MINNESOTA DEPARTMENT OF HEALTH
DISEASE CONTROL NEWSLETTER

Volume 35, Number 1 (pages 1-28) January/August 2007

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 2006

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 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 2006 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 GM (Greater Minnesota).

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

In 2006, 176 HA cases (3.4 cases per 100,000) were reported (Figure 1). This represents a 5% decrease from

continued on page 4

Inside:

Table 1. Diseases Reportable to the Minnesota Department of Health

Report Immediately by Telephone

Anthrax (*Bacillus anthracis*) a
Botulism (*Clostridium botulinum*)
Brucellosis (*Brucella* spp.) a
Cholera (*Vibrio cholerae*) a
Diphtheria (*Corynebacterium diphtheriae*) a
Hemolytic uremic syndrome a
Measles (rubeola) a
Meningococcal disease (*Neisseria meningitidis*) (all invasive disease) a, b
Orthopox virus a
Plague (*Yersinia pestis*) a
Poliomyelitis a
Q fever (*Coxiella burnetii*) a
Rabies (animal and human cases and suspected cases)
Rubella and congenital rubella syndrome a
Severe Acute Respiratory Syndrome (SARS)
(1. Suspect and probable cases of SARS. 2. Cases of health care workers hospitalized for pneumonia or acute respiratory distress syndrome.) a
Smallpox (variola) a
Tularemia (*Francisella tularensis*) a
Unusual or increased case incidence of any suspect infectious illness a

Report Within One Working Day

Amebiasis (*Entamoeba histolytica/dispar*)
Anaplasmosis (*Anaplasma phagocytophilum*)
Arboviral disease (including but not limited to, LaCrosse encephalitis, eastern equine encephalitis, western equine encephalitis, St. Louis encephalitis, and West Nile virus)
Babesiosis (*Babesia* spp.)
Blastomycosis (*Blastomyces dermatitidis*)
Campylobacteriosis (*Campylobacter* spp.) a
Cat scratch disease (infection caused by *Bartonella* spp.)
Chancroid (*Haemophilus ducreyi*) c
Chlamydia trachomatis infection c
Coccidioidomycosis
Cryptosporidiosis (*Cryptosporidium* spp.) a
Cyclosporiasis (*Cyclospora* spp.) a
Dengue virus infection
Diphyllobothrium latum infection
Ehrlichiosis (*Ehrlichia* spp.)
Encephalitis (caused by viral agents)
Enteric *E. coli* infection (*E. coli* O157:H7, other enterohemorrhagic [Shiga toxin-producing] *E. coli*, enteropathogenic *E. coli*, enteroinvasive *E. coli*, enterotoxigenic *E. coli*) a
Enterobacter sakazakii (infants under 1 year of age) a
Giardiasis (*Giardia lamblia*)
Gonorrhea (*Neisseria gonorrhoeae*) c
Haemophilus influenzae disease (all invasive disease) a,b
Hantavirus infection
Hepatitis (all primary viral types including A, B, C, D, and E)
Histoplasmosis (*Histoplasma capsulatum*)
Human immunodeficiency virus (HIV) infection, including Acquired Immunodeficiency Syndrome (AIDS) a, d
Influenza (unusual case incidence, critical illness, or laboratory confirmed cases) a, e
Kawasaki disease
Kingella spp. (invasive only) a, b
Legionellosis (*Legionella* spp.) a
Leprosy (Hansen's disease) (*Mycobacterium leprae*)
Leptospirosis (*Leptospira interrogans*)
Listeriosis (*Listeria monocytogenes*) a
Lyme disease (*Borrelia burgdorferi*)
Malaria (*Plasmodium* spp.)
Meningitis (caused by viral agents)
Mumps
Neonatal sepsis, less than 7 days after birth (bacteria isolated from a sterile site, excluding coagulase-negative *Staphylococcus*) a, b
Pertussis (*Bordetella pertussis*) a
Psittacosis (*Chlamydophila psittaci*)
Retrovirus infection
Reye syndrome
Rheumatic fever (cases meeting the Jones Criteria only)
Rocky Mountain spotted fever (*Rickettsia rickettsii*, *R. canada*)
Salmonellosis, including typhoid (*Salmonella* spp.) a
Shigellosis (*Shigella* spp.) a
Staphylococcus aureus (vancomycin-intermediate *S. aureus* [VISA], vancomycin-resistant *S. aureus* [VRSA], and death or critical illness due to community-associated *S. aureus* in a previously healthy individual) a
Streptococcal disease (all invasive disease caused by Groups A and B streptococci and *S. pneumoniae*) a, b
Syphilis (*Treponema pallidum*) c
Tetanus (*Clostridium tetani*)
Toxic shock syndrome a
Toxoplasmosis (*Toxoplasma gondii*)
Transmissible spongiform encephalopathy
Trichinosis (*Trichinella spiralis*)
Tuberculosis (*Mycobacterium tuberculosis* complex) (Pulmonary or extrapulmonary sites of disease, including laboratory confirmed or clinically diagnosed disease, are reportable. Latent tuberculosis infection is not reportable.) a
Typhus (*Rickettsia* spp.)
Unexplained deaths and unexplained critical illness (possibly due to infectious cause) a
Varicella-zoster disease
(1. Primary [chickenpox]: unusual case incidence, critical illness, or laboratory-confirmed cases. 2. Recurrent [shingles]: unusual case incidence, or critical illness.) a
Vibrio spp. a
Yellow fever
Yersiniosis, enteric (*Yersinia* spp.) a

Sentinel Surveillance (at sites designated by the Commissioner of Health)

Methicillin-resistant *Staphylococcus aureus*

a Submission of clinical materials required. If a rapid, non-culture assay is used for diagnosis, we request that positives be cultured, and isolates submitted. If this is not possible, send specimens, nucleic acid, enrichment broth, or other appropriate material. Call the MDH Public Health Laboratory at 651-201-4953 for instructions.

b Isolates are considered to be from invasive disease if they are isolated from a normally sterile site, e.g., blood, CSF, joint fluid, etc.

c Report on separate Sexually Transmitted Disease Report Card.

d Report on separate HIV Report Card.

e For criteria for reporting laboratory confirmed cases of influenza, see www.health.state.mn.us/divs/idepc/dtopics/reportable/index.html.

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health, by District of Residence, 2006

District*
(population per U.S. Census 2006 estimates)

Disease	Metropolitan (2,766,951)	Northwestern (154,634)	Northeastern (321,014)	Central (703,134)	West Central (229,462)	South Central (286,317)	Southeastern (484,154)	Southwestern (221,435)	Unknown Residence	Total (5,167,101)
Anaplasmosis	51	9	21	88	5	0	2	0	0	176
Arboviral disease										
LaCrosse	0	0	0	0	0	1	0	0	0	1
West Nile	15	3	0	8	15	5	0	19	0	65
Babesiosis	7	3	4	3	1	0	0	0	0	18
Campylobacteriosis	441	15	45	119	35	44	138	62	0	899
Cryptosporidiosis	59	1	23	38	21	27	40	33	0	242
Escherichia coli O157 infection	71	2	9	22	1	8	28	76	0	147
Hemolytic Uremic Syndrome	4	0	0	6	0	0	7	2	0	19
Giardiasis	706	15	57	93	10	45	82	24	73	1,105
Haemophilus influenzae invasive disease	56	4	5	8	8	6	6	5	0	98
HIV infection other than AIDS	214	1	3	2	2	4	5	4	2	237
AIDS (cases diagnosed in 2006)	141	0	6	8	0	1	2	4	1	163
Legionellosis	11	0	6	4	0	1	3	1	0	26
Listeriosis	4	0	0	2	0	0	1	0	0	7
Lyme disease	386	69	77	266	18	10	83	4	0	913
Meningococcal disease	6	0	0	1	1	1	3	3	0	15
Mumps	83	0	26	23	3	6	25	14	0	180
Pertussis	163	3	16	57	1	11	63	6	0	320
Salmonellosis	441	16	24	87	35	28	60	34	0	725
Sexually transmitted diseases*	11,716	270	759	1,108	185	444	906	365	675	16,428
Chlamydia trachomatis - genital infections	8,815	245	647	1,013	160	396	811	323	525	12,935
Gonorrhea	2,741	23	110	91	22	46	88	40	142	3,303
Syphilis, total	160	2	2	4	3	2	7	2	8	190
Primary/secondary	45	0	0	0	1	0	1	0	0	47
Early latent**	53	2	0	0	1	0	1	0	0	58
Late latent***	63	0	2	2	1	2	6	2	2	79
Congenital	1	0	0	1	0	0	0	0	0	2
Other	3	0	0	0	0	0	0	0	1	4
Chancroid	0	0	0	0	0	0	0	0	0	0
Shigellosis	215	3	1	11	8	4	12	5	0	259
Streptococcus pneumoniae invasive disease	312	33	50	84	31	37	65	23	0	635
Streptococcal invasive disease - Group A	80	6	20	20	8	12	18	7	0	171
Streptococcal invasive disease - Group B	207	8	14	47	12	23	38	12	0	361
Toxic Shock Syndrome	3	0	0	2	1	0	1	0	0	7
Tuberculosis	166	0	6	9	6	4	22	4	0	217
Viral hepatitis, type A	17	1	1	4	1	0	2	5	0	31
Viral hepatitis, type B (acute infections only, not perinatal)	23	1	2	1	0	2	2	0	1	32
Viral hepatitis, type C (acute infections only)	4	0	2	1	1	1	2	0	0	11
Yersiniosis	6	0	1	3	2	0	10	1	0	23

*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 neurosyphillis

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, Mahnomen, 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

continued...

the record high of 186 cases in 2005 (3.6 per 100,000) but is markedly higher than the median number of cases reported annually from 1995 to 2004 (median, 58 cases; range, 5 to 139). One hundred twelve (64%) case-patients reported in 2006 were male. The median age of case-patients was 58 years (range, 5 to 91 years), nearly 20 years older than the median age of Lyme disease cases. Onsets of HA peaked in June (59 cases [33%]), earlier in the season than Lyme disease because of a shorter incubation period and more abrupt symptoms. In 2006, 41% of HA case-patients were hospitalized for their infection.

HA co-infections with Lyme disease and/or babesiosis can occur from the same tick bite. During 2006, six (3%) HA case-patients also had objective evidence of Lyme disease, and three (2%) had evidence of babesiosis. Because of under-detection, these numbers may underestimate the true frequency of co-infections. The risk for HA is highest in many of the same Minnesota counties where the risk of Lyme disease is greatest, especially Aitkin, Cass, and Crow Wing Counties.

For a discussion of the recent increase in tick-borne disease in Minnesota and the distribution of ticks that transmit HA and other tick-borne diseases, see "Expansion of the Range of Vector-borne Disease in Minnesota" in the March/April 2006 issue (vol. 34, no. 2) of the *DCN*.

Arboviral Disease

LaCrosse encephalitis and Western equine encephalitis historically have been the primary arboviral encephalitides found in Minnesota. During July 2002, West Nile virus (WNV) was identified in Minnesota for the first time. In 2006, WNV cases were reported from 43 states and the District of Columbia; nationwide, 4,269 human cases of WNV disease were reported, including 177 fatalities. The largest WNV outbreaks during 2006 occurred in Idaho (996 cases), Texas (354 cases), and Colorado (345 cases).

In Minnesota, 65 cases of WNV disease were reported in 2006 (the highest total since the 148 cases reported in 2003). Thirty-four (52%) case-patients had West Nile (WN) fever; 23 (35%) had meningitis, and eight (12%) had encephalitis. The median age of all WN case-patients was 50 years (range, 3 to 88 years); WN encephalitis patients were older (median, 76 years; range, 44 to 83 years). Two WN encephalitis patients and one WN meningitis patient (72, 76, and 88 years old, respectively) died from their illness. Forty-two cases (65%) occurred among residents of western and south central Minnesota. The earliest case-patient had onset of symptoms on July 2; the latest on September 22. Similar to previous years, the peak in illness onsets was from July 15 through September 15 (53 [82%] cases).

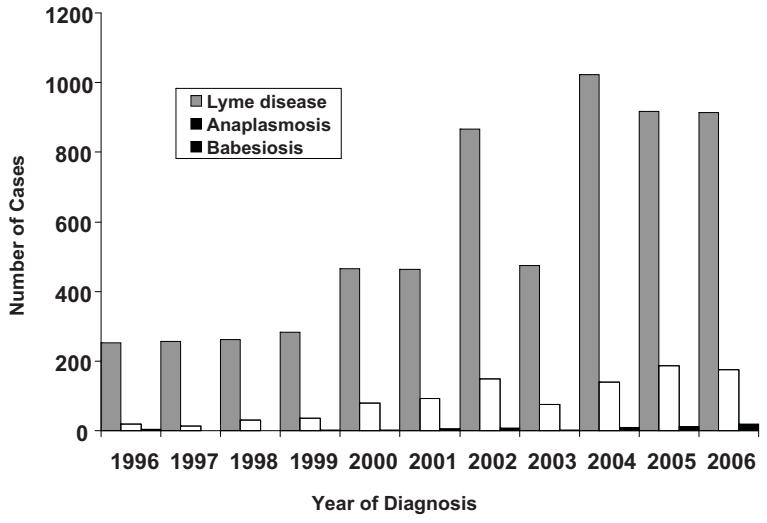
The field ecology of WNV is complex. The virus is maintained in a mosquito-to-bird transmission cycle. Several mosquito and bird species may be involved in this cycle, and regional variation in vector and reservoir species is likely. In 2006, warm spring and summer weather lead to early and efficient amplification of WNV between birds and mosquitoes, likely contributing to the increased incidence of human cases. Interpreting the effect of weather on WNV transmission is extremely complex, leading to great difficulty in predicting how many people will become infected in a given year. WNV appears to be established throughout Minnesota; it will probably be present in the state to some extent every year. The disease risk to humans, however, will likely continue to be higher in central and western Minnesota where the primary mosquito vector, *Culex tarsalis*, is most abundant. Locally acquired cases of WNV disease remain absent in the northeastern third of Minnesota, which corresponds to the region where *Cx. tarsalis* is rare or absent.

During 2006, only one case of LaCrosse encephalitis was reported to MDH. The disease, which primarily affects children, is transmitted through the bite of infected *Aedes triseriatus* (Eastern Tree Hole) mosquitoes. Persons are exposed to infected mosquitoes in wooded or shaded areas inhabited by this mosquito species, especially in areas where water-holding containers (e.g., waste tires, buckets, or cans) that provide mosquito breeding habitats are abundant. From 1985 through 2006, 122 cases were reported from 21 southeastern Minnesota counties, with a median of five cases (range, 1 to 13 cases) reported annually. The median case-patient age was 6 years. Disease onsets have been reported from June through September, but most onsets have occurred from mid-July through mid-September.

Babesiosis

Babesiosis is a malaria-like illness caused by the protozoan *Babesia microti*. This parasite is transmitted to humans by bites from *Ixodes scapularis* (the deer tick or blacklegged tick), the

Figure 1. Reported Cases of Anaplasmosis, Babesiosis, and Lyme Disease, Minnesota, 1996-2006



*Includes 6,175 Lyme disease cases, 996 anaplasmosis cases, and 58 babesiosis cases.

same vector that transmits the agents of Lyme disease and human anaplasmosis (HA). *B. microti* can also be transmitted by blood transfusion.

In 2006, a record number of 18 babesiosis cases (0.4 cases per 100,000) were reported, nearly double the previous high of 10 cases in 2005. This is notably higher than the median number of cases reported annually from 1992 to 2004 (median, 3 cases; range, 1 to 7). Seven (39%) babesiosis case-patients reported in 2006 were male. The median age of case-patients was 60 years (range, 7 to 76 years). The peak in onsets of illness occurred in July and August (11 cases [61%]). In 2006, 69% of case-patients were hospitalized for their infection. One case-patient, whose infection likely occurred through blood transfusion, died from babesiosis in 2006.

Babesiosis co-infections with Lyme disease or HA can occur from the same tick bite, although the majority of babesiosis infections are asymptomatic. During 2006, three (17%) babesiosis case-patients also had objective evidence of Lyme disease, and two (11%) had objective evidence of HA. The risk for babesiosis is highest in many of the same Minnesota counties where the risk of Lyme disease and HA is greatest, especially in east-central and north-central Minnesota and western Wisconsin.

For a discussion of the recent increase in tick-borne disease in Minnesota and the distribution of ticks that transmit *B. microti* and other tick-borne diseases, see "Expansion of the Range of Vector-borne Disease in Minnesota" in the March/April 2006 issue (vol. 34, no. 2) of the *DCN*.

Campylobacteriosis

Campylobacter continues to be the most commonly reported bacterial enteric pathogen in Minnesota. There were 899 cases of culture-confirmed *Campylobacte*r infection reported in 2006 (17.4 per 100,000). This represents a 6.6% increase from the 843 cases reported in 2005, reversing a trend in which the number of *Campylobacter* cases had declined each year since 2000 (Figure 2). The median annual number of cases reported from 2001 to 2005 was 937 (range, 843 to 953). In 2006, 51% of cases occurred in people who resided outside the metropolitan area. Of the 853 *Campylobacter* isolates confirmed and identified to species by MDH, 91% were *C. jejuni* and 8% were *C. coli*.

The median age of case-patients was 33 years (range, 1 month to 93 years). Forty-five percent of cases were between 20 and 49 years of age, and 14% were 5 years of age or younger. Fifty-six percent of cases were male. Thirteen percent of case-patients were hospitalized; the median length of hospitalization was 2 days. Forty-five percent of infections occurred during June through September. Of the 791 (88%) case-patients for whom data were available, 151 (19%) reported travel outside of the United States during the week prior to illness onset. The most common travel destinations were Mexico (n=44), Asia (n=31), Central or South America or the Caribbean (n=34), and Europe (n=23). There were no outbreaks of campylobacteriosis in Minnesota identified in 2006; however, two cases were part of an outbreak in Wisconsin associated with unpasteurized cheese curds.

A primary feature of public health importance among *Campylobacter* cases was the continued presence of *Campylobacter* isolates resistant to fluoroquinolone antibiotics (e.g., ciprofloxacin), which are commonly used to treat campylobacteriosis. In 2006, the overall proportion of quinolone resistance among *Campylobacter* isolates tested was 18% (a slight decline from 2005). However, 60% of *C. jejuni* isolates from patients with a history of foreign travel during the week prior to illness onset, regardless of destination, were resistant to fluoroquinolones. This was also a slight decrease from 2005.

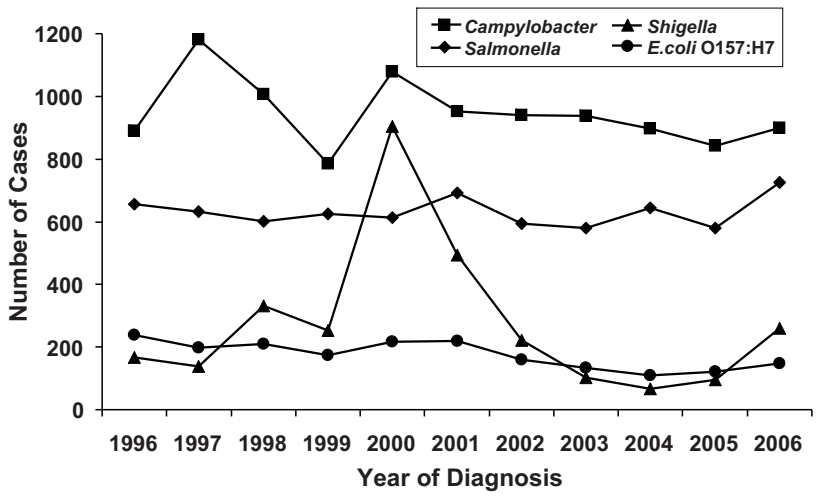
Domestically-acquired quinolone-resistant *C. jejuni* infections have increased in recent years. This increase likely is due largely to the use of fluoroquinolones in poultry (the primary source of *Campylobacter* for humans) in the United States, which began late in 1995. In 2006, as in 2005, 9% of *C. jejuni* isolates from patients who acquired the infection domestically were resistant to fluoroquinolones. Because of the public health risk associated with the use of fluoroquinolones in poultry, the U. S. Food and Drug Administration (FDA) withdrew the approval of enrofloxacin (a veterinary fluoroquinolone) for use in poultry in September 2005.

Cryptosporidiosis

During 2006, 242 confirmed cases of cryptosporidiosis (4.7 per 100,000) were reported. This equals the highest number of cases ever reported in Minnesota, and is 42% higher than the median number of cases reported annually from 1996 to 2005 (median, 170 cases; range, 81 to 242). The median age of case-patients in 2006 was 24 years (range, 1 month to 97 years). Children 10 years of age

continued...

Figure 2. Reported Cases of *Campylobacter*, *Salmonella*, *Shigella*, and *Escherichia coli* O157:H7 Infection, Minnesota, 1996-2006



or younger accounted for 29% of cases. Fifty-one percent of cases occurred during July through October. The incidence of cryptosporidiosis in the Southwestern, West Central, South Central, Southeastern, and Northeastern districts (14.6, 11.4, 9.4, 8.3, and 7.1 cases per 100,000, respectively) was significantly higher than the statewide incidence. Only 59 (24%) reported cases occurred among residents of the metropolitan area (2.1 per 100,000). Forty-three (18%) case-patients required hospitalization, for a median of 4 days (range, 1 to 56 days). Six cases were known to be HIV-infected. One outbreak of cryptosporidiosis was identified in 2006, accounting for 17 laboratory-confirmed cases. This outbreak was associated with multiple school swimming pools.

***Escherichia coli* O157 Infection and Hemolytic Uremic Syndrome (HUS)**

During 2006, 147 culture-confirmed cases of *Escherichia coli* O157 infection (2.8 per 100,000) were reported. Although the number of reported cases represents a 16% decrease from the median number of cases reported annually from 1997 to 2005 (median, 175 cases; range, 110 to 219), it represents a 21% increase from the 121 cases reported in 2005 and the highest count since 2003. Seventy-one (48%) cases occurred in the metropolitan area. Eighty (54%) cases occurred during July through September. The median age of case-patients was 17 years (range, 7 months to 88 years). Sixty-one (41%) case-patients were hospitalized; the median duration of hospitalization was 4 days (range, 1 to 39 days).

Three *E. coli* O157 outbreaks were identified during 2006; all were food-borne. One outbreak occurred in July, resulting in 17 cases, four of which were culture-confirmed. Nine of the cases were hospitalized, three developed hemolytic uremic syndrome (HUS), and one died. The likely source of this outbreak was ready-to-eat foods served at a church smorgasbord that likely had been contaminated by ground beef used simultaneously to prepare meatballs for the event. Some of the cases likely were associated with restaurants that purchased ground beef from the same grocery store that supplied the church. *E. coli* O157:H7 of the rare outbreak PFGE subtype was isolated from beef trimmings from a USDA-inspected plant in the weeks prior to the outbreak, suggesting that the beef was likely already contaminated when received by the store. A second outbreak was identified in August, resulting in three cases, including one case that developed HUS. No deaths occurred. All three cases ate at the same restaurant in the week before their illness. No specific food vehicle was identified, but shredded iceberg lettuce was the only common menu item consumed by all the cases. The third outbreak was associated with shredded iceberg lettuce consumed at restaurants from a fast-food Mexican chain in Minnesota and Iowa in December. This outbreak resulted in 32 cases, including 12 that were culture-confirmed. Eight case-patients were hospitalized and one developed HUS. No deaths occurred. The outbreak strain of *E. coli* O157:H7 was recovered from environmental samples collected from dairy farms near the source fields for the contaminated lettuce in California.

In 2006, 19 HUS cases were reported. There was one fatal case, aged 73 years. From 1997 to 2006, the median annual number of reported HUS cases in Minnesota was 16 (range, 9 to 25), and the overall case fatality rate was 7.4%. In 2006, the median age of HUS case-patients was 5 years (range, 1 to 73 years); 13 of the 19 cases occurred in children. All 19 case-patients were hospitalized, with a median hospital stay of 11 days (range, 3 to 39 days). Eighteen of the 19 HUS cases reported in 2006 were post-diarrheal; one HUS case followed a *Streptococcus pneumoniae* infection. *E. coli* O157:H7 was cultured from the stool of 14 (74%) case-patients. *E. coli* O157 serology was positive in one HUS patient with a negative stool culture. *E. coli* O145:NM was isolated from one case-patient.

Giardiasis

During 2006, 1,105 cases of *Giardia* infection (21.4 per 100,000) were reported. This represents an 11% decrease from the 1,241 cases reported in 2005 and a 5% decrease from the median number of cases reported annually from 1996 through 2005 (median, 1,163, cases; range, 851 to 1,556). Of the total number of *Giardia* cases for 2006, 449 (41%) represented positive tests during routine screenings of recent immigrants and refugees. The median age for all case-patients reported in 2006 was 14 years (range, 1 month to 86 years). The median age among non-immigrant cases was 35 years (range, 1 month to 86 years). As in previous years, cases were clustered among children less than 5 years of age (29%); only 11% of cases were over 50 years of age. Overall, 4% of case-patients were hospitalized; 8% of case-patients over 50 years of age were hospitalized. No outbreaks of giardiasis were identified in Minnesota in 2006.

***Haemophilus influenzae* Invasive Disease**

Ninety-eight cases of invasive *Haemophilus influenzae* disease (1.9 per 100,000) were reported in 2006. Case-patients ranged in age from newborn to 96 years (median, 58 years). Thirty-eight (39%) case-patients had pneumonia, 39 (40%) had bacteremia without another focus of infection, 10 (10%) had meningitis, and 11 (11%) had other conditions. Twelve (12%) deaths were reported among these case-patients.

Of 86 *H. influenzae* isolates for which typing was performed at MDH, 23 (27%) were type f, seven (8%) type e, four (5%) type b, three (3%) type a, two (2%) type c, and 47 (55%) were untypeable.

Four cases of type b (Hib) disease occurred in 2006, compared to one case in 2005, two cases in 2004, and five cases in 2003. Two of the 2006 Hib cases occurred in children <5 years of age: an 8-month-old had not received the Hib vaccination, and a 12- month-old received only one vaccination. One of the children had cellulitis and the other had pneumonia. Of the two adult cases, one had pneumonia and one had bacteremia, but both had significant underlying illness. All of the case-patients survived.

The 12 deaths occurred in patients ranging in age from 18 to 88 years. Five case-patients presented with pneumonia, five with bacteremia without another focus of infection, one with meningitis, and one with a urinary tract infection. Eleven case-patients had *H. influenzae* isolated from blood and one from cerebral spinal fluid. Eight had significant underlying medical conditions. Of the 12 case-patients who died, seven case-isolates were untypeable isolates, three were

serotype f, and two were not available from the hospital lab.

HIV Infection and AIDS

Surveillance for AIDS has been conducted in Minnesota since 1982. In 1985, when the FDA approved the first diagnostic test for HIV, Minnesota became the first state to make HIV infection a name-based reportable condition; 47 states now require name-based HIV infection reporting.

The incidence of HIV/AIDS in Minnesota is moderately low. In 2005, state-specific AIDS rates ranged from 1.0 per 100,000 in Vermont to 32.7 per 100,000 in New York. Minnesota had the 16th lowest AIDS rate (4.4 cases per 100,000). Similar comparisons for HIV (non-AIDS) incidence rates are not possible, because some states only began HIV (non-AIDS) reporting recently.

As of December 31, 2006, a cumulative total of 8,149 cases of HIV infection, 4,986 AIDS cases and 3,163 HIV (non-AIDS) cases have been reported among Minnesota residents. Of the HIV/AIDS case-patients, 2,838 (35%) are known to have died.

The annual number of AIDS cases reported in Minnesota increased steadily from the beginning of the epidemic through the early 1990s, reaching a peak of 370 cases in 1992. Beginning in 1996, the annual number of new AIDS diagnoses, and deaths among AIDS case-patients, declined sharply, primarily due to new antiretroviral therapies, which delay the progression from HIV infection to AIDS and improve survival. In 2006, 163 new AIDS cases (Figure 3) and 58 deaths among AIDS patients were reported.

The annual number of newly diagnosed HIV (non-AIDS) cases reported in Minnesota has increased slightly from 185 in 2003 to 237 in 2006 (a 28% increase). This trend, coupled with improved survival, has led to an increasing number of persons in Minnesota living with HIV or AIDS. Approximately 5,600 persons with HIV/AIDS were residing in Minnesota at the end of 2006.

Historically, and in 2006, nearly 90% (283/318) of new HIV infections (both HIV [non-AIDS] and AIDS at first diagnosis) reported in Minnesota occurred in the metropolitan area. However, HIV or AIDS cases have been diagnosed in residents of more than 80% of counties statewide. HIV infection is most common in areas with higher population densities and greater poverty.

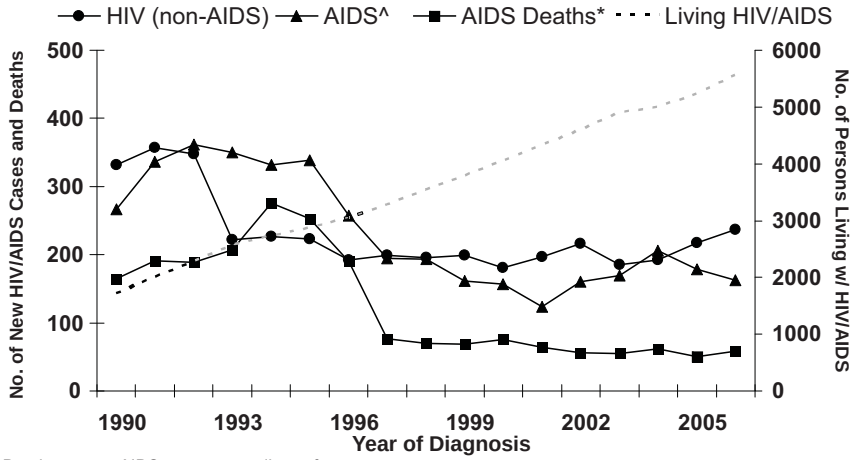
The majority of new HIV infections in Minnesota occur among males. Trends in the annual number of new HIV infections diagnosed among males differ by race/ethnicity. New infections occurred primarily among white males in the 1980s and early 1990s. Although whites still comprise the largest proportion of new HIV infections among males, the number of new infections in this population has decreased since 1991. In contrast to declining numbers of new HIV infections among white males, the decline among U.S.-born black males has been more gradual, falling from a peak of 81 new infections in 1992 to 36 new infections in 2006. The number of HIV infections diagnosed among Hispanic males increased substantially in the past year, from 17 in 2005 to 37 in 2006. The number of new infections among African-born males has decreased over the past 3 years, with 18 new infections diagnosed in 2006.

Females account for an increasing percentage of new HIV infections, from 10% of new infections in 1990 to 28% over the past few years. Trends in HIV infections diagnosed annually among females also differ by race/ethnicity. Early in the epidemic, whites accounted for the majority of newly diagnosed infections in women. Since 1991, the number of new infections among women of color has exceeded that of white women. The annual number of new HIV infections diagnosed among U.S.-born black females had remained stable at 20 or fewer cases during 2001 to 2004, but increased to 28 new cases in each of the past 2 years. In contrast, the number of new infections among African-born females increased greatly from four cases in 1996 to 41 in 2002. However, since 2002 the number of new HIV infections in African-born females has decreased steadily, with 18 new cases diagnosed in 2006. The annual number of new infections diagnosed among Hispanic, American Indian, and Asian females is small, with 10 or fewer cases annually in each group.

Despite relatively small numbers of cases, persons of color are disproportionately affected by HIV/AIDS in Minnesota. In 2006, non-white men comprised approximately 12% of the male population in Minnesota and 45% of new HIV infections among men. Similarly, persons of color comprised approximately 11% of the female population and 68% of new HIV infections among women. It bears noting that race is not considered a biological cause of disparities in the occurrence of HIV, but instead race is a marker for other risk factors, including lower socioeconomic status and education.

continued...

Figure 3. HIV/AIDS in Minnesota: Number of New Cases, Prevalent Cases, and Deaths by Year, 1990-2006



*Deaths among AIDS cases, regardless of cause.

^Includes refugees in the HIV+ Resettlement Program diagnosed with AIDS subsequent to their arrival in the United States.

Since the beginning of the HIV epidemic, male-to-male sex has been the predominant mode of exposure to HIV reported in Minnesota, although the number and proportion of new HIV infections attributed to men who have sex with men (MSM) has declined since 1991. In 1991, 69% (324/470) of new HIV infections were attributed to MSM (or MSM who also inject drugs); in 2005, this group accounted for 48% of new infections (154/318). However, current attitudes, beliefs, and unsafe sexual practices documented in surveys among MSM nationwide, and a current epidemic of syphilis among MSM documented in Minnesota and elsewhere, warrant concern. Similar to syphilis increases in other U.S. cities and abroad, nearly 40% of the recent syphilis cases in Minnesota among MSM were co-infected with HIV, some for many years. "Burn out" from adopting safer sexual practices and exaggerated confidence in the efficacy of HIV treatments may be contributors to resurging risky sexual behavior among MSM. CDC recommends annual screening for sexually transmitted diseases (including HIV and syphilis) for sexually active MSM and more frequent screening for MSM who report sex with anonymous partners or in conjunction with drug use.

The number and percentage of HIV infections in Minnesota that are attributed to injection drug use has declined over the past decade for men and women, falling from 17% (80/470) of cases in 1991 to 4% (13/318) in 2006. Heterosexual contact with a partner who has or is at increased risk of HIV infection is the predominant mode of exposure to HIV for women. Eighty percent of 90 new HIV diagnoses among women in 2006 can be attributed to heterosexual exposure after re-distributing those with unspecified risk (Lansky A, et al. A method for classification of HIV exposure category for women without HIV risk information. *MMWR* 2001; 50[RR-6]:29-40).

Historically, race/ethnicity data for HIV/ AIDS in Minnesota have grouped U.S.-born blacks and African-born persons together as "black." In 2001, MDH began analyzing these groups separately, and a marked trend of increasing numbers of new HIV infections among African-born persons was observed. In 2006, there were 36 new HIV infections reported among Africans. While African-born persons comprise less than 1% of the state's population, they accounted for 11% of all HIV infections diagnosed in Minnesota in 2006. Until recently, culturally specific HIV prevention messages have not been directed to African communities in Minnesota. Taboos and other cultural barriers make it challenging to deliver such messages and to connect HIV-infected individuals with prevention and treatment services. However, in 2005, several African agencies were awarded HIV prevention funds to initiate and in some cases continue prevention programs in these communities. Additionally, collaborations between MDH, the Minnesota Department of Human Services, and community-based organizations serving African-born persons in Minnesota are continuing to address these complex issues.

Influenza

On December 7, 2006, the Public Health Laboratory isolated influenza virus from a Minnesota resident for the first time during the 2006-07 influenza season. This date represented an average start of influenza activity. Since 1990-91, the first isolate typically has been between mid-November and mid-December. Influenza activity peaked in early February 2007. 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 1995-96 influenza season, and a Sentinel Provider Influenza Network was initiated in 1998-99 to conduct active surveillance. Thirty sentinel sites participated during the 2006-07 season. While the program has surpassed its goal of 20 sentinel sites (i.e., one site per 250,000), MDH plans to expand the network to ensure sites represent all areas of the state. Clinics are particularly needed in northern and southern areas 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 2006-07 season. Surveillance for influenza-related adult hospitalizations in the metropolitan area was added in 2005 and continued through the 2006-07 season.

Six pediatric, influenza-related deaths were identified during the 2006-07 influenza season. All six cases were male. Cases ranged in age from 17 months to 8 years. Four cases were white, non-Hispanic; one case was white, Hispanic; and one case was Asian. Onsets occurred between mid-January and late February 2007. Deaths occurred between late January and late February 2007. Three cases had underlying health conditions. Five cases were not vaccinated for influenza for that season. Three cases resided in the metropolitan area and three resided in greater Minnesota. Prior to 2006-07, the last reported pediatric influenza death in Minnesota occurred during the 2004-05 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 >101º 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 2006-07 season, MDH received reports of probable ILI outbreaks from 209 schools in 57 counties throughout Minnesota and possible outbreaks in 124 schools in 52 counties. A total of 333 schools in 73 counties reported suspected outbreaks in 2006-07. Since 1988-89, the number of schools reporting suspected influenza outbreaks has ranged from a low of 38 schools in 20 counties in 1996-97 to a high of 441 schools in 71 counties in 1991-92.

An ILI outbreak is suspected in a long-term care facility when three or more residents in a single unit present with a cough and fever (>101º F) or chills during a 48- to 72-hour period. An ILI outbreak is confirmed when at least one resident has a positive culture or rapid antigen test for influenza. Twelve facilities in 10 counties reported confirmed influenza outbreaks in 2006-07. In all 12 facilities, influenza was laboratory-confirmed by rapid tests or culture. Since 1988-89, the number of long-term care facilities reporting ILI outbreaks has ranged from a low of six in 1990-91 to a high of 140 in 2004-05. Influenza surveillance statistics for Minnesota are available at http://www.health.state.mn.us/divs/idepc/diseases/flu/stats/index.html.

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 (WHO) reported on September 10, 2007 that a total of 328 human cases including 200 deaths have been confirmed since January 2003, with an overall case-fatality rate of 61%. Twelve countries in Asia and Africa have reported human cases of avian influenza. Minnesota utilizes guidelines developed by the CDC to assess ill patients returning from affected countries. Currently, no cases of H5N1 have been identified in Minnesota or 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. A comprehensive draft Minnesota Pandemic Influenza Plan is available at http://www.health.state.mn.us/divs/idepc/diseases/flu/pandemic/plan/plan.html.

Legionellosis

During 2006, there were 27 confirmed cases of legionellosis (Legionnaires' disease [LD]) reported. This included 11 cases (41%) among residents of the metropolitan area and 16 cases (59%) among Greater Minnesota residents. Four (15%) case-patients died. Older adults and elderly persons were more often affected, with 20 (74%) cases occurring among individuals aged 50 years and over (median age, 56 years; range, 31 to 85 years). Ten (37%) cases reported onset dates in June through September. Travel-associated legionellosis accounted for 14 (52%) cases, defined as spending at least 1 night away from the case's residence in the 10 days before onset of illness.

Confirmed LD case criteria includes X-ray confirmed pneumonia and positive results for one or more of the following tests: culture of *Legionella* sp., or detection of *L. pneumophila,* serogroup 1 infection by *Legionella* urinary antigen, direct fluorescent antigen, or by acute and convalescent antibody titers with a four-fold or greater rise to ≥1:128. A single antibody titer at any level is not of diagnostic value for LD. For detection of LD, the Infectious Diseases Society of America treatment guidelines for community-acquired pneumonia recommend urinary antigen assay and culture of respiratory secretions on selective media (http://www.journals.uchicago.edu/CID/journal/issues/v37n11/32441/32441.html). Culture is particularly useful because environmental and clinical isolates can be compared by molecular typing in outbreaks and in investigations of healthcare-associated LD.

Starting in 2005, CDC recommended routine assessment of travel history among LD cases so that travel-associated LD clusters or outbreaks could be more readily and quickly detected. Clinical guidance on legionellosis and other resources can be found at: http://www.cdc.gov/legionella/index.htm.

Listeriosis

Seven cases of listeriosis were reported during 2006. Five case-patients were hospitalized, and one died. The median age of case-patients was 63 years (range, 53 to 81 years). Four had *Listeria monocytogenes* isolated from blood, two from stool, and one from a liver cyst. Two of the cases were identified as part of an investigation of a foodborne outbreak of febrile gastroenteritis. All five of the non-outbreak cases had underlying medical conditions.

The seven cases reported in 2006 is similar to the median annual number of cases reported from 2000 through 2005 (median, 6 cases; range, 4 to 15).

A foodborne outbreak of febrile gastroenteritis caused by *L. monocytogenes* was associated with eating at a restaurant in Dakota County in June. Two cases reported diarrhea, abdominal cramping, chills, fever (101º F and 103.4º F), and severe body aches 25 hours and 30 hours after eating together at the restaurant. The duration of illness for both cases was greater than 7 days. Stool specimens for both cases were positive for *L. monocytogenes*, and the isolates had indistinguishable PFGE patterns. Both cases reported eating chicken taco salad. A specific ingredient was not implicated. Although environmental samples at the restaurant tested negative for *Listeria*, numerous critical food-handling violations were noted at the restaurant which likely contributed to the outbreak.

Elderly persons, immunocompromised individuals, pregnant women, and neonates are at highest risk for acquiring listeriosis. Listeriosis generally manifests as meningoencephalitis and/or septicemia in neonates and adults. Pregnant women may experience a mild febrile illness, abortion, premature delivery, or stillbirth. In healthy adults and children, symptoms usually are mild or absent. *L. monocytogenes* can multiply in refrigerated foods.

Lyme disease

Lyme disease is caused by *Borrelia burgdorferi*, a spirochete transmitted to humans by bites from *Ixodes scapularis* (the deer tick or blacklegged tick). The same tick vector also transmits the agents of human anaplasmosis (HA) and babesiosis.

In 2006, 913 confirmed Lyme disease cases (17.7 cases per 100,000) were reported (Figure 1). This is similar to the 918 cases (17.9 per 100,000) in 2005 and the record number of 1,023 cases (20.0 per 100,000) in 2004. The frequency of Lyme disease since 2004 has been considerably higher than the median number of cases reported annually from 1996 through 2003 (median, 374 cases; range, 252 to 866). In 2006, an additional 24 cases were classified as probable Lyme disease. Five hundred twenty-eight (58%) confirmed case-patients in 2006 were male. The median age of case-patients was 40 years (range, <1 to 98 years). Physician-diagnosed erythema migrans was present in 719 (79%) cases. Two hundred fifteen (24%) cases had at least one late manifestation of Lyme

continued...

disease (including 176 with a history of objective joint swelling and 28 with cranial neuritis) and confirmation by a positive immunoglobulin G antibody test. Onsets of illness peaked in July (44% of cases), corresponding to the peak activity of nymphal *Ixodes scapularis* in mid-May through mid-July.

Lyme disease co-infections with HA and babesiosis can occur from the same tick bite. During 2006, six (1%) Lyme disease case-patients also had objective evidence of HA, and two (<1%) had objective evidence of babesiosis. Because of under-detection, these numbers may underestimate the true frequency of co-infections.

Most Lyme disease case-patients in 2006 either resided in or traveled to endemic counties in east-central Minnesota or western Wisconsin. As in 2006, Crow Wing County continued to have the highest number of Lyme disease case exposures (103 [19%] of 444 cases who reported a single county of exposure). Three hundred eighty-six (42%) cases occurred among residents of the metropolitan area. However, a minority of these residents (47 [19%] of 248 case-patients with known exposure) were likely exposed to infected *I. scapularis* in the metropolitan area, primarily Anoka and Washington Counties. Risk for Lyme disease continues to be high in certain counties at the northern and western edges (Becker, Beltrami, Clearwater, Hubbard, and Itasca Counties) and southeastern edge (Houston County) of Minnesota's endemic area. About half of Lyme disease case-patients in 2006 (285 [53%] of 541 cases with a known activity) were exposed to deer ticks while on vacation, visiting cabins, hunting, or during outdoor recreation.

For a discussion of the recent increase in tick-borne disease in Minnesota and the distribution of ticks that transmit Lyme disease and other tick-borne diseases, see "Expansion of the Range of Vector-borne Disease in Minnesota" in the March/April 2006 issue (vol. 34, no. 2) of the *DCN*.

Measles

One case of measles was reported during 2006. The case was confirmed by both viral culture and a positive IgM serologic test for measles. The case-patient was a 7-month-old infant adopted from Africa and residing in the metropolitan area. The child had arrived in the United States 9 days prior to rash onset and was therefore considered an international importation. The child was too young to have been vaccinated.

No secondary cases were identified despite numerous exposures just prior to and during the infant's measles prodrome. Exposure notification and follow-up were conducted at a large middle school and at the child's primary care clinic. The lack of measles transmission indicates a highly protected population.

This was the first case of measles reported in Minnesota since 2002, when two unrelated cases occurred, a 29-year-old female visiting from the Ukraine, and an 8-month-old infant returning from an extended stay in the Philippines. Neither of these cases resulted in secondary transmission.

Although rare in Minnesota and the United States, measles continues to cause significant morbidity and mortality worldwide. Imported cases of measles can result in outbreaks, particularly in unvaccinated population groups; therefore, continued vigilance with regard to disease surveillance and immunization is essential to prevent measles resurgence.

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 provides timely results; however, due to low incidence, the positive predictive value is not optimal. Multiple tests (including acute and convalescent measles IgG, 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 (urine, nasopharyngeal swabs, or throat swabs) should be collected as soon as possible within 10 days of rash onset.

Meningococcal Disease

Fifteen cases of *Neisseria meningitidis* invasive disease (0.3 per 100,000) were reported in 2006, compared to 16 cases in 2005. There were five (33%) serogroup B cases, four (27%) serogroup C cases, and six (40%) serogroup Y cases. In addition, there were three culture-negative suspect cases that were positive by polymerase chain reaction (PCR) in the Public Health Laboratory.

Case-patients ranged in age from 2 months to 85 years, with a median of 22 years. Forty percent of the cases occurred in the metropolitan area. Seven (47%) case-patients had bacteremia without another focus of infection, seven (47%) had meningitis, and one (7%) had pneumonia. Two serogroup Y cases had links to the same nursing home. All other cases were sporadic, with no definite epidemiologic links.

Three deaths occurred among cases reported in 2006. A 30-year-old male and a 73-year-old male died of bacteremia attributed to serogroup Y. A 19-year-old female died of bacteremia 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. 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 the MCV4 vaccine. Six cases occurred among 11-22 year-olds, including four college students and one high school student. Three cases had serogroup B disease 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 college student. The case-patients in this age group who had serogroup C or serogroup Y disease had not received meningococcal vaccine.

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Strains of *Staphylococcus aureus* that are resistant to methicillin and all beta-lactam antibiotics are referred to as methicillin-resistant *Staphylococcus 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 submit 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 (Naimi, T., et al. Community-onset and healthcare-associated methicillin-resistant *Staphylococcus aureus* in Minnesota. *JAMA*. 2003;290(22):2976-84.)

In 2006, 3,653 cases of MRSA infection were reported to MDH by the 12 sentinel hospital laboratories. Forty-one percent (1,502/3,653) of these cases were classified as CA-MRSA; 57% (2,077/3,653) were classified as HA-MRSA; and 2% (74/3,653) could not be classified. Isolates were received from 978 (65%) of the 1,502 CA-MRSA cases. To date, antimicrobial susceptibility testing has been completed on 492 (50%); PFGE subtyping has been completed for 259 (26%) of these isolates.

Notable trends in total case numbers, PFGE subtypes, and antibiotic susceptibility patterns have been identified during the 6 years of CA-MRSA sentinel surveillance. CA-MRSA infections reported from the 12 sentinel surveillance sites have increased from 131 cases (12% of all MRSA infections reported) in 2000 to 1,502 cases (41% of total MRSA infections reported) in 2006.

MRSA is resistant to all beta-lactam antimicrobials, and beta-lactams should no longer be used as the sole empiric therapy for severely ill patients whose infections may be staphylococcal in origin. However, all 2006 CA-MRSA isolates tested to date have been susceptible to gentamicin, linezolid, synercid, trimethoprim-sulfamethoxazole, and vancomycin, and most CA-MRSA isolates were susceptible to rifampin (99%), tetracycline (96%), clindamycin (95%), and ciprofloxacin (72%). Conversely, only 17% of CA-MRSA isolates in 2006 were susceptible to erythromycin.

The CDC classifies MRSA isolates into pulsed-field types (PFTs) (currently USA100-1200) based on genetic relatedness. (McDougal, L. et. al. Pulsed-field gel electrophoresis typing of oxacillin-resistant *Staphylococcus aureus* isolates from the United States: Establishing a national database. *J Clin Microbiol*. 2003;41:5113-20). 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.

Critical illnesses or deaths due to community-associated *S. aureus* infection (both methicillin-susceptible and -resistant) are now reportable in Minnesota, as is vancomycin-intermediate and vancomycin-resistant *S. aureus*.

Mumps

During 2006, 180 cases of mumps (3.7 per 100,000) were reported to MDH. By comparison, one to six cases had been reported annually in each of the previous 5 years. A total of 22 cases were reported in Minnesota between 2001 and 2005.

A multi-state resurgence of mumps occurred in the United States in 2006. Eight Midwestern states including Minnesota, Iowa, Kansas, Illinois, Missouri, Nebraska, South Dakota, and Wisconsin reported mumps incidence rates of more than 2 per 100,000. Forty-five states and Washington D.C. reported a collective total of 6,330 mumps cases, the largest outbreak in more than 20 years. The first outbreak cases occurred in college students in eastern Iowa in December 2005; peak incidence occurred in April 2006 in Iowa and other outbreak states, including Minnesota.

In Minnesota, case-patients ranged in age from 2 months to 92 years. The highest age-specific attack rate occurred in persons 18-24 years of age (42 [23%] cases; 7.9 per 100,000). This is consistent with other outbreak states for which the overall age-specific attack rate for persons 18-24 years of age was 6.0 per 100,000, affecting primarily college students. Sixty-seven (37%) cases occurred in children <18 years of age (5.2 per 100,000); 40 (22%) occurred in adults 25-49 years of age (2.1 per 100,000); and 31 (17%) occurred in adults age ≥50 years of age (2.1 per 100,000). The comparable age-

continued...

specific incidence rates in adults 25-49 years of age and those aged ≥50 years do not support the assumption that persons born before 1957 are immune to mumps due to natural infection.

IgM and IgG serologic testing, and viral culture, should all be performed on suspect mumps cases. False-positive indirect immunofluorescent antibody (IFA) results for mumps IgM antibody have been reported, particularly in persons who are infected with Epstein Barr Virus (EBV). Initial specimens for IgM and acute IgG should be drawn 4-7 days after onset of symptoms. In previously vaccinated persons, the expected rise in IgM antibody may be delayed or absent; therefore, healthcare providers should consider repeating initially negative IgM serologic tests at least 1 week after onset in previously vaccinated persons. Mumps is confirmed by viral culture of buccal swabs, throat swabs, urine, or spinal fluid specimens. Specimens for viral culture should be collected as soon as possible during the first 5 days of illness.

Neonatal Sepsis
Neonatal sepsis was added to the Minnesota Rules Governing Communicable Diseases in September 2005, and surveillance and collection of isolates in addition to group B *Streptococcus* began in January 2006. This statewide effort includes reporting of all bacteria other than coagulase-negative *Staphylococcus* isolated from a sterile site in infants less than 7 days of age. The most prevalent sterile sites have been in blood and CSF.

The 2006 summary for Minnesota neonatal sepsis organisms in infants <7 days of age is as follows:

25 Group B *Streptococcus*,
13 *Escherichia coli*,
8 *Staphylococcus aureus*,
8 *Streptococcus viridians*,
4 *Corynebacterium*
2 *Haemophilus influenzae*,
2 *Micrococcus*,
2 *Propionibacteria,*
2 *Enterococcus,* and
1 each Group D *Streptococcus*, *Streptococcus bovis*, *Pseudomonas stutzeri*, *Neisseria subflava*, *Morganella morganii*, *Kingella dentrificans*, *Kocuria kristinae*, *Paenibacillus,* and *Leuconostoc* species.

Isolates were received for 55 of 75 identified neonatal sepsis organisms.

To download copies of our neonatal sepsis poster or report forms or for more information on neonatal sepsis surveillance activities in Minnesota, please visit: www.health.state.mn.us/divs/idepc/dtopics/neosep/.

Pertussis
During 2006, 320 cases of pertussis (6.2 per 100,000) were reported in Minnesota, following a peak of 1,571 cases reported in 2005. Laboratory confirmation was available for 209 (65%) cases, 39 (19%) of which were confirmed by culture and 170 (81%) of which were confirmed by PCR. In addition to the laboratory-confirmed cases, 49 (15%) cases were epidemiologically linked to laboratory-confirmed cases, and 62 (19%) met a clinical case definition. One hundred sixty-three (51%) of the reported cases occurred in residents of the metropolitan area.

Paroxysmal coughing is the most commonly reported symptom. Three hundred (94%) of the case-patients experienced paroxysmal coughing. About one third (97, 30%) 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 154 (48%) of the cases. Infants and young children are at the highest risk for severe disease and complications. Pneumonia was diagnosed in 14 (4%) case-patients, three (21%) of whom were less than 18 months of age. Thirteen (4%) case-patients were hospitalized; eight (62%) 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 2006, case-patients ranged in age from 1 month to 89 years. One hundred twelve (35%) cases occurred in adolescents 13 to 17 years of age; 91 (28%) cases occurred in adults 18 years of age and older; 64 (20%) occurred in children 5-12 years of age; 32 (10%) occurred in children 6 months through 4 years of age, and 20 (6%) occurred in infants less than 6 months of age. Age was unknown for one case.

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 2006, 24 pertussis cases were reported in infants less than 1 year of age. A likely source of exposure was identified for 14 (58%) cases; six (25%) of the 24 infant cases were infected by adults 18 years of age and older, one (4%) was infected by a child 13 years of age or older, and seven (29%) were infected by a child less than 13 years of age. Ten (42%) of the 24 infant cases had no identified source of infection. For these cases, the source of infection was likely outside the household. One death was reported in a 1-month-old with no underlying medical conditions. The likely source of infection was a caregiver with an undiagnosed prolonged cough illness.

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 38 case-patients who were 7 months to 6 years of age, 19 (50%) were known to have received at least a primary series of three doses of DTP/DTaP vaccine prior to onset of illness, two (5%) received fewer than three doses and were considered preventable cases, and 17 (45%) cases in this age group had unknown vaccine history.

MDH reporting rules require that clinical isolates of *Bordetella pertussis* be submitted to the Public Health Laboratory. Of the 39 culture-confirmed cases, 38 (97%) of the isolates were received and sub-typed by PFGE and tested for antibiotic susceptibility to erythromycin, ampicillin, and trimethoprim-sulfamethoxazole. Eleven distinct PFGE patterns were identified; four of these patterns occurred in only a single case isolate. The two most common patterns identified accounted for 17 (45%) 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 October 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.

Two pertussis-containing vaccines (both of which combine tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine [Tdap] products) were licensed in 2005: Boostrix® (GlaxoSmithKline Biologicals), licensed for persons ages 10 through 18 years; and Adacel™ (sanofi pasteur), licensed for persons ages 11 through 64 years. These vaccines will help to decrease the incidence and transmission of pertussis in the community. The national Advisory Committee on Immunization Practices recommends Tdap vaccination in adolescents and adults through age 64 years in place of a regularly scheduled tetanus and diphtheria toxoids (Td) booster. Detailed information is at: http://www.cdc.gov/nip/vaccine/tdap/tdap_acip_recs.pdf.

Salmonellosis

During 2006, 725 culture-confirmed cases of *Salmonella* infection (14.0 per 100,000) were reported. This represents a 25% increase from the 580 cases reported in 2005 and an 18% increase from the median annual number of cases reported from 1996 to 2005 (median, 612 cases; range, 576 to 693) (Figure 2). Three serotypes, *S.* Typhimurium (171 cases) *S.* Enteritidis (162 cases), and *S.* Newport (52 cases) accounted for 53% of cases reported in 2006. There were five cases of *S.* Typhi infection. Three of the *S.* Typhi case-patients traveled internationally (India and Laos) and developed symptoms during their travel or within 1 week of their return; one case was a Hmong refugee who immigrated to the United States in 2004 but without a recent travel history. Twenty-five percent of salmonellosis case-patients were 13 years of age or younger. Twenty percent of case-patients were hospitalized for their infection. Of the 643 case-patients who were interviewed, 107 (17%) traveled internationally during the week prior to their illness onset. An 89-year-old case-patient died; the cause of death was pneumonia, but *Salmonella* was isolated from a urine specimen.

Nine outbreaks of salmonellosis were identified in 2006; all involved foodborne transmission. Seven of these outbreaks occurred in restaurant settings.

An outbreak of *S.* Typhimurium infections associated with eating the same brand of frozen, microwaveable, stuffed chicken products resulted in three cases from April to June. *S.* Typhimurium that matched the case-isolates' PFGE subtype was isolated from a product which one of the cases purchased at the same time as the products he consumed before his illness. This was the fourth outbreak in Minnesota associated with this type of chicken product since 1998.

In June, an outbreak of *S.* Typhimurium infections was associated with a Hennepin County restaurant. Forty patron cases were identified, including 26 culture-confirmed patron cases. Seven foodworkers at the restaurant also tested positive for *S.* Typhimurium. Carrot curry soup was identified as the vehicle. The soup was likely contaminated by raw unpasteurized eggs mixed in the same blender.

Another restaurant-associated *S.* Typhimurium outbreak occurred in June in Washington County. Four patron cases were identified, three of which were culture-confirmed. The small number of cases precluded confirmation of the specific food vehicle. However, violations associated with temperature control, cross-contamination, and lack of handwashing were documented.

From June through July, nine *S.* Paratyphi B var. L(+) tartrate + (formerly Java) cases were identified in Nobles, Olmsted, and St. Louis Counties. Among the eight cases interviewed, two were prison inmates, two worked in prisons, and five ate at restaurants of the same Mexican fast food chain. Additional cases from North Dakota that ate at restaurants of the same chain were identified. Colorado also identified cases of the same serotype and PFGE subtype. The cases in Colorado ate at restaurants of a different Mexican fast-food chain. The most likely vehicle was either lettuce or tomatoes. However, despite collaborating with Colorado on the investigation, conducting a case-control study, and reviewing food invoices, a specific vehicle could not be confirmed.

Three *S.* Miami cases were identified in August. The three cases ate at the same restaurant in Carver County within 2 days of each other. No specific food vehicle was implicated.

In September, a Ramsey County restaurant was implicated in a *S.* Newport outbreak, resulting in 18 cases, eight of which were culture-confirmed. Boneless skinless chicken breasts served as an ingredient in different dishes was the implicated vehicle.

In October, a restaurant in Hennepin County was implicated in an outbreak of *S.* Enteritidis infections resulting in four cases, three of which were culture-confirmed. In addition to the patron-cases, five restaurant employees tested positive for *S.* Enteritidis. Two of the positive employees were asymptomatic. Patron cases had eaten a variety of foods. A specific food vehicle was not identified.

continued...

A multi-state *S.* Typhimurium outbreak associated with tomatoes served in restaurants resulted in 181 cases in 21 states in September and October. Fourteen culture-confirmed cases were identified in Minnesota. Five of the cases and one resident of another state were all exposed at the same fast food restaurant in Ramsey County. The tomatoes were traced back to a grower in Ohio.

From September 2006 to April 2007, 12 *S.* Tennessee cases that were part of a national outbreak associated with peanut butter were identified in Minnesota. This outbreak resulted in 628 cases in 47 states from August 2006 to May 2007. The two brands of peanut butter implicated in this outbreak were produced at a single plant in Georgia. *S.*Tennessee of the outbreak PFGE subtype was isolated from open jars of peanut butter from cases' homes in Minnesota and other states, from unopened jars of peanut butter, and from environmental samples at the plant. The product was recalled and the plant stopped production in February 2007. The initial source of contamination at the plant has not been identified.

Sexually Transmitted Diseases

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. Cases of syphilis and 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.

Table 3. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Syphilis, Minnesota, 2002-2006

	2002		2003		2004		2005		2006	
Disease	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Chlamydia	10,118	206.0	10,807	220.0	11,601	236.0	12,187	248.0	12,935	263.0
Gonorrhea	3,050	62.0	3,237	66.0	2,957	60.0	3,481	71.0	3,303	67.0
Syphilis, Total	149	3.0	198	4.0	145	2.9	207	4.2	190	3.9
Primary/ Secondary	59	1.2	48	1.0	27	0.5	70	1.4	47	1.0
Early Latent	23	0.5	45	0.9	21	0.4	46	0.9	57	1.2
Late Latent*	65	1.3	105	2.1	95	1.9	84	1.7	80	1.6
Other	1	0.00	0	0.0	1	0.02	5	0.1	4	0.1
Congenital**	1	1.5	0	0.0	1	1.4	2	2.8	2	2.8
Chancroid	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

*Late latent syphilis includes neurosyphillis.
**Congenital syphilis rate per 100,000 live births.
Note: Data exclude cases diagnosed in federal or private correctional facilities.

Table 4. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Primary/Secondary Syphilis by Residence, Age, Gender, and Race/Ethnicity, Minnesota, 2006

	Chlamydia		Gonorrhea		Syphilis	
Demographic Group	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Total	12,935	263	3,303	67	47	1.0
*Residence**						
Minneapolis	2,863	748	1,267	331	29	7.6
St. Paul	1,926	671	644	224	4	1.4
Suburban**	4,026	204	830	42	10	0.5
Greater Minnesota	3,595	158	420	18	2	0.1
Age						
<15 years	129	12	37	3	0	0.0
15-19 years	3,862		809	216	2	0.5
20-24 years	4,996		1,047	325	5	1.6
25-29 years	2,312		603	189	10	3.1
30-34 years	866		309	87	8	2.3
35-44 years	581		345	42	16	1.9
≥45 years	189		153	9	6	0.4
Gender						
Male	3,691		1,489	61	43	1.8
Female	9,242		1,814	73	4	0.2
Transgender^^	2		0	---	0	---
Race^/Ethnicity						
White	5,430		796	18	34	0.8
Black	3,609		1,709	842	7	3.4
American Indian	415		104	128	1	1.2
Asian	505		43	26	1	0.6
Other	503		121	---	1	---
Unknown^^	2,474		530	---	3	---
Hispanic^^^	997		152	106	5	3.5

*Residence information missing for 525 chlamydia cases,142 gonorrhea cases and 2 syphilis cases.
**Suburban is defined as the seven-county metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties), excluding cities of Minneapolis and St. Paul.
^Case counts include persons by race alone. Population counts used to calculate results include race alone or in combination.
^^No comparable population data available to calculate rates.
^^^Persons of Hispanic ethnicity may be of any race.
Note: Data exclude cases diagnosed in federal or private correctional facilities.

Specifically, STDs disproportionately affect adolescents, young adults, and persons of color.

Chlamydia

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. In 2006, 12,935 chlamydia cases (263 per 100,000) were reported, representing a 5% increase from 2005 (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 (1,549 per 100,000), with the next highest rate among 15 to 19-year-olds (1,032 per 100,000). The incidence of chlamydia among adults 25 to 29 years of age (723 per 100,000) is considerably lower but has increased in recent years. The chlamydia rate among females (372 per 100,000) is more than twice the rate among males (152 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 (1,778 per 100,000) is over 14 times higher than the rate among whites (126 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 (300 per 100,000), American Indians (512 per 100,000), and Hispanics (695 per 100,000) are over two to five times higher than the rate among whites.

Chlamydia infections occur throughout the state, with the highest reported rates in Minneapolis (748 per 100,000) and St. Paul (671 per 100,000). In 2006, the greatest increases for chlamydia have been seen in St. Paul and the suburbs with increases of 11% and 9%, respectively.

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. In 2006, 3,303 cases (67 per 100,000) were reported, representing a decrease of 6% from 2005 (Table 3).

Adolescents and young adults are at greatest risk for gonorrhea (Table 4), with incidence rates of 216 per 100,000 among 15 to 19-year-olds, 325 per 100,000 among 20 to 24-year-olds, and 189 per 100,000 among 25 to 29-year-olds. Gonorrhea rates for males (61 per 100,000) and females (73 per 100,000) are comparable. Communities of color are disproportionately affected by gonorrhea, with 52% of cases reported among blacks. The incidence of gonorrhea among blacks (842 per 100,000) is approximately 47 times higher than the rate among whites (18 per 100,000). Rates among American Indians (128 per 100,000) and Hispanics (106 per 100,000) are approximately six to seven times higher than among whites. The rate among Asian/Pacific Islanders (26 per 100,000) is slightly higher than among whites.

Gonorrhea rates are highest in the cities of Minneapolis and St. Paul (Table 4). The incidence in Minneapolis (331 per 100,000) is 1.5 times the rate in St. Paul (224 per 100,000), eight times higher than the rate in the suburban metropolitan area (42 per 100,000), and over 18 times higher than the rate in Greater Minnesota (18 per 100,000).

Quinolone-resistant *Neisseria gonorrhoeae*

While the overall rate of gonorrhea has stayed relatively constant over the past 3 years, the prevalence of quinolone-resistant *N. gonorrhoeae* (QRNG) has increased approximately four-fold from 1.4% in 2003 to 5.8% in 2006. Of concern is the high prevalence among men who have sex with men (MSM), which increased sharply from 0% in 2002, to 8.9% in 2003, and to 27% in 2004. Since then the prevalence among MSM has remained stable but elevated (27% in 2006). As a result, fluoroquinolones (e.g., ciprofloxacin) are no longer recommended for treating gonorrhea in men with male sexual partners in Minnesota.

Syphilis

Surveillance data for primary and secondary syphilis are used to monitor morbidity trends because they represent recently acquired infections. Data for early syphilis (which includes primary, secondary, and early latent stages of disease) are used in outbreak investigations because they represent infections acquired within the past 12 months and signify opportunities for disease prevention.

Primary and Secondary Syphilis

The incidence of primary/secondary syphilis in Minnesota is lower than that of chlamydia or gonorrhea (Table 3), but has remained elevated since an outbreak was observed in 2002 among men who have sex with men (MSM). In 2006, 47 cases of primary/secondary syphilis (1.0 per 100,000) were reported compared to 71 (1.4 per 100,000) cases in 2005. Although this represents a 34% decrease, the number of cases has been fluctuating over the past few years.

Early Syphilis

In 2006, the number of early syphilis cases decreased by 12%, with 104 cases occurring in 2006 compared to 118 cases in 2005. The incidence is highest amongst MSM. Of the early syphilis cases in 2006, 90 (88%) occurred among men; 80 (89%) of these men reported having sex with other men; 40% of the MSM diagnosed with early syphilis were co-infected with HIV.

Congenital Syphilis

Two cases of congenital syphilis were reported in Minnesota in 2006 (Table 3).

Chancroid

Chancroid continues to be very rare in Minnesota. No cases were reported in 2006.

Shigellosis

During 2006, 259 culture-confirmed cases of *Shigella* infection (5.0 per 100,000) were reported (Figure 2). This represents a 270% increase from the 96 cases reported in 2005, and a 17% increase from the median number of cases reported annually from 1999 to 2005 (median, 222 cases, range, 68 to 904).

In 2006, *S. sonnei* accounted for 227 (88%) cases, *S. flexneri* for 24 (9%), and *S. boydii* for four (2%). Case-patients ranged in age from 8 months to 96 years (median, 10 years). Fifty-one percent of case-patients were less than 10 years of age; children less than 5 years of age accounted for 23% of cases. Thirty-six (14%) case-patients were hospitalized. Eighty-three percent of case-patients resided in the metropolitan area, including 32% in Anoka County and 31% in Hennepin County.

continued...

Five outbreaks of shigellosis were identified in 2006; four were caused by *S. sonnei* and one was caused by *S. boydii*. These outbreaks resulted in 72 culture-confirmed cases (representing 28% of reported *Shigella* cases). Four person–to-person outbreaks occurred in a variety of settings, including one in a daycare facility, one in a women's shelter, one in an elementary school, and one at a private party. One foodborne outbreak also occurred and was associated with a restaurant in which several workers had recently been ill.

Every tenth *Shigella* isolate received at MDH was tested for antimicrobial resistance. Thirty-four isolates were tested in 2006; 74% were resistant to ampicillin, 29% were resistant to trimethoprim-sulfamethoxazole, and 6% were resistant to both ampicillin and trimethoprim-sulfamethoxazole. All isolates tested were susceptible to ceftriaxone.

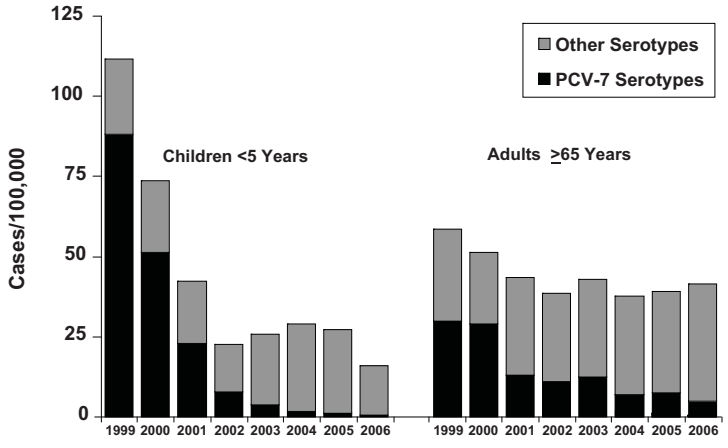
Streptococcus pneumoniae Invasive Disease

Statewide active surveillance for invasive *Streptococcus pneumoniae* (pneumococcal) disease began in 2002, expanding from the metropolitan area, where active surveillance has been ongoing since 1995. In 2006, 635 cases (12.4 per 100,000) of invasive pneumococcal disease were reported. By age group, annual incidence rates per 100,000 were 22.4 among children aged 0-4 years; 4.0 among children and adults aged 5-39 years; 12.5 among adults 40-64 years; and 40.1 among adults aged 65 years and older.

In 2006, pneumonia accounted for 357 (56%) cases of invasive pneumococcal disease among all cases (i.e., those infections accompanied by bacteremia or isolation of pneumococci from another sterile site such as pleural fluid). Bacteremia without another focus of infection accounted for 196 (31%) cases statewide. Pneumococcal meningitis accounted for 32 (5%) cases. Seventy patients (11%) with invasive pneumococcal disease died.

In 1999, the year before the pediatric pneumococcal conjugate vaccine (Prevnar, Wyeth-Lederle [PCV-7]) was licensed, the rate of invasive pneumococcal disease among children <5 years of age in the metropolitan area was 111.7 cases/100,000. Over the years 2000-02 there was a major downward trend in incidence in this age group (Figure 4). Rates in each of the subsequent 4 years were somewhat higher, although there has not been a continuing upward trend (25.8 cases per 100,000 in 2003; 29.0, 27.4, and 23.3 cases per 100,000 in 2004, 2005, and 2006, respectively (Figure 4). Based on the distribution of serotypes among isolates from these cases, this increase was limited to disease caused by non-vaccine serotypes (i.e., serotypes other than the seven included in PCV-7) [Figure 4]). This small degree of replacement disease due to non-PCV-7 serotypes, similar to that seen in other parts of the country, has been far outweighed by the declines in disease caused by PCV-7 serotypes. This trend supports the need for ongoing monitoring because further increases due to non-vaccine serotypes are possible. In Figure 4 rates of invasive pneumococcal disease among adults aged ≥65 years are shown by serotypes included and not included in PCV-7. Declines in incidence in this age group, particularly in disease due to PCV-7 serotypes, have been observed elsewhere in the United States and are likely attributable to herd immunity from use of PCV-7 among children. Among cases overall, a serotype not included in the PCV-7 vaccine, serotype 19A, is now most commonly associated with invasive pneumococcal disease in Minnesota.

Figure 4. Invasive Pneumococcal Disease Incidence Among Children <5 Years and Adults ≥65 Years of Age, by Year and Serotype, Twin Cities Metropolitan Area, 1999-2006



Of the 578 isolates submitted in 2006, 46 (8%) were highly resistant to penicillin and 66 (11%) exhibited intermediate-level resistance; 86 (15%) exhibited multi-drug resistance (i.e., high-level resistance to two or more drug classes). *S. pneumoniae* is one of several pathogens included in the MDH Antibiogram (see pp. 24-25), which gives detailed antimicrobial susceptibility results of isolates tested at the Public Health Laboratory from 2006 cases, and is available to download on the MDH website at: www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/antibiogram.html.

Streptococcal Invasive Disease - Group A

One hundred seventy-one cases of invasive group A streptococcal (GAS) disease (3.4 per 100,000), including 17 deaths, were reported in 2006, compared to 122 cases and nine deaths in 2005. Ages of case-patients ranged from 1 month to 93 years (mean, 50 years). Forty-seven percent of case-patients were residents of the metropolitan area. Fifty-nine (35%) case-patients had bacteremia without another focus of infection, and 38 (22%) case-patients had cellulitis with bacteremia. There were 22 (13%) cases of primary pneumonia and 11 (6%) cases of necrotizing fasciitis. Nine (5%) case-patients had septic arthritis and/or osteomyelitis, and three (2%)

had streptococcal toxic shock syndrome (STSS) accompanied by another focus of infection. Six (4%) case-patients were residents of long-term care facilities. None of the facilities had more than one case-patient.

The 17 deaths included six cases of bacteremia without another focus of infection and five cases of pneumonia. The six remaining fatal cases had bacteremia with cellulitis (2), meningitis (2), necrotizing fasciitis, and vasculitis. The deaths occurred in persons ranging in age from 15 to 91 years. For the 16 deaths in patients with known health histories, significant underlying medical conditions were reported for 13 of the case-patients.

Isolates were available for 159 (93%) cases, and 155 were subtyped using PFGE; 64 different molecular subtypes were identified. Forty-three subtypes were represented by one isolate each; other subtypes were represented by two to 31 isolates each. No direct epidemiologic links were noted among cases with indistinguishable subtypes.

Isolates were available for 15 of the deaths and were distributed among 12 different PFGE subtypes. Three deaths were attributed to the most common subtype, and two other deaths had indistinguishable subtypes.

Streptococcal Invasive Disease - Group B

Three hundred sixty-one cases of group B streptococcal invasive disease (6.9 per 100,000), including 18 deaths, were reported in 2006. These cases were those in which group B *Streptococcus* (GBS) was isolated from a normally sterile site; seven cases of miscarriage or stillbirth in which GBS was cultured from the placenta were also reported.

Overall, 196 (54%) cases presented with bacteremia without another focus of infection. The other most common types of infection were cellulitis (15%), pneumonia (7%), osteomyelitis (6%), arthritis (5%), and meningitis (2%). The majority (78%) of cases had GBS isolated from blood only. Fifty-seven percent of cases occurred among residents of the metropolitan area. Forty-nine (14%) case-patients were infants less than 1 year of age, and 187 (52%) were 60 years of age or older.

Fifty-nine cases of infant (early-onset or late-onset) or maternal GBS disease were reported, compared to 44 cases in 2005. Twenty-five infants developed invasive disease within 6 days following birth (0.36 cases per 1,000 live births), and 21 infants became ill at 7 to 89 days of age. Ten stillbirths or spontaneous abortions were associated with 13 maternal invasive GBS infections.

From 1997 to 2006, there were 255 early-onset disease cases reported, and 13 infants died. Fifty-one infants were born at less than 37 weeks gestation and accounted for 20% of early-onset cases. Bacteremia without another focus of infection (79%) was the most common type of infection in these early-onset cases, followed by pneumonia (12%) and meningitis (7%).

The *Prevention of Perinatal Group B Streptococcal Disease, Revised Guidelines* published by CDC in August 2002 included the following key changes: the recommendation for universal prenatal screening of all pregnant women at 35 to 37 weeks gestation and updated prophylaxis regimens for women with penicillin allergies. In light of these revised guidelines, MDH reviewed the maternal charts for all 25 early-onset cases reported during 2006. Overall, 19 (76%) of 25 women who delivered GBS-positive infants underwent prenatal screening for GBS. Of these, eight (42%) women were positive and 10 (53%) were negative. One woman had an unknown test result. Among the six women who did not receive prenatal screening for GBS, none were screened upon admission to the hospital and prior to delivery of her infant. Among the 25 women of infants with invasive GBS disease, five (20%) received intrapartum antimicrobial prophylaxis (IAP). Two (25%) of the eight women with a positive GBS screening result received IAP. MDH continues to follow the incidence of GBS disease among infants, screening for GBS among pregnant women, and the use of IAP for GBS-positive pregnant women during labor and delivery.

Tetanus

One case of fatal tetanus was reported during 2006. The case occurred in an 80-year-old white, non-Hispanic female with history of receiving tetanus and diphtheria toxoid (Td) in 2003. She had sustained numerous deep puncture wounds from falling in raspberry bushes. She sought medical attention 3 days later for cellulitis at the site of one of the puncture wounds. She received a Td booster and an antibiotic (levofloxacin). Four days subsequent to that (one week after the injury), she experienced cramping in her arm and neck. She was hospitalized and given tetanus immune globulin (TIG). One of the wounds was debrided, removing pieces of raspberry cane. *Clostridium sordellii* (and not *Clostridium tetani*) was isolated. *C. sordellii* is ubiquitous in the environment, and *C. tetani* is rarely isolated from tetanus cases. The clinical presentation was consistent with tetanus. The case-patient died 17 days after the wound incident.

Although this case-patient had received Td within the previous five years, it is unclear whether she had completed a primary series. If not, TIG would have been indicated at the time of her injury. A wound management algorithm for preventing tetanus is posted on the MDH website at www.health.state.mn.usdivs/idepc/diseases/pertussis/tetwdmgmt.html. Wounds contaminated with soil present the greatest risk. Tetanus cases often result from minor wounds for which individuals did not seek immediate medical attention; therefore, all individuals should complete the primary series and receive Td boosters every 10 years.

Toxic Shock Syndrome

Surveillance for staphylococcal toxic shock syndrome (STSS) over much of the last 20 years has been passive, relying on infection control and health care providers to notify MDH and report the syndrome. This system is limited particularly for STSS due to the complexity of confirming the diagnosis. Recently, there have been more strains of *Staphylococcus aureus* isolated carrying the toxin which can lead to STSS. In particular, strains of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) are known to cause STSS and have rapidly become prevalent in healthy children and adults. No change had been observed in the number of passively reported cases over the last few years, including in 2006, with three to six cases reported annually in the metropolitan area (seven statewide in 2006). In order to identify if there was a

continued...

true increase in the incidence of STSS, MDH began a retrospective review to identify cases of STSS hospitalized during 2000-2003 in the metropolitan area.

Forty-three cases of STSS were identified in the surveillance area, with 23 cases related to menstruation (menstrual) and 20 cases unrelated to menstruation (nonmenstrual). The median age was 23.2 years (range, 1.4 to 81.0 years). Thirty-two (74%) of the 43 STSS cases had at least one positive culture for *Staphylococcus aureus,* including three (7%) with MRSA. Of the 22 menstrual cases with tampon use documented, 21 (95%) were using tampons at the onset of their first STSS related symptom. Of the 20 nonmenstrual cases, 10 (50%) had a skin or soft tissue site of infection, of which four were following a surgical procedure. Additionally, seven (42%) had no primary source identified after a median of four (range, one to six) sites cultured, two had multiple positive culture sites, and one had a pulmonary primary site.

The average yearly incidence was 0.52 cases per 100,000 with a 95% confidence interval (CI) of 0.32-0.77 for all ages. For menstrual related cases aged 13-24 years, the yearly incidence was 1.41 (95% CI, 0.63-2.61), but lower among menstrual cases aged 25-54 years at 0.43 (95% CI, 0.19-0.82). Among all nonmenstrual cases the incidence was 0.32 (95% CI, 0.12-0.67). These incidence rates are consistent with previous population-based estimates for STSS. We identified an increase in the incidence of menstrual STSS among ages 13-24 years during 2000-2003 (<0.1 to 2.3, p=.02) but a decrease in the incidence of menstrual STSS among females aged 25-54 years (1.0 to 0.2, p=0.01). From the 43 cases of STSS identified, 15 of 23 (65%) menstrual cases and three of 20 (15%) nonmenstrual cases were reported to MDH.

Currently, MDH is reviewing cases of possible STSS from 2004-06 to identify if there is a continued increasing trend in the incidence of menstrual STSS cases aged 13-24 years. Reporting of STSS continues to be a challenge, especially for nonmenstrual cases. STSS cases should be reported as they are identified.

Tuberculosis

While the number of cases of tuberculosis (TB) disease reported nationally has decreased each year since 1993, the incidence of TB in Minnesota increased throughout much of the 1990s and peaked at 239 TB cases (4.8 cases per 100,000) in 2001. After 3 consecutive years (2002-2004) of decreasing incidence followed by a plateau at 199 new cases in 2005, the number of newly reported TB cases in Minnesota increased 9% to 217 cases in 2006. The increase in cases observed in 2006 was due primarily to a 62% increase in the number of U.S.-born cases, whereas the number of foreign-born cases counted in 2006 was essentially the same as the prior year. The 217 cases counted in 2006 represent an incidence rate of 4.2 cases per 100,000. Although the statewide incidence of TB disease is slightly less than the national rate (4.6 cases per 100,000 in 2006), the incidence rate in Minnesota exceeds the U.S. Healthy People 2010 objective of 1.0 cases per 100,000 (Figure 5).

The most distinguishing characteristic of the epidemiology of TB disease in Minnesota continues to be the very large proportion of TB cases reported among foreign-born persons. Although the percentage of foreign-born cases declined from 87% in 2005 to 81% in 2006, the data for 2006 are consistent with the average percentage of foreign-born cases (81%) reported from 2002 through 2006. In contrast, 57% of TB cases reported nationwide in 2006 were foreign-born.

The 175 foreign-born TB case-patients reported in Minnesota during 2006 represent 31 different countries of birth. The most common region of birth among foreign-born TB cases reported in 2006 was sub-Saharan Africa (59%), followed by South/Southeast Asia (22%) (Figure 6). The ethnic diversity among these foreign-born TB cases reflects the unique and constantly changing demographics of immigrant and other foreign-born populations arriving in Minnesota. This diversity also poses significant challenges in providing culturally and linguistically appropriate TB prevention and control services for populations most affected by and at risk for TB in Minnesota.

More than one-third (34%) of the 175 foreign-born TB case-patients reported in Minnesota during 2006 were diagnosed within 12 months after arriving in the United States. These cases likely represent persons who acquired latent TB infection outside the United States and began progressing to active TB disease prior to immigrating. Persons 15 years of age or older who arrive in the United States as immigrants or refugees receive a pre-immigration medical examination overseas that includes screening for pulmonary TB disease. Of 48 TB case-patients 15 years of age or older who were diagnosed in Minnesota during 2006 within 12 months of arriving in the United States and who arrived as immigrants or refugees, only nine (19%) had any TB-related condition noted in their pre-immigration medical exam results. These findings highlight the need for clinicians to have a high index of suspicion for TB among newly arrived foreign-born persons, regardless of the results of medical exams performed overseas. More than half (52%) of foreign-born TB case-patients reported in Minnesota during 2006 were diagnosed 2 or more years after arriving in the United States. These data suggest that at least half of foreign-born TB cases reported in Minnesota may be preventable by focusing on thorough domestic screening, evaluation, and treatment of latent TB infection among recently arrived refugees, immigrants, and other foreign-born persons.

The majority (65%) of foreign-born TB case-patients reported in Minnesota in 2006 were 15 to 44 years of age, whereas only 36% of U.S.-born TB cases occurred among persons in this age category. In contrast, 43% of U.S.-born TB case-patients were 45 years of age or older. The proportion of pediatric patients less than 5 years of age was considerably larger among U.S.-born TB cases than among foreign-born cases (12% versus 1%, respectively), although nearly all of these U.S.-born case-patients were children born in the U.S. to foreign-born parents. These first-generation U.S.-born children appear to experience an increased risk of TB disease that more closely resembles that of foreign-born persons. Presumably, these children may be exposed to TB as a result of travel to their parents' country of origin and/or visiting or recently arrived family members who may be at increased risk for TB acquired overseas.

Aside from foreign-born persons, other high-risk population groups comprise much smaller proportions of the TB cases reported in Minnesota. Among TB cases reported in 2006, persons with certain medical conditions (excluding HIV infection) that increase the risk for progression from latent TB infection to active TB disease (e.g., silicosis, diabetes, prolonged corticosteroid therapy or other immunosuppressive therapy, end stage renal disease, etc.) were the most common of these other high-risk population groups, representing 15% of TB cases. Substance abuse (including alcohol abuse and/or illicit drug use) was the second most common of these other risk factors, with approximately 6% of TB case-patients having a history of substance abuse during the 12 months prior to their TB diagnosis. Eight (4%) of the 217 TB case-patients reported in Minnesota during 2006 were infected with HIV; six (75%) of those HIV-infected TB case-patients were foreign born, including two persons born in Kenya and one person each from El Salvador, Ethiopia, Mexico, and Somalia. The percentage of TB case-patients in Minnesota with HIV co-infection remains less than that among all TB cases reported nationwide. Other risk groups such as homeless persons, correctional facility inmates, and residents of nursing homes each represented only 1-2% of TB cases reported in Minnesota during 2006.

Twenty-nine (33%) of the state's 87 counties reported at least one case of TB disease in 2006, with the majority (76%) of cases occurring in the metropolitan area, particularly in Hennepin (44%) and Ramsey (20%) Counties, both of which have public TB clinics. Twelve percent of TB cases occurred in the five suburban Twin Cities metropolitan counties (i.e., Anoka, Dakota, Carver, Scott, and Washington). Olmsted County, which maintains a public TB clinic staffed jointly by the Olmsted County Health Department and Mayo Clinic, represented 7% of TB cases reported statewide in 2006. The remaining 17% of cases occurred primarily in rural areas of Greater Minnesota. MDH calculates county-specific annual TB incidence rates for Hennepin, Ramsey, and Olmsted Counties, as well as for the five-county suburban metropolitan area and collectively for the remaining

continued...

Figure 5. Tuberculosis Incidence Rate per 100,000 Population, United States and Minnesota, 1992-3006

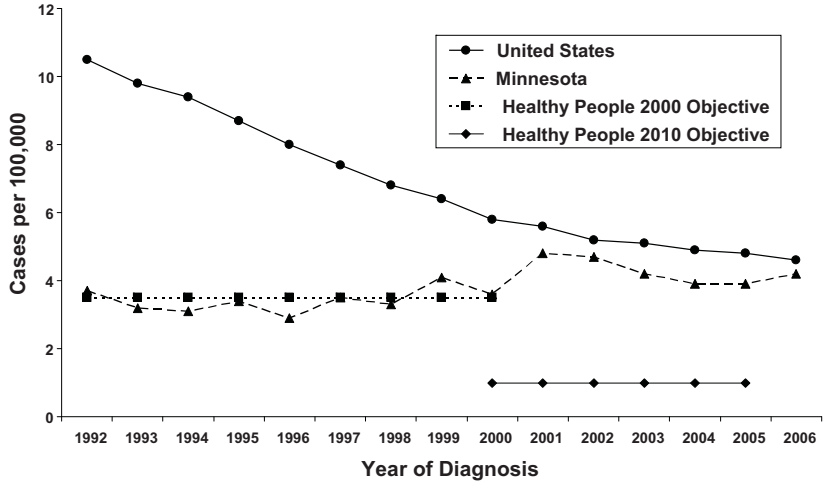


Figure 6. Foreign-Born Tuberculosis Cases by Region of Birth and Year of Diagnosis, Minnesota, 2002-2006

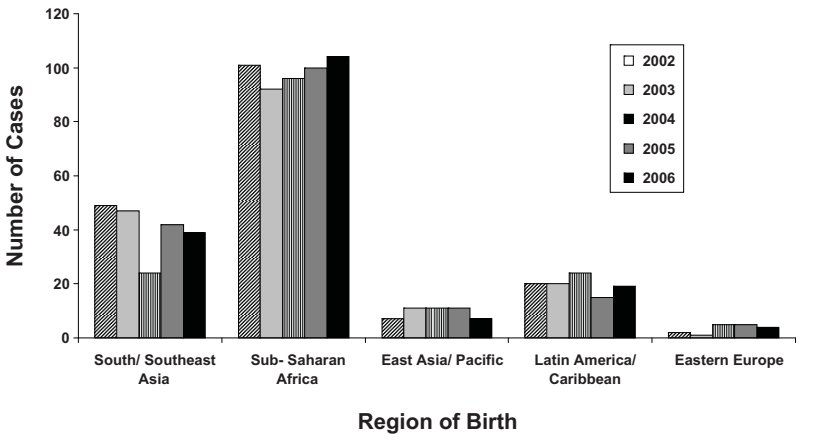
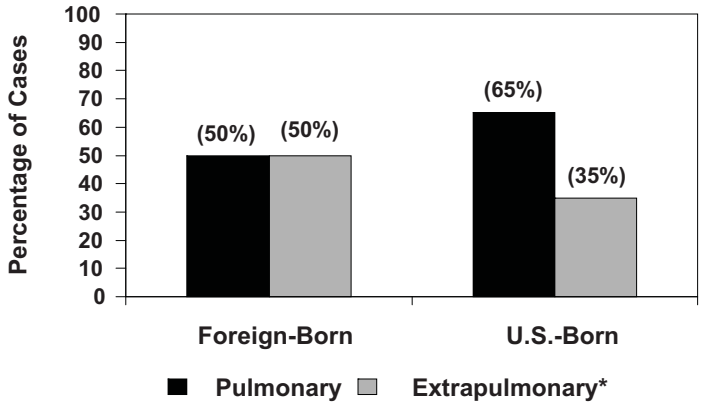


Figure 7. Tuberculosis Cases by Site of Disease and Place of Birth, Minnesota, 2002-2006



*** Includes cases with both extrapulmonary and pulmonary sites of disease**

79 counties in Greater Minnesota. In 2006, the highest TB incidence rate (10.8 cases per 100,000) was reported in Olmsted County, followed by Ramsey and Hennepin Counties, respectively. The TB incidence rate in Ramsey County increased from 7.0 cases per 100,000 in 2005 to 8.5 cases per 100,000 in 2006, exceeding the steadily declining incidence rate in Hennepin County (8.2 cases per 100,000 in 2006) for the first time since Minnesota began reporting county-specific TB incidence rates in 1992.

Drug-resistant TB is a critical concern in the prevention and control of TB in Minnesota, as well as nationally and globally. The prevalence of drug-resistant TB in Minnesota, particularly resistance to isoniazid (INH) and multi-drug resistance, exceeds comparable national figures. In 2006, 25 (14%) of 177 culture-confirmed TB cases were resistant to at least one first-line anti-TB drug (i.e., INH, rifampin, pyrazinamide, or ethambutol). In particular, 18 (10%) cases were resistant to INH, and two (1%) cases were multidrug-resistant (i.e., resistant to at least INH and rifampin). One of the multidrug-resistant TB (MDR-TB) cases also met the definition of extensively drug-resistant TB (XDR-TB); this is the only case of XDR-TB reported to date in Minnesota since MDH began maintaining data on drug susceptibility results for isolates of *Mycobacterium tuberculosis* in 1993. These data represent a decrease in the prevalence of MDR-TB during 2006, which averaged approximately 3% of cases annually from 2002 through 2005. Drug resistance is approximately twice as common among foreign-born TB cases as it is among U.S.-born cases in Minnesota. Of particular concern, 10 (45%) of 22 MDR-TB cases reported from 2002 through 2006 were resistant to all four first-line drugs. These 10 pan-resistant MDR-TB case-patients represented eight different countries of birth (i.e., one each from China, Ethiopia, Laos, Moldova, South Korea, and Thailand, and two each from Somalia and the United States). One of the two U.S.-born pan-resistant patients had resided in Africa for several years; the other was a young child infected by a foreign-born family member.

Another clinical characteristic of significance among TB cases in Minnesota is the preponderance of extrapulmonary disease among foreign-born TB patients. Half (50%) of foreign-born TB case-patients counted from 2002 through 2006 had an extrapulmonary site of disease; in contrast, only 35% of U.S.-born TB case-patients had extrapulmonary TB (Figure 7). The unusually high incidence of extrapulmonary TB disease in Minnesota exemplifies the need for clinicians to be aware of the epidemiology of TB in Minnesota and to have a high index of suspicion for TB, particularly among foreign-born patients and even when the patient does not present with a cough or other common symptoms of pulmonary TB.

The epidemiology of TB in Minnesota highlights the need to support global TB elimination strategies, as well as local TB prevention and control activities targeted to foreign-born persons. TB in Minnesota occurs primarily, although not exclusively, among foreign-born persons, with TB case-patients representing many countries of origin and varied cultural backgrounds. Although the incidence of TB in Minnesota is less than the national rate, the prevalence of drug-resistant TB in Minnesota is high, and extrapulmonary sites of disease are common, especially among foreign-born cases. The proportion of TB cases occurring in persons under 5 years of age in Minnesota exceeds the comparable figure nationally, with many of these children being born to foreign-born parents. These trends suggest that the incidence of TB in 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 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 apparent non-nosocomial infectious processes) 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.

Forty-five cases (36 deaths and nine critical illnesses) were reported in 2006, compared to 67 cases in 2005. The cause(s) of illness subsequently were determined for nine cases. Among the remaining 36 cases, 12 case-patients presented with respiratory symptoms; three presented with shock/sepsis; five presented with neurologic symptoms; eight presented with cardiac symptoms; three presented with sudden unexpected death (SUD); four presented with gastrointestinal (GI) symptoms; and one had an illness that did not fit a defined syndrome. Case-patients with respiratory symptoms ranged from 1 month to 48 years of age; those with sepsis were 1 month to 58 years of age; the neurologic case-patients were 1 year to 59 years of age; the cardiac case-patients were 1 month to 45 years of age; the case-patients with GI symptoms were 4 to 47 years of age; the case-patients with sudden unexpected death were 2 months to 35 years of age; and the case-patient without a defined syndrome was 41 years of age. Ten patients with respiratory symptoms, two patients with sepsis, three patients with neurologic symptoms, five patients with a cardiac syndrome, and three patients with a GI syndrome died, as did the patient without a defined syndrome. Eighteen patients resided in the metropolitan area, 12 case-patients resided in Greater Minnesota, three case-patients were out-of-state residents hospitalized in Minnesota, and residence for three case-patients was unknown.

Twenty-one cases were eligible for the CDC project (nine respiratory, one sepsis, two neurologic, four cardiac, and four GI cases; and one SUD). Specimens were obtained for testing at MDH or CDC for 14 cases. Probable etiologies were established for three cases. A 4-year-old male who died with GI symptoms had immunohistochemical testing of the small intestine that was positive for rotavirus. A 39-year-old male who died with a respiratory syndrome had positive PCR tests of lung samples and a nasopharyngeal swab for metapneumovirus. A 47-year-old female who died with GI symptoms had a positive PCR result for norovirus from a stool sample. Positive PCR results for three other cases were of unknown significance.

Testing was also provided at MDH and/or CDC at the physician's request for eight of the 15 cases that were not eligible for the CDC project. Positive results were found for two of these cases. A PCR for Epstein-Barr virus was positive in a blood sample of a 9-year-old male with myocarditis and a PCR for parainfluenza 3 was positive in a bronchial wash specimen of a 7-year-old female with myocarditis. The significance of these results is unknown.

Medical Examiner Surveillance Summary

In September 2006, MDH began a medical examiner (ME) surveillance program in Minnesota to collect reports of all deaths possibly due to infectious diseases that were reported to the ME's office. Our program was based on the New Mexico Office of the Medical Investigator, National Association of Medical Examiners, and CDC programs titled: "Medical Examiner/Coroner-based Surveillance for Fatal Infectious Diseases and Bioterrorism". The surveillance program was piloted in 2006 at the Minnesota Regional Coroner's Office, in Hastings. This office covers seven counties, including Carver, Chisago, Dakota, Houston, Fillmore, Goodhue, and Scott, which together make up 14.3% of the state population.

There are two main components to the program. First, we increased the collection of samples taken at autopsy from cases with possible infectious disease signs or symptoms at the time of death or upon autopsy. MDH distributed specimen collections kits to the ME office to help guide the number and type of specimens collected. These specimens were tested at the facility laboratory or sent to MDH for testing. In addition, MDH consulted with CDC on unexplained cases. There were approximately 10 kits distributed. Use of these kits improved the quality and number of specimens sent to MDH, which aided in determining a possible infectious disease cause of death.

The other main component to the program was a review of all death reports from 2006 at the ME office to determine any other possible infectious disease deaths not already reported to MDH. There were 1,563 death reports reviewed at the Minnesota Regional Coroner's Office. Of these, 56 (4%) were determined to be ME infectious disease surveillance cases, which means there were signs or symptoms of an active infectious disease at the time of death or upon autopsy, or it was an unexplained death in someone <50 years of age. There were 16 (29%) deaths determined to be due to infectious disease causes, 28 (50%) were possibly due to infectious disease causes, seven (13%) were not due to infectious disease causes, and five (9%) were unable to be determined because there was no anatomic cause of death. Cases were determined to be possible infectious disease causes if an infectious disease was a possible significant contributing cause of death or there was not enough information available to definitively attribute the cause of death to the infectious disease. Of the 16 deaths determined to be infectious disease related, eight did not have a pathogen specified, five were not vaccine preventable (two CJD, two HIV, and one HSV), and three were vaccine preventable (two *S. pneumoniae*, one *N. meningitidis*).

Of the 56 cases, 10 (19%) were reported to MDH as part of the unexplained deaths project. The ME also reported four additional cases, but these did not meet criteria for the unexplained deaths project. In addition, at least five cases were reported to MDH by the hospital, nursing home, or other care provider as part of the EIP. This means there were approximately 37 cases picked up by the ME active surveillance in addition to cases already reported to MDH, which represents 66% of the total cases found using the ME surveillance program.

Varicella and Zoster

Varicella and zoster surveillance were implemented in Minnesota pursuant to their addition to the Minnesota Rules Governing Communicable Diseases, effective September 13, 2005. The reporting rules require that unusual case incidence, individual critical cases, and deaths related to varicella and zoster be reported. The reporting rules also allow for the use of a sentinel surveillance system to monitor varicella and zoster incidence until that system no longer provides adequate data for epidemiological purposes, at which time case-based surveillance will be implemented. This summary represents the first full year of these surveillance efforts. Over time, these data will be used to monitor trends in varicella and zoster disease in Minnesota, and will be used to extrapolate to the statewide disease burden.

Zero varicella-related deaths were identified in 2006. Two cases of critical varicella illness were reported to MDH. Both had underlying medical conditions. A 14-year-old male with a history of acute lymphoblastic leukemia, treated with immunosuppressant drugs and a bone marrow transplant, developed varicella-related encephalitis. A 1-year-old female with a history of a rare autoimmune disease treated with chemotherapy developed vaccine-associated varicella within 3 weeks of receiving vaccine. Both children recovered.

Varicella surveillance in Minnesota includes reporting of outbreaks from all schools, and reporting of individual cases from selected sentinel schools and childcare centers. Outbreak surveillance was initiated in the fall of the 2005-06 school year, and case-based surveillance at sentinel schools was initiated in January 2006. Forty sentinel schools were selected and participated from January 2006 through the end of the school year, and 80 sentinel schools were selected and participated throughout the 2006-07 school year. Forty childcare centers were selected and participated throughout 2006.

An outbreak of varicella in a school is defined as five or more cases within a 2-month period in persons less than 13 years of age, or three or more cases within a 2-month period in persons 13 years of age and older. An outbreak is considered ended when no new cases occur within 2 months after the last case is no longer contagious. During the 2006-07 school year, MDH received reports of 73 outbreaks from 69 schools (four schools reported two outbreaks) in 30 counties throughout Minnesota involving 1,230 students and zero staff. By comparison, MDH received reports of outbreaks from 76 schools in 33 counties throughout Minnesota involving 1,146 students and two staff during the 2005-06 school year. The number of cases per outbreak ranged from five to 96 (median, 13) during the 2006-07 school year and five to 73 (median, 12) during the 2005-06 school year.

continued...

A case of varicella is defined for school and childcare facility reporting as an illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause. During the 2006-07 school year, MDH received 192 reports of varicella from 29 (36%) of 80 sentinel schools. Six sentinel schools reported seven clusters of cases that met the outbreak definition (one school reported two outbreaks). One hundred thirty-one (68%) of 192 reported cases were included in these seven outbreaks. Cases per outbreak ranged from five to 57 (median, 8). The 61 cases not associated with an outbreak represent sporadic varicella incidence in Minnesota schools.

Based on sentinel school data, an estimated 951 sporadic cases of varicella would have been expected to occur during a school year among the 883,181 total school-aged children in Minnesota, representing 0.11% of this population, for an incidence rate of 107.7 per 100,000. Estimated grade level-specific annual incidence rates are 166.4 per 100,000 (686 of 412,111) for elementary school students; 75.8 per 100,000 (112 of 148,267) for middle school students; and 51.2 per 100,000 (153 of 299,320) for high school students.

In 2006, MDH received 16 reports of varicella cases from four of 40 sentinel childcare centers. Eleven of 16 cases occurred in the same childcare center. Based on sentinel childcare data, an estimated 1,343 (1.3%) cases of varicella would have been expected to occur during a calendar year among the 107,070 children enrolled in Minnesota childcare centers.

Zoster surveillance in Minnesota currently relies on reporting from health care providers of unusual case incidence, individual critical cases, and deaths, as well as reporting of individual cases in school-age children from all schools, and reporting of individual cases in students and staff from selected childcare centers. The current school reporting system was initiated in November 2005. The current childcare center reporting system was initiated in January 2006. MDH plans to expand zoster surveillance to include all childcare centers, and selected long-term care facilities.

During the 2006-07 school year, MDH received 144 reports of zoster from schools in 37 counties throughout Minnesota. Ages ranged from 5 to 18 years. By comparison, MDH had received 20 reports of zoster in 12 counties throughout Minnesota between November 2005 and the end of the school year. Ages ranged from 5 to 16 years. The increase in reported cases may be attributable to several factors including longer surveillance period, increased awareness of the surveillance system, as well as increased incidence. No cases of zoster were reported by sentinel childcare centers in 2006.

Three varicella-containing vaccines are now approved for use in the United States: varicella vaccine (Varivax), combination measles-mumps-rubella-varicella vaccine (ProQuad), and herpes zoster vaccine (Zostavax). Varivax was licensed in the United States in 1995, and ProQuad was licensed in 2005, for persons 12 months of age and older and 12 months through 12 years of age, respectively. Zostavax was approved in May 2006 for use in persons 60 years of age and older. In 2004, a single dose of varicella vaccine was required for kindergarteners and seventh graders enrolling in Minnesota schools. This requirement will change to two doses of varicella vaccine in 2008. These vaccines will help to decrease the incidence and transmission of varicella in Minnesota schools and the community.

Viral Hepatitis A

In 2006, 31 cases of hepatitis A (0.6 per 100,000) were reported. Seventeen (55%) case-patients were residents of the metropolitan area, including eight (26%) residents of Hennepin or Ramsey Counties. Sixteen (52%) of the cases were male. Case-patients ranged in age from 3 to 76 years (median, 25 years). Race was reported for 18 (58%) cases, of whom 14 (78%) were white, two (11%) were Asian, one (6%) was black, and one (6%) was of other race. No cases have been reported in American Indians since 2002. The incidence rate of hepatitis A in American Indians declined steadily from 10.4 per 100,000 in 1999 to 6.0, 3.7, and 2.5 per 100,000, in 2000, 2001, and 2002 respectively, demonstrating the success of targeted immunization efforts initiated in 1999. Hispanic ethnicity was reported for 12 cases (6.1 per 100,000).

One (3%) case-patient was an employee of a commerical food establishment. No community transmission of hepatitis A was identified.

A risk factor was identified for 28 (90%) of the 31 cases, two (7%) of whom had known exposure to a confirmed hepatitis A case. These persons became infected following exposure to a close contact, representing missed opportunities to administer immune globulin.

Of the remaining 26 (84%) cases with a risk factor identified, 16 (62%) were associated with travel. Of these 16, 13 (81%) traveled to Mexico, Central, or South America, three of whom reported consuming raw shellfish.

Hepatitis A vaccine is recommended routinely for all children ages 12-23 months, as well as for persons who are at increased risk of infection (including persons who travel to countries with hepatitis A virus endemicity, and men who have sex with men, and for any person wishing to obtain immunity) (CDC. Prevention of hepatitis A through active or passive immunization: Recommendations of the Advisory Committee on Immunization Practices [ACIP] *MMWR* 2005;55[No. RR-7]:1-23). Universal hepatitis A vaccination of children is intended to further reduce hepatitis A morbidity and mortality in the United States, and make eventual elimination of HAV transmission a possibility.

Viral Hepatitis B

In 2006, 32 cases of clinically symptomatic acute hepatitis B virus (HBV) infection (0.6 per 100,000) were reported, with no deaths. In addition to the 32 cases, seven individuals with documented asymptomatic seroconversions were reported. Prior to 2006, both symptomatic cases and asymptomatic seroconvertors were counted as incident cases. This change in case counting criteria should be considered when

examining case incidence trends. MDH received 1,136 reports of newly identified cases of chronic HBV infection.

Acute cases ranged in age from 12 to 71 years (median, 37 years). Twenty-three (72%) of the 32 cases were residents of the metropolitan area, including 16 (50%) in Hennepin County and three (9%) in Ramsey County. Twenty (63%) cases were male, and 17 (53%) were adolescents or young adults between 13 and 39 years of age. Seventeen (53%) were white, six (19%) were black, and three (9%) were American Indian; race was unknown for six (19%) cases. Two (6%) case-patients were of Hispanic ethnicity. Although the majority of cases were white, incidence rates were higher among American Indians (5.3 per 100,000), blacks (2.7 per 100,000), and Hispanics (1.0 per 100,000) than among non-Hispanic whites (0.4 per 100,000).

Twelve (38%) of the 32 case-patients were interviewed regarding possible modes of transmission. A case-patient may report more than one risk factor. Of the 12 case-patients interviewed, 10 (83%) reported having sexual contact with one or more partners within 6 months prior to onset of symptoms. Two of the 10 case-patients reporting sexual activity reported having sexual contact with a known carrier of hepatitis B surface antigen (HBsAg). Three of the 10 case-patients reporting sexual activity reported sexual contact with two or more partners. Of seven males reporting sexual activity, four (57%) males reported only female partners, and three (43%) reported only male partners. All three of the females reporting sexual activity reported only male partners. One (8%) of the 12 case-patients interviewed reported being incarcerated for more than 24 hours. Two (17%) case-patients reported no risk factors.

Hepatitis B vaccine has been available since 1982, yet it continues to be underutilized in persons at greatest risk of infection. A large proportion of hepatitis B case-patients identified risk factors for sexual transmission; therefore, health care providers should discuss the need for HBV testing and vaccination with at-risk patients, including all unvaccinated adolescents, young adults, and patients seen for other sexually transmitted diseases. It is also recommended that all adults wishing to obtain immunity be vaccinated without requiring them to acknowledge a specific risk factor (CDC. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States:Recommendations of the Advisory Committee on Immunization Practices [ACIP] Part II: Immunization of adults. *MMWR* 2006;55[No. RR-16]:1-25).

In addition to the 32 hepatitis B cases, six perinatal infections were identified in infants who tested positive for HBsAg during post-vaccination screening performed between 9 and 15 months of age. One perinatal case-patient was born in 2004 and five were born in 2005. All six perinatal infections occurred in infants identified through a public health program that works to ensure appropriate prophylactic treatment of infants born to HBV-infected mothers. The infants were born in the United States and had received hepatitis B immune globulin and three doses of hepatitis B vaccine in accordance with the recommended schedule (i.e., were treatment failures). Despite these treatment failures, the success of the public health prevention program is demonstrated by the fact that an additional 430 infants born to HBV-infected women during 2005 had post-serologic testing demonstrating no infection.

Viral Hepatitis C

In 2006, 11 cases of clinically symptomatic acute hepatitis C virus (HCV) infection were reported. In addition to the eleven cases, 10 individuals with asymptomatic, laboratory-confirmed acute HCV infection were reported. Prior to 2006, both symptomatic and asymptomatic acute infections were counted as incident cases. This change in case counting criteria should be considered when examining case incidence trends.

Seven (64%) of the 11 case-patients resided in Greater Minnesota. The median age was 37 years (range, 18 to 58 years). Six (55%) case-patients were female. Six (55%) were white, non-mixed race; two (18%) were American Indian; and three (27%) were of unknown race.
Among the 11 case-patients, one (9%) case-patient had sexual contact with a known HCV-infected partner within 6 months prior to onset of symptoms; and one (9%) had been incarcerated within 6 months prior to onset of symptoms.

MDH received more than 2,200 reports of newly identified anti-HCV positive persons in 2006, the vast majority of whom are chronically infected. Because most cases are asymptomatic, medical providers are encouraged to consider each patient's risk for HCV infection to determine the need for testing. Patients for whom testing is indicated include: persons with past or present injection drug use; recipients of transfusions or organ transplants before July 1992; recipients of clotting factor concentrates produced before 1987; persons on chronic hemodialysis; persons with persistently abnormal alanine aminotransferase levels; healthcare, emergency medical, and public safety workers after needle sticks, sharps, or mucosal exposures to HCV-positive blood; and children born to HCV-positive women. Infants born to HCV-infected mothers should be tested at 12 to 18 months of age, as earlier testing tends to reflect maternal antibody status. Persons who test positive for HCV should be screened for susceptibility to hepatitis A and B virus infections and immunized appropriately.

Antimicrobial Susceptibilities of Selected Pathogens, 2006

On the following pages is the *Antimicrobial Susceptibilities of Selected Pathogens, 2006*, a compilation of antimicrobial susceptibilities of selected pathogens submitted to MDH during 2006 in accordance with Minnesota Rule 4605.7040. Because a select group of isolates is submitted to MDH, it is important to read the notes entitled "Sampling Methodology" and "Trends, Comments, and Other Pathogens."

Please note the data on inducible clindamycin resistance for Group A and B *Streptococcus* and community associated methicillin-resistant *Staphylococcus aureus.*

The MDH Antibiogram is available on the MDH Web site at: www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/antibiogram.html.

Limited laminated copies can be ordered from: Antibiogram, Minnesota Department of Health, Acute Disease Investigation and Control Section, PO Box 64975, St. Paul, MN 55164 or by calling (651) 201-5414.

Trends, Comments, and Other Pathogens	
1 *Campylobacter* spp.	Ciprofloxacin susceptibility was determined for all isolates (n=802). Only 40% of isolates from patients returning from foreign travel were susceptible to quinolones. Most susceptibilities were determined using 2006 CLSI breakpoints for *Campylobacter*. Susceptibility for gentamicin was based on an MIC ≤ 4 µg/ml, and for azithromycin was based on an MIC ≤ 2 µg/ml (no established CLSI breakpoints).
2 *Salmonella enterica* (non-typhoidal)	Antimicrobial treatment for enteric salmonellosis generally is not recommended.
3 *Neisseria gonorrhoeae*	In 2006, we tested 328 isolates for antibiotic resistance. 227 (69%) of the isolates were submitted by the Red Door Clinic in Minneapolis and 102 (30%) by Room 111 in Saint Paul. 256 isolates were associated with heterosexual transmission, and 0.8% were resistant to ciprofloxacin. 63 isolates were associated with men who have sex with men and 27% were resistant to ciprofloxacin.
4 *Neisseria meningitidis*	According to CLSI, MICs ≥ 8 µg/ml for nalidixic acid may correlate with diminished fluoroquinolone susceptibility. No isolates had an MIC > 1 µg/ml.
5 Group A *Streptococcus*	Of 15 isolates that were resistant to erythromycin, one was also resistant to clindamycin. The other 14 were susceptible, but 10 had inducible clindamycin resistance by D-test.
6 Group B *Streptococcus*	96% (24/25) of early-onset infant, 100% (21/21) of late-onset infant, 31% (4/13) of maternal, and 89% (272/302) of other invasive GBS cases were tested. Among 60 erythromycin-resistant, clindamycin-susceptible strains, 32 (53%) had inducible resistance to clindamycin by D-test. Overall, 72% (230/321) were susceptible to clindamycin and were D-test negative (where applicable). 80% (39/49) of infant and maternal cases were susceptible to clindamycin and were D-test negative (where applicable).
7 *Streptococcus pneumoniae*	The 578 isolates tested represented 91% of 634 total cases. Of these, 11% (66/578) had intermediate susceptibility and 8% (46/578) were resistant to penicillin. Reported above are the proportions of case-isolates susceptible by meningitis breakpoints for cefotaxime and ceftriaxone (intermediate = 1.0 µg/ml, resistant ≥ 2.0 µg/ml). By nonmeningitis breakpoints (intermediate = 2.0 µg/ml, resistant ≥ 4.0 µg/ml), 98% (566/578) and 98% (569/578) of isolates were susceptible to cefotaxime and ceftriaxone respectively. Isolates were screened for high-level resistance to rifampin; all were ≤ 2 µg/ml. 15% (86/578) of isolates were resistant to two or more antibiotic classes and 9% (52/578) were resistant to three or more antibiotic classes.
8 *Haemophilus influenzae*	28% of the isolates were nonsusceptible to ampicillin (26% were ampicillin-resistant and 2% were ampicillin-intermediate) and produced ß-lactamase, but were susceptible to amoxicillin-clavulanate, which contains a ß-lactamase inhibitor. Three isolates were multidrug-resistant to two antibiotics (trimethoprin/sulfamethoxazole and ampicillin).
9 *Mycobacterium tuberculosis* (TB)	National guidelines recommend initial four-drug therapy for TB disease, at least until first-line drug susceptibility results are known. Of the 27 drug-resistant TB cases reported in 2006, 23 (85%) were in foreign-born persons, including one of two multidrug-resistant (MDR-TB) cases (*i.e.,* resistant to at least isoniazid [INH] and rifampin). One of the two MDR-TB cases also met the case definition for extensively drug-resistant TB (XDR-TB) (*i.e.,* resistance to at least INH, rifampin, any fluoroquinolone, and at least one second-line injectable drug).
Community-associated Methicillin Resistant *Staphylococcus aureus* (CA-MRSA)	1,453 CA-MRSA cases were reported in 2006. Antimicrobial susceptibility testing was conducted on 493 isolates from CA-MRSA cases (425 isolates from cases < 18 years and 67 isolates from cases > 18 years*) 71% were susceptible to ciprofloxacin, 17% were susceptible to erythromycin, 97% were susceptible to mupirocin, (MIC < 4µg/ml) 99% were susceptible to rifampin, and 96% were susceptible to tetracycline. All isolates were susceptible to gentamicin, linezolid, trimethoprim/sulfamethoxazole, and vancomycin. 10% (38/381) of erythromycin-resistant, clindamycin-susceptible isolates tested positive for inducible clindamycin resistance (ICR) using the D-test. Overall, 87% (429/493) were susceptible to clindamycin and D-test negative (where applicable). * Several differences were noted when 2006 CA-MRSA isolate susceptibility results from cases < 18 years were compared to those > 18 years. Isolates from patients > 18 years were less likely to be susceptible to erythromycin (10% vs. 19%) and ciprofloxacin (60% vs. 73%). Isolates from cases > 18 years were also more likely to demonstrate ICR (22% vs. 8%) and therefore were less likely to be susceptible to clindamycin (70% vs. 89%) than were isolates from cases < 18 years.
Bordetella pertussis	Erythomycin susceptibility testing was performed on 41 *B. pertussis* isolates. All 41 were susceptible to erythromycin using provisional CDC breakpoints.
Escherichia coli O157:H7	Antimicrobial treatment for *E. coli* O157:H7 infection is not recommended.

Antimicrobial Susceptibilities of Selected Pathogens, 2006

Sampling Methodology
† all isolates tested
‡ ~10% sample of statewide isolates received at MDH
§ isolates from a normally sterile site

		Campylobacter spp. [1‡]	*Salmonella* Typhimurium [2†]	Other *Salmonella* serotypes (non-typhoidal) [2‡]	*Shigella* spp. [‡]	*Neisseria gonorrhoeae* [3]	*Neisseria meningitidis* [4†§]	Group A *Streptococcus* [5†§]	Group B *Streptococcus* [6†§]	*Streptococcus pneumoniae* [7†§]	*Haemophilus influenzae* [8†§]	*Mycobacterium tuberculosis* [9†]
Number of Isolates Tested		77	163	54	34	328	15	158	321	578	85	177
		% Susceptible										
ß-lactam antibiotics	amoxicillin									96		
	ampicillin		77	93	26			100	100		72	
	penicillin					4	100	100	100	81		
	cefixime					99						
	cefuroxime sodium									90	100	
	cefotaxime							100	100	92	100	
	ceftriaxone		96	94	100	100	100			92		
	meropenem						100			91	100	
Other antibiotics	ciprofloxacin	82[1]	100	100	100	90	100				100	
	levofloxacin						100	99	99	99		
	azithromycin	99									100	
	erythromycin	99						91	63	80		
	clindamycin							99/93[5]	82/72[6]	94		
	chloramphenicol		82	94	94		100			99	100	
	gentamicin	96										
	spectinomycin					99						
	tetracycline	39				40		92		91	100	
	trimethoprim/sulfamethoxazole		96	96	71		47			78	88	
	vancomycin							100	100	100		
TB antibiotics	ethambutol											98
	isoniazid											90
	pyrazinamide											94
	rifampin						100				100	98

13th Annual Emerging Infections in Clinical Practice and Public Health Conference November 8 and 9 (half-day), 2007

13th Annual Emerging Infections in Clinical Practice and Public Health Conference, November 8-9 (half-day), 2007
Hilton Downtown Minneapolis

REGISTRATION FORM

PLEASE PRINT OR TYPE:

Name _____

Affiliation _____

Department _____

Address _____

Mail Stop _____

City _____

State _____

Zip _____

☐ Home ☐ Office

Office Telephone Number _____

E-mail _____

Degree _____

_____

MAIL TO:

Emerging Infections Conference
Office of Continuing Medical Education
200 Oak St. SE, Suite 190
Minneapolis, MN 55455
or Fax to: 612-626-7766
Phone: 612-626-7600 or 1-800-776-8636
or Online: www.cmecourses.umn.edu

PAYMENT METHOD

☐ Check (payable to University of Minnesota)

☐ VISA ☐ MasterCard ☐ American Express

Cardholder Name _____

Card No. _____

Exp. Date _____

Signature _____

Registration Fees:	On or Before October 11	After October 11
☐ Physician	$175	$200
☐ Non-Physician & Retired Physician	$135	$160
☐ Resident/ Fellow	$135	$160
☐ Medical Industry Professional	$175	$200
University of Minnesota and Mayo Clinic		
☐ Physician	$110	$135
☐ Non-Physician	$75	$100
☐ Resident/Fellow/Student (School of Public Health)	$25	$25

More Information at www.cmecources.umn.edu (Click on “Course Calendar”)

continued...

Emerging Infections Conference Program (cont'd)

Program Includes:

- Keynote: Emerging Respiratory Pathogens - Yu-lung Lau, MBChB, MD, University of Hong Kong
- Infections at the Maternal/Fetal Interface: A Need for Increased Awareness - Mark Schleiss, MD
- Zoonoses Update - Jeff Bender, DVM, MS
- Update on Non-HIV Antivirals - Henry Balfour, MD
- Hot Topics from the Minnesota Department of Health - Richard Danila, PhD, MPH
- Infectious Diseases and Airplanes - Karen Marienau, MD, MPH
- Update on HIV Testing and Treatment - W. Keith Henry, MD
- Case Presentations of Typical Local Patients: Panel Discussion by Local Clinicians

Vaccine Topics:

- New Vaccine Develpments - Gregory Poland, MD
-
- Adolescent Vaccine Update - Levi Downs, MD

MRSA Topics:

- MRSA Control in Healthcare Settings: Part 1 - Carlene A. Muto, MD, MS
- MRSA Control in Healthcare Settings: Part 2 - Jane D. Siegel, MD
- MRSA - Minnesota Update Including Healthcare Recommendations from a Minnesota Department of Health Workgroup - Ruth Lynfield, MD
- MRSA Panel Discusssion

Provider Participation and Saturation in the Minnesota Immunization Information Connection (MIIC) System for 2006

The Minnesota Immunization Information Connection (MIIC) system, the secure, web-based application (Immunization Information System [IIS]) that allows local public health and primary care providers the ability to record immunizations given to their patients and to view detailed vaccine recommendations, continues to grow and strive to reach the Healthy People 2010 goals. The 2010 goal for participation is to have 95% of all immunization providers enrolled in a fully operational IIS. Currently, 100% of local public health agencies and 82% of primary care providers fully participate in MIIC, which includes both submitting immunization data and regularly logging into the system to view their patient's records. To maintain as specific a denominator as possible, immunization providers are defined as local public health agencies and primary care providers who receive publicly purchased vaccine from the Minnesota Vaccines for Children Program (MnVFC). This includes a total of 784 providers. Provider participation is one important measure upon which all state immunization information systems are judged.

Enrollment saturation rates of children aged 0 to 6 years with two or more immunizations recorded in MIIC has increased to 91% (n=344,260). This includes only Minnesota residents. The 2010 goal is to have 95% of children with two or more immunizations in this age range enrolled in an IIS.

MIIC is populated with all births that occur in the state via a secure, electronic data load process from the MDH Center for Health Statistics. There is an opt-out process for those patients who do not wish to be included in the system. For children born in 2006 (n=81,446), only 442 parents requested to have their child excluded from MIIC.

Recording childhood vaccinations is only a part of MIIC's role, since the system is capable of recording immunizations given to adults as well. MIIC contains over 24 million immunization records for 3.4 million persons of all ages, which enables providers to view all immunizations given to their patients on one consolidated record. MIIC's sophisticated vaccine recommendation algorithm determines whether a patient may be due or overdue for immunizations by looking at the history that is in the system and making age and interval-specific recommendations. Reminder/recall notices can be generated in such instances. Also, schools have read-only access to MIIC and can verify student's histories for school entry, greatly reducing the number of calls to clinics.

Other benefits of MIIC include the ability to identify missed opportunities for immunization and to analyze susceptibility to disease during an outbreak such as mumps.

If you are a health care provider not currently participating in MIIC and would like more information about how to join, please visit the MDH website at: www.health.state.mn.us/divs/idepc/immunize/registry/index.html or by calling the MDH at (651) 201-5503 or 1-800-657-3970.

Influenza season is coming -
Increase immunization coverage of your patients and among health care providers.

To access the *Disease Control Newsletter* go to this link; www.health.state.mn.us/divs/idepc/newsletters/dcn/index.html and click on "Subscribe."

The *Disease Control Newsletter* is available on the MDH Acute Disease Investigation and Control (ADIC) Section web site (http://www.health.state.mn.us/divs/idepc/newsletters/dcn/index.html).