



Etiology of Foodborne and Waterborne Outbreaks

by Stephanie Borchardt, M.P.H., Ph.D.

A total of 326 foodborne and waterborne outbreaks were identified in Illinois from 2001 through 2004 (Table 1). The number of outbreaks each year ranged from 60 to 93. An etiologic agent was identified in 71 percent of all outbreaks (range, 59% to 87%). Approximately half of the outbreaks with a known etiology were caused by norovirus. In contrast, nationally in 2003, 1,073 outbreaks of foodborne disease were reported to the U.S. Centers for Disease Control and Prevention (CDC; Atlanta, GA), of which only 38 percent had a confirmed etiology. Thirty-six percent of foodborne outbreaks with a confirmed etiology were caused by a viral agent.¹ The high frequency of outbreaks with a confirmed etiologic agent is a credit to the local health departments and the Illinois Department of Public Health Division of Laboratories and Communicable Disease Control Section and other staff involved in foodborne outbreak investigations.

References

1. U.S. Centers for Disease Control and Prevention. U.S. foodborne disease outbreaks, 2003. Available at http://www.cdc.gov/foodborneoutbreaks/us_outb/fbo2003/summary03.htm. Accessed 25 July 2005.

Table 1. Summary of foodborne and waterborne outbreaks in Illinois 2001 to 2004.

Year	Number of outbreaks	Etiology known No. (%)	Norovirus No. (%)
2001	75	65 (87)	28 (43)
2002	98	58 (59)	33 (57)
2003	60	46 (77)	19 (41)
2004	93	63 (68)	37 (59)
Total	326	232 (71)	117 (50)

Hantavirus

by Connie Austin, D.V.M., M.P.H., Ph.D.

Hantavirus pulmonary syndrome (HPS) was first recognized as a human pathogen in 1993. The first documented outbreak of HPS was reported in June and July of 1993 in the area of the United States known as the "four corners" where Arizona, Colorado, New Mexico and Utah meet. Hantavirus is transmitted to humans when they inhale aerosolized droppings, urine or saliva from infected rodents. The deer mouse (*Peromyscus maniculatus*) is the most common rodent carrier of hantavirus in the Midwest. The common house mouse (*Mus musculus*) does not spread hantavirus. The incubation period is approximately two weeks but can range from a few days to six weeks. Cases in the U.S. often occur in the spring after cleaning of residences and businesses. Cases usually occur sporadically in rural areas where the deer mouse may be present. Two cases of hantavirus have been reported in Illinois, both in northern Illinois. One case occurred in 1996 and the other in 2005. Hantavirus is reportable in Illinois and, upon reporting of a case, an environmental inspection of the possible exposure sites is performed by the local health department.

The first case of hantavirus in Illinois was reported in June 1996 in a 40-year-old man in northwestern Illinois. The exposure was believed to be in or near the residence of the case (peridomestic) where rodents, including deer mice, were present. Six of 46 (13 percent) *Peromyscus* species trapped at the residence were positive for hantavirus.

The 2005 case was a 22-year-old man from north-eastern Illinois who had no travel outside the state and worked and lived at a landscaping business. At the time of the environmental investigation, there was minimal evidence of mouse droppings at the cases work place. However, the business had performed a spring cleanup before the patient's illness. Onset of illness was May 1 and the initial symptoms were vomiting, diarrhea, bleeding from the nose and cough. He was hospitalized and symptoms

progressed to chest pain, difficulty breathing and acute respiratory distress syndrome. The patient also had thrombocytopenia and leukocytosis. The patient did recover and was discharged from the hospital.

From 1993 to May 1, 2005, 387 hantavirus cases were reported in the U.S. from 30 states. Most cases were residents of rural areas and 69 percent of exposures were believed to be peridomestic. Approximately one-third of cases were fatal and most had onset in spring or summer. Prevention and control measures for hantavirus include rodent control (both indoors and outdoors) and careful cleaning of areas with rodent droppings. Rodents should be excluded from dwellings by denying them access to food, such as not storing food on the ground and by proper maintenance of residences. Trapping and use of rodenticides to control rodents are only a supplement to rodent exclusion and appropriate sanitation.

County Corner

Local Health Department Reports of Outbreaks, Studies or Prevention Efforts

Outbreak of *Shigella sonnei* in a Long Term Care Facility (LTCF)

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On September 17, 2004 the Cook County Department of Public Health (CCDPH) Communicable Disease Control Unit was notified by the infection control practitioner (ICP) at Northwest Community Hospital that between September 14 and 17 six residents of a nearby long term care facility (LTCF) had been admitted to the hospital with gastrointestinal illness. The first onset was September 14. Stool cultures for enteric pathogens were obtained from all six patients, four of which tested positive for *Shigella sonnei*.

On September 21, personnel from CCDPHs Communicable Disease Control Unit paid a site visit to the LTCF, an institution for the developmentally

disabled. The CCDPH team met with administrative and clinical staff of the facility to provide recommendations for contact isolation precautions and to emphasize the importance of hand hygiene in controlling the spread of infection. The following specific recommendations were made:

1. Increase availability of alcohol-based hand hygiene preparations and encourage frequent use by staff and ambulatory patients.
2. Furlough all staff with diarrhea and clear for returning to work only upon completion of treatment and a negative stool culture.
3. Cohort residents with *Shigella sonnei* infection and restrict participation in group activities until cleared of the infection.
4. Enforce adherence to policies for environmental cleaning.
5. Assure that guidelines for laundry services are being adhered to.
6. Close the indoor swimming pool until the outbreak has been controlled.
7. Screen food handlers for enteric pathogens.

At the request of the director of the LTCF, the environmental services staff also were also screened for enteric pathogens. CCDPH provided the test kits with direction for specimen pick-up and transportation to the IDPH laboratory for testing. All samples collected from kitchen and environmental cleaning staff tested negative for enteric pathogens.

Retrospective review of *Shigella sonnei* cases reported to CCDPH in a two month period preceding the outbreak revealed that a member of the kitchen staff from the LTCF had tested positive for *Shigella sonnei* on August 12. This individual was cleared for return to work on September 8.

On September 22, CCDPH was notified that two additional residents were admitted to Northwest Community Hospital with illness. However, stool specimens from both patients tested negative for *Shigella sonnei*.

On September 27, two patient care attendants at the LTCF developed diarrhea; one tested positive for *Shigella sonnei*. This individual was restricted from work pending treatment and clearance for returning to duty.

The last reported case of diarrhea in a resident of the LTCF was on September 30. No new cases of gastro-

intestinal illness have been reported since that time. Personnel and residents of the LTCF have resumed their regular activities. The swimming pool was hyperchlorinated and opened for use on October 13.

Editorial note:

In this outbreak, a foodhandler was diagnosed with shigellosis and was appropriately restricted from work until "two consecutive specimens of feces, taken not less than 24 hours apart" were found to be negative (as outlined in the Rules and Regulations for the Control of Communicable Disease Section 690.640). The foodhandler had a stool culture positive on August 12 and returned to work on September 8. However, the first onset date of the outbreak was September 14, suspiciously close to the date of the return to work of the foodhandler. Since the incubation period for infection with *Shigella sonnei* is usually 1 to 3 days and can range from 12 hours to 4 days, is it possible that the outbreak was caused by shedding of *Shigella* in the kitchen worker? It is possible if the kitchen worker continued to shed *Shigella* after return to work and at least through September 10 (four days before the first recognized onset of illness in the outbreak). This is not likely but to establish how unlikely this would be, it is important to review how long can *Shigella* be shed in humans after infection and what factors can affect stool culture results that may have led to negative results in the foodhandler (thus allowing them to return to work) despite ongoing, perhaps intermittent, shedding.

Shigella may be shed in the stool for up to four weeks. If treatment with effective antibiotics are prescribed, this time would likely be much less. Factors that might lead to a negative stool culture result in someone who is shedding *Shigella* include obtaining an insufficient quantity of stool for culture and improper transport or handling of the stool. In addition, based on studies of shigellosis cases involving many stool follow-up specimens, persons with shigellosis may intermittently shed the organism such that one or more samples may be negative followed by a positive sample after that. Persons with shigellosis may also become reinfected but asymptotically shed. If one knew that this foodhandler was responsible for transmission to the first recognized case, this latter explanation would be the most likely because the date of culture for the foodhandler was more than four weeks before the first onset date of the outbreak. Therefore, it is possible that the foodhandler

contributed to this outbreak although the information available does not prove it. It is more likely that the foodhandler was part of a chain of person to person transmission that led to the first recognized case in September but they were unlikely the person who infected that first case.

Surveillance Is Information for Action: Lyme Disease

by Joan Bestudik

Q: What public health action is triggered when a Lyme disease case is reported to the local health department?

A: Lyme disease is a notifiable disease in Illinois. Local public health departments obtain the patient's clinical information from the physician's office to complete a Lyme disease case report form. The initial reports of Lyme disease patients are received from a variety of sources, e.g., laboratories, physicians, self-reports by patients and family members. A current edition of the national public health surveillance case definition, first published in 1990, is used by the Illinois Department of Public Health (IDPH) for classifying cases. IDPH encourages the reporting of all suspect cases of Lyme disease. It should be stressed to readers of these criteria that a national public health surveillance case definition is not intended for use in clinical diagnosis of patients.

Lyme disease (or asymptomatic infection) can result from infection with the bacterium, *Borrelia burgdorferi*, following the bite of an infected blacklegged tick (*Ixodes scapularis*). Symptoms of Lyme disease are seen in humans, dogs, cattle and horses. Studies indicate transmission results after 24 hours or more of tick attachment, which emphasizes the importance of proper tick checks so that ticks can be removed before exposure results in infection. The blacklegged tick also can transmit one form of ehrlichiosis.

A confirmed case of Lyme disease is a patient with the skin manifestation of erythema migrans (EM). EM is an expanding rash that increases in size over a period of several days. It is usually not painful and the center of the rash may clear as it enlarges, resulting in what has been called a bull's-eye appearance. A rash appearing immediately at the site of a tick bite is an allergic reaction to the tick's

saliva from attachment and feeding. EM appears three to 32 days after exposure to the bacterium. The EM must be 5 cm or greater and diagnosed by a physician according to national surveillance criteria (no supportive laboratory testing is needed for a patient to be classified as a case when diagnosed with EM). EM is the symptom most commonly reported in Illinois and nationally, however, not everyone exhibits this rash and not all EM are recognized. A patient also is a case when he/she is objectively diagnosed with one of the following manifestations and has appropriate positive serologic results: acute onset of 2nd-degree or 3rd-degree heart conduction deficits (heart block), lymphocytic meningitis, cranial neuritis (particularly facial palsy that may be bilateral), radiculoneuropathy, encephalomyelitis (rare) or Lyme arthritis. Laboratory diagnosis should consist of a two-test approach; all specimens positive or equivocal by a sensitive EIA or IFA should be tested by a standardized Western immunoblot. Specimens negative by a sensitive EIA or IFA need not be tested further. A positive IgM test result alone is not recommended for use in determining active disease in persons with onset longer than one month prior to testing because the likelihood of a false-positive test result for a current infection is high for these persons. Disseminated or later-stage Lyme disease almost always produces a strong IgG response to *Borrelia burgdorferi* antigens. The local public health authority obtains exposure locale information and information about the patient's activities at the time of exposure directly from the patient (with any missing demographic information needed to complete the report form).

From 1990 to 2004, more than 500 cases of Lyme disease were reported in Illinois residents. Cases are described as follows: 58 percent male, 42 percent female; most cases (33%) occur in 40 to 64 year olds followed by those ages 5 to 14 years old. The warm weather months are when onsets of symptoms are cited most often, with most reported in July, followed by June, August and May.

Concerns resulting from the number of Lyme disease reports in children and youth have resulted in annual spring mailings of the Department's tick awareness poster to licensed youth camps and campgrounds, state parks and local public health authorities. Information is provided to promote precautions against tickborne diseases, including Lyme disease.

During the summer of 2000, physician reports of multiple rashes with an appearance like the Lyme disease rash were received for children attending an Illinois youth camp. Although these patient's serologies were negative for Lyme disease at the CDC, ticks collected from the southern Illinois youth camp where the tick bites occurred, yielded a *Borrelia* presumed to be *Borrelia lonestari* (this is an area where lone star ticks are known to be plentiful) that this was later supported by DNA sequence analysis. The EM-like rash associated with the bite of the lone star tick has come to be called Southern Tick-Associated Rash Illness, also known as STARI. This is a new and emerging infection and there is not an assay available to differentiate presumed STARI patients from those with EM caused by the Lyme disease bacterium. Because STARI patients also can have physician-diagnosed EM of 5 cm or greater, they are included in Lyme disease case totals. It has long been known these rashes were occurring in patients exposed in east central and southern Illinois in areas where the blacklegged tick was not known to be established, but lone star ticks were present. Please visit the CDC STARI website to learn more: <http://www.cdc.gov/ncidod/dvbid/stari/index.htm>. In adults, reports of recreational and peridomestic activities are often associated with Lyme disease patients, e.g., mushroom hunting, camping, hiking and clearing vegetation.

It is not surprising the number of cases continues to increase as persons reside in wooded areas developed for full or part-time residences. Occupational risk also has been cited by some adult cases who work in potential tick habitats, e.g., landscapers, mammalogists and farmers.

During 2003 and 2004, Jo Daviess County reported a dramatic increase of Lyme disease cases. Prior to 2003, this local public health authority reported one to three cases a year. During 2003 and 2004, they reported eight cases and 11 cases, respectively. A Lyme disease educational program for physicians was provided at the Jo Daviess County Health Department to benefit local health care providers who were seeing the vast majority of suspected Lyme disease patients. Other persons in the area also were invited to the program held in early March 2005 (before the time when ground temperatures remain at the level where ticks become active [approximately 40 degrees F]).

Reports of Lyme disease also can be combined with verified identifications of blacklegged ticks to trigger environmental surveillance in areas where these ticks are not previously known to be established. During 2003 and 2004, two blacklegged ticks were submitted from DuPage County; genus and species were verified. This information was combined with two Lyme disease patient reports from 2003 and 2004 citing DuPage County as the probable exposure locale. As a result of a joint effort between the local public health authority, IDPH and persons knowledgeable in environmental tick surveillance, the blacklegged tick was found in two small areas along the east branch of the DuPage River. Numerous American dog ticks also were collected. The American dog tick (*Dermacentor variabilis*) is most often associated with Rocky Mountain spotted fever, but may also transmit tularemia and ehrlichiosis. Many other areas of DuPage County were surveyed with negative findings for the blacklegged tick; a lone star tick was found in one surveyed location. The lone star tick is most often associated with one form of ehrlichiosis and also can transmit tularemia and Rocky Mountain spotted fever. The DuPage County Health Department and IDPH announced the new findings, informational print materials were disseminated and education was provided to reduce the risk of acquiring tick-borne disease.

The Department disseminates Lyme disease materials to the public and other interested parties directly and via local public health authorities. Print material and electronic mailings provide information on human cases and surveillance of the vector. These mailings are sent to hospitals, infectious disease specialists, park and recreation areas, campgrounds and local public health authorities. Health care provider education on Lyme disease and other tickborne diseases that occur in Illinois also has been provided at communicable disease conferences and when physicians have made such a request to their local public health authority. These activities occur in response to reports of Lyme disease in Illinois residents. It is important to remember that prevention measures against Lyme disease also can prevent other tick-borne diseases that can be acquired in Illinois - ehrlichiosis, Rocky Mountain spotted fever and tularemia. These three infections can be fatal if symptoms are not recognized and patients do not receive treatment. More information is available on the IDPH web site by selecting the "a-z topics list" button on the homepage www.idph.state.il.us, which will take you to a list to select the topic of interest.

Factoid

The U.S. Centers for Disease Control and Prevention (CDC) has updated its laboratory reporting guidelines for hepatitis C. Persons testing positive for hepatitis C by immunoassay (e.g. EIA) are considered a confirmed case of hepatitis C if the signal to cut-off ratio is indicative of a true positive according to the recommendations for the EIA test used without the need for confirmatory testing. IDPH is planning to change the reporting rule for hepatitis C to make it consistent with this updated reporting guideline.

Kudos

The afternoon of July 8, 2005, the Madison County Health Department reported suspected foodborne illnesses associated with a party catered by a Madison County restaurant/caterer over the July 4 weekend. The party was reported to be large and held in another county. At least 14 ill persons were initially reported. Most persons attending the party were from Madison County and Macoupin County but ill attendees were believed to include persons from other counties and states. Additionally, a person who took carry-out from the restaurant/caterer July 5 also was reported ill, indicating transmission may have continued after the holiday weekend. Staff of the Madison County Health Department, Macoupin County Health Department and Jersey County Health Department demonstrated their responsiveness to these reports of illness by beginning the investigation Friday, July 8; Madison County Health Department and Macoupin County Health Department continued to work during the weekend. This timely response provided adequate data for analysis of information gathered from attendees at the party before the weekend ended. Fruit salad was statistically associated with illness (relative risk 4.96, 95% CI 2.3 - 10.7). The fruit salad was prepared by the caterer from a frozen fruit mixture, but fresh watermelon was added. Assistance with this investigation also included a member of the IDPH Edwardsville Preparedness and Response staff and the IDPH Division of Infectious Diseases staff in Springfield.

Article Alert

In an effort to keep you updated on recent published infectious disease articles by local or state public health department authors, please be aware of the following:

- Huhn GD, Adam B, Ruden R, Hilliard L, Kirkpatrick P, Todd J, Crafts W, Passaro D, Dworkin MS. Outbreak of travel-related Pontiac Fever among hotel guests illustrating the need for better diagnostic tests. *J Travel Med.* 2005 Jul-Aug;12(4):173-9.
- Huhn GD, Austin C, Langkop C, Kelly K, Lucht R, Lampman R, Novak R, Haramis L, Boker R, Smith S, Chudoba M, Gerber S, Conover C, Dworkin MS. The emergence of west nile virus during a large outbreak in Illinois in 2002. *Am J Trop Med Hyg.* 2005 Jun;72(6):768-76.
- Huhn GD, Gross C, Schnurr D, Preas C, Yagi S, Reagan S, Paddock C, Passaro D, Dworkin MS. Myocarditis outbreak among adults, Illinois, 2003. *Emerg Infect Dis* [serial on the Internet]. 2005 Oct [date cited]. Available from <http://www.cdc.gov/ncidod/EID/vol11no10/04-1152.htm>
- Jones RC, Gerber SI, Diaz PS, Williams LL, Dennis SB, Parish ES, Paul WS. Intensive investigation of bacterial foodborne disease outbreaks: proposed guidelines and tools for the collection of dose-response data by local health departments. *J Food Prot.* 2004 Mar;67(3):616-23.
- Jones RC, Gerber SI, Fernandez JR, Patch F, King P, Diaz PS. Emergence of pork carnitas as a cause of foodborne disease outbreaks in Chicago. *Foodborne Pathog Dis.* 2004 Summer;1(2):120-4.

Upcoming Events

Paul Q. Peterson Grand Rounds Series
The Illinois Department of Public Health and the University of Illinois School of Public Health are pleased to announce the establishment of the Paul Q. Peterson Grand Round Series. Grand rounds will be held once a month as a live Web cast from the auditorium at the University of Illinois School of Public Health in Chicago. In addition, archived copies of the Web cast will be posted at http://www.uic.edu/sph/news_pres.htm a few days after the live program. Check the website for new programs on current public health topics.

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