

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 2007

Introduction

Assessment of the population's health is a core public health function. Surveillance for communicable diseases is one type of assessment. Epidemiologic surveillance is the systematic collection, analysis, and dissemination of health data for the planning, implementation, and evaluation of health programs. The Minnesota Department of Health (MDH) collects information on certain infectious diseases for the purposes of determining disease impact, assessing trends in disease occurrence, characterizing affected populations, prioritizing control efforts, and evaluating prevention strategies. Prompt reporting allows outbreaks to be recognized in a timely fashion when control measures are most likely to be effective in preventing additional cases.

In Minnesota, communicable disease reporting is centralized, whereby reporting sources submit standardized report forms to MDH. Cases of disease are reported pursuant to Minnesota Rules Governing Communicable Diseases (Minnesota Rules 4605.7000 - 4605.7800). The diseases listed in Table 1 (page 2) must be reported to MDH. As stated in the rules, physicians, health care facilities, laboratories, veterinarians and others are required to report these diseases. Reporting sources may designate an individual within an institution to perform routine reporting duties (e.g., an infection control professional for a hospital). Data maintained by MDH are private and protected under the Minnesota

Government Data Practices Act (Section 13.38). Provisions of the Health Insurance Portability and Accountability Act (HIPAA) allow for routine disease reporting without patient authorization.

Since April 1995, MDH has participated as an Emerging Infections Program (EIP) site funded by the Centers for Disease Control and Prevention (CDC) and, through this program, has implemented active hospital- and laboratory-based surveillance for several conditions, including selected invasive bacterial diseases and food-borne diseases.

Isolates for pathogens associated with certain diseases are required to be submitted to MDH (Table 1). The MDH Public Health Laboratory (PHL) performs microbiologic evaluation of isolates, such as pulsed-field gel electrophoresis (PFGE), to determine whether isolates (e.g., enteric pathogens such as *Salmonella* and *Escherichia coli* O157:H7, and invasive pathogens such as *Neisseria meningitidis*) are related, and potentially associated with a common source. Testing of submitted isolates also allows detection and monitoring of antimicrobial resistance, which continues to be an important problem.

Table 2 summarizes cases of selected communicable diseases reported during 2007 by district of the patient's residence. Pertinent observations for some of these diseases are discussed below.

Incidence rates in this report were calculated using disease-specific numerator data collected by MDH and a standardized set of denominator data derived from U.S. Census data. Disease incidence may be categorized as occurring within the seven-county Twin Cities metropolitan area (metropolitan area) or outside of it in Greater Minnesota.

Anaplasmosis

Human anaplasmosis (HA) (formerly known as human granulocytic ehrlichiosis) is caused by *Anaplasma phagocytophilum*, a rickettsial organism transmitted to humans by bites from *Ixodes scapularis* (the blacklegged tick or deer tick). The same tick also transmits the agents of Lyme disease and babesiosis.

In 2007, a record number of 322 HA cases (6.2 per 100,000 population) were reported (Figure 1). This represents an 83% increase from the
continued on page 4

Inside:

**14th Annual Emerging Infections
in Clinical Practice and Public
Health Conference, November
14, 2008, Program and Registra-
tion.....24**

**Antimicrobial Susceptibilities of
Selected Pathogens, 2007.....26**

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health, by District of Residence, 2007

District*
(population per U.S. Census 2007 estimates)

Disease	Metropolitan (2,794,796)	Northwestern (153,381)	Northeastern (320,637)	Central (709,386)	West Central (228,559)	South Central (286,848)	Southeastern (484,905)	Southwestern (219,109)	Unknown Residence	Total (5,197,621)
Anaplasmosis	82	23	45	148	10	3	11	0	0	322
Arboviral disease										
LaCrosse	0	0	0	1	0	0	0	0	0	1
West Nile	19	17	4	6	32	3	2	18	0	101
Babesiosis	8	1	6	5	1	0	3	0	0	24
Campylobacteriosis	463	12	30	130	37	43	130	62	0	907
Cryptosporidiosis	67	4	20	37	29	42	68	35	0	302
<i>Escherichia coli</i> O157 infection	91	3	4	34	7	3	18	5	0	165
Hemolytic Uremic Syndrome	11	0	0	3	1	0	3	0	0	18
Giardiasis	561	7	46	72	23	43	62	16	74	904
<i>Haemophilus influenzae</i> invasive disease	41	7	6	10	2	2	12	2	0	82
HIV infection other than AIDS	200	2	5	10	3	2	7	0	0	229
AIDS (cases diagnosed in 2007)	134	1	6	7	1	4	3	3	0	159
Legionellosis	20	0	1	3	0	3	3	1	0	31
Listeriosis	3	0	0	1	0	2	0	0	0	6
Lyme disease	558	41	109	376	27	18	103	7	0	1,239
Meningococcal disease	11	1	0	4	2	0	4	0	0	22
Mumps	17	0	1	6	0	2	1	1	0	28
Pertussis	297	7	8	16	12	8	45	0	0	393
Salmonellosis	404	13	27	98	16	26	98	30	0	709
Sexually transmitted diseases	11,965	247	860	1,266	189	533	992	373	632	17,057
<i>Chlamydia trachomatis</i> - genital infections	9,028	221	715	1,102	171	491	845	337	502	13,412
Gonorrhea	2,772	26	145	158	16	42	143	34	123	3,459
Syphilis, total	165	0	0	6	2	0	4	2	7	186
Primary/secondary	55	0	0	1	1	0	1	0	1	59
Early latent**	53	0	0	0	0	0	0	0	2	55
Late latent***	57	0	0	5	1	0	3	2	4	72
Congenital	0	0	0	0	0	0	0	0	0	0
Other †	0	0	0	0	0	0	0	0	0	0
Chancroid	0	0	0	0	0	0	0	0	0	0
Shigellosis	171	22	6	17	6	3	6	7	0	238
<i>Streptococcus pneumoniae</i> invasive disease	318	34	54	100	29	48	60	21	0	664
Streptococcal invasive disease - Group A	94	6	18	23	2	8	13	9	0	173
Streptococcal invasive disease - Group B	187	18	24	36	11	13	31	11	0	331
Toxic Shock Syndrome	2	1	3	1	0	0	0	2	0	9
Tuberculosis	187	0	3	13	2	4	24	5	0	238
Viral hepatitis, type A	61	1	2	8	3	2	8	9	0	94
Viral hepatitis, type B (acute infections only, not perinatal)	12	2	1	2	0	3	3	2	0	25
Viral hepatitis, type C (acute infections only)	12	0	6	3	0	2	4	1	0	28
Yersiniosis	8	1	1	4	1	2	7	0	0	24

*Cases for which the patient's residence is unknown are assigned the geographic location of the reporting clinic

**Duration ≤1 year

***Duration >1 year

†Includes unstaged neurosyphilis, latent syphilis of unknown duration, and latent syphilis with clinical manifestations

County Distribution within Districts

Metropolitan - Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington

Northwestern - Beltrami, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Pennington, Polk, Red Lake, Roseau

Northeastern - Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, St. Louis

Central - Benton, Cass, Chisago, Crow Wing, Isanti, Kanabec, Mille Lacs, Morrison, Pine, Sherburne, Stearns, Todd, Wadena, Wright

West Central - Becker, Clay, Douglas, Grant, Mahnomon, Norman, Otter Tail, Pope, Stevens, Traverse, Wilkin

South Central - Blue Earth, Brown, Faribault, LeSueur, McLeod, Martin, Meeker, Nicollet, Sibley, Waseca, Watonwan

Southeastern - Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona

Southwestern - Big Stone, Chippewa, Cottonwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood,

Renville, Rock, Swift, Yellow Medicine

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mid-November and mid-December. Influenza activity peaked in late February/early March 2008. Nationally, a similar activity pattern was seen.

Influenza surveillance in Minnesota relies on reporting of selective individual cases from clinics, hospitals, and laboratories, as well as outbreak reporting from schools and long-term care facilities. The current system for reporting outbreaks has been in place since the 1995-1996 influenza season, and a Sentinel Provider Influenza Network was initiated in 1998-1999 to conduct active surveillance. Twenty-eight sentinel sites participated during the 2007-2008 season. While the program has surpassed its goal of 20 sentinel sites (i.e., one site per 250,000 population), MDH plans to expand the network to ensure sites represent all areas of the state. Clinics are particularly needed in southern region of the state, where coverage is sparse.

MDH requests reports of all suspected or confirmed cases of influenza-related encephalopathy or encephalitis in children <18 years of age, suspected or confirmed influenza-related deaths in children <18 years of age, suspected or confirmed cases of influenza and staphylococcal co-infection, suspected or confirmed influenza in hospitalized pregnant women, and suspected cases of novel influenza. Surveillance initiated in 2003 in the metropolitan area to monitor influenza-related pediatric hospitalizations was continued through the 2007-2008 season. Surveillance for influenza-related adult hospitalizations in the metropolitan area was added in 2005 and continued through the 2007-2008 season. From October 1, 2007 to April 26, 2008, 525 adult and pediatric hospitalizations with lab-confirmed influenza were reported to MDH from hospitals in the metropolitan area.

Three pediatric influenza-related deaths were identified during the 2007-2008 influenza season. Two cases were female and one was male. Cases ranged in age from 5 to 12 years. One case was white, non-Hispanic; one case was white, Hispanic; and one case's race and ethnicity were unknown. Onsets occurred between mid-February and early March 2008. Deaths occurred between late February and mid-March 2008. One case had an underlying health condition. The three cases were not vaccinated for influenza

for that season. Two cases resided in the metropolitan area and one resided in Greater Minnesota. During the 2006-2007 season, six pediatric influenza deaths were reported. Prior to 2006-2007, the last reported pediatric influenza death in Minnesota occurred during the 2004-2005 season.

A probable outbreak of influenza-like illness (ILI) in a school is defined as a doubled absence rate with all of the following primary influenza symptoms reported among students: rapid onset, fever of >101° F, illness lasting 3 or more days, and at least one secondary influenza symptom (e.g., myalgia, headache, cough, coryza, sore throat, or chills). A possible ILI outbreak in a school is defined as a doubled absence rate with reported symptoms among students, including two of the primary influenza symptoms and at least one secondary influenza symptom. During the 2007-2008 season, MDH received reports of probable ILI outbreaks from 135 schools in 44 counties throughout Minnesota and possible outbreaks in 81 schools in 38 counties. A total of 216 schools in 54 counties reported suspected outbreaks in 2007-2008. Since 1988-1989, the number of schools reporting suspected influenza outbreaks has ranged from a low of 38 schools in 20 counties in 1996-1997 to 441 schools in 71 counties in 1991-1992.

An influenza outbreak is suspected in a long-term care facility when three or more residents in a single unit present with a cough and fever (>101° F) or chills during a 48- to 72-hour period. An influenza outbreak is confirmed when at least one resident has a positive culture or rapid antigen test for influenza. One hundred fifteen facilities in 48 counties reported confirmed influenza outbreaks in 2007-2008. In all facilities, influenza was laboratory-confirmed by rapid tests or culture. Since 1988-1989, the number of long-term care facilities reporting ILI outbreaks has ranged from a low of six in 1990-1991 to 140 in 2004-2005.

As of May 5, 2008, 189 (22%) of 869 influenza isolates in the PHL were well-matched to one of the three strains included in the vaccine for the 2007-2008 influenza season, compared to approximately 40% nationally. Of those, 55 (29%) were identified as influenza A/H1, 125 (66%) were identified as influenza A/H3, and 7 (4%) were

identified as influenza B/Malaysia-like. Four hundred twenty isolates (48%) were identified as influenza B/Shanghai-like, a different lineage than the vaccine reference strain. For 30% of isolates in the PHL, a vaccine match could not be determined; it is likely that many of these isolates were antigenically different from strains included in the 2007-2008 vaccine.

The PHL detected one case of influenza A (H1N1) swine influenza in a 26 year-old female. The case was black, non-Hispanic and lived in the metropolitan area. She had no underlying medical conditions and was not vaccinated for the 2007-2008 influenza season. The identification of this case demonstrates the capacity of the PHL to detect novel influenza viruses.

The highly pathogenic avian strain of influenza A (H5N1) continues to circulate in Southeast Asia, Europe, and Africa, causing illness in poultry and humans. The World Health Organization reported on April 8, 2008 that a total of 379 human cases including 239 deaths have been confirmed since January 2003, with an overall case-fatality rate of 63%. Fourteen countries in Asia and Africa have reported human cases of avian influenza. MDH utilizes guidelines developed by the CDC to assess ill patients returning from affected countries. Currently, no cases of H5N1 have been identified in the United States. Although person-to-person spread of H5N1 has likely occurred in situations of very close contact, sustained person-to-person spread has not been demonstrated.

Legionellosis

During 2007, 31 confirmed cases of legionellosis (Legionnaires' disease [LD]) were reported including 19 cases (61%) among residents of the metropolitan area and 12 cases (39%) among Greater Minnesota residents. One (3%) case-patient died. Older adults and elderly persons were more often affected, with 23 (74%) cases occurring among individuals 50 years and older (median age, 57 years; range, 37 to 72 years). Twenty-three (74%) cases had onset dates in June through September. Travel-associated legionellosis accounted for seven (23%) cases, defined as spending at least 1

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Suspect measles cases should be reported to MDH immediately. Blood specimens for IgM serologic testing should be drawn at least 72 hours after rash onset. Testing for measles IgM antibody provides timely results; however, the positive predictive value is suboptimal when disease incidence is low (as it is currently). Multiple tests (including acute and convalescent measles IgG antibody and viral culture) are therefore strongly recommended. Testing for both measles and rubella is routinely recommended for individuals presenting with acute generalized rash and fever. Blood specimens for acute and convalescent IgG serology should be drawn within 4 days of rash onset and again 3 to 5 weeks later, and tested as paired sera. Specimens for viral culture (throat swabs, urine, or nasopharyngeal swabs) should be collected as soon as possible within 10 days of rash onset.

Meningococcal Disease

Twenty-two cases of *Neisseria meningitidis* invasive disease (0.4 per 100,000 population) were reported in 2007, compared to 15 cases in 2006. There were six (27%) serogroup B cases, nine (41%) serogroup C, six (27%) serogroup Y, and one (5%) ungroupable case. In addition, there were five culture-negative suspect cases that were positive by polymerase chain reaction (PCR) in the PHL.

Case-patients ranged in age from 1 to 82 years, with a median of 19 years. Fifty percent of the cases occurred in the metropolitan area. Six (27%) case-patients had bacteremia without another focus of infection and 16 (73%) had meningitis. One individual had two episodes of invasive meningococcal disease. All cases were sporadic, with no definite epidemiologic links. One death occurred; a 5-year-old male died of meningitis attributed to serogroup B.

In January 2005, a meningococcal polysaccharide-protein conjugate vaccine for serogroups A,C,Y, and W-135 (MCV4) was licensed for use in the United States for persons aged 11 to 55 years. In 2007, the license was approved to include 2 to 10 year olds. The Advisory Committee on Immunization Practices and American Academy of Pediatrics recommend immunization with the new vaccine at age 11-12 years, or at high school entry, as well as for college freshmen

living in dormitories, and other groups in the licensed age range previously determined to be at high risk. In 2006, MDH in collaboration with the CDC and other sites nationwide, began a case-control study of the efficacy of MCV4. Eight cases occurred among 11-22 year-olds, including one college student with two episodes of disease and three high school students. One case had serogroup B disease and one had disease caused by an ungroupable isolate that would not have been prevented by the vaccine. There was also a culture-negative, PCR-positive suspected case of serogroup C disease in a high school student. The case-patients in this age group who had serogroup C or serogroup Y disease had not received meningococcal vaccine except for the case-patient with recurrent disease who had received vaccine prior to the second episode of illness.

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Strains of *Staphylococcus aureus* that are resistant to methicillin and all available beta-lactam antibiotics are referred to as methicillin-resistant *S. aureus* (MRSA). Traditional risk factors for healthcare-associated (HA) MRSA include recent hospitalization or surgery, residence in a long-term care facility, and renal dialysis.

In 1997, MDH began receiving reports of healthy young patients with MRSA infections. These patients had onset of their MRSA infections in the community and appeared to lack the established risk factors for MRSA. Although most of the reported infections were not severe, some resulted in serious illness or death. Strains of MRSA cultured from persons without HA risk factors for MRSA are now known as community-associated MRSA (CA-MRSA). CA-MRSA is defined as: a positive culture for MRSA from a specimen obtained <48 hours of admission to a hospital in a patient with no history of prior MRSA infection or colonization; no presence of indwelling percutaneous devices or catheters at the time of culture; and no history of hospitalization, surgery, residence in a long-term care facility, hemodialysis, or peritoneal dialysis in the year prior to the positive MRSA culture.

MDH initiated active surveillance for CA-MRSA at 12 sentinel hospital laboratories in January 2000. The laboratories (six in the metropolitan area and six in Greater Minnesota) were selected to represent various geographic regions of the state. Sentinel sites report all cases of MRSA identified at their facilities and for the first six years of surveillance submitted all CA-MRSA isolates to MDH. The purpose of this surveillance is to determine demographic and clinical characteristics of CA-MRSA infections in Minnesota, to identify possible risk factors for CA-MRSA, and to identify the antimicrobial susceptibility patterns and molecular subtypes of CA-MRSA isolates. A comparison of CA- and HA-MRSA using sentinel site surveillance data from 2000 demonstrated that CA- and HA-MRSA differ demographically and clinically, and that their respective isolates are microbiologically distinct.

In 2007, 3,495 cases of MRSA infection were reported by the 12 sentinel hospital laboratories. Fifty percent (1,761/3,495) of these cases were classified as CA-MRSA; 47% (1,644/3,495) were classified as HA-MRSA; and 3% (90/3,495) could not be classified. CA-MRSA infections increased from 131 cases (12% of all MRSA infections reported) in 2000 to 1,761 cases (50% of total MRSA infections reported) in 2007.

The CDC classifies MRSA isolates into pulsed-field types (PFTs) (currently USA100-1200) based on genetic relatedness. CA-MRSA isolates are most often classified as PFT USA300 or USA400. In Minnesota, the predominant CA-MRSA PFT has changed dramatically over time. In 2000, 63% of CA-MRSA isolates were USA400 and 4% were USA300. In 2006, only 10% of CA-MRSA isolates were USA400 and 78% were USA300. Because USA400 isolates are much more likely than USA300 isolates to demonstrate inducible clindamycin resistance (ICR) on disk diffusion testing, the change in the predominant CA-MRSA PFT has also been associated with a decrease in the proportion of erythromycin-resistant, clindamycin-sensitive CA-MRSA isolates demonstrating ICR, from 93% in 2000 to 10% in 2006.

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confirmed cases, and 87 (22%) met the clinical case definition. Two hundred ninety-seven (76%) of the reported cases occurred in residents of the metropolitan area.

Paroxysmal coughing was the most commonly reported symptom. Three hundred seventy-one (94%) of the case-patients experienced paroxysmal coughing. Nearly one third (108, 27%) reported whooping. Although commonly referred to as "whooping cough," very young children, older individuals, and persons previously immunized may not have the typical "whoop" associated with pertussis. Post-tussive vomiting was reported in 158 (40%) of the cases. Infants and young children are at the highest risk for severe disease and complications. Pneumonia was diagnosed in four (1%) case-patients, two (50%) of whom were less than 18 months of age. Seventeen (4%) case-patients were hospitalized; 11 (65%) of the hospitalized patients were younger than 6 months of age.

Due to waning of immunity from either natural infection or vaccine, pertussis can affect persons of any age. The disease is increasingly recognized in older children and adults. During 2007, case-patients ranged in age from 1 week to 97 years. One hundred thirty-five (34%) cases occurred in adolescents 13 to 17 years of age; 110 (28%) cases occurred in adults 18 years of age and older; 93 (24%) occurred in children 5-12 years of age; 30 (8%) occurred in children 6 months through 4 years of age, and 25 (6%) occurred in infants less than 6 months of age.

Infection in older children and adults may result in exposure of unprotected infants who are at risk for the most severe consequences of infection. During 2007, 30 pertussis cases were reported in infants less than 1 year of age. A likely source of exposure was identified for 14 (47%) cases; nine (30%) were infected by adults 18 years of age and older, two (7%) were infected by a child 13 years of age or older, and three (10%) were infected by a child less than 13 years of age. For the 16 cases with no identified source of infection, the source was likely from outside the household.

Although unvaccinated children are at highest risk for pertussis, fully

immunized children may also develop disease. Disease in those previously immunized is usually mild. Efficacy for currently licensed vaccines is estimated to be 71 - 84% in preventing serious disease. Of the 34 case-patients who were 7 months to 6 years of age, 22 (65%) were known to have received at least a primary series of three doses of DTP/DTaP vaccine prior to onset of illness, 12 (35%) received fewer than three doses and were considered preventable cases.

MDH reporting rules require that clinical isolates of *Bordetella pertussis* be submitted to the PHL. Of the 32 culture-confirmed cases, 27 (84%) of the isolates were received and sub-typed by PFGE and tested for antibiotic susceptibility to erythromycin, ampicillin, and trimethoprim-sulfamethoxazole. Nine distinct PFGE patterns were identified; five of these patterns occurred in only a single case isolate. The most common pattern identified accounted for 15 (56%) of the total isolates and they occurred throughout the year.

No cases of erythromycin-resistant *B. pertussis* have been identified in Minnesota since the first case was identified in 1999. Statewide, all 1,194 other isolates tested to date have had low minimum inhibitory concentrations, falling within the reference range for susceptibility to the antibiotics evaluated. Only eight other erythromycin-resistant *B. pertussis* cases have been identified to date in the United States.

Laboratory tests should be performed on all suspected cases of pertussis. Culture of *B. pertussis* requires inoculation of nasopharyngeal mucous on special media and incubation for 7 to 10 days. However, *B. pertussis* is rarely identified late in the illness; therefore, a negative culture does not rule out disease. A positive PCR result is considered confirmatory in patients with a 2-week history of cough illness. PCR can detect non-viable organisms. Consequently, a positive PCR result does not necessarily indicate current infectiousness. Patients with a 3-week or longer history of cough illness, regardless of PCR result, may not benefit from antibiotic therapy. Cultures are necessary for molecular and epidemiologic studies and for drug susceptibility testing. Whenever

possible, culture should be done in conjunction with PCR testing. Direct fluorescent antibody (DFA), provides a rapid presumptive diagnosis of pertussis; however, because both false-positive and false-negative results can occur, DFA tests should not be relied upon solely for laboratory confirmation. Serological tests are not standardized and are not acceptable for laboratory confirmation at this time.

Salmonellosis

During 2007, 709 culture-confirmed cases of *Salmonella* infection (13.6 per 100,000 population) were reported. This represents a 2% decrease from the 725 cases reported in 2006 but a 13% increase from the median annual number of cases reported from 1996 to 2006 (median, 626 cases; range, 576 to 725) (Figure 2). Of the 99 serotypes identified in 2007, five serotypes, *S. Typhimurium* (152 cases), *S. Enteritidis* (138 cases), *S. Montevideo* (39 cases), *S. Newport* (37 cases) and *S. I 4,5,12:i:-* (37 cases) accounted for 57% of cases. *Salmonella* was isolated from stool in 634 (89%), urine in 37 (5%), and blood in 34 (5%) case-patients. There were eight cases of *S. Typhi* infection. Five of the *S. Typhi* case-patients traveled internationally (India, Laos, Nigeria, and Pakistan) within approximately 3 weeks of their illness onset. Twenty-five percent of salmonellosis case-patients were 12 years of age or younger. Twenty-four percent of case-patients were hospitalized for their infection. Of the 635 case-patients who were interviewed, 107 (17%) traveled internationally during the week prior to their illness onset. A 58-year-old case-patient died; the cause of death was a pulmonary embolism, but *Salmonella* was isolated from a blood specimen 8 days prior to death.

Eighty-seven cases were part of 12 outbreaks of salmonellosis identified in 2007. Nine of the outbreaks involved foodborne transmission, including four outbreaks with cases in multiple states. Three outbreaks involved contact with animals, or food for animals; all three had cases in multiple states.

Ten *S. Tennessee* cases (seven cases in 2007 and three in 2006) with isolates of the same (PFGE) subtype that were part of a national outbreak associated with peanut butter were identified in
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A *S. Schwarzengrund* case in July matched the outbreak PFGE subtype in a multi-state outbreak associated with contact with contaminated dry pet food made by a single manufacturer. The outbreak resulted in 62 cases in 18 states. It is unclear if the Minnesota case had contact with the contaminated pet food.

An outbreak of *S. Enteritidis* infections associated with eating at a Mexican restaurant in Hennepin County was identified in August. Sixteen culture-confirmed and three probable case-patrons ate at the restaurant from August 1 through August 8. Restaurant employees and environmental samples tested negative for *Salmonella*. Eating salsa was associated with illness, but the source of contamination was not identified.

Seven cases of *S. I 4,5,12:i:-* infection with onset of illness from August through October were part of a multi-state outbreak associated with consumption of frozen pot pies. Although not a ready-to-eat food, most cases cooked the products in the microwave. The cooking instructions were confusing and likely inadequate. The implicated pot pies were recalled. Between January and December, 2007, 401 isolates of *S. I 4,5,12:i:-* of the outbreak subtype were collected from ill persons in 35 states.

A *S. Typhimurium* outbreak associated with eating tomatoes at a sandwich restaurant in Olmsted County occurred in October. Eighteen culture-confirmed patron-cases and five probable cases with meal dates at the restaurant from October 1 through October 8 were identified. Two restaurant employees with onsets of illness during the same week in October as the patrons also tested positive for the outbreak subtype of *S. Typhimurium*. Cross-contamination of the tomatoes from foods of animal origin at the restaurant was ruled-out. The tomatoes were likely already contaminated when they entered the restaurant. The restaurant's practice of storing tomatoes at room temperature for ripening before being used may have contributed to amplification of the contamination.

In November, two cases of *S. Newport* infection associated with an office potluck were identified. The investigation identified an additional

nine probable cases that attended the potluck. A specific food vehicle was not identified.

Six *S. Montevideo* cases with isolates of the same PFGE subtype that were identified from September through December 2007, and an additional three cases that were identified from January through March 2008, were part of an outbreak associated with a grocery store deli in Wadena County. The outbreak subtype was the same as that from the earlier outbreak associated with contact with chickens discussed above. The chicken contact outbreak evidently resulted in infection of deli workers; leading to foodborne transmission to deli patrons. Two deli employees tested positive for the outbreak subtype of *S. Montevideo*, and one of the employees owned backyard chickens. Infected foodworkers were the source of contamination. This investigation is ongoing.

Sexually Transmitted Diseases (STDs)

Active surveillance for gonorrhea and chlamydia, initiated in 2002, involves cross-checking laboratory-reported cases against cases reported by clinicians. Although both laboratories and clinical facilities are required to report STDs independently of each other, an episode of STD is not considered a case for surveillance purposes until a corresponding case report is submitted by a clinical facility. Case reports contain demographic and clinical information that is not available from laboratory reports. When a laboratory report is received but no corresponding case report is received within 45 days, MDH mails a reminder letter and case report form to the corresponding clinical facility. Active surveillance for syphilis also began in 2002 and involves immediate follow-up with the clinician upon receipt of a positive laboratory report. Cases of chancroid are monitored through a mostly passive surveillance system. Herpes simplex virus and human papillomavirus infections are not reportable.

Although overall incidence rates for STDs in Minnesota are lower than those in many other areas of the United States, certain population subgroups in Minnesota have very high STD rates. Specifically, STDs disproportionately

affect adolescents, young adults, and persons of color.

Chlamydia

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. In 2007, 13,412 chlamydia cases (273 per 100,000 population) were reported, representing a 4% increase from 2006 (Table 3).

Adolescents and young adults are at highest risk for acquiring chlamydial infection (Table 4). The chlamydia rate is highest among 20 to 24-year-olds (1,592 per 100,000), with the next highest rate among 15 to 19-year-olds (1,071 per 100,000). The incidence of chlamydia among adults 25 to 29 years of age (716 per 100,000) is considerably lower but has increased in recent years. The chlamydia rate among females (390 per 100,000) is more than twice the rate among males (153 per 100,000). This difference is likely due to more frequent screening among women.

The incidence of chlamydia infection is highest in communities of color (Table 4). The rate among blacks (1,871 per 100,000) is over 14 times higher than the rate among whites (130 per 100,000). Although blacks comprise approximately 4% of Minnesota's population, they account for 28% of reported chlamydia cases. Rates among Asian/Pacific Islanders (311 per 100,000), American Indians (504 per 100,000), and Hispanics (646 per 100,000) are two to five times higher than the rate among whites.

Chlamydia infections occur throughout the state, with the highest reported rates in Minneapolis (769 per 100,000) and St. Paul (659 per 100,000). In 2007, the greatest increases for chlamydia were seen in the suburbs and Greater Minnesota with increases of 4% and 8%, respectively.

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. In 2007, 3,459 cases (70 per 100,000 population) were reported, representing an increase of 5% from 2006 (Table 3).

Adolescents and young adults are at greatest risk for gonorrhea (Table 4), with incidence rates of 229 per 100,000
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Minnesota is not likely to decrease in the foreseeable future.

Unexplained Critical Illnesses and Deaths of Possible Infectious Etiology

Surveillance for unexplained critical illnesses and deaths of possible infectious etiology (UNEX) began in September 1995. Any case should be reported, regardless of the patient's age or underlying medical conditions. A subset of cases (persons up to 49 years of age with no underlying medical conditions who died of an apparent non-nosocomial infectious process) are eligible for testing performed at CDC as part a special project. For cases not eligible for the CDC project, some testing may be available at MDH or CDC, at the physician's request.

Sixty-four cases (39 deaths and 25 critical illnesses) were initially reported in 2007, compared to 45 cases in 2006. The cause(s) of illness subsequently were determined for 13 cases and were no longer considered unexplained. Among the remaining 51 cases, 15 presented with neurologic symptoms; 11 case-patients presented with respiratory symptoms; 10 presented with cardiac symptoms; seven presented with shock/sepsis; five presented with sudden unexpected death (SUD); one presented with gastrointestinal (GI) symptoms; one presented with a renal syndrome; and one had an illness that did not fit a defined syndrome. Case-patients with neurological symptoms were 1 to 76 years of age; those with respiratory symptoms ranged from 2 to 54 years of age; those with the cardiac case-patients were 8 days to 52 years of age; those with sepsis were 1 to 54 years of age; the case-patients with SUD were 1 to 53 years of age; the case-patient with GI symptoms was 16 years of age; the case-patient with renal symptoms was 39 years old, and the case-patient without a defined syndrome was 15 years of age. Nine patients with a cardiac syndrome, six patients with sepsis, five patients with respiratory symptoms, two patients with neurologic symptoms, and the patient with a GI syndrome died, as did the patient with a renal syndrome. Twenty-five patients resided in the metropolitan area, 14 case-patients resided in Greater Minnesota, and 12 case-patients were out-of-state residents hospitalized in Minnesota.

Nineteen cases were eligible for the CDC project (five cardiac, four respiratory, three sepsis, three neurologic, two SUD, the GI case, and the renal syndrome case). Specimens were obtained for testing at MDH or CDC for 14 cases. Probable etiologies were established for nine cases. Immunohistochemical (IHC) testing and a viral culture of the lungs were positive for influenza A from a 1 year-old who experienced sudden unexpected death. A viral culture and PCR test of a nasopharyngeal swab was also positive for influenza A. A 2-year-old had influenza A cultured from the lung and spleen and also had a culture and PCR test of the lung that were positive for group A streptococcus. A 10-month-old, a 4-year-old, and a 25 year-old male who died from myocarditis all had positive PCR tests for enterovirus from heart samples. A 44 year-old male who died with a respiratory syndrome had positive PCR tests of lung samples for *Streptococcus pneumoniae*. A 47 year-old male who died with a respiratory syndrome had IHC testing of a lung sample that was positive for *S. pneumoniae*. A 2 year-old who died with a respiratory syndrome had adenovirus type 2 isolated from a viral culture of a nasopharyngeal swab. A 3 year-old who died with shock/sepsis syndrome had a positive PCR test of blood for serogroup C *Neisseria meningitidis*.

Testing was also provided at MDH and/or CDC at the physician's request for 18 of the 32 cases that were not eligible for the CDC project. Positive results were found for four of these cases. All four (a 2 year-old, a 3 year-old, a 17 year-old female, and a 40 year-old female) were hospitalized with culture-negative meningitis and had positive PCR tests of cerebrospinal fluid for serogroup C *N. meningitidis*.

Medical Examiner Surveillance

MED-X is a population-based surveillance program aimed at identifying all infectious disease related deaths that are investigated by medical examiners (MEs). There are three mechanisms in place for case finding. First, as part of the unexplained deaths surveillance (UNEX), MDH reviews all death certificates for deaths due to infectious causes. Second, MDH reviews all death investigation reports at the Minnesota Regional Medical Examiner Office (MRMEO) in Hastings. This office cov-

ers seven counties, including Carver, Chisago, Dakota, Houston, Fillmore, Goodhue, and Scott, which together make up 14.3% of the state population. Lastly, the ME offices actively report cases that have infectious causes or are suspicious for infectious causes and MDH collaborates with them to determine the cause of death. In some instances, these become UNEX cases and may have additional testing done at CDC.

In 2007, MED-X was expanded to include the Hennepin County Medical Examiner's Office and the Midwest Regional Forensic Pathology Office in Anoka, in addition to the MRMEO. Additional counties covered by these two offices include Anoka, Crow Wing, Hennepin, Mille Lacs, Meeker, McLeod, Sibley, and Wright counties. The three ME offices together cover 48% of the state population.

MDH distributes specimen collection kits to the ME offices to help guide the number and type of specimens collected. These specimens are then tested at the facility laboratory or sent to MDH for testing. There were 15 kits distributed in 2007. Use of these kits has continued to improve the quality and number of specimens sent to MDH, which has increased our ability to determine a cause of death.

There were 104 MED-X cases in 2007, and 24 of these were also UNEX cases. Based on MRMEO data, the population-based rate of potential infectious disease related deaths as reported to medical examiners was 5,700 per 100,000 ME cases, which translates to 2,700 per 100,000 total deaths and 12 per 100,000 among the total population. The mean age of the case was 58 years, and 52% were female. The majority of cases were found through death investigation report review (78, [75%]). MEs reported 22 cases (21%), and four (4%) were found through death certificate review. The most common presenting symptom was pneumonia/upper respiratory infection, which was also the most common pathologic finding. In addition, there were 12 cases with myocarditis. Of the 104 cases, 35 (34%) were confirmed to be due to an infectious cause, 58 (56%) were possibly due to infectious cause, nine (9%) were determined to not

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