive for WNV in 57 counties in Illinois. Fifty-five percent of all submitted dead birds were positive for WNV. Positive dead birds were collected in Illinois between May 10 and October 13. Positive mosquito pools were collected between May 6 and October 23.

There were eight cases of CE and no cases of SLE reported in 2004. Three cases of Dengue and one case of Ross river virus were reported in Illinois residents who traveled outside the United States. The first indication of WNV activity in the state was in mosquito pools on May 6, followed by birds on May 10, human cases on June 11 followed by horse cases on August 3. Illinois had the eighth highest number of reported cases in the United States. However, the incidence rate in Illinois was 0.48 per 100,000. During 2004, human WNV cases were reported from 22 of the 102 counties in Illinois. In 2004, the majority of the cases were in the Chicago metropolitan area.
In 2004, there was widespread WNV activity in birds early in the summer. Record cold temperatures in July and August suppressed mosquito activity. Flooding occurred in some areas in May and June.

**Suggested readings**


Haemophilus influenzae (Invasive Disease)

Background

*Haemophilus influenzae* can cause invasive disease such as meningitis, septic arthritis, pneumonia, epiglottitis and bacteremia. *H. influenzae* forms part of the normal flora of the human throat and is divided into six serotypes (a through f). The organism is transmitted by droplets and discharges from the nose and throat. The incubation period is probably short, from two to four days. Children younger than 5 years of age should be vaccinated against *H. influenzae*.

Nontypable *H. influenzae* has increased since the vaccine for *H. influenzae* type b became available in 1988. *H. influenzae* has changed from a disease that mainly affected children to one that mainly affects adults.

In 2004, 331 cases were reported in those less than 5 years of age in the United States. Only 6 percent of these were *H. influenzae* type b but 53 percent had missing information as to serotype, so type b represents 12 percent of those serotyped. In the United States, the incidence of all cases of invasive *H. influenzae* was 0.7 per 100,000 population.

Case definition

The case definition for a confirmed case of invasive *H. influenzae* in Illinois is a clinically compatible illness with isolation of the organism from a normally sterile site. A probable case is a clinically compatible illness and detection of *H. influenzae* type b antigen in CSF.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 135 (five-year median = 103). From 1999 to 2004, the number of cases reported per year ranged from 62 to 135 (Figure 25).
- Age – Fifty-five percent of the cases were older than 49 years of age (Figure 26). Ten of the reported cases due to *H. influenzae* type b were younger than 5 years of age.
- Gender – Forty-nine percent of cases were in females.
- Race/ethnicity – Twenty-one percent were African Americans, 76 percent were white and 3 percent were other races; 12 percent were Hispanic.
- Seasonal distribution – *H. influenzae* occurs throughout the year. (Figure 27).
- Clinical syndrome – 133 (98 percent) of 135 reported cases for which information was available were hospitalized. No deaths were reported.
- Diagnosis - Typing was available on 75 isolates; 7 percent of the isolates for which typing was attempted were type b, 17 percent were type f, 3 percent were type c and 3 percent were type a. Seventy-one percent of cases were nontypable. Four of the five cases of type b had age available. These serotype b cases ranged in age from 16 to 85.

Summary

The number of *H. influenzae* cases (135 cases) exceeded the five-year median (103 cases). Of the isolates that were typed, five cases (7 percent) were type b. Cases occur throughout the year (Fig. 34).
Suggested readings


Listeriosis

Background

Listeriosis is caused by infection with *Listeria monocytogenes*. *L. monocytogenes* is common in the environment. Listeriosis affects the unborn, neonates, immunocompromised and the elderly most commonly. It is a foodborne illness that can cause sepsis in immunocompromised persons and meningoencephalitis and febrile gastroenteritis in immunocompetent persons. Febrile gastroenteritis is considered to be uncommon. A study in Canada identified only 17 cases of *L. monocytogenes* in 8,000 stool specimens submitted for diagnosis of a diarrheal illness.

Patients receiving antineoplastic therapy are more susceptible to listeriosis. Bloodstream infection, sepsis and meningitis are typical clinical presentations. Listeriosis has the highest case fatality rate of any foodborne illness. Pregnant women whose gastrointestinal tracts become colonized with the bacteria after they eat contaminated foods can transmit the organism to the fetus or can contaminate the baby's skin or respiratory tract during childbirth.

The median incubation period is three weeks, which makes identifying a suspect food vehicle difficult. *L. monocytogenes* is found frequently in nature and can be cultured from foods and the environment, which makes typing of isolates from patients and suspected food items important. The majority of isolates from cases are 1/2 a, 1/2 b or 4b. Pulse field gel electrophoresis can be used to further discriminate between isolates. Contaminated food vehicles often identified in outbreaks of listeriosis in the United States include unpasteurized dairy products. However, other vehicles have been identified.

*L. monocytogenes* can resist salt, heat, nitrite and acidity better than many other organisms. It also can survive and multiply at cold temperatures. Refrigerators at 40° F or below are best for reducing the potential for listeriosis.

Of the 10 diseases/syndromes under active FoodNet surveillance (those caused by *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *E. coli* O157:H7, HUS, *Listeria monocytogenes*, *Salmonella*, *Shigella*, *Vibrio* and *Yersinia enterocolitica*), listeriosis comprised 0.8 percent of the reported infections in 2004. Incidence rates ranged from 1 per million to 5 per million at the nine sites with an overall incidence of 0.27 cases per 100,000 population.

In 2004, 753 cases of listeriosis were reported to CDC from 47 states and territories.

Case definition

Illinois uses the CDC case definition for *Listeria* cases: a clinically compatible history (stillbirth, listeriosis of the newborn, meningitis, bacteremia or localized infection) and isolation of *L. monocytogenes* from a normally sterile site. In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue is adequate as laboratory confirmation. A maternal-child pair will only be counted as one maternal case. For this report, case information was acquired from Epi Info 2004 files.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 – 24 total (five were described as cases of meningitis) The five-year median is 24 (Figure 28). The 2004 incidence for all reported listeriosis was 0.19 per 100,000 population.
• Age - Cases ranged in age from newborn to 88 years of age; 67 percent of cases were older than 59 years of age.
• Gender – Fifty-four percent of cases were female.
• Race/ethnicity – Eighty-six percent were white, 9 percent were African American and 4 percent were Asian. Three persons reported Hispanic ethnicity.
• Diagnosis - The site of Listeria isolation was identified as follows: blood (13), cerebrospinal fluid (two), blood and CSF (four), peritoneal fluid (one) and unknown sites (five). One case was in a newborn, but no site of infection was reported for them.
• Underlying conditions - No pregnant women were reported with listeriosis although one newborn was reported with listeriosis. Fifteen of 18 cases with information available on immunosuppressive conditions reported an immunosuppressive condition. These included cancer, diabetes mellitus, renal disease/dialysis or steroid therapy.
• Mortality - Four cases died among 17 (23 percent) cases with information on mortality.
• There were no outbreaks of reported listeriosis in Illinois in 2004.

Summary
In 2004, Illinois recorded 24 listeriosis cases; 67 percent of the cases were older than 59 years of age. The incidence rate (0.19) was within the range described by CDC’s FoodNet sites in 2004.

Suggested Readings
**Neisseria meningitidis, Invasive**

**Background**

*N. meningitidis* is an important cause of bacterial meningitis and septicemia in the world. Five serogroups (A, B, C, Y and W-135) are identified based on the differences among surface polysaccharides. The bacteria that causes meningococcal disease, *N. meningitidis*, is carried in the pharynx by about 5 percent to 10 percent of the population. The organism is transmitted by direct contact with respiratory droplets from the nose and throat of an infected person. Most patients acquire infection from an asymptomatic carrier during face-to-face contact including coughing, sneezing and kissing and the sharing of drinks, foods and cigarettes. Risk factors identified for carriage in British teenagers included attendance at clubs or pubs, intimate kissing and cigarette smoking. Passive smoking also resulted in higher risk for carriage. The incubation period ranges from two to 10 days and is usually three - four days. Meningococcal disease is an acute bacterial disease that may be characterized by fever, headache, stiff neck, delirium and, often, a rash and vomiting. It presents as meningitis in 80 percent to 85 percent of cases. Septicemia also can result from infection with *N. meningitidis*. *N. meningitidis* can produce endotoxin rapidly and in some cases can result in death within hours after onset. Sequelae to meningococcal disease can include hearing loss, seizures, mental retardation and limb amputation. The overall case fatality rate is between 5 percent and 10 percent. Carriage of the meningococcus organism is transient and the level of carriage does not predict the course of an outbreak. Less than 1 percent of exposed persons who become infected develop invasive disease.

Antimicrobial chemoprophylaxis is used for close contacts of cases. Only close contacts should be given chemoprophylaxis due to concerns about antimicrobial resistance. Vaccination can be used as an adjunct measure to protect against A, C, Y and W135 serogroups. A meningococcal vaccine which protects against these serogroups was licensed in the United States in 1982. It is given routinely to military recruits and to certain travelers. A second vaccine using conjugate technology was approved in early 2005 for protection against the same 4 serotypes among persons aged 11-55 years. A conjugate vaccine against serogroup B has been used successfully in some settings overseas. It has not been approved for use in the United States. Vaccination campaigns are used in highly selected situations.

From 1994 through 2002, CDC identified 69 clusters of *N. meningitidis* infection in the United States. The most common serotype involved was serogroup C. Sixty-four percent were organization based and 36 percent were community-based. In 2004, 1,361 cases were reported in the United States.

**Case definition**

The case definition for a confirmed case of meningococcal disease is a clinically compatible case with *N. meningitidis* isolated from a normally sterile site. The case definition for a probable case is a compatible illness with positive results on latex agglutination or gram-negative diplococci in CSF. A person without laboratory confirmation of *N. meningitidis* but with a clinical diagnosis of rash illness consistent with meningococcemia will be counted as a case in Illinois. For 2004, the 2004 Epi Info bacterial meningitis database and the 2004 INEDSS records were used for this report.
Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 36 (incidence of 0.28 per 100,000) (five-year median = 88) (Figure 29). Two cases were reported to be attending day cares. No clusters requiring a vaccination campaign occurred in 2004.
- Age - The age distribution of reported meningococcal disease is shown in Figure 30. Median age of cases was 33.
- Gender – Fifty-eight percent of cases were female.
- Race/ethnicity - Sixteen percent were African American and 84 percent were white; 3 percent were Hispanic.
- Seasonal distribution - Meningococcal disease occurred throughout 2004 with peaks in early spring and in the fall (Figure 31).
- Presentation - Case reports indicated that 54 percent of 18 reported cases with information available had bacteremia, 38 percent had meningitis and 11 percent had pneumonia. Four cases were reported with multiple presentations of illness.
- Diagnosis - Thirty five cases were culture-confirmed and one was a probable case. The organism was isolated from blood only (16 cases) and CSF only (four) in 22 cases with information available on site of isolation. Serogrouping was performed on isolates from 75 percent of cases. In cases where typing was done, the serogroups identified were Y (30 percent), C (30 percent), B (26 percent), W-135 (4 percent) and nontypable (11 percent) (Figure 32).
- Outcome – All patients were hospitalized. Two cases were fatal.
- Clusters – None reported.

Summary

The number of *N. meningitidis* cases reported in Illinois in 2004 (36) was lower than the five-year median (88 cases). Seventy-five percent of isolates were serogrouped. Almost equal numbers of serogroup B, C and Y isolates were identified.

Suggested readings


Invasive Group B *Streptococcus*

**Background**

Group B streptococcus (GBS) and *E. coli* cause most cases of sepsis in infants. Around 10 percent to 35 percent of pregnant women may be colonized with GBS at the time of labor placing them at risk for transmitting the disease to their infants.

GBS infections are due to *Streptococcus agalactiae* and cause disease and death in newborns and morbidity in peripartum women and nonpregnant adults with chronic medical conditions. Early-onset disease of neonates (<7 days) may consist of sepsis, respiratory distress, apnea, shock, pneumonia and meningitis. The infection is acquired during delivery or *in utero*. Early-onset disease is caused by maternal GBS carriage. Risk factors for early-onset GBS sepsis (that occur within 72 hours of life) include fever in the mother during labor, preterm delivery, membrane rupture greater than 18 hours before delivery and a mother with a previous infant with GBS. Infants acquire infection through aspiration of contaminated amniotic fluid or during passage through the birth canal. Late-onset disease (seven days to several months) is characterized by sepsis and meningitis and is acquired by person-to-person contact. Only about 50 percent of late-onset disease cases have been shown to be of maternal origin.

This was the third full year for mandatory reporting of only invasive GBS in infants younger than 3 months.

**Case definition**

A confirmed case of invasive GBS disease is defined as isolation of GBS from a normally sterile site (e.g., blood or cerebrospinal fluid). A probable case is defined as a person who is latex agglutination positive for GBS from a sterile site. Only cases less than 3 months of age are required to be reported in Illinois in 2003. Information for this report was obtained from the 2004 Epi Info file.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2004 – 68; 48 cases were less than 3 months of age.
- Age – Seventy-six percent of all cases occurred in those younger than 1 year of age.
- Gender – Fifty-seven percent of all cases were female.
- Race/ethnicity – Sixty-one percent of all cases were white and 39 percent were African American; 21 percent were Hispanic. Thirty-nine per cent of cases three months of age or younger were African American.
- Seasonal variation - Cases occurred throughout the year.
- Diagnosis – All cases were confirmed by a positive culture. The organism was isolated from blood (49 cases), CSF (five cases), blood and CSF (eight cases) and other or unknown sites (six cases).
- Case outcome – All 68 cases were hospitalized; three cases were known to be fatal.

**Summary**

Cases of GBS disease in newborns can be prevented if the appropriate guidelines are followed by health care providers. Sixty-eight cases of GBS disease were reported in
Illinois, the majority in those less than 3 months of age. Although only GBS disease in those less than 3 months of age is reportable, voluntary reporting of invasive GBS disease in persons older than 3 months of age occurs.
Cholera

Background
Cholera is a bacterial enteric disease that causes sudden onset of severe watery diarrhea and also may cause vomiting. Rapid dehydration and renal failure can occur. *Vibrio cholerae* serogroups 01 and O139 are associated with cholera. Serogroup 01 has two biotypes: classical and El Tor. *V. cholerae* O139 is present in South East Asia. Cholera is transmitted by ingestion of contaminated food or water. The incubation period is usually two to three days.

Epidemics of cholera are associated with consumption of contaminated water, poor hygiene, poor sanitation and crowded living conditions. Cholera is one of three diseases requiring international notification to the World Health Organization. Five cases were reported to CDC in 2004 and all were caused by toxigenic *Vibrio cholerae* O1. Four were acquired outside the United States and one was believed to have been acquired through imported seafood. The average annual incidence from 2001 through 2004 in the United States was three cases per 100,000 population. Vaccines are available and are used in travelers to countries with cholera.

Case definition
A confirmed case of cholera in Illinois is a clinically compatible case (diarrhea and/or vomiting) that is laboratory confirmed. Laboratory confirmation is through isolation of toxigenic *V. cholerae* 01 or 0139 from stool or vomitus or serologic evidence of cholera.

Descriptive Epidemiology
One case of cholera serogroup 01 was reported in a Chicago resident in February. The patient had a history of travel to Cambodia and Thailand with onset of illness three days following his return home. He ate raw seafood while there. The isolate was serotype Inaba, biotype El Tor CT+ and was resistant to furazolidone. The patient survived.

Summary
The last case of cholera in Illinois before the case reported in 2004 occurred in 1995. Cholera is infrequently reported in Illinois and is usually associated with travel overseas.
Cryptosporidiosis

Background
Cryptosporidiosis is primarily a gastrointestinal disease that affects humans and 45 other animal species. Disease results from infection with *Cryptosporidium* species oocysts. There are 12 species recognized. Two species, *C. hominis* (previously known as *C. parvum* genotype 1) and *C. parvum* (previously known as *C. parvum*, genotype 2) are the most important human pathogens. *C. hominis* is largely restricted to humans and *C. parvum* to a range of species including sheep, cattle and humans. Less commonly, *C. felis*, *C. canis*, *C. meleagris*, *C. suis*, *C. muris* and *C. corvine* can occur in humans. The organism is shed in the feces in the form of an oocyst, which has a hard shell to protect it from the environment. Oocysts are immediately infective upon excretion by an infected host and can be shed for up to 50 days in immunocompetent humans. The infectious dose is low. Infection is spread through person-to-person transmission, from direct contact with animals and by swimming in contaminated water. Approximately 1 percent to 3 percent of the general population may be excreting oocysts. The incubation period is an average of seven days (range is one to 12 days). Predominant symptoms include profuse and watery diarrhea accompanied by vomiting, abdominal cramping and weight loss. Infection in immunocompetent people lasts one to two weeks. Persons at risk for more severe infection include young children, pregnant women or persons with weakened immune systems. Asymptomatic infections often occur.

Oocysts of cryptosporidia can be found in many types of water including untreated surface water, filtered swimming pool water and even from chlorine-treated or filtered drinking water. The minimum level of detectable oocysts that pose a public health threat in domestic water supplies is not known. Outbreaks have occurred due to person-to-person and waterborne spread. *Cryptosporidium* is the leading cause of reported outbreaks of gastroenteritis linked to treated swimming venues. A 10-fold increase occurs during summer and fall months with an increase in outdoor swimming activities.

Of the 10 diseases under active surveillance in FoodNet sites (illnesses caused by *Campylobacter, Cryptosporidium, Cyclospora, E. coli O157:H7, HUS, Listeria monocytogenes, Salmonella, Shigella, Vibrio* and *Yersinia enterocolitica*), *Cryptosporidium* comprised 4 percent of the reported infections in 2004 FoodNet data. This was an incidence rate of 1.4 per 100,000 and ranged from six to 28 at the 10 FoodNet sites. Twenty-seven percent of *Cryptosporidium* cases were hospitalized in FoodNet sites in 2004.

From 1988 to 2004 in the United States, cryptosporidiosis was the causal agent of approximately one-third of the recreational water outbreaks and 5 percent of drinking water outbreaks. In 2004, there were 3,577 cases of cryptosporidiosis reported to CDC. Persons at increased risk are people ingesting contaminated recreational water, close contacts of infected persons and travelers to endemic areas. Important features of cryptosporidiosis include: 1) waterborne outbreaks are typical, 2) oocysts are resistant to commonly used disinfectants 3) transmission can occur by direct fecal-oral contact, 4) as few as 10 to 100 oocysts can cause infection, 5) oocysts are infectious upon excretion and 6) asymptomatic infections occur.

A treatment, nitazoxamide was licensed for children younger than 11 years of age in 2002 and for persons older than 11 years of age in 2004.

Prevention of outbreaks includes advising ill persons to wash hands with soap and water after using the toilet and before eating or preparing food, to avoid swimming in recreational water during illness and for at least two weeks after diarrhea stops and to
avoid fecal exposure during sexual activity. Environmental control measures, such as hyperchlorination may be needed when outbreaks in recreational water facilities are discovered.

**Case definition**
A confirmed symptomatic case of cryptosporidiosis in Illinois is laboratory confirmed (demonstration of Cryptosporidium oocysts in stool by microscopic examination, or demonstration of Cryptosporidium in intestinal fluid or small bowel biopsy specimens, or demonstration of Cryptosporidium oocyte or sporozoite by a specific immunodiagnostic test such as ELISA or by PCR techniques or demonstration of reproductive stages in tissue preparations) associated with one of the following symptoms: diarrhea, abdominal cramps, loss of appetite, low-grade fever, nausea or vomiting. A confirmed asymptomatic case is a laboratory confirmed case associated with none of the symptoms described above. A probable outbreak case was defined as a clinically compatible case with no confirmatory laboratory testing who had the same exposure as confirmed cases in the outbreak. Information for this report was obtained from INEDSS.

**Descriptive epidemiology**
- Number of cases reported in Illinois in 2004 – 161 cases (five-year median = 121; see Figure 33). CDC reports show 135 cases for Illinois, which are the number of confirmed cases. Illinois also had 26 probable cases. Both probable and confirmed cases are used in the figures below. The incidence rate was 0.82 per 100,000.
- Age - Mean age for all 2003 cases was 30 years. Age distribution of cases is shown in Figure 34.
- Gender – Fifty-six percent were male.
- Race/ethnicity – Eighty-four percent of cases were white, 13 percent were African American and 3 percent were other races; 11 percent were Hispanic.
- Seasonal variation - Cases peaked in August through October (Figure 35).
- Outbreaks: In 2004, two swimming pool outbreaks occurred in Illinois involving 45 cases, these are discussed in further detail in the foodborne and waterborne disease outbreak section. Thirty-seven Illinois residents reported as cryptosporidiosis cases in 2004 were outbreak associated cases linked to an outbreak in DeKalb County.

**Summary**
The number of reported cases of cryptosporidiosis in 2004 was higher compared to 102 in 2003. Most cases in 2004 occurred in the July and August. The incidence of reported cryptosporidiosis in Illinois (0.82 per 100,000) was lower than the incidence reported by FoodNet (1.4 per 100,000).

**Suggested readings**
Cyclosporiasis

Background
Cyclosporiasis is caused by a protozoal organism, *Cyclospora cayatensis*. Clinical illness consists of watery diarrhea and abdominal cramping. Diarrhea is usually self-limiting but may be prolonged. The median incubation period is seven days. Transmission to persons is usually through drinking or swimming in contaminated water. Several international outbreaks have involved consumption of raspberries from Guatemala. Basil and lettuce also have been implicated in transmission. In June 2004 an outbreak of cyclosporiasis started in persons from a residential facility in Pennsylvania. Illnesses were linked to consumption of raw Guatamalan snow peas at five special events. Ninety-six persons became ill and 40 were laboratory confirmed.

In 2004, 171 confirmed cyclosporiasis cases were reported to CDC through NETSS. Pennsylvania reported the most cases, followed by Illinois. Of the 10 diseases under active surveillance in FoodNet sites (illnesses caused by *Campylobacter, Cryptosporidium, Cyclospora, E. coli O157:H7, HUS, Listeria monocytogenes, Salmonella, Shigella, Vibrio and Yersinia enterocolitica*), *Cyclospora* comprised 0.09 percent of the reported infections in data from 2004. Data from 2004 showed the incidence rate was 0.30 per million for *Cyclospora* and ranged from 0.2 to 2.0 at the 10 FoodNet sites.

Case definition
Laboratory confirmation is the finding of *C. cayatensis* oocysts in stool by microscopic examination or in intestinal fluid or small bowel biopsy specimens; or demonstration of sporulation or PCR positive in stool, duodenal/jejunal aspirates or small bowel biopsy specimens. CDC has two case classifications:
Confirmed, symptomatic - laboratory confirmed with clinically compatible illness.
Confirmed, asymptomatic - laboratory confirmed with no symptoms.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 61. Twenty-seven cases were confirmed; the rest were probable. CDC only reports the confirmed cases.
- Age – Cases ranged in age from 19 to 82 (median=39)
- Gender – Twenty-six (44 percent) were female.
- Race/ethnicity – Forty three (93 percent) were white.
- Seasonal variation – The majority of cases occurred in February and March during an outbreak of *Cyclospora*. Other sporadic cases (five cases) occurred from April to July.
- Geographic Location – Cases resided in the following counties: DuPage (26), Cook (20), Will (nine), McHenry (two), Whiteside (two), Winnebago (one) and Kane (one).
- Clinical illness: One person reported being hospitalized for her illness.
- Outbreaks – One outbreak was reported from DuPage County in 2004. See detailed description in the “Food and Waterborne Outbreaks” section.
Summary
The third full year of mandatory reporting of cyclosporiasis was 2004. One outbreak of cyclosporiasis was reported in Illinois in 2004 and is described further in the foodborne and waterborne outbreak section.

Suggested Readings
Ehrlichiosis

Background

*Ehrlichia* are bacteria that infect a wide variety of animals and are transmitted by tick bites. Four *Ehrlichia* pathogens have been identified in the United States: *E. chaffeensis* (causing human monocytic ehrlichiosis (HME)), *Anaplasma phagocytophilum* (formerly *Ehrlichia phagocytophila*) causing human granulocytic anaplasmosis (HGA), *E. canis* and *E. ewingii*. Only one person with *E. canis* has been reported and the person was not clinically ill. *E. chaffeensis* and *E. canis* mainly invade the monocyte and the disease caused by these organisms is termed HME. The majority of the ehrlichiosis cases in the United States are HME. *A. phagocytophilum* and *E. ewingii* invade mainly the granulocytes and the disease is referred to as granulocytic ehrlichiosis. Both HGA and HME are zoonotic diseases requiring an arthropod vector and a mammalian reservoir. Differences in the geographic distribution of the tick vectors result in HME occurring primarily in the South and southeastern United States and HGA in the upper Midwest, New England, parts of the mid-Atlantic states, northern California and many parts of Europe. Both *E. chaffeensis* and *E. ewingii* are transmitted by the lone star tick, *Amblyomma americanum*, which is found from west central Texas north to Iowa and southeastern to the Atlantic coast. *E. ewingii* in the lone star tick has only been found in North Carolina, Florida and Missouri. *E. ewingii* infection has been found in North Carolina, Florida, Missouri, Kentucky, Georgia and South Carolina. Most cases of HME are reported between May and July when the lone star ticks are more likely to feed. In animal studies, ehrlichiosis could be transmitted within the first 24 hours a tick is attached. The incubation period is seven to 21 days.

HGE has been reported in the eastern and central United States and can be transmitted by deer ticks. This is the same tick that transmits Lyme disease and human babesiosis, in these areas. The primary reservoir host mammals for HGE are thought to be the white-footed mouse and the white-tailed deer.

Both HME and HGA result in similar symptoms: fever, headache and myalgia. Cases also may have low platelets, low white blood cells and increased liver enzymes. A rash may be present in approximately one-third of HME cases; rashes are much less common in HGE. In 25 percent of HME cases, respiratory tract involvement occurs and in 20 percent of cases central nervous system disease occurs. More than 40 percent of HME cases require hospitalization and severe complications can include meningoencephalitis, acute respiratory distress syndrome, toxic shock like syndrome, renal failure, coagulopathy and multiorgan failure. These *Ehrlichia* organisms can form clusters of organisms called morulae, in the white blood cells. The case fatality rate has been reported as 5 percent in HME and 10 percent in HGE.

In 2004, 537 HGA and 338 HME were reported to CDC.

Case definitions

**HME**

A clinically compatible illness with demonstration of a four-fold change in antibody titer to *E. chaffeensis* antigen by IFA in paired serum or positive PCR and confirmation of *E. chaffeensis* DNA, or identification of morulae in leukocytes and a positive IFA titer to *E. chaffeensis* antigen, or immunostaining of *E. chaffeensis* antigen in a biopsy or autopsy specimen or positive culture for *E. chaffeensis* in a clinical specimen.
HGE
A clinically compatible illness with demonstration of demonstration of a four-fold rise in antibody titer to *E. phagocytophila* antigen by IFA in paired serum or positive PCR and confirmation of *E. phagocytophila* DNA, or identification of morulae in leukocytes and a positive IFA titer to *E. phagocytophila* antigen, or immunostaining of *E. phagocytophila* antigen in a biopsy or autopsy specimen or positive culture for *E. phagocytophila* in a clinical specimen.

**Ehrlichiosis, human, other or unspecified agent**
A clinically compatible illness with demonstration of a four-fold change in antibody titer to more than one *Ehrlichia* species by IFA in paired serum samples, in which a dominant reactivity cannot be established, or identification of *Ehrlichia* species other than *E. chaffeensis* or *E. phagocytophila* by PCR, immunostaining or culture.

**Descriptive epidemiology**
- Number of cases reported in Illinois in 2004 - 12; four were HME, one was HGA and seven were of unknown type. CDC has three HME cases recorded for Illinois for 2004, but additional information was available at the time of this report that classified one unknown type as HME.
- Age - Cases ranged in age from 9 to 82 years of age.
- Gender - Eight cases were male and four were female.
- Race/ethnicity - Nine cases with information about race were white; none were Hispanic.
- Geographic distribution – Sites of tick exposure were unknown for three cases (one HME and two unspecified). For two HME cases, exposure locations were Jackson county and one case with exposure to both Jackson County and Kentucky. The case of HGA reported an exposure location in Cook County. For the six unspecified with a known exposure locations the locations were Effingham county (one), Franklin (two), Lee (one), St Clair (one) and one reporting both Union and Williamson County.
- Seasonal variation - Onsets of all cases occurred between May and August.
- Diagnosis – One case (HGA) was confirmed with a four-fold rise in titer, two were PCR positive and eight had serologic titers without a four-fold rise.
- Outcomes – Ten of 12 cases were hospitalized. All 10 cases with outcome information survived.

**Summary**
Twelve ehrlichiosis cases were reported in Illinois in 2004. Four were classified as HME cases and one was classified as HGA. The others were classified as unspecified type.
Shiga-toxin Producing E. coli, Enterotoxigenic E. coli, Enteropathogenic E. coli

Background
Strains of Escherichia coli that cause diarrhea are classified into pathotypes. Enterohemorrhagic E. coli (EHEC) may cause bloody diarrhea and hemolytic uremic syndrome because they produce Shiga toxins. E. coli O157:H7 is the most common shiga toxin producing E. coli (STEC). In the United States, non-O157 STEC may comprise up to 50 percent of all STEC infections. STEC that produce Stx2 alone or both Stx1 and Stx2 are more likely to be associated with HUS than those producing Stx1 only. Enteropathogenic E. coli (EPEC) lack Shiga toxins and cause nonspecific diarrhea in infants in less-developed countries.

E. coli O157:H7 was first recognized as a cause of human illness and associated with ground beef in 1982. E. coli O157:H7 causes primarily a diarrheal illness. The infectious dose is thought to be low due to evidence of person-to-person transmission and recreational water exposure transmission. The incubation period is from three to eight days with an average of three to four days. Occasionally, longer incubation periods have been reported. Infection with E. coli O157:H7 produces symptoms that range from mild to bloody diarrhea and that may progress to hemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP); 3 to 5 percent of HUS cases are fatal. HUS is used to describe acute renal failure accompanied by non-immune hemolytic anemia and thrombocytopenia. It occurs most frequently in children younger than five years of age after infection by an agent producing shiga toxin. The illness can involve the central nervous system (CNS), pancreas, heart and other organs. Twenty-five percent of HUS patients suffer permanent renal injury. HUS can be caused by Shigella dysenteriae type 1 and STEC. The most common cause of HUS in the United States is E. coli O157:H7.

Escherichia coli O157:H7 is transmitted through consumption of contaminated food or beverage, person-to-person contact or swimming in contaminated recreational water. An outbreak of E. coli O157:H7 occurred at the North Carolina state fair in 2004. More than 180 case patients were identified, many of them children. Risk factors included having contact with manure at the petting zoo and spending more time in the petting zoo. Signs about handwashing and hand sanitizing stations were available but did not protect against infection.

During 2004, shiga toxin producing E. coli (STEC) cases were reported from all states. Of these, 2,544 (80 percent) were classified as E. coli O157:H7, 316 (10 percent) as shiga toxin producing E. coli, non-O157 and 308 (10 percent) as STEC, not serogrouped.

Of the 10 diseases under active surveillance in the FoodNet sites (illnesses caused by Campylobacter, Cryptosporidium, Cyclospora, STEC, HUS, Listeria monocytogenes, Salmonella, Shigella, Vibrio and Yersinia enterocolitica), STEC was responsible for 3.2 percent of the reported infections in 2004 data. The incidence rate for STEC O157:H7 was 0.90 per 100,000. Between 1996 and 2004 there was a decline in the incidence of infections caused by STEC in FoodNet sites. The incidence of STEC O157 infections was below the Healthy People 2010 objective of 1 case per 100,000. The most common STEC non-O157 were 0111, 0103 and 026. The hospitalization rate for STEC O157 in FoodNet sites was 42 percent. Of the STEC O157 cases, 9 percent were outbreak related. Of the outbreak associated STEC O157 cases, 58 percent were food-related, 39 percent were not food related and 3 percent had an unknown mode of transmission. Three percent of the STEC O157 cases reported international travel within the seven days prior to onset.
CDC recommends that all bloody diarrheal stools be routinely cultured for *E. coli* O157:H7. Rapid tests also are available to directly detect shiga toxin in stool specimens. Specimens testing positive should be cultured to identify which organism (*E. coli* or *Shigella*) produced the shiga toxin. Broth culture media or specimens in which shiga toxin has been detected should be cultured for *E. coli* or submitted to the state public health laboratory for *E. coli* isolation.

Pulsed-field gel electrophoresis (PFGE) is done routinely in Illinois on *E. coli* O157:H7 isolates that are submitted to the state laboratory. Epidemiologic investigation into a cluster of cases should occur after finding a match by two enzyme PFGE. Single enzyme analysis is insufficient to determine whether isolates and cases are truly related.

Enterotoxigenic *E. coli* (ETEC) is believed to be a common cause of diarrhea in countries with poor sanitation and a common cause of traveler’s diarrhea. U.S. residents who travel overseas may return to the United States with ETEC. Transmission is from consumption of fecally contaminated food or water. Symptoms include profuse, watery diarrhea. ETEC is not identified by routine stool culture methods. ETEC should be suspected as a cause of foodborne outbreaks when stool cultures are negative for routine enteric pathogens, the median incubation period is 24 to 48 hours, the diarrhea to vomiting ratio is greater than 2.5 and the duration of illness is greater than 60 hours.

Prevention measures for enteric *E. coli* infections include cooking food thoroughly, prompt refrigeration of foods and separation of cooked and raw foods. Antibiotics are contraindicated for treatment of *E. coli* O157:H7 infections; this treatment leads to release of toxin as bacteria die and increased risk for development of HUS.

Food safety practices that can decrease risk of *E. coli* O157:H7 from ground beef include thawing frozen ground beef in the refrigerator, not at room temperature and cooking to a temperature of 160 F. Kitchen items in contact with raw ground beef should be washed thoroughly before reusing.

**Case definition**

The case definition for a confirmed case of *E. coli* O157:H7 used in Illinois is a clinically compatible illness with isolation of *E. coli* O157:H7 from a stool specimen or *E. coli* O157 organisms that are laboratory confirmed as producing shiga toxin. *E. coli* isolated in stool from a person with clinically compatible illness that produce shiga toxin but are not identified as O157 is also reportable as enterohemorrhagic *E. coli*, non-O157. A confirmed case of ETEC is a clinically compatible illness with laboratory confirmation of enterotoxigenic *E. coli* from stool. A confirmed case of enteropathogenic *E. coli* is a clinically compatible illness with laboratory confirmation of enteropathogenic *E. coli* from stool. A probable case of ETEC or enteropathogenic *E. coli*, or enterohemorrhagic is a clinically compatible case which is epidemiologically linked to cases but has not been laboratory confirmed. Case information was obtained from the INEDSS Communicable Disease Universe for demographics. For risk factor and symptom information, both the INEDSS enterics universe and paper records were used to obtain the information in the following report.

**Descriptive epidemiology**

**Shiga-toxin producing *E. coli*, including *E. coli* O157:H7**

- Number of cases reported in Illinois in 2004 – 122 STEC (107 *E. coli* O157:H7, 7 STEC non O157 and 8 STEC not serogrouped) (five-year median = 194) (see
The incidence in 2004 was 0.98 cases per 100,000 population. Of the reported cases, 118 were confirmed and four were probable.

- **Age** - Cases occurred in all age groups. (median = 17 years of age) (Figure 37).
- **Gender** – Sixty-two percent were female.
- **Race/ethnicity** – Ninety-four percent were white, 3 percent were African American and 3 percent were other. Seven percent of 95 cases with ethnicity information were Hispanic.
- **Seasonal variation** - The largest number of cases occurred in the months from June to October (67 percent of cases) (Figure 38).
- **Geographic location** – The five counties reporting the most cases were: Cook (30 cases), DuPage (21), Stephenson (nine), Winnebago (nine) and Lake (eight).
- **Symptoms** - Among those with culture-confirmed *E. coli* O157:H7 for which symptom information was available, 99 percent reported diarrhea, 87 percent reported bloody diarrhea and 48 percent reported fever; five of 84 cases (6 percent) of patients for whom information was available) had hemolytic uremic syndrome (HUS) and two of 84 cases (2 percent had thrombotic thrombocytopenic purpura (TTP).
- **Outcome** – Eighty-eight (72 percent) were hospitalized. No cases were fatal.
- **Outbreaks** – One foodborne outbreak was reported in 2004 (see detailed description in the “Food and Waterborne Outbreaks” section). Six cases were outbreak-associated.

**Risk factors for ECO157:H7**

The standard case report form developed by CDC is used to investigate ECO157:H7 cases in Illinois. It includes questions on possible sources for ECO157:H7. Individuals are asked if they consumed any ground beef and are then asked if they consumed undercooked ground beef. Cases also are asked if they were around children with diapers or if they changed diapers. The results of investigation of exposure to risk factors are presented in Table 3.

The following percentages of patients reported consuming foods that have been associated with this infection in the seven days before symptom onset: ground beef (75 percent), other beef products (20 percent), well water (15 percent), undercooked ground beef (12 percent), other undercooked beef products (6 percent). Six percent reported contact with cattle. These risk factors were not confirmed as the source of illness in all of these cases.

**ETEC**

No ETEC cases were reported.

**Other types of reportable enteric *E. coli***

There were no other types of pathogenic enteric *E. coli* infections reported in 2004.

**Summary**

The incidence of infection with *E. coli* O157:H7 in 2004 was 0.98 cases per 100,000 population, which is similar to what was found in CDC’s FoodNet sites (0.90 per 100,000). Illinois was one of seven states reporting the highest category of cases (more than 105 cases) in 2004.
An increase in cases of STEC occurred in the months of July through September. Bloody diarrhea was reported by 87 percent of individuals; 6 percent of patients reportedly had HUS. Seventy-two percent of cases were hospitalized compared to 42 percent of the 2004 FoodNet cases. No Illinois cases were fatal.

**Suggested readings**


Figure 38. Shiga toxin producing *E. coli* in Illinois by Month, 2004

Table 2. Reported characteristics of STEC cases in Illinois, 2004

<table>
<thead>
<tr>
<th>Characteristic</th>
<th># reporting factor</th>
<th>Total # with Information on factor</th>
<th>Percentage Reporting Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending or working in day care center</td>
<td>12</td>
<td>96</td>
<td>12</td>
</tr>
<tr>
<td>Attending or working at an institution</td>
<td>7</td>
<td>86</td>
<td>8</td>
</tr>
<tr>
<td>Food/water history in prior seven days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground beef</td>
<td>71</td>
<td>95</td>
<td>75</td>
</tr>
<tr>
<td>Undercooked ground beef</td>
<td>10</td>
<td>83</td>
<td>12</td>
</tr>
<tr>
<td>Other beef products</td>
<td>11</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td>Undercooked other beef</td>
<td>3</td>
<td>49</td>
<td>6</td>
</tr>
<tr>
<td>Well water</td>
<td>13</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Other unchlorinated water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other factors in prior seven days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel out of the country</td>
<td>6</td>
<td>92</td>
<td>6</td>
</tr>
<tr>
<td>Swam in non-chlorinated water</td>
<td>7</td>
<td>93</td>
<td>7</td>
</tr>
<tr>
<td>Contact with cattle</td>
<td>6</td>
<td>92</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Illinois Department of Public Health
Foodborne and Waterborne Outbreaks

Background

Food can act as a vehicle for transmission of pathogens or their by products. Although many foodborne illnesses result in a few days of diarrhea, with additional symptoms such as fever, vomiting or muscle aches, others can have serious health effects such as hemolytic uremic syndrome, reactive arthritis, sepsis or Guillain Barré syndrome. The primary forms of foodborne illness are intoxications, which are caused by toxins produced by organisms in the food, and infections, where the organism must multiply in the person before causing illness.

Foodborne illness can be caused by microorganisms and their toxins, marine organisms and their toxins, fungi and chemical contaminants. There are four categories of organisms to consider in discussing the causes of foodborne illness: viruses, bacteria, parasites and fungi. For some viruses, such as hepatitis A or Noroviruses, also known as small round-structured viruses, humans are the only reservoir. Food can be contaminated with viruses if food handlers do not practice good hygiene before preparing food that is not later cooked, or if sewage contaminates the food. Rotaviruses can occasionally cause foodborne outbreaks. Shellfish have been associated with hepatitis A virus, calicivirus and Vibrio spp. outbreaks.

Bacteria make up the largest category of foodborne agents. These include E. coli O157:H7, Salmonella and Listeria monocytogenes. Parasites like Trichinella in pork, Anasakis in raw fish or Cyclospora in raspberries also can cause foodborne illness. Some enteric pathogens, such as Campylobacter, Giardia and Shigella, rarely cause foodborne outbreaks.

The use of gloves for food handlers is often recommended to decrease transmission of enteric pathogens. A study of glove use did not verify that glove wearers had less coliform bacteria on the food as compared to food handlers who did not wear gloves. It has been observed that food handlers wear the same pair of gloves for extended periods of time.

Case definition

A foodborne outbreak is a cluster of illnesses in which two or more persons (usually residing in separate households) experience the onset of a similar, acute illness (usually gastrointestinal) following ingestion of common food or drink. CDC has established case definitions for confirmed outbreaks and these are listed under the specific organisms in this outbreak section.

For foodborne outbreaks, the number ill reflects those who meet a clinical case definition. For outbreaks where the etiologic agent was suspected and not confirmed, and the clinical syndrome matched the suspect etiologic agent but no laboratory confirmation was obtained, the suspect cause is ascribed to this etiologic agent.

IDPH receives reports of potential foodborne outbreaks from many sources. Outbreak investigations, which are conducted by local health departments, may not result in a confirmed foodborne outbreak designation and will not be counted in the state totals. There are a number of reasons for this: lack of information, classification as
person-to-person transmission or because the symptoms and incubation period do not clearly indicate a known foodborne pathogen.

**Descriptive epidemiology**

The number of possible food or waterborne outbreaks reported to IDPH by local health departments (LHDs) was 126 during 2004. Of these, 25 were determined by the LHD or IDPH to not meet the criteria for a food or waterborne outbreak. The total for the year was 101 outbreaks that met the definition of an outbreak and were submitted to the Centers for Disease Control and Prevention (CDC). Of the 101 foodborne and waterborne outbreaks, the etiology was confirmed in 37 outbreaks, suspected in 37 outbreaks and determined to be unknown in 27 outbreaks. Nine outbreaks were due to recreational water exposure.

The number of outbreaks by year for 1999 through 2004 are shown in Figure 39. In the year 2004, a total of 1,819 people were reported to have become ill as the result of the 92 foodborne outbreaks and 205 as a result of the nine recreational water outbreaks. The median number ill per foodborne outbreak was 12 (range: 2, 119). Thirty-five persons were hospitalized as a result of these outbreaks. There were no fatalities reported due to foodborne illness during the year 2004. Counties reporting outbreaks during the year 2004 were: Cook, excluding Chicago (27), city of Chicago (16), DuPage (eight), Lake (five), St. Clair (five); McHenry (four), Will (four), McLean (three), Champaign (2), Kane (2), Whiteside (2), Knox (2), Winnebago (3) and one each was reported from Stephenson, Carroll, Coles, Kankakee, Morgan, Kendall, Jo Daviess, Madison and Ogle. The waterborne outbreaks were reported from Cook, DeKalb, Douglas, Jo Daviess, Peoria, Piatt, Sangamon, Vermilion and Will.

The 92 reported foodborne outbreaks occurred in the following months: January, 10 (11 percent); February, 11 (12 percent); March, nine (10 percent); April, five (5 percent); May, nine (10 percent); June, seven (8 percent); July, three (3 percent); August, four (4 percent); September, six (6 percent); October, six (6 percent); November, eight (9 percent); and December, 14 (15 percent). The recreational water outbreaks were in January (two), February (two), March (two), July (two), and September (one).

In the 92 foodborne outbreaks reported to CDC, the etiologic agent was determined to be bacterial, either suspect or confirmed, in 17 (18 percent) (Table 3). The bacterial pathogens were as follows: *Clostridium perfringens/Bacillus cereus*, four cases (22 percent); *Staphylococcus aureus*, three cases (17 percent); *Salmonella sp.*, seven cases (39 percent); *Clostridium perfringens*, one case (5 percent); *Escherichia coli O157:H7*, one case (5 percent) and ETEC, one case (5 percent).

The etiologic agent in 47 (51 percent) of the foodborne outbreaks was suspected or confirmed to be caused by Noroviruses. The IDPH laboratories were able to confirm 23 [49 percent] of these viral outbreaks. The remaining 24 [51 percent] outbreaks were classed as suspicious Norovirus outbreaks, largely based on symptoms, incubation and duration in the people who were affected; for four suspect outbreaks, one specimen tested positive for norovirus.

No toxin/chemical foodborne outbreaks were reported. One foodborne outbreak were caused by a parasitic agent, *Cyclospora*.
Nine of the outbreaks were due to drinking or recreational water exposure and were due to chloramines (two), Cryptosporidium (two), Pseudomonas (two), algae control chemical (one), unknown (one) and chemical, unknown (one).

Although thorough investigations were conducted, there was inconclusive evidence to classify either suspect or confirm etiologic agents in 27 (29 percent) of the foodborne outbreaks and they were thus classified as etiology unknown.

In 50 food or waterborne outbreaks ill persons were tested for at least one pathogen. In 39 of the outbreaks where ill persons were tested, at least one person tested positive for the pathogen implicated in the outbreak.

Food handlers were laboratory tested in 18 of the outbreaks. In 14 of the outbreaks food handlers were found to be positive for the etiologic agent implicated in the outbreak. Food handlers tested positive for Norovirus in seven outbreaks, Salmonella in six outbreaks and for Cyclospora in one outbreak.

Environmental samples were taken in six outbreaks (four waterborne outbreaks and two foodborne outbreaks). Environmental samples from four outbreaks were positive; all from recreational water outbreaks. Samples were positive for elevated chlorine (two outbreaks), Pseudomonas (one) and Cryptosporidium (one).

Through either epidemiology or food testing, 23 food or water items were implicated in outbreaks. Meat was implicated in four outbreaks (ground beef in two outbreaks, pork in two outbreaks including one linked to pork carnitas). Fruits and vegetables were implicated in four outbreaks (basil, green salad, cucumber salad, unspecified type of salad). Beverages were implicated in two outbreaks (ice water, soda and ice). Cake was implicated in three outbreaks. For six outbreaks complex foods were implicated (sandwiches in four outbreaks, tortellini in one outbreak, palak paneer in one outbreak). Salsa was implicated in one outbreak. Multiple foods were implicated in three outbreaks.

Food was tested for pathogens in 14 (15 percent) of the outbreaks. Positive foods were found in five (36 percent) of the outbreaks where samples were tested. The responsible pathogens found were coliforms (one outbreak), E. coli O157:H7 (one), S. aureus (one), Salmonella (one) and C. perfringens (one). Ground beef tested positive for E. coli O157:H7 in one outbreak and salsa was positive for Salmonella in another outbreak. Turkey and rice tested positive for S. aureus. Palak paneer tested positive for C. perfringens. Well water was positive for coliforms but no known pathogens in one outbreak.

The site of food preparation in these 92 foodborne outbreaks was: restaurant, 57 (62 percent); school, one (1 percent); caterer, five (5 percent); home, six (6 percent); long-term care, one (1 percent); work, one (1 percent); prison, one (1 percent); multiple, 12 (12 percent); unknown, none (0 percent) and other, eight (10 percent). The other sites included a university, grocery store, food distributor, hotel, entertainment center, cruise ship, private club and a camp. The nine recreational waterborne outbreaks were from a hotel pool, hot tub or whirlpool (7) and a community pool (2).

The site where the food was consumed in 92 foodborne outbreaks was: restaurant, 46 (50 percent); home, 14 (15 percent); workplace, nine (10 percent); school, five (5 percent); banquet hall, two (2 percent); church, one (1 percent); prison, one (1 percent); park facility, one (1 percent); long-term care, one (1 percent); unknown,
In 59 (88 percent) of the 92 foodborne outbreaks, contributing factors were listed as unknown. Factors that were identified as contributing to 33 outbreaks were: bare-handed contact by food handler, 11 (33 percent); temperature abuse, six (18 percent); handling by an infected person or carrier of a pathogen, five (15 percent); inadequate cleaning of processing/preparation equipment/utensils, four (12 percent); handling by an ill food handler, four (12 percent), contaminated product, four (12 percent); gloved contact with ready-to-eat food, two (6 percent); inadequate cooking, two (6 percent); cross contamination, two (6 percent); storage in contaminated environment, one (3 percent); contaminated surface, one (3 percent); unlicensed facility, one (3 percent); ill attendee, one (3 percent); infected non food staff, one (3 percent) and lack of hand washing facilities, one (3 percent). Ten outbreaks had multiple contributing factors. Proliferation factors and survival factors that may have led to an outbreak only apply to outbreaks where bacterial pathogens are involved.

Information about individual outbreaks is available in Table 4.

Summary

In 2004, Illinois recorded 92 foodborne and nine waterborne outbreaks compared to a five-year median of 74 foodborne and one waterborne outbreak. The most common site of food preparation in the reported outbreaks was restaurants. Food handlers who had bare-hand contact with food and temperature abuse of food were the most commonly reported contributing factors to outbreaks. Both bacterial and viral agents were important causes of foodborne outbreaks.
Table 3. Etiologic Agent involved in 2004 Outbreaks

<table>
<thead>
<tr>
<th>Agent</th>
<th>Confirmed</th>
<th>Suspect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foodborne outbreaks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. cereus</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B. cereus/S. aureus</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B. cereus/C. perfringens</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>C. perfringens</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>S. aureus</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E. coli O157:H7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ETEC</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Histamine</td>
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<td>0</td>
</tr>
<tr>
<td>Norovirus</td>
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<td>24</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td><em>Shigella</em></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Cyclospora</em></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Recreational water</strong></td>
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<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Chloramine</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Chemical, algae control</td>
<td>0</td>
<td>1</td>
</tr>
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<td>Chemical, unknown type</td>
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<td>Unknown (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNKNOWN (27)</td>
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</tr>
</tbody>
</table>

Figure 39. Number of foodborne or waterborne outbreaks in Illinois, 1999-2004
Specific types of foodborne outbreaks

*Bacillus cereus*

*B. cereus* causes foodborne illness through intoxication. There are two types of illness caused by *B. cereus*, depending on the enterotoxin elaborated by the organism. In one type, the incubation period is from one to six hours and symptoms last 12 hours or less. Almost all individuals experience vomiting and about one-third experience diarrhea. The illness is caused by a preformed enterotoxin. Rice has been associated with this type of *B. cereus* in past outbreaks. In the other type, the incubation period ranges from eight to 16 hours and symptoms last less than 24 hours. Diarrhea is a prominent feature but vomiting is absent. Foods associated with previous outbreaks include custards, cereals, and meat or vegetable dishes. The organism multiplies rapidly at room temperature and the spores can survive boiling.

**Case definition**

Laboratory confirmation for *B. cereus* includes isolation of greater than $10^5$ organisms per gram in properly handled food or isolation of the organism from two or more ill people and not from controls.

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2004 - None confirmed. There was one outbreak that may have been caused by either *B. cereus* or *Staphylococcus aureus* as suggested by the clinical presentation and four outbreaks in which the clinical picture suggested either *B. cereus* or *C. perfringens*.

*Clostridium perfringens*

Another foodborne intoxication is caused by *C. perfringens* enterotoxin. Diarrhea is common but vomiting and fever are usually absent. The incubation period is eight to 16 hours (usually 12 hours). The illness lasts one day or less. Almost all outbreaks are associated with the inadequate heating or reheating of meats or gravies, which allows the organism to multiply. The enterotoxin is heat-resistant.

**Case definition**

There are three ways to establish laboratory confirmation of a *C. perfringens* outbreak:
1) isolation of greater than $10^5$ organisms per gram of food that has been properly handled for testing, 2) demonstration of enterotoxin in the stool of two or more ills, or 3) isolation of greater than $10^6$ organisms per gram in the stool of two or more ill persons.

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2004 - One confirmed; four were suspected to be due to either *C. perfringens* or *B. cereus* but laboratory confirmation did not occur.
  - An outbreak of confirmed *C. perfringens* occurred in the city of Chicago in
November 2004. The investigation identified 11 ill individuals following consumption of palak paneer, a spinach and cheese dish served at a restaurant. The palak paneer tested positive for *C. perfringens* (800,000 per gram). The median incubation period was seven hours. No stool specimens were submitted. Contributory causes were unknown.

**Enterohemorrhagic E. coli (E. coli O157:H7 and others)**

Foodborne outbreaks of *E. coli* O157:H7 have been linked to undercooked ground beef, apple cider, sprouts and lettuce. Other types of *E. coli* also can be pathogenic in humans and cause outbreaks.

**Case definition**

Laboratory confirmation of an outbreak occurs when *E. coli* O157:H7 or other Shiga-like toxin-producing *E. coli* is isolated from stool of two or more ills or from the implicated food or water.

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2004 - One confirmed *E. coli* O157:H7 outbreak
  - The *E. coli* O157:H7 outbreak occurred in Knox County in August after a cookout at a private home. This cookout involved residents of Illinois and Nevada. Hamburgers were reported to be undercooked. Two cases were Illinois residents. Six cases (four laboratory confirmed and two probable cases) were identified as having eaten at the cookout. Four persons sought medical attention and two were hospitalized. No hemolytic uremic syndrome (HUS) cases or fatalities occurred. Ground beef from the freezer of the host family tested positive for *E. coli* O157:H7. The PFGE pattern for the human isolates and ground beef isolate was the same (EXHX01.0080).

**Enterotoxigenic E. coli**

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2004 - One suspect outbreak was reported.
  - The enterotoxigenic *E. coli* (ETEC) outbreak occurred in Lake County in September after persons ate from a buffet line at a workplace cafeteria. There were six cases confirmed by PCR and/or culture and 105 probable cases of the 140 persons interviewed. There were an estimated 300 persons ill from this outbreak and a total of 700 who ate the company luncheon. Twenty-two persons sought medical care and two were hospitalized. The median duration of illness was seven days. No fatalities occurred. Cucumber salad and noodle salad were statistically significant in multivariate analysis. Cucumber salad contained cucumber, red onions
and carrots. No food was available for testing. Six of 11 persons tested positive for ETEC by PCR. Three stool samples were culture positive at CDC but with three different serotypes (O159:H4 LT, O27:H7 ST and O6:H16 LT/ST). Therefore, this was classified as a suspect outbreak of ETEC. The discovery of multiple serotypes and lack of illness in food handlers supports the hypothesis that sewage contamination of a fresh ingredient present in the salads was the probable source of the outbreak.

Suggested readings

**Salmonella**
*Salmonella* is the most common causative agent associated with bacterial foodborne outbreaks. The incubation period for *Salmonella* is six to 72 hours. Symptoms may include diarrhea, vomiting, fever and headache.

**Case definition**
A laboratory-confirmed outbreak of *Salmonella* occurs when bacteria are either cultured from implicated food or *Salmonella* of the same serotype is cultured from clinical specimens from two or more ill individuals.

**Descriptive epidemiology**
- Number of outbreaks reported in Illinois in 2004 – Seven confirmed with 122 people ill (median of five persons ill per outbreak). Outbreaks occurred in Chicago (three), DuPage (one), Kane (one), McLean (one), Morgan (one). The *Salmonella enterica* serotypes involved in the outbreaks were Anatum (one), Braenderup (one), Enteritidis (one), Infantis (two), Ohio (one) and Saint-paul (one). In six outbreaks, foodhandlers were tested and tested positive for *Salmonella*. The seventh outbreak involved food made in a private home.
  - The first *Salmonella* outbreak of 2004 occurred in April in two residents of McLean County. The ill persons were positive for *Salmonella* ser. Infantis. The outbreak was identified during a review of laboratory reports. During interviews, both cases had a history of attending the same wedding reception for more than 200 persons. Foods were prepared in homes. No information was available about whether food handlers in the homes were ill. No PFGE results were available.
  - In May, three laboratory confirmed cases of S. ser. Anatum from separate households occurred among patrons of a restaurant in Morgan County. Three food handlers also tested positive for *Salmonella* serovar Javiana. It was not possible to identify what food was responsible for illness. The restaurant had low inspection scores and cross connections were identified during their plumbing inspection. A frozen food sample from the household of the probable case and from the meal tested negative for *Salmonella*. No PFGE results were available.
Three confirmed and one probable case of S. ser. Saint-paul from separate households ate at a common restaurant in September from the city of Chicago. Two food handlers tested positive of 182 tested; one reported illness, one did not. Three other food handlers who tested negative reported a prior diarrheal illness. One food item taken home from the restaurant and frozen by the family tested negative along with four other food items taken at the restaurant. The PFGE patterns between cases matched.

Another Salmonella outbreak (S. ser. Ohio) occurred in June in 20 persons (10 confirmed and 10 probable cases) in the city of Chicago. All had eaten takeout foods from a single restaurant. The ill persons ate carnitas. Follow-up samples of carnitas tested negative. Four food handlers were tested positive for a different serotype of Salmonella and all denied any illness. The PFGE pattern was TDU01.0002.

The fifth Salmonella outbreak was reported from Kane County in June and was due to S. ser. Infantis. The PFGE pattern was SIN04X3. Twenty-two confirmed and 31 probable cases from multiple counties were linked to this outbreak. Persons consumed take-out from a grocery store. Salsa tested positive for S. ser. Infantis. In addition, eight food handlers were positive for Salmonella ser. Infantis. Cross contamination was observed by restaurant inspectors.

A S. ser. Braenderup outbreak occurred in Chicago in May. Thirty-five cases were identified from separate households who ate at the same restaurant. Food handlers were positive and worked while symptomatic. Foods were held at improper temperatures. Salsa was tested negative. No specific food was implicated by epidemiologic analysis. The PFGE pattern was JBPX01.0092.

The last Salmonella outbreak due to Salmonella ser. Enteritidis occurred in five individuals from DuPage County who reported eating at the same restaurant. Two food handlers tested positive and one reported illness. No foods were tested or statistically linked to illness. Some food dishes may have been undercooked. The facility was asked to change to pasteurized egg products. The isolates matched by PFGE. The phage type was 13a.

Shigella

The Shigella organism is not a common cause of foodborne outbreaks. Instead, it causes a gastrointestinal illness often transmitted from person to person. However, outbreaks in the United States have been associated with bean dip, lettuce, parsley and contaminated water. Outbreaks of shigellosis also have been associated with swimming in contaminated water.

Case definition

The case definition for an outbreak of Shigella is identification of the same serotype of the bacteria in two or more ill persons.
Descriptive epidemiology
- Number of outbreaks reported in Illinois in 2004 - None.

Staphylococcal food poisoning
One type of foodborne illness, classified as an intoxication, is caused by enterotoxin-producing strains of *Staphylococcus aureus*. Within 30 minutes to eight hours (usually two to four hours) after eating contaminated food, a person may experience explosive vomiting and diarrhea. The duration of illness is usually short - less than 24 hours. Humans are considered to be the primary source of the organism in foodborne outbreaks. *S. aureus* can be found in nasal passages, throat and hair and on the skin of healthy people; bacteria are present in high numbers in cuts, pustules and abscesses. The enterotoxins produced by *S. aureus* are heat stable. The organism may produce toxin in foods and then die so cultures of foods may be negative and yet the foods contained the staphylococcal enterotoxin that made people ill. Foodborne outbreaks caused by *S. aureus* and those caused by the *B. cereus* type where vomiting predominates have similar incubation periods and clinical syndromes.

Case definition
Laboratory confirmation of an outbreak attributable to *S. aureus* requires detection of enterotoxin in food or organisms with the same phage type in stools or vomitus of two or more cases or isolation of greater than $10^5$ organisms per gram in properly handled food.

Descriptive epidemiology
- Number of outbreaks reported in Illinois in 2004 – Three; one confirmed and two suspect. There was one outbreak suspected of being either *S. aureus* or *B. cereus* but the agent was not confirmed.
  - For the confirmed outbreak, six of 19 persons eating at a school became ill. Turkey and rice prepared two days in advance of the event at a private home tested positive for *S. aureus* at 110,000,000 per gram. No stool specimens were tested.

Chemical agents
This category includes toxins such as ciguatera and scombrototoxin, associated with fish consumption. Ciguatera toxin poisoning is caused by the ingestion of the toxin in predatory reef fish, such as barracuda, amberjack and grouper. The toxin is initially produced by dinoflagellates that are eaten by herbivorous fish, which are then consumed by the predatory fish. There is a test to detect the toxin in fish. However, the toxic fish have a normal taste and appearance. The toxin cannot be destroyed by cooking or freezing. Symptoms of diarrhea and vomiting develop within three to six hours after consuming contaminated fish. Neurologic symptoms may follow and persist for weeks or months. These neurologic symptoms include numbness, tingling of the mouth and extremities, muscle pain and weakness, and reversal of temperature sensation. There is no diagnostic test or treatment available for humans.
Scombrotoxin poisoning occurs when a person consumes fish with a high level of histamine that can be produced in the muscle of fish after harvest. Some fish, such as tuna, mackerel, bluefish, dolphin, bonito and saury, are more likely to have high levels of histamines in their tissue. When there is temperature abuse of fish after harvesting, the potential for outbreaks associated with scombrotoxin increases. The clinical signs of toxicity in people include lip swelling, itching, a peppery taste in the mouth, nausea, vomiting, facial flushing, headache and stomach pain. Symptoms usually only last a few hours and there are no lasting effects.

Haff disease is a rare cause of foodborne illness from consuming fish. It results in a syndrome of rhabdomyolysis and is believed to be caused by a yet unidentified toxin. Persons present with muscle tenderness, rigidity and dark brown urine. Complications can include electrolyte disturbances, renal failure and disseminated intravascular coagulation. Symptoms generally occur within 18 hours of eating fish. In 1997, there were six cases (four from California and two from Missouri) that resulted from eating buffalo fish. Buffalo fish are bottom-feeding species found mostly in the Mississippi River or its tributaries.

Case definition
The case definition for ciguatera toxin outbreaks is the demonstration of ciguatoxin in epidemiologically implicated fish or a clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning. The outbreak must involved two or more ill persons.

The case definition for scombroid toxin outbreaks is demonstration of histamine in epidemiologically implicated fish or a clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning. The outbreak must involved two or more ill persons.

Descriptive epidemiology
- Number of outbreaks reported in Illinois in 2004 – none.
- Individual case reports
  - Three individual cases of fish toxin poisoning occurred in 2004 but two or more cases are required to call them outbreaks.
  - Symptoms of scombroid poisoning occurred in a person after consumption of tuna at a restaurant in Cook County in July. Symptoms included headache, flushing of skin and palpitations within 30 minutes of eating tuna. Over 500 ppm of histamine were identified in the fish.
  - A person in St. Clair County developed symptoms of flushing and anaphylaxis 30 minutes after eating tuna at a restaurant in July.
- A suspect case of Haff’s disease was identified in a resident of Madison County who had consumed buffalo fish from the Mississippi River 12 hours prior to illness. The person was hospitalized with diaphoresis, chest and muscle pain, facial swelling and elevated creatine kinase levels. Only one case was identified despite intensive case finding efforts.
Suggested readings

Parasitic agents
There are a variety of parasitic agents that can cause foodborne or waterborne outbreaks, for example, Cryptosporidia, Cyclospora and Giardia. The incubation periods for parasitic agents can be up to 25 days.

Descriptive epidemiology
- Number of outbreaks reported in Illinois in 2004 - One confirmed.
  - An outbreak of Cyclospora cayatensis occurred in DuPage County in February. Four separate groups and an individual who consumed food from a single establishment were involved in this outbreak. Fifty-six cases occurred including two food handlers. Three foods were implicated by epidemiologic analysis including pasta salad, tuna salad and mixed green salad. Basil was the probable source of the organism. Another outbreak occurred in Texas during the same time frame with basil as the suspected ingredient but traceback was inconclusive.

Viral gastroenteritis
Noroviruses cause almost all of the outbreaks of acute non-bacterial gastroenteritis in the United States. Estimates are that 23 million people are affected by Noroviruses in the United States each year. The most common cause of viral gastroenteritis are small round-structured viruses (SRSV), commonly called Norovirus. SRSV are caliciviruses and can be classified into two genogroups: genogroup 1 (Norwalk virus, Southampton virus and Desert shield virus) and genogroup 2 (Toronota virus, Mexico virus, Hawaii virus, Bristol virus, Lordsdale virus, camberwall virus, Snow Mountain agent and Melksham virus). G1 and G2 genogroups affect humans and include five to 10 genetic clusters. Norovirus G2 is the most common norovirus circulating in communities causing sporadic, nosocomial and outbreak cases. A study in Hong Kong showed that the viral load of norovirus G2 is higher than that of G1 in fecal specimens of patients with gastroenteritis.

Noroviruses are transmitted through consumption of contaminated food or water, directly from person to person and from airborne droplets produced during vomiting. Outbreaks of norovirus have occurred after consumption of contaminated raw or undercooked oysters. Oysters are filter feeders and can concentrate viruses when in contaminated waters. The most common method of spread is via the fecal-oral route. The virus is excreted in stool and vomitus for as many as 10 days. The incubation period and duration of illness ranges from 24 to 48 hours. Virus shedding peaks 25 to 72 hours after exposure to the virus. Within 48 to 72 hours after symptom onset, virus concentration in the stool declines below levels detectable by electron microscopy. Short-term immunity occurs after infection. Vomiting, diarrhea, headache and body aches are commonly reported. A common feature of Norovirus outbreaks is secondary transmission to household members not exposed to the implicated food or water.
Humans are the only known reservoir for these viruses. These viruses cannot replicate outside the human body and therefore will not multiply in food items. Characteristics of the virus that facilitate spread include low infectious dose, high concentration of virus in stool, strain diversity, environmental stability and prolonged shedding. Failure of an ill food handler to perform proper handwashing may result in fecal contamination of food. Illness caused by SRSV can be suspected based on incubation period, duration of illness, symptoms and the absence of bacterial or parasitic pathogens in stool samples. Noroviruses can survive freezing and temperatures of up to 60°C and can survive chlorine levels up to 10 ppm, which is in excess of what is normally present in public water systems.

The virus cannot be grown in cell culture; a polymerase chain reaction (PCR) test is used to diagnose Norovirus. Testing for viral gastroenteritis in humans is not useful for screening individual samples but is useful when multiple samples are available in an outbreak. Approximately 25 state health department laboratories, including Illinois, can do the RT-PCR to detect Norovirus. Norovirus can be present in stools for up to a week after illness onset. Immunity is short-lived and appears to be strain specific. Since there are so many strains, individuals can be repeatedly infected by Noroviruses during their lifetime.

**Case definition**

Several laboratory tests may help to confirm an outbreak related to Norovirus. These include positive results on RT-PCR, visualization of SRSV in electron microscopy of stool from ill individuals, or a four-fold rise in antibody titer to Norovirus seen in acute and convalescent sera in most serum pairs. Multiple samples are needed from each outbreak to provide sufficient specimens to verify the causative agent as Norovirus. An outbreak is considered confirmed when at least two ill persons have positive PCR results.

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2004 – 47 confirmed or suspect outbreaks. Twenty-four suspected outbreaks of viral gastroenteritis, based on clinical syndrome, incubation period and duration of illness also were reported. Twenty-three confirmed outbreaks of norovirus occurred involving 840 ill persons (median = 23 ill persons per outbreak). Nineteen were confirmed as the G2 genogroup, three as G1 and one as both G1 and G2. The median incubation period for the confirmed outbreaks was 32 hours. Fifty-three people visited a health care provider and seven were hospitalized.

- The 23 confirmed outbreaks occurred in Chicago (seven), DuPage (three), Will (two), McHenry (two), Lake (two), and one each in Coles, Cook excluding Chicago, Jo Daviess, Knox, Madison, Ogle and Whiteside counties.
  - The first confirmed norovirus outbreak occurred in Cook County in February. Forty-four persons became ill after eating sandwiches ordered
from a restaurant and taken to a worksite. Two persons tested positive for norovirus type G2. It is unknown whether food handlers were ill.

- The next confirmed norovirus outbreak occurred in Madison County in February. The agent was norovirus type G2 and affected 115 persons in a long-term care facility including both residents and employees. Food handlers and caregiver staff reported gastrointestinal illness. No specific food item could be linked to illness. An epidemic curve reflected a point source outbreak followed by a secondary peak of illnesses.

- Another norovirus type G2 outbreak occurred in DuPage County in June. Thirty-four employees of an office building who ate food from a restaurant delivered to the workplace became ill. Three persons tested positive. Information about illness in food handlers is unknown.

- In Chicago in May, 9 persons became ill after sharing take out food at work. Seven of seven persons tested were positive for norovirus type G1. No leftover foods were available for testing. In Chicago in April, 23 persons from several groups became ill following consumption of food at a restaurant. Three persons tested positive for norovirus type G2. No food handlers reported illness.

- Six persons became ill after a meal at a restaurant in Jo Daviess County in April. Two ill persons tested positive for norovirus type G2/SR47D. No food handlers reported illness.

- Fifty-eight persons became ill after a catered wedding reception in Chicago in August. No food handlers reported illness. Two ill attendees tested positive for norovirus type G2.

- In an outbreak of norovirus type G1 in Lake County in March there were 70 ill school personnel and students and one ill food handler. Six stools were positive for norovirus and one was from a food handler. A single food item could not be implicated as the source of the outbreak.

- An outbreak of Norovirus type G2 occurred in October in DuPage County. Twelve ill persons became ill and four ill persons tested positive of 21 attendees of a baby shower luncheon at a restaurant. A specific food could not be linked to illness. No food handlers reported illness.

- Knox County HD investigated a norovirus type G2 outbreak in October after a group had dinner at a restaurant. All five ill persons ate salads. Two persons tested positive for norovirus. No food handlers reported illness.

- An outbreak of norovirus type G2 at a school in Ogle County occurred in November. There were 17 reported illnesses in one kindergarten classroom. Some treats were brought into the classroom and had been made by someone with gastrointestinal illness. Two secondary cases also were reported.

- A church convention in November in DuPage County resulted in illness in 15 of 24 persons interviewed. One attendee and one ill food handler tested positive for norovirus type G2.

- The Chicago Department of Public Health (CDOH) reported a norovirus type G2 outbreak in persons staying at a hotel who had visited an
entertainment center in December where food was served. Seventeen of 47 persons interviewed reported illness and two tested positive. No food handlers reported illness. No specific food was linked to illness.

- The CDOH reported a norovirus type G2 outbreak in persons attending a dinner on a cruise ship in December. Forty-three of 78 persons interviewed reported illness. Four of six persons tested, tested positive for norovirus. No food handlers reported illness. An epidemiologic investigation implicated tortellini as a cause of illness.

- An outbreak of norovirus occurred in persons eating at a restaurant in Will County in December. Seventy-eight persons reported illness. Employees and ill patrons were positive for norovirus type G1. The owner was positive for G2. No specific food item was implicated as a source of illness.

- An outbreak of norovirus type G2 occurred in Whiteside County after patrons ate food from a restaurant. Residents of other counties in the state were involved. Three persons tested positive and a total of 12 were reported ill.

- Seventy-three persons were reported ill at a hotel in Chicago in November. Ill employees were identified. Nine persons (employees and hotel guests) tested positive for norovirus type G2. Hotel guests ate food at the hotel.

- Three persons reported illness after a common restaurant meal in Coles County in March. No food handlers reported illness. Three persons tested positive for norovirus type G2.

- Three persons became ill after a meal at a restaurant in McHenry County. Two persons tested positive for norovirus type G2. No food item could be implicated and food handler illness status is unknown.

- An outbreak in Chicago in October involved 17 ill persons who attended a birthday party; two persons from the same household tested positive for norovirus type G2. Information on illness in food handlers is unknown.

- In October an outbreak of norovirus type G1 occurred in 30 persons who attended a Bat Mitzvah celebration in Lake County. A bartender with gastrointestinal illness who served drinks tested positive for norovirus. Diet soda and ice were significant upon epidemiologic analysis.

- In December, 37 persons including two food handlers were ill in McHenry County after a meal served at a club. Seven persons tested positive for norovirus type G2 including the two food handlers. Ice water was linked to illness by epidemiologic analysis.

- A norovirus type G2 outbreak was reported by Will County Health Department in December involving 119 ill persons at a detention center. Ten persons tested positive for the virus at the detention center. Residents assisted with food handling duties and may have been ill.

**Suggested readings**

Drinking Water Outbreaks

Descriptive epidemiology
Number of drinking water outbreaks in 2004 – none.

Recreational Water Outbreaks

Descriptive epidemiology
Number of recreational waterborne outbreaks in 2004 – Nine outbreaks.

General Description – The outbreaks occurred after swimming in community pools (two), hotel pools, whirlpools or hot tubs (six).

Etiologic Agents – The etiologic agents were determined to be chemical including organochlorines (four), Cryptosporidium (two), Pseudomonas (two) and unknown (one).

Geographic Location - The outbreaks occurred in Cook, DeKalb, Douglas, Jo Daviess, Peoria, Piatt, Sangamon, Vermilion and Will counties.

- Twenty two persons became ill after swimming at an indoor hotel pool during a pool party in Douglas County on January 5. A cohort of 47 of 77 persons who were at the hotel were interviewed. Within minutes of being in the pool, swimmers reported burning eyes, watery eyes, headache, cough and sore throats. A smaller number of persons also experienced vomiting and rash. The pool was a 9,500 gallon pool and a whirlpool housed within feet of each other inside the hotel. At the time of inspection on January 6, the pool water tested negative for coliforms, Pseudomonas, Cryptosporidium and Giardia. Elevated chlorine levels were found in the swimming pool and whirlpool. Risk factors identified included entering the swimming pool water or entering the pool area on January 4 or January 5. Entering the whirlpool also was associated with illness. A malfunctioning ventilation system may have exacerbated the airborne chlorine and chloramines levels. The pool also had elevated levels of cyanuric acid levels. The Centers for Disease Control and Prevention assisted in the investigation with an Epi-Aid.

- Forty-five persons who swam at an indoor hotel pool in Peoria reported illness shortly after being in the pool in January. Symptoms included cough, burning eyes, watery eyes, sore throat and vomiting. Risk factors identified included entering the swimming pool, entering the pool area and drinking fountain contact. The pool had mildly elevated chloramines levels during inspection the day after the illnesses occurred. The pool also had elevated cyanuric acid levels.

- In February, three persons from different families developed dermatitis after contact with a whirlpool in a hotel in Sangamon County in February. Whirlpool water tested positive for Pseudomonas aeruginosa (260 per 100 ml). The pool water tested negative for Pseudomonas. No persons were tested.
Sixteen persons reported dermatitis after exposure to a pool and hot tub during a birthday party at a hotel. The suspected organism was *Pseudomonas* although no persons were tested. The water at the time of inspection tested negative for *Pseudomonas*. It is unknown if cleaning took place between the reports of illness and collection of water samples.

An outbreak in Piatt County took place in March and involved eight ill individuals. Individuals who had contact with the pool or whirlpool developed vomiting and diarrhea between 10 and 21 hours after being in a pool and hot tub at a hotel. The pool was drained before water samples could be taken. No stools were collected.

In March, 57 persons became ill shortly after swimming in a pool or spa at a hotel in Jo Daviess County. Symptoms included cough, sore throat and burning eyes. Other symptoms reported by a smaller number of individuals included vomiting, difficulty breathing, diarrhea and dizziness. The time from exposure to symptoms ranged from immediately after exposure to four hours after exposure. The pool area consisted of a large swimming pool with a slide, a wading pool and whirlpool spa. Ill persons reported a strong chlorine odor at the pool area. Of the 145 guests interviewed, 57 met the case definition. Five saw a health care provider. One child with a history of asthma was hospitalized after experiencing difficulty in breathing. Water collected from the pool at the time of inspection had chlorine levels of 2.5 ppm while the maximum allowable combined chlorine level is not supposed to exceed 0.5 ppm. The pool was closed until the levels could be remedied.

In July, nine persons reported illness after a swim meet at a community pool in Vermilion County. Persons experienced either vomiting or fainting shortly after pool exposure. Algae control chemicals had been added to the pool prior to the event.

Thirty-seven persons reported gastrointestinal illness after swimming at a community pool facility which included a wading pool, large pool, splash wading pool and a diving pool in DeKalb County in late July and early August. Symptoms included diarrhea, vomiting and abdominal cramps. Twelve of 14 persons tested positive for *Cryptosporidium*. A fecal accident from an infected person is suspected as the cause of the outbreak. The pool was closed for superchlorination and information on cryptosporidiosis was sent to pool operators in the area. Five persons were hospitalized including two pregnant women. The pool was superchlorinated before water could be taken for testing.

Eight Wisconsin residents developed gastrointestinal illness after swimming at a hotel pool in Cook County in September. Three persons tested positive for *Cryptosporidium hominis*. The median incubation period was 10 days. *Cryptosporidium* was identified in pool water and in the filter. One sample from the pool was *C. parvum*, the sample from the filter was *Cryptosporidium* genotype W15. The Wisconsin Department of Health counted the eight cases in their annual numbers for cryptosporidiosis.
Recommendations from CDC after their investigation of hotel pool outbreaks in late 2003 and early 2004 included the following:

1. Pool/spa maintenance personnel should be required to attend training programs in pool maintenance.
2. The ventilation system serving the pool and spa areas should be kept separate from other rooms in the same building and should be in good working condition while the pool is in operation.
3. Pool/spa maintenance personnel should comply with state recommendations on maintenance and recordkeeping at pools and state and local inspectors should verify compliance with recommendations.
4. Swimming pool and spa inspectors should record date and time on inspection reports so as to compare with hotel maintenance records.
5. Urine and serum specimens from ills and wells should be collected during outbreaks linked to chemical exposures.
6. Pool water samples should be collected immediately after notification of illnesses associated with a pool.
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<th>Onset Date</th>
<th>City of exposure</th>
<th>County</th>
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<th>Symptoms</th>
<th>Incub (hrs)</th>
<th>Foods implicated</th>
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¹ Symptoms: V - Vomiting, D - Diarrhea, AC - Abdominal cramps, F - Fever, rash
² Status: S - Stool, C - Contact, H - Headache, U - Unknown
³ Contributory causes: unknown
⁴ Place of prep/Place eaten: restaurant, hotel whirlpool, school, hotel hot tub, restaurant and home/home, restaurant and home/workplace, restaurant
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<th>Incub (hrs)</th>
<th>Foods implicated</th>
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<tr>
<td>2004-108</td>
<td>12/3</td>
<td>Chicago</td>
<td>Cook</td>
<td>17/47</td>
<td>V,D,AC, myalgia</td>
<td>21</td>
<td>Roast beef sandwich</td>
<td>Norovirus, G2</td>
<td>C</td>
<td>U</td>
<td>entertainment center</td>
</tr>
<tr>
<td>2004-109</td>
<td>12/3</td>
<td>Chicago</td>
<td>Cook</td>
<td>43/78</td>
<td>V,D,AC, myalgia</td>
<td>34</td>
<td>Tortellini</td>
<td>Norovirus, G2</td>
<td>C</td>
<td>U</td>
<td>cruise ship</td>
</tr>
<tr>
<td>2004-113</td>
<td>12/9</td>
<td>Addison</td>
<td>DuPage</td>
<td>19/25</td>
<td>V,D</td>
<td>23</td>
<td>Submarine sandwich</td>
<td>Norovirus</td>
<td>S</td>
<td>U</td>
<td>caterer/work site</td>
</tr>
<tr>
<td>IDPH Log #</td>
<td>Onset Date</td>
<td>City of exposure</td>
<td>County</td>
<td># ill/# exposed</td>
<td>Symptoms¹</td>
<td>Incub (hrs)</td>
<td>Foods implicated</td>
<td>Agent</td>
<td>Status²</td>
<td>Contributory causes³</td>
<td>Place of prep/ Place eaten⁴</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
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<td>--------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>2004-112</td>
<td>12/11</td>
<td>Crete</td>
<td>Will</td>
<td>65/146</td>
<td>D, V</td>
<td>33</td>
<td>Unknown</td>
<td>Norovirus, G2</td>
<td>S, 1 stool pos</td>
<td>U</td>
<td>restaurant</td>
</tr>
<tr>
<td>2004-111</td>
<td>12/12</td>
<td>Joliet</td>
<td>Will</td>
<td>78/128</td>
<td>D, V, AC</td>
<td>36</td>
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<td>C</td>
<td>H</td>
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<tr>
<td>2004-114</td>
<td>12/12</td>
<td>McHenry</td>
<td></td>
<td>8/18</td>
<td>V, D, AC</td>
<td>35</td>
<td>Multiple</td>
<td>Norovirus</td>
<td>S</td>
<td>H</td>
<td>camp</td>
</tr>
<tr>
<td>2004-115</td>
<td>12/19</td>
<td>Crestwood</td>
<td>Cook</td>
<td>5/11</td>
<td>V, D, AC</td>
<td>10</td>
<td>Unknown</td>
<td>Norovirus</td>
<td>S</td>
<td>H, C, ICL</td>
<td>restaurant</td>
</tr>
<tr>
<td>2004-123</td>
<td>12/21</td>
<td>Hoffman Estates</td>
<td>Cook</td>
<td>8/45</td>
<td>V, D, AC</td>
<td>10</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>restaurant/work place</td>
</tr>
<tr>
<td>2004-121</td>
<td>12/23</td>
<td>Chicago</td>
<td>Cook</td>
<td>6/6</td>
<td>V, D</td>
<td>2</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>restaurant/home</td>
</tr>
<tr>
<td>2004-124</td>
<td>12/24</td>
<td>Cicero</td>
<td>Cook</td>
<td>7/19</td>
<td>V, D, AC</td>
<td>15</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>restaurant/home</td>
</tr>
<tr>
<td>2004-118</td>
<td>12/25</td>
<td>Loves Park</td>
<td>Winnebago</td>
<td>9/unknown</td>
<td>V, D, AC</td>
<td>18</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>retail and home/home</td>
</tr>
<tr>
<td>2004-120</td>
<td>12/26</td>
<td>Rock Falls</td>
<td>Whiteside</td>
<td>12/unknown</td>
<td>V, D, AC</td>
<td>32</td>
<td>Unknown</td>
<td>Norovirus, G2</td>
<td>C</td>
<td>H</td>
<td>restaurant</td>
</tr>
</tbody>
</table>

¹BA=body ache, BD=bloody diarrhea,  D=diarrhea, F=fever, H=headache, V=vomiting, AC=cramps; > 40% ills reporting symptoms
²S=suspect, C=confirmed, U=unknown; ³C=contaminated surfaces, CC=cross contamination, H=inadequate foodhandler hygiene, I=improper thawing, IF=ill foodhandlers, IC= inadequate cooking, P=preparing food ahead, PF=laboratory positive foodhandler, T=improper holding temperatures, F=unsafe foods, ICL=inadequate cleaning, CE=storage in contaminated environment, R=insufficient reheating, U=unknown; ⁴rest=restaurant
Giardiasis

Background

*Giardia* is the most commonly diagnosed intestinal parasite in public health laboratories. A common intestinal parasite of children, especially those attending day care, it is spread from person to person through fecal-oral transmission and has a median incubation period of seven to 10 days. Symptoms include diarrhea, abdominal cramps, bloating and weight loss. Many infections are asymptomatic and repeated infections can occur in the same person. There are three species of giardia: *G. lamblia*, *G. agilis* and *G. muris*. The main human pathogen is *G. lamblia*. Cysts are infective immediately upon excretion and can remain viable for months. The infectious dose is low, as few as 10 cysts can cause infection and excretion can continue for months. Giardiasis also affects domestic and wild mammals including cats, dogs, cattle, deer and beavers.

Persons at greatest risk are children in day care facilities, close contacts of infected persons, travelers to endemic areas, men who have sex with men, backpackers, persons in contact with infected animals, campers and persons drinking from water contaminated with the organism or swimmers swallowing contaminated water. The most commonly identified intestinal parasite in international travelers is *G. lamblia*. Giardiasis peaks in late summer and early fall. Metronidazole is the most frequent treatment in the United States. Zoonotic transmission does not play a major role in *Giardia* transmission. From 1995 to 2004 in the United States, *Giardia* caused 4 percent of recreational water gastrointestinal outbreaks and 13 percent of drinking water gastrointestinal outbreaks.

Approximately 85 percent of infections can be diagnosed with a single stool specimen. Diagnosis is made by identification of the parasite in wet mount staining with trichrome or iron hematoxylin, by direct fluorescent antibody detection, or by enzyme immnosorbent assay.

Because of its long period of communicability, low infectious dose and environmental resistance, giardiasis is easily transmitted. Preventive measures should include practicing good hygiene, avoiding water or food that might be contaminated and avoiding fecal exposure during sex with infected persons.

Treatment alternatives include metronidazole, nitazoxanide, tinidazole, paromomycin, furazolidone and quinacrine.

Giardiasis became nationally notifiable in 2002. In 2004, the CDC received reports of 20,962 cases.

Case definition

The case definition for giardiasis in Illinois is the presence of diarrhea and the identification of *Giardia* trophozoites or cysts in stool, or detection of antigen by the ELISA antigen test. Carriers are those persons identified with *Giardia* trophozoites or cysts in the stool but who have no symptoms of disease. The information for this analysis was obtained from INEDSS, onset year=2004, case status=confirmed or probable, remove December 24, 2004 cases to match the 807 cases sent to CDC.
Descriptive epidemiology

- Number of cases (cases and carriers) reported in Illinois in 2004 – 807 (five-year median = 873); the incidence rate was 6.4 per 100,000 population. Three cases were probable and 804 were confirmed. Reported cases have declined since 1999 (see Figure 40).
- Age - Mean age of cases was 42 years. The age group with the highest incidence was 1 to 4 years of age, which included 164 of 765 cases, or 21 percent of the total.
- Gender – Fifty-eight percent were male. Males had a higher incidence in every age group except the younger than one-year age group. Figure 41 shows incidence by age and sex.
- Race/ethnicity – 72 percent were white, 15 percent were African American and 5 percent were other races; 14 percent were Hispanic.
- Seasonal variation - More cases occurred July through September (32 percent) than any other three-month period. (Figure 42).
- Geographic variation - Counties with the highest number of cases included Cook (409), DuPage (64), Lake (37) and Kane (36).
- Clinical syndrome – Hospitalization history was available for 414 cases; 124 were hospitalized. Three persons died with Giardia.
- Risk factors
  - Travel - Of the 335 persons with a history on whether they traveled internationally prior to onset, 69 (30 percent) traveled overseas. The five countries most commonly traveled to included Mexico (16), Russia (seven), China (six), Ukraine (five) and Canada (five).
  - Swimming - Of 324 cases who reported whether they swam in non-chlorinated water during the incubation period, 11 percent did swim. Of 314 with a history of whether they swam in chlorinated water, 49 (16 percent) reported that had swam.

Summary

Giardiasis cases decreased in 2004 compared to the previous five-year median (873). The mean age of cases was 42 years, and more cases occurred in the warmest months of the year.

Suggested readings

Figure 40. Giardiasis Cases in Illinois, 1999-2004

Number of cases

Year

1999 2000 2001 2002 2003 2004

1150 873 904 871 861 807

Figure 41. Incidence of Giardiasis Cases in Illinois by Age and Sex, 2004

Incidence per 100,000

Age groups

<1 yr 1-4 yr 5-9 yr 10-19 yr 20-29 yr 30-39 yr 40-49 yr 50-59 yr >59 yr

Figure 42. Giardiasis Cases in Illinois by Month, 2004

Number of cases

Month of onset

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

83
Hemolytic Uremic Syndrome (HUS)

Background

Hemolytic uremic syndrome (HUS) is characterized by acute hemolytic anemia, thrombocytopenia, and renal insufficiency. Many microbes including *Shigella dysenteriae*, *Salmonella* ser. Typhi, *Campylobacter jejuni* and *E. coli* O157:H7 have been linked to HUS. Bacteria, such as shiga toxin producing *E. coli* (STEC) produce a toxin that can cause vascular cell damage. The most serious sequelae from infection with Shiga toxin-producing *E. coli* in people is HUS.

HUS occurs primarily in children younger than five years of age after infection by an organism producing shiga toxin and causing diarrhea. HUS usually occurs within 2 to 14 days after onset of diarrhea. Almost half of children with HUS require dialysis. The illness can involve the central nervous system (CNS), pancreas, heart and other organs. During 2004, 200 cases of HUS were reported to CDC from 30 states.

Antibiotic therapy has been identified as a risk factor for HUS development; therefore, if antibiotic therapy is being considered, it should be withheld for treatment of patients with diarrhea until (at least) a culture confirms that STEC is not present in a stool specimen.

Case definition

Laboratory criteria are both acute anemia with microangiopathic changes (i.e. schistocytes, burr cells or helmet cells) on peripheral blood smear and acute renal injury evidenced by either hematuria, proteinuria, or elevated creatinine level (i.e. greater than or equal to 1.0 mg/dL in a child younger than 13 years or greater than or equal to 1.5 mg/dL in a person aged greater than or equal to 13 years, or greater than or equal to 50 percent increase over baseline).

A probable case is an acute illness diagnosed as HUS or TTP that meets the laboratory criteria in a patient who does not have a clear history of acute or bloody diarrhea in the preceding three weeks, or an acute illness diagnosed as HUS or TTP that a) has onset within three weeks after onset of an acute or bloody diarrhea and b) meets the laboratory criteria except that microangiopathic changes are not confirmed.

A confirmed case is an acute illness diagnosed as HUS or TTP that both meets the laboratory criteria and began within three weeks after onset of an episode of acute or bloody diarrhea

Descriptive epidemiology

- Three of the HUS cases in Illinois in 2004 were reported in persons with confirmed *E. coli* O157:H7 infections. The HUS cases were 9, 12 and 15 years of age. Onsets occurred in July (one), August (one) and September (one). All cases were admitted to the hospital. No cases were fatal. No cases were linked to a known outbreak. Counties in which cases occurred were Cook (two) and Lee (one).
  - **Case Description**
    - Case One - A resident of Cook County had bloody diarrhea and abdominal pain and developed HUS several days later. No dialysis was required. No pathogen was isolated from stool.
Case Two - This case from Lee County had bloody diarrhea and abdominal pain and developed HUS about 10 days later. This patient received packed red blood cells and platelets but did not require dialysis. No pathogen was isolated from stool.

Case Three – The third case was a resident of Cook County but detailed information was not available.

Summary

Three cases of HUS were reported by Illinois to CDC in 2004. No cases of HUS were fatal.
VIRAL HEPATITIS

Viral hepatitis is the primary cause of hepatocellular carcinoma and is the eighth most common cause of cancer in the world. Acute infections with hepatitis A, hepatitis B and hepatitis C and hepatitis B carriers are reportable in Illinois. Cases of acute infection must have either jaundice or liver enzymes elevated over normal. Although testing is available for hepatitis C, the role of currently available supplemental tests in diagnosing acute infection is limited. Hepatitis A is usually transmitted by fecal-oral contact or, rarely, by contamination of food by a food handler. Hepatitis B and C are transmitted through percutaneous and permucosal exposure to infective body fluids that may occur through blood transfusions, sharing needles in injection drug use, tattooing, acupuncture or needlestick injury. Hepatitis B can be transmitted through sexual contact. Hepatitis C also may be transmitted through sharing of equipment for intranasal cocaine use. Of the 273 reported acute hepatitis A, B and C cases in Illinois in 2004, 147 (54 percent) were hepatitis A, 111 (41 percent) were hepatitis B and 15 (5 percent) were hepatitis C. A comparison of characteristics of these types of hepatitis is found in Table 5 and includes only cases for whom information was gathered on the hepatitis reporting form. Jaundice was reported in 83 percent of reported hepatitis A cases and in 60 percent of hepatitis C cases. Hospitalization occurred for 36 percent of hepatitis A cases and 54 percent of hepatitis C.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Hepatitis A, acute</th>
<th></th>
<th>Hepatitis B, acute</th>
<th></th>
<th>Hepatitis C, acute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># (total #</td>
<td>%²</td>
<td># (total #</td>
<td>%²</td>
<td># (total #</td>
<td>%²</td>
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<tr>
<td></td>
<td>reporting)¹</td>
<td></td>
<td>reporting)¹</td>
<td></td>
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<tr>
<td>Demographics</td>
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<tr>
<td>Mean Age</td>
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<td>na ()</td>
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<tr>
<td>Female</td>
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<td>35 (32)</td>
<td>7 (15)</td>
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<td>Asian</td>
<td>14 (140)</td>
<td>10</td>
<td>5 (4)</td>
<td>1(15)</td>
<td>7</td>
<td></td>
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<tr>
<td>African American</td>
<td>7 (140)</td>
<td>5</td>
<td>42 (38)</td>
<td>3 (15)</td>
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<tr>
<td>White</td>
<td>116 (140)</td>
<td>83</td>
<td>50 (45)</td>
<td>11 (15)</td>
<td>73</td>
<td></td>
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<td>Other</td>
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<td>14 (13)</td>
<td>0 (15)</td>
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<td>9 (8)</td>
<td>0 (15)</td>
<td>0</td>
<td></td>
</tr>
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<td></td>
</tr>
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<td>Jaundice</td>
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<td>83</td>
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<td></td>
</tr>
<tr>
<td>Hospitalized</td>
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<td>na ()</td>
<td>6 (11)</td>
<td>54</td>
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<tr>
<td>Deaths</td>
<td>2 (126)</td>
<td>2</td>
<td>0 (0)</td>
<td>0 (10)</td>
<td>0</td>
<td></td>
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</tbody>
</table>

¹ number of cases reporting that factor (total number of cases interviewed about that factor), na is not available

Source: Illinois Department of Public Health
Hepatitis A

Background

Hepatitis A virus (HAV) is transmitted though the fecal-oral route by person-to-person contact and by contaminated food, water or fomites. HAV infection can spread in household members, through day care centers, among persons who consume contaminated or uncooked food handled by infected workers and among men who have sex with men (MSM). Immunity after infection is lifelong.

Young children who are frequently asymptomatic when infected may play an important role in HAV transmission in communities. The incubation period is 15 to 50 days. Onset of illness with HAV can be abrupt with fever, anorexia, nausea and abdominal discomfort, followed by jaundice. The disease can vary from one to two weeks of mild symptoms to a severe illness lasting months. Severity generally increases with age and many infections are asymptomatic, especially in young children. Peak levels of the virus appear in the feces one to two weeks before symptom onset and diminish rapidly after symptoms appear. Serologic testing for IgM anti-HAV is required for laboratory confirmation of hepatitis A infection. IgM anti-HAV becomes detectable five to 10 days after exposure and can persist for up to six months.

Since routine childhood vaccination was recommended in 1999 in areas where hepatitis A rates were high, hepatitis A cases have declined. In 2004, the rate was the lowest ever recorded (1.9 per 100,000). In 2004, 5,683 cases were reported in the United States. In October 2005, routine vaccination nationwide of children aged 12 to 23 months should result in further declines in cases. Travel to countries in which hepatitis A is endemic is the most frequently reported risk factor for hepatitis A cases younger than the age of 15 years. The attack rate of HAV infections in travelers to underdeveloped countries ranges between 1 and 7 per 100,000 travelers in a study in Switzerland.

A positive IgM anti-HAV test result in a person without typical symptoms of hepatitis A might indicate asymptomatic acute HAV infection, previous HAV infection with prolonged antibody presence, or a false positive result. HAV infection can cause asymptomatic infection to hepatitis with fever and jaundice. Approximately 70 percent of children younger than six years of age will be asymptomatic, while older children and adults are usually symptomatic. Persons who are unlikely to have acute viral hepatitis should not be tested for hepatitis A. Prophylaxis for contacts is unlikely to be needed for persons whose illness does not meet the case definition unless they had recent exposure to someone with acute HAV infection.

Hepatitis A virus infection can be prevented by good personal hygiene, particularly handwashing, pre-exposure or post-exposure immunization with immune globulin (IG), and pre-exposure immunization with HAV vaccine. The administration of IG for persons exposed to HAV is 85 percent effective in preventing symptomatic HAV infection if given within two weeks of exposure and may prevent infection entirely if given soon after exposure. The effect of IG starts within hours of administration and provides from three to six months of protection.

Hepatitis A is typically transmitted from person-to-person through the fecal-oral route. Occasionally, foodborne transmission occurs when an HAV-infected food handler contaminates food which is not later cooked. Food handler associated outbreak
characteristics include the presence of an HAV infected food handler who worked while infectious and had contact with uncooked food or food after it had been cooked, secondary cases among other food handlers who ate food contaminated by the index case and low attack rates in patrons. Hepatitis A outbreaks have been associated with fresh produce consumption.

Case definition
The CDC case definition for a case of hepatitis A is used in Illinois: an illness with a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels, and IgM anti-HAV positive serology. Information on hepatitis A cases was obtained from the 2004 mainframe Epi Info database with datediag<> and from the paper records.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 - 147 (five-year median =441) (see Figure 43). All were confirmed.
- Age - Incidence was highest in 5- to 9-year-olds (4 per 100,000) (mean age = 27) followed by the age group of 80 years and over (1.9 per 100,000) (see Figure 44). The overall incidence rate for hepatitis A was 1.1 per 100,000.
- Gender – 50 percent of cases were male. Race/ethnicity - 83 percent were white, 5 percent African American and 10 percent Asian; 41 percent were Hispanic. Hispanics were overrepresented in the case population as compared to the Illinois population.
- Employment – Two of 123 cases (2 percent) of hepatitis A cases were food handlers.
- Seasonal variation - Cases occurred throughout the year (see Figure 45).
- Geographic variation - The three counties with the highest number of cases were Cook (74), DuPage (18) and Lake (18).
- Risk factors – Travel outside the United States or Canada in 42 of 124 (34 percent), household contact with a hepatitis A case occurred in 17 of 117 cases (14 percent), consumption of raw shellfish in eight of 121 (7 percent) and employment in the medical field was reported in no cases. Some persons had multiple risk factors. The location of travel was listed: Mexico (23 cases), South or Central America, not further specified (nine), Middle East (three), India (two), Pakistan (two), Guatamala (one) and Caribbean (one).
- Symptoms/outcomes – 109 (83 percent) of reported cases were jaundiced. Eighty seven of 95 persons with ALT results had ALT more than two times normal. Forty-six (36 percent) of cases were hospitalized. Two deaths were linked to acute hepatitis A.
- Prophylaxis of close contacts – At least 340 persons were provided with immune globulin for prophylaxis. The median number prophylaxed per household was one person.
- Hepatitis A cases with household contact to a hepatitis A case –
  o For 13 cases with exposure to a hepatitis A case, sufficient information was available to describe why prevention measures were not effective in
preventing the case.

- In seven situations, notification and interviewing of the index case took place too late to prevent subsequent cases in the household.
- For two cases from the same household they refused the immune globulin recommendation.
- For two cases, they received vaccination, not immune globulin after the identification of the first case in the household.
- For two cases, immune globulin was given but was not effective. For one case the immune globulin was given 23 days after onset of the index case, for one case it was given 10 days after the onset of the index case.

Summary

Hepatitis A is the most commonly reported acute infectious hepatitis in Illinois. The incidence rate (1.1 per 100,000) was lower than the national incidence (1.9 per 100,000). The number of cases has been decreasing dramatically in the last several years. This may be due to the greater availability of HAV vaccine. The mean age of cases was 27 years, although the highest incidence (4 per 100,000) in 2004 occurred in 5- to 9-year-olds. Hispanics were overrepresented in hepatitis A cases (41 percent) as compared to the Illinois population (12 percent).

Suggested readings


Novak, R., Williams, I. and Bell, B. Update: Prevention of hepatitis A after exposure to hepatitis A virus and in international travelers. Updated recommendations of the Advisory Committee on Immunization Practices. MMWR 2007; 56(41): 1080-84.

Figure 43. Hepatitis A Cases in Illinois, 1999-2004
Figure 44. Number of Hepatitis A Cases in Illinois by Age and Sex, 2004

Figure 45. Hepatitis A Cases in Illinois by Month, 2004
Hepatitis B

Background

In 2004, 6,202 cases were reported to CDC. From 1990 through 2004, the number of acute hepatitis B cases has declined 68 percent. In 2004, the rate in the cohort born since routine infant vaccination was implemented (children younger than 13 years), the rate was 0.07 per 100,000 population. A high proportion of cases in adults occur among persons in identified risk groups such as injection drug users, men who have sex with men and persons with multiple sexual partners.

Incidence among children aged younger than 13 years was 0.07 per 100,000 in the United States. This is the cohort born since routine infant vaccination was recommended. The rates among adolescents aged 14 to 18 years of age was 0.4 per 100,000.

Hepatitis B virus is a bloodborne and sexually transmitted virus. It is acquired by percutaneous and mucosal exposure to blood or body fluids from an infected person. Men who have sex with men (MSM) are at increased risk for hepatitis B. Approximately 35 percent of cases of acute hepatitis B occur in people who report no recognized risk factor. The most commonly reported risk factors for transmission in the United States are high-risk sexual activity and injection drug use. The incubation period is 45 to 180 days (average 60 to 90 days). Positivity for HBeAg is linked to an increased risk of hepatocellular carcinoma.

Fewer than half of acute hepatitis B cases will have jaundice (<10 percent of children, and 30 percent to 50 percent of adults). The onset is usually insidious with anorexia, nausea, vomiting, abdominal discomfort, jaundice, occasional arthralgias and rash. Chronic HBV infection is found in about 0.5 percent of adults in North America. An estimated 15 percent to 25 percent of persons with chronic hepatitis B will progress to cirrhosis or hepatocellular carcinoma.

A vaccine became available in 1982. In Illinois, hepatitis B vaccination in children was mandated in 1997. CDC also recommends vaccination for MSM’s, certain travelers, injection drug users, heterosexuals with multiple sex partners or with sexually transmitted diseases, clients or staff in developmentally disabled institutions, health care workers with blood contact, some immigrants, hemodialysis patients, household contacts and sexual partners of hepatitis B virus carriers and male prisoners. During 2004, 6,212 acute hepatitis B cases were reported to CDC from across the United States. The incidence of acute hepatitis B declined 75 percent from 1990 to 2004, with the greatest decrease in children and adolescents. The incidence is highest in adults who account for about 95 percent of new cases in 2004.

Case definition

The CDC case definition is used as the surveillance case definition for hepatitis B in Illinois: a clinical illness with a discrete onset of symptoms and jaundice or elevated serum aminotransferase levels, and laboratory confirmation. Laboratory confirmation consists of IgM anti-HBc-positive (if done), or HbsAg-positive, and IgM anti-HAV-negative (if done).
Descriptive epidemiology
- Number of cases reported in Illinois in 2004 - 111 confirmed acute cases (five-year median = 185) (see Figure 46). The overall one-year incidence rate of reported acute hepatitis B in Illinois was 0.9 cases per 100,000 population
- Age – Acute hepatitis B is primarily a disease of adults. (Figure 47).
- Gender - 68 percent were male. The incidence per 100,000 in males was 1.2 as compared to 0.55 in females.
- Race/ethnicity – Thirty-eight percent of cases were African American and 45 percent were white; 8 percent were Hispanic.
- Geographic location – The majority of the cases were reported from Cook County (60), followed by Winnebago (eight) and DuPage (seven).
- Outcomes – No cases were fatal.

Summary
There were 111 confirmed acute hepatitis B cases reported in Illinois in 2004.

Suggested readings
Hepatitis C

Background

Hepatitis C virus (HCV), an RNA virus, is the most common chronic bloodborne infection in the United States. There are at least six distinct genotypes of HCV; types 1a and 1b are most common in the United States. It is estimated that 1.8 percent of United States residents have been infected with HCV. The incubation period for HCV ranges from two weeks to six months, most commonly six to nine weeks. Many individuals are asymptomatic and only a small proportion become jaundiced. Forty percent of infected adults are symptomatic, and 85 percent of adults with acute hepatitis C develop persistent infection. Acute hepatitis C is uncommon.

The most efficient route of transmission is by direct percutaneous exposure (e.g., blood or blood product transfusion, organ or tissue transplants, and sharing of contaminated needles between injection drug users [IDUs]). Low efficiencies of transmission occur from sexual and household exposure to an infected contact. Transmission of HCV has been reported from patient to health care worker. The virus has been shown to be transmitted by the use of shared drug preparation equipment such as drug cookers and filtration cotton. In the United States, injection drug use accounts for 60 percent of HCV infection, sexual contact (20 percent) and other exposures (household, perinatal and occupational) for 10 percent. Ten percent of cases have no identified risk factor. The rate of transmission after needle-stick injury from a known infected person is less than 10 percent.

Hepatitis C is the most common indication for liver transplantation in adults and accounts for about 40 percent of all transplants in the United States. About 50 percent to 80 percent of patients with pretransplantation viremia develop hepatitis in the liver graft.

The hepatitis C virus can cause chronic hepatitis, cirrhosis and hepatocellular carcinoma. Among adults who had acute hepatitis C, 26 percent to 50 percent developed chronic active hepatitis and 3 percent to 26 percent developed cirrhosis. Heavy alcohol use increased the risk for developing cirrhosis. Anti-HCV positive persons had a 5- to 50-fold higher risk of primary hepatocellular carcinoma compared to anti-HCV negative patients. These sequelae typically take 20 or more years to develop.

Routine screening for HCV infection is recommended only for persons who have a history of ever injecting drugs, recipients of clotting factor concentrates prior to 1987, recipients of blood transfusions or solid-organ transplants prior to July 1992, and chronic hemodialysis patients. Screening is also recommended for sex partners of HCV-infected persons, infants 12 months or older who were born to HCV-infected women, and health care workers after accidental needle-sticks or mucosal exposure to anti-HCV-positive blood. There is no vaccine or effective post-exposure prophylaxis to prevent HCV infection.

Diagnostic tests for HCV infection include serologic assays for antibodies and molecular tests for viral particles. Screening tests for HCV include enzyme immunoassays (EIAs) to measure anti-HCV antibody. While these tests are highly sensitive, they do not distinguish between acute, chronic or resolved infections. False-positive results are common, resulting in the need for supplementary testing. Diagnostic testing for HCV should include use of both an EIA and supplemental or confirmatory
testing with a more specific assay such as the recombinant immunoblot (RIBA, Chiron Corporation). RIBA results are reported as positive, indeterminate or negative. It is not as sensitive as the EIA and should not be used for screening.

Persons with chronic hepatitis C should not drink alcohol and should be vaccinated for hepatitis A and hepatitis B. HCV-positive persons should not donate blood, organs, tissues or semen. There is insufficient data to recommend that infected persons change sexual practices with steady partners. HCV-positive household members should not share toothbrushes or razors.

Treatment for hepatitis C may be recommended for persons with elevated serum alanine aminotransferase (ALT) and tests that indicate the presence of circulating HCV RNA. HCV RNA levels do not correlate with grade or stage of disease. Genotype is a predictor of response to therapy. Genotype 1a and 1b HCV infection, the most common types in the United States, has a poorer response to therapy than other types. Response to therapy is higher in those with genotypes 2 and 3.

It is difficult to monitor acute hepatitis C rates because there is no serologic marker for acute infection and limited resources for investigation.

Case definition

The CDC case definition which is used in Illinois is a discrete onset of symptoms with either jaundice or liver enzymes (ALT or AST) >2.5 x upper limit of normal and negative serology for acute hepatitis A and hepatitis B and positive for HCV antibody confirmed by a supplemental test (or simply positive for HCV by the supplemental test). Case information for 2004 was acquired from Epi Info file and from paper records.

Descriptive Epidemiology

• Number of cases in Illinois in 2004 – 15 cases of acute hepatitis C.
• Age – Acute hepatitis C cases ranged in age from 19 to 71 years (mean age =43).
• Gender - Fifty-three percent of acute hepatitis C cases were male.
• Race/ethnicity - For acute hepatitis C cases, 73 percent of cases were white, 20 percent were African American and 7 percent were Asian; None reported Hispanic ethnicity.
• Geographic location – Eleven counties reported cases. No counties reported more than two cases of acute hepatitis C.
• Risk factors - For acute hepatitis C, five of 10 (50 percent) cases reported a history of injection drug use in the six weeks to six months prior to onset. Two of the five cases only reported IDU, three of the five reported IDU use and other risk factors such as receipt of tattoo or piercings. Risk factor information was unknown for five cases. No risk factors were reported by one individual. Other risk factors reported by cases included work in the receipt of tattoo/piercing (two), medical field (one) and dialysis (one).
• Symptoms/outcomes – Six of 10 (60 percent) of acute hepatitis C cases with histories were jaundiced, six of 11 (54 percent) were hospitalized and no cases were fatal.
Summary

Fifteen cases of acute hepatitis C were reported in 2004. All five cases with risk factor information reported a history of injection drug use. Most cases of hepatitis C are chronic or resolved.
Histoplasmosis

Background
Histoplasmosis is a systemic fungal disease caused by *Histoplasma capsulatum*. Transmission occurs through inhalation of the organism. The incubation period ranges from three to 17 days. Signs and symptoms of histoplasmosis include fever, headache, muscle aches, cough and chest pain. Patients who have underlying lung disease may develop chronic lung disease after *H. capsulatum* infection. Bird and bat droppings are beneficial to the growth of the organism. Diagnosis of infection can be through culture or serology. The M precipitin alone indicates active or past infection. The H precipitin indicates active disease or recent infection.

Histoplasmosis can be a severe infection in persons with HIV or other immunocompromising conditions. Approximately 5 percent of persons with AIDS who live in endemic areas may develop histoplasmosis, which frequently disseminates. Occupational outbreaks of histoplasmosis are reported. In 2004, an outbreak of histoplasmosis occurred in 25 workers at a local agricultural processing plant in Nebraska. These workers were believed to have been infected after movement of soil that had previously caused a histoplasmosis outbreak.

Case definition
Histoplasmosis is not a nationally notifiable disease. The case definition for histoplasmosis in Illinois is either:

1) Isolation of the organism from a clinical specimen in patients with acute onset of flu-like symptoms, or

2) In patients with flu-like symptoms, hilar adenopathy and/or patchy infiltrates found on chest radiograph, if done, and at least one of the following
   a. M or H precipitin bands positive by immunodiffusion
   b. A four-fold rise between acute and convalescent complement fixation (CF) titers
   c. A single CF titer of >1:32
   d. Demonstration of histoplasma polysaccharide antigen by radioimmunoassay (RIA) in blood or urine, or demonstration of organisms by silver staining blood specimens or biopsy material

3) Probable case: clinically compatible illness and epidemiologic link to known outbreak

Case information was obtained from INEDSS and from paper records for this year.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 - 96 (five-year median =59) (see Figure 48). At least 24 of 46 (52 percent) of these cases were in immunocompromised persons; therefore, for these 24 cases it is not possible to determine whether they represent new infections or reactivation of previous infections
- Age - Mean age was 48 years (range was younger than one year to 85 years (Figure...
98)

- **Gender** – Fifty-six of 96 cases (58 percent) were male.
- **Race/ethnicity** - Ninety percent were white, 9 percent were African Americans and 1 percent were Asian; 3 percent were Hispanic.
- **Disease type** – Of 55 cases with detailed disease information, 35 (64 percent) had disease localized to the respiratory system and 20 (36 percent) had disease outside the respiratory tract. Of 54 cases with chest X-ray results, 47 (87 percent) had abnormalities.
- **Symptoms** – fever, 45 of 65 (69 percent); cough, 39 of 65 (60 percent); difficulty breathing, 38 of 65 (58 percent); night sweats, 32 of 62 (52 percent) and chest pain, 23 of 62 (37 percent). Twenty-seven percent reported being current smokers.
- **Diagnosis** – Forty-nine cases were confirmed by culture. Cultures were positive from blood (22 cases), sputum (one case), bronchial wash (13 cases), lung tissue (12 cases) and tongue (one case). Twelve had positive smears. Twenty-five were M band positive by immunodiffusion. Sixteen had complement fixation titers $\geq 1:32$. Some cases had multiple positive laboratory results positive.
- **Seasonal variation** – Cases increased in the winter months (See Figure 50).
- **Geographic variation** – The two counties reporting the most cases were Cook (23) and Sangamon (12).
- **Reports of exposure to the following (not reported for all cases)** - Construction (27 percent), bird droppings (25 percent), potting soil (20 percent), plowing (19 percent), excavation (13 percent), dirt arenas or barns (14 percent), bird raising (9 percent), bats in an attic (3 percent) and caves (3 percent).
- **Outcomes** – Ninety-four (99 percent) were hospitalized; four cases were known to be fatal.
- **Outbreaks** - No outbreaks were reported in 2004.

**Summary**

Ninety-six cases were reported in 2004 as compared to 57 in 2003. No outbreaks were reported.

**Suggested readings**

Figure 48: Histoplasmosis Cases in Illinois, 1999-2004

Figure 49: Age Distribution of Histoplasmosis Cases in Illinois, 2004

Figure 50: Histoplasmosis Cases in Illinois by Month, 2004
Legionellosis

Background

*Legionella* spp are a group of intracellular pathogens that are ubiquitous in aquatic environments and multiply inside free-living amoebae when in warm water. There are 48 species of *Legionella* and several serotypes. *L. pneumophila* serotype 1 is responsible for most lower respiratory tract infections. Nineteen other *Legionella* species have been documented as human pathogens based on isolation from clinical material. *L. pneumophila* 1,3,4, and 6 cause most human infections.

The two major clinical manifestations of infection with *Legionella* bacteria are Legionnaires’ disease (legionellosis) and Pontiac fever. Legionellosis may be epidemic or sporadic, nosocomial or community acquired. The incubation period is two to 10 days (average five to six days). For Pontiac fever, it is five to 66 hours (average 24–48 hours). Initial symptoms of both are anorexia, myalgia and headache often followed by a nonproductive cough and diarrhea. Patients with legionellosis clinically have pneumonia and abnormal chest radiographs.

Legionellosis most often occurs in those who are immunocompromised due to disease or aging. Risk factors are underlying medical conditions such as human immunodeficiency virus, organ transplantation, renal dialysis, diabetes, chronic obstructive pulmonary disease, cancer, immunosuppressive medication or smoking. Pontiac fever is an acute, febrile illness with a high attack rate, short incubation period and rapid recovery. Most cases are sporadic (not associated with a known outbreak). Outbreaks have been associated with aerosol producing devices such as whirlpool spas, showers, humidifiers, respiratory care equipment, evaporative condensers, air conditioners, grocery store mist machines and cooling towers, and have occurred in industrial settings. Approximately 20 percent of all Legionnaires’ disease cases are associated with recent travel. Many are thought to be associated with potable water systems in hotels or whirlpool spas in hotels or on board cruise ships. *Legionella* are widely distributed in the environment including lakes, rivers, creeks and also in potable water supplies; amoebae are the natural hosts in the environment. An outbreak in Maryland in 2003 and 2004 was believed to have been linked to a hotel’s potable water system. *Legionella* was cultured from water.

*Legionella* urine antigen testing and culture of respiratory secretions are useful for diagnostic testing. The urine antigen test provides rapid diagnosis for *L. pneumophila* serogroup 1 but will not provide an isolate to compare to clinical and environmental isolates gathered during outbreak investigations. Testing for *Legionella* species is not performed by the IDPH laboratory. Most test results among reported cases are from hospital or commercial laboratories.

In 2004, 2,093 cases of legionellosis were reported to CDC from state health departments.

Case definition

A confirmed case in Illinois is one that meets the CDC case definition, i.e., a clinically compatible illness with laboratory confirmation of disease by 1) isolation of *Legionella* from lung tissue, respiratory secretions, pleural fluid, blood or other normally...
sterile sites; or 2) demonstration of a fourfold or greater rise in the reciprocal indirect fluorescence (IF) antibody titer to \( \geq 128 \) against \( L. \text{pneumophila} \) serogroup 1 between paired acute and convalescent phase serum specimens; or 3) demonstration of \( L. \text{pneumophila} \) serogroup 1 in lung tissue, respiratory secretions, or pleural fluid by direct fluorescent antibody (FA); or 4) demonstration of \( L. \text{pneumophila} \) serogroup 1 antigens in urine by radioimmunoassay (RIA) or enzyme-linked immunoassay (ELISA). Data for this disease was obtained from INEDSS records for 2004 and paper records.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 55 (five-year median =33) (Figure 51).
- Age – Thirty-three (61 percent) were older than 50 years of age (see Figure 52). The mean age was 56 years of age.
- Gender - Forty (73 percent) cases were male.
- Race/ethnicity – Thirty-nine (89 percent) of cases with information available were white.
- Seasonal variation - Fourteen (25 percent) of cases with the information had a date of onset in July or August.
- Geographic distribution – Eighteen counties reported cases with 20 (36 percent) from Cook County.
- Risk factors - Four of 28 cases (14 percent) had been hospitalized continuously for three or more days before onset; one (3 percent) was discharged from the hospital within 10 days before onset; 22 (78 percent) had no hospital visits in the 10 days before symptoms, one (3 percent) had other types of health care exposure and 27 cases had no information on hospital visits immediately prior to onset. Nine of 26 cases (35 percent) traveled overnight in the two weeks prior to onset. At least one underlying health problem among diabetes (seven), cancer (nine), transplant (three), renal dialysis (two), corticosteroid therapy (seven), other immunosuppressive condition (five) or smoking (11) was reported by 25 of 30 (80 percent) cases with that information; 20 percent reported no underlying health problems. Ten cases had two or more underlying risk factors.
- Diagnosis - Cases were diagnosed through urine antigen alone (28), serology only (six), culture of respiratory secretions or blood alone (seven), direct fluorescent antibody (one), multiple methods (two) or unknown (11).
- Outcomes - Hospitalization was required for 39 of 41 cases with hospitalization information available; 39 cases with information available had X-ray confirmed pneumonia; five cases were reported to be fatal.
- Outbreaks – No outbreaks were reported in 2004.

Summary

In 2004, there were 55 cases of legionellosis reported in Illinois. Eighty percent of cases had pre-existing medical conditions. There were no outbreaks of legionellosis in 2004.
Suggested readings


Lyme disease

Background
Lyme disease is a tickborne zoonotic disease caused by the bacterium *Borrelia burgdorferi* sensu lato. The reservoir is the black-legged tick (*Ixodes scapularis*), commonly called the deer tick. Human disease is thought to be primarily caused by nymphal tick bites, usually in late spring or summer. Babesiosis and ehrlichiosis also are transmitted by the same tick. In the Midwest, wild rodents and other animals maintain the transmission cycle. Deer are the preferred host of the adult tick.

Laboratory studies indicate ticks must be attached for > 24 hours for transmission to humans to occur. Experiments in animals have shown that most often the tick must feed at least 48 hours before the risk of transmission becomes substantial.

Erythema migrans (EM) is an expanding red annular rash and is a characteristic sign of most early localized cases of Lyme disease. The rash may be followed by cardiac, neurologic and/or rheumatologic involvement. The incubation period for EM ranges from three to 32 days (mean: seven to 10 days) after tick exposure; it is present in 80 percent to 90 percent of case patients. EM may be characterized by a homogenous rash rather than a target appearance because of early presentation for treatment. Early manifestations include fever, headache, fatigue, migratory arthralgias and possibly lymphadenopathy. It can take approximately two to four weeks or longer for antibodies to be detected by blood tests so these tests are not required for patients diagnosed with EM in the public health surveillance case definition.

There were 19,804 cases of Lyme disease reported in 2004 in the United States, mainly from the Northeast, mid-Atlantic and north-central regions of the country. This was a decrease of 17 percent from 2002. All but five states reported cases during 2004. Ten states - Connecticut, Delaware, Maryland, Massachusetts, Minnesota, New Jersey, New York, Pennsylvania, Rhode Island and Wisconsin - accounted for 92 percent of all cases reported.

Effective prevention measures include personal protective measures (tick checks, repellents) and decreasing tick exposure.

Case definition
The surveillance case definition for Lyme disease in Illinois is the CDC definition: 1) erythema migrans, or 2) at least one late manifestation (musculoskeletal system, nervous system or cardiovascular system) and supportive laboratory evidence of infection or laboratory confirmation, i.e., isolation of *B. burgdorferi* from a clinical specimen, or demonstration of diagnostic immunoglobulin M or immunoglobulin G antibodies to *B. burgdorferi* in serum or cerebrospinal fluid (CSF). A two-test approach using a sensitive enzyme immunoassay or immunofluorescence antibody followed by Western blot is required by IDPH for confirmation of non-EM cases.

Descriptive epidemiology
• Number of cases reported in Illinois in 2004 - 87 (five-year median = 35) (See Figure 53). The incidence was 0.7 per 100,000.
• Age - Cases ranged in age from 4 to 83 years of age.
• Gender - Fifty-four (62 percent) were male.
• Race/ethnicity – Seventy-nine cases (95 percent) for which race is known were white, four (5 percent); two (two percent) also identified themselves as Hispanic.
• Seasonal distribution – Lyme disease case onsets were most common in the months of May through August in 2004 (Figure 54).
• Tick Distribution – A map of Illinois with the distribution of known *Ixodes scapularis* (the vector for Lyme disease) is provided (Figure 55). The blacklegged tick was found in two areas along the east branch of the DuPage river.
• Geographic distribution - The Illinois exposure locations for the 2004 cases are shown in Figure 56. Thirty two cases reported exposure in northern Illinois. Three cases had exposure locale information indicating multiple counties of exposure in northern Illinois (Bureau or Ogle-one, Carroll or Jo Daviess-one, Ogle or Rock Island-1). During 2003 and 2004, two Lyme disease patients were reported with DuPage County exposures. One case reported exposure in central Illinois, Sangamon County (one). Three cases reported exposures in southern Illinois. Fifty cases reported out-of-state exposures including: Connecticut (one), Kentucky (one), Massachusetts (one), Michigan (two), Minnesota (one), New Hampshire (one), New Jersey (one), New York (two), Pennsylvania (two), Virginia (one), Wisconsin (36) and Europe (one). One person had an unknown exposure history.
• Symptoms - Qualifying manifestations were EM (68), rheumatologic signs (10) and neurologic signs such as Bell’s palsy (nine).
• Prevention Activities - In 2003 and 2004, Jo Daviess County reported a dramatic increase in Lyme disease cases. Prior to 2003, the Jo Daviess CHD reported one to three cases a year. During 2003 they reported eight cases and in 2004 they reported 11 cases. A Lyme disease educational program was provided by the LHD to local health care providers after 2004 also showed an increase. Reports of Lyme disease also can be combined with environmental investigations of an area to identify whether blacklegged ticks have become established in the area.

**Summary**

For the 87 cases reported in Illinois residents during 2004, EM was the most common qualifying manifestation for Lyme disease. The number of cases peaked in the summer months. A higher than normal number of cases occurred in Jo Daviess County. The number of reported cases of Lyme disease has increased every year in Illinois since 2001.

**Suggested readings**
Figure 53. Lyme Disease Cases in Illinois, 1999-2004

Figure 54. Lyme Disease Cases in Illinois by Month, 2004
Figure 55. Illinois Map of Reported Exposure Location of Lyme disease Cases by County

Known Geographic Distribution of Ixodes scapularis by county in Illinois 2004

*Ixodes scapularis* is also known as the “deer tick” and the “black-legged tick.” *Amblyomma americanum*, the lone star tick, and *Dermacentor variabilis*, the American dog tick, should be presumed present throughout the state.

Shaded counties denote where the “deer tick” has been found repeatedly in the environment and is believed established. CDC criteria for “established” ticks are at least 6 ticks or 2 life stages (larvae, nymphs, adults) identified.

Cross-hatched counties denote where additional reports suggest the “deer tick” is present and may be established.

Additional tick and host surveillance activities not depicted on this map may have been conducted by other agencies/organizations in Illinois - findings reflected on this map are those reported to the Illinois Department of Public Health (IDPH). IDPH does not perform testing for disease pathogens in ticks but identification for genus and species is performed at IDPH when the tick is intact and sent in a crush-proof container to:

Illinois Department of Public Health
Entomologist, Division of Environmental Health
525 West Jefferson - 3rd Floor
Springfield, IL 62761
(217) 782-5830
Figure 56. Illinois Map of Lyme Disease Cases by County of Exposure for Cases Exposed Within Illinois, 2004
Malaria

Background

Malaria is a very important global parasitic disease. It is endemic in more than 100 countries. The incubation period may range from seven days to 10 months. Symptoms of malaria include fever, headache, muscle aches, fatigue, diarrhea and vomiting. Four species of *Plasmodium* (*P. vivax*, *P. falciparum*, *P. malariae* and *P. ovale*) cause disease in people. *P. vivax* malaria is the most common form. *P. falciparum* is the most common species in tropical areas and causes the most malaria deaths. The majority of malaria-endemic countries are in sub-Saharan Africa, Southeast Asia and Latin America. More than 90 percent of the incidence of malaria in the world occurs in sub-Saharan Africa and two-thirds of the remaining cases occur in India, Myanmar, Afghanistan, Vietnam and Colombia. The highest risk of malaria is for travelers to sub-Saharan Africa, Papua New Guinea and the Solomon Islands. About 90 percent of *P. falciparum* infections are acquired in Africa. More than 70 percent of *P. vivax* infections are due to exposures in Asia or Latin America.

Immunity lasts less than two years once a person leaves an endemic area. Many persons who travel back to their home country assume they are immune. Identification of the species is important because treatment can differ. For example, disease caused by *P. falciparum* has a more serious prognosis and must be treated differently. Untreated *P. falciparum* can progress to coma, renal failure, pulmonary edema and death. The majority of fatal cases in the United States are due to not using correct chemoprophylaxis, incorrect initial chemotherapy and delays in malarial diagnosis. One of the most important diagnoses to consider in recent travelers with fever is malaria. Imported malaria cases occur in Illinois when someone with the disease immigrates to the United States or when someone who travels overseas uses inadequate chemoprophylaxis. Persons traveling to malarious areas should take recommended chemoprophylaxis regimens and use appropriate personal protective measures against mosquito bites (using mosquito nets at night when accommodations do not protect against mosquitoes and repellents). The risk of malaria depends on geographic location of travel, urban versus rural stay, type of accommodations, duration of stay, time of the year, activities, elevation and compliance with preventive measures. In the United States, malaria is transmitted predominantly by the bite of an infective female anopheline mosquito in travelers while overseas. Other less common methods would include infected blood products, congenital transmission or local mosquito borne transmission. Malarial infection or relapse during pregnancy results in risk to the mother and fetus including maternal anemia, spontaneous abortion, perinatal mortality, low birthweight and prematurity. Symptoms in newborns included fever, poor appetite, irritability and lethargy and the symptoms mimic sepsis.

Malaria should be considered in the differential diagnosis of illness in persons with 1) persons with fever and a history of travel to areas where malaria is endemic, including immigrants, 2) fever of unknown origin, regardless of travel history, 3) ill neonates and young infants with fever and mothers who have immigrated or traveled to areas where malaria is endemic.

In 2004, 1,324 malaria cases were reported to CDC through the National Malaria
Surveillance System in the United States including four fatal cases. The species of malaria identified in these cases was *falciparum* (50 percent), *vivax* (24 percent), *malariae* (4 percent) and *ovale* (2 percent). In 20 percent of cases the species was unknown. All but four of the cases reported to CDC were imported. The majority of infections in the United States were acquired in Africa (68 percent), followed by Asia (14 percent), the Americas (14 percent) and Oceana (3 percent). West Africa accounted for 74 percent of cases acquired in Africa and India accounted for 66 percent of the cases in those acquired in Asia. Seventy percent of cases acquired in the Americas were acquired in Central America and the Caribbean, followed by 20 percent in South America and 10 percent in Mexico. Travelers to East Africa had the highest risk for being reported with malaria followed by travelers to central Africa and West Africa.

Sixty-five percent of United States citizens with malaria did not take any chemoprophylaxis while traveling and 10 percent had not taken a CDC-recommended drug for the area visited. Of the 160 patients who contracted malaria after taking a recommended antimalarial drug for chemoprophylaxis, 39 percent reported compliance with the regimen, 46 percent reported noncompliance and 16 percent had missing compliance information. For *P. vivax* or *P. ovale*, if onset develops 45 days after arriving in the United States this is consistent with relapsing infection and does not indicate primary prophylaxis failure. Of the imported malaria cases, 73 percent occurred among United States residents and 27 percent among residents of other countries diagnosed in the United States. Of the United States’ civilians with malaria, 53 percent of persons had visited friends or relatives in malarious areas. The second leading reason for travel was missionary work (11 percent) followed by tourism (9 percent).

**Case definition**

Illinois uses the CDC case definition. A confirmed case is a person (symptomatic or asymptomatic) with an episode of microscopically confirmed malaria parasitemia diagnosed in the United States, regardless of whether the person experienced previous episodes of malaria while outside the country.

Case information for this report were acquired from paper records and the 2004 Epi Info database.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2004 - 47, all of which were among non-military personnel and imported from outside the United States (5-year median = 68) (see Figure 57).
- Age - Peak incidence occurred in the 20- to 49-year-old age groups; the mean age was 35. (Figure 58)
- Race/ethnicity – Fifty-seven percent were African American, 20 percent were white, 20 percent were Asian and 2 percent were other races; 3 percent were Hispanic. There were significantly higher proportions of African Americans with malaria compared to their presence in the Illinois population and significantly lower proportions of whites and Hispanics with malaria compared to the Illinois population.
• Seasonal variation - Cases of malaria were reported throughout the year although less cases were reported each month from February through April (Figure 59).

• Speciation - The malaria species identified in the reported cases were *P. falciparum* (25 cases, 12 percent), *P. vivax* (nine cases, 22 percent), *P. malariae* (two cases, 5 percent), *P. ovale* (four cases, 10 percent) and unknown (seven cases).

• Treatment/outcomes - Twenty nine of 36 (80 percent) were hospitalized. No cases are known to have been fatal. The 25 *P. falciparum* cases were treated with the following medications: chloroquine (one case); doxycycline and quinine (eight); doxycycline (one); quinine (four); mefloquin (two); quinine and chloroquin (one); doxycycline, quinine and primoquin (two) and unknown (six). For *P. ovale*, treatment consisted of quinine (one); doxycycline and quine (one); primaquin and chloroquin (one) and unknown medication (one). Treatments used for nine *P. vivax* cases were primaquin (two); chloroquin and primaquin (two); doxycycline and quinine (one); malarone (one); primaquin, doxycycline and quinine (one) and unknown (two). For *P. malariae*, treatment was chloroquin (one case) and mefloquin (one). No cerebral malaria cases were reported.

• Risk factors - The major risk factor is travel outside the United States (Figure 65). Specific information was available for 37 of the 2004 cases. The only Asian countries reported by cases as travel destinations were India (six cases) and Pakistan (one). In Africa, the following travel destinations were reported: Nigeria (10 cases), Ghana (four), Uganda (one), Kenya (one), Madagascar (one), Burundi (one), West Africa (one), multiple countries (one) and unspecified “Africa” (five). Travel to the Far East was reported by two cases, one to Indonesia and one to New Guinea. Cases reporting travel to Central or South America reported visiting the Dominican Republic (one case), Honduras (one) and South America, not further specified (one).

Of the 10 cases reporting travel to Nigeria, seven cases were infected with *P. falciparum* and two with *P. ovale*. One case specimen was not speciated. All four cases with a travel destination of Ghana had *P. falciparum*. The six cases reporting travel to India were infected with two different species: *P. vivax* (four cases) and *P. malariae* (one). One case was not speciated.

• Cases provided the following reasons for travel overseas: visiting friends or relatives (14 cases), missionary work (two), business (three), student or teacher (one), tourism (two), immigrant or refugee (six) and other (two).

• Malaria prophylaxis was reported by only 10 of 33 cases providing information (30 percent). Cases indicated taking the following medications for the prevention of malaria: mefloquine (one), chloroquine (two), doxycycline (one), pyrimethamine (two), malarone (one) and multiple drugs (two).
- Past infection - Seven of 33 cases (21 per cent) reported a history of malaria in the previous 12 months.

**Summary**

There were 47 reported cases of imported malaria identified in Illinois in 2004, the 10th highest number of cases among the states. This was lower than the median number of cases in Illinois for the previous five years.

African Americans made up a higher proportion of persons with malaria than in the Illinois population. Laboratories should forward blood smears to the IDPH laboratory for verification of species. Laboratories should be thorough in identifying the species of this parasite because treatment differs by species (e.g., *P. vivax* and *P. ovale* require additional treatment with primaquine to prevent relapses) and simultaneous infection with more than one species does occur.

**Suggested readings**


Measles

Background
Measles is an acute viral illness that can cause severe pneumonia, diarrhea, encephalitis and death. Measles is a highly communicable viral disease with humans as the only natural host for the infection. Transmission most commonly occurs through airborne spread or through direct contact with nasal or throat secretions of infected people. The incubation period is about 10 days, but varies from seven to 18 days. Infected individuals show fever, conjunctivitis, coryza, cough and Koplik’s spots on the buccal mucosa, along with a rash that appears on the third to seventh day. The disease can be prevented by proper immunizations. A two-dose vaccination schedule is recommended in the United States, one at 12-15 months and one at school entry (4-6 years) or by 11-12 years. Sustaining high levels of vaccination is important to limit indigenous spread of measles from cases imported into the United States.

In the United States, measles mainly occurs in residents who are returning from abroad or who have contact with an infected traveler. Nationally, there were 37 cases reported to CDC. Confirmed measles cases occurred mainly among preschool-aged children (aged 1-4 years) followed by children aged 5-19 years. Twenty-seven (73 percent) of the 37 cases were imported; 14 (52 percent) cases occurred in United States residents who acquired measles while traveling overseas. Thirteen (48 percent) occurred in foreign nationals who acquired disease abroad and traveled to the United States. Ten (27 percent) cases were indigenous of which six (60 percent) were import-linked and four had unknown sources of exposure. Two outbreaks occurred, both from imported sources.

Case definition
A confirmed case in Illinois is one that meets the CDC definition, i.e., a case that is laboratory confirmed, or that meets the clinical case definition and is epidemiologically linked to a confirmed case. Laboratory confirmation consists of 1) isolation of measles virus from a clinical specimen, or 2) significant rise in measles antibody level by any standard serologic assay, or 3) positive serologic test for measles IgM antibody. The clinical case definition is an illness characterized by a generalized rash lasting \( \geq \) three days, and a temperature of \( \geq 101 \)° F, and a cough or coryza or conjunctivitis.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 - One imported case (See Figure 60). This measles case was confirmed.
- Age - The case was less than 1 year of age.
- Gender – The case was male.
- Onset – Onset was in December.
- Clinical Information – The patient survived.
- Geographic distribution - The case was from Madison County.
Summary

One case of measles was reported.

Suggested readings


Figure 60. Measles Cases in Illinois, 1999-2004
Mumps

Background
Mumps is transmitted by droplet spread and by direct contact with the saliva of an infected person. The incubation period is 12 to 25 days. This viral disease is characterized by fever and swelling and tenderness of salivary glands. Orchitis may occur in males and oophoritis in females. Winter and spring are the times of increased occurrence. Vaccination can prevent mumps. In 2004, 258 mumps cases were reported to CDC.

Case definition
A confirmed case in Illinois is one that meets the CDC case definition: a clinically compatible illness that is laboratory confirmed, or that meets the clinical case definition and is epidemiologically linked to a confirmed or probable case. A laboratory-confirmed case does not need to meet the clinical case definition. The laboratory confirmation may consist of 1) isolation of mumps virus from a clinical specimen, or 2) a significant rise in mumps antibody level by a standard serologic assay, or 3) a positive serologic test for mumps IgM antibody. The clinical case definition is an illness with acute onset of unilateral or bilateral tender, self-limiting swelling of the parotid or other salivary gland, lasting > 2 days, and without other apparent cause.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 - 10 (Figure 61). The previous five-year median was 16. Seven were confirmed and three were probable.
- Age - Median age was 14 years (range was four years to 73 years).
- Gender - Fifty percent were female.
- Race/ethnicity - Eighty percent were white, and 20 percent were unknown. No cases reported Hispanic ethnicity.
- Geographic distribution - Cases resided in six counties (Cook, Kane, McLean, Ogle, Perry and Whiteside).
- Seasonal variation - Cases occurred from January through August.
- Fatalities – No fatalities were reported.
- Immunization status - Fifty percent of cases were age-appropriately vaccinated; five cases had unknown vaccination status.

Summary
The median age of the eight reported mumps cases in 2004 was 14 years. More than half reported being appropriately immunized.
Figure 61. Mumps Cases in Illinois, 1999-2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>16</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
</tr>
<tr>
<td>2001</td>
<td>21</td>
</tr>
<tr>
<td>2002</td>
<td>18</td>
</tr>
<tr>
<td>2003</td>
<td>8</td>
</tr>
<tr>
<td>2004</td>
<td>10</td>
</tr>
</tbody>
</table>
Orf

Background

Orf is known as contagious ecthyma in sheep and goats. It is an acute infectious skin disease that causes papules and vesicles to develop around lips, legs and feet, nostrils, eyes and udder. Orf vaccine can minimize severity in the flock. However, the vaccine is modified live and can cause infection in persons who accidentally inject themselves with vaccine. It may be used in approximately 5 percent of United States sheep operations. Two vaccines are commercially available and local vaccine produced by the local veterinarian from the virus circulating on the farm may be used. In persons, orf is transmitted from direct contact with infected animals or contaminated equipment such as knives or shears or through injection of orf vaccine. Also, bottle feeding of infected lambs may result in human infection. Persons with skin breaks who come into contact with infected animals may be more at risk than those without breaks in the skin. Infections tend to occur in spring and summer during lambing season. Orf is in the same poxvirus family as smallpox, monkeypox, molluscum contagiosum and cowpox. Orf can be mistaken for other diseases. Differential diagnoses include monkeypox, cowpox and cutaneous anthrax. Diagnosis is by clinical appearance of the skin lesion and PCR of vesicle material, scab debris or tissue specimens at CDC. Preventive measures include handling infected animals with care, avoiding accidental injection of vaccine, not allowing infected animals to show and washing of hands after handling sheep or goats.

Case definition

A clinically compatible illness with positive PCR of vesicle material, scab debris or tissue specimens at the CDC laboratory.

Descriptive Epidemiology

In July 2004, a 16-year-old male from Madison County was bitten by a sheep while washing the sheep for the county fair. Three days later the teenager developed a skin lesion at the bite site (Figure 62). Within three weeks, the teenager sought care from a local clinician after a football injury at the same area. Orf was confirmed through polymerase chain reaction testing at CDC. The lesions healed spontaneously after two months. Active case finding failed to reveal any other orf infections in county fair attendees or staff.

Figure 62. Orf lesion from 2004 Illinois case.
Summary

A single case of orf was identified in a person who was getting a sheep ready for the fair. No other cases were identified.

Suggested readings

Pertussis

Background

Pertussis is a prolonged respiratory illness caused by the organism *Bordatella pertussis*. The incubation period is usually 7 to 10 days although it can range from 5 to 21 days. Pertussis is transmitted from person to person via aerosolized droplets from cough or sneeze or by direct contact with secretions from the respiratory tract of infectious persons. Pertussis can be highly infectious during the three weeks after onset of illness. Pertussis can start as nasal congestion, runny nose, mild sore throat, mild dry cough and minimal fever. The cough can become paroxysmal and terminate with an inspiratory whoop. Cough can be followed by post-tussive vomiting. Cough can persist for two to six weeks. Severe coughing side effects can occur pneumothorax, epistaxis, subconjunctival hemorrhage, subdural hematoma, hernia, rectal prolapse, urinary incontinence and rib fracture. Pertussis should be considered in adolescents and adults especially if the cough is associated with vomiting or gagging or persists more than two weeks. In the United States, children less than 6 months of age are at highest risk for severe illness or death. Most children in the United States do not complete their vaccination series until age 6 months.

Pertussis in adults may be missed because symptoms may be atypical, and nasopharyngeal cultures are rarely positive if taken during the first seven days of illness. The secondary attack rate is 80 percent in susceptible persons.

In order to confirm a diagnosis in symptomatic adults, health care providers should obtain a nasopharyngeal swab or aspirate for *B. pertussis* culture within two weeks of cough onset. Early reporting is essential to identify cases for treatment and contacts for prophylaxis. Even properly vaccinated children lose immunity three to 12 years after completing vaccination. There is an 80 percent secondary attack rate in susceptible persons.

Of the diseases for which childhood vaccination is recommended, only pertussis has increased in incidence in the United States. A resurgence of cases has been reported in the last decade in the United States. In 2004, 8.5 cases per 100,000 or 25,827 cases were reported in the United States. The number of pertussis cases in 2004 was the highest since 1959. New laboratory diagnostics such as PCR and increased reporting may have contributed to this increase. For the third year in a row pertussis cases increased. This is the highest number reported since 1959. Of these cases, the incidence was highest (137 per 100,000 population) in infants younger than six months of age (too young to have received three doses of vaccine). The incidence per 100,000 in other age groups was as follows: children aged 6 to 11 months (32), 1 to 4-year-olds (17), 5 to 9-year-olds (13), 10 to 19-year-olds (24), older than 19 years (3). Adolescents and adults account for the majority of cases (67 percent). Vaccine-induced immunity wanes about five to 10 years after pertussis vaccination.

Pertussis has increased in adults. Active immunization with five doses of vaccine at 2, 4, and 6 months, at 12-15 months and at school entry can prevent this disease. Vaccination is the most important prevention against pertussis. Neither vaccination nor natural disease confers complete or lifelong immunity. Close asymptomatic contacts can be administered postexposure chemoprophylaxis and symptomatic contacts can be
treated as cases. Outbreaks are managed through prompt treatment of patients and antimicrobial prophylaxis of close contacts.

**Case definition**

The case definition for pertussis in Illinois is a clinically compatible illness that is laboratory confirmed or epidemiologically linked to a laboratory-confirmed case. Laboratory confirmation is through culture of *B. pertussis* from a clinical specimen. A clinically compatible illness is a cough lasting at least two weeks with one of the following: paroxysms of coughing, inspiratory whoop or post-tussive vomiting (without other apparent causes) or greater than two weeks of cough in a person in an outbreak setting. A confirmed case is defined as a cough illness of any duration in any person with isolation of *B. pertussis* or a case that meets the clinical case definition and is confirmed by polymerase chain reaction or by epidemiologic linkage to a laboratory-confirmed case. A probable case meets the clinical case definition but is not laboratory confirmed or epidemiologically linked to a laboratory-confirmed case.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2004 - 1,604 (five-year median = 194) (Figure 63). Note: 1,554 were reported to CDC (several other cases were reported after the deadline for reporting to CDC). Of the 1,604 cases 983 were confirmed. The one-year incidence rate for pertussis was 12 per 100,000.
- Age – Twenty-two percent occurred in those younger than 5 years of age as compared to 34 percent in 2003 (Figure 64). In 2004, 26 percent of reported cases occurred in those older than 19 years of age. The incidence of cases in those older than 19 years of age is higher in Illinois than in the nation as a whole.
- Gender - Females comprised 56 percent of cases.
- Race/ethnicity – Seventy-seven percent were white, 5 percent were African American and 0.4 percent were in other races; 3 percent reported Hispanic ethnicity.
- Seasonal variation - Cases increased in August and September (Figure 65).
- Geographic location – Sixty-two local health jurisdictions reported cases. The jurisdictions with the most reported cases were Cook County Public Health Department (298), McHenry County Health Department (191), Lake County Health Department (164), Kane County Health Department (154), Will County Health Department (142) and Chicago Department of Health (132).
- Clinical Outcome – Two cases were fatal.
- Vaccination status – Vaccination status was known for 876 cases and 55 percent were appropriately vaccinated for their age.
- Outbreaks – Forty-four outbreaks were reported. A regional outbreak of pertussis occurred affecting middle school aged children (10-15 years of age) in Lake, McHenry, Cook and Kane counties.

**Summary**
The number of yearly reported pertussis cases has been increasing since 2000 in Illinois. The highest incidence occurred in those younger than 1 year of age. There were 1,604 pertussis cases reported in Illinois in 2004 including 44 outbreaks. Adolescent and adult pertussis cases have increased in Illinois and this follows a national trend in 2004.

**Suggested readings**

Figure 65. Pertussis Cases in Illinois by Month, 2004

Number of cases

Year

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

0 100 200 300 400

122
Q fever

Background

Q fever is an acute rickettsial disease. *Coxiella burnetti* is the causative agent. Q fever is a worldwide zoonosis. Phase I is found in nature and phase II after multiple laboratory passages in the laboratory. The infective dose can be very low, as low as one organism. Symptoms include fever, headache and severe sweats. Mild disease can be accompanied by hepatitis, pneumonia or meningencephalitis. Chronic Q fever may appear as endocarditis. Immunocompromised patients may relapse. Q fever in pregnant women may result in abortion, prematurity or low birth weight. Persons at higher risk of infection include animal workers. Men are at higher risk than females which may be due to a protective effect of female hormones. Q fever is more common in persons greater than 15 years of age. The animal reservoirs include sheep, cattle, goats, cats, dogs and some wild animals. The organism can be shed in high quantities in placental fluids at parturition. Ticks can be a rare source of infection in the United States. Q fever is most commonly transmitted through airborne dissemination of the organism in dust from premises contaminated with placental tissues and excreta of infected animals, in necropsy rooms or in animal processing establishments. Rarely, it can be transmitted from consumption of unpasteurized milk or cheese. The incubation period is from two to three weeks. Q fever is also a Category B bioterrorism agent. Outbreaks have been linked to aerosol transmission in heavy winds.

Seventy cases of Q fever were reported to CDC in 2004.

Case Definition

A confirmed case of Q fever is a clinically compatible illness with either isolation of *C. burnetti* from a clinical specimen, demonstration of *C. burnetti* in a clinical specimen by detection of antigen or nucleic acid, or a fourfold or greater change in serum antibody titer to *C. burnetti* antigen. A probable case is defined as a clinically compatible or epidemiologically linked case with an elevated serum antibody titer to *C. burnetti*.

Descriptive Epidemiology

- Number of cases reported in Illinois in 2004 – Five (four probable and one confirmed case).
- Ages – Cases ranged in age from 52 to 67.
- Gender - All five cases were male.
- Race/ethnicity - Four were white and one did not report race; none reported Hispanic ethnicity.
- Seasonal variation - Cases reported onsets in January, February, April, November and December (Figure 78).
- Geographic – Cases were reported from Dupage, Kane, Mercer, Shelby and Tazewell counties.
- Clinical syndrome – Two cases were diagnosed with endocarditis.
- Outcome – Two cases were hospitalized. No cases were fatal.
- Risk factors – Histories were available on all cases. Three of the four reported
exposures to sheep and goats. Two reported no animal exposures.

**Summary**

Five cases of Q fever were reported in Illinois if the third full year of reporting. Three of the five cases reported specific exposures to cattle, sheep and goats. States reporting the highest number of cases were California (11), Kentucky (four), Illinois, Texas and Arizona (five each).
Rabies

Background

In the United States, rabies is a disease that affects primarily wildlife populations. It is a neurologic illness that follows infection with a rhabdovirus. It produces encephalitis and typically progresses to death. Transmission of rabies to humans results from the bite of a rabid animal or from contact between the saliva of a rabid animal and a mucous membrane or wound. The rabies virus is inactivated by sunlight, heat and desiccation.

The incubation period is usually three to eight weeks. The length of the incubation period depends on the distance of the bite site to the brain, the severity of the wound, the amount of virus entering the body, the immune reaction of the host and whether the site of exposure is rich in nerve cells.

Bat variants of rabies were identified in skunks in Arizona in 2001. Typically interspecies infection produces small spillover event but secondary transmission among the spillover species rarely occurs. In Arizona, skunks transmitted bat rabies variants within the skunk species.

Symptoms may include fever, anxiety, malaise, and tingling and pruritus at the bite site. Neurologic signs, beginning two to 10 days later, may include hyperactivity, paralysis, agitation, confusion, hypersalivation and convulsions. The paralytic form of rabies must be differentiated from Guillain Barré syndrome. After two to 12 days, the patient may go into a coma and experience respiratory failure. Rabies should be considered in the differential diagnosis of any acute rapidly progressive encephalitis, regardless of documentation of an animal bite.

In 2004, the United States and Puerto Rico reported eight cases of human rabies and 6,836 cases of animal rabies. Wild animals accounted for 92 percent of the animal cases reported in the United States; the top three species with rabies were the raccoon, skunk and bat. The top six rabies-positive bats after speciation (not done in all states) were the big brown bat (61 percent), Mexican free-tailed bat (15 percent), Western pipistrelle (5 percent), little brown bat (4 percent), the hoary bat (4 percent) and red bat (3 percent). The most commonly identified rabid bat in the United States was the big brown bat. The peak of bat rabies in the United States occurs in August.

Eight human cases of rabies occurred in the United States in 2004. This is the highest number of cases since 1956, when 10 cases were reported. Two cases were due to rabies infection from bats in the United States. In October 2004, a Wisconsin resident was diagnosed with rabies after a bat bite one month earlier. The patient received no rabies PEP following the bat bite. Symptoms included diplopia, tingling and numbness at the bite site, unsteady gait, nerve palsies, slurred speech, tremors of the arm, fever, hypersalivation and nystagmus. The child was treated with supportive care, drug-induced coma and intravenous ribavirin under an investigational protocol and the child survived. This is the sixth known occurrence of human recovery after rabies infection. The five other patients who survived had all received at least some rabies vaccination before infection. Only one of the five cases recovered without neurologic complications. Thirty-seven persons received rabies PEP after exposure to the child with rabies. Another bat-associated case, an Arkansas resident, died and because
rabies was not recognized as the cause of death, four transplant associated cases (one from Oklahoma and three from Texas) also occurred. Lungs, kidney, iliac artery and liver were transplanted from the donor who had rabies. The donor was diagnosed with a subarachnoid hemorrhage leading to cerebral herniation and death. Lungs were transplanted into someone who died of intraoperative complications. The liver recipient developed symptoms of rabies 21 days after implantation. One kidney recipient developed symptoms 25 days after transplantation. The second kidney recipient developed rabies symptoms 27 days after transplantation. The donor was found to be positive by serology and had a history of bat bite. The patients had a bat rabies variant. The remaining two cases were from exposures outside of the United States. In California, an immigrant from El Salvador also developed rabies. In February 2004, a Florida resident who had recently arrived from Haiti died with a Haitian canine variant of rabies. The patient was bitten by a dog in Haiti about eight months earlier.

From 1990 through 2004, there have been 46 cases of human rabies in the United States and one in Puerto Rico. Ten persons were infected outside the United States. Thirty-four of the cases were infected with the rabies variant most prevalent in bats. Four cases were infected after a transplant from an infected patient.

In South Carolina, from 1993 to 2002, the incidence of post-exposure (PEP) administration was 11 per 100,000. In South Carolina, the state distributes biologics for rabies postexposure prophylaxis. Almost three-quarters of rabies PEP was administered after exposure to domestic animals.

The incidence in four counties in New York of rabies PEP was 27 per 100,000. PEP incidence was highest in persons 5 to 9 years of age and in those 30 to 34 years of age. Bats accounted for 30 percent of exposures resulting in PEP and dogs can cats accounted for 51 percent.

Over the past 40 years in Illinois, skunks and bats have been the main wildlife reservoirs of rabies virus. The last human case of rabies in Illinois was reported in 1954.

Case definition
The case definition for human rabies is a clinically compatible illness that is laboratory confirmed. Laboratory confirmation is through detection by direct fluorescent antibody (DFA) of viral antigens in a clinical specimen (preferably brain tissue or punch biopsy of the nape of neck, including at least 10 hair follicles where associated nerves are likely to show evidence of infection), or isolation of rabies virus from saliva or cerebrospinal fluid (CSF), or identification of a rabies-neutralizing titer of greater than 1:5 in the serum or CSF of an unvaccinated person. A case of animal rabies is confirmed by (DFA) of brain tissue. If samples are sent to CDC, as is normally done only for confirmation of a positive result in a domestic species, the CDC results are used as the final results for the purposes of this report.

Descriptive epidemiology
- Number of animals submitted for rabies testing in Illinois in 2004 – 4,659; 52 did not meet criteria established by the testing laboratories (Illinois Department of Agriculture and IDPH). Examples of unsatisfactory specimens are those determined to be too decomposed or too damaged to test. Fifty-one specimens
were DFA positive; 50 were bats and one was a horse (Table 6). Trends in animal rabies testing in Illinois are shown in Figure 66.

- **Exposures to rabid animals (See Table 7)**
  - There were 50 rabid bat situations.
  - In 36 of the 50 rabid bat situations, no human exposures sufficient to require rabies PEP occurred. In 12 of the rabid bat situations involving humans, some detail of the exposure was reported to IDPH by the local health department involved. Five exposures are known to have occurred in homes. In three situations the bat was found alive in a yard and resulted in human exposures; in another case the situation resulted in two children exposed. In one situation, a bat landed on a child's arm. In one situation a bat was found in a pool and exposed four teenagers who rescued it. In one situation a bat was found in a public works office and a person with gloves on was bitten through the glove. In another situation the bat was found hissing by a dog which picked up the bat and two persons received rabies PEP.
    - Domestic animals (all dogs or cats) were either exposed or possibly exposed to the rabid bat in eight of the 50 situations (Table 8).
    - Condition of bat when found – Fourteen of the rabid bats were down and unable to fly, two were killed by, brought home by or found dead near a pet, one was found foaming at the mouth and died, two were found in the kitchen, two were found dead on a sidewalk, three were found flying in home, three were found in pool and the behavior or status of the other 23 was not described.

- **Exposures to rabid horse** – There was one rabid horse situation.
  - A horse with anorexia and constipation and later aggression was tested positive for rabies. Eleven persons (four from the household and seven from the veterinary clinic) received post-exposure prophylaxis.

- **Testing of bats** - Bats accounted for 50 of 51 of the confirmed rabid animals in 2004. The total number of bats tested for rabies was 1,122 (positivity rate = 4.4 percent).
  - Geographic distribution - Rabid bats were dispersed in 18 counties across the state. The following counties had one positive bat each except where noted: Clinton, Cook (7), DeKalb, DuPage (2), Franklin, Jackson (2), Lake (2), LaSalle (3), Madison (2), Marion (3), McHenry (9), McLean (2), Sangamon, St Clair (2), Tazewell, Washington (2), Will (5) and Winnebago (4).
  - Speciation - The Illinois Natural History Survey speciates bats tested for rabies in Illinois (Table 9). In 2004, they speciated a total of 1,113 bats submitted for rabies testing. Of the 52 positive bats (*50 positive bats were reported in 2004, so it is possible that 2 of these rabid bats were from other years), 29 were big brown bats, 12 were red bats, four were hoary bats, three were little brown bats, two were Eastern pipistrelles and two were silver-haired bats. The negative bats were identified as: big brown bat (806), silver-haired bat (85), red bat (74), little brown bat (30), northern
long-eared bat (18), hoary bat (eight), eastern pipistrelle (six), evening bat (six) and unknown (eight).

- Seasonal variation - Figure 67 shows bats submitted for testing by month in 2004. Bats submitted for rabies testing increase in August and September.

- Testing of skunks - Rabies testing was performed on 100 skunks in 2004 as compared to 73 in 2003. At least one skunk from each of 23 Illinois counties was tested; no skunks were tested in 79 counties. The following counties have submitted skunks for rabies testing: Boone, Clinton, Cook, DeKalb, DuPage, Hancock, Jackson, Jo Daviess, Kane, Knox, Lake, Logan, Madison, McHenry, McLean, Mercer, Perry, Sangamon, Union, Wabash, Wayne, Will and Williamson. The county submitting the largest number of skunks for testing was Cook with 28, followed by Lake with 18 and Will with 10. The number of skunks tested in Illinois increased from 2003 to 2004.
  - For rabies surveillance to be optimal in Illinois an adequate number of skunks, the main terrestrial animal reservoir, must be tested. Test results from wild terrestrial mammals is one factor used to determine whether rabies PEP is recommended in cases of stray dog and cat bites. If enough skunks from throughout the state are not tested, recommendations against rabies PEP following such a bite cannot be made with confidence.
  - Figure 68 shows the number of rabid skunks found in Illinois and the road kill index from 1975 through 2004. The road kill index is calculated by the Illinois Department of Natural Resources as a measure of changes in the skunk population size. When the road kill index increases, the skunk population is increasing and conditions are likely to be suitable for a rabies epizootic in skunks. This last occurred in the late 1970s and early 1980s, when the road kill index and the rate of skunks testing positive both increased.

- Rabies positivity rate - Table 8 shows the rabies positivity rate in different species of animals in Illinois from 1971 to 2004. This information can be useful in explaining why rabies PEP is not recommended for the large majority of mouse, rat and squirrel bites. No rats, mice or squirrels have been identified with rabies in Illinois in more than 30 years. Because bats with rabies are identified almost every year in Illinois, rabies PEP is recommended for exposures to these animals and many other wild mammals unless they can be tested and are negative for rabies. When comparing the positivity rates for cumulative 1971-2004 data vs. 1991-2004 data, the percentage of skunks positive for rabies declined dramatically and the percentage of positive bats stayed very constant.

**Summary**

Bats were the main species identified with rabies in Illinois in 2004. Testing of skunks for rabies has declined in Illinois thereby decreasing the reliability of surveillance of the terrestrial animal reservoir in the state. One horse tested positive for rabies (skunk strain) indicating that skunk rabies is circulating in this part of the state. Local animal control jurisdictions are encouraged to increase submission of skunks for rabies.
testing to maintain surveillance in this species. There have been no human rabies cases in Illinois since 1954.

**Suggested readings**


Table 6. Animal Rabies Testing in Illinois in 2004

<table>
<thead>
<tr>
<th>Species</th>
<th>Total number suitable for testing</th>
<th>Total positive</th>
<th>% positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bat</td>
<td>1,122</td>
<td>50</td>
<td>4.4</td>
</tr>
<tr>
<td>Cat</td>
<td>1,067</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cattle/buffalo</td>
<td>332</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dog</td>
<td>1,499</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Coyote/fox</td>
<td>19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ferret</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Horse/donkey</td>
<td>12</td>
<td>1</td>
<td>8.3</td>
</tr>
<tr>
<td>Opossum</td>
<td>34</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Raccoon</td>
<td>155</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rodents/lagomorphs</td>
<td>226</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sheep/Goats</td>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skunk</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other*</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4,607</td>
<td>51</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**“Other” species tested in 2004 included alpaca, deer, kangaroo, mink, pig, shrew, sugar glider, weasel.**

*Source: Illinois Department of Public Health*
<table>
<thead>
<tr>
<th>Date</th>
<th>Human exposure?</th>
<th>Animal exposure?</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>Yes; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>May</td>
<td>None, bat found dead on sidewalk</td>
<td>None</td>
</tr>
<tr>
<td>May</td>
<td>No, bat found dead in apartment</td>
<td>Unvaccinated dog</td>
</tr>
<tr>
<td>May</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>June</td>
<td>No, exported to Ohio for research</td>
<td>None</td>
</tr>
<tr>
<td>June</td>
<td>None, bat found in empty dog run</td>
<td>None</td>
</tr>
<tr>
<td>June</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>June</td>
<td>Yes, one exposure; bat found hanging on garage</td>
<td>None</td>
</tr>
<tr>
<td>July</td>
<td>None; bat found on screen door</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>Yes, four exposed; bat flying in home</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>None</td>
<td>Dog</td>
</tr>
<tr>
<td>July</td>
<td>None; bat acting oddly, then died</td>
<td>None</td>
</tr>
<tr>
<td>July</td>
<td>Yes; found in yard alive</td>
<td>None known</td>
</tr>
<tr>
<td>July</td>
<td>None; found in kitchen</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>Yes, one exposed; found in yard when mowing barefoot</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>Yes, three persons exposed; found flying in living quarters</td>
<td>Dog</td>
</tr>
<tr>
<td>August</td>
<td>Yes, one child exposed; bat landed on her arm</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>None; was on house, fell off and killed by owner</td>
<td>Cats</td>
</tr>
<tr>
<td>August</td>
<td>None; details unknown</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>Yes, four teenagers exposed; teenagers rescued bat from pool</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>Yes, two persons; bat found alive</td>
<td>Dog, unvaccinated</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found dead</td>
<td>Three cats</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found on porch</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>None; found in swimming pool</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>Yes, one person; found in workplace building; bit through glove</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found in yard</td>
<td>Two dogs</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found in sink at workstation and died</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found outside and killed by person</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>None; bat found in pool</td>
<td>None</td>
</tr>
<tr>
<td>August</td>
<td>One person exposed; woke to find bat in room</td>
<td>Cat, unvaccinated</td>
</tr>
<tr>
<td>Month</td>
<td>Event Description</td>
<td>Notes</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>September</td>
<td>One person exposed; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>September</td>
<td>None; details unknown</td>
<td>None</td>
</tr>
<tr>
<td>September</td>
<td>None; found on sidewalk dead</td>
<td>None</td>
</tr>
<tr>
<td>September</td>
<td>None; found on porch</td>
<td>None</td>
</tr>
<tr>
<td>September</td>
<td>None; details unknown</td>
<td>None</td>
</tr>
<tr>
<td>September</td>
<td>None; details unknown</td>
<td>None</td>
</tr>
<tr>
<td>October</td>
<td>None; found on porch</td>
<td>Two cats</td>
</tr>
<tr>
<td>October</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>October</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>October</td>
<td>None known; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>October</td>
<td>Yes, one exposed; divebombed in yard and followed him into garage and killed bat</td>
<td>None</td>
</tr>
<tr>
<td>October</td>
<td>None; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>October</td>
<td>None; bat found alive in basement</td>
<td>Cat, euthanized</td>
</tr>
<tr>
<td>November</td>
<td>None known; details unknown</td>
<td>None known</td>
</tr>
<tr>
<td>November</td>
<td>None; bat found in kitchen</td>
<td>None known</td>
</tr>
<tr>
<td>November</td>
<td>Yes, two children touched bat; bat found outside alive, then died</td>
<td>None</td>
</tr>
</tbody>
</table>

Table 8. Rabies positivity rate by animal species in Illinois, selected time spans.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># tested</td>
<td># positive</td>
</tr>
<tr>
<td>Bat</td>
<td>12,349</td>
<td>603</td>
</tr>
<tr>
<td>Cat</td>
<td>43,561</td>
<td>141</td>
</tr>
<tr>
<td>Cattle</td>
<td>3,597</td>
<td>214</td>
</tr>
<tr>
<td>Dog</td>
<td>44,727</td>
<td>110</td>
</tr>
<tr>
<td>Fox</td>
<td>1,421</td>
<td>72</td>
</tr>
<tr>
<td>Horse</td>
<td>694</td>
<td>23</td>
</tr>
<tr>
<td>Mouse</td>
<td>4,707</td>
<td>0</td>
</tr>
<tr>
<td>Raccoon</td>
<td>9,482</td>
<td>17</td>
</tr>
<tr>
<td>Rat</td>
<td>1,863</td>
<td>0</td>
</tr>
<tr>
<td>Skunk</td>
<td>7,488</td>
<td>2,526</td>
</tr>
<tr>
<td>Squirrel</td>
<td>6,944</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Illinois Department of Public Health
Table 9. Bat Speciation Results from Bats Submitted for Rabies Testing in 2004

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th># testing neg.</th>
<th># testing pos.</th>
<th># unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Eptesicus fuscus</em></td>
<td>Big brown bat</td>
<td>806</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td><em>Lasiurus borealis</em></td>
<td>Red bat</td>
<td>74</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td><em>Lasiurus cinereus</em></td>
<td>Hoary bat</td>
<td>8</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td><em>Lasionycteris noctivagans</em></td>
<td>Silver-haired bat</td>
<td>85</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><em>Pipistrellus subflavus</em></td>
<td>Eastern pipistrelle</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><em>Myotis lucifugus</em></td>
<td>Little brown bat</td>
<td>30</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><em>Myotis septentrionalis</em></td>
<td>Northern long-eared bat</td>
<td>18</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><em>Nycticeius humeralis</em></td>
<td>Evening bat</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td>8</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1041</td>
<td>52*</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: Illinois Natural History Survey
*There were 50 bats identified as rabid in 2004; this data is from the Illinois Natural History Survey

Figure 66. Trends in Animal Rabies Testing in Illinois, 1990-2004

<table>
<thead>
<tr>
<th>Year</th>
<th># skunks tested</th>
<th># bats tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>1992</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>1994</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>1996</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>1998</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2002</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>2004</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>
Figure 67. Bat Testing for Rabies by Month, 2004

Number of bats tested

Month of testing

January  February  March  April  May  June  July  August  September  October  November  December

0  100  200  300  400

Figure 68. Skunk Rabies and Skunk Road Kill Index in Illinois, 1975-2004

Number of rabid skunks

Year


0  200  400  600

Rabid skunk  Road kill index

0  1  2  3  4  5  6

Road kill index
Rabies, Potential Human Exposure

Background
Exposures to animals, especially those involving bites or bat exposures, often result in the need for public health consultation on whether rabies post-exposure prophylaxis (PEP) is needed for the exposed individual. All animal bites in Illinois are reportable to local animal control for the purposes of following up with the owner of the biting animal. Animal control authorities are responsible for ensuring that dangerous animals are maintained so that they cannot injure the public. Potential human rabies exposures are reportable to human health including all instances when rabies post-exposure prophylaxis is initiated and all bat exposures.

Case definition
The definition of exposed person to be reported is:

1) Any contact (bite or non-bite) to a bat, or
2) Any contact (bite or non-bite) to an animal that subsequently tests positive for rabies virus infection, or
3) Anyone who was started on rabies post-exposure prophylaxis, or
4) Exposure to saliva from a bite, or contact of any abrasion or mucus membrane with brain tissue or cerebrospinal fluid of any suspect rabid animal. Exposure to healthy rabbits, small rodents, indoor-only pets or rabies-vaccinated dogs, cats or ferrets is excluded, unless the exposure complies with subsections (a)(1) through (a)(3) above, or the animal displays signs consistent with rabies.

Descriptive epidemiology
The following information was obtained from investigation forms obtained during the surveillance of potential human exposures to rabies in Illinois during 2004. The investigation forms had questions on demographics, exposure characteristics and rabies post-exposure treatment information. Not all local health jurisdictions have submitted investigation forms so this is a minimum estimate of the number of potential human rabies exposures in Illinois.

- Number of cases reported in Illinois in 2004 - 184 potential human rabies exposures were reported.
- Age - The mean age of those exposed was 32.
- Gender – Forty-one percent of RPHE reports were in males.
- Seasonal peak - Higher numbers of exposures occurred in the summer months of August and September.
- Geographic location – Thirty-five counties reported at least one RPHE. Sixty-six percent of exposures took place in urban settings.

Type of exposure
Three types of exposures can be summarized from the reports: bite, non-bite
(scratch or abrasion or contamination of open cuts with saliva or nervous tissue, bat present in room with sleeping person or physical contact with a bat where a bite cannot be ruled out) or non-exposure (petting, handling, blood contact, bat in room but no physical contact and no one asleep). Of the total exposures reported, 77 (42 percent) were due to animal bites, 86 (47 percent) from non-bite exposures and 18 (10 percent) no human exposure. In three situations the type of exposure was unknown.

Of the 70 bite exposures with the site of bite reported, most bites were to the arm or hand, 48 (68 percent), followed by leg or foot, 15 (21 percent) and head or neck, 7 (10 percent). The bite site was not indicated for seven bite exposures.

Of the 86 non-bite exposures, bats were found in the room with a sleeping person in 44 (54 percent) of exposures, physical contact with a bat took place in 20 (24 percent) of exposures, contact with saliva from a rabid horse resulted in 11 exposures (13 percent), contact with rabid sheep in a Texas petting zoo, two (2 percent) and other types of exposures occurred in five (6 percent) of non-bite exposures. Bats were tested in 15 of the 44 situations where they were found in a room of the house with a sleeping person. Twelve bats tested negative, one tested positive and two specimens were unsuitable for testing. Of the 12 testing negative, in eight situations only one of the multiple bats causing exposure was tested. For the 28 situations of physical contact with a bat, the bat was tested in 10 situations and eight were positive and two had unsatisfactory test results. The other five non-bite exposures included a person exposed when a bat hit their car and fluids came in through the window, a person exposed when breaking up a fight between a dog and a raccoon, a person scratched by a cat in India and two bats in a house but not in the room where someone was sleeping.

Animals causing exposure

The following information is by each individual person’s exposure history. Multiple individuals may have been exposed to a single animal. Of 184 animals causing exposures, 143 (78 percent) were wild, not domesticated animals. The types of animals causing exposures included bat, 123 (68 percent); raccoon, 16 (9 percent), cat, 11 (6 percent); dog, 11 (6 percent); horse, 11 (6 percent) and other, eight (4 percent). The type of animal was unknown for four exposure situations. Of the 37 domestic animals exposing persons, 17 (23 percent) were described as stray and 20 (54 percent) were owned. Sixteen (43 percent) of these animals had an unknown vaccination history, 17 (46 percent) were not rabies vaccinated, one (3 percent) had at least one previous rabies vaccination, but were not up to date and three (8 percent) were up to date on rabies vaccinations. Rabies vaccination of dogs is required in Illinois. Only two of 11 owned dogs causing exposures were known to be up to date on their rabies vaccinations. Sixteen (73 percent) of 22 bites from dogs and cats were provoked.

For domestic animal exposures, 16 (44 percent) were unavailable for either confinement or testing, 15 (42 percent) were tested for rabies and five (14 percent) were confined for observation. Five (25 percent) of the 20 owned domestic animals were owned by the family of the person bitten and 15 (75 percent) were owned by another individual.

Overall, 61 percent of animals were not available for confinement or testing. Sixty-six (36 percent) of animals potentially exposing someone to rabies were submitted
for rabies testing. Of the 66 animals tested for rabies, 29 (44 percent) were negative, 31 (47 percent) were rabies positive and six (9 percent) were unsuitable for testing. Eighteen people were exposed to positive bats, 11 to a positive horse and two to a rabies positive sheep in Texas. The specimens that were unsuitable for testing were from five bats and one cat.

Twenty-four animals were reported to exhibit signs of rabies. Signs of rabies included aggression, seven (29 percent); impaired locomotion, one (4 percent); no fear of humans, two (8 percent); other, three (12 percent) and multiple, 11 (46 percent).

Rabies post-exposure prophylaxis (PEP)

During 2004, 149 persons were reported to have started rabies PEP. The first recommendation about whether rabies PEP was needed for a person starting rabies PEP came from the following sources: public health personnel, 49 (35 percent) and health care provider, 93 (65 percent). For seven persons started on rabies PEP, the source of the recommendation was unknown.

The final recommendation on rabies PEP for those starting rabies PEP came from public health personnel, 71 (51 percent) and health care provider, 69 (49 percent). For nine exposed persons receiving PEP, the source of the final recommendation was not known.

For 95 (72 percent) of 132 persons with information available, rabies PEP was completed in an emergency department followed by completion in a physician’s office, 31 (23 percent). Most rabies PEP was paid for by private insurance, 69 (60 percent), followed by Medicare or Medicaid, 15 (13 percent), no payment source, seven (6 percent), worker’s compensation, 10 (9 percent) and out-of-pocket expense, seven (6 percent). Payment source was unknown for seven persons. Ten (6 percent) of persons recommended for rabies PEP refused to be treated.

Rabies PEP was completed in 126 (82 percent) of 147 persons for whom information was available. In 21 persons, rabies PEP was not completed. In eight persons rabies PEP was not completed because the animal was tested negative. Of these eight situations, six were bat exposures, one was a raccoon exposure and one was a cat exposure. The rabies PEP recommendation for these eight persons was made by health care providers. In one situation, the animal survived the confinement period, in three situations the patient refused to complete treatment, in one situation the person had a reaction to the rabies PEP products and four had other reasons.

Decisions on rabies PEP should be based on ACIP guidelines. For 173 exposed persons, it was possible to determine if the PEP recommendation followed ACIP guidelines. For 123 (71 percent) of these persons, rabies PEP was recommended and the recommendation followed ACIP guidelines. For 32 (18 percent) of persons, rabies PEP was recommended but this was not correct according to ACIP guidelines. For 17 persons (10 percent), rabies PEP was not recommended and that was correct according to ACIP. For one person PEP was not recommended and that was incorrect. In this one situation, a person was bitten by a monkey in Thailand and should have been recommended for rabies PEP. In 32 situations, PEP was recommended incorrectly. In 12 situations, PEP was recommended when a bat was found in a house, even though no one was sleeping in the room. The ACIP recommends rabies PEP if the
bat is found in a room with a sleeping person or person who is unable to say whether they were bitten. In seven situations an animal that exposed someone tested negative for rabies but PEP was started. Because the turn around time is rapid for rabies testing, PEP can be delayed until the testing of the animal takes place. Because of the lack of terrestrial animal rabies in the last few years in Illinois, no rabies PEP would be recommended if the dog or cat bite was provoked and the animal showed no signs of rabies. In ten situations, persons were recommended for PEP even though a domestic animal exposed the person with a provoked bite and was not acting abnormally. In two situation a low risk animal, rodent or opossum, bit someone and PEP was recommended. In the last of the 32 situations, a person was scratched by an animal and was recommended for PEP.

Of the persons exposed, 126 completed rabies PEP. For 46 of 111 (41 percent) persons completing rabies PEP and with information available, the ACIP rabies protocol was followed exactly. Sixty-five people had incorrect administration of rabies PEP. Types of incorrect administration were incorrect timing of injections (40, 62 percent), multiple problems (12, 19 percent), no RIG given (nine, 14 percent), incorrect site of administration of injections (two, 3 percent) and one unknown. For the 12 persons with multiple incorrect aspects of PEP administration, eight persons were not given RIG and had incorrect vaccination timing and four had incorrect timing of injections and incorrect site of administration for injections.

Six persons started on rabies PEP had been pre-exposure immunized for rabies. Three were veterinary staff exposed to a horse and three were persons exposed to bats.

Summary

There is vast underreporting of potential human rabies exposures in Illinois with some jurisdictions not reporting any exposures. Therefore, the summary information is not a complete picture of human rabies exposures in Illinois. Forty-two percent of reported exposures were due to bites. Most bites were to the hand or arm which is typical as persons reach to pick up or handle an unfamiliar animal. Of the non-bite exposures, 54 percent of reported exposures were from bats found in a room with a sleeping person. In 66 percent of these situations the bat was not available for testing. Education of the public and animal control personnel could result in increased submission of bats that have exposed person in homes being tested for rabies. If the bat tests negative, the person would not need rabies PEP.

The main animal causing potential human rabies exposures was the bat, followed by the dog, the raccoon, the cat and the horse. This is primarily due to the definition of possible rabies exposure to a bat. The bat is the only wild mammal where rabies PEP is recommended if a person is in a room sleeping where a bat is found and it cannot be tested, or tests positive.

Sixty-five percent of rabies PEP recommendations were made by emergency room health care providers or other health care providers. This indicates the importance of providing health care providers with up to date information on rabies incidence in their area and on rabies PEP recommendations.

Eighteen percent of rabies PEP given in 2004 would not have been indicated
according to public health guidelines. In some situations persons were started on rabies PEP even though the animal was available for testing. Health care providers, especially in emergency rooms, should be advised that rabies testing of animals can be completed rapidly at the state laboratories, and, if necessary, emergency testing can be requested for high priority specimens on holidays or weekends. For emergency testing health care providers can contact local health department personnel or use the state emergency phone number. Rabies PEP can be delayed until testing is completed if testing is prompt.

The rabies PEP protocol is provided in, “Human Rabies Prevention-United States, 1999. Recommendations of the Advisory Committee on Immunization Practices (ACIP): MMWR 1999;48(RR-1). In 41 percent of cases where rabies PEP was completed, PEP was administered correctly. Common errors in administration included incorrect timing of injections and forgetting to administer RIG. The ACIP recommendation for rabies PEP should be adhered to when administering rabies PEP. It can be difficult to get exposed individuals to adhere to a complicated vaccination schedule but the person should be informed about the universally fatal nature of rabies and the importance of adhering to the ACIP schedule.
Rocky Mountain spotted fever

Background
Rocky Mountain spotted fever (RMSF) can be a life-threatening tick-borne disease that is present in much of the United States. RMSF is the most frequently reported fatal tick-borne disease in the United States. RMSF has been reported throughout the continental United States. The causative agent is *Rickettsia rickettsii*. Both dogs and humans may experience clinical illness due to RMSF. In 2004, 1,713 human cases were reported nationally to the CDC. Most cases are reported from April through September when the greatest number of *Dermacentor* ticks are present in the environment.

Tick vectors include the American dog tick (*Dermacentor variabilis*) and the lone star tick (*Amblyomma americanum*). In Arizona, an increase in RMSF was thought to be associated with *Rhipicephalus sanguineus* (brown dog tick), not previously reported to be a vector in the United States.

Only about 1 percent to 5 percent of ticks are usually infected with *R. rickettsii* in an area where transmission to humans occurs. In order for one of these ticks to transmit the bacteria, it must be attached for at least four to six hours. The incubation period for RMSF is three to 14 days after a tick bite. Common presenting symptoms include high fever, severe headache, deep myalgias, fatigue, chills and rashes. If a skin rash is present, it appears an average of three to five days after symptom onset. Only about 15 percent of patients have a rash on the first day of illness and less than one-half develop rash in the first 72 hours after illness. Starting most often on the ankles and wrists, the rash then appears on the trunk, palms and soles. Patients also may have gastrointestinal signs such as abdominal pain and nausea which may be serious enough to lead to an erroneous diagnosis such as appendicitis.

Case definition
The case definition for a confirmed case of RMSF in Illinois is a clinically compatible illness that is laboratory-confirmed. The laboratory confirmation is a four-fold or greater rise in antibody titer by a standardized assay, usually IFA or EIA or ELISA in acute and convalescent specimens ideally taken more than three weeks apart; or demonstration of positive immunofluorescence of a skin lesion or organ tissue, positive polymerase chain reaction or isolation of *R. rickettsii* from a clinical specimen. A clinically compatible illness is one characterized by acute onset and fever, usually followed by myalgia, headache and petechial rash. A probable case is defined as a clinically compatible case in a single titer (cutoff determined by the testing laboratory).

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 14 total (13 probable and 1 confirmed case).
- Age - Cases ranged in age from 10 to 89 years of age.
- Gender – Eight cases were male (57 percent).
- Race/ethnicity - Eleven cases were white, two were African American and one had unknown race; none were Hispanic.
• Geographic distribution - Sites of tick exposure were: Jefferson (three cases), Jackson (two), and one each for DuPage, Marion, Stephenson, Union, Vermilion, Wayne, White, and Williamson. One case reported exposure out of state in Mississippi as well as in Jackson County, Illinois.

• Seasonal variation - Onsets of the cases ranged from late April to mid-September.

• Symptoms/outcomes – Case reports were available for 12 cases at the time of this report. All cases were hospitalized. One case was fatal and 11 were non-fatal. The fatality had hepatic failure and adult respiratory distress syndrome. One other case reported paraesthesias.

• Past incidence - Rocky Mountain spotted fever cases reported per year in the state were: 1991 (five), 1992 (two), 1993 (four), 1994 (11), 1995 (10), 1996 (four), 1997 (three), 1998 (one), 1999 (seven), 2000 (five), 2001 (12), 2002 (12) and 2003 (five).

Summary
Most cases of RMSF occurred in summer months in locations scattered throughout Illinois.

Suggested readings
Salmonellosis (Non-typhoidal)

Background

There are more than 2,400 serovars of Salmonella. However, approximately 50 percent of human cases are caused by three serovars: Salmonella enterica ser Enteritidis, S. ser Typhimurium and S. ser Newport. Transmission to humans is usually after consumption of contaminated food products. Raw or undercooked meat, eggs, raw milk and poultry have been identified as vehicles for Salmonella infection. Fresh produce, such as lettuce, unpasteurized apple or orange juice or sprouts also have caused outbreaks.

Hospital and commercial laboratories are required to submit isolates of Salmonella to IDPH’s laboratory for serotyping. This is necessary to detect increases in specific serotypes. Identification of serotypes is useful in identifying which patients are likely linked to a common source of infection. Another way to link Salmonella isolates to a common source is pulse field gel electrophoresis (PFGE).

Of the 10 diseases/syndromes (those caused by Campylobacter, Cryptosporidium, Cyclospora, shiga toxin producing E. coli O157, HUS, Listeria monocytogenes, Salmonella, Shigella, Vibrio and Yersinia enterocolitica) under active surveillance in the federal FoodNet sites, Salmonella comprised 40 percent of the reported infections in 2004. Salmonella had the highest incidence of any pathogen reported to FoodNet. The incidence rate was 14.6 per 100,000. The five most common serotypes reported by FoodNet were Typhimurium (20 percent), Enteritidis (15 percent), Newport (10 percent), Heidelberg (5 percent) and Javiana (7 percent). The hospitalization rate was 26 percent for Salmonella cases in FoodNet sites in 2004. Five percent of the Salmonella cases reported in FoodNet sites were linked to an outbreak. Of the outbreak cases, 78 percent were food related, 20 percent were not food related and for 2 percent the mode of transmission was unknown. Ten percent of Salmonella cases reported a history of international travel in the seven days before onset.

Foodborne outbreaks of Salmonella are not uncommon. An outbreak of Salmonella ser. Enteritidis was linked to raw almond consumption in the United States and Canada in 2004. Outbreaks associated with produce items are also not uncommon. Three outbreaks of Salmonella infections were linked to Roma tomatoes in the United States and Canada during 2004. Exposure was from eating tomatoes at a chain delicatessen. In July 2004, there were 429 culture confirmed outbreak associated salmonellosis cases identified in nine states. No cases were known to have occurred in Illinois. A variety of Salmonella species were involved. In a case-control study 90 percent of case patients ate Roma tomatoes compared with 48 percent of controls. There was a strong association with Roma tomatoes. A second outbreak in 125 case patients who had S. ser. Braenderup with the same PFGE pattern was identified in 16 states from June 18-July 21. The only exposure significantly linked to illness was Roma tomatoes. A third outbreak in Canada involved seven confirmed cases of S. ser. Javiana from July 4-8, 2004. All patients ate at the same restaurant and all reported eating Roma tomatoes. Another multi-state outbreak involving S. ser. Typhimurium was linked to ground beef purchased at a common grocery store chain.

Pets such as reptiles or rodents also can transmit Salmonella to people. Turtles with carapaces less than 4 inches are banned for sale in the United States due to this
risk. Six human cases of salmonellosis in Wisconsin and Wyoming were linked to illegal sale of these small turtles in 2004. When Sweden changed its import regulations to allow importation of reptiles without certification of testing for Salmonella an increase was seen in suspected reptile associated Salmonella. A public education program was initiated and suspected reptile associated Salmonella decreased. During 2004 a multidrug-resistant Salmonella ser. Typhimurium was identified in multiple states associated with pet rodent contact. Two Illinois residents in one family became ill after contact with an ill rat. A retail pet store in Illinois reported they had a hamster that had tested positive for the same type of Salmonella. S. ser. Typhimurium was isolated from 16 of 22 necropsied hamsters in the store and the same PFGE type was identified. These hamsters traced to shipments originating from an Iowa distributor who had also shipped hamsters to Minnesota which were linked to illnesses. Rodents were given antimicrobials before shipping through a few days after shipping. Isolates of this strain were also identified from shipping containers. Twenty-nine percent of human Salmonella enterica serotype Typhimurium isolates from 1997 to 2003 in Minnesota were multidrug resistant. Eighty-one percent of animal isolates were multidrug resistant. Another possible source of Salmonella is raw food pet diets and pet treats. In 1999, 51 percent of pig ears had Salmonella in a Canadian study.

Among outbreaks of S. ser. Enteritidis from 1985 to 2003 where a food vehicle was identified in the United States, 75 percent were due to consumption of eggs or egg-containing dishes.

In the United States national surveillance data, 42,197 cases of Salmonella were reported to CDC. Since 1993, serotypes Typhimurium and Enteritidis are the most common serotypes in the United States. Globally, in the WHO Global Salm-Surv country databank the most common serotype was Enteritidis and accounted for 65 percent of isolates. The next most common were S. ser. Typhimurium (12 percent) followed by S. ser. Newport (4 percent). The national 2010 objective for Salmonella infections is less than 7 per 100,000.

Prevention measures for S. ser. Enteritidis include farm-based programs to prevent SE from entering flocks, refrigeration of shell eggs and education of consumers and food workers about risks from raw or undercooked eggs.

Case definition
The case definition for a confirmed case is isolation of Salmonella from a clinical specimen. The case definition for a probable case is a person who has a clinically compatible illness that is epidemiologically linked to a confirmed case, but is not laboratory-confirmed.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – 1,612 (see Figure 69 for number of cases since 1999). The annual incidence rate for salmonellosis in Illinois in 2004 was 13 per 100,000 population. Of the reported cases, 1,531 were confirmed and 81 were probable. Thirty-nine cases were asymptomatic.
- Age - Salmonellosis occurred in all age groups (mean age = 29) (see Figure 70). However, the incidence rate was highest in those younger than 1 year of age (67
cases per 100,000 population).

- **Gender** – Fifty-four percent were female.

- **Race/ethnicity** – Seventy-six percent of cases were white, 14 percent African American, 2 percent Asian and 6 percent other races; percent were Hispanic.

- **Seasonal variation** A peak in salmonellosis cases occurred from May through September in 2004 (Figure 71).

- **Geographic distribution** - The mean annual incidence rates for salmonellosis were highest in some scattered counties in the state (Figure 93). The five counties with the highest mean annual incidence rates per 100,000 population (and at least 20 cases, total) for salmonellosis from 2000-2004 were Kankakee (35 per 100,000), Wayne (27), Stephenson (27), Lake (23) and Montgomery (23).

- **Serotypes** - Ninety-three percent (based on 114 isolates not received for serotyping) were sent to the IDPH laboratory for serotyping. The most common serotypes in 2004 are found in Table 10. The three most common serotypes were S. ser. Typhimurium (274, 18 percent), S. ser. Enteritidis (236, 16 percent) S. ser. Infantis (96, 6 percent) (See Figure 72). Serotypes of *Salmonella* found in Illinois from 1996-2004 are shown in Table 11.

- **Risk factors** –
  - Swimming – Nine percent of cases reported swimming in non-chlorinated water and 12 percent of cases swam in chlorinated water during their incubation period.
  - Well water – Fifty-eight consumed water from a well at home and seven from a well at work or school.
  - Travel – During the incubation period, 5 percent of cases reported travel in state, 12 percent reported travel to another state and 11 percent reported travel outside the country.
  - Reptile and amphibian contact - A history of reptile or amphibian contact was reported by 62 *Salmonella* cases in 2004 but a link between the reptiles or amphibians and transmission of the infection could not be confirmed.
    - Cases reported contact with the following types of reptiles or amphibians: snakes (nine), lizards (12), turtles (26), salamander (one), not specified (four) and multiple types (10).
    - For those with reported reptile contact, the mean age was 14 years; 17 cases were younger than 5 years of age.
    - Males accounted for 45 percent of the cases.
    - The two most common species in these cases were Enteritidis (11) and Typhimurium (10). *Salmonella* isolates from the subspecies I, II, III and IV have been associated with reptile contact and, for the 2004 reptile contact cases, the following serotypes from these groups were identified: Telekhebir (one).
  - Other risk factors - Seventy-four cases had contact with a day care and 83 persons had contact with a residential facility. Twenty-six cases attended day care and nine lived in a residential facility.

- **Clinical Syndrome** – Symptoms in cases included diarrhea (93 percent), vomiting
(42 percent) and fever (71 percent). Seven percent of cases were listed as immunocompromised.

- **Outcome** – Forty-two percent were hospitalized and three cases were fatal.
- **Reporters** – The most common reporters were infection control professionals (297) and laboratories (207).
- **Outbreaks** - There were seven confirmed foodborne outbreaks of *Salmonella* reported in 2004. (See the section of this report detailing foodborne outbreaks for more details.)

**Summary**

In 2004, 1,612 cases of *Salmonella* were reported in Illinois. The one-year incidence rate of *Salmonella* for 2004 was 13 per 100,000 population, which is lower than the average incidence reported at CDC’s FoodNet sites (15 per 100,000). The mean age for *Salmonella* cases was 29 years, although the incidence was highest in those younger than 1 year of age. *Salmonella* cases increased in Illinois during the summer. The percentage of isolates that were serotyped in Illinois was 93 percent. The percentages of the three most common serotypes were Typhimurium (18 percent), Enteritidis (16 percent) and Infantis (6 percent). A lower proportion of Illinois isolates serotyped in Illinois were S. ser. Newport (6 percent) as compared to 2004 FoodNet data (10 percent). The proportions of S. ser. Typhimurium (18 percent) and S. ser. Enteritidis (16 percent), were similar to the 2004 FoodNet data for those serotypes. Reptile contact was reported in 17 cases younger than 5 years of age. CDC recommends that households with children younger than 5 years of age not have reptiles as pets. Illinois Salmonella cases had a higher hospitalization rate (42 percent) than CDC’s FoodNet site *Salmonella* cases (26 percent). This may be because more severely ill persons are reported to public health in Illinois.

**Suggested readings**


Figure 72. One-year Salmonellosis Incidence Rates for Illinois, 2000-2004

Source: Illinois Department of Public Health

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Source: Illinois Department of Public Health

Table 11. Frequency of *Salmonella* Serotypes in Illinois, 1996-2004

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Sexually Transmitted Diseases

Included in this section are three diseases - chlamydia, gonorrhea and syphilis - transmitted primarily or exclusively through sexual contact and reportable under Illinois statutes and administrative rules. Other diseases not included in this section (such as herpes and human papillomavirus) may be transmitted sexually. HIV/AIDS is discussed in a separate section.

The control of sexually transmitted diseases (STDs) is an important strategy for the prevention of HIV. The inflammation and lesions associated with STDs increase an individual’s risk for acquisition of HIV, as well as the ability to transmit HIV to others.

Chlamydia

Background

*Chlamydia trachomatis* infection is a significant cause of genitourinary complications, especially in women. Early symptoms of cervicitis or urethritis are mild; asymptomatic infection is common in both women and men. If left untreated, chlamydia infection can lead to pelvic inflammatory disease in women. It may cause severe fallopian tube inflammation and damage, even though symptoms may be mild. Due to the insidious nature of the infection, *C. trachomatis* is a major cause of long-term sequelae such as tubal infertility and ectopic pregnancy and can cause premature rupture of membranes in pregnant women. Chlamydia also can cause ophthalmia and pneumonia in newborns exposed to it during birth.

Chlamydia is reportable in all but one state. During 2004, 929,462 chlamydia infections were reported to the CDC, making chlamydia the most commonly reported notifiable disease in the United States. However, national data are incomplete because the majority of testing is currently conducted in females.

Federal and state funding for chlamydia is targeted at providing screening programs in STD clinics, women’s health programs (such as family planning and prenatal clinics), and in adult and juvenile correctional centers.

Case definition

The case definition is isolation of *C. trachomatis* by culture, or demonstration of *C. trachomatis* in a clinical specimen by detection of antigen or nucleic acid.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 47,185; the overall incidence rate was 380 per 100,000 population. The number of cases increased by 100 percent from 1994 (23,325) to 2004 (47,185) (Figure 73).
- Age - Adolescents and young adults (ages 15 to 24) accounted for 71 percent of reported chlamydia cases in 2004 (Figure 74). The average age of persons reported with chlamydia was 23.
- Gender - Most reported cases were in women (76 percent) due to screening efforts that target this group. The female-to-male ratio of reported cases was 3.2: 1.0.
- Race/ethnicity - The racial distribution of cases was 52 percent African American, 19 percent white, 1 percent Asian/Pacific Islander, less than 1 percent Native
American, 19 percent other or unknown race and 9 percent were Hispanic.

- Geographic distribution - Chlamydia is geographically distributed throughout the state. Cases were reported from all 102 counties. The five counties with the highest incidence rates per 100,000 were Alexander (740), Pope (1,133), St. Clair (695), Champaign (669) and Peoria (685).
- The number of screening tests was 223,406 (overall positivity rate was 8 percent). The positivity rate at screening sites for females aged 15-24 years of age was adult and juvenile correctional centers (19 percent), STD clinics (17 percent), school-based health clinics (13 percent) and family planning clinics (7 percent).
- Reporters – Hospitals and private physician offices reported 60 percent of cases. Other reporters included STD clinics (16 percent), family planning clinics (12 percent) and correctional facilities (4 percent).

Summary
Chlamydia is the most commonly reported sexually transmitted disease in Illinois. Cases were reported from all counties in Illinois during 2004. Adolescents and young adults had the highest incidence rates.
Gonorrhea

Background
Gonorrhea is a bacterial infection caused by Neisseria gonorrhoeae. Uncomplicated urogenital infection may progress, without treatment, to complications such as infertility, pelvic inflammatory disease (PID) and disseminated infection. Resultant scarring of fallopian tubes may result in ectopic pregnancy. Women are more likely than men to suffer complications from gonorrhea infection because early symptoms are often not present or not recognized in females. Infants born to infected mothers may develop gonococcal ophthalmia, which is potentially blinding, or sepsis, arthritis or meningitis. The United States recorded 330,132 cases of gonorrhea in 2004. In 2004, the gonorrhea incidence in the United States was 113.5 cases per 100,000 nationwide and was the lowest ever reported in the United States. The rate per 100,000 population for African Americans remains 19 times higher than that for whites, with the highest rate among persons aged 15 to 24 (2,080) and persons aged 20 to 24 years of age (2,487).

Currently recommended therapies for gonorrhea are highly effective, although antimicrobial drug resistance has been a problem. Gonococcal susceptibility to some currently recommended drugs is gradually declining, and active surveillance is required to monitor resistance and to ensure the effectiveness of therapy.

Case definition
Isolation of typical gram-negative, oxidase positive diplococci (presumptive Neisseria gonorrhoeae) from a clinical specimen; demonstration of N. gonorrhoeae in a clinical specimen by detection of antigen or nucleic acid; or observation of gram-negative intracellular diplococci in a urethral smear obtained from a male urethral or female endocervical smear.

Descriptive epidemiology
• Number of cases reported in Illinois in 2004 - 20,597; case rate was 166 per 100,000 population. From 1994 through 2004, reported cases decreased by 16 percent. Reported cases decreased by 6 percent from 2003 to 2004 (Figure 75). A large jail in Cook County discontinued gonorrhea screening which may explain the decrease. Gonorrhea is the second most commonly reported STD in Illinois.
• Age - Adolescents and young adults are at greatest risk for gonorrhea infection. Persons aged 15 to 24 accounted for 60 percent of reported cases in (Figure 76). The mean age was 25 years.
• Sex – The ratio of female to male cases during 2004 was 1.3:1.0.
• Race/ethnicity - Illinois minorities are disproportionately affected by gonorrhea. The reported cases were 68 percent African American, 12 percent white, less than 1 percent Asian/Pacific Islander and 18 percent other or unknown race. Three percent were Hispanic.
• Geographic distribution - At least one case of gonorrhea was reported in 94 of 102 Illinois counties. The five counties with the highest incidence rate in 2004 were Alexander (438), Macon (390), St. Clair (364), Winnebago (308) and Peoria (305).
Summary
Gonorrhea is the second most commonly reported sexually transmitted disease after chlamydia in Illinois. In Illinois in 2004, 60 percent of cases were in those 15-24 years of age.
Syphilis

Background
Syphilis is a systemic disease caused by the spirochete Treponema pallidum. The infection is definitively diagnosed through microscopic examination of lesion exudates and presumptively through serologic testing. Without treatment, syphilis infection progresses through four stages: primary, characterized by a painless ulcer at the point at which the organism entered the body (genitals, mouth, anus); secondary, characterized by lesions, rashes, hair loss, lymphadenopathy and/or flu-like symptoms; latent with no signs or symptoms; and late symptomatic, in the form of neurosyphilis (with neurologic damage) and tertiary (cardiovascular or gummatous disease).

The open lesions of syphilis are infectious to sex partners. Syphilis during pregnancy can lead to a congenital form of the disease that may result in stillbirth or severe illness and lifelong debilitating consequences for the infant. Increases in syphilis often are associated with poverty, limited availability of health services and the exchange of sex for drugs or money. Syphilis outbreaks are often a precursor of HIV increases in affected populations because the lesions caused by syphilis increase the likelihood of both acquisition and transmission of HIV. Without treatment, approximately 10 percent of persons with syphilis will develop neurosyphilis, but in persons co-infected with HIV, 25 percent may develop neurosyphilis. Neurosyphilis is a rare manifestation of syphilis, usually occurring within the first year of infection. The clinical manifestations are variable. Visual disturbances and symptoms of meningitis occur.

Early syphilis refers to syphilis infection of less than one year duration and progresses through: primary, secondary and early latent. Public health disease intervention efforts emphasize control of early syphilis because persons with this stage of the disease are most likely to have been infectious within the past year. Many individuals do not notice or recognize the symptoms of syphilis, so screening for latent disease and partner notification and referral are important components of control efforts.

Congenital syphilis occurs when the syphilis organism is transmitted from a pregnant woman to her fetus. Untreated syphilis during pregnancy can result in stillbirth, neonatal death or infant disorders such as deafness, bone deformities and neurologic impairment.

Significant public health resources must be devoted to control of syphilis. Untreated syphilis can result in neurological or cardiovascular complications. It also can be transmitted to a fetus from an infected woman during pregnancy, which results in congenital syphilis.

In 2004, 32,401 cases of syphilis (all stages) were reported to CDC. Of these, 7,980 were primary and secondary and 353 were congenital. The rate of infection was 2.7 per 100,000 population 84 percent were in men. The incidence in African Americans was 9 per 100,000 in 2004 in the United States. The increase in African Americans was in males only.

Case definition
Syphilis is a complex disease with a highly variable clinical course. The following case definitions are used for surveillance purposes for syphilis that has not progressed to late symptomatic stages.
• Primary. A clinically compatible case with one or more ulcers (chancres) consistent with primary syphilis and a reactive serologic test; or demonstration of *T. pallidum* in clinical specimens by dark field microscopy, fluorescent antibody or equivalent methods.

• Secondary. A clinically compatible case with a reactive nontreponemal test titer of $\geq 1:4$ (probable case), or demonstration of *T. pallidum* in clinical specimens by dark field microscopy, fluorescent antibody or equivalent methods (confirmed case).
  - Latent. No clinical signs or symptoms of syphilis and the presence of one of the following:
    - No past diagnosis of syphilis, a reactive nontreponemal test and a reactive treponemal test.
    - A past history of syphilis therapy and a current nontreponemal test titer demonstrating fourfold or greater increase from the last nontreponemal test titer.

Descriptive epidemiology
• Number of cases reported in Illinois in 2004 - 25 congenital cases and 386 primary or secondary cases. Primary and secondary cases increased by 3 percent between 2003 and 2004. The incidence rate for 2004 was 3 per 100,000 population for primary and secondary syphilis and 14 per 100,000 live births for congenital syphilis. Note: CDC summaries show 23 congenital syphilis cases reported from Illinois in 2004. We will use information on 25 cases in this report.
• Age - The average age of persons diagnosed with primary and secondary syphilis is 36 years. Adults ages 30 years or greater accounted for two-thirds of primary and secondary cases.
• Gender – Eighty-six percent of cases were male. Of the 331 males, 63 percent were in men who have sex with men. The rate of male to female cases was 6.0:1.0.
• Race/ethnicity – The percent of cases in whites increased from 17 percent in 2000 to 44 percent in 2004. During 2004, white males as well as African American females were disproportionately affected by syphilis. The proportion of primary and secondary syphilis cases by race were non-hispanic white (38 percent), non-hispanic African American (47 percent), other or unknown races (5 percent). Ten percent were Hispanic. The racial distribution of congenital syphilis cases was African American (56 percent), white (4 percent) and other or unknown (28 percent). Hispanics were 12 percent of congenital syphilis cases.
• Geographic distribution - Syphilis is more prevalent in urban populations. The disease has become progressively concentrated geographically. Cases of primary and secondary syphilis were reported from 18 counties. The number of cases increased in three counties (Kane, Cook and Winnebago). The five highest incidence rates per 100,000 population in counties with at least three cases were Cook (six), Madison (three), St Clair (two), Kane (two) and Winnebago (one). Congenital cases were reported from four of 102 counties.
• Clinical presentation – During 2004, there were 18 cases of reported neurosyphilis; 15 (83 percent) of the 2004 cases were in men. Of the 15 males, 27 percent were MSM. All of the MSM cases were known to be co-infected with HIV. Of the 386 primary or secondary cases in 2004, one-third were co-infected with HIV.

• Reporting – The reporters included private physicians (37 percent), hospitals (28 percent), STD clinics (26 percent), correctional facilities (4 percent) and other facilities (5 percent).

Summary

Primary and secondary syphilis cases increased by 3 percent in 2004 compared to 2003. During 2004, white males and African American females were disproportionately affected by syphilis.

Suggested readings

Chancroid and Lymphogranuloma Venereum

Background

Chancroid and lymphogranuloma venereum are rarely diagnosed in Illinois. Chancroid is required to be reported in Illinois. Chancroid is caused by Haemophilus ducreyi which is difficult to culture. It is characterized by painful genital ulcers and enlarged lymph nodes. In 2004, 30 cases were reported in the United States. This disease is reportable in Illinois.

LGV is characterized by genital lesions, enlarged lymph nodes and hemorrhagic proctitis. It is caused by specific serotypes (L1, L2, and L3) of Chlamydia trachomatis. In 2004, 27 cases were reported nationally. This disease is not a mandated reportable disease in Illinois.

Descriptive Epidemiology

Number of cases of chancroid – No cases reported in 2004 or the past five years.
Number of case of LGV – One confirmed case was reported in Illinois and the person resided in Chicago.
Shigellosis

Background

Shigellosis is an acute bacterial disease of humans and non-human primates caused by four species or serogroups of *Shigella*: *S. dysenteriae* (group A), *S. flexneri* (group B), *S. boydii* (group C) and *S. sonnei* (group D). The infectious dose is low; as few as 10 to 100 bacteria can cause infection. Transmission is via direct or indirect fecal-oral routes. Outbreaks of *S. sonnei* in day care centers are not uncommon and *Shigella* can be transmitted through unchlorinated wading pools, interactive water fountains and from consumption of food items such as parsley and bean dip. In the past the most common *Shigella* in men who have sex with men was *S. flexneri*. More recently *S. sonnei* also has been identified in MSM. The incubation period is usually one to three days. Symptoms of the disease are watery or bloody diarrhea with fever and sometimes vomiting or tenesmus. Mild and asymptomatic infections can occur. Duration of illness is usually from four to seven days. *Shigella* can be shed in stool for four weeks. Disease caused by *Shigella dysenteriae* type 1 is the most severe and can cause hemolytic uremic syndrome (HUS) due to a toxin similar to that produced by *E. coli* O157:H7. Antimotility drugs are contraindicated. Antimicrobial therapy can limit the clinical course and duration of fecal excretion of *Shigella*. *Shigella* can develop antimicrobial resistance quickly.

The subgroups, serotypes and subtypes of *Shigella* are:

- **Group A**: *Shigella dysenteriae* 15 serotypes (type 1 produces Shiga toxin)
- **Group B**: *Shigella flexneri* 8 serotypes and 9 subtypes
- **Group C**: *Shigella boydii* 19 serotypes
- **Group D**: *Shigella sonnei* 1 serotype

Of the 10 diseases/syndromes (caused by *Campylobacter*, *Cryptosporidium*, *Cyclospora*, HUS, *E. coli* O157:H7, *Listeria monocytogenes*, *Salmonella*, *Shigella*, *Vibrio* and *Yersinia enterocolitica*) under active surveillance in the federal FoodNet sites, *Shigella* comprised 14 percent of the reported infections in 2004. The incidence rate overall was 5 per 100,000 for shigellosis. In 2004, 18 percent of *Shigella* cases were hospitalized.

In 2004, 9,343 *Shigella* isolates and 14,627 cases (a decrease from 2003) were reported to CDC. *S. sonnei* accounts for more than 75 percent of shigellosis cases in the United States.

Risk for *Shigella* infection increases with poor handwashing, inadequate sanitation, overcrowding, ingestion of contaminated food or water or sexual contact with an infected person. Multi-community outbreaks of shigellosis require extensive time and effort on the part of public health. Because of the low infectious dose, shigellosis spreads quickly between people when breaches in handwashing or sanitation occur. Propagation of shigellosis is increased because of the difficulty in maintaining handwashing and sanitation in day care centers, high proportion of mild or asymptomatic *Shigella* infections and frequent contact between children who attend multiple day care centers. Interventions include alerting the media to the outbreak, direct communication with day care centers and the medical community, and promoting control strategies such as supervised handwashing and exclusion of symptomatic children from day care. However, strict exclusion policies of infected but asymptomatic
children can lead to spread of an outbreak if excluded day care attendees are then placed in alternative child care settings.

Although Shigella is infrequently recognized as a cause of foodborne disease outbreaks, it can cause foodborne outbreaks. A large outbreak of S. flexneri occurred in New York and was believed to be associated with consumption of tomatoes at several restaurants.

Case definition

The case definition for a confirmed case of shigellosis in Illinois is a case from which Shigella is isolated from a clinical specimen. The case definition for a probable case is a person who has a clinically compatible illness that is epidemiologically linked to a confirmed case, but is not laboratory confirmed.

Descriptive epidemiology

- Number of reported cases in Illinois in 2004 - 402 (five-year median = 1,105; see Figure 77. Overall annual incidence rate was 3.2 per 100,000. The number of confirmed cases was 365 and the number of probable cases was 36. For one case the information was not available at the time of this report.
- Age – The mean age was 21 (Figure 78). By age group, annual incidence rates per 100,000 were: less than 1 year old, 3.5; 1-4 years of age, 12; 5-9 years of age, 9; 10-19 years of age, 2; 20-29 years of age, 3; 30-59 years of age, 2; and 60 and older, 0.7.
- Gender - Fifty percent were female.
- Race/ethnicity - 60 percent were white, 27 percent were African American and 13 percent were other races; 39 percent were Hispanic. There were significantly higher proportions of African Americans and Hispanics with shigellosis compared to their representations in the Illinois population (which were 15 percent and 12 percent, respectively).
- Seasonal variation - Shigellosis cases occurred in all months of the year with a peak from June through August (Figure 79).
- Geographic distribution - One-year incidence rates by county for 2000 to 2004 ranged from (among counties with cases – 73 counties reported no cases) 0 to 106 per 100,000 population. The five highest annual incidence rates per 100,000 population for this time period were in Stephenson (106), Henderson (49), Warren (27), Rock Island (22) and Hardin (21). Figure 80 shows county incidence for the state.
- Serotypes - Ninety percent of isolates were serotyped in 2004. The most common species was S. sonnei (68 percent of typed isolates), followed by S. flexneri (29 percent). S. boydii and S. dysenteriae each made up <2 percent of typed isolates. The boydii serotypes found in Illinois were 2, 4, 8, 18 and 20 and the dysenteriae serotypes were 1 and 3 (Table 12 and 13). The four most common S. flexneri serotypes were 1, 2, 3 and 4 (Table 14). S. sonnei does not have subtypes.
- Risk Factors – Of the 238 cases who reported whether they traveled to another country during their incubation period, 41 (17 percent) had traveled. The three
countries most frequently visited were Mexico (21), India (six) and the Dominican Republic (four). Of the 241 persons with a history of whether they swam in chlorinated water, 27 (11 percent) reported swimming. Of the 242 with information on whether they swam in nonchlorinated water, 17 (7 percent) reported this type of swimming. Twenty-six of 241 (11 percent) of cases reported having contact with a residential facility. Forty of 247 (16 percent) cases reported contact with a day care.

- Foodborne outbreaks – There were no foodborne outbreaks of shigellosis in 2004.
- Person-person outbreaks – One person-to-person outbreak was reported from a Will County camp.

Summary

There was a large decrease in Shigella cases from 2003 to 2004. The incidence rate for 2004 of 3.2 per 100,000 was lower than the incidence reported nationally (5 per 100,000). The proportion who were Hispanic or African American was higher than the representation of each group in the Illinois population. The mean age of cases was 21 years. S. sonnei was the most common species found in Illinois, which is the same as the most common species reported to CDC. Isolates of Shigella are required to be submitted to the IDPH laboratories for speciation and/or serotyping (if this cannot be done by the clinical laboratory).

Suggested readings

Figure 80. One-year Shigellosis Incidence Rates by County for Illinois, 2000-2004

Source: Illinois Department of Public Health


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Source: Illinois Department of Public Health

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Source: Illinois Department of Public Health
**Staphylococcus aureus, Methicillin Resistant, Community Acquired (CA-MRSA)**

**Background**

The first occurrence of a community-acquired methicillin resistant *Staphylococcus* strain (CA-MRSA) occurred in 1993 in Australia. CA-MRSA strains are different than nosocomial MRSA infections by both epidemiology and genetics. When necessary, most CA-MRSA can be treated with aminoglycosides, tetracyclines or fluoroquinolones. Most infections caused by CA-MRSA are skin infections. Incision and drainage may be all that is needed to treat these infections. Persons may confuse these infections with spider bites. CA-MRSA strains can cause pneumonia and death in previously healthy individuals. CA-MRSA isolates are generally susceptible to non-B lactam antimicrobials and genetic fingerprinting suggests they are unrelated to hospital acquired strains. Community-associated MRSA infections are not believed to have their origins in health care settings. MRSA is spread by direct physical contact and indirect contact by touching objects contaminated by MRSA.

MRSA is an emerging cause of skin infection in the community. Outbreaks of CA-MRSA have been associated with sports teams, correctional facilities, intravenous drug users, and men who have sex with men. Outbreaks have occurred in participants of competitive sports including rugby, football, wrestling and fencing. Risk factors have included playing in certain football positions, skin abrasions, body shaving and sharing towels. Four factors contribute to the spread of MRSA in correctional facilities: barriers to routine inmate hygiene, proper access to medical care was hindered, frequent medical staff turnover, and previous unrecognized MRSA.

In a Los Angeles area emergency department, the proportion of skin and soft tissue infections caused by MRSA increased from 29 percent in 2001 to 64 percent in 2004.

**Descriptive Epidemiology**

- In 2004, individual MRSA cases were not reportable in Illinois. Voluntary reporting of clusters occurred.

**Clusters**

- In March 2004 a jail in St Clair County reported six detainees with MRSA. Between September 2003 and March 2004, 10 MRSA cases occurred at the jail; nine were laboratory confirmed and one was a suspect case. Seventy percent of patients were initially thought to have spider bites.

- In September 2004, Tazewell County Health Department reported a cluster of MRSA skin infections in high school football players and a dance team member. Three MRSA cases were identified; two in football players and one in a dance team member. Seven methicillin sensitive *S. aureus* (MSSA) cases were identified in two football players, one soccer player, one member of the dance team, two students without sports affiliation and a school janitor. One player with MRSA was hospitalized. The two MRSA case isolates available each had unique PFGE patterns. Recommendations were that students maintain good hygiene and avoid contact with drainage from skin lesions of other students. Game uniforms were to be laundered at least once a week, special attention to wound
care for players and skin lesions were to be covered with an occlusive dressing before play. Players also were not to share towels or other personal items.

- In the fall of 2004, a cluster of MRSA infections occurred in newborns at a hospital in Chicago. Eleven cases were identified. One physician and one nurse who attended to newborns were found to have nasal MRSA. Isolates matched by pulse field gel electrophoresis (PFGE).

**Suggested Readings**


Vos, M.C., Verbrugh, H.A. MRSA: We can overcome, but who will lead the battle? Inf Control and Hosp Epidem 2005;26(2):117-120.

Staphylococcus aureus, Intermediate or High Level Vancomycin Resistance

Background

Staphylococcus aureus causes both community and health-care associated infections in persons. The National Committee for Clinical Laboratory Standards (NCCLS) defines staphylococci requiring concentrations of vancomycin of ≤ 4 ug/mL for growth inhibition as susceptible to vancomycin. Those requiring concentrations of 8-16 ug/mL as intermediate and those requiring concentrations of ≥ 32 ug/mL as resistant. S. aureus-with reduced vancomycin susceptibility includes all S. aureus isolates with MICS of vancomycin of ≥ 4 ug/mL.

The most accurate form of vancomycin susceptibility testing method for staphylococci is a nonautomated MIC method (e.g., broth microdilution, agar dilution or agar-gradient diffusion) in which the organisms are incubated for 24 hours before reading results. CDC recommends contact precautions when caring for patients with VRSA including placing the patient in a private room, wearing gloves and a gown during patient contact, washing hands after contact with the patient, infectious body tissues or fluids and limiting the use of patient-care items to individual patients. The number of persons caring for the VRSA patient should be minimized.

A vancomycin resistant S. aureus (VRSA) case was reported from New York in 2004. Three cases of VRSA have been identified in Illinois, two in 1999 and one in 2000.

Case definition

A case of S. aureus, intermediate or high level vancomycin resistance is defined as S. aureus isolated from infected humans with an MIC of vancomycin of ≥ 4 ug/mL.

Descriptive epidemiology

No cases were reported in 2004.

Summary

No cases were reported in 2004 in Illinois.

Suggested readings

**S. pneumoniae**

**Background**

The risk of *S. pneumoniae* infection is higher in people of low socioeconomic status who have underlying medical conditions and for those with high-risk behaviors (smoking, alcohol abuse). An increase in *S. pneumoniae* serotype 12 f cases occurred in a rural region in Alaska in 2003 and 2004. The Advisory Committee on Immunization Practices (ACIP) recommends a one-time vaccination for persons older than 64 years of age. Many persons involved in the outbreak had not been vaccinated although they were in groups that are suggested for vaccination.

In a study of *S. pneumoniae* data from 1999 and 2000 showed the incidence rates varied between healthy adults (8 per 100,000), diabetic adults (51), chronic lung disease (63), chronic heart disease (94), alcohol abuse (100), solid cancer (300), HIV/AIDS (423) and hematologic cancer (503).

In Illinois, the estimated percentage of residents older than the age of 65 who were ever vaccinated for *S. pneumoniae* was 58 percent.

A study in Illinois compared case reporting of *S. pneumoniae* to IDPH and information available about *S. pneumoniae* cultures from laboratories; 51 percent of cases cultured at the laboratories were not reported to IDPH.

**Case definition**

A case is defined as a person with clinically compatible symptoms and from whom isolation of the organism from a normally sterile site has occurred.

**Descriptive epidemiology**

- Number of reported invasive *S. pneumoniae* reported cases in Illinois in 2004 – 935 cases (see Figure 81). The incidence rate for 2004 was 7.5 per 100,000 population.
- Age – The mean age of cases was 57 years (Figure 82). By age group, the highest incidence per 100,000 occurred in those older than 79 years of age (48 per 100,000 in that age group), followed by those 70 to 79 years of age (20) and 60 to 69 years of age (14).
- Gender – Forty-eight percent were male.
- Race/ethnicity - Cases were 74 percent white, 24 percent African American and 2 percent other races; 5 percent occurred among Hispanics.
- Geographic distribution – Forty-two percent were residents of Cook County.
- Seasonal variation – An increase in cases occurred from January through April (Figure 83).
- Positive cultures - Of 710 cases in a separate IDPH database for *S. pneumoniae*, the organism was isolated from the following site in these cases : blood (673), CSF (37), pleural fluid (17), peritoneal fluid (two), pericardial fluid (one), joint (six).
- Clinical syndrome - Of 710 cases in a separate IDPH database for *S. pneumoniae*, 646 reported bacteremia, 49 meningitis, 18 otitis media, 398 pneumonia, nine sinusitis and three peritonitis.
- Underlying conditions - Underlying conditions were: cardiovascular (202), pulmonary (166), renal failure (67), liver problems (32) and transplant (six). Of
these cases, 130 were immunosuppressed.

**Summary**

An increase in the number of reported invasive *S. pneumoniae* cases occurred over the five-year median. The elderly have the highest incidence of reported invasive *S. pneumoniae*.

**Suggested readings**

Streptococcus pyogenes, Group A (Invasive Disease)

Background

The spectrum of disease caused by group A streptococci (GAS) is diverse and includes pharyngitis and pyoderma, severe invasive infections, post-streptococcal acute rheumatic fever and acute glomerulonephritis. Invasive GAS may present as any of several clinical syndromes including pneumonia, bacteremia in association with cutaneous infection (cellulitis, erysipelas or infection of a surgical or nonsurgical wound), deep soft tissue infection (myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (puerperal fever), neonatal sepsis and non-focal bacteremia. Two types of invasive GAS are streptococcal toxic shock syndrome (STSS) and necrotizing fasciitis. The symptoms of STSS include fever, myalgia, vomiting, diarrhea, confusion, soft tissue swelling, renal dysfunction, respiratory distress and shock. Necrotizing fasciitis is a deep infection of subcutaneous tissue that results in destruction of fat and fascia and often leads to systemic illness. Risk factors for necrotizing fasciitis include injection drug use, obesity and diabetes mellitus.

Transmission of GAS occurs by direct contact with patients or carriers, or by inhalation of large respiratory droplets. Approximately 5 percent of the population may be asymptomatic carriers, but these individuals are less likely to transmit the organism than symptomatic persons. Predisposing risk factors for invasive GAS include older age, injection drug use, human immunodeficiency infection, diabetes, cancer, alcohol abuse, varicella, penetrating injuries, surgical procedures, childbirth, blunt trauma and muscle strain. Treatment guidelines have been established by the Infectious Diseases Society for GAS pharyngitis. Chemoprophylaxis is not recommended for all household contacts to cases of invasive GAS. Household members should monitor themselves for signs and symptoms for 30 days after exposure.

A study of GAS in the Active Bacterial Core surveillance program of CDC in persons older than the age of 65 showed that the incidence of invasive GAS was much higher in those in long-term care facilities as compared to community-based elderly. Persons with emm types 1 and 3 and pneumonia or streptococcal toxic shock syndrome are predictors of death.

Hospital acquired infections can occur. A study in Canada showed that hospital acquired infections included surgical site, postpartum and nonsurgical nonobstetrical infections. Approximately 12 percent of invasive GAS infections were hospital-acquired.

In CDC’s Active Bacterial Core Surveillance sites from 2000 through 2004, 5,400 cases (3.5 per 100,000) of invasive GAS were reported. Case fatality rates were 36 percent for STSS and 24 percent for NF. Incidence was highest for those at the extremes of age and African Americans. Most clusters in long-term care facilities occurred in the winter and spring.

In routine surveillance, 4,395 cases of invasive GAS were reported to CDC and 132 cases of streptococcal TSS. In 2004, streptococcal toxic shock was reportable in seven states.

Case definition

The case definition of invasive GAS disease in Illinois is the isolation of group A
**Streptococcus pyogenes** by culture from a normally sterile site.

**Descriptive epidemiology**
- Number of reported cases in Illinois in 2004 - 252 invasive GAS cases and 32 streptococcal toxic-shock syndrome (five-year median for both combined = 273) (see Figure 84). The incidence rate for 2004 was 2.3 per 100,000 population.
- Age – The mean age of cases was 58 years (Figure 85). By age group, the highest incidence per 100,000 occurred in those older than 79 years of age (14 per 100,000 in that age group), followed by those 70 to 79 years of age (8) and 60 to 69 years of age (4).
- Gender – Forty-six percent were male.
- Race/ethnicity - Cases were 82 percent white, 15 percent African American and 3 percent other races; 8 percent occurred among Hispanics.
- Geographic distribution – Forty-three percent were residents of Cook County.
- Seasonal variation – An increase in cases occurred from January through April (Figure 86).
- Clusters – None reported.

**Summary**
The number of reported invasive GAS cases continues to rise in Illinois. The incidence in Illinois was lower (2.3 per 100,000) as compared to the CDC ABC sites (3.5 per 100,000).

**Suggested readings**
Tetanus

Background
Tetanus is an uncommon disease in the United States after introduction of a vaccine in the 1940s. Tetanus is induced by a toxin produced by Clostridium tetani, which grows anaerobically at the site of a skin wound. The disease is characterized by muscular contractions. The reservoir for the organism is the soil or fomites contaminated with human or animal feces. Tetanus spores are common in the environment. The incubation period is three to 21 days. Prevention is through immunization.

In 2004, 34 cases of tetanus were reported to CDC from 18 states. Two fatal cases were reported in 2004. The majority of cases (76 percent) occurred in persons more than 40 years of age.

Persons who have received a primary tetanus vaccination series but who have not had a tetanus booster during the 10 years preceding an injury should receive a booster dose. Persons who present with wounds contaminated with dirt, feces, or saliva, or wounds with necrotic tissue and who have not had a booster during the preceding five years also should receive a dose of tetanus vaccine. Persons who have never had tetanus vaccination or those with unknown or uncertain vaccination histories should receive the first dose of a primary series at the time of presentation and tetanus immune globulin.

Descriptive Epidemiology
Number of cases in Illinois for 2004 - No cases were reported in Illinois.
Tick-borne diseases found in Illinois

Ticks are the most common vector of vector-borne diseases in the United States. Ticks are responsible for the following diseases in the United States: babesiosis, Colorado tick fever, human granulocytic ehrlichiosis, human monocytic ehrlichiosis, Lyme disease, Powassan encephalitis, relapsing fever, Rocky Mountain spotted fever (RMSF), tick paralysis and tularemia.

Ticks usually attach around the head, neck and groin of the human host. The rates of human infection with tick-borne diseases are influenced by the prevalence of vector tick species, the tick infection rate, the readiness of ticks to feed on humans and the prevalence of their usual animal hosts.

Seven tick-borne diseases have been reported in Illinois residents. Five of these tick-borne diseases are listed in Table 15 and in individual sections of this document. A case of babesiosis was reported each year in 2003 and 2004. The 2004 case traveled to Massachusetts. According to CDC guidelines, any Illinois resident diagnosed with a tick-borne disease is counted in the state’s case count, even though he/she may have reported tick exposures in another state. Case counts by year for 1999 through 2004 for four of these infections that occur regularly in Illinois are shown in Figure 86.

Case numbers for every tick-borne disease increased in Illinois in 2004.

Figure 86. Tick-borne Disease Cases in Illinois, 1999-2004

![Figure 86. Tick-borne Disease Cases in Illinois, 1999-2004](image-url)
Table 15. Tick-borne Diseases Reported in Illinois Residents

<table>
<thead>
<tr>
<th>Disease</th>
<th>Organism</th>
<th>Tick vectors</th>
<th>Symptoms</th>
<th>Where found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocky Mountain spotted fever</td>
<td><em>Rickettsia rickettsii</em></td>
<td><em>Dermacentor variabilis</em> (American dog tick), <em>D. andersoni</em> (Rocky Mountain wood tick)</td>
<td>fever, headache, rash</td>
<td>throughout the U.S. but most common in Southeast; entire state of Illinois</td>
</tr>
<tr>
<td>Tularemia</td>
<td><em>Francisella tularensis</em></td>
<td><em>Amblyomma americanum</em> (lone star tick), <em>D. variabilis</em>, <em>D. andersoni</em></td>
<td>ulcer at entry site, enlarged lymph node</td>
<td>throughout North America; primarily central and southern Illinois</td>
</tr>
<tr>
<td>Lyme disease</td>
<td><em>Borrelia burgdorferi</em></td>
<td><em>Ixodes scapularis</em> (deer tick)</td>
<td>fatigue, chills, fever, erythema migrans, enlarged lymph nodes</td>
<td>primarily on the West Coast, in northeastern and north central U.S.; primarily northern Illinois</td>
</tr>
<tr>
<td>Human monocytic ehrlichiosis</td>
<td><em>Ehrlichia chaffeensis</em></td>
<td><em>A. americanum</em></td>
<td>fever, headache, myalgia, vomiting</td>
<td>most common in the southern states; more common in southern Illinois</td>
</tr>
<tr>
<td>Human granulocytic ehrlichiosis</td>
<td><em>Anaplasma phagocytophilum</em></td>
<td><em>I. scapularis</em></td>
<td>fever, headache, myalgia, vomiting</td>
<td>most common in upper Midwest and Northeast; in Illinois, unknown distribution</td>
</tr>
</tbody>
</table>

* Although suspected to be present in Illinois, no diagnostic test is available yet.
Toxic Shock Syndrome (TSS) Due to *Staphylococcus aureus*

**Background**

Toxic shock syndrome is classified by clinical and laboratory evidence of fever, rash, desquamation, hypotension and multiple organ failure caused by toxins produced by *Staphylococcus aureus*. Methicillin resistant *S. aureus* (MRSA) strains have caused TSS in other countries. Most cases have been associated with strains of *Staphylococcus aureus* that produce a special toxin.

Ninety-five cases were reported to CDC in 2004.

**Case definition**

The five clinical findings used to establish whether a case meets the case definition for staphylococcal TSS are:

1) Fever-temperature greater than 102° F
2) Rash
3) Desquamation
4) Hypotension
5) Multisystem involvement (three or more of the following)
   a. Gastrointestinal - vomiting or diarrhea
   b. Muscular - myalgia or creatine phosphokinase (>twice upper limit of normal)
   c. Mucous membrane - vaginal, oropharyngeal or conjunctival hyperemia
   d. Renal - blood urea nitrogen or creatinine ≥twice the upper limit of normal or urinary sediment with pyuria in the absence of urinary tract infection
   e. Hepatic - total bilirubin, alanine aminotransferase (ALT) or aspartate aminotransferase (AST) ≥twice the upper limit of normal for the lab
   f. Hematologic - platelets less than 100,000/mm³
   g. CNS - disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent.

In addition, there should be negative results on the following tests (if done)

a. Blood, throat or CSF cultures (blood cultures can be positive for *S. aureus*)
   b. Rise in titer to Rocky Mountain spotted fever, leptospirosis or measles

The CDC case definition for a probable case is one with any four of the five clinical findings above. A confirmed case is one with all five of the clinical findings, including desquamation, unless the patient dies before desquamation can occur.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2004 - Six (five-year median = 5). Three were confirmed and three were probable.
- Age - Ages ranged from 15 to 42 years.
- Gender - All six cases were female.
- Race/ethnicity - All six cases were white; none were Hispanic.
- Geographic distribution - Cases resided in five different counties, with two cases from Lake County and one each in Champaign, Cook, Logan and Winnebago.
- Symptoms – Rash and fever (six cases each), hypotension (five cases), vomiting (four cases), sore throat and oropharyngeal hyperemia (three cases each), diarrhea, myalgia, conjunctival hyperemia (three cases each) and one case each for desquamation, vaginal discharge, vaginal hyperemia, vaginal ulceration, disorientation, abdominal pain, cardiac arrhythmia and necrotizing fasciitis.
- Laboratory findings - S. aureus was isolated from the vagina in six cases. Five cases were classified as menstruation-associated.
- Treatment - All nine patients were hospitalized.
- Outcome - All patients survived.
- Past cases – Toxic shock syndrome cases due to S. aureus reported per year in the state previously were 1998 (seven), 1999 (five), 2000 (three), 2001 (four), 2002 (five), 2003 (six).

Summary
Six cases of staphylococcal toxic shock were reported in 2004, and five cases were considered to be associated with menstruation.
Trichinella

Background
Trichinellosis is a parasitic infection associated with ingestion of contaminated meat. Infection can result from eating contaminated pork or wild game meat, such as bear. Persons should cook meat, particularly wild game to a temperature of 160 F. Symptoms include fever, facial edema, myalgias, muscle swelling and weakness. Eosinophilia is typically present. Physicians should consider Trichinella in any ill person with eosinophilia and history of eating wild game. Five cases were reported to CDC in 2004.

Descriptive epidemiology
Number of cases reported in Illinois in 2004 - none

Suggested readings
Tuberculosis

Background

The *Mycobacterium tuberculosis* complex includes *M. tuberculosis*, *M. africanum*, *M. bovis* and *M. microti*. Tubercle bacilli are transmitted by inhalation of airborne droplet nuclei produced by persons with tuberculosis (TB) disease. Prolonged close contact with cases may lead to latent TB infection (LTBI). Tuberculin skin sensitivity often indicates LTBI (as noted by a positive skin test), which usually appears four to 12 weeks after infection. LTBI is different from TB disease and is defined as a condition in which TB bacteria are alive but inactive in the body. People with latent TB infection have no symptoms and cannot spread TB to others and usually have a positive skin test reaction. But they may develop TB disease later in life if they do not receive treatment for latent TB infection.

Approximately 90 percent to 95 percent of newly infected individuals have LTBI where early lung lesions heal and leave no residual changes except small calcifications in the pulmonary or tracheobronchial lymph nodes. In those patients whose infection progresses to disease, early symptoms may include fatigue, fever, night sweats and weight loss. In advanced disease, symptoms such as cough, chest pain, coughing up of blood and hoarseness may occur.

Several issues, such as patient’s immune status and immigration from areas where TB is common, impact the incidence of TB in Illinois. The AIDS epidemic had a profound effect on the number of TB cases in Illinois in the past. TB is a major opportunistic infection in HIV-infected persons. In Illinois, the percentage of TB cases diagnosed in foreign-born individuals is increasing. CDC recommends that all immigrants, refugees, foreign-born students and their families, and others accompanying them into the country be tuberculin-test screened and medically treated when appropriate.

Both suspected and confirmed cases of TB are reportable in Illinois. The sooner cases are reported to the local TB control authority, the sooner their personnel can begin investigations which may interrupt transmission of TB in the community.

During 2004, a total of 14,517 cases (5 per 100,000) were reported to CDC. Fifty-four percent were among foreign born persons (22.8 per 100,000). In 2004, the case rate was almost nine times higher in foreign-born persons than among U.S.-born persons. The rate was higher than the 2000 national objective of 3.5 cases per 100,000. The highest rates were in Asians, Native Hawaiians or other Pacific Islanders, non-Hispanic blacks and Hispanics. Seven states reported more than 400 cases; this includes Illinois. Illinois had an 11 percent decrease from 2003. Illinois was not in the top 20 percent of states for tuberculosis rate.

Case definition

A confirmed case of tuberculosis in Illinois is a case that is either laboratory confirmed or is a case that meets the clinical case definition criteria:

1) A positive tuberculin skin test
2) Other signs and symptoms compatible with tuberculosis, such as an abnormal, unstable chest radiograph, or clinical evidence of current disease
3) Treatment with two or more anti-tuberculosis medications
4) Completed diagnostic evaluation

Laboratory criteria for diagnosis are isolation of \textit{M. tuberculosis} from a clinical specimen, demonstration of \textit{M. tuberculosis} from a clinical specimen by DNA probe or mycolic acid pattern on high-pressure liquid chromatography, or demonstration of acid-fast bacilli in a clinical specimen when a culture has not been or cannot be obtained.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2004 – 569 (4.5 per 100,000 population), a 10 percent decrease from 2003. (Figure 87). TB cases in Chicago decreased to 308 cases (11 per 100,000) from (339 in 2003), a 9 percent decline over 2003.
- Age - The highest incidence of TB occurred in older age groups (Table 16).
- Gender – Sixty percent were male.
- Race/ethnicity – Thirty-three percent were African American (non-Hispanic), 15 percent white (non-Hispanic), 28 percent Hispanic and 22 percent were Asian or Pacific Islander.
  - The number and percent of foreign-born TB cases increased in 2004 (N=230, or 40 percent) as compared to 2003 (N=273, 43 percent) (Figure 88). The largest number of cases were born in Mexico (34 percent), followed by India (19 percent) and the Philippines (16 percent). Persons born in China, Viet Nam and South Korea (8 percent combined) also were represented among foreign-born cases.
- Geographic Location – A map of location of residence of cases is shown in Figure 89.
- Risk factors - Homeless in past 12 months (4 percent), injection drug use (1 percent), being an inmate in a correctional facility (2 percent) and residing in a long-term care facility (2 percent). Five percent of cases were HIV positive.
- Drug resistance –Five of 569 cases (0.8 percent) were MDR.
- Clinical Syndrome – Seventy percent of cases were pulmonary and 26 percent were extrapulmonary.
- Death during anti-TB treatment -Eleven (4 percent) of Illinois cases from outside of Chicago died during treatment in 2004.

**Summary**

In 2004, Illinois ranked fifth in the United States in the number of reported TB cases and 18\textsuperscript{th} in the nation based on incidence rate. The incidence of TB ranges from less than one case per year in rural areas to a high of more than 400 cases per year in the Chicago metropolitan area. In 2004, for the eighth year in a row, the number of TB cases has declined in Illinois. The number of cases reported was 569 (4.5 per 100,000). The city of Chicago reported 308 case (11.7 per 100,000). The percentage of foreign born cases increased from previous years to 40 percent in 2004 from 21 percent in 1995. MDR cases were 5 of 569 cases (0.8 percent) tested in 2004.

In 2004, 569 cases of TB were reported in Illinois with an incidence rate of 4.5 per 100,000 which is very similar to the national incidence rate of 5.0. Forty percent of
these Illinois cases were among persons born outside of the United States. An increasing percentage of foreign-born cases are being seen in Illinois, with India, Mexico and the Philippines being the most common countries of origin. Public health attention must continue to focus on high-risk groups, especially those born outside of this country. Four percent of Illinois cases died during anti-TB treatment.

Table 16. Age Distribution of Tuberculosis Cases in Illinois, 2004

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>2.4</td>
</tr>
<tr>
<td>5-14</td>
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<tr>
<td>15-24</td>
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<tr>
<td>25-44</td>
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</tr>
<tr>
<td>45-64</td>
<td>6.5</td>
</tr>
<tr>
<td>65+</td>
<td>6.3</td>
</tr>
<tr>
<td>TOTAL ILLINOIS</td>
<td>4.5</td>
</tr>
<tr>
<td>U.S.</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Illinois Department of Public Health
Figure 87. Tuberculosis Cases in Illinois, 1999-2004

Figure 88. Country of Origin for Foreign-born TB Cases, Illinois, 2004
Figure 89. Tuberculosis Cases in Illinois by County, 2004
Tularemia

Background

Tularemia is caused by *Francisella tularensis* and is a zoonotic disease that infects vertebrates, especially rabbits and rodents. The incubation period is three to five days. Tularemia can be classified into six primary syndromes: ulceroglandular (the most common form), glandular, typhoidal, oculoglandular, oropharyngeal, and pneumonic. Clinical signs in people include fever, chills, malaise, cough, myalgias, vomiting and fatigue followed by the development of one of six clinical syndromes. Isolation of *F. tularensis* requires biosafety level 3 facilities. In a study of cases reported to CDC from 1964 through 2004, the clinical forms were ulceroglandular and glandular (65 percent), pneumonic (17 percent), typhoidal (12 percent), oculoglandular (4 percent), meningitis (1 percent) and pharyngeal (1 percent). The case fatality rate can be 30 percent to 60 percent if untreated and typhoidal. There are two subspecies of tularemia designated as tularensis (Type A) and holartica (Type B). Type A is highly virulent for humans and is found mainly in North America. Type B is less virulent and present in North America, Asia and Europe. From the cases reported to CDC from 1964 through 2004, two cases reported from Illinois were Type A and six were Type B. Tularemia can affect many wildlife species, including prairie dogs, squirrels and cats in addition to humans. The most common modes of transmission are tick bites and handling infected animals. In the study of cases reported to CDC from 1964 through 2004, arthropod bites accounted for 44 percent of Type A cases and 2 percent of Type B cases. The disease also can spread through ingestion of contaminated water or food, inhalation and insect bites.

Tularemia has two peaks in occurrence; a peak in the summer reflects transmission from ticks and a peak in winter reflects transmission from animal contacts, especially rabbits, often during hunting or trapping seasons. The most important epizootic hosts for tularemia in the United States include rodents and lagomorphs. Tularemia has been associated with die-offs in exotic animals, such as prairie dogs.

The most common tick vectors in the United States are the American dog tick (*Dermacentor variabilis*), the Lone Star tick (*Amblyomma americanum*) and the Rocky Mountain wood tick (*D. andersoni*).

In 2004, 134 cases were reported to CDC from 26 states. In 2004, there were laboratory acquired pneumonic tularemia among researchers working with cultures of the organism and a case from a pet hamster bite.

Tularemia is considered a possible bioterrorism agent. Vaccination is recommended only for limited numbers of persons in high-risk occupations.

Prevention methods include wearing gloves when handling dead animals, especially rabbits and rodents; avoiding bites of ticks, flies and mosquitoes by using insect repellents, cooking game meat thoroughly and avoiding drinking of untreated water.
Case definition
The CDC case definition for a confirmed case of tularemia is a clinically compatible case with either isolation of *F. tularensis* from a clinical specimen or a four-fold or greater rise in serum antibody titer to *F. tularensis* antigen. A probable case is a clinically compatible case with either detection of *F. tularensis* in a clinical specimen by fluorescent antibody or an elevated serum antibody titer to *F. tularensis* antigen in a patient with no history of vaccination.

Descriptive epidemiology
- Number of cases reported in Illinois in 2004 – five (two were confirmed and three were probable cases). The median number of cases per year for the last five years is four.
- Age - The cases ranged in age from 4 to 60 years of age.
- Gender – Four were male and one was female.
- Seasonal variation – One onset was in February, one in July and three in August.
- Geographic distribution – The exposure sites for cases included Greene County (1), Peoria County (1), Union County (1) and Wayne County (1). One case had out-of-state exposure in Colorado.
- Symptoms/diagnosis/treatment – Four of four cases with information on hospitalization were hospitalized. Three cases were culture positive; one from a cat bite site, one from a bubo and one from a lesion on the forehead. Two were positive on serology by agglutination testing.
- Exposures –
  - Case One. This Kane County resident with onset in August was bitten by a cat in Colorado and the culture was positive at the site of the bite.
  - Case Two. This Peoria County resident with onset in August reported bites from ticks and deer flies while working on his farm.
  - Case Three. This Wayne County resident with onset in February reported hunting and handling rabbits in January.
  - Case Four – This Greene County resident with onset in July reported tick bites.
  - Case Five – This Union County resident with onset in August reported tick bites and the site of the tick bite was culture positive.
- Other
  Six of 30 free ranging beavers used in a study at Eastern Illinois University were found dead in November and December 2004. These beavers had reportedly come from Coles, Cumberland, and Douglas counties. Tularemia was identified in two of these dead beavers. No human cases were linked to these findings.
- Past incidence - The numbers of cases in Illinois by year are as follows: 1991 (five), 1992 (two), 1993 (three), 1994 (three), 1995 (four), 1996 (four), 1997 (five), 1998 (five), 1999 (two), 2000 (four), 2001 (14), 2002 (five) and 2003 (one).

Summary
The number of cases of tularemia increased from 2003. Three cases had histories of tick or deer fly bites. One had a history of physical contact with rabbits and one had a history of cat bite.

**Suggested readings**

Typhoid Fever

Background

Typhoid fever is a systemic infection caused by infection with Salmonella enterica serotype Typhi. The incubation period is from three days to three months with a usual range of one to three weeks. Transmission of typhoid fever is usually by ingestion of food or water contaminated by fecal or urinary carriers of S. enterica serotype Typhi. Types of products implicated in some countries include shellfish, raw fruits, vegetables and contaminated milk or milk products. Unlike other types of Salmonella, S. enterica ser. Typhi is not found in animal reservoirs; humans are the only reservoirs. In developed countries like the United States, most cases are sporadic after travel to endemic areas. The infectious dose ranges from 1,000 to 1 million organisms. Constipation is more common than diarrhea in adults. The onset of bacteremia with typhoid fever results in fever, headache, abdominal discomfort, dry cough and myalgia. Other findings may include bradycardia, rash and splenomegaly. Complications may include gastrointestinal bleeding, intestinal perforation, and typhoid encephalopathy. Relapse may occur in 5 percent to 10 percent of patients, usually two to three weeks after resolution of fever. Up to 10 percent of untreated patients will shed organisms in the feces for up to three months. One percent to 4 percent may develop long-term carriage of the organism up to one year. Most carriers are asymptomatic. Chronic carriage is more common in women, the elderly and in patients with cholelithiasis.

Typhoid fever is typically diagnosed with blood cultures. Bone marrow cultures also can be used. For travelers to developing countries, water should be boiled or bottled and food should be thoroughly cooked to avoid acquiring typhoid fever. Vaccination is recommended for persons traveling to areas where typhoid is endemic.

In 2004, 322 typhoid fever cases were reportable in the United States. Approximately 75 percent of cases reported international travel in the month before illness.

Case definition

A confirmed case is a clinically compatible illness with isolation of S. enterica ser. Typhi from blood, stool or other clinical specimen. A probable case is defined as a clinically compatible illness that is epidemiologically linked to a confirmed case in an outbreak.

Descriptive epidemiology

- Number of cases reported in Illinois in 2004 - 16 (five-year median = 17) (see Figure 90). One case had onset in a previous year but was counted in 2004.
- Age - Cases ranged in age from 1 to 55 years of age (median age = 21 years).
- Seasonal variation - Cases occurred throughout the year.
• Geographic distribution - Of the 16 cases, 12 (75 percent) resided in Cook County.
• Case surveillance reports - The following information was drawn from three case reports:
  o Citizenship status - One case was known to be a citizen of the United States; the citizenship status of two other cases was unknown.
  o Employment – No cases were known to be food handlers.
• Treatment/outcomes -Two cases of three with available information were hospitalized.
• Drug resistance - Resistance characteristics of isolates was not known.
• Vaccination status – One case reported no typhoid fever vaccination and the vaccine histories for the other two were unknown.
• Risk factors - No cases were known to have been linked to a typhoid carrier. Travel destinations for imported cases included India (two) and Pakistan (one).

Summary
There were 16 typhoid fever cases reported in Illinois in 2004. All cases were believed to have been acquired outside the United States. Illinois had the fifth highest number of cases in the United States.

Figure 90. Typhoid Fever Cases in Illinois, 1999-2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>17</td>
</tr>
<tr>
<td>2000</td>
<td>26</td>
</tr>
<tr>
<td>2001</td>
<td>18</td>
</tr>
<tr>
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</tr>
<tr>
<td>2003</td>
<td>17</td>
</tr>
<tr>
<td>2004</td>
<td>16</td>
</tr>
</tbody>
</table>
Varicella (Chickenpox)

Background

Chickenpox (varicella) caused by varicella-zoster virus is characterized by sudden onset of slight fever and a rash. Lesions present with successive crops and several stages of maturity present at the same time. Serious complications of varicella may occur and can include pneumonia, secondary bacterial infections, hemorrhagic complications an encephalitis. Herpes zoster (shingles) is a local manifestation of reactivation of latent varicella in dorsal root ganglia. Severe pain and paresthesia may accompany this manifestation.

The incubation period is two to three weeks long. A person is communicable as long as five days before rash onset and remains infectious until the rash is crusted over. The disease is transmitted through direct contact between persons, droplet or airborne spread of vesicle fluid or respiratory tract secretions or indirectly through fomites.

Varicella or chickenpox is a highly infectious vaccine preventable disease. Varicella related deaths became nationally notifiable in 1999 to allow for evaluation of the vaccine program. In the United States, nine varicella deaths were reported from eight states to CDC in 2004. The number of chickenpox cases reported nationally was 32,931 but reporting was not available for 12 states.

Illinois implemented school entry requirements for varicella in July 2002. In Illinois, any child 2 years of age or older entering a child care facility or school program under the kindergarten level (defined as nursery schools, pre-school programs, early childhood programs, Head Start, or other pre-kindergarten child care programs offered or operated by a school or school district) is required to be vaccinated for varicella. Rules in Illinois are pending to require case-based reporting for all varicella cases.

Case definition

Physician diagnosed cases are reported to IDPH with a weekly summary from local health jurisdictions. Individual adult cases or fatal cases are reported.

Descriptive Epidemiology

- Number of total reported cases – 6,279.
- Number of adult varicella cases – Of the seven adult varicella cases, six were confirmed and one was probable.
- Sex of adult varicella cases – Three were male and four were female
- Race/ethnicity of adult varicella cases – Of the seven cases, six were white and one was other race. One was Hispanic.
- Fatalities – No varicella deaths were reported in 2004.

Summary

Varicella (chickenpox) is reportable in aggregate in Illinois and more than 6,000 cases were reported in 2004. The number of reported chickenpox cases has been declining since 1997. No fatal cases were reported in 2004.
**Vibrio, Non Cholera**

**Background**

The two most common Vibrio species that cause human illness other than *V. cholerae* include *V. parahaemolyticus* and *V. vulnificus*. *V. parahaemolyticus* causes watery diarrhea. The incubation period can range from four to 30 hours, typically ranges between 12 and 24 hours. Cases occur primarily in the summer months after consumption of contaminated undercooked or raw seafood. *V. vulnificus* produces septicemia in persons with underlying diseases. *V. vulnificus* also can infect wounds, even in healthy persons, swimming in contaminated water. Transmission is from consumption of contaminated raw or undercooked seafood.

In FoodNet data, the two most commonly identified *Vibrio* species were *parahaemolyticus* and *vulnificus*. The percent of cases of enteric diseases that were reported to FoodNet and were *Vibrio* was 0.76 percent. The incidence per 100,000 was 0.28 per 100,000. The hospitalization rate for *Vibrio* was 32 percent.

**Descriptive epidemiology**

*V. parahaemolyticus*

Number of cases reported in 2004 - Seven cases of *V. parahaemolyticus* were reported. All cases were confirmed.

Age – Cases ranged in age from 39 to 71 years of age.

Sex – Five cases were female and two were male.

Seasonal variation – Most cases (five) occurred in September with one in July and one in September.

Geographic distribution – Most cases were reported from Cook County (five) and two from DuPage.

Outcome – No cases were known to be fatal.

*V. vulnificus*

One case of *V. vulnificus* was reported in 2004 in a 59-year-old male from Chicago. This person ate raw oysters in a restaurant and had underlying diabetes and liver disease. Symptoms included fever, vomiting and headache.

**Suggested readings**

Yersiniosis

Background
Yersiniosis, an infrequently reported cause of diarrhea in the United States, is caused by *Yersinia enterocolitica* or *Y. pseudotuberculosis*. Transmission is by the fecal-oral route, through consumption of contaminated food or water or by contact with infected people or animals. The incubation period is three to seven days. Fecal shedding occurs for as long as symptoms are present, usually two to three weeks. Manifestations of the disease include an acute febrile diarrhea and abdominal pain. Symptoms can mimic appendicitis. Bloody diarrhea is seen in 10 percent to 30 percent of children with *Y. enterocolitica*. Animals are the principal reservoir for *Yersinia*, with the pig the primary reservoir of *Y. enterocolitica*; rodents are the main reservoirs for *Y. pseudotuberculosis*. Most pathogenic strains of *Y. enterocolitica* have been isolated from raw pork or pork products. Chitterling consumption or contact with someone preparing chitterlings is a common exposure history for those with yersiniosis. *Yersinia* is cold-tolerant and can replicate under refrigeration.

Of the 10 diseases (those caused by *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *E. coli* O157:H7, *HUS*, *Listeria monocytogenes*, *Salmonella*, *Shigella*, *Vibrio* and *Yersinia enterocolitica*) under active surveillance in the federal FoodNet sites, *Yersinia* comprised 1 percent of the reported infections in data from 2004. The incidence rate per 100,000 for yersiniosis in 2004 data was 0.4 per 100,000. In FoodNet sites in 2004, 27 percent of cases of *Yersinia* were hospitalized.

Case definition
The case definition in Illinois includes only a positive culture for *Yersinia*. Information for this report was obtained from the INEDSS system, year counted=2004 and from paper records not in INEDSS.

Descriptive epidemiology
- Number of reported cases in Illinois in 2004 = 28 (five-year median = 24) (see Figure 91). The incidence rate per 100,000 was 0.2.
- Age – Fourteen cases (50 percent of those with age information) occurred in those younger than 5 years of age (Figure 92).
- Gender – Forty-eight percent were female.
- Race/ethnicity - Fifty percent were African American, 45 percent white and 4 percent Asian. Only one of 22 cases reported Hispanic ethnicity.
- Seasonality – Case onsets by month are shown in Figure 93. More cases were reported in December and January.
- Outcome – For 22 cases with complete case information, 12 cases (54 percent) were hospitalized and no cases were reported to be fatal.

Summary
The yersiniosis incidence rate of 0.2 per 100,000 for 2004 in Illinois was similar to that found in the CDC’s FoodNet sites. Fifty percent of cases in 2004
with age information occurred in children younger than 5 years old.

**Suggested readings**

Other Incidents of Interest, 2004

Avian influenza

Type A influenza virus can affect humans, birds, pigs, horses, seals and whales. In humans, H1N1, H1N2 and H3N2 are the subtypes that circulate. Type A avian influenza viruses are divided into subtypes on the basis of their surface proteins-hemagglutinin (HA) and neuraminidase (NA). There are 15 known H subtypes, and only three subtypes have circulated in humans (H1, H2, H3). Two subtypes of NA (N1 and N2) have circulated in humans. In general, most forms of avian influenza do not result in wild birds becoming ill after infection but domestic birds do become ill. Some subtypes of avian influenza A have crossed the species barrier and have infected humans. In 1997, 6 of 18 people in Hong Kong affected with H5N1 died. In 2003, a Dutch outbreak of H7N7 occurred and caused one human fatality. In 2004, increased attention was focused on avian influenza due to cases of H5N1.

In December 2003 and January 2004, 10 cases of avian influenza A (H5N1) occurred in Vietnam. All patients presented with fever, respiratory symptoms and lymphopenia. Seven of the 10 patients had diarrhea. Eight patients died. The infection appeared to have been acquired directly from poultry and there was no direct evidence of person-to-person transmission. The incubation period was estimated as two to four days.

In Texas avian influenza highly pathogenic H5N2 was identified. This was the first incidence of this in the United States in 20 years.

Canada reported detection of H7N3 influenza virus on a chicken farm. At least one government poultry inspector developed influenza infection.

Four large zoo cats in Thailand and some domestic cats died after developing avian influenza subsequent to eating fresh chicken carcasses.

From 1997 through January 2004, avian influenza in humans has been reported five times: 1997 (Hong Kong, H5N1), 1999 (Hong Kong, H9N2), 2003 (Hong Kong, H5N1), 2003 (Netherlands, H7N7) and 2003 (Hong Kong, H9N2), 2003-2004 (Vietnam and Thailand, H5N1).

Suggested readings


Non-Foodborne, Non-Waterborne Outbreaks

Eleven non-foodborne, non-waterborne outbreaks were reported in 2004. All were person-to-person outbreaks. One was caused by *Shigella* and the other 10 were suspected or confirmed to be caused by norovirus. Eight were confirmed as norovirus and two were suspected to be norovirus. Six were norovirus G2, one was a mixed G1 and G2 and the type of the other outbreak was unknown.

Outbreak descriptions follow:

- The *Shigella* outbreak occurred in a camp setting in Will County in June and affected 22 people.
- A suspect norovirus outbreak in a facility occurred in January 2004 in Cook County; 41 residents and 11 staff became ill. No laboratory testing was performed.
- A long-term care outbreak in Dekalb County in January involved 35 residents (45 percent) and 28 staff (35 percent). Norovirus G2 was identified in two of three stool specimens submitted.
- A confirmed norovirus outbreak occurred in a hospital in Cook County and involved 50 staff and patients. Four of seven stools tested positive for norovirus G2.
- A suspect norovirus outbreak occurred in Lake County at an assisted living facility in February. Twenty of 91 (22 percent) of residents and 11 of 80 (14 percent) of staff became ill.
- A long-term care facility in Chicago experienced a confirmed outbreak of norovirus G2 in March. Fifteen staff and residents became ill.
- A Marion County long-term care facility had 31 residents and staff become ill in March. Eight residents were hospitalized. Seven of 10 persons tested positive for norovirus G2.
- Eleven staff and 11 residents of a Cook County long-term care facility became ill in March. One resident was hospitalized. Three of seven tested positive for norovirus G2.
- Ten of 80 campers became ill in June in Jersey County. One person tested positive for G1 and one for G2.
- A Macon County long-term care facility had 35 residents and staff become ill in December. Two of five persons tested were norovirus positive.
- In December, a long-term care facility in Winnebago County had 45 of 85 (53 percent) of residents and 16 staff members become ill. Two residents were hospitalized. Four of four persons tested were positive for norovirus G2.
<table>
<thead>
<tr>
<th>Disease</th>
<th>Number</th>
<th>Disease</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>1,424</td>
<td>HIV</td>
<td>2,796</td>
</tr>
<tr>
<td>Amebiasis cases, acute</td>
<td>75</td>
<td>Legionnaires’ disease</td>
<td>55</td>
</tr>
<tr>
<td>Anthrax</td>
<td>0</td>
<td>Leprosy</td>
<td>1</td>
</tr>
<tr>
<td>Arbovirus infection</td>
<td>60 WNV, 0 SLE, 8 LAC, 3 Dengue, 1 Ross river</td>
<td>Leptospirosis</td>
<td>0</td>
</tr>
<tr>
<td>Aseptic meningitis or encephalitis of unknown etiology</td>
<td>1,256</td>
<td>Listeriosis</td>
<td>24</td>
</tr>
<tr>
<td>Aseptic meningitis or encephalitis of known etiology</td>
<td>156</td>
<td>Lyme disease</td>
<td>87</td>
</tr>
<tr>
<td>Blastomycosis</td>
<td>92</td>
<td>Malaria</td>
<td>47</td>
</tr>
<tr>
<td>Botulism</td>
<td>0</td>
<td>Measles</td>
<td>1</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>9</td>
<td>Meningococcal, invasive</td>
<td>36</td>
</tr>
<tr>
<td>Campylobacteriosis</td>
<td>1401</td>
<td>Murine Typhus</td>
<td>0</td>
</tr>
<tr>
<td>Chickenpox</td>
<td>6,279</td>
<td>Mumps</td>
<td>10</td>
</tr>
<tr>
<td><em>Chlamydia trachomatis</em></td>
<td>47,185</td>
<td>Pertussis</td>
<td>1,604</td>
</tr>
<tr>
<td>Cholera and other <em>Vibrio species</em></td>
<td>1</td>
<td>Psoatasis</td>
<td>0</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>161</td>
<td>Q fever</td>
<td>5</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>61</td>
<td>Rabies, animal</td>
<td>51</td>
</tr>
<tr>
<td>Cysticercosis</td>
<td>0</td>
<td>Reye syndrome</td>
<td>0</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>0</td>
<td>Rocky Mountain spotted fever</td>
<td>14</td>
</tr>
<tr>
<td>Ehrlichiosis, human granulocytic</td>
<td>1</td>
<td>Rubella</td>
<td>0</td>
</tr>
<tr>
<td>Ehrlichiosis, human monocytic</td>
<td>4</td>
<td>Salmonellosis</td>
<td>1612</td>
</tr>
<tr>
<td>Ehrlichiosis, unknown type</td>
<td>7</td>
<td>Shigellosis</td>
<td>402</td>
</tr>
<tr>
<td><em>E. coli</em>, shiga toxin producing</td>
<td>122 (107 are O157:H7)</td>
<td>S. aureus, vancomycin resistant</td>
<td>0</td>
</tr>
<tr>
<td>Foodborne and waterborne outbreaks</td>
<td>92 foodborne, 9 recreational water</td>
<td><em>Streptococcus</em>, group A, invasive</td>
<td>284</td>
</tr>
<tr>
<td>Giardiasis case</td>
<td>807</td>
<td><em>Streptococcus</em>, group B, invasive</td>
<td>68</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>20,579</td>
<td><em>Streptococcus pneumoniae</em>, invasive</td>
<td>935</td>
</tr>
<tr>
<td>Guillain Barre syndrome</td>
<td>5</td>
<td>Syphilis, primary or secondary</td>
<td>386</td>
</tr>
<tr>
<td>H. influenzae, invasive disease</td>
<td>135</td>
<td>Tetanus</td>
<td>0</td>
</tr>
<tr>
<td>Hantavirus</td>
<td>0</td>
<td>Toxic shock syndrome</td>
<td>6</td>
</tr>
<tr>
<td>Hemolytic uremic syndrome</td>
<td>3</td>
<td>Trichinosis</td>
<td>0</td>
</tr>
<tr>
<td>Hepatitis A case, acute</td>
<td>147</td>
<td>Tuberculosis</td>
<td>569</td>
</tr>
<tr>
<td>Hepatitis B case, acute</td>
<td>111</td>
<td>Tularemia</td>
<td>5</td>
</tr>
<tr>
<td>Hepatitis C case, acute</td>
<td>15</td>
<td>Typhoid fever cases</td>
<td>16</td>
</tr>
<tr>
<td>Histoplasmosis</td>
<td>96</td>
<td>Yersiniosis</td>
<td>28</td>
</tr>
</tbody>
</table>

* one case of babesiosis, one case of orf and one case of lymphogranuloma venereum also were reported
Methods

Health care professionals, including infection control nurses, physicians and school nurses, are required by Illinois law to report specific infectious diseases to their local health department. There are 94 local health departments in Illinois. Some serve a city or district, some serve the entire county and some serve residents of several counties. Local health departments report cases to the Illinois Department of Public Health (IDPH), which, in turn, reports all nationally notifiable diseases to the U.S. Centers for Disease Control and Prevention (CDC). All information about patients is confidential; case reports to the CDC do not identify patients.

This annual report includes only cases reported to IDPH. Therefore, these annual numbers will underestimate the total number of cases of each disease in the state. Some patients with disease do not seek medical attention, some may not have the necessary testing done for a diagnosis, or the medical provider may not report the case to public health authorities. Also, to standardize reporting in the state, only cases that are reported and meet the case definition for that disease are included in case counts. For some diseases, a case definition is listed for both confirmed and probable cases. For all diseases except HIV/AIDS, the number of cases reported in a year is “closed out” on a set date in the following year. If cases from the preceding year are reported after the closed out date, they are not included in the annual reported cases. For HIV/AIDS, there are two categories: number of cases reported in a given year vs. number of cases diagnosed in a given year. The number of cases diagnosed in a given year is continually updated even if there is an extremely long delay in reporting a case. Therefore, the numbers for diagnosed AIDS cases in 2000 may be updated.

Reportable diseases diagnosed in college students living away from home and in residents of prisons, long-term care or other residential facilities are reported in the jurisdiction where the patient resides at the time of diagnosis. This results in attributing to rural counties that have a college or prison high incidence rates of certain diseases. Persons who are residents of Illinois but are not citizens of the United States may be counted. Persons who are visiting the United States and become clinically ill with malaria or typhoid fever are counted in Illinois malaria and typhoid fever statistics. Residents of other states who become ill in Illinois are not counted in this state’s statistics but are transferred to the state of residence. However, temporary workers in Illinois are counted in Illinois statistics.

The Illinois population used to calculate incidence rates and race and ethnicity proportions in this document was from the 2000 Census data. According to the U.S. Census Bureau, Illinois’s population was 12,419,293 in 2000. In 2000, the census found the following percentages: 73 percent white, 15 percent African American, 3 percent Asian and 8 percent other or mixed races. Those indicating Hispanic ethnicity was 12 percent. In 2000, 49 percent of the population was male and 51 percent was female. The following table shows the age distribution of the Illinois population as determined by the 2000 census.
<table>
<thead>
<tr>
<th>Age category</th>
<th>Census numbers used for 2000 annual report</th>
<th>% of population</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>173,373</td>
<td>1</td>
</tr>
<tr>
<td>1-4 years</td>
<td>703,176</td>
<td>6</td>
</tr>
<tr>
<td>5-9 years</td>
<td>929,858</td>
<td>7</td>
</tr>
<tr>
<td>10-19 years</td>
<td>1,799,099</td>
<td>14</td>
</tr>
<tr>
<td>20-29 years</td>
<td>1,742,602</td>
<td>14</td>
</tr>
<tr>
<td>30-59 years</td>
<td>5,108,274</td>
<td>41</td>
</tr>
<tr>
<td>&gt;59 years</td>
<td>1,962,911</td>
<td>15</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12,419,293</td>
<td></td>
</tr>
</tbody>
</table>

Where it was deemed useful, graphs were produced showing the number of cases by month, the number of cases by year since 1995 and the age distribution. Incidence rates were calculated by age for some diseases. One-year incidence rates by county were graphed for some diseases. Incidence rate was calculated by taking the number of cases in a category, dividing by population size from 2000 census data and multiplying by 100,000. If an annual incidence rate was calculated for the period 2000 to 2004, it was reached by taking the number of cases reported from 2000 through 2004, dividing by the population and multiplying by 100,000; it was then annualized by dividing by five.

In 2004, the Communicable Disease Control Section was converting from one database to INEDSS. Therefore, the surveillance information for communicable diseases may have been obtained from multiple sources so as to be complete. When the INEDSS system was used, the criteria used were (status=confirmed or probable, onset from January 1 to December 31, disease selected). For diseases where asymptomatic cases do not meet the case definition (hepatitis A and amebiasis), these asymptomatic laboratory confirmed cases were not included in the detailed information in the disease information. The epidemiologic information presented for each disease is for 2004 only, unless otherwise specified. For some diseases, where the number of cases by year was low, information may have been combined for multiple years to allow demonstration of trends by month and age. When the case population differed from the Illinois population in the racial distribution, a chi-square test for a significant difference in proportions was done using the Epi-Info software package. Means were reported when the data followed a normal distribution; otherwise, the median was reported.

Suggested reading lists are provided for some diseases.