

Volume 32, Number 4 (pages 33-52)

July/August 2004

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 2003

Introduction

Assessment is a core public health function. Surveillance for communicable diseases is one type of ongoing assessment activity. Epidemiologic surveillance is the systematic collection, analysis, and dissemination of health data for the planning, implementation, and evaluation of public health programs. The Minnesota Department of Health (MDH) collects disease surveillance information on certain communicable diseases for the purposes of determining disease impact, assessing trends in disease occurrence, characterizing affected populations, prioritizing disease control efforts, and evaluating disease 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 (MN Rules 4605.7000 - 4605.7800). The diseases listed in Table 1 (page 34) must be reported to MDH. As stated in these rules, physicians, health care facilities, medical laboratories, veterinarians, and veterinary medical laboratories 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 practitioner 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 communicable disease reporting without patient authorization.

Since April 1995, MDH has participated as one of the Emerging Infections Program (EIP) sites 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 extensive 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 the numbers of cases of selected communicable diseases reported during 2003 by district of the patient's residence. Pertinent observations for some of these diseases are discussed below. A summary of influenza surveillance data also is included. However, these data

do not appear in Table 2 because the influenza surveillance system is based on reported outbreaks rather than on individual cases.

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 (Twin Cities metropolitan area) or outside of it (Greater Minnesota).

Anaplasmosis

Human anaplasmosis (HA) is the new nomenclature for the disease formerly known as human granulocytic ehrlichiosis. HA (caused by the rickettsia *Anaplasma phagocytophilum*) is transmitted to humans by *Ixodes scapularis* (deer tick or black-legged tick), the same tick that transmits Lyme disease.

Similar to Lyme disease, HA case numbers also dropped during 2003, from a record high of 149 cases in 2002 (3.0 per 100,000 population) to 78 cases (1.6 per 100,000). Fifty-five (71%) case-patients reported in 2003 were male. The median age of case-patients was 61 years (range, 3 to 91 continued...

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Table 1. Diseases Reportable to the Minnesota Department of Health

(All reportable diseases must be reported within 1 working day, unless otherwise specified.)

Foodborne, Vectorborne and Zoonotic Diseases

- Amebiasis (*Entamoeba histolytica/dispar*)
- Anaplasmosis (*Anaplasma phagocytophilum*) **h**
- Anthrax (*Bacillus anthracis*) **a,d**
- Arboviral Disease **h**
- Babesiosis (*Babesia* spp.)
- Botulism (*Clostridium botulinum*) **a**
- Brucellosis (*Brucella* spp.) **d,g**
- Campylobacteriosis (*Campylobacter* spp.) **b**
- Cat scratch disease (infection caused by *Bartonella* spp.)
- Cholera (*Vibrio cholerae*) **a,b**
- Cryptosporidiosis (*Cryptosporidium parvum*) **d**
- Cyclosporiasis (*Cyclospora cayetanensis*) **d,h**
- 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*) **b**
- Enterobacter sakazakii* **d,h,i**
- Giardiasis (*Giardia lamblia*)
- Hantavirus infection
- Hemolytic uremic syndrome **d,g**
- Kingella* spp. **d,h**
- Leptospirosis (*Leptospira interrogans*)
- Listeriosis (*Listeria monocytogenes*) **b**
- Lyme disease (*Borrelia burgdorferi*)
- Malaria (*Plasmodium* spp.)
- Plague (*Yersinia pestis*) **d,g**
- Psittacosis (*Chlamydophila psittaci*)
- Q fever (*Coxiella burnetii*) **d,g**
- Rabies (animal and human cases and suspects) **a**
- Rocky Mountain spotted fever (*Rickettsia* spp., *R. canada*)
- Salmonellosis, including typhoid (*Salmonella* spp.) **b**
- Shigellosis (*Shigella* spp.) **b**
- Toxoplasmosis
- Trichinosis (*Trichinella spiralis*)
- Tularemia (*Francisella tularensis*) **d,g**
- Typhus (*Rickettsia* spp.)
- Vibrio* spp. **d,h**
- Yellow fever
- Yersiniosis, enteric (*Yersinia* spp.) **b**

Invasive Bacterial Diseases

- Haemophilus influenzae* disease (all invasive disease) **b,c**
- Meningococcal disease (*Neisseria meningitidis*) **b,c,g**
- Neonatal sepsis (infants <7 days of age; excluding coagulase-negative *Staphylococcus*) **c,d,h**
- Streptococcal disease (all invasive disease caused by Groups A and B streptococci and *S. pneumoniae*) **b,c**
- Toxic shock syndrome **b**

Vaccine Preventable Diseases

- Diphtheria (*Corynebacterium diphtheriae*) **b,g**
- Hepatitis (all primary viral types including A, B, C, D, and E)
- Influenza (unusual case incidence, critical illness, or laboratory-confirmed cases) **d**
- Measles (Rubeola) **a,d**
- Mumps
- Pertussis (*Bordetella pertussis*) **b**
- Poliomyelitis **a,d**
- Rubella and congenital rubella syndrome **g**
- Smallpox **d,g,h**
- Tetanus (*Clostridium tetani*)
- Varicella-zoster (Primary [chickenpox] - unusual case incidence, critical illness or laboratory-confirmed cases; or recurrent [shingles] - unusual case incidence or critical illness) **d,h**

Sexually Transmitted Diseases and Retroviral Infections

- Chancroid (*Haemophilus ducreyi*) **e**
- Chlamydia trachomatis* infection **e**
- Gonorrhea (*Neisseria gonorrhoeae*) **e**
- Human immunodeficiency virus (HIV) infection, including Acquired Immunodeficiency Syndrome (AIDS) **f**
- Retrovirus infection (other than HIV)
- Syphilis (*Treponema pallidum*) **e**

Other Conditions

- Blastomycosis (*Blastomyces dermatitidis*)
- Coccidioidomycosis **h**
- Histoplasmosis (*Histoplasma capsulatum*)
- Kawasaki disease
- Legionellosis (*Legionella* spp.) **d**
- Leprosy (*Mycobacterium leprae*)
- Meningitis (viral agents)
- Orthopox virus **d,g,h**
- Reye syndrome
- Rheumatic fever (cases meeting the Jones Criteria only)
- Severe Acute Respiratory Syndrome (1. Suspect and probable cases of SARS and 2. Cases of health care workers hospitalized for pneumonia or acute respiratory distress syndrome) **a,b**
- Staphylococcus aureus* (including only vancomycin-intermediate *Staphylococcus aureus* [VISA], vancomycin-resistant *Staphylococcus aureus* [VRSA], and deaths or critical illness due to community-acquired *Staphylococcus aureus* in a previously well individual) **d,h**
- Transmissible spongiform encephalopathy **h**
- Tuberculosis (*Mycobacterium tuberculosis* and *M. bovis*) **b**
- Unexplained deaths **b** and unexplained critical illness (possibly due to infectious cause) **d,h**
- Unusual or increased case incidence of any illness **a,d**

a Report immediately by telephone: 612-676-5414 or 1-877-676-5414.
b Submission of isolates 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, enrichment broth, or other appropriate material. Call the MDH Public Health Laboratory at 612-676-5396 for instructions.
c Isolates are considered to be from invasive disease if they are isolated from a normally sterile site, e.g. blood, CSF, joint fluid, etc.

d Submission of isolates or clinical materials requested; reporting rule change expected in 2004.
e Report on separate Sexually Transmitted Disease Report Card.
f Report on separate HIV Report Card.
g Requested to report immediately by telephone; reporting rule change expected in 2004.
h Addition to reporting rule change expected in 2004.
i Infants only; reporting rule change expected in 2004.

years). The peak in onsets of illness occurred in June and July (43 cases [55%]). Co-infections with Lyme disease and HA can occur from the same tick bite; during 2003, five HA case-patients (6%) also had objective evidence of Lyme disease. The risk for

HA is highest in the same east-central Minnesota counties where the risk of Lyme disease is greatest, including Aitkin, Crow Wing, Cass, Pine, and Morrison Counties.

For additional information on HA, see "Lyme Disease and Human Anaplasmosis in Minnesota, 2003" in the March/April 2004 issue (vol. 32, no. 2) of the *Disease Control Newsletter*.

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Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health, by District of Residence, 2003

Disease	District* (population per U.S. Census 2000)									Total (4,919,479)
	Metropolitan (2,642,056)	Northwestern (152,001)	Northeastern (248,425)	Central (683,787)	West Central (222,691)	South Central (280,332)	Southeastern (460,102)	Southwestern (230,085)	Unknown Residence	
Anaplasmosis	21	1	7	41	1	2	5	0	0	78
Campylobacteriosis	447	17	29	133	55	44	142	70	0	937
Cryptosporidiosis	13	1	12	46	10	22	37	14	0	155
Encephalitis - viral										
LaCrosse	1	0	0	1	0	0	1	0	0	3
West Nile	25	4	1	23	32	21	4	38	0	148
<i>Escherichia coli</i> O157 infection	68	3	6	14	10	6	11	15	0	133
Hemolytic Uremic Syndrome	6	1	1	1	0	0	0	0	0	9
Giardiasis	471	9	24	142	33	31	97	42	2	851
<i>Haemophilus influenzae</i> invasive disease	27	4	3	8	2	7	5	1	0	57
HIV infection other than AIDS	157	0	2	7	0	0	7	0	4	177
AIDS (cases diagnosed in 2002)	141	1	1	5	1	4	7	3	0	163
Legionnaires' disease	2	1	0	0	0	2	3	0	0	8
Listeriosis	3	0	1	0	0	0	1	1	0	6
Lyme disease	238	15	30	135	5	7	43	0	0	473
Measles	0	0	0	0	0	0	0	0	0	0
Mumps	0	0	0	0	0	0	1	0	0	1
<i>Neisseria meningitidis</i> invasive disease	19	0	1	3	5	0	1	0	0	29
Pertussis	137	7	11	12	5	1	21	13	0	207
Rubella	0	0	0	0	0	0	0	0	0	0
Salmonellosis	293	13	61	77	22	27	50	33	0	576
Sexually transmitted diseases*	10,642	233	704	841	196	412	839	244	0	14,111
<i>Chlamydia trachomatis</i> - genital infections	7,736	207	604	746	172	335	696	218	0	10,714
Gonorrhea	2,738	26	99	82	23	74	137	23	0	3,202
Syphilis, total	168	0	1	13	1	3	6	3	0	195
primary/secondary	42	0	0	3	0	0	2	0	0	47
early latent**	41	0	0	1	0	2	1	0	0	45
late latent***	85	0	1	9	1	1	3	3	0	103
congenital	0	0	0	0	0	0	0	0	0	0
other	0	0	0	0	0	0	0	0	0	0
Chancroid	0	0	0	0	0	0	0	0	0	0
Shigellosis	80	3	1	10	0	0	7	2	0	103
<i>Streptococcus pneumoniae</i> invasive disease	314	24	39	85	28	46	43	28	0	607
Streptococcal invasive disease - Group A	98	7	15	13	10	7	23	8	0	181
Streptococcal invasive disease - Group B	175	10	17	36	17	26	37	11	0	329
Tuberculosis	169	2	4	4	1	1	27	6	0	214
Viral hepatitis, type A	33	0	0	8	0	4	7	0	0	52
Viral hepatitis, type B (acute infections only, not perinatal)	39	0	5	8	1	0	2	0	0	55
Viral hepatitis, type C (acute infections only)	6	1	8	3	1	1	3	0	0	23
Yersiniosis	5	1	1	1	0	0	3	1	0	12

*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 neurosyphilis

County Distribution within Districts

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

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

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

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

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

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

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

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

Renville, Rock, Swift, Yellow Medicine

Arboviral Encephalitis

LaCrosse encephalitis and Western equine encephalitis historically have been the primary arboviral encephalides found in Minnesota. During July 2002, West Nile virus (WNV) was identified in Minnesota for the first time. In 2003, Minnesota was on the eastern edge of a large WNV outbreak in the Great Plains states.

WNV 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 occurs. During 2003, WNV was found in 46 states and the District of Columbia. In 2003, 9,858 human cases of WNV disease were reported in the United States, including 262 fatalities. In Minnesota, 148 cases (4

fatal) of WNV disease were reported. Ninety-nine (67%) Minnesota case-patients had West Nile fever; 25 (17%) had meningitis, and 24 (16%) had encephalitis. The median case-patient age was 47 years (range, 2 to 96 years), but WNV encephalitis patients tended to be older (median, 74 years; range, 38 to 96 years).

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For a more complete update of WNV activity in Minnesota see "West Nile Virus in Minnesota: 2003 Update" in the May/June 2004 issue (vol. 32, no. 3) of the *Disease Control Newsletter*.

During 2003, three cases of LaCrosse encephalitis were reported. The disease, which primarily affects children, is transmitted through the bite of infected *Ochlerotatus 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 2003, 117 cases were reported from 19 southeastern Minnesota counties, with a median of five cases (range, three to 13 cases) reported annually. Disease onsets have been reported from June through September; most onsets have occurred from mid-July through mid-September.

Campylobacteriosis

Campylobacter continues to be the most commonly reported bacterial enteric pathogen in Minnesota (Figure 1). There were 937 cases of culture-confirmed *Campylobacter* infection reported in 2003 (19.0 per 100,000 population). This is similar to the 941 cases reported in 2002 and also similar to the mean annual number of cases reported from 1998 to 2002 (mean, 953 cases; range, 786 to 1,006). Fifty-two percent of cases occurred outside the

Twin Cities metropolitan area. Of the 829 *Campylobacter* isolates confirmed and identified to species by MDH, 92% were *C. jejuni* and 7% were *C. coli*.

The median age of case-patients was 32 years (range, 1 month to 87 years). Forty-six percent of cases were between 20 and 49 years of age, and 15% were 5 years of age or younger. Fifty-five percent of the cases were male. Fifteen percent of case-patients were hospitalized; the median length of hospitalization was 2 days. Fifty percent of infections occurred during June through September. Of the 827 (88%) case-patients for whom data were available, 132 (16%) reported travel outside of the United States during the week prior to illness onset. The most common travel destinations were western Europe (n=35) and Mexico (n=31). There were no outbreaks of campylobacteriosis identified in 2003.

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. From 1992 to 2002, the proportion of *C. jejuni* isolates from Minnesota residents that were resistant to quinolones increased from 1% to 18%. In 2003, the proportion of quinolone-resistant *Campylobacter* isolates was 16%.

During 2003, 60% of *C. jejuni* isolates from patients with a history of foreign

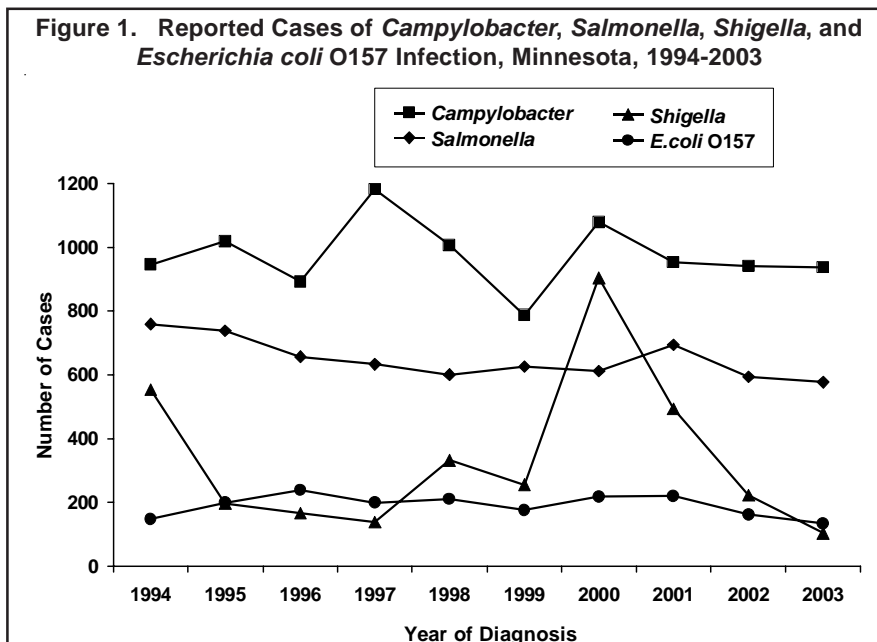
travel (regardless of destination) during the week before illness onset were resistant to fluoroquinolones. Domestically acquired quinolone-resistant *C. jejuni* infections also have increased significantly since 1996. This increase likely is due largely to the use of fluoroquinolones in poultry (the primary source of *Campylobacter* for humans) in the United States, which began late in 1995.

Cryptosporidiosis

During 2003, 155 confirmed cases of *Cryptosporidium* spp. (3.2 per 100,000 population) were reported. This is lower than the 206 cases reported in 2002 and represents a 21% decrease from the median number of cases reported annually from 1996 to 2002 (median, 197 cases; range, 81 to 242). The median age of case-patients in 2003 was 14 years (range, 4 months to 79 years). Children 10 years of age or younger accounted for 37% of cases. Sixty-one percent of cases occurred during July through October. The incidence of cryptosporidiosis in the Southeastern, South Central, and Central districts (8.0, 7.9, and 7.5 cases per 100,000 population, respectively) was significantly higher than the statewide incidence. Only 13 (8%) reported cases occurred among residents of the Twin Cities metropolitan area (0.5 per 100,000 population). Twenty-three (15%) case-patients required hospitalization, for a median of 2 days (range, 1 to 29 days). Two case-patients were known to be HIV-infected.

Four outbreaks of cryptosporidiosis were identified in 2003. Two outbreaks occurred due to contact with calves at a farm program that was affiliated with a high school. The first outbreak had 31 cases (nine laboratory-confirmed) and the second outbreak had 37 cases (nine laboratory-confirmed). A third outbreak related to animal contact occurred when employees at a veterinary clinic provided care for an ill calf; two laboratory-cases were identified. A foodborne outbreak of cryptosporidiosis was associated with a potluck event at a private home, resulting in nine cases (three laboratory-confirmed); the vehicle was not identified.

Figure 1. Reported Cases of *Campylobacter*, *Salmonella*, *Shigella*, and *Escherichia coli* O157 Infection, Minnesota, 1994-2003



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

During 2003, 133 culture-confirmed cases of *Escherichia coli* O157 infection (2.7 per 100,000 population) were reported. This represents a 17% decrease from the 160 cases reported in 2002 and a 35% decrease from the median number of cases reported annually from 1997 to 2002 (median, 204 cases; range, 160 to 219). Sixty-eight (51%) cases occurred in the Twin Cities metropolitan area. The remaining 65 cases occurred throughout Greater Minnesota. One hundred eleven (83%) cases occurred from May through October. The median age of case-patients was 18 years (range, 9 months to 76 years). Forty-four (33%) case-patients were hospitalized; the median duration of hospitalization was 3 days (range, 1 to 36 days).

Four *E. coli* O157 outbreaks were identified during 2003. Among these, two outbreaks were foodborne: the first outbreak, resulting in five primary and two secondary confirmed *E. coli* O157 infections in Minnesota residents, was associated with consumption of alfalfa sprouts traced to seeds imported from Australia by a Kentucky distributor. The second foodborne outbreak was associated with consumption of vacuum-packed frozen steaks sold door-to-door; this outbreak resulted in six confirmed and two probable *E. coli* O157 cases in Minnesota residents as well as single confirmed cases in Michigan, Kansas, Iowa, and North Dakota. One of the Minnesota case-patients developed HUS with serious neurologic sequelae.

The third *E. coli* O157 outbreak, resulting in three confirmed *E. coli* O157 cases, occurred in a daycare, and was likely transmitted person-to-person. The fourth outbreak was associated with attendance at a county fair and was likely transmitted by direct or indirect contact with animals. There were five confirmed cases among Minnesota residents and there was one confirmed case in a Nevada resident. One of the Minnesota cases developed HUS and was hospitalized for 36 days.

In 2003, nine cases of hemolytic uremic syndrome (HUS) were reported. There were no fatal cases. From 1997 to 2003, the mean annual number of reported HUS cases was 14 (range, nine to 22), and the overall

case fatality rate was 9%. In 2003, the median age of HUS case-patients was 13 years (range, 1 to 58 years). Four case-patients were middle-aged (ages 48, 50, 52, and 58 years), an unusual age group for HUS, which occurs predominantly in children and the elderly. All nine case-patients were hospitalized, with a median hospital stay of 16 days (range, 5 to 36 days). All HUS cases occurred during June through September. As noted previously, there were two outbreak-related cases of HUS. All HUS cases reported in 2003 were post-diarrheal. *E. coli* O157:H7 was cultured from the stool of six case-patients and *E. coli* O145:H25 was cultured from the stool of one case-patient. *E. coli* O157 serology was positive in one HUS patient with a negative stool culture. One HUS patient had an undefined etiology.

Giardiasis

During 2003, 851 cases of *Giardia* infection (17 per 100,000 population) were reported. This represents a 13% decrease from the 982 cases reported in 2002 and is substantially less than the annual number of cases reported from 1996 through 2002 (median, 1,098 cases; range, 982 to 1,556).

The median age of case-patients reported in 2003 was 25 years. As in previous years, cases were clustered among children less than 5 years of age (21%); only 16% of cases were over 50 years of age. This age distribution suggests a higher risk for transmission among young children and the adults who care for them. Overall, 6% of case-patients were hospitalized; 19% of case-patients over 50 years of age were hospitalized.

There were two outbreaks of giardiasis in Minnesota in 2003; both occurred in child daycare settings (six and three confirmed cases, respectively) with person-to-person transmission. One waterborne outbreak was documented among Minnesota residents who were exposed to contaminated drinking water while camping in a national park in another state; 18 laboratory-confirmed cases among Minnesota residents were identified.

MDH began systematically interviewing cases of giardiasis in January 2002 in order to better characterize the illness and evaluate potential risk factors for infection. Sixty-two percent of the 2003 cases were interviewed. The

symptoms most commonly reported by case-patients included diarrhea (95%), fatigue (82%), gas or bloating (74%), abdominal pain (73%), and nausea (62%); less commonly reported symptoms included vomiting (35%), and chills or fever (24%). The median duration of symptoms was 23 days (range, 2 to 358 days).

Case-patients were interviewed about potential exposures during the 14-day period prior to their illness onset. Forty-one percent of interviewed cases reported traveling prior to their onset. Among travelers, 25% reported travel outside the United States. Eighteen percent of case-patients reported camping or hiking prior to onset, and 39% reported swimming or entering water. Fifty-one percent of adult case-patients reported having children in their households; 53% of those case-patients had children in diapers. Thirty-five percent of adults reported changing a diaper prior to onset. Among pediatric giardiasis cases, 42% of interviewed parents reported that their child had contact with a childcare setting prior to and/or during illness.

***Haemophilus influenzae* Invasive Disease**

Fifty-seven cases of invasive *Haemophilus influenzae* disease (1.2 per 100,000 population) were reported in 2003. Case-patients ranged in age from newborn to 96 years (median, 60 years). Twenty-three (40%) case-patients had pneumonia, 18 (32%) had bacteremia without another focus of infection, four (7%) had meningitis, and 12 (21%) had other conditions. Eight (14%) deaths were reported among these case-patients.

Of 53 *H. influenzae* isolates for which typing was performed at MDH, eight (15%) were type f, five (9%) were type b, four (8%) were type e, two (4%) were type c, and 34 (64%) were untypeable. Isolates from four cases were not available for typing.

Five cases of type b (Hib) disease occurred in 2003, compared to one case in 2002 and one case in 2001. The Hib cases reported in 2003 occurred in two case-patients <1 year old and three >50 years old. An 11-month-old infant had received one dose of Hib vaccine; a 9-month-old infant had not been vaccinated. Four out of the five cases had significant **continued...**

underlying medical conditions. Of the five cases of Hib, two had pneumonia, one had epiglottitis, one had cellulitis, and one had bacteremia without another focus of infection. All patients survived.

The eight deaths occurred in patients ranging in age from newborn to 87 years. Five case-patients presented with pneumonia, and three with bacteremia without another focus of infection. All eight case-patients had *H. influenzae* isolated from blood and seven had underlying medical conditions. The isolate from one of the deceased case-patients was type c; the seven other deceased case-patients had untypeable isolates.

HIV Infection and AIDS

AIDS is the advanced state of HIV infection. Surveillance for AIDS has been conducted in Minnesota since 1982. In 1985, when the U.S. Food and Drug Administration approved the first diagnostic test for HIV, Minnesota became the first state to make HIV infection a reportable condition; 39 states now require confidential reporting of HIV infection.

Compared to other states nationwide, the incidence of HIV/AIDS in Minnesota is moderately low. In 2002, state-specific AIDS incidence rates per 100,000 population ranged from 0.5 in North Dakota to 34.8 in New York, with 3.2 cases per 100,000 population reported in Minnesota. Similar comparisons for HIV (non-AIDS) incidence rates are not possible, because some states only began HIV (non-AIDS) reporting in the last year.

As of December 31, 2003, a cumulative total of 7,356 cases of HIV infection have been reported to MDH, including 4,183 AIDS cases and 3,173 HIV (non-AIDS) cases. Of these HIV/AIDS case-patients, 2,583 (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 in Minnesota, primarily due to new antiretroviral therapies such as protease inhibitors, which delay the progression from HIV infection to AIDS

and improve survival among AIDS patients. In 2003, 163 new AIDS cases and 54 deaths among AIDS patients were reported (Figure 2).

The annual number of newly diagnosed HIV (non-AIDS) cases reported in Minnesota has remained fairly constant since the mid-1990s, with 177 reported in 2003. This trend, coupled with the improved survival of HIV-infected individuals, has led to an increasing number of persons in Minnesota living with HIV or AIDS. Approximately 4,600 persons with HIV/AIDS were residing in Minnesota at the end of 2003.

Historically, and in 2003, approximately 90% (232/266) of new HIV infections (both HIV [non-AIDS] and AIDS at first diagnosis) reported in Minnesota occur in the Twin Cities 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.

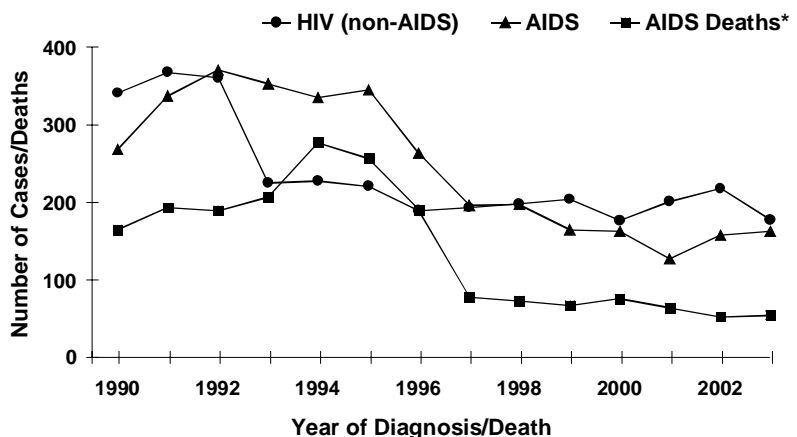
The majority of new HIV infections in Minnesota occur among males. Trends in the annual number of new HIV infections diagnosed among males differ by race/ethnicity. New infections occurred primarily among white males in the 1980s and early 1990s. Although whites still comprise the largest proportion 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 33 new infections in 2003. The number of HIV infections diagnosed among Hispanic and African-born males has increased annually, with 23 and 27 new infections, respectively, diagnosed in 2003.

Females account for an increasing percentage of new HIV infections, from 10% of new infections in 1990 to 24% in 2003. 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 almost doubled from 1990 (12 cases) to 2003 (20 cases), whereas the number of new infections among African-born females has increased nine-fold from three cases in 1990 to 28 cases in 2003. The annual number of new infections diagnosed among Hispanic, American Indian, and Asian females is small, with fewer than 10 cases annually in each group.

Despite relatively small numbers of cases, persons of color are disproportionately affected by HIV/AIDS in Minnesota. In 2003, non-white men comprised approximately 12% of the male population in Minnesota and 46% **continued...**

Figure 2. HIV (non-AIDS) and AIDS Cases by Year of Diagnosis, and AIDS Deaths by Year of Death, Minnesota, 1990-2003



* Deaths among AIDS cases, regardless of cause

of new HIV infections among men. Similarly, persons of color comprised approximately 11% of the female population and 88% 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.

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) have declined since 1991. In 1991, 69% (324/470) of new HIV infections were attributed to MSM (or MSM who also inject drugs); by 2003, this percentage had decreased to 47% (126/266). However, current attitudes, beliefs, and unsafe sexual practices documented in surveys among MSM nationwide, and a current increase in syphilis cases among MSM, documented in Minnesota and elsewhere, warrant concern. Similar to syphilis increases in other United States cities and abroad, nearly 50% 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 have declined over the past decade for men and women, falling from 17% (80/470) of cases in 1991 to 5% (13/266) in 2003. 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 65 new HIV diagnoses among women in 2003 can be attributed to heterosexual exposure after re-distributing those with unspecified risk (Lansky A, Fleming PL, Byers RH, 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 2003, there were 55 new HIV infections reported among Africans. While African-born persons comprise less than 1% of the state's population, they accounted for 21% of all HIV infections diagnosed in Minnesota in 2003. 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. Collaborations between MDH, the Minnesota Department of Human Services, and community-based organizations serving African-born persons in Minnesota are underway addressing these complex issues.

Influenza

The MDH Public Health Laboratory confirmed the first influenza isolate of the 2003-2004 influenza season in Minnesota on November 12, 2003, which represented an early start of influenza activity. Since 1990-1991, the first influenza isolate typically has been identified between mid-November and mid-December. Increased influenza activity followed shortly thereafter, both nationally and locally. During the week of November 22, 10 states reported widespread influenza activity. Reports from other states of severe influenza illness and deaths in children were making news headlines, causing increased public demand for vaccine and quickly exhausting the existing vaccine supply. More than 5,000 phone calls were made to an MDH influenza vaccine hotline between December 5 and 16, requesting information on vaccine availability. National influenza-like illness (ILI) activity peaked the week of December 20, and peaked in Minnesota the following week.

Influenza surveillance in Minnesota relies on reporting of individual cases from clinics, hospitals, and laboratories, as well as outbreak reporting from schools and long-term care facilities.

The current surveillance systems for reporting outbreaks in schools and long-term care facilities have been in place since the 1995-1996 influenza season, and a Sentinel Provider Influenza Network was initiated in 1998-1999 to conduct active surveillance. Twenty-nine sentinel sites participated in the network during the 2003-2004 season. While the program has surpassed its goal of 20 sentinel sites (i.e., one site per 250,000 population), MDH plans to expand the network to ensure active surveillance sites represent all areas of the state. Volunteers are particularly needed in northern and southern areas of the state where there is sparse sentinel coverage. In order to establish baseline rates of ILI and to monitor influenza year-round, MDH initiated a Summer Influenza Sentinel Surveillance program with 17 participating sites in May 2003.

In response to increasing influenza-related encephalitis cases in children in Japan and reports of severe influenza in pregnant women in the southern United States, enhanced surveillance was implemented during the 2003-2004 influenza season. MDH requested reports of 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, and suspected or confirmed influenza in hospitalized pregnant women. A surveillance project was also initiated in the metropolitan area to monitor influenza-related pediatric hospitalizations.

As a result of enhanced surveillance, two cases of influenza-related encephalopathy and one pediatric, influenza-related death were identified. The encephalopathy cases presented in a six-month-old from Martin County and a four-year-old from Fairbault County. The six-month-old had no pre-existing conditions and was not vaccinated for influenza. The four-year-old had a history of pneumonia as a two-year-old and an unknown influenza vaccination history. Both case-patients developed symptoms in mid-December and both resulted in mild neurologic sequelae. The death occurred in a six-year-old of McLeod County. The child **continued...**

had a history of severe static encephalopathy secondary to a motor vehicle accident. He was admitted to the hospital in early January with respiratory distress identified as influenza A pneumonia; the child had a DNR/DNI order and died in late January.

The MDH Public Health Laboratory received 919 influenza isolates for viral confirmation and strain identification. Of these isolates, 911 (99.1%) were influenza type A (H3); 1 (0.1%) was A (H1); 1 (0.1%) was B, 1 (0.1%) was B Sichuan-like, and 5 (0.5%) were A (with unidentifiable strains). Influenza type A/Fujian (H3N2) was the predominant strain circulating nationally, representing 88% of influenza A viruses typed at CDC. The predominant influenza strain, influenza A (H3), circulating in Minnesota during 2003-2004 was not well matched to the strains in the influenza vaccine used in 2003-2004. Studies conducted during previous seasons with imperfect vaccine matches have shown that even a poorly matched vaccine is still moderately effective in preventing influenza-related hospitalizations and deaths.

A probable outbreak of 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 $\geq 101^{\circ}$ F, illness lasting 3 or more days, and at least one secondary influenza symptom (e.g., myalgia, headache, cough, coryza, sore throat, 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. In 2003-2004, MDH received reports of probable ILI outbreaks from 92 schools in 40 counties throughout Minnesota and possible outbreaks in 77 schools in 35 counties. Schools began reporting ILI outbreaks in late October; 76% of the probable and possible ILI outbreaks were reported during December. Since 1988-1989, the number of schools reporting suspected influenza outbreaks has ranged from 38 schools in 20 counties in 1996-1997 to 441 schools in 71 counties in 1991-1992.

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 ($\geq 101^{\circ}$ 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. Forty-four long-term care facilities reported confirmed or suspected ILI outbreaks in 2003-2004. In 41 (93%) of these facilities, influenza was laboratory-confirmed by rapid tests or culture. Thirty-four (77%) facilities reported outbreaks between mid-December and mid-January. Since 1988-1989, the number of long-term care facilities reporting ILI outbreaks has ranged from six in 1990-1991 to 79 in 1997-1998.

Avian influenza surveillance efforts worldwide identified two highly pathogenic avian influenza (HPAI) strains that infected humans. In mid-December the Republic of Korea reported sudden deaths of chickens on a poultry farm; the pathogen was determined to be an HPAI (H5N1) strain. Three weeks later, a severe respiratory illness was reported in 11 previously healthy Vietnamese children who were hospitalized in Hanoi. Testing performed on two fatal cases from this cluster revealed HPAI (H5N1) as the pathogen. During this time, several poultry outbreaks of HPAI were reported in Vietnam. Japan, Indonesia, Thailand, China, Cambodia, Laos followed shortly thereafter also with reports of poultry outbreaks. Thailand and Vietnam have been the only countries to date to report human cases of avian influenza during this outbreak. The World Health Organization (WHO) has confirmed 12 H5N1 cases in Thailand with 8 deaths and 22 H5N1 cases in Vietnam with 15 deaths (68% case-fatality rate overall). Human-to-human transmission was initially suspected in a family cluster of cases in Vietnam; this has been ruled out. Reports of avian influenza outbreaks in poultry continue to be reported in Southeast Asia.

In late March, two Canadian poultry farmers were infected with the H7 avian influenza strain, both have recovered from the disease that manifested in conjunctivitis and mild respiratory symptoms. As a result of these human infections, the WHO elevated the global pandemic preparedness level from 0.1 to 0.2. Level 0.2 indicates that more than one human case caused by a new subtype of influenza has been identified in a local event. Avian influenza continues to be reported in British Columbia. In

response to the avian influenza outbreaks and emergency response infrastructure changes, MDH is currently updating its influenza pandemic plan.

The events of the 2003-2004 influenza season emphasized many critical components to managing influenza. These include vaccinating at-risk patients and healthcare workers annually, and carefully evaluating patients with severe influenza for travel and exposure histories that could indicate a potential novel strain.

Listeriosis

Six cases of listeriosis were reported during 2003. All six case-patients were hospitalized, and one died 26 days after specimen collection. None of the cases was associated with a recognized outbreak. The ages of five case-patients ranged from 58 to 69 years, and the remaining case was 23 years of age. Five cases had underlying medical conditions, including one undergoing radiation therapy for cancer, two taking corticosteroids (one for multiple sclerosis), one with diabetes, and one with asthma. The 23-year-old case-patient was 35 weeks pregnant and had a C-section due to decreased fetal movement; the infant was hospitalized for 10 days after birth and was discharged after recovery.

The six cases reported in 2003 continues a recent trend of decreased listeriosis reports in Minnesota. As recently as 1999, 18 cases were reported, decreasing to four cases in 2002. The median number of cases reported annually from 1996 to 2002 was 10 (range, 4 to 18 cases).

Elderly persons, pregnant women, neonates, and immunocompromised individuals 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. *Listeria monocytogenes* can multiply in refrigerated foods. Persons at highest risk should: 1) avoid soft cheeses (e.g., feta, Brie, Camembert, blue-veined, and Mexican-style cheeses) and unpasteurized milk; 2) thoroughly heat/reheat deli meats, hot
continued...

dogs, other meats, and leftovers; and 3) wash raw vegetables.

Lyme Disease

During 2003, reported Lyme disease cases decreased to 473 (9.4 cases per 100,000 population) from a record 867 cases (17.6 per 100,000) in 2002. An additional 31 cases were classified as probable Lyme disease. Two hundred seventy-four (58%) confirmed case-patients in 2003 were male. The median age of case-patients was 33 years (range, 1 to 90 years). Physician-diagnosed erythema migrans was present in 393 (83%) cases. One hundred seven (23%) cases had at least one late manifestation of Lyme disease (including 82 with a history of objective joint swelling and 19 with cranial neuritis) and confirmation by a positive Western blot test. Onsets of illness peaked in July (39% of cases), corresponding to the peak activity of nymphal *Ixodes scapularis* (deer tick or black-legged tick) in mid-May through mid-July.

Two hundred thirty-eight (50%) cases occurred among residents of the Twin Cities metropolitan area. However, only 50 (15%) of 331 case-patients with known exposure data likely were exposed to infected *I. scapularis* in metropolitan counties, primarily Anoka, Washington, and extreme northern Ramsey Counties. Most case-patients either resided in or traveled to endemic counties in east-central Minnesota or western Wisconsin. As in 2002, Crow Wing County continued to have the highest number of Lyme disease case exposures (60 [18%] of 331 case-patients).

For a more detailed discussion of Lyme disease and other tick-borne diseases in Minnesota, including a map of high-risk areas, see "Lyme Disease and Human Anaplasmosis in Minnesota, 2003" in the March/April 2004 issue (vol. 32, no. 2) of the *Disease Control Newsletter*.

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). Risk factors for 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 healthcare-associated 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 \leq 48 hours of admission to a hospital (if patient admitted); no history of prior MRSA infection or colonization; no presence of indwelling percutaneous devices or catheters at the time of culture; or 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.

In 1999, the Minnesota Rules governing communicable disease reporting were amended to require that designated sentinel hospitals report all cases of MRSA to MDH. In addition, cases of CA-MRSA causing serious illness or death were made reportable statewide.

MDH initiated active surveillance for CA-MRSA at 12 sentinel hospital laboratories in January 2000. The laboratories (six in the Twin Cities 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 community and healthcare-associated MRSA (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):2976-2984).

In 2003, 1,817 cases of MRSA infection were reported in 2003. Eighteen percent of these cases were classified as CA-MRSA; 81% were classified as HA-MRSA, and 1% could not be classified. Isolates were received from 298 (90%) of the 333 CA-MRSA cases. To date, antimicrobial susceptibility testing has been completed on 81 (24%) and molecular subtyping by PFGE has been completed for 161 (54%) of these isolates. CA-MRSA patients were younger than patients with HA-MRSA (median age, 29 years vs. 68 years) and more likely to have MRSA isolated from the skin (77% vs. 19%). Most CA-MRSA isolates belonged to one particular PFGE clonal group that is distinct from the clonal group most common among HA-MRSA isolates.

Clinicians should be aware that therapy with beta-lactam antimicrobials can no longer be relied upon as the sole empiric therapy for severely ill patients whose infections may be staphylococcal in origin. All CA-MRSA isolates submitted in 2003 were susceptible to gentamicin, linezolid, rifampin, synergid, trimethoprim-sulfamethoxazole, and vancomycin. Most CA-MRSA isolates (94%) were susceptible to tetracycline. Sixty-seven percent were susceptible to ciprofloxacin and 69% were susceptible to clindamycin including 14 isolates demonstrating inducible clindamycin resistance. Conversely, only 26% of isolates were susceptible to erythromycin.

MDH has also received reports of serious illness and death due to community-associated methicillin-susceptible *S. aureus* (CA-MSSA) infection and is interested in receiving reports of all serious illnesses or deaths due to *S. aureus* infection, regardless of susceptibility to methicillin.

Mumps

Only one case of mumps was reported to MDH during 2003; a total of 33 mumps cases have been reported in the past five years.

The case was a 25-year-old white, non-Hispanic male, with unknown history of vaccination with measles, mumps and rubella (MMR) vaccine. No source case was identified. Adults represent an increasing proportion of **continued...**

mumps cases reported in Minnesota. In 2002, three of the five cases occurred in adults, highlighting the need to assess the mumps immunization status of adults.

This case was laboratory confirmed by positive IgM serology; however, no convalescent serum specimen was collected to demonstrate a rise in serum IgG antibody. Both IgM and IgG serologic testing should be performed on suspect mumps cases, as false-positive indirect immunofluorescent antibody (IFA) tests for mumps IgM have been reported. Mumps can also be confirmed by viral culture of throat washings, urine, or spinal fluid specimens. Specimens for viral culture should be collected during the first five days of illness.

***Neisseria meningitidis* Invasive Disease**

Twenty-nine cases of *Neisseria meningitidis* invasive disease (0.6 per 100,000 population) were reported in 2003, compared to 36 cases in 2002. The distribution of serogroups among case isolates from 2003 was similar to 2002, except for a decline in the number of serogroup Y cases, with 16 (55%) serogroup C cases, eight (28%) serogroup B cases, three (10%) serogroup Y cases, one (3%) serogroup W-135 case, and one (3%) case whose isolate was not groupable.

Case-patients ranged in age from 1 month to 49 years, with a mean of 22 years. Sixty-six percent of the cases occurred in the Twin Cities metropolitan area. Seventeen (59%) case-patients had meningitis, five (17%) had bacteremia without another focus of infection, two (7%) had bacteremia with pneumonia, two had peritonitis, one (3%) had septic arthritis, one had pericarditis, and one had cellulitis with bacteremia. All cases were sporadic, with no definite epidemiologic links.

Three deaths occurred among cases reported in 2003. A 19-year-old female and a 20-year-old female died of meningitis attributed to serogroup C. A 49-year-old male died of peritonitis due to serogroup Y.

Since the fall of 1998, MDH has collected additional information on college-aged students with *N. meningitidis* invasive disease as part of a nationwide effort to determine whether providing meningococcal

vaccine to incoming college freshmen effectively prevents disease in this age group. In the fall of 1999, the Advisory Committee on Immunization Practices recommended that health care providers inform college students about meningococcal disease and the availability of vaccine. Serogroups A, C, Y, and W-135 are covered by the quadrivalent vaccine. Two serogroup C cases and one serogroup B case reported in Minnesota during 2003 occurred in college students; none were freshmen.

In the spring of 2002, MDH in collaboration with CDC and other EIP sites nationwide, began a case-control study of risk factors for meningococcal disease among high school students in Minnesota. One culture-confirmed serogroup B case and one confirmed serogroup C case occurred among high school students in 2003. One culture-negative suspected case of meningococcal disease, positive by polymerase chain reaction (PCR), occurred in a high school student also was included in the study in 2003.

Pertussis

During 2003, 207 (4.2/100,000 population) cases of pertussis were reported, compared to 429 cases reported in 2002, and 308 in 2001. Laboratory confirmation was available for 131 (63%) cases; 59 (45%) were confirmed by culture and 72 (55%) by PCR. Among the remaining cases, 52 (25%) were epidemiologically-linked to culture-confirmed cases, and 24 (12%) met the clinical case definition. Sixty-six percent of the reported cases occurred in residents of the Twin Cities metropolitan area.

Two deaths due to pertussis-related complications were reported in 2003. One case was a 13-year-old with neuroblastoma. The other case was an 82-year-old with chronic renal insufficiency and multiple myeloma. Both had pertussis-related pneumonia. Disease in the 82-year-old woman was confirmed by blood culture. There has been only one prior report of *B. pertussis* isolated from blood (CDC. Fatal case of unsuspected pertussis diagnosed from a blood culture – Minnesota, 2003. *MMWR* 2003;53:131-2).

Paroxysmal coughing is the most commonly reported symptom. In 2003, 192 (93%) of the case-patients

experienced paroxysmal coughing. Over one third (73, 35%) 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 100 (48%) of the cases. Sixty-nine (33%) of the case-patients reported apnea. Infants and young children are at the highest risk for severe disease and complications. Pneumonia was diagnosed in 8 (4%) case-patients, 3 of whom were less than 18 months of age. Nineteen (9%) case-patients were hospitalized; 13 of the hospitalized patients were younger than 6 months of age.

Due to waning immunity, of either natural infection or vaccine, pertussis can affect persons of any age. The disease is increasingly recognized in older children and adults; however, it is not clear whether it is a true increase or due to changes in surveillance and reporting. During 2003, case-patients ranged in age from 1 day to 82 years. Fifty-eight (28%) cases occurred in persons ages 13 to 17 years old. Fifty-five (27%) cases occurred in persons 18 years of age and older. Persons 5-12 years of age accounted for 21% (44) of all cases. Twenty-one (10%) of the total cases occurred in infants less than 6 months of age, and 29 (14%) occurred in children ages 6 months through 4 years.

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 2003, 23 cases of pertussis were reported in infants less than 1 year of age. A likely source of exposure was identified for 11 (48%) cases: 5 (46%) were infected by adults age 18 and over, 3 (27%) were infected by an adolescent, and 3 (27%) were infected by a child less than 13. Twelve (52%) cases had no identified source of infection. For these cases, the source of infection was likely outside the household.

Although unvaccinated children are at highest risk for pertussis, fully immunized children may also develop disease. Disease in those previously immunized is usually mild. Efficacy for currently licensed vaccines is estimated to be 71 to 84% in preventing **continued...**

serious pertussis disease, but waning immunity begins around 3 years after the last dose of DTaP. Of the 118 case-patients who were 7 months to 15 years of age, 82 (70%) are known to have received at least a primary series of three doses. Of the 31 cases in persons 7 months to 7 years of age, 12 (39%) received fewer than three doses of DTP/DTaP vaccine before onset of illness, and were considered preventable cases.

MDH reporting rules require that clinical isolates of *B. pertussis* be submitted to the Public Health Laboratory. Of the 59 culture-confirmed cases, 58 (98%) isolates were received and subtyped by PFGE and tested for antibiotic susceptibility to erythromycin, ampicillin, and trimethoprim/sulfamethoxazole. Ten distinct PFGE patterns were identified; three of these patterns occurred in only a single case isolate. The two most common patterns identified accounted for 36 (62%) of the total isolates and occurred throughout the year.

No cases of erythromycin-resistant *B. pertussis* have been identified in Minnesota since the first case in October 1999. Statewide, all 968 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.

The prompt diagnosis and treatment of cases, and prophylaxis of contacts, are the only options for limiting transmission, until an approved booster vaccination for pertussis is available to protect older children and adults. Pertussis should be included in the differential diagnosis of cough illness in persons of all ages regardless of immunization status.

Laboratory tests should be performed on all suspected cases of pertussis. Culture of *B. pertussis* requires inoculation of nasopharyngeal (NP) mucous on special media and incubation for seven to ten 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.

Salmonellosis

During 2003, 576 culture-confirmed cases of *Salmonella* infection (11.7 per 100,000 population) were reported. This represents a 3% decrease from the 593 cases reported in 2002 and a 8% decrease from the median annual number of cases reported from 1996 to 2002 (median, 626 cases; range, 593 to 693) (Figure 1). Four serotypes, *S. Typhimurium* (124 cases), *S. Enteritidis* (107 cases), *S. Heidelberg* (63 cases), and *S. Newport* (41 cases), accounted for 58% of cases reported in 2003. There were three cases of *S. Typhi* infection, but only two had symptoms compatible with typhoid fever. Six percent of salmonellosis case-patients were less than 1 year of age, and 25% were less than 8 years of age. Twenty-four percent of case-patients were hospitalized for their infection. Of 538 cases who were interviewed, 68 (13%) traveled internationally during the week prior to their illness onset.

Two case-patients died. Isolates from these case-patients included one *S. Berta* isolated from stool and one *S. Typhimurium* isolated from blood. Both had serious underlying medical conditions (hepatocellular carcinoma, history of kidney transplant).

Six outbreaks and one probable outbreak of salmonellosis were identified in 2003. One outbreak involved contact with reptiles. The remaining five outbreaks and the probable outbreak were food-borne.

One outbreak of *S. Ealing* as a result of indirect contact with reptiles was

identified. This outbreak resulted in two culture-confirmed cases among visitors to a private residence where more than 30 reptiles were housed. The case-patients visited the house in February and April. Numerous reptile samples and environmental samples from the human living areas, including the kitchen sink, tested positive for several *Salmonella* serotypes, including the outbreak strain of *S. Ealing*.

The first food-borne outbreak of 2003 occurred in April. Several families purchased a cow, killed it, and butchered it at the farm where it was purchased. The beef was subsequently eaten at various locations. *Salmonella* Somatic Group D (9,12: non-motile) was isolated from the stool of three persons, and *S. Enteritidis* (motile) was isolated from the stool of one person. These four *Salmonella* isolates were indistinguishable by PFGE subtyping. *Campylobacter jejuni* was isolated from the stool of two cases, including one case-patient co-infected with *Salmonella*. One case-patient tested positive for *Aeromonas hydrophila*. Eleven additional cases of illness were identified but were not culture-confirmed.

A probable outbreak of *S. Litchfield* associated with a restaurant occurred in April. Two patrons became ill with salmonellosis after eating at the same restaurant over a 2-day period. No additional cases were identified. The source and vehicle of transmission were not confirmed.

A cluster of six *S. Enteritidis* cases with illness onset dates ranging from May 13 to June 22 was identified in June. The outbreak was associated with eating at one restaurant. Eggs from a producer in Iowa were most likely the initial vehicle in the restaurant outbreak. One additional case-patient also ate eggs at a different restaurant.

In September, three persons became ill with *S. Saint Paul* after attending a block party. Two additional cases of gastrointestinal illness were identified but were not tested for *Salmonella*. Toffee bars were statistically associated with illness, but because there was some cooking of foods of animal origin going on during the event (e.g., grilling chicken), cross-contamination of surfaces or ready-to-eat food items was a possible cause of this outbreak. **continued...**

A S. Heidelberg outbreak associated with eating at a restaurant resulted in 41 culture-confirmed S. Heidelberg cases among patrons and employees in September, including a resident from Wisconsin and one from Washington. An additional 16 unconfirmed cases were identified. Consumption of eggs and pancakes was associated with illness. Multiple violations in food holding, handwashing, disinfection, and labeling of food items were identified.

In November, a S. Enteritidis outbreak associated with eating at a restaurant resulted in 20 patrons and seven restaurant employees with confirmed S. Enteritidis infections. Three additional ill patrons were identified but not confirmed. Shell eggs were confirmed as the ultimate source of S. Enteritidis through trace back and environmental testing at the farm of origin. Deficiencies in food holding and preparation, including inadequate refrigeration and potential cross-contamination, were identified at the restaurant. Deficiencies were also identified at the distributor that supplied shell eggs served at the restaurant. Extensive S. Enteritidis contamination was found at the source egg farm. A later sporadic S. Enteritidis case was associated with eggs from the implicated farm, but not the restaurant. Eggs from this farm were diverted to pasteurization until FDA testing criteria were met.

Severe Acute Respiratory Syndrome (SARS)

SARS emerged in Guangdong Province, China in November 2002. The disease spread to Hong Kong and subsequently caused outbreaks in Taiwan, Vietnam, Singapore and Canada. SARS has been shown to be caused by a novel coronavirus (SARS-CoV). Minnesota Rules governing disease reporting were amended in November 2003 to include SARS. For additional information on SARS, see "SARS: Severe Acute Respiratory Syndrome" in the October/November 2003 issue (vol. 3, no. 6) of the *Disease Control Newsletter*.

On September 26, 2003, WHO reported a total of 8,098 SARS cases worldwide, with 774 (9.6%) deaths. The CDC reported a total 134 suspect and 19 probable cases of SARS in the United States. Eight cases had laboratory confirmation of SARS-CoV.

Eleven SARS cases were reported to MDH during 2003. According to a CDC case definition used at the time, there were 3 probable and 8 suspect cases. The cases were reported from mid-March to early May. All had a history of travel to a SARS-affected area with known community transmission (nine case-patients traveled to China, one to Hanoi, Vietnam and one to Toronto, Canada). The age range was from 8 months to 71 years. The probable cases were all children; two of them were hospitalized, none required assisted ventilation, and all cases, (probable and suspect) recovered.

MDH collaborated with clinicians by providing guidance on infection control, clinical management, and laboratory testing. Specimens were tested at MDH and sent to CDC for SARS-CoV testing. In addition, the MDH Public Health Laboratory provided viral and bacterial testing for respiratory pathogens. Results were positive for two cases for human metapneumovirus, and one each of parainfluenza 3, adenovirus, and respiratory syncytial virus.

MDH staff monitored SARS patients and their families during the infectious period to provide infection control instructions, to track symptoms and detect the possibility of transmission in close contacts.

In July 2003, applying a revised case definition to the 11 reported cases, two probable and seven suspect cases were excluded due to negative convalescent SARS-CoV serology. One probable case had an alternate diagnosis and was excluded. One suspect case did not have a convalescent serum drawn and remains as the only SARS case reported from Minnesota in 2003.

Sexually Transmitted Diseases

Active surveillance for gonorrhea and chlamydia was initiated in January 2002. This process 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. Additionally, case reports contain critical 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. Specifically, STDs disproportionately affect adolescents, young adults, and persons of color.

Chlamydia

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. In 2003, 10,714 cases (218 per 100,000 population) were reported, representing a 6% increase from 2002 (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 (1,253 per 100,000 population), with the next highest rate among 15 to 19-year-olds (927 per 100,000). The incidence of chlamydia among adults 25 to 29 years of age (518 per 100,000) is considerably lower but has increased in recent years. The chlamydia rate among females (317 per 100,000) is more than twice the rate among males (117 per 100,000). This difference probably is due to more frequent screening among women.

The incidence of chlamydia infection is highest in communities of color (Table 4). The rate among blacks (1,490 per 100,000 population) is 14 times higher than the rate among whites (105 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 (275 per 100,000), American Indians (464 per 100,000), and Hispanics (561 per 100,000) are two to five times higher than the rate among whites.

Chlamydia infections occur throughout the state, with the highest reported rates in Minneapolis (755 per 100,000 **continued...**)

population) and St. Paul (618 per 100,000). The incidence in the suburban metropolitan area (156 per 100,000) is similar to that in Greater Minnesota (131 per 100,000).

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. In 2003, 3,202 cases (65 per 100,000 population) were reported, representing an increase of 5% from 2002 (Table 3).

Adolescents and young adults are at greatest risk for gonorrhea (Table 4), with incidence rates of 209 per 100,000 population among 15 to 19-year-olds, 321 per 100,000 among 20 to 24-year-olds, and 168 per 100,000 among 25 to 29-year-olds. Gonorrhea rates for males (58 per 100,000) and females (72 per 100,000) are comparable. Communities of color are disproportionately affected by gonorrhea, with 46% of cases reported among blacks. The incidence of gonorrhea among blacks (727 per 100,000) is approximately 33 times higher than the rate among whites (22 per 100,000). Rates among American Indians (104 per 100,000) and Hispanics (106 per 100,000) are approximately five times higher than among whites. The rate among Asian/Pacific Islanders (29 per 100,000) is similar to that among whites.

Gonorrhea rates are highest in the cities of Minneapolis and St. Paul (Table 4). The incidence in Minneapolis (359 per 100,000 population) is nearly twice the rate in St. Paul (200 per 100,000), nine times higher than the rate in the suburban metropolitan area (40 per 100,000), and 18 times higher than the rate in Greater Minnesota (20 per 100,000).

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.

continued...

Table 3. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Syphilis, Minnesota, 1999-2003

Disease	1999		2000		2001		2002		2003	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Chlamydia	7,459	153.0	8,147	166.0	8,369	170.0	10,118	206.0	10,714	218.0
Gonorrhea	2,830	58.0	3,189	65.0	2,708	55.0	3,051	62.0	3,202	65.0
Syphilis, Total	70	1.4	80	1.6	135	2.7	149	3.0	195	4.0
Primary/										
Secondary	10	0.2	16	0.3	33	0.7	59	1.2	47	1.0
Early Latent*	9	0.2	18	0.4	16	0.3	23	0.5	45	0.9
Late Latent**	50	1.0	44	0.9	81	1.6	65	1.3	103	2.1
Congenital***	1	1.5	2	3.0	2	3.0	1	1.5	0	0.0
Other	0	0.0	0	0.0	3	0.1	1	0.02	0	0.0
Chancroid	1	0.02	0	0.0	1	0.0	0	0.0	0	0.0

*Duration ≤1 year
 **Duration >1 year; includes neurosyphilis
 ***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, 2003

Demographic Group	Chlamydia		Gonorrhea		Syphilis	
	No.	Rate	No.	Rate	No.	Rate
Total	10,714	218	3,202	65	47	1.0
<i>Residence</i>						
Minneapolis	2,887	755	1,374	359	21	5.5
St. Paul	1,776	618	575	200	5	1.7
Suburban*	3,073	156	789	40	16	0.8
Greater Minnesota	2,978	131	464	20	5	0.2
<i>Age</i>						
<10 years	11	2	0	0	0	0.0
10-14 years	159	42	55	15	0	0.0
15-19 years	3,469	927	783	209	2	0.5
20-24 years	4,040	1,253	1,035	321	4	1.2
25-29 years	1,656	518	538	168	2	0.6
30-34 years	732	207	326	92	10	2.8
35-44 years	522	63	347	42	22	2.7
≥45 years	125	8	118	7	7	0.4
<i>Gender</i>						
Male	2,848	117	1,418	58	43	1.8
Female	7,866	317	1,784	72	4	0.2
<i>Race**/Ethnicity</i>						
White	4,703	105	995	22	34	0.8
Black	3,025	1,490	1,475	727	6	3.0
American Indian	376	464	84	104	2	2.5
Asian	462	275	49	29	1	0.6
Other	259	291	72	81	1	1.1
Unknown***	1,889	---	527	---	3	---
Hispanic****	804	561	152	106	2	1.4

*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
 **Race-specific case counts include persons by race alone. Denominators used to calculate rates 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

Primary and Secondary Syphilis

The incidence of primary/secondary syphilis in Minnesota is lower than that of chlamydia or gonorrhea (Table 3). Forty-seven cases of primary/secondary syphilis (1.0 per 100,000 population) were reported in 2003.

Early Syphilis

The number of cases of early syphilis increased significantly in 2003, driven by an increase in syphilis cases among white men who have sex with men (MSM). Ninety-two cases of early syphilis were reported in 2003, compared to 82 cases in 2002. Of the 92 early syphilis cases in 2003, 83 (90%) occurred among men; 71 (86%) of these men reported having sex with other men. Almost half (42%) of the MSM diagnosed with early syphilis were co-infected with HIV. Similar increases in syphilis among MSM have been observed in other parts of the United States.

Congenital Syphilis

No cases of congenital syphilis were reported in Minnesota in 2003 (Table 3).

Chancroid

Chancroid continues to be very rare in Minnesota. No cases were reported in 2003.

Shigellosis

During 2003, 103 culture-confirmed cases of *Shigella* infection (2.1 per 100,000 population) were reported (Figure 1). This represents a 54% decrease from the 222 cases reported in 2002 and a 69% decrease from the median number of cases reported annually from 1998 to 2002 (median, 331 cases; range, 222 to 904).

In 2003, *Shigella sonnei* accounted for 72 (70%) cases, *S. flexneri* for 27 (26%), *S. boydii* for two (2%), and *S. dysenteriae* for one (1%); one isolate was not serotyped. Case-patients ranged in age from 7 months to 74 years (median, 23 years). Thirty-three percent of case-patients were less than 10 years of age; children less than 5 years of age accounted for 18% of cases. Sixteen (16%) case-patients were hospitalized. Seventy-eight percent of case-patients resided in the Twin Cities metropolitan area, with 44% of all case-patients residing in Hennepin County. There were no outbreaks of shigellosis in 2003.

Every tenth *Shigella* isolate received at MDH was tested for antimicrobial resistance. Ten isolates were tested in 2003; 100% of isolates were resistant to ampicillin, 80% were resistant to trimethoprim-sulfamethoxazole, and 80% of isolates tested were resistant to both ampicillin and trimethoprim-sulfamethoxazole.

***Streptococcus pneumoniae* Invasive Disease**

Statewide active surveillance for invasive *Streptococcus pneumoniae* (pneumococcal) disease began in 2002, expanded from the Twin Cities metropolitan area, where active surveillance has been ongoing since 1995. In 2003, 607 cases of invasive pneumococcal disease were reported, including 314 cases among Twin Cities metropolitan area residents, and 293 cases among residents of Greater Minnesota. Incidence rates overall, and by age group were similar between these two geographic regions. For example, there were 11.6 cases of invasive pneumococcal disease per 100,000 Twin Cities metropolitan area residents, and 12.6 cases per 100,000 residents of Greater Minnesota. By age group, annual incidence rates per 100,000 Twin Cities area residents and Greater Minnesota residents were, respectively, 26.3 and 18.9 cases among children aged 0-4 years; 2.4 and 4.0 cases among children and adults aged 4-34 years, 11.2 and 10.0 cases among adults 35-64 years, and 43.6 and 41.4 cases among adults aged 65 years and older.

In 2003, pneumonia accounted for 357 (59%) 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). The 194 pneumonia cases among Twin Cities area residents accounted for a higher proportion of all invasive disease in that group (62%), than the 163 cases among residents of Greater Minnesota (56%). Bacteremia without another focus of infection accounted for 178 (29%) cases statewide, including 75 (24%) cases in Twin Cities area residents and 103 (35%) cases in Greater Minnesota residents. Pneumococcal meningitis accounted for 37 (6%) cases statewide, including 24 (8%) of cases in Twin Cities area residents and 13 (4%) cases in Greater Minnesota residents. Seventy-two patients with invasive

pneumococcal disease died (12%), 41 (13%) were Twin Cities area residents and 31 (11%) were Greater Minnesota residents.

Compared with 1999, the year before the pediatric conjugate vaccine (PCV-7, Prevnar[®], Wyeth-Lederle) was licensed, a major downward trend in incidence of invasive pneumococcal disease was evident in 2000-2002 among children under age 5 years from the Twin Cities metropolitan area (Figure 3). The incidence rate in this age group increased slightly in 2003 (26.3 cases per 100,000, up from 22.5 cases per 100,000 cases the year before). Based on the distribution of serotypes among isolates from these cases, this increase only occurred in disease due to non-vaccine serotypes (i.e. serotypes other than the seven included in PCV-7, and other closely related serotypes). This trend bears further monitoring because increases due to non-vaccine serotypes, also called "replacement disease" are hypothetically possible, and a small degree of replacement disease among children has been observed elsewhere in the United States.

In 2003, among those in other age groups (especially aged 65 years and older), rates of invasive pneumococcal disease were substantially lower than those in 1999. This has also been observed elsewhere in the United States, and is likely attributable to herd immunity from use of the conjugate vaccine in children. PCV-7 reduces pneumococcal colonization by the vaccine serotypes, so it is possible that the reservoir of circulating pneumococcal strains in the community might now include fewer of the PCV-7 serotypes, leading to these disease reductions. For example, of invasive isolates from cases in Twin Cities area residents aged 65 years and older in 2003, 29% (32/110) were serotypes included in PCV-7, compared to 51% (72/142) in 1999. The 23-valent pneumococcal polysaccharide vaccine (PPV-23, Pneumovax[®], Merck, and Pnu-Immune 23[®], Wyeth-Ayerst Laboratories) is recommended for adults over age 64, and for other individuals with certain chronic conditions, but increasing use of this vaccine is unlikely to have caused this change in disease rates. There are 16 serotypes included in PPV-23 that are not included in PCV-7. In 2003, 43% (47/110) of isolates from **continued...**

those aged 65 years and older were of one of these 16 serotypes, compared with 30% (42/142) in 1999. Therefore, only the PPV-23 serotypes also included in the PCV-7 have declined in this age group.

Out of 567 isolates submitted for 2003 cases, 47 (8%) were highly resistant to penicillin and 32 (6%) exhibited intermediate-level resistance; 70 isolates (12%) exhibited multi-drug resistance (i.e. high-level resistance to two or more drug classes). The proportion of isolates submitted from

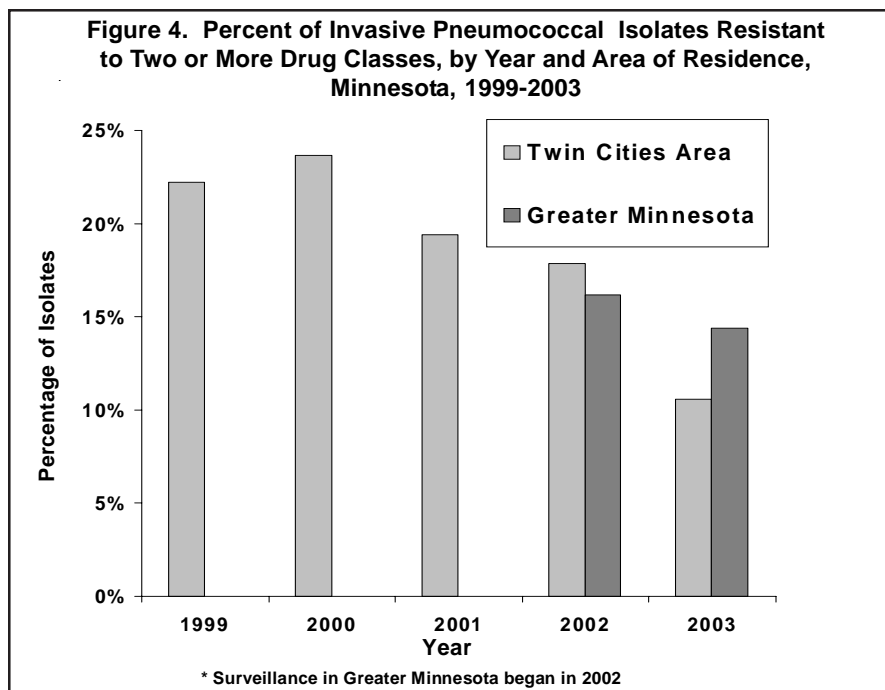
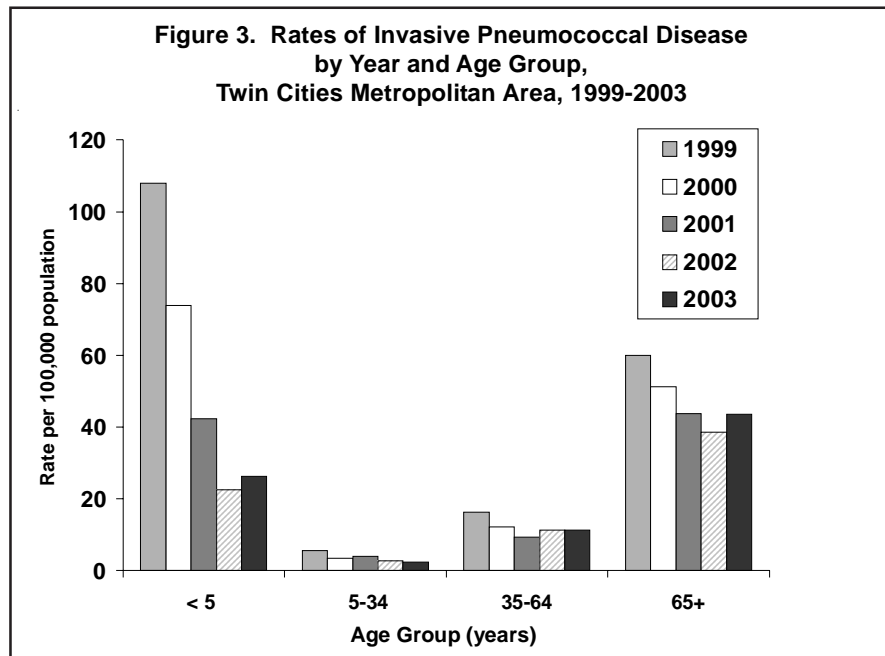
Greater Minnesota residents with high- or intermediate-level resistance to penicillin (40/264, 15%) was somewhat higher than the proportion from Twin Cities area residents (39/303, 13%); however, this was not a statistically significant difference. From Twin Cities area cases in 2003, the proportion of multi-drug resistant isolates (11%) represented a continuing decline, a trend that began in 2001 (Figure 4). From Greater Minnesota cases, over two years, the proportion of invasive multi-drug resistant isolates also declined, from 16% in 2002 to 14% in

2003. The decreased incidence of invasive disease due to drug resistant strains is also very likely due to use of PCV-7. This is because the majority of drug resistant strains are isolates with serotypes included in the PCV-7. In 2003, of 79 isolates with intermediate- or high-level resistance to penicillin, 67 (85%) were either included in the PCV-7 or were closely related to PCV-7 serotypes (i.e. were immunologically similar to PCV-7 serotypes). *Streptococcus pneumoniae* is one of several pathogens included in the MDH Antibiogram, which gives detailed antimicrobial susceptibility results of isolates tested at the Public Health Laboratory from 2003 cases, and is available on our MDH website: www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/antibiogram.html.

Streptococcal Invasive Disease - Group A

One hundred eighty-one cases of invasive group A streptococcal (GAS) disease (3.7 per 100,000 population), including 22 deaths, were reported in 2003, compared to 147 cases and 24 deaths in 2002. Ages of case-patients ranged from one to 96 years (mean, 50 years). Fifty-four percent of case-patients were residents of the Twin Cities metropolitan area. Forty-five (25%) case-patients had bacteremia without another focus of infection. There were 21 (12%) cases of primary pneumonia and 17 (9%) cases of necrotizing fasciitis. Twelve (7%) case-patients had septic arthritis and/or osteomyelitis, and nine (5%) had streptococcal toxic shock syndrome (STSS). Twenty-three (13%) case-patients were residents of 17 long-term care facilities. Five facilities had more than one case and each case within a facility had a matching PFGE subtype to the other case(s) in the facility.

The 22 deaths included eight (36%) cases of bacteremia without another focus of infection, two (9%) cases of pneumonia, and one (5%) case of septic arthritis. One case had STSS and one case had both peritonitis and STSS. The remaining fatal cases had bacteremia with another focus of infection, including six (27%) with cellulitis, and one (5%) each with mediastinitis, pneumonia, and one with both pharyngitis and cellulitis. The deaths occurred in persons ranging in age from one to 92 years. For the 14 continued...



deaths in patients with known health histories, significant underlying medical conditions were reported for all of the cases.

Isolates were available for 171 (94%) cases, of which 159 were subtyped using PFGE; 50 different molecular subtypes were identified. Twenty-seven subtypes were represented by one isolate each; other subtypes were represented by two to 47 isolates each. No epidemiologic links were noted among cases with indistinguishable subtypes, except for the cases from the five long-term care facilities having multiple cases as described previously.

The deaths were distributed among 12 different PFGE subtypes, with eight (36%) deaths attributed to the most common PFGE subtype. No other subtype accounted for more than two deaths.

Streptococcal Invasive Disease - Group B

Three-hundred and twenty-nine cases of group B streptococcal invasive disease (6.5 per 100,000 population), including 27 deaths, were reported in 2003. These cases were those in which group B *Streptococcus* (GBS) was isolated from a normally sterile site; three cases of miscarriage or stillbirth in which GBS was cultured from the placenta were also reported.

Overall, 154 (47%) cases presented with bacteremia without another focus of infection. The other most common types of infection were cellulitis (12%), arthritis (7%), osteomyelitis (8%), pneumonia (6%), and meningitis (3%). The majority (74%) of cases had GBS isolated from blood only. Fifty-three percent of cases occurred among residents of the Twin Cities metropolitan area. Thirty-eight (12%) case-patients were infants less than 1 year of age, and 178 (54%) were 60 years of age or older.

In 2003 there were 40 cases of infant (early-onset or late-onset) or maternal GBS disease were reported, compared to 59 cases in 2001. Twenty infants developed invasive disease within 6 days following birth (i.e., early-onset disease), and 16 infants became ill at 7 to 89 days of age (i.e., late-onset disease). Three stillbirths or spontaneous abortions were associated with four maternal invasive GBS infections.

From 1997 to 2003, there were 189 early-onset disease cases reported and eight infants died. Thirty-four infants were born at less than 37 weeks' gestation and accounted for 18% of early-onset cases. Bacteremia without another focus of infection (85%) was the most common type of infection in these early-onset cases, followed by pneumonia (19%) and meningitis (8%).

In August 2002, CDC published revised guidelines for the prevention of perinatal GBS disease (www.cdc.gov/groupbstrep/docs/RR5111.pdf). Key changes include 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 20 early-onset cases reported during 2003. Overall, 13 (68%) of 20 women who delivered GBS-positive infants were screened prenatally for GBS. Of these, 2 (15%) women were positive and 11 (85%) women were negative. Among the seven women who were not prenatally screened for GBS, 1 (14%) was screened upon admission to the hospital and prior to delivery of her infant. Among the 20 women of infants with invasive GBS disease, 6 (30%) received intrapartum antimicrobial prophylaxis (IAP). One of the two women with a positive GBS screening result received IAP. MDH continues to monitor the incidence of GBS disease among infants, screening for GBS among pregnant women, and IAP use of GBS-positive pregnant women during labor and delivery.

Tuberculosis

The number of cases of tuberculosis (TB) disease reported in the United States has decreased each year since 1992, although the decline slowed to its smallest annual percent change (1.4%) with the 14,871 TB cases reported in 2003. The incidence of TB in Minnesota also declined for several years following a peak of 165 new cases in 1992. In 1999, however, the number of TB cases reported in Minnesota began a dramatic increase, reaching a new high of 239 cases in 2001. In 2003, 214 cases of TB disease (4.4 cases per 100,000 population) were reported in Minnesota. The incidence of TB in Minnesota exceeds the national objective of 3.5

cases per 100,000 population that was established as an interim goal for the year 2000. In 2003, 24 U.S. states reported TB incidence rates that met the 2000 national objective.

In many ways, the epidemiology of TB in Minnesota is distinct from other states and has been a precursor of trends that now are emerging nationally. The most significant such factor is the very large proportion of TB cases reported among foreign-born persons in Minnesota, which has averaged 80% over the past 5 years. In 2003, 173 (81%) TB cases in Minnesota occurred in persons born outside the United States. In contrast, 53% of TB cases reported nationwide in 2003 were born outside the United States, although that percentage has been increasing steadily for several years.

The 173 foreign-born TB cases reported in Minnesota during 2003 represent persons from 26 different countries of birth. These epidemiologic characteristics directly reflect the unique and constantly changing demographics of immigrant and other foreign-born populations arriving in Minnesota. The most common regions of birth among foreign-born TB cases reported in 2003 were sub-Saharan Africa (53%, n = 92) and South/Southeast Asia (27%, n = 47) (Figure 5). In particular, 58 case-patients from Somalia who were diagnosed with TB in Minnesota comprised 55% of all Somali TB cases reported nationwide in 2003. The age distribution of TB cases in Minnesota differs by country of birth, with the largest age group among foreign-born cases in 2003 being young adults 25 to 44 years of age (47%). The proportion of TB patients who were 65 years of age or older was higher among U.S.-born cases than among foreign-born cases (17% versus 7%). Although the proportion of patients who were less than 5 years of age was higher among U.S.-born cases than among foreign-born cases (17% versus 2%), approximately 90% of these young, U.S.-born, pediatric cases occurred in households with foreign-born parents or other family members.

Persons 15 years of age or older who arrive in the United States as immigrants or refugees receive a medical evaluation overseas that includes screening for pulmonary TB disease. **continued...**

Among 159 foreign-born persons 15 years of age or older who were diagnosed with TB disease in Minnesota during 2003 and whose date of arrival in the United States was known, more than half (55%) were diagnosed fewer than 5 years after arriving in the United States. Of 26 TB case-patients diagnosed within 12 months of their arrival in the United States, only seven (27%) had any TB-related conditions noted in their pre-immigration medical exams. 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. Providers should thoroughly pursue screening, evaluation, and, if indicated, treatment of active TB disease or latent TB infection among patients who originate from areas where TB is endemic.

While the total number of TB cases reported in Minnesota declined 10% from 2002 to 2003, the decline was focused among U.S.-born persons; during this period, the number of foreign-born TB cases decreased 4%, whereas the number of U.S.-born cases declined 27% (Figure 6). Combined with the fact that the vast majority of TB cases in Minnesota occur among foreign-born persons, these data highlight the need to support global TB elimination strategies as well as local TB prevention and control activities targeted to foreign-born persons in order to control TB effectively in Minnesota. MDH is among 22 sites funded by the CDC through a TB Epidemiologic Studies Consortium to conduct a study, beginning in 2004, that is designed to identify missed opportunities for preventing TB disease among foreign-born populations in the United States and Canada.

Aside from country of birth, other less common risk factors among TB cases reported in Minnesota during 2003 included homelessness (5%), HIV infection (4%), incarceration in a correctional facility (2%), and residence in a nursing home (1%). Twenty-three (26%) of the state's 87 counties reported at least one case of TB disease in 2003, with the majority (79%) of cases occurring in the Twin Cities metropolitan area, particularly among residents of Hennepin (53%) and Ramsey (14%) counties. Notably, continued...

Figure 5. Foreign-Born Tuberculosis Cases by Region of Origin and Year of Diagnosis, Minnesota, 1999-2003

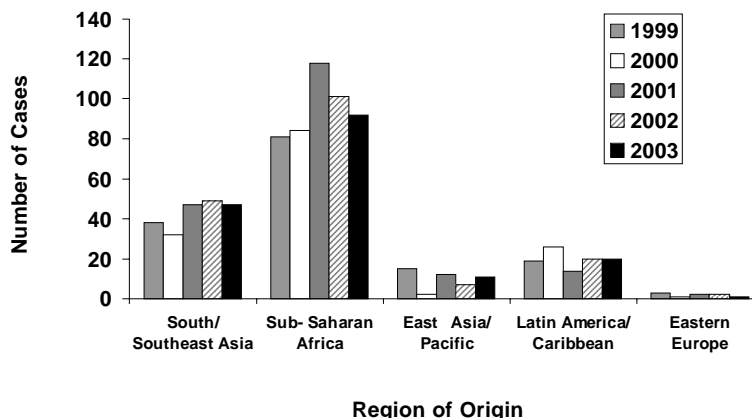


Figure 6. Tuberculosis Cases by Country of Origin, Minnesota, 1994-2003

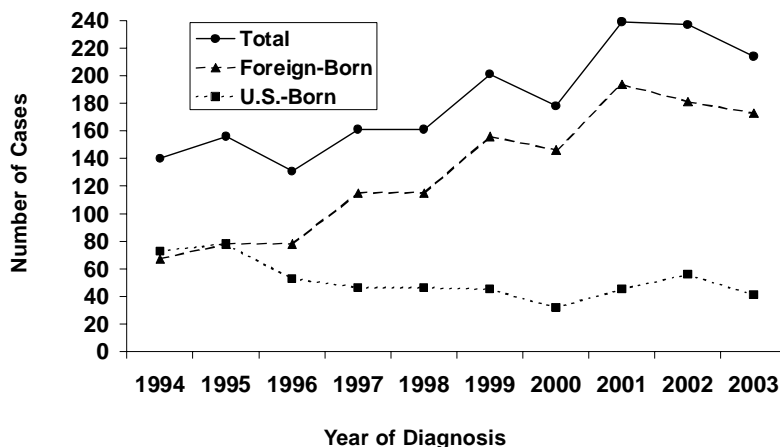


Table 5. Tuberculosis Cases by Drug Susceptibility Results and Year, Minnesota, 1999-2003

Year	Cases with Susceptibility Results*	Any Drug Resistant No. (%)	INH-Resistant** No. (%)	MDR-TB† No. (%)
1999	166	30 (18)	20 (12)	4 (2)
2000	141	37 (26)	23 (16)	1 (1)
2001	195	56 (29)	23 (12)	4 (2)
2002	187	52 (28)	26 (14)	6 (3)
2003	172	42 (24)	30 (17)	5 (3)
Total	861	217 (25)	122 (14)	20‡ (2)

* Culture-confirmed cases with drug susceptibility results available

** Isoniazid (INH)-resistant cases (also may have resistance to other drugs)

† Multidrug-resistant TB, with resistance to at least INH and rifampin

‡ Seven of these cases were resistant to INH, rifampin, pyrazinamide, ethambutol and streptomycin

while the numbers of TB cases reported in Hennepin County, Ramsey County, and Greater Minnesota each decreased from 2002 to 2003, the number of cases reported in the suburban metropolitan counties of Anoka, Carver, Dakota, Scott, and Washington increased 53%.

Drug-resistant TB is a critical and growing 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 2003, 42 (24%) cases of drug-resistant TB were reported in Minnesota among 172 culture-confirmed cases, including 30 (17%) cases resistant to INH and five (3%) cases of multidrug-resistant TB (MDR-TB) (i.e., resistant to at least INH and rifampin) (Table 5). This is the highest prevalence of INH-resistance and MDR-TB reported statewide since MDH began collecting such data in 1992. Drug-resistant TB in Minnesota is approximately twice as common among foreign-born TB cases compared to U.S.-born cases. Thirty-seven (88%) of the 42 patients with drug-resistant TB reported in 2003 were born outside the United States, including 26 (87%) of the 30 INH-resistant cases and four (80%) of the five MDR-TB cases. The one U.S.-born MDR-TB case was a child living in a household with a foreign-born grandparent with MDR-TB. Of great concern, seven of 20 MDR-TB cases reported in Minnesota during the past 5 years have been resistant to all five first-line TB drugs (i.e., INH, rifampin, pyrazinamide, ethambutol, and streptomycin). These seven MDR-TB case-patients originated from six different countries (one each from Ethiopia, Laos, Moldova, Somalia, and Thailand, and two from the United States); one of the two U.S.-born MDR-TB case-patients had resided in Africa for more than 20 years, and the other was the previously described child in a household with foreign-born family members.

TB-related resources for patients and health care providers (including patient education materials translated in nine languages) are available on the MDH TB Program's web site (www.health.state.mn.us/tb).

Unexplained Critical Illnesses and Deaths of Possible Infectious Etiology

Surveillance for unexplained critical illnesses and deaths of possible infectious etiology in Minnesota began in September 1995. Any case of unexplained critical illness or death that appears to have a possible infectious cause should be reported, regardless of the patient's age or underlying medical conditions. A subset of reported cases (i.e., persons 6 months to 49 years of age with no serious 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 who are not eligible for enrollment in the CDC project, some testing may be available at CDC and MDH, at the physician's request.

Thirty-eight cases were investigated by MDH in 2003, compared to 40 cases in 2002. The cause(s) of illness subsequently were determined for eight cases. Among the remaining 30 cases, nine case-patients presented with respiratory symptoms; seven presented with shock/sepsis; four each presented with neurologic symptoms and hepatic disease; and two each presented with cardiac symptoms, sudden unexpected death, and gastrointestinal (GI) symptoms. Case-patients with respiratory symptoms ranged from 22 to 75 years of age; those with sepsis were 1 to 72 years of age; those with hepatic disease were 5 to 55 years of age; the neurologic case-patients were 2 to 53 years of age; the cardiac case-patients were 17 and 29 years of age; the sudden unexpected deaths occurred in a 1-year-old and a 45-year-old; and the case-patients with GI symptoms were one and 11 years of age. Eight patients with respiratory symptoms, five patients with sepsis, and three each with neurologic and hepatic symptoms died as did both patients with GI symptoms and one with a cardiac syndrome. Seven respiratory case-patients; 3 each of the neurologic case-patients and shock/sepsis case-patients; two each of the GI, hepatic, and cardiac case-patients; and one case-patient with sudden unexpected death resided in the Twin Cities metropolitan area. The remaining case-patients resided in Greater Minnesota, except for two hepatic cases, one respiratory, and one sepsis

case-patient who were out-of-state residents hospitalized in Minnesota.

Three respiratory cases; two each of the neurologic, GI, and hepatic cases; and one sepsis case were eligible for inclusion in the CDC project. Specimens have been obtained for testing at MDH or CDC for all cases, except for one hepatic case. Preliminary tests have not revealed an etiology for any of these cases.

Viral Hepatitis A

In 2003, 52 cases of hepatitis A (1.1 per 100,000 population) were reported. Thirty-three (63%) cases were residents of the Twin Cities metropolitan area, including 25 (48%) residents of Hennepin or Ramsey Counties. Twenty-nine (56%) of the cases were male. Of 47 cases for whom race was reported, 38 (81%) were white, four (8%) were black, and five (11%) were Asian. Although the greatest number of case-patients were white, incidence rates were higher among Asians (3.1 per 100,000), and blacks (2 per 100,000), than among whites (0.9 per 100,000). Hispanic ethnicity, which can be any race, was reported for six cases (4.2 per 100,000). Case-patients ranged in age from one to 90 years.

Four (8%) case-patients were employees of four different food-serving establishments. No community transmission of hepatitis A was identified.

Of the 52 cases, a risk factor for infection was identified for 27 (52%). Three case-patients had known exposure to a confirmed hepatitis A case. One of these became infected following exposure in a childcare setting. The index case had recently traveled to Mexico and the subsequent case developed symptoms less than a month later. The entire childcare received immune globulin following the second case.

Of the remaining 24 (89%) cases with a risk factor identified, 21 (88%) were associated with travel (four of whom consumed raw shellfish). Of those, 16 (76%) traveled to Mexico or South America. One (4%) was a man who reported having sex with men (MSM), and two (8%) were adults with no reported risk factors other than working in childcare centers. Young children infected with hepatitis A are often **continued...**

asymptomatic or experience mild illness, but remain efficient transmitters of disease. Twenty-five (48%) cases had no identifiable risk factors.

Persons who travel to hepatitis A endemic countries and MSM should be educated about their risk of hepatitis A and offered hepatitis A vaccine.

Viral Hepatitis B

In 2003, 55 cases of acute hepatitis B virus (HBV) infection (1.1 per 100,000) were reported, including two deaths. Forty-three (78%) of these cases had clinical symptoms; the remaining 12 had documented asymptomatic seroconversions. Thirty-nine (71%) case-patients were residents of the Twin Cities metropolitan area, including 27 (49%) in Hennepin County. Thirty-six (65%) case-patients were male, and 35 (64%) were adolescents or young adults between 13 and 39 years of age. Twenty-seven (49%) were white, 15 (27%) were black, six (11%) were Asian, and three (6%) were American Indian; race was unknown for four (7%). Hispanic ethnicity was reported for four (7%) cases. Although the majority of cases were white, incidence rates were higher among blacks (7.4 per 100,000), American Indians (3.7 per 100,000), Asians (3.6 per 100,000), and Hispanics (2.8 per 100,000) than among non-Hispanic whites (0.6 per 100,000).

Thirty-eight (69%) of the 55 case-patients were interviewed regarding possible modes of transmission. For 26 (68%) of these cases, the likely mode of transmission was sexual. Eleven (29%) case-patients were men who reported having sex with men, seven (18%) were persons who reported heterosexual contact with a known carrier of HBsAg, six (16%) reported heterosexual contact with multiple partners within 6 months prior to onset of symptoms, and two (5%) reported having multiple partners with undocumented sexual preference. Four (11%) case-patients reported using needles to inject drugs, and one occurred in a person who received a tattoo within 6 months prior to onset of

symptoms. One (3%) case-patient reported a recent history of blood transfusion. No reported cases occurred as a result of occupational exposure. Risk factors for acquiring HBV infection were not identified for the remaining six (16%) cases. These six cases and the 17 who were unavailable for interviews were between 13 and 72 years of age (median, 36 years).

Hepatitis B vaccine has been available since 1982, yet it continues to be underutilized in persons at greatest risk of infection. The majority of hepatitis B cases reported in 2003 with an identified risk factor indicated likely 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.

In addition to the 55 reported cases, six perinatal infections were identified in infants who tested positive for hepatitis B surface antigen (HBsAg) during post-vaccination screening. Five perinatal cases were identified in 2002, and one in 2001. Five perinatal infections occurred in infants identified through a public health program that works to ensure appropriate prophylactic treatment of infants born to hepatitis B-infected mothers, and one occurred in an infant adopted from an endemic region who arrived in Minnesota with an incomplete immunization history. All five U.S.-born infants had received hepatitis B immune globulin (HBIG) and three doses of hepatitis B vaccine in accordance with the recommended schedule (i.e., were treatment failures). These cases were identified in post-vaccination serologic testing performed at 9 to 15 months of age.

Viral Hepatitis C

In 2003, 23 cases of acute hepatitis C virus (HCV) infection were reported. Sixteen (70%) of these case-patients had clinical symptoms, and seven were asymptomatic seroconversions. Seventeen (74%) case-patients resided in Greater Minnesota. The

median age was 28 years (range, 19 to 55 years). Sixteen (70%) case-patients were female. Fifteen (65%) case-patients were white; seven (30%) were American Indian; and one (4%) was black. Incidence rates were higher among American Indians (8.6 per 100,000 population) and blacks (0.5 per 100,000 population) than among whites (0.3 per 100,000 population).

Among the 23 case-patients, 13 (57%) reported using needles to inject drugs, two of whom also had HCV-positive sex partners; two (9%) case-patients had sexual contact with a known anti-HCV-positive partner within 6 months prior to onset of symptoms; one (4%) case-patient had a needle stick occupational exposure; and one (4%) had a recent tattoo. No risk factor could be determined for the remaining six (26%) cases, three of whom were plasma donors with documented seroconversions who could not be reached for interview.

MDH received more than 2,400 reports of newly identified anti-HCV-positive persons in 2003, the vast majority of whom are chronically infected. The 23 acute cases represent less than 1% of those recently diagnosed. Since 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 injecting 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 infection and immunized appropriately.

Mark the Date: 10th Annual Emerging Infections in Clinical Practice and Emerging Health Threats Conference, Minneapolis, November 12, 2004

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