The Epidemiology of Infectious Diseases in Illinois

2003
# The Epidemiology of Infectious Diseases in Illinois, 2003

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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 United States 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 meningitides. 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  
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

\(^1\)HIV 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.
2003 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 51 diseases or conditions listed as nationally reportable to the United States 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, SARS and yellow fever. Animal rabies testing is only performed by state laboratories in Illinois so reporting is complete through state laboratory reporting. In 2003, the 10 most frequently reported notifiable infectious diseases in the United States were AIDS, chlamydia, giardiasis, gonorrhea, Lyme disease, salmonellosis, shigellosis, syphilis, tuberculosis and varicella.

In 2003, 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 2003. 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 trachomatis, gonorrhea, HIV, Salmonella and AIDS. Diseases with increased reporting in 2003 over the previous five-year median included amebiasis, blastomycosis, California encephalitis, Chlamydia trachomatis, Campylobacter, ehrlichiosis, H. influenzae, histoplasmosis, Legionella, Lyme disease, pertussis, Salmonella, group B streptococcus, invasive group A streptococcus and S. pneumoniae. The number of reported cases of brucellosis, shiga-toxin producing E. coli, giardiasis,
gonorrhea, hepatitis A, hepatitis B, malaria, mumps, *N. meningitidis*, syphilis, tuberculosis and varicella have been decreasing compared to the previous five-year median. The number of WNV cases decreased as compared to last year, the first year of human cases in Illinois.

Highlights of 2003 in Illinois include:

- On April 15, 2003, the Health Insurance Portability and Accountability Act went into effect.
- A multi-state monkeypox outbreak including 10 cases from Illinois was linked to pet prairie dog exposure.
- A case of babesiosis was reported in Illinois.
- A cluster of myopericarditis occurred in the state.
- An outbreak of histoplasmosis occurred in highway workers in Iroquois County.
- WNV cases in people were reported for the second year to the Illinois Department of Public Health.
- A cluster of meningococcal disease in Chicago residents who were in the men who have sex with men community occurred and resulted in a meningococcal vaccination campaign.
- 30 *E. coli* O157:H7 cases occurred in persons who ate food at a St Clair County restaurant.
- 297 *Salmonella* cases occurred in people who ate at two restaurants from the same chain in Lake County. Many food handlers were positive for *Salmonella*.
- An outbreak of illness was associated with raphide consumption in Chicago.
- A large norovirus outbreak involving 269 ill persons who visited a shrine in St Clair County was reported.
- Severe Acute Respiratory Syndrome (SARS) occurred for the first time in Asia.

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](http://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 West Taylor St., Chicago, IL 60612
Illinois counties
Acquired immune deficiency syndrome/Human immunodeficiency virus

Background

HIV/AIDS is transmitted through the exchange of blood, semen or vaginal secretions from an infected to an uninfected individual. 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.

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 cryptoccocosis, 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 also are 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 MMWRs (Morbidity and Mortality Weekly Report) should be reviewed:

1) Review of the CDC surveillance case definition for acquired immunodeficiency syndrome. MMWR 1987;36 (Suppl:)1-15s.
2) 1993 revised classification system for HIV infection and expanded surveillance
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 2003 – 1,485. The number of reported AIDS cases decreased from the 2,376 reported in 2002 (See Figure 1). The number of reported HIV cases was 2,537, a decrease from the 3,053 reported in 2002.
- The majority of reported AIDS cases in 2003 were in males (1,165 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 (694 cases or 60 percent), followed by injection drug use (IDU) with 181 cases or 15 percent. The majority of reported HIV cases in 2003 were in males (1,710 or 67 percent). For all cases reported among males, MSM accounted for the largest number of HIV cases (1,022 or 66 percent), followed by IDUs with 279 or 16 percent.
- Reported cases of AIDS among females accounted for 316 cases or 21 percent of the total AIDS cases reported in 2003. Among females, heterosexual contact accounted for 158 cases or 50 percent of the total, with IDU accounting for 89 cases or 28 percent. Reported cases of HIV among females accounted for 645 or 25 percent of the total reported HIV cases in 2003. Among females, heterosexual contact accounted for 339 or 21 percent of the total HIV cases reported, with IDU accounting for 135 or 21 percent.
- African Americans, who represent 15 percent of the state’s population, accounted for 745 or 50 percent of the AIDS cases reported in 2003. This represents a decrease since 2002 when 1,323 (56 percent) of cases reported were among African Americans (Figure 2).
- Heterosexual contact as the mode of transmission accounted for 238 cases or 16 percent of all the reported AIDS cases in 2003. This represents an increase since 1994 when 9 percent of all AIDS cases reported heterosexual contact as the mode of transmission (Figure 3).
- In 2003, Cook County and the collar counties (DuPage, Kane, Lake, McHenry and Will) comprised 87 percent of the total, with Chicago accounting for 67 percent of the total reported AIDS cases. Reported AIDS cases residing outside of Cook and collar counties represented 13 percent of the state total. Cook County and the collar counties comprised 76 percent of the total. Reported HIV cases residing
outside of the Cook County and collar counties represented 24 percent of the state total.

Summary
In 2003, 1,485 AIDS cases and 2,537 HIV cases were reported in Illinois between January 1 and December 31, 2003. 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 2. Reported AIDS Cases in Illinois by Race, 1999-2003

Figure 3. Reported AIDS Cases in Illinois by Mode of Transmission, 1999-2003
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).

Descriptive epidemiology

- Number of cases reported in Illinois in 2003 - 86 (previous five-year median=59). From 1998 to 2003, the number of cases reported per year ranged from 49 to 86 (Figure 4).
- Age - Cases ranged from 4 years to 83 years of age (mean=31) (Figure 5).
- Gender - Males accounted for 53 percent of cases. In some age groups males appeared to be more affected than females.
- Race/ethnicity - 73 percent of cases were white, 17 percent were African American, with 6 percent reporting some other racial identity; 60 percent of those (n=55) 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 throughout the year.
- Symptoms – Detailed information was collected on 15 cases. Diarrhea was reported by 67 percent of cases and vomiting by 20 percent of cases. One case was hospitalized. No fatalities were reported.
- Treatment – Detailed information was collected on 15 cases. All cases reported
being treated for their illness.

- Risk factors - Traveling outside the country (33 percent), contact with someone in a residential institution (17 percent) and drinking from a private water supply (8 percent) were reported risk factors. All of the individuals who traveled reported their destination to be a developing country.

**Summary**

The number of cases in 2003 was higher than the five-year median. Amebiasis was significantly more common in those reporting Hispanic ethnicity.

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**Figure 4. Amebiasis Cases in Illinois, 1998-2003**

- 1998: 54 cases
- 1999: 65 cases
- 2000: 59 cases
- 2001: 65 cases
- 2002: 49 cases
- 2003: 86 cases

**Figure 5. Age & Sex Distribution of Amebiasis Cases in Illinois, 2003**

- Male
- Female

<table>
<thead>
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<th>Age Group</th>
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<tr>
<td>&gt;59 yr</td>
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</table>
Bioterrorism

An important aspect of surveillance for bioterrorism is prompt reporting by the health care community. Physicians and infection control practitioners are an important part of this network. In addition, medical examiners and coroners have authority to investigate deaths that are sudden, suspicious, violent, unattended or unexplained and can report those deaths that may have public health implications.

Listed below are the bioterrorism agents by category.

**Category A Agents**
Smallpox  
Anthrax  
Plague  
Botulism  
Tularemia  
Hemorrhagic fever viruses

**Category B Agents**
Q fever  
*Brucella*  
Glanders  
VEE, EEE, WEE  
Ricin toxin  
*C. perfringens* epsilon toxin  
Staph enterotoxin B  
Food and waterborne illness

**Category C Agents**
Nipah  
Hantavirus  
Tickborne hemorrhagic fever  
Tickborne encephalitis virus  
Yellow fever  
MDR *M. tuberculosis*

**Suggested readings**
Blastomycosis

Background

*Blastomyces dermatitidis* is a dimorphic fungus found in both Canada and the United States. Blastomycosis is a zoonotic disease endemic in the midwestern United States. Occasionally, outbreaks occur in areas outside the endemic areas. The ideal area for the mycelial form of the organism is acidic soil of warm, moist, wooded areas rich in organic debris. 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. Initial symptoms are non-specific and may include fever, myalgias, weight loss, cough and pleuritic chest pain. Cutaneous blastomycosis can occur. Blastomycosis most commonly affects immunocompetent persons. For symptomatic infections, the incubation period ranges from 30 to 45 days.

A review of Illinois surveillance data from 1993 through 2003 indicated a rise in cases from 24 cases in 1993 to a peak of 89 cases in 2003. Four counties reported the largest number of cases, Cook, Kane, Lake and Winnebago in that 11-year period.

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 2003 – 89 (previous five-year median=50). From 1998 to 2003, the number of cases per year ranged from 47 to 89 (Figure 6). The 2003 incidence rate was 0.71 per 100,000 population in Illinois.
- Age - The mean age was 41 years (range 9 to 76) (Figure 7).
- Gender - 62 percent were male.
- Race/ethnicity - Fifty-two percent were white and 39 percent were African American; 15 percent were Hispanic.
- Geographic distribution – More than 60 percent of the cases had residential addresses in Cook, Kane or Lake counties (Figure 8).
- Symptoms - Fever (71 percent), weight loss (63 percent), dyspnea (61 percent), night sweats (55 percent), chills (53 percent), anorexia (43 percent), cough (41 percent), hemoptysis (41 percent), skin lesions (32 percent), joint pain (26 percent) and local swelling (17 percent). In 34 percent of cases, disease was present in tissue other than the lung. In 56 patients with radiographic results, the following findings were reported: pulmonary infiltrates (70 percent), nodules (29 percent), cavitation (7 percent) and hilar lymphadenopathy (17 percent).
- Diagnosis – 35 cases were only culture positive, 18 were culture positive and organism identification in a biopsy specimen, five were culture positive and smear positive, five were culture, smear and biopsy positive, eight were biopsy only positive, one case was smear and biopsy positive. The method of laboratory diagnosis was not available for 17 cases at the time of this report. Of the 63 cases with positive cultures, cases were culture confirmed from a bronchial wash (24),...
lung tissue (14), sputum (8), skin (6), joint (2), blood (1), other (1) and multiple sites (6; Note: one case had isolates from three sites). For the 32 cases with positive biopsy specimens, 22 were from lung tissue, two from lymph nodes and eight specimens were from other tissues. Positive smears were identified in 11 cases and the smears were positive in sputum (3), blood (1) and other (7).

- Treatment - 81 percent of cases were hospitalized; five cases were fatal.
- Risk factors – Ever smoked (63 percent); 54 percent of the ever smokers were current smokers. Other risk factors were walking by waterways (18 percent), potting soil exposure (11 percent), excavation (14 percent), dirt arenas (4 percent) and plowing (2 percent). At least 21 percent of cases had diabetes, 7 percent had a chronic lung condition and 16 percent reported an underlying immunosuppressive condition.

Summary
A higher number of blastomycosis cases were reported in 2003 (89 cases) as compared to the five-year median of 50. Blastomycosis cases occurred predominantly in adults. Many cases had symptoms of respiratory involvement, including cough, dyspnea or hemoptysis. Eighty-seven percent of reported cases were confirmed by culture. Among reported cases, more than 60 percent of cases reported living in Cook, Kane or Lake counties.

Selected readings
Figure 8. Geographic Location of Blastomycosis Cases in 2003
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. 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. Spores exist in soil and dust. Honey is an avoidable source of spores for infants. 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.

Between 20 and 30 cases of foodborne botulism are reported annually to CDC. 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. 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.

If botulism is suspected, contact your local health department immediately. This will allow for rapid investigation to identify the source. If the source was a commercial product it could 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 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 *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 *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 botulism reported in the state in 2003.
Brucellosis

Background
Brucellosis is a systemic bacterial infection caused by *Brucella* species that can cause intermittent or continuous fever and headache, sweating and arthralgia. 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* but are not considered to be an important public health concern in the United States. The disease is most common in residents or travelers to the Mediterranean, Middle East, Mexico, and Central and South America. 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. Veterinarians can acquire infection from assisting in births of infected animals or exposure to *B. abortus* strain 19 vaccine. Laboratory workers are at risk when handling specimens containing *Brucella* species. *Brucella* is one of the most commonly acquired laboratory infections. The incubation period varies from one to two months. Investigation of *Brucella* cases could reveal foci of infection in United States livestock that should be investigated and eliminated. However, 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 2003, 104 human brucellosis cases were reported to CDC. Most were in international travelers or immigrants.

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).

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 – 0

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. In 2003, there were no cases reported. Case numbers for 1998 through 2003 are found in Figure 9.
Suggested readings

Figure 9. Brucellosis Cases in Illinois, 1998-2003
**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-Barré 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 33 percent of all of those reported in 2003. The overall incidence for this infection from the nine FoodNet sites was 12.6 per 100,000. The 2010 national health objective is for less than 12 cases per 100,000. *Campylobacter* decreased 29 percent from 1996 to 2003 in 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 contaminated water, eating at barbecues, eating poultry purchased raw, having occupational exposure to animals and eating undercooked pork were risk factors for sporadic campylobacteriosis. In a Quebec study of sporadic cases, eating raw, rare or undercooked poultry, consuming raw dairy products, professional exposure to animals and eating turkey or chicken outside of the home were risk factors for illness. The main risk factor for sporadic campylobacter in Denmark was eating fresh unfrozen chicken. Freezing reduces the number of viable Campylobacter bacteria. Denmark has seen an increase in the incidence of Campylobacter.

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

The first full year of mandatory *Campylobacter* reporting in Illinois was in 2002.

**Case definition**

The case definition for a confirmed case of campylobacteriosis in Illinois is a clinically compatible illness with 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 2003 – 1,235 (previous five-year median=951); incidence rate of 9.9 per 100,000 (Figure 10).
- Gender - 54 percent were males.
- Age - Mean age of reported cases was 38; highest incidence rate occurred in those younger than 5 years of age: 14.5 per 100,000. The number of cases by
age group is shown in Figure 11.

- Race/ethnicity - The majority of cases (91 percent) were in whites, with 4 percent in African Americans, 3 percent in Asians and 2 percent in other races. Those indicating Hispanic ethnicity accounted for 14 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 September) (Figure 12).

**Summary**

This was the third full year of mandatory reporting of campylobacteriosis in Illinois and the incidence of the disease stayed virtually the same between last year and this year at 9.9 per 100,000. This rate was below the 2010 national objectives of 12 per 100,000. *Campylobacter* infections occur more commonly from June through September. The incidence is highest in 1-to 4-year-olds. Whites are more likely to be reported with campylobacteriosis than other races.

**Suggested readings**

Figure 11. Number of Campylobacteriosis Cases in Illinois by Age, 2003

Figure 12. Campylobacteriosis Cases in Illinois by Month, 2003
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 13.

Table 1. Number of reported CNS infections reported in Illinois, 2003

<table>
<thead>
<tr>
<th>Type of CNS Infection</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aseptic meningitis, unknown etiology</td>
<td>1023</td>
</tr>
<tr>
<td>Aseptic meningitis, known virus, not arboviral</td>
<td>228</td>
</tr>
<tr>
<td>Encephalitis, acute, known virus, not arboviral</td>
<td>23</td>
</tr>
<tr>
<td>Encephalitis, acute, unknown etiology</td>
<td>189</td>
</tr>
<tr>
<td>WNV</td>
<td>54</td>
</tr>
<tr>
<td>California encephalitis</td>
<td>11</td>
</tr>
<tr>
<td>SLE</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1528</td>
</tr>
</tbody>
</table>

Figure 13. Reported Non-bacterial CNS Infections by Year in Illinois, 1998-2003

![Figure 13. Reported Non-bacterial CNS Infections by Year in Illinois, 1998-2003](image-url)
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.

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 – 1,212 (1,023 meningitis cases and 189 encephalitis cases).
- Age - Annual incidence rate highest in those younger than five years of age (24 per 100,000) (Figure 14). In all other age groups, the incidence rate was below 13 per 100,000. The mean age of reported cases was 26.
- Gender - 49 percent were male.
- Race/ethnicity - 82 percent white, 16 percent African American and 2 percent other races; 20 percent Hispanic.
- Seasonal variation - Most common July through October (Figure 15); 933 cases had onsets between May 15 and October 31 (279 had onsets outside of this time frame).
- Geographic distribution - Highest annual incidence rates per 100,000 population for 2003 were in Kendall (31), Vermillion (30), Kane (29), Schuyler (28) and Woodford (25) 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 14. Incidence of Aseptic Meningitis and Encephalitis, Unknown Etiology in Illinois by Age, 2003

Figure 15. Aseptic Meningitis and Encephalitis, Unknown Etiology by Month, 2003
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.

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.

On July 1, 2002, it became mandatory for laboratories to submit CSF to the IDPH laboratory for patients diagnosed with aseptic meningitis.

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.

Descriptive epidemiology

- Number of cases – 251 cases were reported (228 meningitis, 23 encephalitis).
- Age - Median age was 17 years.
- Gender – 54 percent of cases were male.
- Race/ethnicity – 75 percent were white, 19 percent African American and 6 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 (Figure 16). Of the 251 cases, 227 cases (90 percent) had onsets during arbovirus season from May 15 through October 31.
- Diagnosis – For 106 cases the etiologies were known at the time of this report. Viruses identified as the etiologic agent were echovirus 9 (68), herpes simplex (19), echovirus 30 (8) and one each for echovirus 6 and
11. Other viruses identified as the etiologic agents were Ebstein Barr virus (2), varicella zoster virus (6) and coxsackie B (1). One-hundred forty-five were due to viruses unknown at the time of this report.

Summary
In 316 of 1,528 (21 percent) of encephalitis and aseptic meningitis cases, an etiologic agent (including arboviruses) was identified as the cause of illness. Echovirus 9 was the most common virus 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 include those due to West Nile virus, St. Louis encephalitis (SLE), California (LaCrosse) (LAC) 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 2003 are WNV and California encephalitis.

WNV is a flavivirus in the Japanese encephalitis antigenic complex. Birds become infected from mosquitoes. Bird to 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. Gastrointestinal symptoms and a rash may also occur. Cerebrospinal fluid showed normal glucose level, elevated protein (up to 900 mg percent) and lymphocytic pleocytosis (10-100 cells/mm$^3$). In a study of WNV infections in Colorado in 2003, alcohol abuse and diabetes were associated with West Nile virus encephalitis as a syndrome.

A report of a single case of fatal hemorrhagic fever caused by WNV was reported in a resident of Florida. Age, immunosuppression, requirement for mechanical ventilation and history of stroke were linked to death from WNV. Older age was a risk factor for death from WNV.

A study of WNV cases in North Dakota revealed that multiple somatic complaints, tremor and abnormalities in motor skills and executive functions were common long-term problems for those with WNV. WNV can result in cognitive, physical and functional impairments lasting more than 18 months after onset of illness. Patients reported difficulty walking, muscle weakness, fatigue, backache, myalgia) is not uncommon. Gastrointestinal symptoms and a rash may also occur. Cerebrospinal fluid showed normal glucose level, elevated protein (up to 900 mg percent) and lymphocytic pleocytosis (10-100 cells/mm$^3$). In a study of WNV infections in Colorado in 2003, alcohol abuse and diabetes were associated with West Nile virus encephalitis as a syndrome.

In the United States, human cases reported to CDC by year are as follows: 1999 (62), 2000 (21), 2001 (66), 2002 (4,156) and 2003 (9,862). The epidemic peak occurred during the week of August 16 in 2003. In this year, WNV expanded its range to 45 states and the District of Columbia. In 2003, the focus of transmission in the United States changed from the Midwest and south central states to the western plains and front range of the Rocky Mountains. Six states (Colorado, Nebraska, North Dakota, South Dakota, Texas and Wyoming) in the United States reported 77 percent of all cases. In 2003, nationally there were 2,866 human cases of neuroinvasive disease and 264 deaths.
Onsets of human cases were April 14 through December 5. Other positive WNV results included 12,066 birds, 8,384 mosquito pools, 5,145 horses and 106 other animals.

In 2003, Illinois was 21st in the nation in the number of cases of WNV. In Illinois, 100 of 102 counties had evidence of WNV circulation in mammals, birds or mosquitoes. LAC 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 LAC virus infection are most often reported from Peoria, Tazewell and Woodford counties. The main vector is thought to be *Ochlerotatus triseriatus* (treehole mosquito). In 2003, 108 cases were reported in the United States from 11 states (Ohio, Illinois, Wisconsin, Minnesota, Virginia, West Virginia, North Carolina, Kentucky, Tennessee, Mississippi and Louisiana).

SLE also can be identified in persons in Illinois. In 2003, 41 cases of SLE were reported from nine states (Arizona, Louisiana, New Mexico, New York, Pennsylvania, Texas, Michigan, Mississippi and South Dakota). Several epidemics of this disease have occurred in Illinois, including a large outbreak in 1975.

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. On June 30, 2003, the Public Act, 093-0052 (SB 361) in Illinois established the Emergency Public Health Fund which increases the tire tax to fund local mosquito control efforts. In July and August 2003, $1,592,795 was awarded to 90 LHDs for WNV response activities based on population and number of cases in 2002.

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 LAC, SLE, Eastern equine encephalitis and WEE 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).

**Descriptive epidemiology**

From May 15, 2003, through January 2004, the IDPH laboratory tested 5,000 serum and CSF human specimens for WNV, Saint Louis encephalitis, Eastern Equine encephalitis and California encephalitis; 87 specimens were positive for WNV.
LaCrosse Encephalitis Surveillance
- Occurrence – 11 cases as compared to the previous five-year median of four (Figure 17).
- Age - Cases ranged in age from 3 to 32 years of age. Ten cases were younger than the age of 13.
- Sex – Five were female and six were male.
- Clinical presentation - Six cases presented with aseptic meningitis, four cases with encephalitis and one had an unknown presentation type. Symptoms reported by 10 cases with symptom information were fever (10 cases), gastrointestinal signs (10), headache (10), stiff neck (4), change in consciousness (4), photophobia (4), seizures (3), tremor (2) and rash (1). All eleven cases were hospitalized. No LAC cases were fatal.
- Case status - Ten cases were confirmed and one was probable.
- Onset – Case illness onsets ranged from July 15 through September 26. Four cases had onset in July, four cases in August and three cases in September.
- Geographic location - The 11 LAC encephalitis cases resided in Tazewell (2), McHenry (2), Cook (2), Pike (1), DeKalb (1), Fulton (1), JoDaviess (1) and Lee (1) Counties.
- Environmental surveys to identify mosquito breeding sites are conducted in some counties. The Lee County and Cook county case (Skokie) had travel to other states during the incubation period. The environmental investigation around the JoDaviess residence revealed tires, culverts and pipes that were potential mosquito breeding sites. The DeKalb and Tazewell environmental investigations did not reveal potential mosquito breeding sites around the residence. For six cases, either environmental investigations were not performed or the results were not reported to IDPH.

SLE Surveillance
Occurrence - 0 cases of SLE were reported.

West Nile Virus Surveillance
Bird, mosquito pool, horse and human surveillance for WNV was conducted in 2003. Of the 102 Illinois counties, 77 reported WNV activity. The total WNV positive results in 2003 included 54 humans, 70 horses, 507 mosquito pools, 236 birds and three other mammals (squirrels, cats).

WNV Human Cases
Number of cases reported in Illinois – 54 WNV cases were reported; 26 (48 percent) were confirmed and 28 (52 percent) were classified as probable. The incidence in Illinois was 0.43 cases per 100,000 population.
Age – Ages ranged from 16 years to 91 years of age (mean=54) (Figure 18).
Gender – 30 (55 percent) were male.
Race/ethnicity – 42 (87 percent) were white, two (4 percent) were African American and four (8 percent) were other.

Clinical Presentation – Cases were classified as: WNF (24) and neuroinvasive (30) (Figure 19). Of the neuroinvasive cases, 14 were classified as encephalitis and 16 as aseptic meningitis. For individuals over 59 years of age, 71 percent had neurologic disease while only 28 percent had WNF. In all other age groups, neurologic disease comprised 45 percent of cases while 54 percent had WNF. Cases exhibited the following symptoms: fever, 48 (89 percent), headache, 40 (74 percent), vomiting, 21 (39 percent), stiff neck, 17 (31 percent), rash, 15 (28 percent), change in consciousness, seven (13 percent), tremor, six (11 percent) and paresis, two (4 percent).

Hospitalization – 38 (70 percent) cases were hospitalized.

Fatalities – One case was fatal. The fatal case was a 78-year-old female from Cook County who died in September.

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 54 reported cases, positive tests occurred as follows: both serum and CSF (13), CSF only (9) and serum only (32).

Blood transfusion - IDPH received reports of 10 WNV positive results in Illinois residents from four different blood centers. Six of the 10 were positive by at least two tests (PCR, NAT or IgM) at the blood centers. Four were positive only by NAT. Of the 10 positives reported to IDPH, three met the case definition for WNV Fever, while the remaining seven were considered not to be clinical cases of WNV infection.

Seasonal Distribution – Onset of cases ranged from July 16 (DuPage County) through October 1 (Piatt County). Figure 20 shows the number of WNV infections by week.

Geographic Distribution – 22 counties had evidence of WNV activity in humans (Figure 21). The largest number of cases per county (20 of 54, 37 percent) occurred in Cook County (incidence in Cook County 0.37 per 100,000 population).

**Bird testing**

A total of 428 suitable dead birds were submitted for WNV testing in 2003. 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 236 birds tested positive (55 percent). The types of positive birds were 150 crows and 86 blue jays.

The first WNV positive bird collection was from May 1 in Henderson County. The last positive bird of the season was collected on October 8 from Winnebago County. Birds were submitted from 70 of the 102 Illinois counties (See Figure 22). No birds were collected from 32 counties. Fifty-seven counties had positive birds identified.

**Mosquito Pool Testing**

In 2003, 507 of 6,989 (7 percent) pools tested positive. Twenty-three counties had positive mosquito pools. Of the 507 positive mosquito pools, 504 were *Culex* spp. and three were *Aedes vexans*. The first positive mosquito pool was collected on June 4 from Lake County which was after the collection date (June 5) of the first positive bird. The last positive mosquito pool was collected on October 9 in Cook County. In some areas of Cook County, the mosquito infection rate was as much as 80 percent. In 2003, Cook
County mosquito pool positives were as follows: May 1-June 14 (0 of 263-0 percent positive), June 15-July 15 (4 of 254-2 percent), and July 15-August 9 (120 of 336, 36 percent).

**WNV Horse testing**
In 2003, 70 horses and donkeys tested positive for WNV. Positives were identified in 45 counties. The first positive was identified on August 13 in Mercer county and the last positive on October 31 in Hamilton County.

**Other species**
There were two squirrels and a cat that were symptomatic and tested positive for WNV in Illinois in 2003. One squirrel was from Champaign County and exhibited unilateral neurologic signs including loss of motor control in the right forepaws. The squirrel was brought in to the Wildlife clinic at the University of Illinois, College of Veterinary Medicine on September 11. A wolf that tested positive for WNV and had neurologic disease with onset in 2003 in Kane County was reported too late to count for official numbers for 2003. The wolf died in September 2003.

**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. There were 11 cases of LAC encephalitis and no cases of SLE reported in 2003. This was the second year for humans to test positive for WNV in Illinois. Dead crows and blue jays tested positive for WNV in counties in Illinois. Fifty-five percent of all submitted dead birds were positive for WNV. Positive dead birds were collected in Illinois between May 1 and October 8. Positive mosquito pools were collected between June 4 and October 9.

The first indication of WNV activity in the state was in birds in May, followed by mosquito pools; horse and human cases followed. Illinois had the 21st highest number of reported cases in the United States. The top five states in the number of WNV cases in 2003 were Colorado, Nebraska, South Dakota, Texas and North Dakota. The incidence rate of human cases in Illinois was 0.43 which was the same as the incidence in Cook County alone. During 2003, human WNV cases were reported from 22 of the 102 counties in Illinois. In 2003, 20 of the 54 cases had residences in Cook County.

Nationally, 69 percent of cases were WNF, while in Illinois it was 55 percent. In some states samples were only accepted at public health laboratories if the person had neurologic disease. In Illinois, health care providers were encouraged to submit specimens from any patient with suspected WNV.

Factors contributing to the lower number of cases in 2003 in Illinois included:
- Cool summer temperatures
- Better mosquito control through larviciding

**Suggested readings**

Dodd, R.Y. Emerging infections, transfusion safety, and epidemiology. NEJM 2003;349(13):1205-6.
Figure 20. Epidemic Curve for Human WNV Cases in Illinois, 2003

Figure 21. WNV Map of Human Cases in Illinois, 2003
Figure 22. WNV Positive Birds in Illinois, 2003

Number of cases

Week of onset

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

35
**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*. In the United States, conjugate vaccines against *H. influenzae* type b were introduced in 1987 and have resulted in a dramatic drop in case numbers.

In 2003, 376 cases were reported in those younger than five years of age in the United States. Only 9 percent of these were *H. influenzae* type b but 60 percent had missing information as to serotype, so type b represents 21 percent of those serotyped.

**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 2003 - 109 (five-year median = 89). From 1998 to 2003, the number of cases reported per year ranged from 62 to 120 (Figure 23).
- Age – 55 percent of the cases were older than 49 years of age (Figure 24). Ten of the reported cases due to *H. influenzae* type b were younger than 5 years of age.
- Gender - 49 percent of cases were in females.
- Race/ethnicity - 23 percent were African Americans, 76 percent were white and 1 percent were other races; 12 percent were Hispanic.
- Seasonal distribution – *H. influenzae* occurs throughout the year although numbers for 2003 are higher in January through May (Figure 25).
- Presentation - Bacteremia (69 percent), pneumonia (30 percent), meningitis (7 percent), otitis media (1 percent) and cellulitis (1 percent). (Eight patients had more than one manifestation of disease and are represented in each presentation reported for them.)
- Treatment – 93 percent of 87 reported cases for which information was available were hospitalized.
- Mortality – Thirteen (17 percent) cases where information was available died. Twelve of the fatal cases occurred in individuals older than 50 years of age.
Diagnosis - All cases were culture confirmed. *H. influenzae* was isolated from blood (80 cases), CSF (5 cases), pleural fluid (1 case) and from other or unknown sites (23). Typing was attempted on specimens from 64 percent of reported cases; 5 percent of the isolates for which typing was attempted were type b, 13 percent were type f and 5 percent were type e. Forty percent of cases were nontypable.

Summary

The number of *H. influenzae* cases (109 cases) exceeded the five-year median (89 cases). Of the isolates that were typed, 5 percent were type b. Cases occur throughout the year, with slightly more occurring in late winter and spring (Figure 25). Three of these were in children younger than five years of age for whom the vaccine is indicated. The 5 percent of isolates serotyped as type b decreased from the 10 percent seen in 2002. Seventy-six percent of cases in 2003 were either nontypable (40 percent) or the outcome of typing is unknown (36 percent), which includes isolates not submitted for typing by the clinical laboratory as required by regulation. Fifty-five percent of all cases occurred in people older than 49 years of age.
Figure 23. H. influenzae Cases in Illinois, 1998-2003

Figure 24. H. influenzae Cases By Age in Illinois, 2003

Figure 25. H. influenzae Cases in Illinois by Month, 2003
Listeriosis

Background

Listeriosis is caused by infection with *Listeria monocytogenes*. *L. monocytogenes* is common in the environment. It is a foodborne illness that can cause sepsis in immunocompromised persons and meningoencephalitis and febrile gastroenteritis in immunocompetent persons. Patients receiving antineoplastic therapy are more susceptible to listeriosis. *L. monocytogenes* causes sepsis, meningitis, fetal loss and gastroenteritis. 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. Risk factors for infection include immunosuppression, pregnancy and extremes of age.

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 1/2a, 1/2b 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 can also survive and multiply at cold temperatures. Storing foods needing refrigeration at 40 F or below is best for reducing the potential for listeriosis. Foods at higher risk for containing listeriosis include those with potential for contamination by *L. monocytogenes*, supports its growth, are ready-to-eat foods, require refrigeration and are stored for a long time.

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 0.9 percent of the reported infections in 2003. Incidence rates ranged from 0.11 to 0.63 per 100,000 at the nine sites. The rate of hospitalization was highest with listeriosis, with 91 percent of cases hospitalized. Listeriosis cases also had the highest number of fatalities with 22. Five percent of listeriosis cases from 2000 to 2003 in FoodNet sites were linked to outbreaks. For sporadic cases, illnesses were linked to eating melons or hummus at a commercial establishment.

In 2003, 696 cases of listeriosis were reported to CDC from all states and territories. The incidence of laboratory confirmed listeriosis decreased by 24 percent from 1996 through 2003. Pregnancy-associated disease decreased by 37 percent during this time.

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.
Descriptive epidemiology

- Number of cases reported in Illinois in 2003 – 24 total (3 were described as cases of meningitis). The previous five-year median is 24. (Figure 26). The 2003 incidence for all reported listeriosis was 0.19 per 100,000 population.
- Age - Cases ranged in age from newborn to 86 years of age; 74 percent of cases were older than 59 years of age. Note: The CDC case definition requires counting the maternal case as the case, when there is a maternal infant pair with listeriosis. One case this year was counted as the infant side of the pair.
- Gender - The listeriosis cases in Illinois in 2003 were evenly divided between females and males.
- Race/ethnicity - 81 percent were white, 19 percent were African American. No other racial identity was reported among the cases. One person reported Hispanic ethnicity.
- Diagnosis - The site of *Listeria* isolation was identified as follows: blood (15), cerebrospinal fluid (3), joint aspirate (1) and unknown sites (5). One case was in a newborn, but no site of infection was reported for the baby. The mother had a history of soft cheese consumption and symptoms compatible with listeriosis shortly before delivery.
- Underlying conditions - No pregnant women were reported with listeriosis. For 20 of the other cases, information was available on underlying conditions and 13 had a condition known to cause immunosuppression. These included cancer (9), diabetes mellitus (2), renal disease/dialysis (1) and newborn (1).
- Mortality - Four cases died among 19 cases with information on mortality. Among the fatal cases, two had cancer and one had long-term renal disease as underlying medical conditions.
- There were no outbreaks of listeriosis documented in Illinois in 2003.

Summary

In 2003, Illinois recorded 24 listeriosis cases; 74 percent of the cases were older than 59 years of age. The incidence rate (0.19 per 100,000) was within the range described by CDC’s FoodNet sites in 2003.

Suggested Readings


Invasive *Neisseria meningitidis*

**Background**

*N. meningitidis* is an important cause of bacterial meningitis and septicemia in the world. 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. The incubation period ranges from two - 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*. 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.

In 1997, the American College Health Association recommended that college students consider meningococcal disease vaccination. A CDC study in the United States of 50 college students found that freshmen living in dormitories had an elevated risk of meningococcal disease as compared to other college students. The incidence for freshman in dormitories was 5 per 100,000.

*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. Five serogroups (A,B,C,Y and W-135) are identified based on the differences among surface polysaccharides.

In 2003, 1,756 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.
Descriptive epidemiology

- Number of cases reported in Illinois in 2003 - 73 (incidence of 0.58 per 100,000) (five-year median = 91) (Figure 27). One case was reported to be a college student and four cases were reported to be day care attendees. One cluster requiring a vaccination campaign occurred in 2003. (See “Clusters” below.)
- Age - The age distribution of reported meningococcal disease is shown in Figure 28. The mean age of cases was 32.
- Gender – 53 percent of 73 cases with gender information were female.
- Race/ethnicity - 17 percent were African American and 83 percent were white; 15 percent were Hispanic.
- Geographic location – 52 percent of cases resided in Cook County.
- Seasonal distribution - Meningococcal disease occurred throughout 2003 with peaks in early spring and in the fall (Figure 29).
- Presentation - Case reports indicated that 68 percent of reported cases had bacteremia, 34 percent had meningitis and 8 percent had pneumonia. Six cases were reported with multiple presentations of illness.
- Diagnosis – Sixty-seven cases were culture-confirmed and nine were probable cases. The organism was isolated from blood only (40 cases), CSF only (13), blood and CSF (5), blood and peritoneal fluid (1), joint fluid only (1) and invasive site unknown (7). Serogrouping was performed on isolates from 63 percent of cases with positive cultures. In cases where typing was done, the serogroups identified were Y (31 percent), C (36 percent), B (19 percent), W-135 (2 percent) and nontypeable (12 percent). Serogroup C was the strain involved in the Chicago cluster described below. Serogroup Y isolates have increased from 4 percent of isolates in 1991 to 31 percent in 2003 (Figure 30).
- Treatment – 58 of 62 (94 percent) of individuals with information available were hospitalized.
- Mortality - The case fatality rate was 11 percent for 54 patients where the outcome of infection was known. Ages of the six fatal cases were less than one year (1 case), 1 to 4 years of age (2), 20-29 years (1) and 30-59 years (2).
- Clusters - On October 14, 2003 a suspect case of N. meningitidis was reported to the Chicago DPH. The following day three more suspect cases were reported. All patients lived on the north side of the city, two patients had died and one was on a ventilator. On October 17, a death in a patient with purpura fulminans (the rash characteristic of some meningococcal infections) was reported from the medical examiner’s office. All five cases had connections to the men who have sex with men (MSM) community. An alert was sent to medical practices that specialize in treating MSMs. On October 18, a sixth case of N. meningitidis serogroup C was reported from the IDPH laboratory with an October 6 onset that had not previously been reported to the Chicago DPH. All six cases were male and residents of four community areas on the north side of Chicago. Three were fatalities. Four cases were confirmed as N. meningitidis serogroup C and two were probable cases. Ages ranged from 27 to 42 years of age. Most cases frequented multiple social settings (bars, bookstores and bathhouses) on the north side of Chicago but on different days and without contact with each other. (Bar patronage had been found associated with a higher risk of carriage of this organism in a previous investigation of another cluster of meningococcal disease in Illinois.) This cluster met the criteria for a meningococcal vaccination campaign. Five vaccination sites
were chosen and vaccination started on October 19. Individuals with direct contact with gay or bisexual men in social settings on the north side of Chicago in October 2003 and those with direct contact with saliva or respiratory secretions of these individuals were encouraged to receive vaccinations. An average of one person was vaccinated per minute and the process from enrolling to departure took five to 15 minutes. A total of 14,267 persons were vaccinated from October 19 to October 26. CDC reimbursed the Chicago DPH for some of the costs of the vaccination program. Antimicrobial prophylaxis was given to persons with close contacts to cases. This was the seventh cluster in Illinois that resulted in a meningococcal disease vaccination campaign.

Summary

The number of *N. meningitidis* cases reported in Illinois in 2003 (73) was lower than the five-year median (91 cases). Of the cases that were culture positive, 63 percent had isolates submitted for serotyping. Serogroup C was the most common serogroup reported. A vaccination campaign was required due to a cluster of *N. meningitidis* serogroup C infections among MSM in Chicago that resulted in six cases with three fatalities. Over 14,000 persons received meningococcal vaccine as a result.

Suggested readings


![Figure 27. Meningococcal Disease in Illinois, 1998-2003](image-url)
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.

Guidelines for GBS prevention were published in 1996 and are replaced with the guidelines published in an MMWR in 2002 as listed in the suggested readings. The 2002 guidelines differ in the following recommendations:

1. Universal prenatal screening for vaginal and rectal GBS colonization of all pregnant women at 35-37 weeks of gestation
2. Updated prophylaxis regimens for women with penicillin allergy
3. Detailed instruction on specimen collection and culture processing
4. Recommendations against routine intrapartum antibiotic prophylaxis for GBS colonized women undergoing planned Cesarean deliveries who have not begun labor or had rupture of membranes
5. An algorithm for management of patients with projected preterm delivery
6. An updated algorithm for management of newborns exposed to intrapartum antibiotic prophylaxis.

This was the second full year for mandatory reporting of only invasive GBS in infants younger than 3 months. Beginning on April 1, 2001, only invasive GBS in infants younger than 3 months was reportable in Illinois. Previously, invasive GBS in all ages was reportable.

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 younger than 3 months of age are required to be reported in Illinois in 2003.

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 - 67 (five-year median = 41). Forty-six cases were younger than 3 months of age. Cases greater than 2 months of age were reported voluntarily; this reporting was not mandated by law.
• Age - 70 percent of all cases occurred in those younger than 1 year of age.
• Gender - 64 percent of all cases were female.
• Race/ethnicity - 62 percent of all cases were white, 32 percent were African American and 6 percent Asian; 10 percent were Hispanic. Forty-two percent of cases 3 months of age or younger were African American. There was a significantly higher proportion of African Americans with GBS as compared to their representation in the Illinois population.
• Seasonal variation - Cases occurred throughout the year, although only 16 cases occurred from September through December.
• Diagnosis – Sixty-one cases were confirmed by a positive culture. The organism was isolated from blood (50 cases), CSF (2), blood and CSF (7) and other or unknown sites (2).
• Case outcome – 55 of 57 cases with information available were hospitalized; three cases were known to be fatal. For those younger than 3 months of age, 40 of 42 cases were hospitalized and two fatalities were among this age group.

Summary
Cases of GBS disease in newborns can be prevented if the appropriate guidelines are followed by health care providers. The number of cases of invasive GBS in Illinois in 2003 was higher than the five-year median. The percent of cases in those less than one year of age decreased from 80 percent in 2002 to 70 percent in 2003. Although it is too early to detect a trend, this may show increased awareness due to the change to reporting of invasive GBS only in children younger than 3 months of age that began on April 1, 2001. Also, efforts by physicians to inform themselves about screening and treatment recommendations may be increasing the number of pregnant women screened and treated with prophylactic antibiotics, thus reducing the incidence of GBS infection in newborns.
Cryptosporidiosis

Background

Cryptosporidiosis is primarily a gastrointestinal disease that 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. Oocysts are immediately infective upon excretion by an infected host and can be shed for up to two weeks or longer in immunocompetent humans. 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). *Cryptosporidium* produces a self-limited diarrhea in immunocompetent persons and a potentially life-threatening diarrhea in the immunocompromised. The occurrence of *Cryptosporidium* has declined in HIV infected patients since the introduction of antiretroviral therapy. The duration and severity of symptoms depends on the immune status of the person. In immunocompetent persons, asymptomatic infections, acute diarrhea or persistent diarrhea may occur as a result of *Cryptosporidium* infection. Diarrhea can last two weeks and vomiting or fever may be present in over half of infected persons.

Oocysts of *Cryptosporidium* 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 associated with water supplies can occur when there is fecal contamination of drinking water.

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 3 percent of the reported infections in 2003 FoodNet data. This was an incidence rate of 1.09 per 100,000 for *Cryptosporidium* and ranged from 0.34 to 3.06 at the nine FoodNet sites. Cryptosporidiosis reports from these sites declined 52 percent over the period 1996-2003.

Important features of cryptosporidiosis include: 1) water-borne 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.

Prevention measures for cryptosporidiosis include handwashing after using the toilet and after contact with fecal material, not swimming with diarrhea, not swallowing water while swimming and washing foods before eating them.

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 sporozite 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.

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2003 – 102 cases (five-year median = 121; see Figure 31). 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 32.
- Gender - 56 percent were male.
- Race/ethnicity - 84 percent 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 33).
- Outbreaks – None reported.

**Summary**

The number of reported cases of cryptosporidiosis in 2003 was lower compared to the previous five-year median. A large outbreak in 2001 increased the numbers in that year. Most cases in 2003 occurred in the late summer and early fall. The incidence of reported cryptosporidiosis in Illinois (0.82 per 100,000) was lower than the incidence reported by FoodNet (1.09 per 100,000).

**Suggested readings**

Figure 33. Cryptosporidiosis Cases in Illinois by Month, 2003
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. 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 2003. Data from 2003 showed the incidence rate was 0.03 per 100,000 for *Cyclospora* and ranged from 0.0 to 0.11 at the nine FoodNet sites. Reporting of cyclosporiasis became mandatory in April 1, 2001, in Illinois.

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 2003 – 0.

Summary
The second full year of mandatory reporting of cyclosporiasis was 2003. No cases and no outbreaks were reported in 2003 in Illinois.

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 ehrlichiosis (HGE), *E. canis* and *E. ewingii*. The majority of the ehrlichiosis cases in the United States are HME. 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. *A. phagocytophilum* and *E. ewingii* invade mainly the granulocytes and the disease is referred to as granulocytic ehrlichiosis. Both HGE 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 HGE in the northeast and northern midwest. 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 southeastward to the Atlantic coast. *E. ewingii* in the lone star tick has only been found in North Carolina, Florida, Missouri and 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 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 HGE 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 the United States, 362 HGE and 321 HME cases were reported in 2003. The second complete year of mandatory reporting of ehrlichiosis in Illinois occurred in 2003.

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. phagocytophilum* 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 2003 - nine; six cases were HME, two cases were HGE and one was of unknown type.
- Age - Cases ranged in age from 40 to 81 years of age.
- Gender - Eight cases were male; the female case was diagnosed with HGE.
- Race/ethnicity - Eight cases with information about race were white; none were Hispanic.
- Geographic distribution – Sites of tick exposure for the HME cases were Brown county (1 case), Fulton (1), Jefferson (1), Johnson (1), Lake (1) and Pike (1) counties. The HGE cases reported tick exposure in DuPage and Henry counties.
- Seasonal variation - Onsets of all cases occurred between May and September.
- Outcomes – All six of the HME cases and the one unspecified case were hospitalized because of their illness. None of the reported cases was fatal.

**Summary**

The probable tick exposure locales reported by most of the ehrlichiosis cases in Illinois in 2003 were in central and southern Illinois.

**Suggested readings**


Enteric *Escherichia coli* infections (*E. coli* O157:H7 and other enterohemorrhagic *E. coli*, enterotoxigenic *E. coli*, enteropathogenic *E. coli*)

**Background**

Strains of *Escherichia coli* that cause diarrhea are classified into types including enterotoxigenic *E. coli* (ETEC), Shiga toxin producing *E. coli* (STEC) and enteropathogenic *E. coli* (EPEC). STEC may cause bloody diarrhea and hemolytic uremic syndrome. 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 percent 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 5 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. 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.

Non O157 shiga toxin-producing *E. coli* also cause significant illness in people. There are 61 serogroups, but only six serogroups account for 71 percent of the isolates received at CDC from 1983 to 2002. The most common serogroups other than O157 identified by CDC from 1983 to 2002 were O26 (22 percent), O111 (16 percent), O103 (12 percent), O121 (8 percent), O45 (7 percent) and O145 (5 percent).

*Escherichia coli* O157:H7 is transmitted through consumption of contaminated food or beverage, person-to-person contact or swimming in contaminated recreational water. Undercooked ground beef is a primary source for *E. coli* O157:H7 infections. Foods of bovine origin are common causes of sporadic infections and outbreaks.

However, outbreaks have been associated with other foods, including alfalfa sprouts. In addition, outbreaks have been associated with drinking water. An outbreak in Wyoming was linked to drinking of unchlorinated municipal water.

Of the 10 diseases under active surveillance in the FoodNet sites (illnesses caused by *Campylobacter*, *Cryptosporidium*, * Cyclospora*, *E. coli* O157:H7, HUS, *Listeria monocytogenes*, *Salmonella*, *Shigella*, *Vibrio* and *Yersinia enterocolitica*), *E. coli* O157:H7 was responsible for 3 percent of the reported infections in 2003 data. The incidence rate for *E. coli* O157:H7 was 1.06 per 100,000 and ranged from 0.26 to 2.63 per 100,000 at the nine FoodNet sites. *E. coli* O157:H7 declined 43 percent over the period 1996-2003.

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. Shiga toxin-producing *E. coli* should be forwarded to the IDPH laboratory for possible subtyping.

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.

ETEC is believed to be a common cause of traveler’s diarrhea. United States residents who travel overseas may return to the United States with ETEC. This non-invasive organism colonizes the small intestine and causes acute, self-limited diarrhea through enterotoxin production. A high infective dose is required so heavy contamination must occur for outbreaks to occur. ETEC is not identified by routine stool culture methods. Molecular diagnostic techniques like PCR and toxin assays are required to detect and isolate this organism so infections are underreported.

Between 1996 through 2003, there were 16 ETEC outbreaks reported to CDC. These were caused by eight different ETEC serotypes. The most commonly identified serotype was heat-stable toxin-producing *E. coli* O169:H41. Resistance to antimicrobial agents was common in strains identified in these outbreaks. For instance, 80 percent were resistant to tetracycline. Consumption of contaminated food and water is a common mode of transmission. Outbreaks have occurred from consumption of fresh fruits and vegetables (prepared salads, lettuce, parsley, basil) and scallops, shrimp, crab meat, tuna paste and soft cheeses. ETEC is uncommonly found in meat. On cruise ships, contaminated water or ice is a particular problem for this disease. When routine stool cultures are negative for etiologic agents, when the incubation period was 24 to 48 hours, the duration of illness is greater than 60 hours and a diarrhea-to-vomiting ratio is greater than 2.5 cases from the outbreak should be tested for ETEC.

The largest ETEC outbreak in the United States occurred in Cook County in 1998. More than 16,000 people were served in 539 catered events by the implicated caterer. Multiple food items (potato salad, macaroni salad, egg salad and watermelon) were associated with illness. ETEC serotype O6:H16 which produced heat-labile and heat-stable toxins was implicated as the causative agent. It is estimated that 3,300 persons became ill as a result of this outbreak.

Reporting of enteric *E. coli* infections in Illinois was expanded by regulations adopted in April 2001. Other enterohemorrhagic *E. coli* (non-O157), ETEC and EPEC became reportable under this category.

Prevention measures for enteric *E. coli* infections include cooking food thoroughly, prompt refrigeration of foods and separation of cooked and raw foods. Antibiotics may be contraindicated for treatment of *E. coli* O157:H7 infections; this treatment may lead 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 STEC, 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 EPEC is a clinically compatible illness with laboratory confirmation of EPEC from stool. A probable case of ETEC or EPEC or STEC
is a clinically compatible case which is epidemiologically linked to cases but has not been laboratory confirmed.

**Descriptive epidemiology**

**STEC, including *E. coli* O157:H7**
- Number of cases reported in Illinois in 2003 – 124 *E. coli* O157:H7 (five-year median = 194) (see Figure 34). The incidence in 2003 was 0.99 cases per 100,000 population.
- Age - Cases occurred in all age groups with one younger than 1 year old. (median = 32 years of age) (Figure 35).
- Gender - 59 percent were female.
- Race/ethnicity - 96 percent were white and 4 percent were African American; 2 percent were Hispanic.
- Seasonal variation - The largest number of cases occurred in the months from June to October (76 percent of cases) (Figure 36).
- Symptoms - Among those with culture-confirmed *E. coli* O157:H7 for which symptom information was available, 98 percent reported diarrhea, 81 percent reported bloody diarrhea, 50 percent reported fever and 95 percent reported abdominal cramps; two cases (2 percent of patients for whom information was available) had HUS and one case (1 percent had TTP).
- Treatment - Of 106 patients for whom information was available, 45 percent were hospitalized.
- Mortality - One case was fatal.
- Outbreaks - Two foodborne outbreaks were reported in 2003 (see detailed description in the “Food and Waterborne Outbreaks” section). Thirty-three cases (8 confirmed and 25 probable) were outbreak-associated. Due to an error, the 25 probable cases from the outbreaks were not counted among the 2003 cases.

**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 2.

The following percentages of patients reported consuming foods that have been associated with this infection in the seven days before symptom onset: ground beef (56 percent), other beef products (33 percent), well water (17 percent), other undercooked beef products (13 percent), undercooked ground beef (11 percent) and other unchlorinated water (4 percent); 17 percent reported visiting or living on a farm. These risk factors were not confirmed as the source of illness in all of these cases.

**ETEC**

Twenty-one sporadic cases of ETEC from 11 counties in Illinois were reported in 2003. Fourteen were among females, of which five were among 50-to-59 year olds. Six cases occurred in the month of July.

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

There were no other types of *E. coli* infections reported in 2003.
Summary

The incidence of infection with *E. coli* O157:H7 in 2003 was 0.99 cases per 100,000 population, which is similar to what was found in CDC’s FoodNet sites (1.06 per 100,000).

Most cases (76 percent) of *E. coli* O157:H7 occur in the months of June through October. Bloody diarrhea was reported by 81 percent of individuals; 2 percent of patients reportedly had HUS. Forty-five percent of cases were hospitalized compared to 39 percent of the 2003 U.S. FoodNet cases. One Illinois case was fatal. Eleven percent of cases reported consuming undercooked ground beef.

Suggested readings


![Figure 34. *E. coli* O157:H7 and other STEC Cases in Illinois, 1998-2003](image-url)
Figure 35. Age Distribution of STEC Cases in Illinois, 2003

Figure 36. Enterohemorrhagic E. coli in Illinois by Month, 2003
<table>
<thead>
<tr>
<th>Characteristic</th>
<th># reporting factor</th>
<th>Total # with Information on factor</th>
<th>Percentage Reporting Characteristic</th>
</tr>
</thead>
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<td>8</td>
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<tr>
<td>Attending or working at an institution</td>
<td>12</td>
<td>87</td>
<td>14</td>
</tr>
<tr>
<td>Employed as a health care worker</td>
<td>2</td>
<td>97</td>
<td>2</td>
</tr>
<tr>
<td>Employed as a food handler</td>
<td>2</td>
<td>101</td>
<td>2</td>
</tr>
<tr>
<td>Food/water history in prior seven days</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ground beef</td>
<td>56</td>
<td>91</td>
<td>62</td>
</tr>
<tr>
<td>Undercooked ground beef</td>
<td>10</td>
<td>88</td>
<td>11</td>
</tr>
<tr>
<td>Other beef products</td>
<td>28</td>
<td>86</td>
<td>33</td>
</tr>
<tr>
<td>Undercooked other beef</td>
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</tr>
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<td>Fast food</td>
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</tr>
<tr>
<td>Other restaurant food</td>
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<tr>
<td>Other unchlorinated water</td>
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</tr>
<tr>
<td>Apple cider</td>
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<td>2</td>
</tr>
<tr>
<td>Raw milk</td>
<td>2</td>
<td>95</td>
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<tr>
<td>Other factors in prior seven days</td>
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<td></td>
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<tr>
<td>Contact with diapered child</td>
<td>27</td>
<td>94</td>
<td>29</td>
</tr>
<tr>
<td>Travel out of the country</td>
<td>2</td>
<td>101</td>
<td>2</td>
</tr>
<tr>
<td>Swam</td>
<td>15</td>
<td>101</td>
<td>15</td>
</tr>
<tr>
<td>Contact with daycare child</td>
<td>17</td>
<td>102</td>
<td>17</td>
</tr>
<tr>
<td>Visit or live on farm</td>
<td>16</td>
<td>96</td>
<td>17</td>
</tr>
<tr>
<td>Contact with cattle or cattle manure</td>
<td>5</td>
<td>102</td>
<td>5</td>
</tr>
<tr>
<td>Changed diapers</td>
<td>8</td>
<td>96</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Illinois Department of Public Health
Food and Waterborne Outbreaks

Background
Food can act as a vehicle for transmission of pathogens or their byproducts. 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 three categories of organisms to consider in discussing the causes of foodborne illness: viruses, bacteria and parasites. 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.

CDC’s Foodborne Disease Active Surveillance Network (FoodNet) is a system to collect information on 13 percent of the U.S. population about nine enteric pathogens and on hemolytic uremic syndrome. At FoodNet sites, data on the pathogens responsible for most cases of enteric disease in 2003 include Salmonella (14 cases per 100,000), Campylobacter (13 per 100,000), Shigella (7 per 100,000), E. coli O157:H7 (1 per 100,000), and Cryptosporidium (1 per 100,000), Yersinia (0.39 per 100,000), Listeria (0.33 per 100,000), Vibrio (0.26 per 100,000) and Cyclospora (0.03 per 100,000).

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. CDC estimates that in the 1990s approximately 12 percent of foodborne outbreaks were linked to produce items.

In the United States in 2003, 62 outbreaks were linked to treated and untreated recreational water and 36 outbreaks were linked to drinking water and other types of water.
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 foodborne or waterborne outbreaks reported to IDPH by local health departments (LDHs) was 73 during 2003. Of these, 11 were determined by the LHD or IDPH to not meet the criteria for a foodborne or waterborne outbreak. The total for the year was 62 outbreaks that met the definition of an outbreak and were submitted to the Centers for Disease Control and Prevention (CDC). Of the 62 foodborne and waterborne outbreaks, the etiology was confirmed in 20 outbreaks, suspected in 30 outbreaks and determined to be unknown in 12 outbreaks. Two outbreaks out of the 62 outbreaks were due to recreational water exposure. (Note: Drinking water outbreaks were not counted under recreational water outbreaks).

In the year 2003, a total of 1,420 people were reported to have become ill as the result of the 60 foodborne outbreaks and 74 as a result of the two recreational waterborne outbreaks.

The median number ill per foodborne outbreak was seven (range: 2, 297). There were 49 persons hospitalized as a result of these outbreaks. There were no fatalities reported due to foodborne illness during the year 2003. Local health jurisdictions reporting outbreaks during the year 2003 were: Cook, excluding Chicago (22), city of Chicago (9), Lake (5), St. Clair (3); McHenry (2), Will (2), Madison (5) and Coles (2) and one each was reported from Adams, JoDaviess, Kankakee, Mclean, Ogle, Rock Island, Sangamon, Tazewell, Whiteside and Winnebago counties. The waterborne outbreaks were reported from city of Chicago and Tazewell.

The 60 reported foodborne or drinking water outbreaks occurred in the following months: January, seven (12 percent); February, seven (12 percent); March, five (8 percent); April, two (3 percent); May, six (10 percent); June, four (7 percent); July, six (10 percent); August, five (8 percent); September, seven (12 percent); October, seven (12 percent); November, three (5 percent); and December, one (2 percent). The recreational water outbreaks were in December and January.
In the 60 foodborne and drinking water outbreaks reported to CDC, the etiologic agent was determined to be bacterial, either suspect or confirmed, in 24 (40 percent) (Table 3). The bacterial pathogens were as follows: *Clostridium perfringens/Bacillus cereus*, six (25 percent); *Staphylococcus aureus*, four (17 percent), *Salmonella* sp., five (21 percent); *Staphylococcus aureus/Bacillus cereus*, six (25 percent); *Clostridium perfringens*, one (4 percent); and *Escherichia coli O157:H7*, two (8 percent). In one additional outbreak, spoiled milk caused illness.

The etiologic agent in 19 (30 percent) of the foodborne outbreaks was suspected or confirmed to be caused by Noroviruses. The IDPH laboratories were able to confirm six [31 percent] of these viral outbreaks. The remaining 13 [68 percent] outbreaks were classed as suspicious Norovirus outbreaks, largely based on symptoms, incubation and duration in the people who were affected.

Four toxin/chemical foodborne outbreaks were reported (three due to histamine and one due to raphides). No foodborne outbreaks were caused by parasitic agents.

Two of the outbreaks were due to recreational water exposure and one of these was due to *Pseudomonas aeruginosa* and one to Norovirus.

Although thorough investigations were conducted, there was inconclusive evidence to classify either suspect or confirm etiologic agents in 12 (20 percent) of the foodborne or drinking water outbreaks and they were thus classified as etiology unknown.

In 24 food or waterborne outbreaks ill persons were tested for at least one pathogen. In 15 of the outbreaks where ill persons were tested, at least one person tested positive for the pathogen implicated in the outbreak. In these 15 outbreaks, 237 persons tested positive for a pathogen.

Food handlers were laboratory tested in eight of the outbreaks. In six of the outbreaks food handlers were found to be positive for the etiologic agent implicated in the outbreak. Food handlers tested positive for *Salmonella* in four outbreaks and for Norovirus in two outbreaks. In an *E. coli O157:H7* outbreak, food handlers were negative. In a suspect *C. perfringens* outbreak a food handler was positive for norovirus three days after the event.

Environmental samples were taken in one outbreak. In this *E. coli O157:H7* outbreak samples were negative.

Through either epidemiology, supportive information or food testing, 18 food or water items were implicated in outbreaks. Evidence implicating the food included: epidemiology only (8), both epidemiology and laboratory testing of food (3), supportive information (4) and laboratory testing of food only (3). Meat was implicated in three outbreaks (pork in two outbreaks and turkey in one). Fish or seafood was implicated in five outbreaks (marlin in two, tuna in one, shrimp in one and crab cakes in one). Fruits and vegetables were implicated in three outbreaks (melon, green salad and Chinese braised vegetables). A dairy product, milk was implicated in one outbreak. For three outbreaks complex foods were implicated (pie in one and Mexican food in two others). Multiple foods were implicated in two outbreaks. Drinking water was implicated in another outbreak.

Food was tested for pathogens in 15 (25 percent) of the outbreaks. Positive foods were found in eight (53 percent) of the outbreaks where samples were tested. In
one additional outbreak, S. aureus was identified in foods but not in sufficient quantities to call it a confirmed outbreak. In five outbreaks, food samples were check up samples and not the foods served in the outbreak and all five were negative. In one outbreak the food tested negative for E. coli O157:H7. In one outbreak drinking water was tested and it was negative. The responsible pathogens found were fecal coliforms (1), elevated histamine in fish (2), E. coli O157:H7 (1), raphides (1), Salmonella (1), C. perfringens (1) and high bacterial counts in milk (1).

The site of food preparation in these 60 foodborne or drinking water outbreaks was: restaurant, 38 (63 percent); school, 3 (5 percent); banquet hall, 3 (5 percent); caterer, three (5 percent); home, one (2 percent); long-term care, one (2 percent); work, one (2 percent); multiple, seven (12 percent); unknown, one (2 percent) and other, two (4 percent). The other sites included a college cafeteria and a dairy. There also was one drinking water outbreak from consumption of well water at a waterpark. The three recreational waterborne outbreaks were from entering a hotel pool, a hotel hot tub and a waterpark.

The site where the food was consumed in 60 foodborne and drinking water outbreaks was: restaurant, 31 (52 percent); home, five (8 percent); workplace, five (8 percent); school, four (7 percent); banquet hall, three (5 percent); church, three (5 percent); picnic, one (2 percent); long-term care, one (2 percent); unknown, one (2 percent); multiple, three (5 percent) or other, three (5 percent). Other sites included camp dining hall, college cafeteria, and bowling alley.

In 43 (73 percent) of the 60 foodborne and drinking water outbreaks, contributing factors were listed as unknown. Factors that were identified as contributing to 16 outbreaks were: food handler hygiene, two (12 percent), inadequate cleaning of processing/preparation equipment/utensils, one (6 percent); handling by an infected person or carrier of a pathogen, nine (56 percent); contaminated product, one (6 percent); temperature abuse six (37 percent). One outbreak had two contributing factors listed. Proliferation factors and survival factors that may have led to an outbreak only apply to outbreaks where bacterial pathogens are involved.

Significant outbreaks in 2003 included an E. coli O157:H7 outbreak involving 30 ill persons who ate food at a St. Clair County restaurant. A large outbreak of Salmonella occurred in 297 persons who ate at two restaurants in the same restaurant chain in Lake County. Twenty food service workers were positive for Salmonella. A very unusual outbreak associated with raphide consumption occurred in Chicago in 2003. The raphides were present in a vegetable entrée. A large norovirus outbreak in St. Clair occurred in 269 persons who visited a shrine in St. Clair County.

Summary

In 2003, Illinois recorded 62 foodborne and one waterborne outbreak compared to a five-year median of 76. 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 food borne outbreaks.
Suggested readings


Table 3. Etiologic Agent involved in 2003 Outbreaks

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<thead>
<tr>
<th>Agent</th>
<th>Confirmed</th>
<th>Suspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. cereus</td>
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<td>0</td>
</tr>
<tr>
<td>B. cereus/S. aureus</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B. cereus/C. perfringens</td>
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<td>6</td>
</tr>
<tr>
<td>C. perfringens</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Cryptosporidium</td>
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<td>0</td>
</tr>
<tr>
<td>E. coli O157:H7</td>
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<td>ETEC</td>
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</tbody>
</table>

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 2003 - 0 confirmed. There were six outbreaks that may have been caused by either *B. cereus* or *Staphylococcus aureus* as suggested by the clinical presentation and six 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 2003 - one confirmed; six were suspected to be due to either *C. perfringens* or *B. cereus* but laboratory confirmation did not occur.
  - An outbreak of *C. perfringens* occurred in Madison County in February 2003. The investigation identified 18 ill individuals of 59 interviewed following consumption of catered food at an awards banquet. Two persons tested positive for *C. perfringens*. The median incubation period was 10 hours. Barbeque pork was the food item implicated by epidemiology and by laboratory evidence of 930,000 colonies per gram. Contributory causes were slow cooling, food preparation a half day or more before serving and improper reheating.

Shiga toxin producing *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.
A total of 350 *E. coli* O157:H7 outbreaks were reported to CDC from 1982 to 2002. This includes all modes of transmission including laboratory, person-to-person, animal to person, foodborne and waterborne. Ground beef is the most common vehicle in foodborne outbreaks. Produce-associated outbreaks are also common. Person-to-person outbreaks occur most commonly in day care centers.

**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**

In the two outbreaks occurring in 2003, four persons were hospitalized and no fatalities occurred. The mean incubation period was 3.5 days. Improper holding temperatures were cited as a contributing factor for both outbreaks.

- Number of outbreaks reported in Illinois in 2003 - two confirmed *E. coli* O157:H7.
  - The first outbreak occurred in St Clair county in August after consumption of food at a Mexican restaurant. Thirty cases (five laboratory confirmed and 25 probables) were identified who ate food at a single restaurant. Human isolates matched by pulse field gel electrophoresis (PFGE) (pattern 01X5/02B12). Ten persons sought medical attention. No HUS or fatalities occurred. Two employees reported diarrheal illness but tested negative for bacterial pathogens. Pico de gallo sauce was positive by polymerase chain reaction (PCR) for *E. coli* O157:H7.
  - The second outbreak occurred in November in Will County. Three of seven persons became ill after eating food at a home. PFGE patterns of isolates from ills matched. None of the environmental samples collected were positive. No HUS or fatalities occurred.

**Suggested Readings**


**Enterotoxigenic *E. coli***

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2003 - 0 suspected or confirmed.

**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 2003 - five confirmed with 336 people ill (median of 34 persons ill per outbreak). Outbreaks occurred in Lake (2), Adams, Cook (city of Chicago) and Ogle Counties. The *Salmonella enterica* serotypes involved in the outbreaks were Enteritidis (1), Heidelberg (1), Infantis (1), Javiana (1) and Newport (1). In four outbreaks, food handlers were tested and tested positive for *Salmonella*. Factors listed as contributing to these outbreaks included: inadequate cleaning (2 outbreaks), glove contact by food handler (1), cross contamination (1) and inadequate cooking (1).
  - The first *Salmonella* outbreak of 2003 occurred in January in 34 residents and employees of a long-term care facility in Lake County. The ill persons were positive for *Salmonella* ser. Newport. The PFGE pattern matched a nationwide outbreak pattern that was linked to melons.
  - In June, 297 cases occurred among patrons of two restaurants of the same chain in Lake County. Patient specimens, food and food worker specimens tested positive for *Salmonella enterica* serovar Javiana. Twenty food service workers were positive. Both chicken fajitas and chicken tacos were positive for *Salmonella* ser. Javiana and also were significant on epidemiologic investigation.
  - Another *Salmonella* outbreak (S. ser. Heidelberg) occurred in August in four persons (three confirmed and one probable) in Adams county. All had eaten foods from a single restaurant. The ill persons ate banana cream pie and chicken at the restaurant. Fourteen food handlers were tested and one tested positive. The food handler who prepared pies was culture positive. She did report a diarrheal illness but did not say she had worked with diarrhea. Therefore, banana cream pie was considered to be the likely source of illness.
  - Four confirmed cases of S. ser. Enteritidis with matching PFGE patterns were reported in October from Ogle County. Three were from Oregon and one from Stillman Valley. Cases reported eating eggs in the days before onset. Two cases ate at the same restaurant on different days but no connection could be found between all the four cases. No food handlers were tested.
  - The final *Salmonella* outbreak was reported from the city of Chicago in October and was due to S. ser. Infantis. Five isolates matched by PFGE. Fifty-seven confirmed and 36 probable cases were linked to this outbreak. The food item responsible for the illness could not be established. Consumption of foods from a Hispanic grocery store and restaurant were both linked to illnesses. Problems were identified with improper holding temperatures and cross contamination at the grocery store. Eighteen of its
34 employees, a number of whom were food handlers, were positive for *Salmonella*. Seventeen were Infantis and one was London. Food handlers also reported working with gastrointestinal illness.

**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 have been associated with consumption of bean dip, lettuce, parsley and contaminated water. A nationwide outbreak of *S. sonnei* occurred in 2000 and was linked to consumption of commercial five-layered bean dip. It was determined that an ill employee may have contaminated processing equipment. Illinois had two cases associated with this outbreak. Outbreaks of shigellosis have also been associated with swimming in contaminated water. Forty-five persons became ill during one shigellosis outbreak in Iowa after use of a wading pool in 2001.

**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 2003 - 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 food borne 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 2003 – four suspected. There were six outbreaks suspected of being either *S. aureus* or *B. cereus* but the agent was
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.

Scombrototoxin 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 scombrototoxin 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.

Raphides are a rare cause of foodborne illness.

In 2003, a foodborne outbreak of nicotine toxicity occurred in Michigan. Approximately 100 persons became ill after eating ground beef deliberately contaminated with nicotine. A laboratory identified 300 mg/kg nicotine in submitted samples of meat. Symptoms included burning of the mouth, vomiting and dizziness. One person was seen at an emergency room for atrial fibrillation. An employee of the supermarket was arrested and accused of poisoning 200 pounds of meat with an insecticide called Black Leaf 40, which has nicotine as a component. Acute nicotine toxicity results in burning of the throat and vomiting and can lead to cardiac tachyarrhythmias, seizures and hypertensive crisis. High doses can be fatal.

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 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.

Descriptive epidemiology

- Number of outbreaks reported in Illinois in 2003 - four confirmed.
- An outbreak in 10 persons linked to raphide consumption at a cafeteria in an office building was reported in Chicago in February. Symptoms were
oral pain immediately after biting into a Chinese braised vegetables entrée. Descriptions of the symptoms by cases included “burst of stinging,” “exploded in mouth” and “sharp, stabbing pain.” One case was admitted to a hospital for observation due to airway obstruction. The Food and Drug Administration testing of the vegetable entrée showed plant like structures and the presence of oxalate crystals consistent with raphides was noted.

- An outbreak of scombroid poisoning occurred in two persons after consumption of tuna at a restaurant in Chicago in February.
- An outbreak of scombroid poisoning occurred in two persons after consumption of blue marlin at a restaurant in Chicago in September. A blue marlin sample had more than 50 ppm of histamine.
- An outbreak of scombroid poisoning occurred in two persons from Chicago in September after consumption of blue marlin in a restaurant in Oak Park. The blue marlin had more than 50 ppm of histamine.

Suggested Readings

Parasitic agents
There are a variety of parasitic agents that can cause food borne 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 2003 - None.

Viral gastroenteritis
Noroviruses cause almost all of the outbreaks of acute viral gastroenteritis in the United States. Estimates are that 23 million people are affected by Noroviruses in the United States each year. There are five genogroups (1-5). Genogroup G1 (Norwalk virus, Southampton virus and Desert shield virus), G2 (Toronota virus, Mexico virus, Hawaii virus, Bristol virus, Lordsdale virus, camberwall virus, Snow Mountain agent and Melksham virus) and genogroup G4 infect humans, genogroup G3 have been found in cattle and genogroup G5 have been identified in mice. Sapoviruses have only been identified in humans, especially children.
Noroviruses are transmitted through consumption of contaminated food or water, directly from person-to-person and from airborne droplets produced during vomiting. The most common method of spread is via the fecal-oral route. The virus is excreted in stool and vomitus for up to 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 norovirus can be suspected based on incubation period, duration of illness, symptoms or by identification of the organism in stool. Noroviruses can survive freezing and temperatures of up to 60 C and can survive chlorine levels up to 10 ppm (that exceeds what is normally present in public water systems).

In an evaluation of norovirus outbreaks where specimens were submitted to CDC from July 2000 and July 2004, long-term care facilities, retirement centers and hospitals were the most likely sites of outbreaks. Person-to-person transmission was most common followed by foodborne transmission. Genogroup 2 was most common (79 percent) followed by genogroup 1 (19 percent) and sapovirus (2 percent). Serogroup 2 is the prevalent genogroup for noroviruses in outbreaks worldwide.

Outbreaks are not uncommon in closed settings, such as detention facilities, cruise ships, long-term care facilities and hospitals. An outbreak of norovirus affected six consecutive cruises on a single ship. Multiple strains of norovirus were identified.

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 small round structured virus (SRSV) in electron microscopy of stool from ill individuals, or a fourfold 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 laboratory results.

**Descriptive epidemiology**

- Number of outbreaks reported in Illinois in 2003 - 18 suspected or confirmed outbreaks of viral gastroenteritis, based on clinical syndrome, incubation period and duration of illness. Five of these 18 outbreaks were laboratory confirmed outbreaks that involved an estimated 336 people who experienced compatible illness (median = 9 ill persons per outbreak); all five were confirmed as the G2 genogroup. The median incubation period for the confirmed outbreaks was 28 hours. Laboratory confirmation was made in 17 persons. At least 47 people visited a health care provider and four persons were hospitalized. The five confirmed outbreaks occurred in Coles, Cook, Madison St Clair and Winnebago counties. In the two confirmed outbreaks that had contributing factors listed, these included: infected or ill food handlers (2) and inadequate food handler hygiene (2). Three had unknown contributing factors.

- The first outbreak occurred in Madison County after a birthday party at a bowling alley in January. Seven of 19 attendees became ill. The agent was identified as type G2 (subtype SR47D) in three of six patient stool specimens submitted. The contaminated food item could not be determined.

- The second outbreak confirmed as norovirus occurred in Chicago in late January. Forty-nine persons became ill after eating at a college dormitory cafeteria that had multiple food stations. Four persons were seen at emergency rooms and one was admitted due to dehydration. The type was G2 (subtype SR47D). The contaminated food item could not be determined. Food handlers did report illness but were not tested.

- The third outbreak occurred at a popular shrine banquet facility in St Clair county in February. The outbreak was investigated with the assistance of the rapid response team. During this outbreak, 269 persons became ill with norovirus, type G2 (subtype P2B/SR47D). Three patrons were confirmed with norovirus. Food handlers were ill and had bare-handed contact with food. One food handler tested positive. Contaminated food items could not be identified. Persons from other states also visited the shrine.

- The fourth confirmed outbreak was in Coles County in March. In this outbreak two persons became ill after eating at a restaurant. Stool specimens were positive from both persons and the type was G2. No specific food item was linked to illness.

- The fifth outbreak occurred in Winnebago County in June. Nine persons became ill with type G2 after an anniversary party at a restaurant. Four of the nine persons tested positive. One of six food handlers who were tested, tested positive for norovirus. One food item had *E. coli* cultured from it. Several guests who became ill became ill very quickly within two
hours of the event indicating that they could have been a source for others at the event.

**Suggested readings**


**Hepatitis A**

Foodborne outbreaks of hepatitis A are uncommon. When they do occur they are often associated with foods contaminated by infected food handlers. Also, contaminated produce, such as lettuce or strawberries, may be a source of illness. The incubation for hepatitis A is 28 to 30 days. The agent can be found in feces before the onset of illness.

**Descriptive epidemiology**

Number of hepatitis A outbreaks in 2003 – one

Six persons developed hepatitis A after eating crab dishes at a restaurant in Lake County in July. A food handler at the facility tested positive.

**Recreational Water Outbreaks**

**Descriptive epidemiology**

Number of recreational waterborne outbreaks in 2003 – two. The outbreaks occurred in Cook and Tazewell county.

- The first outbreak occurred after persons swam in a hotel hot tub and pool in January in Chicago. Fifty-two persons reported illness that included rash. One patient went to an emergency room and 32 sought medical care. Eight of 13 samples from valves and pipes at the pool and hot tub facility were qualitatively positive for *Pseudomonas aeruginosa*. PH levels had dropped to below recommended levels on the day case exposures occurred. ORP1 levels, which serve as an indicator for chlorine were also low. The chlorinator had accidentally been switched to the off position.

- The second outbreak at a hotel swimming pool in Tazewell County in December resulted in 12 ill persons. Symptoms included vomiting, nausea, dry mouth, tachycardia and headache within two hours of swimming at the pool. The
Centers for Disease Control and Prevention (CDC) assisted with an Epi-Aid for this investigation. The pool manager had not met state requirements for routine chemistry testing of the pool. At the time the outbreak was reported, pool chemical parameters were normal. Some persons may have become ill after seeing others become ill. The causative factors remain unknown.

**Suggested Readings**


<table>
<thead>
<tr>
<th>IDPH Log #</th>
<th>Onset Date</th>
<th>City of exposure</th>
<th>County</th>
<th># ill/# exposed</th>
<th>Symptoms</th>
<th>Incub (hrs)</th>
<th>Foods implicated</th>
<th>Agent</th>
<th>Status²</th>
<th>Contributory causes³</th>
<th>Place of prep/Place eaten¹</th>
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<tbody>
<tr>
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<td>1/5</td>
<td>Granite City</td>
<td>Madison</td>
<td>7/16</td>
<td>D,AC,V</td>
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<td>U</td>
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<td>18</td>
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<td>T</td>
<td>school/school</td>
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<td>60</td>
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<td>Norovirus</td>
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<td>U</td>
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<td>Madison</td>
<td>18/59</td>
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<td>T</td>
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<td>Raphides</td>
<td>C</td>
<td>U</td>
<td>work cafeteria/work cafeteria</td>
</tr>
</tbody>
</table>

² Status: C = confirmed, U = unconfirmed
³ Contributory causes: S = source, H = host, T = transmission
¹ Place of prep/Place eaten: bowling alley and home/bowling alley, restaurant/home, school/school, hotel hot tub, long-term care/Long-term care, restaurant/carry out to another location, restaurant/restaurant, college cafeteria/college cafeteria, restaurant/restaurant, home&retail/home, caterer/camp dining hall, work cafeteria/work cafeteria
<table>
<thead>
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<th>IDPH Log #</th>
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<th>Agent</th>
<th>Status</th>
<th>Contributory causes</th>
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<td>St Clair</td>
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<td>B</td>
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<td>IDPH Log #</td>
<td>Onset Date</td>
<td>City of exposure</td>
<td>County</td>
<td># ill/# exposed</td>
<td>Symptoms</td>
<td>Incub (hrs)</td>
<td>Foods implicated</td>
<td>Agent</td>
<td>Status</td>
<td>Contributory causes</td>
<td>Place of prep/ Place eaten</td>
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<td>S</td>
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<td>restaurant/restaurant and home</td>
</tr>
<tr>
<td>2003-41</td>
<td>7/17</td>
<td>Orland Park</td>
<td>Cook</td>
<td>2/2</td>
<td>V,D,AC</td>
<td>27</td>
<td>Unknown</td>
<td>B. cereus/C. perfringens</td>
<td>S</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>IDPH Log #</td>
<td>Onset Date</td>
<td>City of exposure</td>
<td>County</td>
<td># ill/# exposed</td>
<td>Symptoms</td>
<td>Incub (hrs)</td>
<td>Foods implicated</td>
<td>Agent</td>
<td>Status</td>
<td>Contributory causes</td>
<td>Place of prep/ Place eaten</td>
</tr>
<tr>
<td>------------</td>
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</tr>
<tr>
<td>2003-74</td>
<td>7/18</td>
<td>Mundelein</td>
<td>Lake</td>
<td>6/unknown</td>
<td>jaundice</td>
<td>32 d</td>
<td>Crab cakes or crab stuffing</td>
<td>Hepatitis A</td>
<td>C</td>
<td>B, IF, PF</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-48</td>
<td>8/12</td>
<td>Ellsworth</td>
<td>McLean</td>
<td>7/20</td>
<td>V,D</td>
<td>6</td>
<td>Unknown</td>
<td>B. cereus/S. aureus</td>
<td>S</td>
<td>U</td>
<td>church and home/church&amp;home</td>
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<tr>
<td>2003-47</td>
<td>8/17</td>
<td>Hickory Hills</td>
<td>Cook</td>
<td>17/19</td>
<td>D</td>
<td>10</td>
<td>Unknown</td>
<td>B. cereus/C perfringens</td>
<td>S</td>
<td>T</td>
<td>banquet hall/banquet hall</td>
</tr>
<tr>
<td>2003-49</td>
<td>8/22</td>
<td>Fairview Heights</td>
<td>St Clair</td>
<td>30/unknown</td>
<td>D</td>
<td>3 days</td>
<td>Unknown</td>
<td>E. coli O157:H7, PFGE match 01X5/02B12</td>
<td>C</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-72</td>
<td>8/23</td>
<td>Chicago</td>
<td>Cook</td>
<td>4/4</td>
<td>D</td>
<td>2.5h</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-50</td>
<td>9/18</td>
<td>Matteson</td>
<td>Cook</td>
<td>2/7</td>
<td>V,D</td>
<td>8</td>
<td>Unknown</td>
<td>S. aureus</td>
<td>S</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-51</td>
<td>9/22</td>
<td>Maryville</td>
<td>Madison</td>
<td>8/15</td>
<td>V,D,AC</td>
<td>23</td>
<td>Unknown</td>
<td>Norovirus</td>
<td>S</td>
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<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-71</td>
<td>9/27</td>
<td>Chicago</td>
<td>Cook</td>
<td>2/unknown</td>
<td>D,V, flushing, swelling</td>
<td>&lt;1 hr</td>
<td>Marlin</td>
<td>Scombroid</td>
<td>C</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-68</td>
<td>9/27</td>
<td>Park Ridge</td>
<td>Cook</td>
<td>11/18</td>
<td>V,D</td>
<td>8</td>
<td>Unknown</td>
<td>S. aureus</td>
<td>S</td>
<td>U</td>
<td>restaurant and grocery store and private home / private home</td>
</tr>
<tr>
<td>2003-52</td>
<td>9/27</td>
<td>Alsip</td>
<td>Cook</td>
<td>16/70+</td>
<td>D,AC</td>
<td>11</td>
<td>Unknown</td>
<td>B. cereus/C perfringens</td>
<td>S</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>IDPH Log #</td>
<td>Onset Date</td>
<td>City of Exposure</td>
<td>County</td>
<td># ill/# exposed</td>
<td>Symptoms</td>
<td>Incub (hrs)</td>
<td>Foods implicated</td>
<td>Agent</td>
<td>Status</td>
<td>Contributory causes</td>
<td>Place of prep/Place eaten</td>
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<td>2003-53</td>
<td>9/30</td>
<td>Deer Creek</td>
<td>Tazewell</td>
<td>61/unknown</td>
<td>V,D,AC,HA</td>
<td>unk.</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>school/school</td>
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<tr>
<td>2003-54</td>
<td>9/30</td>
<td>Oak Park</td>
<td>Cook</td>
<td>4/unknown</td>
<td>V,D</td>
<td>1</td>
<td>Marlin</td>
<td>Scromboid</td>
<td>C</td>
<td>U</td>
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<tr>
<td>2003-55</td>
<td>10/8</td>
<td>St. Anne</td>
<td>Kankakee</td>
<td>25/50</td>
<td>V,F,AC</td>
<td>&lt;1</td>
<td>Tortillas</td>
<td>Unknown</td>
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<td>school/school</td>
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<td>2003-56</td>
<td>10/11</td>
<td>Highland</td>
<td>Madison</td>
<td>18/28</td>
<td>V,D</td>
<td>5</td>
<td>Ham</td>
<td>B. cereus/S. aureus</td>
<td>S</td>
<td>U</td>
<td>caterer/church</td>
</tr>
<tr>
<td>2003-60</td>
<td>10/19</td>
<td>Hanover Park</td>
<td>Cook</td>
<td>2/2</td>
<td>D,V</td>
<td>4</td>
<td>Unknown</td>
<td>B. cereus/S. aureus</td>
<td>S</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>2003-65</td>
<td>10/22</td>
<td>Niles</td>
<td>Cook</td>
<td>2/unknown</td>
<td>D,AC</td>
<td>1.25</td>
<td>Unknown</td>
<td>B. cereus/S. aureus</td>
<td>S</td>
<td>U</td>
<td>restaurant/restaurant</td>
</tr>
<tr>
<td>IDPH Log #</td>
<td>Onset Date</td>
<td>City of exposure</td>
<td>County</td>
<td># ill/# exposed</td>
<td>Symptoms</td>
<td>Incub (hrs)</td>
<td>Foods implicated</td>
<td>Agent</td>
<td>Status (^2)</td>
<td>Contributory causes (^3)</td>
<td>Place of prep/ Place eaten (^4)</td>
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<tr>
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<td>--------------------------</td>
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<tr>
<td>2003-70 Epi-AID</td>
<td>12/31</td>
<td>Morton</td>
<td>Tazewell</td>
<td>12/86</td>
<td>H, AC, tachycardia, &lt;1 h</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>U</td>
<td>U</td>
<td>pool/pool</td>
</tr>
</tbody>
</table>

\(^1\)BA=body ache, BD=bloody diarrhea, D=diarrhea, F=fever, H=headache, V=vomiting, AC=cramps; \(> 40\%\) ills reporting symptoms
\(^2\)S=suspect, C=confirmed, U=unknown; \(^3\)C=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
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. 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 these children, men who have sex with men, backpackers, persons in contact with infected animals, campers and persons drinking from shallow wells contaminated by run-off with the organism. 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.

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 immunosorbert 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.

Giardiasis became nationally notifiable in 2002. In 2003, the CDC received reports on 19,709 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.

Descriptive epidemiology

- Number of cases (confirmed and probable) reported in Illinois in 2003 – 861 (five-year median = 904); the incidence rate was 6.9 per 100,000 population. Reported cases have declined since 1998 (see Figure 37). In addition, there were 79 Giardia carriers (Giardia identified in stool but no clinical disease) reported in 2003. The number reported to CDC for giardiasis in Illinois for 2003 was 940 (including both cases and carriers). The following information is derived from reports on cases, not carriers.
- Age-Mean age of cases was 28.5 years. The age group with the highest
incidence was 1 to 4 years of age, which included 158 cases, or 18.5 percent of the total (see Figure 38).

- Gender – 58 percent were male. Males had a higher incidence in every age group except the less than one year and greater than 60 year age group.

- Race/ethnicity - 85 percent were white, 9 percent were African American and 6 percent were other races; 18 percent were Hispanic. There was a significantly higher proportion of whites with giardiasis and a lower proportion of African Americans compared to the Illinois population.

- Seasonal variation - More cases occurred July through September (32 percent) than any other three-month period. (Figure 39).

- Geographic variation - Highest incidence rates per 100,000 for giardiasis occurred in central Illinois (Figure 40). Average annual incidence rates for the period 1999 to 2003 ranged from 0 to 17 per 100,000 population by county. Counties with the highest average annual giardiasis incidence rates per 100,000 population over this period were JoDaviess (17), Peoria (16), Tazewell (16), Jersey (15) and McDonough (14).

**Summary**

Giardiasis cases decreased in 2003 compared to the previous five-year median (904). Whites were overrepresented in the case population for giardiasis (85 percent) compared to their representation in the Illinois population (73 percent); African Americans were underrepresented among giardiasis cases (9 percent) compared to their representation in the Illinois population (15 percent). The mean age of cases was 28 years, and more cases occurred in the warmest months of the year. Medium and smaller population counties had the highest incidence rates for giardiasis over a five-year period.

![Figure 37. Giardiasis Cases in Illinois, 1998-2003](image-url)
Figure 38. Incidence of Giardiasis Cases in Illinois by Age and Sex, 2003

Figure 39. Giardiasis Cases in Illinois by Month, 2003
Figure 40. Average Annual Incidence of Reported Giardia Cases by County, 1999-2003.
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 *E. coli* O157:H7 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 less than 5 years of age after infection by an organism producing shiga toxin and causing diarrhea. HUS usually occurs within two 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 2003, 178 cases of HUS were reported to CDC from 32 states.

Antibiotic therapy may be 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 *E. coli* O157:H7 is not present in a stool specimen.

In the United Kingdom and Ireland, the average annual incidence of HUS was 0.71 per 100,000 from 1997 to 2001.

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 aged less 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

- Two of the five cases of HUS in Illinois in 2003 were reported in persons with confirmed *E. coli* O157:H7 infections. The HUS cases were 1, 20, 24, 26 and 65 years of age. Onsets occurred in July (2 cases), August (2) and October (1). Three cases were put on dialysis and one required exchange transfusion when diagnosed shortly after giving birth by C-section. One case required plasmapheresis over six days and 50 units of fresh frozen plasma. No cases were fatal. No cases were linked to a known outbreak. Counties in which cases
occurred were Logan (2 cases) and one each in Kane, Madison and St. Clair.

Summary
Only three cases of HUS were reported by Illinois to CDC in 2003 due to a
coding error. The two not reported were those due to confirmed infection with *E. coli*
O157:H7. No cases of HUS were fatal.

Suggested Readings
CDC. FoodNet surveillance report for 2004 (Final Report). Available at
[www.cdc.gov/foodnet/reports.htm](http://www.cdc.gov/foodnet/reports.htm).
Lynn RM et al. Childhood hemolytic uremic syndrome, United Kingdom and
Hepatitis, viral

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, hepatitis C, hepatitis non-A, non-B non-C (NANBNC) and hepatitis B carriers are reportable in Illinois. Cases of acute infection must have either jaundice or liver enzymes elevated over normal. On April 1, 2001, reporting of hepatitis C became required so 2003 is the second full year of reporting. 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 338 reported acute hepatitis A, B and C cases in Illinois in 2003, 186 (55 percent) were hepatitis A, 130 (38 percent) were hepatitis B and 22 (6 percent) were hepatitis C. A comparison of characteristics of these types of hepatitis is found in Table 6 and includes only cases for whom information was gathered on the hepatitis reporting form.

Jaundice was reported in 84 percent of reported hepatitis A cases, in 72 percent of hepatitis B cases and in 59 percent of hepatitis C cases. Hospitalization occurred for 37 percent of hepatitis A cases, 40 percent of hepatitis B cases and 31 percent of hepatitis C.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Hepatitis A, acute</th>
<th>Hepatitis B, acute</th>
<th>Hepatitis C, acute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># (total # reporting)¹</td>
<td>%²</td>
<td># (total # reporting)¹</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Age</td>
<td>35 (186)</td>
<td>38 (130)</td>
<td>44 (22)</td>
</tr>
<tr>
<td>Female</td>
<td>93 (186)</td>
<td>54 (130)</td>
<td>3 (22)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>16 (173)</td>
<td>0 (124)</td>
<td>1 (21)</td>
</tr>
<tr>
<td>African American</td>
<td>12 (173)</td>
<td>61 (124)</td>
<td>5 (21)</td>
</tr>
<tr>
<td>White</td>
<td>143 (173)</td>
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<tr>
<td>Other</td>
<td>2 (173)</td>
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<td>1 (21)</td>
</tr>
<tr>
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<td>63 (173)</td>
<td>9 (130)</td>
<td>7 (21)</td>
</tr>
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<td></td>
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<td>93 (130)</td>
<td>10 (17)</td>
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<tr>
<td>Hospitalized</td>
<td>60 (161)</td>
<td>52 (130)</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Deaths</td>
<td>1 (157)</td>
<td>1 (130)</td>
<td>0 (18)</td>
</tr>
</tbody>
</table>

¹ number of cases reporting that factor (total number of cases interviewed about that factor)

Hepatitis A

Background

Hepatitis A virus (HAV) is transmitted through 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). It is one of the most frequently reported vaccine preventable diseases. There is only one serotype and immunity after infection is lifelong. The hepatitis A rate in the United States in 2003 was 2.7 per 100,000. 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.

Hepatitis A virus infection can be prevented by good personal hygiene, particularly handwashing, preexposure or postexposure immunization with immune globulin (IG), and preexposure 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.

In 1995, a hepatitis A vaccine was licensed for individuals older than two years of age. The vaccine was recommended for individuals traveling to areas where there is a higher endemnicity rate. In 1996, the recommendations expanded to include children in communities with high rates of hepatitis A, men who have sex with men, drug users and individuals who are occupationally at risk, have clotting factor disorders or who have chronic liver disease. In 1999, recommendations for hepatitis A vaccination were expanded to 11 states where the average annual hepatitis A incidence during 1987-1997 was at least 20 per 100,000 (twice the national average) and to consider routine vaccination for children (24 to 35 months) in six states where average annual incidence was 10-20 per 100,000. Illinois did not fall into either of these categories. The National Immunization survey provides annual estimates of vaccine coverage in states. In Illinois in 2003, 4 percent of children aged 24-35 months were vaccinated with at least one dose of hepatitis A vaccine. In Chicago the percent vaccinated was 10 percent while the rest of the state was 1.7 percent.

Hepatitis A mortality rates increase with age in a California study using data from 1989 through 2000. The mortality rate in California from 1989 through 2000 was higher among men than women.

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. In 2003, a large foodborne outbreak occurred in Pennsylvania. At least 555 persons with hepatitis A were linked to eating food at a single restaurant in Pennsylvania. At least 13 cases were employees of the restaurant. Residents from six other states were involved. Green onions in salsa and chili con queso were implicated as the source of the outbreak. It is likely the green onions were contaminated somewhere in the growing, harvest, packing or cooling process for the product. No ill food service employee could have been the source of illness. More than 9,000 persons needed to be provided with immune globulin.

In 2003, an outbreak of hepatitis A associated with green onions was detected in three states. Molecular epidemiologic studies of hepatitis A may be able to link clusters of hepatitis A cases together. Viral sequencing demonstrated that there were four geographically separate but temporally related outbreaks that represented at least three distinct events. Green onions were obtained from different farms in each state.

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.

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 - 186 (five-year median =696) (see Figure 41).
- Age - Incidence was highest in 5- to 9-year-olds (3 per 100,000) (mean age =35) followed by the 10-to-19 year-olds (2 per 100,000) (see Figure 42). The overall incidence rate for hepatitis A was 1.5 per 100,000.
- Gender – 50 percent of cases were male.
- Race/ethnicity - 83 percent were white, 9 percent African American and 10 percent other races; 36 percent were Hispanic. Hispanics were overrepresented in the case population as compared to the Illinois population.
- Employment – Three (2 percent) of hepatitis A cases were food handlers.
- Seasonal variation - Cases occurred throughout the year (see Figure 43).
- Geographic variation - The five counties with the highest average annual incidences of hepatitis A per 100,000 population for 1999 to 2003 were Winnebago (8), Madison (6), Cook (6), Grundy (5) and Kane (5). The average annual incidence of hepatitis A by county, from 1999 to 2003, is found in Figure 44.
- Risk factors – Information was collected on 174 cases. Household contact with a hepatitis A case 13 (10 percent), travel outside the U.S. or Canada 65 (43 percent), consumption of raw shellfish 20 (14 percent), employment in the
medical field 8 (6 percent). Some persons had multiple risk factors. For 64 cases the location of travel was listed: Mexico (39 cases), South or Central America, not further specified (6), Guatemala (5), India (4), Ecuador (3) and other countries (7).

- Symptoms/outcomes – 133 (84 percent) of reported cases were jaundiced. Sixty (37 percent) of cases were hospitalized. One death was linked to acute hepatitis A.

Summary

Hepatitis A is the most commonly reported acute infectious hepatitis in Illinois. The incidence rate (1.5 per 100,000) was lower than the national incidence (2.7 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 35 years, although the highest incidence (3 per 100,000) in 2003 occurred in 5- to 9-year-olds. Hispanics were overrepresented in hepatitis A cases.

Suggested readings


Figure 41 . Hepatitis A Cases in Illinois, 1998-2003
Figure 42. Incidence of Hepatitis A Cases in Illinois by Age and Sex, 2003

Figure 43. Hepatitis A Cases in Illinois by Month, 2003
Figure 44. One-year Hepatitis A Incidence Rates per 100,000 by County, Illinois, 1999-2003
Hepatitis B

Background
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 MSMs, 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 2003, 7,526 acute hepatitis B cases were reported to CDC from across the United States.

In the United States there has been more than a 64 percent decrease in hepatitis B since 1990. In 2003, the rate among children younger than 12 years of age (the cohort born since routine infant vaccination was instituted) has declined more than 98 percent compared to 1990.

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 2003 - 131 confirmed acute cases (five-year median = 202) (see Figure 45). Illinois reported 130 cases to CDC and one case was reported late to IDPH. The overall one-year incidence rate of reported acute hepatitis B in Illinois was one case per 100,000 population.
- Age – The incidence rate was highest in the 30-to 49-year-old age groups (mean age = 38 years) (Figure 46).
- Gender - 58 percent were male. The incidence per 100,000 in males was 1.2 as compared to 0.85 in females.
- Race/ethnicity – 47 percent of cases were African American and 48 percent were white; 7 percent were Hispanic.
- Risk Factors - Risk factors identified as occurring in cases from six weeks to six months prior to illness included more than one sexual partner (18 percent), MSM (6 percent), employment in a medical field that entails blood contact (2 percent), tattoos (8 percent), needlestick injury (4 percent) and injection drug use (5 percent).
- Symptoms/outcomes -72 percent of hepatitis B cases were jaundiced and almost 40 percent were hospitalized.

Summary

There were 130 confirmed hepatitis B cases reported in Illinois in 2003. Almost three-quarters were jaundiced and 40 percent were hospitalized.

Figure 45. Hepatitis B Cases in Illinois, 1998-2003

Figure 46. Age Distribution of Hepatitis B Cases in Illinois, 2003
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 U.S. 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. The prevalence of HCV in non-injection drug users in a study in Italy was 20 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. In a study of transfusion related hepatitis C in the United States from 1968 through 1980, the risk for developing cirrhosis was 17 percent. Heavy alcohol use increased the risk for developing cirrhosis. Anti-HCV positive persons had a five- 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 U.S., has a poorer response to therapy than other types. Response to therapy is higher in those with genotypes 2 and 3.

Reporting of acute hepatitis C infection (a person with a supplementary positive test for hepatitis C) began in Illinois on April 1, 2001. Thus, 2003 is the second year with a full year of reporting of acute hepatitis C infection. 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).

**Descriptive Epidemiology**

- Number of cases in Illinois in 2003 – 22 cases of acute hepatitis C.
- Age – Acute hepatitis C cases ranged in age from 19 to 57 years (mean age = 44) (see Figure 62).
- Gender - 86 percent of acute hepatitis C cases were male.
- Race/ethnicity - For acute hepatitis C cases, 67 percent of cases were white, 5 percent were African American and 5 percent were Asian; 5 percent were Hispanic.
- Risk factors - For acute hepatitis C, five of 17 (29 percent) cases reported a history of injection drug use in the six weeks to six months prior to onset.
- Symptoms/outcomes – 10 (59 percent) of 17 acute hepatitis C cases with histories were jaundiced, six of 19 (31 percent) were hospitalized and no cases were fatal.
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. For serologic results, 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 human immunodeficiency virus or other immunocompromising conditions. Approximately 5 percent of persons with acquired immune deficiency syndrome who live in endemic areas may develop histoplasmosis, which frequently disseminates.

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

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 - 67 (five-year median =59) (see Figure 47). At least 15 (22 percent) of these cases were in immunocompromised persons (this information was reported for only 36 cases); therefore, for these cases, it is not possible to determine whether they represent new infections or reactivation of previous infections.
- Age - Mean age of cases was 43 years (Figure 48).
- Race/ethnicity - Ninety percent were white, 9 percent were African Americans and 1 percent were Asian; 11 percent were Hispanic.
- Disease type – Of 40 cases with information, 25 had disease localized to the
respiratory system and 15 had disseminated histoplasmosis. Of 46 cases with chest radiograph results, 38 (83 percent) had lung abnormalities on x-ray.

- Symptoms (not reported for all cases) – Cough, 36 (72 percent); fever, 36 (67 percent); difficulty breathing, 32 (64 percent); night sweats, 26 (57 percent) and chest pain, 22 (48 percent). Fifteen (29 percent) reported being current smokers.
- Diagnosis - 65 cases were reported as confirmed and two were classified as probable. Twenty-nine cases (43 percent) were confirmed by culture. Cultures were positive from blood (15 cases), bone or bone marrow (1), sputum (1), bronchial wash (9), lung tissue (3) and skin (2). Five persons had positive cultures from multiple sites. Nine had positive smears from the following sources blood (6 cases), bone marrow (2) or sputum (2). Only one case had multiple smears positive (blood and sputum). Sixteen cases were M band positive by immunodiffusion. Six cases had complement fixation titers $>1:32$; two of these cases also were positive by M band testing. For 25 cases, more than one diagnostic method was positive.
- Seasonal variation - No seasonal trend in cases was apparent (See Figure 49).
- Geographic variation - The three counties reporting the most cases were Cook (8 cases), Champaign (6) and Kankakee (4).
- Reports of exposure to the following (not reported for all cases) – Construction, 16 (35 percent); pigeon droppings, 12 (30 percent); plowing, 10 (21 percent); potting soil, nine (21 percent); dirt arenas, nine (20 percent); excavation, four (9 percent); bats in an attic, one (3 percent) and caves, one (2 percent).
- Outcomes – 37 (62 percent) were hospitalized; one case was fatal.
- Outbreaks - One outbreak was reported in 2003. In late summer 2003, an outbreak of histoplasmosis occurred in workers at an Iroquois County highway bridge renovation site. Five of 12 bridge workers became symptomatic, had serologic evidence of histoplasmosis and eventually tested positive by urine antigen. Three also had positive urinary HC antigen. One additional asymptomatic worker had positive serology and urine antigen tests. The dates of illness onsets were August 14 to 22. All but one of the cases were male. Cough, fever, sweats, fatigue and headache were most commonly reported symptoms. Four of five symptomatic patients had nodules or opacifications on chest radiograph. The mean time off from work was 21 days. All five cases were residents of Illinois. The attack rate in workers was 50 percent. The bridge had large concrete beams that were removed using jack hammers. This activity produced dust and disturbed bat roosts within the structure. Interviews determined that seeing or having contact with bats, jack-hammering beams and bridge waste disposal were activities linked to illness. One symptomatic community resident who lived in a trailer park near the bridge and fished near the bridge also tested weakly positive. No other residents of the trailer park reported illness consistent with histoplasmosis. Workers were advised to wear personal protective equipment including N95 respirators for any further work at the site. No further cases occurred.
Summary

Sixty-seven cases were reported in 2003 as compared to the previous five-year median of 59. One outbreak at a construction zone in Iroquois County resulted in five cases.
Legionellosis

Background

*Legionella* spp are a group of intracellular pathogens that often inhabit aquatic environments where they can survive well. There are 48 species of *Legionella* and several serotypes. *L. pneumophila* serotype 1 is responsible for most lower respiratory tract infections. However, 19 other *Legionella* species have been documented as human pathogens based on isolation from clinical material. 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. Outbreaks of *Legionella* have occurred in the United States and other countries. In France in late 2003, a large outbreak of legionellosis occurred in France linked to cooling towers on a plant building. The cases occurred in locations up to 6 km from the plant.

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.

*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. On July 1, 2002, it became mandatory to forward isolates of *Legionella* to the IDPH laboratory.

In 2003, 2,232 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. pneumophila* serogroup 1 between
paired acute and convalescent phase serum specimens; or 3) demonstration of *L. pneumophila* serogroup 1 in lung tissue, respiratory secretions, or pleural fluid by direct fluorescent antibody (FA); or 4) demonstration of *L. pneumophila* serogroup 1 antigens in urine by radioimmunoassay (RIA) or enzyme-linked immunoassay (ELISA).

**Descriptive epidemiology**

- Number of cases reported in Illinois in 2003 - 50 (five-year median = 33) (Figure 50). Case report forms were available for 34 of the cases.
- Age - 76 percent were greater than 50 years of age (see Figure 51).
- Gender - 38 (76 percent) cases were male.
- Seasonal Variation - 35 percent of cases with the information had a date of onset in July or August.
- Geographic distribution – Thirteen counties reported cases with 18 cases (36 percent) from Cook Co.
- Risk factors - Four cases (9 percent) had been hospitalized continuously for three or more days before onset; three cases were discharged from the hospital within 10 days before onset; 23 cases (52 percent) had no hospital visits in the 10 days before symptoms, four cases had other types of health care exposure and 10 cases had no information on hospital visits immediately prior to onset. Fourteen of 34 cases (41 percent) traveled overnight in the two weeks prior to onset. At least one underlying health problem was reported among cases: diabetes (7 cases), cancer (4), corticosteroid therapy (4), renal dialysis (4), transplant (1), or other immunosuppressive condition (2). Fifty-two percent reported a history of smoking. Thirty-seven percent reported no underlying health problems.
- Diagnosis - Cases were diagnosed through urine antigen alone (36 cases), serology only (5), culture of respiratory secretions alone (4), direct fluorescent antibody of lung biopsy alone (1) or unknown (2).
- Outcomes - Hospitalization was required for 48 cases with hospitalization information available; all 43 cases with information available had X-ray confirmed pneumonia; four fatalities occurred among cases, but not all may have been directly caused by *Legionella* infection.
- Outbreaks – No outbreaks were reported in 2003.

**Summary**

In 2003, there were 50 cases of legionellosis reported in Illinois. Cases were increased over the five-year median. Twenty of 32 cases had pre-existing medical conditions. There were no outbreaks of legionellosis in 2003.
Figure 50. Legionellosis Cases in Illinois, 1998-2003

Figure 51. Age Distribution of Legionellosis Cases in Illinois, 2003
**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 \( \geq 24 \) 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.

Lyme disease is characterized by a rash-like skin lesion called erythema migrans (EM) that 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. Erythema migrans 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.

The Infectious Diseases Society of America issued guidelines recommending 14 to 21 days of an oral antibiotic for the treatment of erythema migrans. In February 2002, the only human Lyme disease vaccine was removed from the market due to low demand and sales.

There were 21,273 cases of Lyme disease (7.4 per 100,000) reported in 2003 in the U.S., mainly from the Northeast, mid-Atlantic and north-central regions of the country. This was a decrease of 10 percent from 2002 and the first decrease of more than 1,000 reported cases nationally since 1997. All states except Arkansas, Colorado, Montana, North Dakota and Oklahoma reported cases during 2003. Ten states - Connecticut, Delaware, Maryland, Massachusetts, Minnesota, New Jersey, New York, Pennsylvania, Rhode Island and Wisconsin - accounted for 93 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 2003 - 71 (five-year median = 35) (See Figure 52). The incidence was 0.6 per 100,000.
- Age - Cases ranged in age from 2 to 76 years of age.
- Gender - 48 (68 percent) were male.
- Race/ethnicity – All 67 cases for which race is known were white; three cases also identified themselves as Hispanic.
- Seasonal distribution – Lyme disease case onsets were most common in the months of June through August (Figure 53).
- Geographic distribution - The Illinois exposure locations are shown in Figure 54. Most cases with Illinois exposures were in northern Illinois. One case reported exposure in central Illinois: Pike County. Other exposure locales for Illinois resident cases were multiple locations in Illinois and other states (7 cases), Connecticut (2), Minnesota (1), Missouri (1), New York (1), Oregon (1), Rhode Island (1), Vermont (1), and Wisconsin (27). Two cases had unknown exposure histories.
- Tick Distribution – A map of Illinois with the distribution of known *Ixodes scapularis* (the vector for Lyme disease) is provided (Figure 55).
- Symptoms - Qualifying manifestations were EM (58), rheumatologic signs (8) and neurologic signs such as Bell’s palsy (5).

**Summary**
During 2003, increased numbers of cases occurred in the northeastern part of Illinois where deer ticks have become established. Both Minnesota and Wisconsin also reported increases in Lyme disease cases in 2003. For the 71 cases reported in Illinois residents during 2003, EM was the most common qualifying manifestation for Lyme disease. The number of cases peaked in the summer months. The incidence in Illinois (0.6 per 100,000) is much lower than the national average (7.4 per 100,000) for 2003. The number of reported cases of Lyme disease has increased every year in Illinois since 1996.
Figure 52. Lyme Disease Cases in Illinois, 1998-2003

Figure 53. Lyme Disease Cases in Illinois by Month, 2003
Figure 54. Illinois Map of Reported Exposure Location of Lyme disease Cases by County
Figure 55.

Known Geographic Distribution of *Ixodes scapularis* by county in Illinois 2005

*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 at 2 life stages (larvae, nymphs, adults) identified.

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

The "deer tick" was found, late in 2005, in a limited area of southwestern Cook County.

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 of species and sex is performed at IDPH when the tick is intact and sent in a crush-proof container.

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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 (repellents and mosquito nets at night when accommodations do not protect against mosquitoes). 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.

The majority of malaria infections in Illinois are caused by travel to areas with ongoing transmission. In 2003, 1,278 malaria cases were reported in the United States including seven fatal cases. The species of malaria identified in these cases was *falciparum* (53 percent), *vivax* (23 percent), *malariae* (4 percent) and *ovale* (3 percent). In 17 percent of cases the species was unknown. Prior to the 1950s, malaria was endemic in the southeastern United States. The majority of infections in the United States were acquired in Africa (70 percent), followed by Asia (15 percent) and the Americas (12 percent). Of the 167 patients who contracted malaria after taking a recommended antimalarial drug for chemoprophylaxis, 35 percent reported compliance
with the regimen, 47 percent reported noncompliance and 18 percent had missing compliance information. For \textit{P. vivax} or \textit{P. ovale}, if onset develops 45 days after arriving in the United States this is consistent with relapsing infections and does not indicate primary prophylaxis failure. Of the U.S. civilians with malaria, 54 percent of persons had visited friends or relatives in malarious areas. The second leading reason for travel was tourism (12 percent) followed by missionary work (9 percent).

\section*{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.

\section*{Descriptive epidemiology}

- Number of cases reported in Illinois in 2003 - 46, all of which were among non-military personnel and imported from outside the United States (five-year median = 68) (see Figure 56).
- Age - Peak incidence occurred in the 20- to 39-year-old age groups; the mean age was 35. (Figure 57)
- Race/ethnicity - 51 percent were African American, 27 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. (Figure 58).
- Speciation – The malaria species identified in the reported cases were \textit{P. falciparum} (22 cases, 48 percent), \textit{P. vivax} (eight cases, 17 percent), \textit{P. malariae} (four cases, 8 percent), \textit{P. ovale} (four cases, 9 percent) and unknown (eight, 17 percent).
- Treatment/outcomes – 22 of 34 with information available were hospitalized. No cases are known to have been fatal. The 22 \textit{P. falciparum} cases were treated with the following medications: chloroquine (five cases, one of which was also treated with doxycycline and quinine; another of these cases also received primaquine), mefloquine (three cases), quinine/quinidine (10, five of whom also received doxycycline; another of these cases also received clindamycin), chloroquine, doxycycline and quinine (one case) and unknown (one case). No cases were known to be cerebral malaria.
- Risk factors - The major risk factor is travel outside the United States. Specific information was available for 37 of the cases. The only Asian countries reported by cases as travel destinations were India (four cases) and Pakistan (one). In Africa, the following travel destinations were reported: Nigeria (seven cases), Ghana (seven), Cameroon (two, Kenya (one), Senegal (two), South Africa (one), Ivory Coast (one), Malawi (one), Republic of Congo (one), unspecified
West Africa (two), multiple countries (five) and unspecified “Africa” (one). One case visited Haiti.

- Of the eight cases reporting travel to Nigeria, five were infected with *P. falciparum* and two with *P. ovale*. One case was not speciated. Six of the seven cases who visited Ghana had *P. falciparum* and one had *P. ovale*. The five cases reporting travel to India or Pakistan were infected with: *P. vivax* (three cases) and *P. malariae* (two).

Cases provided the following reasons for travel overseas: visiting friends or relatives (20 cases), missionary work (six), business (three), student or teacher (two), tourism (one), refugee (one), other (one) and unknown (three).

Malaria prophylaxis was reported by only 12 of 37 cases providing information (32 percent). Cases indicated taking the following medications for the prevention of malaria: mefloquine (five cases), chloroquine (four), primaquine (one) and other drugs (two).

- Past infection - Seven cases (19 per cent) reported a history of malaria in the previous 12 months.

**Summary**

There were 46 reported cases of imported malaria identified in Illinois in 2003 as compared to the five-year median of 68. Illinois had the 11th highest number of cases among the states.

African Americans and Asians 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 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 measles virus also can cause diarrhea, severe pneumonia, encephalitis and death. 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.

Nationally, there were 56 cases reported to CDC; 24 were internationally imported and 19 additional cases occurred from these imported cases. High immunity levels help prevent the spread of measles from these imported cases. In two other cases, virologic evidence implicated an imported source. The remaining 11 cases were classified as unknown source cases because no link to importation was detected. In 2003, two measles-related deaths were reported in the United States. Both had encephalitis.

From 2001-2003, 216 measles cases were reported in the United States with 44 percent classified as imported, and 120 as indigenous cases. Of the indigenous cases, 49 percent were import-linked, 15 percent were imported virus and 36 percent were unknown source cases. Measles became reportable in the U.S. in 1912.

On July 1, 2002, it became mandatory for laboratories in Illinois to report positive results for measles.

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 ≥ three days, and a temperature of ≥ 101°F, and a cough or coryza or conjunctivitis.

Descriptive epidemiology

- Number of cases reported in Illinois in 2003 – one imported case (See Figure 59).
- Sex – The case was male.
- Age – The case was 10 months of age.
- Clinical Information – The case had onset of rash illness in March. The patient had travel in India before illness onset. The patient had no history of measles
vaccination because he was less than one year of age. The patient survived.

- Race/ethnicity – The case was Asian and non-Hispanic.
- Diagnosis – The case was diagnosed by IgM positive serology.
- Geographic distribution – The case was from Cook County.

Summary
One case of measles was reported.

Suggested readings
Monkeypox
Background

Human monkeypox is viral zoonotic animal poxvirus that occurs mainly in central and western Africa. It can cause painful skin lesions in affected persons. There are three genera of zoonotic poxviruses including parapoxviruses (ex. Orf, milker’s nodules), orthopoxviruses (ex. cowpox, camelpox, monkeypox, and buffalopox) and yatapoxvirus (ex. tanapox). Orf and milker’s nodules are the only animal poxviruses with a worldwide distribution. Diagnosis is by electron microscopy of blister fluid or crusts to demonstrate the virus. Cowpox is not present in the United States. Buffalopox is present on the Indian subcontinent. Tanapox occurs in western and central Africa. Orf can be found in the United States and is usually contracted directly or indirectly from sheep or goats.

Monkeypox is the most important zoonotic poxvirus because of the mortality rate of greater than 10 percent in children. The incubation period is 12 days. Clinical features include flu-like illness and back pain with widespread blistering especially of the face and extremities. Lymphadenopathy occurs in about 90 percent of unvaccinated persons who develop monkeypox but is uncommon in smallpox and can be useful in distinguishing the two infections. The infection in people also may cause a dry, nonproductive cough. Diagnosis is by polymerase chain reaction, electron microscopy, IgM and IgG ELISA, immunofluorescent antibody assay and histopathology.

An outbreak of monkeypox in the United States occurred in the spring of 2003. The source of the outbreak was determined to be prairie dogs (Cynomys species) housed with exotic African rodents. Prairie dogs became infected from African rodents shipped from Ghana to Texas in April 2003. The shipment contained about 800 small mammals of nine different species, including six genera of African rodents. Species included rope squirrels, tree squirrels, Gambian giant rats, brushtail porcupines, dormice, striped mice, gents, palm civets and cusimanses. A Gambian giant rat, three dormice and two rope squirrels from the shipment tested positive for monkeypox. Some African rodents from this shipment died soon after arriving in the United States. Two rope squirrels, one Gambian rat and three dormice tested positive for monkeypox at CDC. CDC necropsied 249 animals of 26 different species and confirmed infection in 33 animals with PCR, and in 22 animals through virus isolation. Infection was confirmed in 14 prairie dogs, two Gambian giant rats, nine dormice, three rope squirrels, one ground hog, one hedgehog, one jerboa and two opossums.

Exposure to infected prairie dogs resulted in 49 confirmed or probable human cases in six Midwestern states. Thirty-seven were laboratory confirmed. Onsets ranged from May 1 to June 20. Thirty individuals were vaccinated for smallpox during this outbreak. Eighteen persons were hospitalized. Two patients had serious illness; one had severe encephalitis and the second had profound painful cervical and tonsilar lymphadenopathy and diffuse pox lesions. No deaths were associated with the outbreak although two children required intensive care and one patient received a corneal transplant due to chronic ocular infection. Nine cases were associated with two prairie dogs housed in a day care center and taken to a veterinarian for care when they became ill. These cases lived in the home, were day care attendees or were veterinary staff that treated the animals. Twenty-seven of 47 patients had exposure to monkeypox.
from infected pets in the home environment. The other 43 percent were all exposed in settings associated with pet care such as pet stores, animal swap meets and veterinary clinics. Seventeen cases (36 percent) received a bit or scratch from an ill prairie dog. The orthopoxvirus involved in the U.S. outbreak was a west African variant.

Prairie dogs are extremely susceptible to fatal infection with monkeypox virus. Approximately 40 percent of the animals survived intranasal infection in a laboratory experiment. Animals showed signs of lethargy and anorexia; some also developed vesicular lesions on the lips and tongue, with nasal congestion and a mucopurulent nasal discharge. Two surviving prairie dogs continued to shed for several weeks after infection and survived till euthanized at 25 days. In two animals examined by pathologists, it appeared that transmission may have occurred through direct mucocutaneous contact and respiratory transmission. Symptoms in prairie dogs included anorexia, wasting, sneezing, coughing, swollen eyelids, ocular discharge and death.

When outbreaks of monkeypox occur, pre-exposure smallpox vaccination of persons, including health care providers, who investigate or provide treatment for animal or human monkeypox cases is recommended. Laboratory workers who handle samples that may contain monkeypox also are recommended for smallpox vaccination. In persons who may have been exposed, vaccination within four to 14 days after initial close contact with a case is recommended. Regulation of imported animals is fragmented among federal agencies.

Case Definition
Clinical signs include rash, fever, headache, backache, lymphadenopathy, sore throat, cough, shortness of breath. The epidemiologic criteria were 1) exposure to an exotic or wild mammalian pet obtained on or after April 15, 2003, with clinical signs of illness (conjunctivitis, respiratory symptoms and/or rash), 2) exposure to an exotic or wild mammalian pet with or without clinical signs of illness that has been in contact with either a mammalian pet or a human with monkeypox, 3) Exposure to a suspect, probable or confirmed human case of monkeypox. Laboratory criteria include 1) virus isolation, 2) PCR 3) electron microscopy identification of orthopoxvirus, 4) immunohistochemistry

A probable case meets one of the epidemiologic criteria and fever and (either vesiculo-pustular rash with onset within 21 days of exposure or unknown type of rash with IgM antibodies reactive to orthopox virus between seven to 56 days after rash onset. A confirmed case meets one of the laboratory criteria.

Descriptive Epidemiology
Number of cases – 10 (9 confirmed and 1 probable). Age distribution – 10 to 47 years (median=18 years). Onset dates – Onsets ranged from May 18 to June 20. Clinical syndrome – Cases reported rash (9 cases), fever (8), sweats (6), chills (5), lymphadenopathy (6), headache (5), cough (5) and sore throat (4). Seven cases visited a health care provider and five cases were hospitalized; no fatalities occurred.
Geographic location – Cases were residents of DuPage (4 cases), Clay (3), Kane (1), Winnebago (1) and Jefferson (1).

Epidemiology – All cases had exposure to prairie dogs prior to illness.

There were five situations in which Illinois human monkeypox cases occurred.

- The first grouping resulted from exposures at the DuPage County animal dealer’s home. One confirmed case from Kane County worked at the dealer’s home. Two other person’s working at the dealer’s facility were suspect cases.
- The second grouping was in DuPage County. Four confirmed cases occurred in three households in DuPage County. Two cases were in brothers living in one household with a prairie dog purchased with conjunctivitis from a swap meet in Streamwood Illinois on May 18. This prairie dog was originally from the DuPage County dealer. Two friends of the brothers also had exposure to this ill prairie dog. All had handled the prairie dog but were not bitten. This prairie dog tested positive for monkeypox at USAMRIID.
- The third group of cases occurred in Clay and Jefferson counties. A prairie dog purchased on May 18 from a swap meet in Indianapolis exposed its initial owner whose onset was May 29. The second owner had onset of illness on June 9 and was bitten by the prairie dog. She had two other prairie dogs at home that became ill. No testing of prairie dogs was completed.
- The fourth case occurred in Clay County. A person bought a prairie dog at a swap meet on May 18 in Indianapolis. The prairie dog became ill on May 19 and died. The illness onset was June 2. His nephew who helped with the animals became a case.
- The fifth group of cases occurred in Winnebago County. A family purchased a prairie dog from the DuPage County dealer on May 18 to become their third prairie dog pet. The new prairie dog became ill on May 25 and died May 28. It was not available for testing. The two other household prairie dogs became ill with skin lesions on June 6. One of the two tested positive at CDC. The family was put on voluntary quarantine. The 10-year-old child became ill on June 16 in Montana during the time they were supposed to be on voluntary quarantine in Illinois. The family returned to Illinois and one hospital refused to see the patient. The child was confirmed with monkeypox.

Eight individuals chose to be vaccinated for smallpox during this investigation. The Illinois Department of Agriculture issued 86 quarantines to individuals or pet stores who declined to euthanize their prairie dogs or Gambian rats.

Summary

Ten Illinois residents became ill with monkeypox and were confirmed or probable cases. All had contact with prairie dogs from an animal dealer in DuPage County. Important management points were that some persons refused to give up their well prairie dogs for euthanasia and there was poor compliance with voluntary quarantine in one family.
Suggested readings


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 2003, 231 mumps cases were reported to CDC.

On July 1, 2002, it became mandatory for laboratories in Illinois to report positive results for mumps.

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 2003 – Eight (Figure 60). Six cases were confirmed and two were classified as probable.
- Age – Median age was 29 years (range was 6 years to 57 years).
- Gender – Six (75 percent) were female.
- Race/ethnicity – 7 (87 percent) were white and one (12 percent) was African American. No cases reported Hispanic ethnicity.
- Geographic distribution – Cases resided in five jurisdictions (Chicago Department of Public Health-5, Kane County Health Department-2, Southern Seven Health Departmetn-1, Will County Health Department-1 and Champaign-Urbana Public Health District-1).
- Seasonal variation – Cases occurred from January through December.
- Fatalities – No fatalities were reported.

Summary
The median age of the eight reported mumps cases in 2002 was 29 years. Five health jurisdictions reported mump cases.
Figure 60. Mumps Cases in Illinois, 1998-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>10</td>
</tr>
<tr>
<td>1999</td>
<td>46</td>
</tr>
<tr>
<td>2000</td>
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<td>2001</td>
<td>21</td>
</tr>
<tr>
<td>2002</td>
<td>18</td>
</tr>
<tr>
<td>2003</td>
<td>8</td>
</tr>
</tbody>
</table>
Pertussis

Background

Pertussis is caused by *Bordatella pertussis* and is characterized by a paroxysmal cough that can last several weeks. Pertussis should be considered in adolescents and adults especially if the cough is associated with vomiting or gagging or persists more than two weeks. 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. 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. The incubation period is usually seven to 10 days although it can range from six to 20 days. For the first week, mild fever, coryza and cough are common. From week one through six, a paroxysmal cough, inspiratory whoop, and post-tussive vomiting may occur. From six to 12 weeks, the intensity of cough decreases. Outbreaks are managed through prompt treatment of patients and antimicrobial prophylaxis of close contacts. Acellular pertussis vaccines are used in children from 6 weeks to 6 years of age.

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. However, immunity from childhood vaccination decreases beginning five to 15 years after the last pertussis vaccine dose. Since 1995, the coverage rate with greater than three doses of a pertussis-containing vaccine has been greater than 94 percent among U.S. children aged 19-35 years.

To confirm the diagnosis of pertussis in symptomatic adults, physicians should obtain a nasopharyngeal aspirate or swab for *B. pertussis* culture within two weeks of cough onset.

A resurgence of cases has been reported in the last decade in the United States. A total of 11,647 pertussis cases (4 per 100,000) were reported to CDC from states in 2003. This is the highest number reported since 1964. Of these cases, the incidence was highest (103 per 100,000 population) in infants less than 6 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 6-11 months (12), 1-to-4 year olds (7), 5-to-9 year olds (4), 10-to-19 year olds (11), older than 20 years (1).

On July 1, 2002, the reporting of positive laboratory results for pertussis became mandatory. In addition, it became mandatory to forward isolates to the IDPH laboratory.

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 \textit{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 2003 - 323 (five-year median = 173) (Figure 61). Note: Illinois reported 321 cases to CDC and two were reported after the deadline for reporting to CDC. The one-year incidence rate for pertussis was three per 100,000. Of these cases, 126 were classified as confirmed and 197 as probable cases.
- Age – 34 percent occurred in those younger than five years of age (Figure 62).
- Gender – Females comprised 175 (54 percent) of cases.
- Race/ethnicity – 258 (80 percent) were white, 42 (13 percent) were African American and 23 (7 percent) were other races. Forty-two (13 percent) reported Hispanic ethnicity as compared to 9 percent in 2002.
- Seasonal variation - Cases increased from August through November (Figure 63).
- Geographic distribution – Counties with the most cases included Cook (186 cases), Lake (121), Macon (92), Kane (53), JoDaviess (53), Champaign (40) and Will (40).

**Summary**

The number of yearly reported pertussis cases has been increasing since 2000 in Illinois. The highest incidence occurred in those younger than one year of age. There were 323 pertussis cases reported in Illinois in 2003. Adolescent and adult pertussis cases have increased in Illinois and this follows a national trend in 2003.

**Suggested readings**


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. 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 meningoencephalitis. Chronic Q fever may appear as endocarditis. Persons at higher risk of infection include animal workers. 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-one cases of Q fever were reported to CDC in 2003.
Q fever became reportable in Illinois on April 1, 2001, due to possible bioterrorism concerns. Therefore, 2003 is the second full year of reporting.

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 2003 - 0.

Summary
No cases of Q fever were reported in Illinois if the second full year of reporting.
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. 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. Prior to 2004, there have been only a handful of persons known to have survived rabies infection. Only one of these did so without severe residual effects. Rabies should be considered in the differential diagnosis of any acute rapidly progressive encephalitis, regardless of documentation of an animal bite.

In 2003, the United States and Puerto Rico reported three cases of human rabies and 7,170 cases of animal rabies. Wild animals accounted for more than 91 percent of the animal cases reported in the United States; the top three species with rabies were the raccoon, skunk and bat. Illinois was one of seven states in 2003 reporting rabies in bats, but not in terrestrial animals. Westward movement of raccoon rabies is a concern for Illinois. Ohio had two raccoon rabies cases in spite of oral rabies vaccination programs in raccoons. Tennessee reported four cases of raccoon rabies making it the 20th state with enzootic raccoon rabies. Single cases of raccoon rabies occurred in Kansas, Kentucky and South Dakota. The top six rabies-positive bats after speciation (not done in all states) were the big brown bat (46 percent), Mexican free-tailed bat (27 percent), red bat (6 percent), hoary bat (6 percent), little brown bat (3 percent) and the silver-haired bat (2 percent). The peak of bat rabies in the United States occurs in August.

Two human cases of rabies occurred in the United States and one in Puerto Rico in 2003. One case was caused by the raccoon strain of rabies, one due to a raccoon strain found primarily in bats and one due to the strain infecting the mongoose in Puerto Rico. A human rabies case in Virginia in 2003 was attributed to the raccoon strain of rabies. Eight persons received rabies post-exposure prophylaxis (PEP) due to contact with the 25-year-old case. A specific exposure history involving raccoon contact could not be elicited from family and friends. This is the first documented human rabies case linked to the raccoon strain of rabies. A 64-year-old resident of Puerto Rico died from infection with the strain of raccoons maintained by the mongoose and unvaccinated dogs in Puerto Rico. This victim was bitten by a dog but did not seek treatment. In California, a 66-year-old man died with the silver-haired and eastern pipistrelle bat strain of rabies. The man told acquaintances when he was bitten by a bat six weeks earlier but did not seek medical attention.

From 1990 through 2000, there have been 32 cases of human rabies in the

125
United States. Eight persons were infected outside the United States. Twenty-four of the 32 cases were infected with the rabies variant most prevalent in bats. Only two of these cases reported a bite from a bat prior to becoming too ill to provide information. The most likely explanation for the other cases is a bat bite that was unnoticed, ignored and/or unreported.

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 2003 – 3,832; 56 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. Twenty-four specimens were DFA positive; all positive animals were bats (Table 7). Trends in animal rabies testing in Illinois are shown in Figure 64.

- Exposures to rabid bats - There were 24 rabid bat situations.
  - In 12 of the 24 rabid bat situations, no human exposures sufficient to require rabies PEP occurred. In nine of the 12 rabid bat situations involving humans, some detail of the exposure was reported to IDPH by the local health department involved. Two exposures are known to have occurred in homes. One happened when a resident swatted the bat with her bare hand. Another occurred when a bat was found in the room of a bed-bound woman whose husband was exposed catching the bat. Three persons received rabies PEP. Two incidents involving children who encountered and either were bitten by or handled the bat led to three of them being exposed and treated. One adult was raking leaves without gloves when she grabbed a handful of leaves which hid a moribund bat. Another adult had a bat land on her shirt, which she removed to use to capture the bat, but could not rule out sufficient contact to cause exposure. In another incident, a police officer called to collect a bat and reported exposure but it is unknown if PEP was completed in this instance. In the other two incidents, the detail provided is insufficient to characterize the exposure.
Domestic animals (all dogs or cats) were either exposed or possibly exposed in five of the 24 rabid bat situations (Table 8).

Condition of bat when found - Six of the rabid bats were down and unable to fly, five were killed by, brought home by or found dead near a pet and the behavior or status of the other 13 was not described.

- Testing of bats - Bats accounted for all 24 of the confirmed rabid animals in 2003. The total number of bats tested for rabies was 846 (positivity rate = 2.8 percent).
- Geographic distribution - Rabid bats were dispersed in 20 counties across the state (Figure 65).
- Speciation - The Illinois Natural History Survey speciates bats tested for rabies in Illinois. In 2003, they speciated a total of 908 bats submitted for rabies testing (some may have been from the previous year). Of the 24 positive bats, 13 were big brown bats, seven were red bats, two were hoary bats and one each was a little brown bat and silver-haired bat. The negative bats were identified as: big brown bat (687 bats), silver-haired bat (84), red bat (52), little brown bat (19), northern long-eared bat (7), hoary bat (6), eastern pipistrelle (2), evening bat (1) and unknown (3).
- Seasonal variation - Figure 66 shows bats submitted for testing by month in 2003. Bats submitted for rabies testing increase in summer months and peaked in August.

- Testing of skunks - Rabies testing was performed on 73 skunks in 2003 as compared to 92 in 2002. At least one skunk from each of 18 Illinois counties was tested; no skunks were tested in 84 counties. The following counties have submitted skunks for rabies testing in 2003: Coles, Cook, DuPage, Jackson, Kane, Lake, Livingston, Madison, McHenry, McLean, Monroe, Morgan, Sangamon, St. Clair Stephenson, Warren, Whiteside and Will. The county submitting the largest number of skunks for testing was Cook with 36, nearly half of the total, followed by Will with seven skunks. The number of skunks tested in Illinois decreased from 2002 to 2003.

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 67 shows the number of rabid skunks found in Illinois and the road kill index from 1975 through 2003. 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 9 shows the rabies positivity rate in different species
of animals in Illinois from 1971 to 2003. 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 to 2003 data vs. 1991 to 2003 data, the percentage of skunks positive for rabies declined dramatically and the percentage of positive bats stayed very constant.

Summary

Bats were the only species identified with rabies in Illinois in 2003. The big brown bat was the most commonly identified species testing positive for rabies and that is consistent with national data. August was the peak month for bat rabies consistent with national data. Testing of skunks for rabies has declined in Illinois thereby decreasing the reliability of surveillance of the terrestrial animal reservoir in the state. This is the fifth consecutive year when no rabid skunks have been identified in 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


MMWR. Human Death Associated with Bat Rabies-California. MMWR 2004;53(02): 33-5.


Table 7. Rabid animals found in Illinois in 2003

<table>
<thead>
<tr>
<th>Species</th>
<th>Total number suitable for testing</th>
<th>Total positive</th>
<th>% positive</th>
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<td>Cat</td>
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<tr>
<td>Dog</td>
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</tr>
<tr>
<td>Coyote/fox</td>
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<td>0</td>
</tr>
<tr>
<td>Ferret</td>
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<tr>
<td>Horse/donkey</td>
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</tbody>
</table>

*"Other" species tested in 2003 included camel, mink, shrew, sugar glider and wolf.
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>March</td>
<td>Yes; details unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>May</td>
<td>Toddler tried to pet bat, bitten; PEP completed</td>
<td>Unknown</td>
</tr>
<tr>
<td>May</td>
<td>No</td>
<td>Cat</td>
</tr>
<tr>
<td>May</td>
<td>No</td>
<td>Cat</td>
</tr>
<tr>
<td>June</td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>June</td>
<td>Resident of home swatted bat out of air with bare hand; PEP completed</td>
<td>No</td>
</tr>
<tr>
<td>July</td>
<td>One child bitten and one child handled bat; both completed PEP</td>
<td>No</td>
</tr>
<tr>
<td>July</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>August</td>
<td>Arkansas resident bitten and received PEP</td>
<td>Unknown</td>
</tr>
<tr>
<td>August</td>
<td>No</td>
<td>Cat found near bat</td>
</tr>
<tr>
<td>August</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>August</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>August</td>
<td>Bat landed on girl’s head; she brushed it off; PEP completed</td>
<td>No</td>
</tr>
<tr>
<td>August</td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>August</td>
<td>Yes; bat found in room with invalid wife; man and wife both received PEP</td>
<td>No</td>
</tr>
<tr>
<td>August</td>
<td>Yes; details unknown</td>
<td>No</td>
</tr>
<tr>
<td>September</td>
<td>No</td>
<td>2 cats</td>
</tr>
<tr>
<td>September</td>
<td>No</td>
<td>Dog</td>
</tr>
<tr>
<td>September</td>
<td>Police officer called to collect bat had contact warranting PEP; no report on its completion</td>
<td>Unknown</td>
</tr>
<tr>
<td>September</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>October</td>
<td>Bat landed on shirt; possible contact while brushing it off; PEP completed</td>
<td>No</td>
</tr>
<tr>
<td>October</td>
<td>Yes; details unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>November</td>
<td>Yes; one person while raking leaves without gloves; grasped bat among leaves; PEP started but not completed</td>
<td>No</td>
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Table 9. Rabies positivity rate by animal species in Illinois, selected time spans.

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<td>Bat</td>
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<td>Cat</td>
<td>42,494</td>
<td>141</td>
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<td>Cattle</td>
<td>3,265</td>
<td>214</td>
<td>6.5</td>
<td>833</td>
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<td>Dog</td>
<td>43,228</td>
<td>110</td>
<td>0.3</td>
<td>19,683</td>
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<td>0.03</td>
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<td>Fox</td>
<td>1,414</td>
<td>72</td>
<td>5.1</td>
<td>229</td>
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<td>Horse</td>
<td>682</td>
<td>22</td>
<td>3.2</td>
<td>223</td>
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<tr>
<td>Mouse</td>
<td>4,681</td>
<td>0</td>
<td>0</td>
<td>636</td>
<td>0</td>
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<tr>
<td>Raccoon</td>
<td>9,327</td>
<td>17</td>
<td>0.2</td>
<td>3,045</td>
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<td>Rat</td>
<td>1,846</td>
<td>0</td>
<td>0</td>
<td>336</td>
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<td>Skunk</td>
<td>7,388</td>
<td>2,526</td>
<td>34</td>
<td>1,220</td>
<td>44</td>
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<td>Squirrel</td>
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<td>1,663</td>
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</table>

Source: Illinois Department of Public Health
### Table 10. Bat Speciation Results from Bats Submitted for Rabies Testing in 2003

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<tr>
<th>Species</th>
<th>Common Name</th>
<th># testing neg.</th>
<th># testing pos.</th>
<th># unsatisfactory</th>
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<tr>
<td>Eptesicus fuscus</td>
<td>Big brown bat</td>
<td>687</td>
<td>13</td>
<td>13</td>
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<td>Lasiurus borealis</td>
<td>Red bat</td>
<td>52</td>
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<td>Lasiurus cinereus</td>
<td>Hoary bat</td>
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<td>2</td>
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<td>Lasionycteris noctivagans</td>
<td>Silver-haired bat</td>
<td>84</td>
<td>1</td>
<td>0</td>
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<td>Pipistrellus subflavus</td>
<td>Eastern pipistrelle</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Myotis lucifugus</td>
<td>Little brown bat</td>
<td>19</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Myotis septentrionalis</td>
<td>Northern long-eared bat</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nycticeius humeralis</td>
<td>Evening bat</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Unknown</td>
<td></td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>861</td>
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<td>23</td>
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</table>

Source: Illinois Natural History Survey

### Figure 64. Trends in Animal Rabies Testing in Illinois, 1990-2003

![Graph showing trends in animal rabies testing in Illinois, 1990-2003](image-url)
Figure 65. Positive Cases of Animal Rabies in Illinois, 2003
(A=bat, total=24)
Figure 66. Bat Testing for Rabies by Month, 2003

Figure 67. Skunk Rabies and Skunk Road Kill Index in Illinois, 1975-2003
Rocky Mountain spotted fever

Background
Rocky Mountain spotted fever (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 2003, 1,091 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*). 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 may also have gastrointestinal signs such as abdominal pain and nausea which may be serious enough to lead to an erroneous diagnosis such as appendicitis.

From 1994-2003, 61 percent of the 68 cases of RMSF reported in Illinois were male. Ninety-eight percent were white. The age of cases was widely distributed, with 12 cases 10 years old or younger, 15 cases 40-49 years and 9 cases 60 or older.

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 immunofluorescent antibody (IFA), complement fixation (CF), latex agglutination (LA), microagglutination (MA) or indirect hemagglutination antibody (IHA) test 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 with a single IFA serologic titer of > 64 or a single CF titer of >16 or other supportive serology (four-fold rise in titer or a single titer > 320 by Proteus OX-19 or OX-2, or a single titer >128 by an LA, IHA or MA test.

Descriptive epidemiology
- Number of cases reported in Illinois in 2003 – four probable and one confirmed case.
- Age - Cases ranged in age from 7 to 77 years of age.
- Gender – Four cases were male (80 percent).
- Race/ethnicity - Five cases were white; none were Hispanic.
- Geographic distribution - Sites of tick exposure for four cases were one case each reporting DeKalb, Pike, St. Clair and White counties. A case from Tazewell County also reported possible exposure and multiple tick bites while camping in Brown County.
- Seasonal variation - Onsets of the five cases occurred between May 1 and September 30.
- Symptoms/outcomes - four cases were hospitalized. None of the five cases were fatal and none had complications reported.

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

Background

Rubella usually causes a self-limiting disease in adults and children. Transmission is from direct contact with, or droplet spread of, nasopharyngeal secretions of infected persons. The incubation period is 12 to 23 days. Rubella can cause a fever and rash along with enlarged lymph nodes in the head and neck. Rubella is one of the most common causes of birth defects in the world. It can result in spontaneous abortions, stillbirths and congenital rubella syndrome. Congenital rubella syndrome includes hearing impairment, blindness, heart defects and mental retardation.

Immunization against rubella is recommended at 12-15 months of age and a second dose at school entry or at adolescence. Vaccine should not be given to anyone who is immunosuppressed, or to pregnant women because it is a live vaccine. Rubella vaccine was licensed in 1969 and measles-mumps-rubella vaccine was licensed in 1971. Rubella vaccination was mandated for school entry in all states by 1979.

In 2003, 7 rubella cases and one congenital rubella case were reported nationally to CDC.

On July 1, 2002, it became mandatory for laboratories in Illinois to report positive laboratory tests for rubella to IDPH.

Case definition

The clinical case definition for rubella is an illness with acute onset of generalized maculopapular rash, fever and either arthritis/arthralgia, lymphadenopathy or conjunctivitis. A confirmed case of rubella is one that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a laboratory confirmed case.

Descriptive epidemiology

- Number of cases reported in Illinois in 2003 – No cases were reported.

Summary

In 2003, no rubella cases were reported in Illinois.
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).


In the U.S. national surveillance data, 43,657 cases of *Salmonella* were reported to CDC. The five most common serotypes reported by FoodNet were Typhimurium (19 percent), Enteritidis (13 percent), Newport (11 percent), Heidelberg (6 percent) and Javiana (6 percent).

A multi-state outbreak of *S. ser. Typhimurium DT104* occurred in late 2003 in the northeastern United States. Fifty-eight case patients in nine states had isolates with the same PFGE pattern. Illness was associated with consuming store-bought ground beef prepared as hamburgers at home and with eating raw ground beef.

Treatment of intestinal *Salmonella* infections with antibiotics can lead to a prolonged carrier state and culture-positive status for as long as three weeks. Such treatment also has not been shown to decrease the length of illness for intestinal *Salmonella*.

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 2003 – 1,955 as compared to a five-year
median of 1,600 (see Figure 68 for number of cases since 1998). The annual incidence rate for salmonellosis in Illinois in 2003 was 16 per 100,000 population.

- Age - Salmonellosis occurred in all age groups (mean age = 31) (see Figure 69). However, the incidence rate was highest in those younger than 1 year of age (87 cases per 100,000 population).
- Gender – 54 percent were female.
- Race/ethnicity – 84 percent of cases were white, 13 percent African American and 3 percent other races; 16 percent were Hispanic.
- Seasonal variation – A peak in salmonellosis cases occurred from June through July in 2003 (Figure 70).
- Geographic distribution – The mean annual incidence rates for salmonellosis were highest in some scattered counties in the state (Figure 71). The five counties with the highest mean annual incidence rates per 100,000 population for salmonellosis from 1999-2003 were Kankakee (35), Wayne, Stephenson and JoDaviess (27 each) and Lake (23).
- Serotypes – 88 percent of Illinois’ *Salmonella* isolates were serotyped. The most common serotypes in 2003 are found in Table 11. The three most common serotypes were *S.* ser. Typhimurium (373, 19 percent), *S.* ser. Javiana (263, 13 percent) and *S.* ser. Enteritidis (207, 11 percent). Serotypes of *Salmonella* found in Illinois from 1995 to 2003 are shown in Table 12.
- Risk factors – A history of reptile or amphibian contact was reported by 80 *Salmonella* cases in 2003 but a link between the reptiles and transmission of the infection could not be confirmed.
  - Cases reported contact with the following types of reptiles: lizards (29 cases), turtles (17), snakes (12), frog (2), not specified (7) and multiple types (12).
  - For those with reported reptile contact, the median age was 10 years; 30 cases were younger than 5 years of age.
  - Males accounted for almost half (47 percent) of the cases.
  - The two most common species in these cases were Typhimurium (18 cases) and Enteritidis (8). *Salmonella* isolates from the subspecies I, II, III and IV have been associated with reptile contact and, for the 2003 reptile contact cases, the following serotypes from these groups were identified: Marina (1 case), Oslo (1), Poano (1) and Telelkebir (1).
- Outbreaks - There were five confirmed foodborne outbreaks of *Salmonella* reported in 2003. (See the section of this report detailing foodborne outbreaks for more details.)

**Summary**

In 2003, 1,955 cases of *Salmonella* were reported in Illinois. The one-year incidence rate of *Salmonella* for 2003 was 16 per 100,000 population, which is higher than the average incidence reported at CDC’s FoodNet sites (14 per 100,000). The mean age for *Salmonella* cases was 31 years, although the incidence was highest in those younger than 1 year of age. *Salmonella* cases increased during summer months. The percentage of isolates that were serotyped in Illinois was 88 percent. The
percentages of the three most common serotypes were Typhimurium (19 percent), Javiana (13 per cent) and Enteritidis (11 percent). A higher proportion of Illinois isolates serotyped in Illinois were S. ser. Javiana (13 percent) as compared to 2003 FoodNet data (6 percent). The proportions of S. ser. Typhimurium (19 per cent) and S. ser. Enteritidis (11 per cent) were similar to the 2003 FoodNet data for those serotypes. Reptile contact was reported in 30 cases younger than 5 years of age. CDC recommends that households with children younger than 5 years of age not have reptiles as pets.

Suggested readings
Figure 70. Salmonella Cases in Illinois by Month, 2003
Figure 71. One-year Salmonellosis Incidence Rates for Illinois, 1999-2003

Source: Illinois Department of Public Health
Table 11. Top 18 *Salmonella* serotypes in Illinois, 2003

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Frequency</th>
<th>Serotype</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>373</td>
<td>Saint-paul</td>
<td>27</td>
</tr>
<tr>
<td>Javiana</td>
<td>263</td>
<td>Montevideo</td>
<td>27</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>207</td>
<td>Berta</td>
<td>23</td>
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<tr>
<td>Newport</td>
<td>151</td>
<td>Paratyphi a</td>
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<td>Infantis</td>
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<td>Hadar</td>
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<td>Heidelberg</td>
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<td>Muenchen</td>
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<tr>
<td>Thompson</td>
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<td>Stanley</td>
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</table>

Source: Illinois Department of Public Health

Table 12. Frequency of *Salmonella* Serotypes in Illinois, 1995-2003

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Severe Acute Respiratory Syndrome (SARS)

Background

On November 16, 2002, the first SARS cases emerged in Guangdon Province, China but were not immediately recognized as a new disease. The World Health Organization (WHO) received the first report of this new condition on February 11, 2003, and by that time 305 cases had been reported.

SARS is a viral pneumonia due to a coronavirus that infected individuals transmit through large airborne droplets. Coronaviruses are RNA viruses causing disease in humans and animals. The only other known coronavirus that affects humans causes the common cold. The SARS-CoV was recovered from animals ranging from rodents to civet cats and raccoon dogs. The incubation period in people ranges from two to 15 days (median ranging from four to seven days). The SARS coronavirus is not highly transmissible. The number of secondary cases generated by an infectious case was low. The transmissibility of the virus was highest after five days of onset. SARS-CoV was identified in respiratory secretions, feces, urine and lung biopsy specimens in ill humans. Those most at risk were close contacts such as family and health care workers. Transmission to casual or social contacts is rare, but has occurred after close contact with a patient in the workplace, on a plane, in hotels or in taxis. Transmission is through direct or indirect contact of mucus membranes (eyes, nose or mouth) with infectious respiratory droplets or fomites. The virus can survive for many days when dried on surfaces and in feces.

Initial symptoms include fever, myalgia, malaise, chills and cough. Shortness of breath, tachypnea or pleurisy may occur later in the illness course. Less common symptoms include rhinorrhea and sore throat. Profuse watery diarrhea occurs later in the course of illness and is a common feature of the disease. The virus may be shed in large quantities in the stool. One-third of patients improve with resolution of radiographic changes. Two-thirds have persistent fever, oxygen desaturation and worsening of chest signs. In 199 patients hospitalized with probable SARS in Singapore, 23 percent were admitted to the ICU and mortality at 23 days post-onset was 10 percent. Approximately 25 percent of SARS patients progressed to severe respiratory failure. Mild or asymptomatic infections appeared to be rare. There was no reported transmission before the onset of symptoms.

Features which distinguish SARS from other respiratory viruses include: a long incubation period, upper respiratory symptoms were uncommon and the disease was milder in children than adults. There is no evidence that SARS is transmitted more than 10 days after resolution of fever.

RT-PCR of stool and respiratory specimens can be diagnostic. Specimens from the lower respiratory tract are the most useful for viral diagnosis, but productive coughs may not appear until later in the course of illness. Antibody only can be detected after a week of illness. For retrospective diagnosis, testing of acute and convalescent sera by enzyme-linked immunoassay is used. To rule out SARS a convalescent specimen should be collected at least 21 days after illness onset.

The first SARS cases appeared in the world news in February 2003. The global epidemic of SARS occurred primarily in Hong Kong and mainland China from March to June 2003. The first outbreak in Hong Kong occurred in the Prince of Wales Hospital
around March 10, 2003. It resulted in 138 SARS patients (69 percent were hospital workers). Overall in Hong Kong, 360 workers contracted SARS. The attack rate for hospital workers in Hong Kong was 1 percent. Support staff had higher attack rates than nurses or other hospital workers. In the 2003 outbreak, health care facilities and workers were primarily affected. Health care workers comprised 25 percent of cases in Hong Kong and 65 percent in Canada. Sixteen confirmed and two probable cases of SARs were identified in passengers of a plane where a SARS infected person was on-board. Illness was related to the proximity to the index patient, with patients within three rows of the case at most risk. Unrecognized infections were an important source of transmission during the outbreak. In several areas, hospital-acquired infections occurred before community transmission indicating that terminating hospital acquired infection could limit the possibility of community spread. From November 1, 2002, through July 1, 2003, 8,445 cases were reported to the WHO. Countries with cases included China (63 percent), Hong Kong (20 percent), Taiwan (8 percent), Canada (3 percent) and Singapore (2 percent). The U.S. had 0.9 percent of the cases.

Prevention of SARS involves early detection and isolation of patients, public education, contact tracing and contact quarantine to prevent community transmission. Enhanced infection control is important to minimize transmission in hospitals. Respiratory droplet and contact precautions are needed for prevention of nosocomial transmission. When aerosol-generating procedures are being done, airborne transmission precautions should be implemented. For this disease both isolation (the separation of known infected persons for the period of communicability in such places and under such conditions to prevent or limit transmission of infection) and quarantine (the restriction of activities of healthy persons who have been exposed to a communicable disease to prevent disease transmission during the incubation period if infection should occur). In Singapore and Hong Kong electronic tracking systems were used to monitor quarantine and isolation.

The eight case patients with laboratory confirmed SARS-CoV infection in the United States had onsets from February 22 to May 24, 2003. Seven had traveled to an area where community transmission of SARS was taking place in the 10 days prior to onset. One had traveled to one of these areas 13 days prior to onset and had a husband with SARS. All eight patients had lower respiratory tract infection including dyspnea, rales or hypoxia. They all had radiographic evidence of pulmonary infiltrates a median of seven days after symptom onset. Gastrointestinal symptoms were also prominent, including diarrhea and/or vomiting.

On July 5, 2003, WHO declared that the epidemic of SARS was contained. Subsequent to this additional individual cases occurred in 2003 with no person-person transmission. In 2004, three laboratory-acquired cases of SARS occurred. In April 2003 SARS was added to CDC’s list of quarantinable diseases.

**Descriptive Epidemiology**

In Illinois, both state and LHDs participated in the investigation of 50 persons for SARS infection in the spring of 2003. Laboratory specimens were collected on 32 persons and all specimens tested negative for SARS. Although 17 persons were classified as suspect or probable, all but eight persons were removed from the suspect
or probable list once acute and convalescent specimens were tested negative. Of the eight individuals who could not be removed, seven were classified as suspect cases and one as probable. Convalescent specimens could not be obtained on these patients. The LHD’s worked to ensure that proper precautions were taken by health care providers, household contacts and patients.

**Suggested readings**


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 2003, 877,478 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 2003 – 48,294; the overall incidence rate was 389 per 100,000 population. The number of cases increased by 96 percent from 1993 (24,603) to 2003 (48,294) (Figure 72).
- Age – Adolescents and young adults (ages 15 to 24) accounted for 71 percent of reported chlamydia cases in 2003 (Figure 73). The average age of persons reported with chlamydia was 23.
- Gender – Most reported cases were in women 36,284 (75 percent) due to screening efforts that target this group. The female-to-male ratio of reported cases was 3.0: 1.0.
- Race/ethnicity – The racial distribution of cases was 51 percent African
American, 25 percent white, 0 percent Asian/Pacific Islander and Native American and 25 percent other or unknown race.

- 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 (751), Pope (725), St. Clair (669), Champaign (589) and Peoria (568).
- 213,000 chlamydia screening tests were conducted during 2003 with a positivity rate of 8 percent.

Summary
Chlamydia is the most commonly reported sexually transmitted disease in Illinois. Cases were reported from all counties in Illinois during 2003. Adolescents and young adults had the highest incidence rates. Reasons for the increase in cases from 1993 to 2003 include increased testing, improved surveillance and the use of more sensitive diagnostic tests.
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 335,104 cases of gonorrhea in 2003.

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 2003 – 21,817; case rate was 176 per 100,000 population. Reported cases in 2003 were lower than the number reported in 2002 (Figure 74). 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 61 percent of reported cases in 2003 and adolescents (ages 15 to 19) for 28 percent (Figure 75).
- Race/ethnicity – Illinois minorities are disproportionately affected by gonorrhea. The reported cases were 66 percent African American, 11 percent white, less than 1 percent Asian/Pacific Islander and 20 percent other or unknown race.
- Geographic distribution – At least one case of gonorrhea was reported in each of 91 Illinois counties. The five counties with the highest incidence rate in 2003 were Alexander (365), Macon (364), Sangamon (357), St. Clair (342) and Pulaski (313).

Summary
Gonorrhea is the second most commonly reported sexually transmitted disease after chlamydia in Illinois. In Illinois in 2003, 61 percent of cases were in those 15-24 years of age.
Figure 74. Gonorrhea Cases in Illinois, 1998-2003

Figure 75. Age Distribution of Gonorrhea Cases in Illinois, 2003
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.

“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. In 2003, the congenital syphilis rate was similar to 2002.

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

The CDC recorded 7,177 primary and secondary syphilis cases in the United States in 2003. The rate of infection was 2.5 per 100,000 population. In 2003, a total of 413 cases of congenital syphilis were reported.

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 2003 – 21 congenital cases and 374 primary or secondary cases (Figure 76). Primary and secondary cases decreased 22 percent between 2002 and 2003. The incidence rate for 2003 was three per 100,000 population for primary and secondary syphilis and 11 per 100,000 live births for congenital syphilis. Note: CDC summaries show 19 congenital syphilis cases reported from Illinois in 2003. We will use 21 cases in this report.
- Age – The average age of persons diagnosed with primary and secondary syphilis is 36. Persons 25 to 44 years old accounted for 73 percent of primary and secondary cases (Figure 77).
- Gender – 87 percent of cases were male.
- Race/ethnicity – Minorities in Illinois are disproportionately affected by syphilis, especially African Americans, who accounted for 90 percent of the congenital syphilis cases. The proportion of primary and secondary syphilis cases by race were non-hispanic white (40 percent), non-hispanic African American (45 percent), non-hispanic Asian Pacific Islander (1 percent) and other or unknown races (5 percent). Nine percent were Hispanic.
- 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 16 counties. The five highest incidence rates per 100,000 population in counties with at least three cases were Vermilion (11), Cook (6), Winnebago (3), St Clair (3) and Madison (3).
- Clinical presentation – During 2003, there were 24 cases of reported neurosyphilis; 21 (88 percent) of the 2003 cases were in men. Of the 21 males, 57 percent were MSM. Forty-two percent of the neurosyphilis cases were known to be co-infected with HIV.
- Outbreaks – Five local health departments reported outbreaks of syphilis including Lake County, DuPage County, Oak Park, East Side Health District and Madison County.
Summary
Primary and secondary syphilis cases decreased by 22 percent in 2003 compared to 2002. During 2003, white males and African-American females were disproportionately affected by syphilis.

Figure 76. Syphilis Cases in Illinois, 1998-2003

Figure 77. Age Distribution of Syphilis Cases in Illinois, 2003
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 in day care centers are not uncommon and Shigella can be transmitted through unchlorinated wading pools, interactive water fountains, food items such as parsley and bean dip and between men who have sex with men. 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 19 percent of the reported infections in 2003. The incidence rate overall was seven per 100,000 for shigellosis. Eighty-six percent of these cases were due to S. sonnei and 13 percent were S. flexneri. The number of Shigella infections decreased by 25 percent in 2003 at these sites.

In 2003, 11,552 Shigella isolates and 23,581 cases (the latter a slight increase from 2002) were reported to CDC. S. sonnei accounts for 80 percent of shigellosis cases in the United States. About 31 percent of isolates were from children younger than 5 years of age. Ninety-six percent of isolates were subgrouped. Subgroup D (S. sonnei) accounted for the largest percentage of isolates (80 percent), followed by subgroup B (S. flexneri, 14 percent), subgroup C (S. boydii, 1 percent) and subgroup A (S. dysenteriae, 0.3 percent). Illinois had the second largest number by state of Shigella cases reported through the CDC Public Health Laboratory Information System.

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 hand washing 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 hand washing 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.

**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 2003 – 1,006 (five-year median = 1,188; see Figure 78. Overall annual incidence rate was 8.1 per 100,000. The number of shigellosis cases decreased 9 percent in 2003 as compared to 2002.**
- **Age – Median age = 18 (Figure 79). By age group, annual incidence rates per 100,000 were: less than 1 year old, 13; 1-4 years of age, 38; 5-9 years of age, 27; 10-19 years of age, five; 20-29 years of age, six; 30-59 years of age, four; and 60 and older, two.**
- **Gender – 52 percent were female.**
- **Race/ethnicity – 63 percent were white, 36 percent were African American and 1 percent were other races; and 22 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 and 12 percent, respectively).**
- **Seasonal variation – Shigellosis cases occurred in all months of the year with a peak in the months of May and June (Figure 80).**
- **Geographic distribution – One-year incidence rates by county for 1999 to 2003 ranged from 0.5 to 106 per 100,000 population (among counties with cases – 24 counties reported no cases). The five highest annual incidence rates per 100,000 population for this time period were in Stephenson (106), Henderson (49), Crawford (26), Rock Island (24) and Warren (22) counties. Figure 81 shows county incidence for the state.**
- **Serotypes – 90 percent of isolates were serotyped in 2003. The most common species was *S. sonnei* (87 percent of typed isolates), followed by *S. flexneri* (12 percent). *S. boydii* and *S. dysenteriae* each made up less than 1 percent of typed isolates. The boydii serotypes found in Illinois were 2, 4 and 14, and the dysenteriae serotype was 2 (Table 13 and 14). The two most common *S. flexneri* serotypes were 2 (33 cases) and 3 (29 cases) (Table 15). *S. sonnei* does not have subtypes.**
- **Foodborne outbreaks – There were no foodborne outbreaks of shigellosis in 2003.**
- **Person-person outbreaks – There was a community outbreak of shigellosis in Henderson and Warren Counties. Because Warren County does not have a health department, the Henderson County Health Department and IDPH had to fill that role in interviewing those cases, obtaining stool specimens for testing**
and educating cases about the disease and its prevention. At least 20 confirmed cases occurred in the two counties in this outbreak. Another community outbreak in 2003 was a resurgence of an outbreak in Stephenson County that began in November 2002. By the end of the outbreak in July, 248 cases were recorded in 2003 (305 was the total since November 2002), mostly in Freeport. One-third of the cases were students, staff or contacts to persons directly involved with one kindergarten class. *Shigella flexneri* 3 emerged in 2003 in men who have sex with men (MSMs) in Chicago. Twenty of 27 adults males available for interview from January 2003 to September 2004 in Chicago were MSMs.

**Summary**

There were more than 1,000 reported cases of shigellosis in Illinois in 2003. The incidence rate for 2003 of eight per 100,000 was similar to that reported at CDC’s FoodNet sites. The proportion who were Hispanic or African American was higher than the representation of each group in the Illinois population. The median age of cases was 18 years. *S. sonnei* was the most common species found in Illinois, which is the same as the most common species identified in CDC’s FoodNet sites. 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). This is useful in identifying outbreaks.

**Suggested readings**


![Figure 78. Shigella Cases in Illinois, 1998-2003](image-url)
Figure 79. Age Distribution of Shigella Cases in Illinois, 2003

Figure 80. Shigella Cases in Illinois by Month, 2003
Figure 81. One-year Shigellosis Incidence Rates by County for Illinois, 1999-2003

Source: Illinois Department of Public Health
Table 13. Frequency of *Shigella boydii* in Illinois, 1995-2003

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Source: Illinois Department of Public Health

Table 14. Frequency of *Shigella dysenteriae* in Illinois, 1995-2003

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Source: Illinois Department of Public Health
**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 $\leq$ 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 $\geq$ 32 ug/mL as resistant. *S. aureus*-with reduced vancomycin susceptibility (SA-RVS) includes all *S. aureus* isolates with minimum inhibitory concentrations of vancomycin of $\geq$ 4 ug/mL.

Three cases of SA-RVS 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 $\geq$ 4 ug/mL.

Descriptive epidemiology

No cases were reported in 2003.

Summary

No cases were reported in 2003 in Illinois.
**Streptococcus pneumoniae, invasive**

**Background**
*S. pneumoniae* is the most common cause of meningitis, community-acquired pneumonia and bacteremia, and acute otitis media. Pneumococci colonize the nasopharynx of 15 percent to 60 percent of individuals; most remain asymptomatic. Carriage is higher in children attending childcare centers outside the home. The onset of *S. pneumoniae* meningitis is usually sudden with high fever, lethargy and signs of meningeal irritation. It is a sporadic disease in the elderly and in young infants.

The pneumococcal conjugate 7-valent vaccine (6B, 14, 18C, 19F, 23F, 9V, 4) was licensed in the United States in February 2000 and can be used in children younger than 2 years of age. The vaccine protects against the seven strains of pneumococcus that cause 80 percent of the invasive disease among children in the United States. A shortage of vaccine was reported between August 2001 and May 2003.

The Advisory Committee on Immunization Practices (ACIP) recommends that vaccine be given to infants in a series of four injections (at 2, 4, 6 and 12-15 months of age). The recommendation applies to all children younger than 24 months of age and to children 24 to 59 months of age who are at higher risk of infection, including those with certain illnesses (e.g., sickle cell anemia, cochlear implant, immunocompromising condition, chronic heart or lung disease) and those who are Alaska natives, American Indian or African American. The vaccine also can be considered for other children ages 24 to 59 months who are at increased risk, such as children in group day care, those with frequent otitis media or those who are economically or socially disadvantaged.

In national surveillance data from the Behavioral Risk Factor Surveillance data, 57 percent of Illinois residents older than the age of 65 reported having ever received a pneumococcal vaccination.

This year, 2003, was the second complete year for reporting of all forms of invasive *S. pneumoniae* in Illinois. The Healthy People 2010 objectives are to reduce invasive pneumococcal disease to 46 per 100,000 in children younger than 5 years and to 42 per 100,000 in adults aged 65 years or older.

**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 cases reported in Illinois in 2003 – 1,012 (See Figure 82). The incidence rate for 2003 was eight per 100,000.
- Age - Mean age of cases was 52 (see Figure 83 for age distribution). Incidence per 100,000 of reported *S. pneumoniae* in those younger than 5 years of age was 15 and for those aged 65 years and older was 27.
- Gender - 53 percent were female.
- Race/ethnicity - 23 percent were African American and 76 percent were white; 6 percent were Hispanic.
- Seasonal peak – An increase in cases occurred in the winter and spring months (Figure 84).
• Diagnosis – For 998 of the cases with specific information in an IDPH database, *S. pneumoniae* was isolated from blood (952), CSF (62), pleural fluid (23), peritoneal fluid (3), joint (11), and pericardial fluid (0). For some cases, the organism was isolated from more than one site.

• Clinical - The most common types of disease reported were bacteremia alone (33 percent), bacteremia with pneumonia (56 percent), meningitis with or without bacteremia (6 percent) and other with or without bacteremia (4 percent). Ninety percent of cases were hospitalized. Fourteen percent of cases were fatal.

• Underlying conditions-The most common underlying conditions for 998 invasive pneumococcal disease cases was chronic cardiovascular (270) and chronic pulmonary disease (199). There were 168 cases who reported an immunosuppressive condition.

**Summary**

This year was the second complete year for mandatory invasive *S. pneumoniae* reporting. On April 1, 2001, mandatory reporting of invasive *S. pneumoniae* began. In previous years, only meningitis due to *S. pneumoniae* was reportable. According to reported invasive *S. pneumoniae* cases, Illinois already meets the Healthy People 2010 objectives for reducing the incidence of invasive pneumococcal disease.

**Suggested readings**

Figure 83. S. pneumoniae Cases By Age in Illinois, 2003

Figure 84. S. pneumoniae Cases in Illinois by Month, 2003
**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.

Clusters of cases can occur. In New York City, two football players from the same high school team were hospitalized with invasive GAS on the same day. Eight percent of teammates were positive for invasive GAS, but only one had the same GAS strain as a teammate.

During 2003, 1,222 cases of invasive GAS were reported from the Active Bacterial Core Surveillance site projects in nine states. Incidence was highest in children younger than one year of age (5.2 cases per 100,000) and adults greater than 65 years (10.7 cases per 100,000). STSS accounted for 6.5 percent and necrotizing fasciitis accounted for 7.1 percent of cases. The overall case fatality rate was less than 1 percent (0.59). In routine surveillance, 5,872 cases of invasive GAS were reported to CDC and 161 cases of streptococcal TSS. (Note: STSS was not reportable in five states in 2003 and 26 other states reported no cases, including California, New York and Texas. Only Ohio and Pennsylvania among states with populations comparable or larger than Illinois’ reported cases of STSS in 2003.)

**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. The CDC case definition for a confirmed case of streptococcal toxic shock syndrome is hypotension with
involvement of two systems (renal impairment, coagulopathy, liver involvement, acute respiratory distress syndrome, macular rash or soft-tissue necrosis) with isolation of the organism from a sterile site. A probable case of streptococcal toxic shock syndrome would be the same as the confirmed except the site of isolation can be non-sterile.

**Descriptive epidemiology**

- **Number of reported cases in Illinois in 2003** - 349 invasive GAS cases and 68 streptococcal toxic-shock syndrome (five-year median for both combined = 272) (see Figure 85). The incidence rate for 2003 was three per 100,000 population.
- **Age** – Mean age was 55 (Figure 86). By age group, the highest incidence per 100,000 occurred in those older than 79 years of age (16 per 100,000 in that age group), followed by those 70 to 79 years of age (8) and 60 to 69 years of age (7). At least 33 cases were residents of long-term care facilities.
- **Gender** – 50 percent were male.
- **Race/ethnicity** – Cases were 81 percent white, 18 percent African American and 0.5 percent other races; 10 percent occurred among Hispanics.
- **Geographic distribution** – 45 percent were residents of Cook County.
- **Seasonal variation** – From 10 to 15 percent of total cases occurred during each of the months December through April (Figure 87).
- **Positive cultures** – The number of positive cultures by type of specimen were: blood, 317 (87 percent of all cultures); unspecified tissue, 26 (7 percent); synovial fluid, 16 (4 percent); pleural fluid, seven (2 percent); pericardial fluid, six (2 percent); cerebrospinal fluid, three (1 percent) and other sources, 55 (15 percent). Cases may have had positive cultures from more than one site.
- **Two of the invasive GAS cases were described as necrotizing fasciitis and 68 were described as toxic shock syndrome.** In 2003, 339 (95 percent) of cases with the information reported were hospitalized. Signs and symptoms reported by cases included: hypotension, 118 (40 percent); renal impairment, 110 (35 percent); pleural or peritoneal effusion, 74 (31 percent); rash, 55 (18 percent); liver impairment, 70 (28 percent); pneumonia, 57 (17 percent); tissue necrosis, 34 (13 percent); acute respiratory distress syndrome, 29 (11 percent); sore throat, 11 (3 percent); myositis, 16 (5 percent) and septic arthritis, 16 (5 percent). Procedures needed on cases included debridement, 36 (13 percent) and amputation, five (2 percent). Two cases requiring amputation whose diabetic status was known were diabetic.
- **Clinical syndromes** – Where the type of infection was indicated, the following conditions were reported: sepsis - 85 (25 percent); coagulopathy, 54 (18 percent); cellulitis, 111 (32 percent), pneumonia, 57 (17 percent); nonsurgical wound, 51 (15 percent); septic arthritis, 16 (5 percent); osteomyelitis, 5 (2 percent); disseminated intravascular coagulation, 12 (5 percent); postpartum, (1 four (1 percent); meningitis, seven (2 percent); peritonitis, six (2 percent); sepsis with other infection, 88 (26 percent) and other, 25 (7 percent). Cases may have had more than one type of infection.
- **Underlying disease/conditions** – Reported in 221 (65 percent of cases, who may have had more than one) included: diabetes, 0 (36 percent), chronic heart disease, 72 (33 percent); malignancy, 31 (14 percent); non-surgical wounds, 51
(15 percent); immunosuppressive therapy, 26 (12 percent); chronic lung disease, 32 (15 percent); blunt trauma, 37 (17 percent); surgery, 57 (20 percent); stroke, 16 (7 percent); renal dialysis, 18 (8 percent); alcohol abuse, 14 (6 percent); intravenous drug use, eight (4 percent); liver cirrhosis, six (3 percent); vascular disease (including lupus and sickle cell disease), five (2 percent) and organ transplant, one (1 percent). One case reported prior varicella infection.

- **Mortality** - Of 295 reported invasive GAS infections with investigation forms available, 55 were fatal (overall case fatality rate - 19 percent). Eighty percent of the fatalities were in those over 49 years of age.

- **Clusters** – The Chicago Department of Public Health reported two long-term care residents with onsets of illness of invasive GAS within a three-week period in January 2003. Both cases were fatal and both were type emm 11. Six (10 percent) of 60 residents had GAS isolated from throat or gastric tube swabs and three (3 percent) of 86 staff had GAS isolated from throat swabs. Isolates from the staff members were not the same emm type, but all residents’ isolates were type emm 11. A long-term care facility in Rock Island County had four cases of invasive GAS infections from February to April. No PFGE testing results were available on these isolates. Education and reinforcement of handwashing requirements for staff was recommended and done. Long-term care facilities in both Boone County and nearby Winnebago County each had two residents develop invasive GAS infections within a short time of each other over February to April. In each instance, the two cases had matching PFGE patterns, though the two patterns differed from each other. One of the cases at the Winnebago County long-term care facility died of the infection. One of the Boone County cases died, but the GAS infection was not considered the cause of death. During this time period the CDC recommendations regarding testing of long-term care staff for GAS infections/colonization changed. As a result, staff were tested at one long-term care facility, but not at the other facility. Testing found five direct-care staff with GAS colonization in one long-term care facility, but the common PFGE pattern for four of these was not the same as the residents’ PFGE pattern, nor was the PFGE pattern of the fifth the same as the residents’ PFGE pattern. Education and reinforcement of handwashing requirements was recommended and done.

- **Noninvasive GAS cluster in a facility for the developmentally disabled** – From April 17 through September 18, 67 cases of noninvasive GAS occurred in staff and residents of facility for the developmentally disabled in Morgan County. Control measures included a handwashing in-service class with staff to reinforce handwashing, increased environmental cleaning and isolation of cases for 24 hours after antibiotic therapy was initiated.

**Summary**

The number of reported invasive GAS cases continues to rise in Illinois. Forty-six percent of the cases in 2003 were older than 60 years of age. Eighty percent of the fatalities were persons 49 years of age or older.
Suggested readings


Figure 85. Invasive GAS and Streptococcal TSS Cases in Illinois, 1998-2003

Figure 86. Invasive GAS and Streptococcal TSS Cases By Age in Illinois, 2003

Figure 87. Invasive GAS and Streptococcal TSS Cases in Illinois by Month, 2003
**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 2003, 20 cases of tetanus were reported to CDC from 13 states. Four (20 percent) were in persons less than 25 years of age, 10 (50 percent) in those aged 25 to 59 years of age and six (30 percent) in those greater than 59 years of age. Two (10 percent) percent of cases were fatal.

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 reported in Illinois in 2003 – None.

**Summary**

No cases of tetanus was reported in 2003 in Illinois.
Tick-borne diseases found in Illinois

At least 869 species of ticks have been identified in the world. 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.

Five tick-borne diseases have been reported in Illinois residents. These tick-borne diseases are listed in Table 16 and in individual sections of this document. 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 1998 through 2003 for four of these infections that occur regularly in Illinois are shown in Figure 94.

Lyme disease is the only tick-borne disease with significantly increased numbers in 2003 over previous years.

Figure 89. Tick-borne Disease Cases in Illinois, 1998-2003

![Chart showing tick-borne disease cases in Illinois from 1998 to 2003](image-url)
Table 16. Tick-borne Diseases Reported in Illinois Residents

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<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>
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*. MRSA strains have caused TSS in other countries. Most cases have been associated with strains of *Staphylococcus aureus* that produce a special toxin.

**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 2003 – Nine (five-year median = 5). Five were confirmed and four were probable.
- Age – Ages ranged from 10 to 52 years.
- Gender – All nine cases were female.
- Race/ethnicity – All nine cases were white; none were Hispanic.
- Geographic distribution – Cases resided in six different counties, with three cases from DuPage County and two cases from Lake County.
- Symptoms – Rash, vomiting and diarrhea (9 cases each), vomiting (9 cases), fever (7 cases), hypotension and myalgia (6 cases each), abdominal pain (5 cases), vaginal discharge (5 cases), desquamation (4 cases), disorientation (3 cases), injected tongue (2 cases), orthostatic dizziness (1 case) and conjunctival hyperemia (1 case).
- 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 (7), 1999 (5), 2000 (3), 2001 (4) and 2002 (5).

Summary
Nine cases of staphylococcal toxic shock were reported in 2003, and five were considered to be associated with menstruation.

Suggested Readings
Trichinella

Background
Trichinosis is caused by a nematode, Trichinella spiralis. People become infected by consuming undercooked meat containing the cysts of the organism. Initial symptoms of disease include diarrhea, vomiting and nausea that occur within a few days of ingestion. Gastrointestinal symptoms may be absent. In the second phase of illness, which begins one to two weeks after exposure, myalgias, periorbital edema, fever, cough, and cardiac and neurologic complications may occur. Titers to trichinosis rise during the third to sixth week following infection. Eosinophilia is common. Muscle biopsies demonstrating the non-calcified larvae of T. spiralis indicate recent infection. Larvae also may be identified in suspect food. In 2003, six cases of trichinosis were reported to CDC from four states.

United States Department of Agriculture recommends that fresh pork be cooked to an internal temperature of 160 F. Freezing also helps kill T. spiralis. However, wild game Trichinella types can be found in frozen meat from wild animal carcasses.

Case definition
A confirmed case is defined as a clinically compatible case with either a positive serologic test for Trichinella or demonstration of Trichinella larvae in tissue obtained by muscle biopsy.

Descriptive epidemiology
• Number of cases reported in Illinois in 2003 - None.

Summary
No cases of trichinosis was reported in Illinois for 2003.
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 2003, a total of 14,883 cases (5 per 100,000) were reported to CDC. Forty-seven percent were among U.S.-born persons (3 per 100,000 population) and 53 percent were among foreign-born persons (24 per 100,000).

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 *M. tuberculosis* from a clinical specimen, demonstration of *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 2003 – 633 (5 per 100,000 population), a 7 percent decrease from 2002 (Figure 90). TB cases in Chicago decreased to 339 cases (11 per 100,000) an 11 percent decline over 2002.
- Age - The highest incidence of TB occurred in older age groups (Table 17).
- Gender -60 percent were male.
- Race/ethnicity - 37 percent were African American (non-Hispanic), 14 percent white (non-Hispanic), 23 percent Hispanic and 24 percent were Asian or Pacific Islander.
  - The number and percent of foreign-born TB cases increased in 2003 (N=273, or 43 percent) as compared to 2002 (N=265) (Figure 91). Persons born in India, Mexico and the Philippines contributed the largest numbers (62 percent combined) of foreign-born cases in Illinois. Persons born in China, Viet Nam and South Korea (9 percent combined) also were represented among foreign-born cases.
- Risk factors - Excessive use of alcohol (10 percent), non-injection drug use (7 percent), homeless in past 12 months (4 percent), injection drug use, being an inmate in a correctional facility and residing in a long-term care facility (each 1 percent).
- Drug resistance – Twenty-six cases undergoing susceptibility testing were resistant to at least one drug. Twenty-three (4 percent of all cases) of 471 isolates tested were resistant to INH and three (0.47 percent of all cases) were multi-drug resistant.
- Death during anti-TB treatment – 34 (5 percent) of Illinois cases died during treatment in 2003.

**Summary**

In 2003, 633 cases of TB were reported in Illinois with an incidence rate of five per 100,000 which is very similar to the national incidence rate. Illinois was ranked 13th in the nation in terms of incidence of TB. The TB rate in Chicago is still twice the national rate (5 per 100,000) and state rates (5 per 100,000). African Americans have the highest proportion of TB cases among all racial groups. In 2003, African Americans accounted for 54 percent of the Chicago TB cases, with a case rate of 17 per 100,000.

Forty-three percent of these cases were among persons born outside of the United States. An increasing percentage of foreign-born cases is 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. Five percent of Illinois cases died during anti-TB treatment.
Table 17. Age Distribution of Tuberculosis Cases in Illinois, 2003

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence *</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 years</td>
<td>2.9</td>
</tr>
<tr>
<td>5 - 14</td>
<td>1.0</td>
</tr>
<tr>
<td>15 - 24</td>
<td>4.1</td>
</tr>
<tr>
<td>25-44</td>
<td>6.0</td>
</tr>
<tr>
<td>45-64</td>
<td>6.8</td>
</tr>
<tr>
<td>65+</td>
<td>7.2</td>
</tr>
<tr>
<td>All</td>
<td>5.0</td>
</tr>
<tr>
<td>U.S.</td>
<td>5.2</td>
</tr>
</tbody>
</table>

* Incidence per 100,000 based on 2000 population.
Source: Illinois Department of Public Health
Figure 90. Tuberculosis Cases in Illinois, 1998-2003

![Bar chart showing tuberculosis cases in Illinois from 1998 to 2003, with years on the x-axis and number of cases on the y-axis. The chart distinguishes between foreign-born and US-born cases.]

Figure 91. Country of Origin for Foreign-born TB Cases, Illinois, 2003

![Pie chart showing the percentage of foreign-born tuberculosis cases by country of origin in 2003. The largest categories are India at 28% and the Philippines at 21%. Other countries include Mexico, Vietnam, and Rep. of Korea.]
Tularemia

Background

Tularemia is caused by *Francisella tularensis* and is a zoonotic disease that infects vertebrates especially rabbits and rodents. There are four biogroups of tularemia designated as Type A and 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. There are two subspecies of *F. tularensis* in the United States, subspecies tularensis (type A) and subspecies holoartica (type B, previously known as paleartica).

Tularemia can affect many animal species, including prairie dogs, squirrels and cats. The most common modes of transmission are tick bites and handling infected animals. The disease also can spread through ingestion of contaminated water or food, inhalation and insect bites. In Wyoming, an investigation of an increase in cases from 2001 through 2003 showed that insect bites, especially from deerflies and horseflies were the most commonly reported mode of transmission and was associated with an outbreak in rabbits in southwestern Wyoming.

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 U.S. are the American dog tick (*Dermacentor variabilis*), the Lone Star tick (*Amblyomma americanum*) and the Rocky Mountain wood tick (*D. andersoni*).

The incubation period is three to five days. Clinical signs in people include fever, chills, malaise, cough, myalgias, vomiting and fatigue followed by the development of one of six clinical syndromes. Tularemia can be classified into six primary syndromes: ulceroglandular (the most common form), glandular, typhoidal, oculoglandular, oropharyngeal, and pneumonic. The case fatality rate can be 30 percent to 60 percent if untreated and typhoidal. Isolation of *F. tularensis* requires biosafety level three facilities. Tularemia is considered a possible bioterrorism agent. Vaccination is recommended only for limited numbers of persons in high-risk occupations.

In 2003, 129 cases were reported to CDC from 27 states. Only four states reported more than five cases in 2003. On July 1, 2002, it became mandatory in Illinois to forward isolates of *F. tularensis* to the IDPH laboratory.

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 fourfold 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 2003 – One case, which was a confirmed case. The median number of cases per year for the last five years is five.
- Age - The case’s age was 82.
- Gender – The case was male.
- Seasonal variation - The case’s onset of symptoms was in August.
- Geographic distribution – The exposure site for the case was Peoria Co.
- Symptoms/diagnosis/treatment - The case was hospitalized. The case was culture positive and PCR-positive at the IDPH lab.
- Exposures - The case had no known tick bite prior to onset of illness, but mowed a large area regularly where he had noticed mosquito and chigger bites; a tick bite could not be ruled out.

Summary

The number of cases of tularemia decreased from 2002. Most cases in Illinois have onsets during the tick transmission season, but the 2003 case had no known tick bite history.

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 1000 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 four 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 can also 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 2003, 356 typhoid fever cases were reported in the United States. Approximately 74 percent of cases reported international travel in the six weeks before illness. Most cases of typhoid fever in the United States occur among travelers.

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 2003 - 17 (five-year median = 18). One case had onset on December 2002 but was not reported until 2003 and was counted as a 2003 case(see Figure 92).
- Age - Cases ranged in age from 3 to 50 years of age (median = 17 years).
- Seasonal variation - Cases occurred throughout the year. Nine cases were reported from June through August.
- Geographic distribution – 11 cases were Cook County residents.
- Case surveillance reports - The following information was drawn from 14 complete case reports:
  - Citizenship status – Of the 14 cases with case reports, seven cases were known to be citizens of the United States, one was not a citizen and the
status of the other six was unknown.

- Employment - One case was reported to be a food handler.
- Treatment/outcomes
  - 13 of the 14 cases were hospitalized.
  - Drug resistance – Isolates from five patients were tested for drug resistance and no resistance was identified.
  - Vaccination status – One case reported receiving typhoid vaccine within five years of illness onset.
  - Risk factors - No cases were known to have been linked to a typhoid carrier. Travel destinations for imported cases included India (11 cases), Mexico (1) and Pakistan (1). Seven cases were visiting relatives overseas, one was on business travel, one was an immigrant and three were overseas for unstated reasons. One case did not travel, but had relatives from Mexico visit in his home and bring dairy products.

Summary

There were 17 typhoid fever cases reported in Illinois in 2003. Most cases were acquired outside the United States. India was the most common travel destination for those cases who reported travel outside the United States. Most cases were traveling to visit relatives overseas.

Figure 92. Typhoid Fever Cases in Illinois, 1998-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>35</td>
</tr>
<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>
<td>2002</td>
<td>17</td>
</tr>
<tr>
<td>2003</td>
<td>17</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 and 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, two varicella deaths were reported to CDC in 2003.

Illinois implemented school entry requirements for varicella in July 2002. It is required for those entering kindergarten in 2002 and for those entering first grade in 2003. Varicella vaccination is also required of all pre-schools that are run by the school district and which have children aged two or older. In this year, IDPH also required reporting of adult chickenpox (in those older than 20 years of age) to be reported within 24 hours under the Medical Studies Practice Act. Illinois has voluntary reporting of varicella deaths. Permanent rules and regulations are being considered. This reporting was implemented because a case of smallpox in an adult might be misidentified as a case of chickenpox. Reported varicella incidence in Illinois has declined 85 percent from 1995 (N=24,813) to 2003 (N=3,829). The highest rates of disease are among children 5 to 9 years of age, representing 68 percent of cases reported during 1995 and 59 percent of cases in 2003.

In 2003, vaccination coverage rates in the United States among children aged 19-25 months were from 67 percent to 93 percent. Varicella vaccine was licensed in 1995.

Case definition

Physician diagnosed cases are reported to IDPH with a weekly summary from local health jurisdictions. Individual cases are not reported.

Descriptive Epidemiology

- Number of cases – 3,829 (median=12,863) (Figure 93).
- Age - Almost three-quarters of cases occurred in individuals between the ages of five and 14 years.
- Fatalities – No varicella deaths were reported in 2003.
Summary

Varicella (chickenpox) is reportable in aggregate in Illinois and almost 4,000 cases were reported in 2003. The number of reported chickenpox cases has been declining since 1998. No fatal cases were reported in 2003.
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. Yersiniosis became reportable in Illinois on April 1, 2001. Prior to this time, reporting of yersiniosis was voluntary.

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 1.03 percent of the reported infections in data from 2003. The incidence rate per 100,000 for yersiniosis in 2003 data ranged from 0.14 to 0.59 at the nine FoodNet sites.

Case definition
The case definition in Illinois includes only a positive culture for *Yersinia*.

Descriptive epidemiology
- Number of reported cases in Illinois in 2003 - 25 (five-year median = 24) (see Figure 94). The incidence rate per 100,000 was 0.2.
- Age – 11 cases (50 percent of those with age information) occurred in those younger than 5 years of age (Figure 95).
- Gender - 55 percent were female.
- Race/ethnicity - 33 percent were African American, 50 percent white and 6 percent Asian.
- Seasonality – Figure 96 shows the case onsets by month. More cases were reported in December, January, June and July.
- Outcome – For 18 cases with complete case information, eight cases were hospitalized and no cases were reported to be fatal.

Summary
The yersiniosis incidence rate of 0.2 per 100,000 for 2003 in Illinois was similar to that found in the CDC’s FoodNet sites. One-half of cases in 2003 with age information occurred in children younger than 5 years old.
Figure 94. Yersiniosis Cases in Illinois, 1998-2003

Figure 95. Age Distribution of Yersiniosis Cases in Illinois, 2003

Figure 96. Yersiniosis Cases in Illinois by Month, 2003
Other incidents of interest, 2003

Myocarditis cluster

Myopericarditis is a disease characterized by inflammation of the myocardium and pericardium. The most common agents causing this disease in the United States include enteroviruses Group B coxsackievirus and echoviruses. Most cases are idiopathic (without a known etiology). Acute myopericarditis is usually sporadic and occurs in the setting of unexplained heart failure or arrhythmia following a systemic febrile illness or upper respiratory tract infection. Clusters can be reported during outbreaks of viral disease. On March 21, 2003, the Kane County Health Department was notified of six cases of presumptive myocarditis and one case of pericarditis that occurred in patients hospitalized in their county within a two-week period (February 26 to March 10). Five cases were younger than 50 years of age, one of whom died within 24 hours of hospitalization. Five of the cases were hospitalized. Case finding revealed 18 cases-15 myocarditis, two pericarditis and one myopericarditis. All case-patients were hospitalized and admitted between January 28 through April 7, 2003. Fifteen cases (83 percent) were in adults younger than 50 years of age. Among the 18 case patients, four were residents of Kane County; the others were from counties in northeastern Illinois. Fourteen cases (78 percent) had an acute viral-like illness within one month before onset of myocarditis or pericarditis. All case-patients were hospitalized. There were two deaths. No common exposures were identified in case patients. This outbreak was of unknown etiology as testing did not confirm a pathogen. Myocarditis and pericarditis are not notifiable in Illinois, but an increase in incidence of disease of unknown or unusual etiology is reportable.

Suggested readings


Avian Influenza-world wide

In December 2003, avian influenza (H5N1) appeared in domestic and other bird types. Some strains of avian influenza can cause serious disease in persons who have close contact with infected birds. Infection in humans also results in the opportunity for coinfection with bird and human influenza virus, which increases the opportunity for recombination. The three known types of RNA genome in the Orthomyxoviridae family are A, B and C. The surface antigens are hemagglutinin (H) and neuraminidase (N). There are 15 subtypes of the A hemagglutinin antigens and nine subtypes for the neuraminidase antigens. Antigenic drift, when exchange of genetic material takes place between subtypes, can cause influenza pandemics. Avian influenza viruses normally do not infect species other than birds or pigs. The first human to become infected was in 1997 in Hong Kong with the H5N1 strain caused severe respiratory disease in 18 persons. In 2003, in Hong Kong, three members of the same family developed H5N1 disease. In 1999, in Hong Kong, two mild cases of H9N2 and
another case in 2003. To minimize risks from avian influenza, minimizing outbreaks in birds is a priority which would decrease human exposure to the virus. Vaccination of persons who may be exposed to infected birds would decrease the risk of human co-infection with avian and human influenza. Personal protective equipment should be worn by persons slaughtering infected flocks and they should receive antiviral medications.

**Suggested Readings**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number</th>
<th>Disease</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>1,485</td>
<td>HIV</td>
<td>2,537</td>
</tr>
<tr>
<td>Amebiasis cases</td>
<td>86</td>
<td>Legionnaires' disease</td>
<td>50</td>
</tr>
<tr>
<td>Anthrax</td>
<td>0</td>
<td>Leprosy</td>
<td>0</td>
</tr>
<tr>
<td>Arbovirus infection</td>
<td>54 WNV, 0 SLE, 11 LAC, 0 Dengue</td>
<td>Leptospirosis</td>
<td>0</td>
</tr>
<tr>
<td>Aseptic meningitis or encephalitis of unknown etiology</td>
<td>1,212</td>
<td>Listeriosis</td>
<td>24</td>
</tr>
<tr>
<td>Aseptic meningitis or encephalitis of known etiology</td>
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<td>Lyme disease</td>
<td>71</td>
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<td>Blastomycosis</td>
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<td>Malaria</td>
<td>46</td>
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<tr>
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<td>Measles</td>
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<td>Pertussis</td>
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<tr>
<td>Cholera</td>
<td>0</td>
<td>Psittacosis</td>
<td>0</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>102</td>
<td>Q fever</td>
<td>0</td>
</tr>
<tr>
<td><em>Cyclospora</em></td>
<td>0</td>
<td>Rabies, animal</td>
<td>24</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>5</td>
</tr>
<tr>
<td>Ehrlichiosis, human granulocytic</td>
<td>2</td>
<td>Rubella</td>
<td>0</td>
</tr>
<tr>
<td>Ehrlichiosis, human monocytic</td>
<td>6</td>
<td>Salmonellosis</td>
<td>1,955</td>
</tr>
<tr>
<td>Ehrlichiosis, unknown type</td>
<td>0</td>
<td>Shigellosis</td>
<td>1,006</td>
</tr>
<tr>
<td><em>E. coli</em>, shiga toxin producing</td>
<td>124</td>
<td>S. aureus, vancomycin resistant</td>
<td>0</td>
</tr>
<tr>
<td>Foodborne and waterborne outbreaks</td>
<td>62 (2 recreational water)</td>
<td><em>Streptococcus</em>, group A invasive</td>
<td>417</td>
</tr>
<tr>
<td>Giardiasis case</td>
<td>861</td>
<td><em>Streptococcus</em>, group B, invasive</td>
<td>67</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>21,817</td>
<td><em>Streptococcus pneumoniae</em>, invasive</td>
<td>1,012</td>
</tr>
<tr>
<td>Guillain Barre syndrome</td>
<td>0</td>
<td>Syphilis, primary or secondary</td>
<td>374</td>
</tr>
<tr>
<td><em>H. influenzae</em>, invasive disease</td>
<td>109</td>
<td>Tetanus</td>
<td>0</td>
</tr>
<tr>
<td>Hantavirus</td>
<td>0</td>
<td>Toxic shock syndrome</td>
<td>9</td>
</tr>
<tr>
<td>Hemolytic uremic syndrome</td>
<td>5</td>
<td>Trichinosis</td>
<td>0</td>
</tr>
<tr>
<td>Hepatitis A case</td>
<td>186</td>
<td>Tuberculosis</td>
<td>633</td>
</tr>
<tr>
<td>Hepatitis B case</td>
<td>131</td>
<td>Tularemia</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis C case, acute</td>
<td>22</td>
<td>Typhoid fever cases</td>
<td>17</td>
</tr>
<tr>
<td>Histoplasmosis</td>
<td>67</td>
<td>Yersiniosis</td>
<td>25</td>
</tr>
</tbody>
</table>
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. The local health department reports 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 April 1 of the following year. If cases from the preceding year are reported after April 1, they are not included in the preceding year’s numbers. Instead, they are included in the following year’s numbers. 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 2003 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 are counted in malaria 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 past editions of this document was from the 1990 Modified Age-Race-Sex (MARS) data. This is the first infectious disease annual report that has used the 2000 census numbers. According to the U.S. Census Bureau, Illinois’ population grew from 11,430,602 in 1990 to 12,419,293 in 2000. The percentage of the population in the various age groups changed very little between the 1990 MARS data and the 2000 census. However, the racial and ethnic distribution did change substantially between 1990 and 2000. In 1990, the state’s population was 82 percent white, 15 percent African American, 2 percent Asian and 1 percent other or mixed races. 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 accounted for 8 percent of the state's population in 1990; in 2000, this proportion had increased to 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 1998 and the age distribution. Incidence rates were calculated by age for diseases in which more than 150 cases occurred. One-year incidence rates by county were graphed for giardiasis, hepatitis A, salmonellosis and shigellosis. 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 1999 to 2003, it was reached by taking the number of cases reported from 1999 through 2003, dividing by the population and multiplying by 100,000; it was then annualized by dividing by five.

The epidemiologic information presented for each disease is for 2003 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.