

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 2001

Introduction

Assessment is a core public health function, and surveillance for communicable diseases is one type of assessment activity that is continuous over time. 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. In addition, prompt surveillance reports allow outbreaks to be recognized in a timely fashion, when control measures are likely to be most effective in preventing additional cases.

In Minnesota, communicable disease reporting is a centralized system, whereby reporting sources submit standardized report forms to MDH. These reports are monitored daily by disease-specific program staff. Cases of disease are reported pursuant to Minnesota Rules Governing Communicable Diseases (MN Rules 4605.7000 - 4605.7800). The Commissioner of Health has determined that the diseases listed in Table 1 (page 22) 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. These 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).

Since April 1995, MDH has been participating 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 these and certain other diseases are required to be submitted to MDH (Table 1).

The MDH Public Health Laboratory performs state-of-the-art microbiologic evaluation of isolates, such as pulsed-field gel electrophoresis (PFGE), to determine whether isolates of selected pathogens (e.g., enteric pathogens such as *Salmonella* and *Escherichia coli* O157:H7, and invasive pathogens such as *Neisseria meningitidis*) are related and therefore may be associated with a common source. In addition, testing of submitted isolates allows detection and monitoring of antimicrobial resistance, which continues to be an increasing problem with many pathogens.

Table 2 summarizes the number of cases of selected communicable diseases reported to MDH during 2001 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 individual cases; and the influenza data reported here pertain to the 2001-2002 influenza season, rather than the 2001 calendar year.

Incidence rates in this report were calculated using disease-specific numerator data collected by MDH and a standardized set of denominator data used by the MDH Infectious Disease Epidemiology, Prevention, and Control Division for the purpose of maximizing the comparability of disease-specific morbidity and mortality rates reported by various programs throughout the division. In particular, changes in the collection of information on race in the U.S. Census 2000 require some estimations of race-specific population sizes in order to calculate the disease-specific incidence rates presented in this report. Population counts by place of residence, age, gender, and race/ethnicity were obtained from the U.S. Census Bureau for 1990 and 2000. Population counts for 1991 through 1999 were estimated by interpolation between the 1990 and 2000 census data. For 2000 census data, population counts by race include the numbers of persons by race alone, or in combination with one or more races. Thus,

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Table 1. Diseases Reportable to the Minnesota Department of Health

Amebiasis (<i>Entamoeba histolytica</i>)	Leptospirosis (<i>Leptospira interrogans</i>)
Anthrax (<i>Bacillus anthracis</i>)*	Listeriosis (<i>Listeria monocytogenes</i>)*
Babesiosis (<i>Babesia</i> species)	Lyme Disease (<i>Borrelia burgdorferi</i>)
Blastomycosis (<i>Blastomyces dermatitidis</i>)	Malaria (<i>Plasmodium</i> species)
Botulism (<i>Clostridium botulinum</i>)*	Measles (Rubeola)*
Brucellosis (<i>Brucella</i> species)	Meningitis (caused by <i>Haemophilus influenzae</i> ,* <i>Neisseria meningitidis</i> ,* <i>Streptococcus</i> <i>pneumoniae</i> ,* or viral agents)
Campylobacteriosis (<i>Campylobacter</i> species)*	Meningococemia (<i>Neisseria meningitidis</i>)*
Cat Scratch disease (infection caused by <i>Bartonella</i> species)	Mumps*
Chancroid (<i>Haemophilus ducreyi</i>)*,**	Pertussis (<i>Bordetella pertussis</i>)*,+
<i>Chlamydia trachomatis</i> infection**	Plague (<i>Yersinia pestis</i>)
Cholera (<i>Vibrio cholerae</i>)*,+	Poliomyelitis*
Cryptosporidiosis (<i>Cryptosporidium parvum</i>)	Psittacosis (<i>Chlamydia psittaci</i>)
Dengue virus infection	Q Fever (<i>Coxiella burnetii</i>)
Diphtheria (<i>Corynebacterium diphtheriae</i>)*	Rabies (animal and human cases and suspects)*
<i>Diphyllobothrium latum</i> infection	Retrovirus infections (other than HIV)
Ehrlichiosis (<i>Ehrlichia</i> species)	Reye Syndrome
Encephalitis (caused by viral agents)	Rheumatic Fever (cases meeting the Jones Criteria only)
Enteric <i>Escherichia coli</i> infection (<i>E. coli</i> O157:H7 and other pathogenic <i>E. coli</i> from gastrointestinal infections)*	Rubella and Congenital Rubella Syndrome
Giardiasis (<i>Giardia lamblia</i>)	Rocky Mountain Spotted Fever (<i>Rickettsia</i> species)
Gonorrhea (<i>Neisseria gonorrhoeae</i>)**	Salmonellosis, including typhoid (<i>Salmonella</i> species)*
<i>Haemophilus influenzae</i> disease (all invasive disease)*	Shigellosis (<i>Shigella</i> species)*
Hantavirus infection	Streptococcal disease (all invasive disease caused by groups A and B streptococci and <i>S. pneumoniae</i>)*
Hemolytic Uremic Syndrome	Syphilis (<i>Treponema pallidum</i>)*,**
Hepatitis (all primary viral types including A, B, C, D, and E)	Tetanus (<i>Clostridium tetani</i>)
Histoplasmosis (<i>Histoplasma capsulatum</i>)	Toxic Shock Syndrome*
Human Immunodeficiency Virus (HIV) infection, including Acquired Immunodeficiency Syndrome (AIDS)***	Toxoplasmosis (<i>Toxoplasma gondii</i>)
Influenza (unusual case incidence or laboratory- confirmed cases)	Trichinosis (<i>Trichinella spiralis</i>)
Kawasaki Disease	Tuberculosis (<i>Mycobacterium tuberculosis</i> and <i>Mycobacterium bovis</i>)*
Legionellosis (<i>Legionella</i> species)	Tularemia (<i>Francisella tularensis</i>)
Leprosy (<i>Mycobacterium leprae</i>)	Typhus (<i>Rickettsia</i> species)
	Unexplained deaths possibly due to unidentified infectious causes
	Yellow Fever
	Yersiniosis (<i>Yersinia</i> species)*

* Report immediately by telephone at (612) 676-5414 or (877) 676-5414

** Report on separate Sexually Transmitted Disease Report Card

*** Report on separate AIDS/HIV Report Card

+ Submit isolates to the Minnesota Department of Health Public Health Laboratory

persons who identified themselves by more than one race are "overcounted."

Arboviral Encephalitis

LaCrosse encephalitis and Western equine encephalitis (WEE) have historically been the primary arboviral encephalitides found in Minnesota. Confirmed cases are defined as those which are clinically and epidemiologically compatible with arboviral encephalitis and meet one or more of the following laboratory criteria: a four-fold or greater rise in antibody titer to the virus; isolation of virus from, or detection of viral antigen in, tissues or body

fluids; or detection of specific IgM antibody in cerebrospinal fluid. Probable cases are defined as clinically compatible cases occurring during a period when arboviral transmission is likely, with an elevated and stable (i.e., two-fold change or less) antibody titer to the virus.

LaCrosse encephalitis is the most commonly reported arboviral infection in Minnesota. 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, especially in areas where water-holding containers (e.g., waste tires, buckets, or cans) are abundant and may be utilized as mosquito breeding habitat. During 2001, twelve cases (three confirmed, nine probable) of LaCrosse encephalitis were reported to MDH. From 1985 through 2001, 101 cases were reported from 17 southeastern Minnesota counties, with a median of five cases (range, three to 12 cases) reported yearly. Disease onsets have been **continued...**

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health by District of Residence, 2001

Disease	District*										Total (4,919,479)
	(population; 2000 Census data)										
	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		
Campylobacteriosis	467	9	36	132	46	59	118	86	0	953	
Cryptosporidiosis	30	3	4	51	22	15	55	18	0	198	
Ehrlichiosis	15	0	5	66	0	1	6	0	0	93	
Encephalitis - viral											
LaCrosse	4	0	0	1	0	1	6	0	0	12	
Western	0	0	0	0	0	0	0	0	0	0	
<i>Escherichia coli</i> O157:H7 infection	98	2	4	38	24	6	31	16	0	219	
Hemolytic Uremic Syndrome	10	0	0	5	2	0	3	2	0	22	
Giardiasis	575	12	29	135	31	23	95	42	119	1,061	
<i>Haemophilus influenzae</i> invasive disease	27	1	8	7	1	3	8	1	0	56	
HIV infection other than AIDS	179	1	2	5	3	2	2	3	0	197	
AIDS cases (diagnosed in 2001)	110	0	1	3	1	3	4	2	0	124	
Legionnaires' disease	5	0	3	3	1	0	2	1	0	15	
Listeriosis	0	0	0	0	0	2	1	1	0	4	
Lyme disease	209	6	14	183	2	9	36	2	0	461	
Measles	4	0	0	0	0	0	0	0	0	4	
Mumps	2	0	0	3	0	0	1	0	0	6	
<i>Neisseria meningitidis</i> invasive disease	13	0	4	4	0	2	2	2	0	27	
Pertussis	207	0	9	53	12	6	4	17	0	308	
Rubella	0	0	0	0	0	0	0	0	0	0	
Salmonellosis	411	13	14	75	30	47	72	31	0	693	
Sexually transmitted diseases*											
<i>Chlamydia trachomatis</i> - genital infections	6,216	166	283	618	215	176	469	180	0	8,323	
Gonorrhea	2,401	10	64	100	26	28	60	12	0	2,701	
Syphilis total	111	1	0	7	0	1	7	2	0	129	
primary/secondary	33	0	0	0	0	0	0	0	0	33	
early latent**	13	0	0	3	0	0	0	0	0	16	
late latent***	63	1	0	4	0	1	7	2	0	78	
congenital	2	0	0	0	0	0	0	0	0	2	
Chancroid	0	0	0	0	0	0	0	0	0	0	
Shigellosis	272	48	7	61	22	10	11	62	0	493	
<i>Streptococcus pneumoniae</i> invasive disease (Twin Cities only)	340	--	--	--	--	--	--	--	--	340	
Streptococcal invasive disease - Group A	118	6	23	23	7	10	12	1	0	200	
Streptococcal invasive disease - Group B	143	8	5	35	8	27	37	10	0	273	
Tetanus	0	0	0	0	0	0	0	0	0	0	
Tuberculosis	199	3	4	2	2	6	17	6	0	239	
Viral hepatitis, type A	30	1	5	3	1	7	0	0	0	47	
Viral hepatitis, type B (acute infections only)	35	2	1	2	1	0	3	0	0	44	
Viral hepatitis, type C (acute infections only, not perinatal)	11	0	8	4	3	2	2	1	0	31	
Yersiniosis	8	0	0	4	1	0	2	4	0	19	

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

**Duration ≤1 year

***Duration >1 year

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 = Carlton, Cook, Lake, St. Louis

Central = Aitkin, Benton, Cass, Chisago, Crow Wing, Isanti, Itasca, Kanabec, Koochiching, Mille Lacs, Morrison, Pine, Sherburne, Stearns, Todd, Wadena, Wright

West Central = Becker, Clay, Douglas, Grant, Mahanomen, 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

reported from June through September; most cases have onset from mid-July through mid-September. For a more detailed discussion of arboviral encephalitis in Minnesota, including West Nile virus, please refer to the July 2002 issue (vol. 30, no. 4) of the *Disease Control Newsletter*.

Campylobacteriosis

Campylobacter continues to be the

most commonly reported bacterial enteric pathogen in Minnesota (Figure 1). There were 953 cases of culture-confirmed *Campylobacter* infection reported in 2001 (19.4 per 100,000 population). This represents a 12% decrease from the 1,079 cases reported in 2000, and a 6% decrease from the mean annual number of cases reported from 1997 to 2000 (mean, 1,043 cases; range, 786 to 1,181).

Campylobacter rates were significantly higher in the Southeastern and Southwestern districts of Minnesota than the state rate overall (25.6 and 37.4 cases per 100,000 population, respectively). The Northwestern district had the lowest rate (5.9 cases per 100,000 population). Forty-nine percent of cases occurred in the seven-county Twin Cities metropolitan area. **continued...**

C. jejuni comprised 91% of the isolates confirmed by MDH, and *C. coli* comprised 8%.

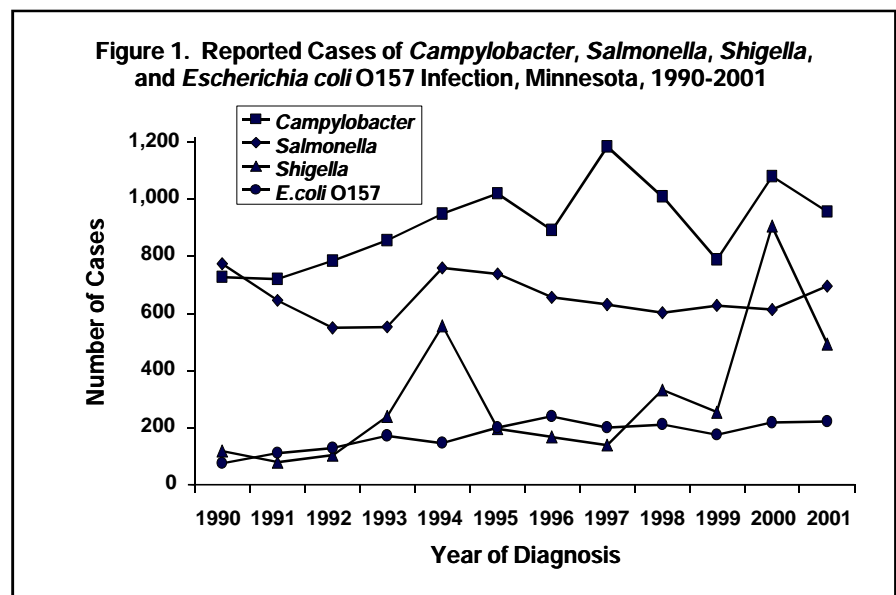
Forty-nine percent of case-patients were 20 to 49 years of age, and 15% were 5 years of age or younger. Fifty-six percent of case-patients were male. Fourteen percent of cases were hospitalized; the median length of hospitalization was 2 days. Forty-six percent of infections occurred during June through September. In March 2001, a food-borne outbreak of *C. jejuni* was identified; the source of the outbreak was unpasteurized milk served to guests on a farm. Four culture-confirmed cases were associated with this outbreak.

The primary feature of public health importance among *Campylobacter* cases was the continued presence of *Campylobacter* isolates resistant to fluoroquinolone antibiotics (e.g., ciprofloxacin), which commonly are used to treat campylobacteriosis. From 1992 to 1999, the proportion of quinolone-resistant *C. jejuni* isolates increased from 1% to 17%. In 2001, the proportion of quinolone-resistant *Campylobacter* isolates was 14%. During 2001, approximately 50% of *C. jejuni* isolates from patients with histories of foreign travel (regardless of destination) during the week before onset of illness 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 U.S., which began late in 1995.

Cryptosporidiosis

During 2001, 198 cases of laboratory-confirmed *Cryptosporidium parvum* infection were reported (4.0 per 100,000 population). This is similar to the 197 cases reported in 2000 but represents a 14% increase from the median number of cases reported annually from 1996 to 2000 (median, 173 cases; range, 81 to 242).

Demographic characteristics of cases reported in 2001 were similar to previous years. The cryptosporidiosis rates in the Southeastern, West Central, Southwestern, and Central districts (12.0, 9.9, 7.8, and 7.5 cases per 100,000 population respectively), were significantly higher than the



statewide rate. The Twin Cities metropolitan area had the lowest rate of cryptosporidiosis (1.1 cases per 100,000 population). Case-patients ranged in age from 3 weeks to 87 years, with a median of 9 years. Children less than 10 years of age accounted for 53% of cases, and children less than 5 years of age accounted for 35%. Fifty-eight percent of cases had stool samples collected during July through October. Sixteen percent of cases were hospitalized; four (2%) cases were known to be HIV-positive.

Two outbreaks of cryptosporidiosis were identified in 2001, accounting for 11 confirmed cases. One outbreak was associated with a child daycare facility, and one was associated with contact with ill calves at a farm day camp.

Ehrlichiosis

Human granulocytic ehrlichiosis (HGE) is an emerging tick-borne bacterial disease in Minnesota. Although the agent of HGE has not been named, it is thought to be similar or identical to two veterinary pathogens (i.e., *Ehrlichia equi* and *Ehrlichia phagocytophila*). HGE is transmitted to humans by *Ixodes scapularis* (deer tick or black-legged tick), the same tick that transmits Lyme disease. During 2001, 93 confirmed or probable cases of HGE were reported (1.8 per 100,000 population). This number represents an 18% increase in cases from the prior high of 79 cases reported in 2000 and a 158% increase in cases since 1999 (36 cases). The national surveillance case definition for a confirmed case of HGE

includes a compatible clinical illness with a four-fold increase in HGE antibody titer by IFA, a positive polymerase chain reaction, or intracytoplasmic morulae and an IFA antibody titer to HGE $\geq 1:64$. Probable HGE cases have a compatible clinical illness and either an IFA serologic titer to HGE $\geq 1:64$ or detection of intracytoplasmic morulae.

Fifty-seven (61%) case-patients reported to MDH were male. The median age of case-patients was 57 years (range, 3 to 95 years). The peak of illness onset was in June (47% of cases). Co-infections of Lyme disease and HGE from the same tick bite are possible, and during 2001, three (3%) HGE cases also met the case definition for early-stage Lyme disease (with a physician-diagnosed erythema migrans). People are at most risk of HGE in the same east-central Minnesota counties where the risk of Lyme disease is greatest (see section on Lyme disease, page 28).

Escherichia coli O157 Infection and Hemolytic Uremic Syndrome (HUS)

During 2001, 219 culture-confirmed cases of *Escherichia coli* O157 infection (4.5 per 100,000 population) were reported. Ninety-eight (45%) cases occurred in the seven-county Twin Cities metropolitan area. The largest numbers of cases in greater Minnesota occurred in Stearns, Olmsted, Wright, and Douglas counties (13, 12, 11, and eight cases, respectively). One hundred sixty-six (76%) cases occurred during June through

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October. The median age of *E. coli* O157 case-patients was 13 years (range, 1 month to 87 years), and 123 (56%) were female. Eighty-one (37%) cases were hospitalized for a median of 3 days (range, 1 to 21 days).

Six outbreaks of *E. coli* O157:H7 were identified in 2001. One large outbreak involving 27 culture-confirmed cases and two smaller outbreaks with three culture-confirmed cases each were associated with person-to-person transmission in child daycare facilities. Five cases of HUS, including one death, resulted from the daycare outbreaks. A water-borne outbreak of *E. coli* O157:H7 at a swimming beach in the Twin Cities metropolitan area resulted in 10 culture-confirmed cases. MDH followed-up on five cases of the swimming beach outbreak who had reported attending daycare during or shortly after their illness; this resulted in identification of one of the aforementioned small daycare outbreaks. Monitored coliform levels in the lake remained above regulatory cut-offs for the remainder of the summer, and the beach was not reopened for the season. A food-borne outbreak in a Chinese buffet-style restaurant, identified through routine surveillance, resulted in five culture-confirmed cases. All five case-patients were hospitalized, and one developed HUS. The likely cause was cross-contamination of raw meats with vegetables and other ready-to-eat foods. Finally, an outbreak of infections with *E. coli* O157:H7 and other enteric pathogens occurred at a farm day camp for children. Transmission of the pathogens was associated with direct contact with calves.

In 2001, 22 cases of HUS were reported to MDH, resulting in four deaths in patients aged 3, 4, 6 and 73 years, respectively. The case fatality rate was 18%. During 1997-2001, the mean annual number of HUS cases reported was 16, and the mean case fatality rate was 11%. The median age of HUS case-patients in 2001 was 4 years (range, 9 months to 73 years), and 14 (64%) were female. All 22 case-patients were hospitalized, with a median hospital stay of 10 days (range, 2 to 46 days). Twelve (55%) cases occurred in August and September. Four of the six outbreak-associated HUS cases also occurred during these months.

All 22 HUS cases were post-diarrheal.

E. coli O157:H7 was isolated from 15 (68%) cases, including two of the fatal cases. Three cases were due to *E. coli* O111; one of these cases was culture-confirmed, and all three were positive for serum antibodies. The *E. coli* O111 cases occurred in siblings, and one case was fatal. In 2000, one HUS case reported to MDH was due to *E. coli* O111. The HUS cases due to *E. coli* O111 in 2000 and 2001 represent the first post-diarrheal HUS cases in Minnesota with a documented etiology other than *E. coli* O157:H7.

Giardiasis

During 2001, 1,061 cases of *Giardia lamblia* infection (21.5 per 100,000 population) were reported. This represents a 14% decrease from the 1,227 cases reported in 2000 but is similar to the mean annual number of cases reported from 1990-2000 (mean, 1,192 cases; range, 827-1,556). The median age of case-patients reported in 2001 was 22 years. Twenty-one percent of cases were in children less than 5 years of age. Only 10% of case-patients 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. However, cases were not systematically interviewed to identify potential sources of exposure, such as attendance at child daycare facilities or caring for young children. No food-borne or water-borne outbreaks of giardiasis were reported in 2001.

Haemophilus influenzae Invasive Disease

Fifty-six cases of invasive *Haemophilus influenzae* disease (1.2 per 100,000 population) were reported in 2001. Case-patients ranged in age from newborn to 89 years, (median, 63 years). Nineteen (34%) had pneumonia, 22 (39%) had bacteremia without another focus of infection, four (7%) had meningitis, and 11 (20%) had other conditions. Twelve (21%) deaths were reported among these cases.

Only one case was known to be type b (Hib), compared to three cases in 2000 and five cases in 1999. The Hib case reported in 2001 occurred in a 5-year-old with a complete vaccine history and no underlying medical conditions. Epiglottitis was the type of infection, and the patient survived.

Nineteen (34%) of the *Haemophilus influenzae* isolates were not available

for typing at MDH. Of the total 37 isolates for which typing was performed (including the one [3%] type b isolate described previously), six (16%) were type f, four (11%) were type d, two (5%) were type a, one (3%) was type e, and 23 (62%) were untypeable isolates.

The 12 deaths occurred in patients ranging in age from 9 months to 89 years. Six cases presented with pneumonia, three with bacteremia without another focus of infection, two with meningitis, and one with cellulitis. Ten cases had *H. influenzae* isolated from blood, and two had the pathogen isolated from cerebrospinal fluid. Eleven were known to have underlying medical conditions. Isolates from one of the deaths was type d; nine were untypeable isolates, and two isolates were not available at MDH for serotyping.

HIV Infection and AIDS

Surveillance for AIDS has been conducted in Minnesota since 1982. In 1985, AIDS officially became a reportable disease for all state and territorial health departments in the U.S. Also in 1985, when the Food and Drug Administration approved the first diagnostic test for HIV, Minnesota became the first state to make HIV infection a reportable condition; 34 states now require confidential reporting of HIV infection.

Compared to other U.S. states, the incidence of HIV/AIDS in Minnesota is moderately low. In 2000, state-specific AIDS incidence rates per 100,000 population ranged from 0.5 in North Dakota to 32.7 in New York, with 3.8 AIDS cases per 100,000 population reported in Minnesota. Similar comparisons for HIV (non-AIDS) incidence rates are not possible, because not all states require reporting of HIV.

As of December 31, 2001, a cumulative total of 6,661 cases of HIV infection have been reported to MDH, including 3,854 AIDS cases and 2,807 HIV (non-AIDS) cases. Of these HIV/AIDS case-patients, 2,332 are deceased. The annual number of new AIDS cases increased steadily from the beginning of the epidemic, 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
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sharply, primarily due to new antiretroviral therapies, including protease inhibitors, which can delay the progression from HIV to AIDS and improve survival among AIDS patients. In 2001, 124 new AIDS cases and 51 deaths among AIDS patients were reported in Minnesota (Figure 2).

The annual number of newly diagnosed HIV (non-AIDS) cases reported in Minnesota has remained fairly constant since the mid-1990s, with 197 cases reported in 2001. This trend, coupled with the improved survival of HIV-infected individuals who receive antiretroviral therapy, has led to an increasing number of people living with HIV or AIDS (Figure 3). Approximately 4,331 known persons with HIV/AIDS were residing in Minnesota at the end of 2001.

Historically, approximately 90% of new HIV infections reported in Minnesota occur in the seven-county Twin Cities metropolitan area. Although HIV infection is more common in communities with higher population densities and greater poverty, HIV or AIDS cases have been diagnosed in over 80% of counties statewide.

Males account for a majority of new HIV infections. Trends in the annual number of new HIV infections diagnosed among males differ by race/ethnicity. New cases 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 generally has been decreasing since 1991. A recent exception to this trend occurred from 2000 to 2001, when cases diagnosed among white males increased from 93 to 130. In contrast to the large decline in the annual number of cases among white males, the decline among African American males has been more gradual, peaking at 82 cases in 1992 and gradually decreasing to 34 cases in 2001. The annual numbers of HIV infections diagnosed among Hispanic and African-born males have increased moderately, with 16 and 19 cases, respectively, reported in 2001.

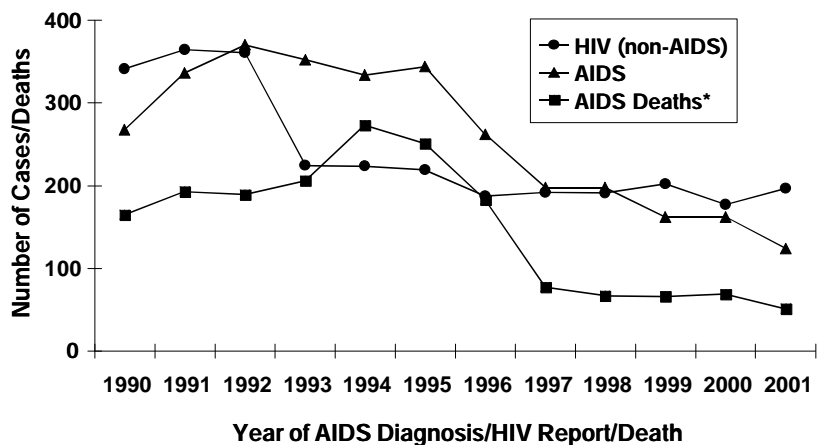
The percentage of cases among females has risen from 10% of new HIV infections in 1990 to 25% in 2001. The number of HIV infections diagnosed annually among females also differs by race/ethnicity. Early in the epidemic,

white women accounted for the majority of newly diagnosed cases. Since 1991, the number of new infections among women of color has exceeded that among white women. The annual number of new infections diagnosed among African American females nearly doubled from 1990 to 2001. The number of new infections diagnosed among African-born females increased nine-fold during the past 5 years. Among females, the only increase in the annual number of HIV infections from 2000 to 2001 occurred among African-born women. The annual numbers of new infections diagnosed among Hispanic, American Indian, and Asian females continue to be small, with fewer than 10 cases annually for each group.

Despite relatively small absolute numbers of cases, persons of color are disproportionately affected by HIV/AIDS. In 2001, non-white men comprised approximately 12% of the male population in Minnesota and 37% of new HIV infections among men. Similarly, non-white women comprised approximately 11% of the female population and 79% of new HIV infections among women. Although race is not considered a primary biological cause of disparities in the occurrence of HIV, race may be a marker for other factors associated with risk for HIV exposure, including socioeconomic status, education, and drug use.

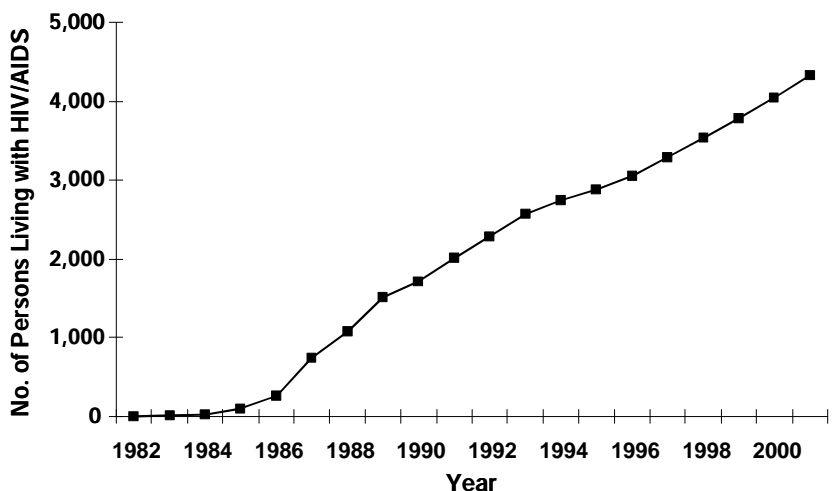
Since the beginning of the HIV epidemic...

Figure 2. AIDS Cases by Year of Diagnosis, HIV Cases by Year of Report, and AIDS Deaths by Year of Death, Minnesota, 1990-2001



* Deaths among AIDS cases, regardless of cause

Figure 3. Persons Living with HIV/AIDS at Year End, Minnesota, 1982-2001



demographic, 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, 70% (323/460) of new HIV infections were attributed to MSM (or MSM who also inject drugs); by 2001, this percentage decreased to 50% (140/282).

However, current attitudes, beliefs, and unsafe sexual practices documented in surveys among MSM nationwide, as well as a recent outbreak of syphilis in Minnesota among MSM, warrant concern. Other cities in the U.S. and abroad have reported increased numbers of syphilis cases among MSM, followed by increases in HIV diagnoses in the same group. In Minnesota, an increase in HIV cases diagnosed among white men (predominantly MSM) in 2001 preceded an outbreak of syphilis among MSM (67% of whom are white) that was detected in early 2002. "Burn out" from adopting safer sexual practices and exaggerated confidence in the ability of HIV treatments to diminish viral transmission may be contributing to a resurgence in risky sexual behavior among MSM. Consistent with these findings, 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 sex in conjunction with drug use.

The number and percentage of HIV cases attributed to injecting drug use (IDU) have declined over the past decade for men and women, falling from 24% (80/340) of cases in 1991 to 5% (14/282) of new HIV infections diagnosed in 2001. 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. An estimated 83% of 71 new HIV diagnoses among women in 2001 were attributable to heterosexual exposure.

Historically, race/ethnicity data for HIV/AIDS in Minnesota have grouped African Americans and African-born persons together as "black." In 2001, MDH retrospectively analyzed these groups separately, which identified an important trend. The number of new HIV infections diagnosed among African-born persons in Minnesota

increased from seven cases in 1990 to 46 cases in 2001. During this time, immigration of Africans to Minnesota also increased. While African-born persons comprise less than 1% of the state's population, they accounted for 16% of all HIV infections diagnosed in Minnesota in 2001.

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 services. Collaborations between MDH and community organizations are underway to address these complex issues.

Influenza

The MDH Public Health Laboratory confirmed the 2001-2002 season's first influenza isolate in Minnesota on December 11, 2001, which represents a typical start of influenza activity. Since 1990-1991, the first influenza isolate usually has been collected and identified between mid-November and mid-December. Despite a typical start, influenza activity in Minnesota began slowly, and activity peaked late, during the last week in February. Similarly, national influenza activity peaked in late February, and deaths attributable to influenza and pneumonia exceeded the epidemic threshold at that time.

Influenza surveillance in Minnesota relies on passive reporting from clinics, hospitals, laboratories, schools, and long-term care facilities. The current surveillance systems used in schools and long-term care facilities have been in place since the 1995-1996 influenza season. A Sentinel Physician Influenza Surveillance Network, consisting of three sentinel sites, was initiated in Minnesota for the 1998-1999 season. Eleven sentinel sites participated in influenza surveillance in 2000-2001, and 21 sites participated during the 2001-2002 season. While the program has surpassed its enrollment goal of 18 sentinel sites (one site per 250,000 population), MDH plans to expand the number of participating sites in order to provide coverage in all areas of the state. The summer Influenza Sentinel Surveillance program began in May 2002, with 15 participating sites; the program's purpose is to establish baseline rates of influenza-like illness activity and to monitor influenza year-round.

During 2001-2002, the MDH Public Health Laboratory received 692 influenza virus isolates collected from Minnesota residents for viral confirmation and strain identification. Of these isolates, 555 (80%) were identified as influenza type A(H3N2)/Panama-like; 119 (17%) were influenza B/Victoria-like; 10 (1%) were B/Sichuan-like; three (<1%) were influenza A with unidentifiable strains, and five (1%) were influenza type B with unidentifiable strains. The predominant influenza A strain circulating in Minnesota during 2001-2002 was well-matched to the influenza A strains included in the 2001-2002 influenza vaccine. Of the two influenza B strains, only B/Sichuan was included in the vaccine, which includes one influenza B strain each year. Influenza type A/Panama, type B/Victoria, and B/Sichuan also were the predominant strains circulating nationally.

The 2001-2002 influenza season was highlighted by the identification of a new strain of influenza, designated A/Wisconsin/12/2001(H1N2). This strain first was identified in a resident of Outagamie County in Wisconsin and has since been reported in England, Israel, and Egypt. The new H1N2 strain appears to be the result of the reassortment of the genes in the circulating A/New Caledonia (H1N1) and the A/Moscow (H3N2) [A/Panama (H3N2)] strains. The identification of this new strain further emphasizes the importance of collecting viral cultures as a part of influenza surveillance.

A probable outbreak of influenza-like illness (ILI) in a school is defined as a doubled absence rate, with all of the following primary influenza symptoms reported among students: rapid onset, fever of 101°F or greater, illness lasting at least 3 days, and at least one secondary influenza symptom (e.g., myalgia, headache, cough, coryza, sore throat, or chills). A possible outbreak of ILI in a school is defined as a doubled absence rate with reported symptoms among students, including two primary influenza symptoms and at least one secondary influenza symptom. Since 1988-1989, the number of schools reporting ILI outbreaks has ranged from 38 schools in 20 counties in 1996-1997 to 441 schools in 71 counties during 1991-1992. Reports of probable ILI outbreaks were received from 165 schools in 46 counties
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throughout Minnesota during 2001-2002; possible outbreaks were reported in 118 schools in 45 counties. Schools began reporting ILI outbreaks in early October; 74% of probable and possible ILI outbreaks were reported during February, March, and April.

An outbreak of ILI is suspected in a long-term care facility when three or more residents with a cough and fever ($\geq 101^{\circ}\text{F}$) or chills present from a single unit during a period of 48 to 72 hours. An ILI outbreak is confirmed when at least one resident has a positive culture or positive rapid-antigen test for influenza. Since 1988-1989, the number of long-term care facilities reporting ILI outbreaks has ranged from six facilities in 1990-1991 to 79 facilities in 1997-1998. Sixty long-term care facilities reported confirmed or suspected ILI outbreaks during 2001-2002. In 47 (78%) facilities, influenza was laboratory-confirmed by direct antigen or culture. Twenty-three (38%) facilities reported outbreaks in February, 30 (50%) in March, and two (3%) in April.

Listeriosis

Four cases of listeriosis were reported during 2001. The first case-patient was a 74-year-old male with a malignant lymphoma; the second was an 82-year-old male; the third was an 85-year-old female with multiple myeloma; and the fourth was an 86-year-old male. All four cases survived their *Listeria* infections. The mean number of cases reported annually from 1996 to 2000 was 14 (range, seven to 19 cases).

Those at highest risk for acquiring listeriosis are the elderly, pregnant women, neonates, and immunocompromised individuals. Listeriosis generally is manifested as meningoenzephalitis and/or septicemia in neonates and adults. Pregnant women may experience a mild febrile illness, spontaneous abortion, premature delivery, or stillbirth. *Listeria monocytogenes* can multiply in refrigerated foods that are contaminated. Persons at highest risk should avoid soft cheeses (e.g., feta, Brie, Camembert, blue-veined, and Mexican-style cheeses) and unpasteurized milk, should heat/reheat deli meats, hot dogs, other meats, and leftovers thoroughly, and should wash raw vegetables.

Lyme Disease

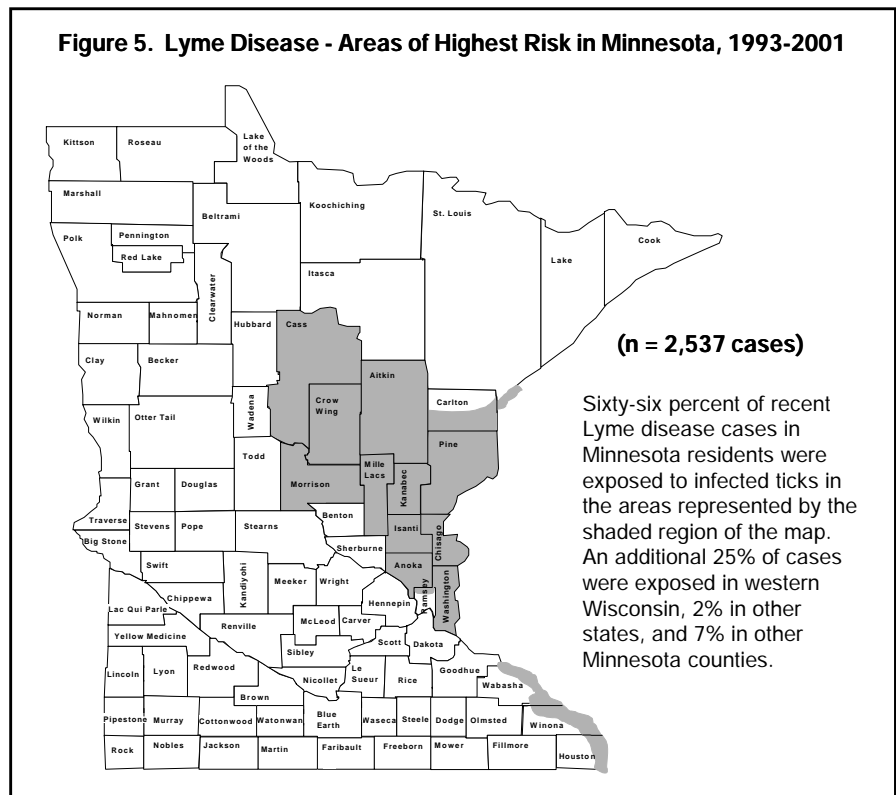
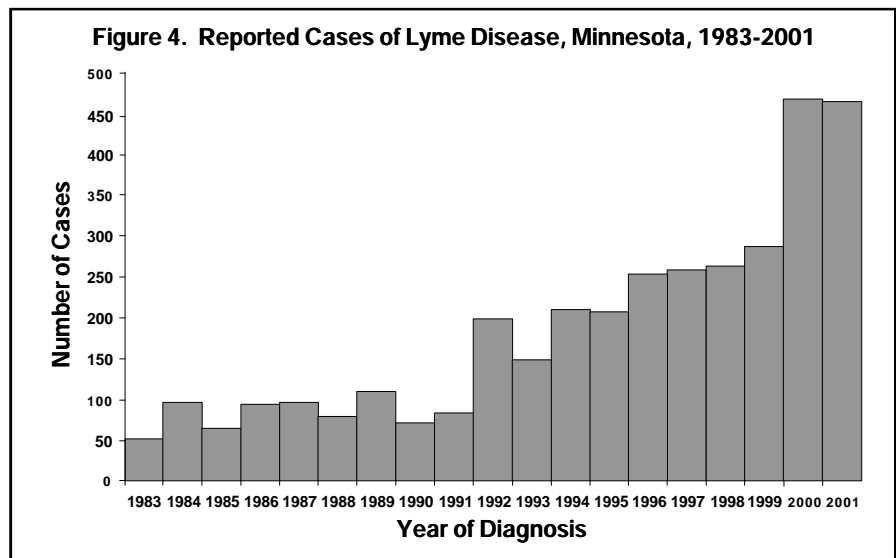
The national surveillance case defini-

tion for a confirmed case of Lyme disease includes: 1) physician-diagnosed erythema migrans (EM) (solitary lesion must be ≥ 5 centimeters in diameter), or 2) at least one late manifestation of Lyme disease (neurologic, cardiac, or joint) and laboratory confirmation of infection. MDH has established the following criteria for laboratory confirmation with regard to counting surveillance cases: 1) positive results of serologic testing conducted by CDC, or 2) a positive Western blot test from a clinical reference laboratory. A probable case of Lyme disease is

defined as a person with at least one late manifestation of Lyme disease and laboratory evidence of infection but without a history of EM or appropriate laboratory confirmation.

During 2001, 461 cases meeting the case definition for a confirmed case of Lyme disease were reported (9.4 per 100,000 population), similar to the 465 cases reported in 2000 (Figure 4). During 2001, an additional 21 reports were classified as probable cases of Lyme disease.

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Two hundred eighty-four (62%) confirmed case-patients were male. The median age of case-patients was 39 years (range, 1 to 91 years). Physician-diagnosed EM was present in 404 (88%) cases. Eighty-two (18%) cases had at least one late manifestation of Lyme disease (48 had a history of objective joint swelling, and 29 reported cranial neuritis) and confirmation by a positive Western blot test. Onsets of illness peaked in June-July (61% of cases), corresponding to the peak activity of nymphal *Ixodes scapularis* (deer tick, or black-legged tick) in June.

Similar to data from previous years, 209 (45%) Lyme disease cases in 2001 occurred among residents of the seven-county Twin Cities metropolitan area. However, only 41 (9%) case-patients likely were exposed to infected *I. scapularis* in metropolitan counties, primarily Anoka, Washington, and extreme northern Ramsey counties. Most case-patients either reside in or travel to endemic counties in east-central Minnesota (Figure 5) or western Wisconsin. Of note, 94 (25%) of 378 Lyme disease cases with known exposure data had likely exposure in Crow Wing County. Several east-central Minnesota counties continue to have the highest incidence of Lyme disease in Minnesota (e.g., Crow Wing, Aitkin, Houston, Cass, and Pine counties had incidence rates of 111, 85, 66, 59, and 49 cases per 100,000 population, respectively).

Measles

Four cases of measles were reported during 2001. Three cases were laboratory-confirmed by a positive serologic test for measles IgM; one case was confirmed by viral culture for measles. No further transmission from any of the four cases was identified.

The first case-patient was a 13-month-old adoptee from China. The child had not been vaccinated and was exposed to measles in a Chinese orphanage 2 weeks prior to rash onset. Serology for measles IgM and the viral culture for measles were positive. The specimen was not viable after initial testing and so could not be sent to CDC for genotype analysis. This child was one of nine measles cases reported in the U. S. during February and March among recent adoptees from China. The second case-patient was a 31-year-old male who reported repeated

domestic travel during February and March. He reported an unknown vaccination history, and laboratory results included both a positive serologic test for measles IgM and a positive viral culture for measles. Genotyping performed at CDC identified the same genotype as another imported case from China, which was reported in Washington state. The Minnesota case had no airplane flights in common with any of the known cases from China.

The third case-patient was a 10-year-old female who was exposed to measles in a refugee camp in Nairobi prior to arrival in the U.S. The child had an unknown vaccination history. The case was laboratory-confirmed by positive serology for measles IgM. Polymerase chain reaction (PCR) testing performed at CDC identified a measles genotype common in Somalia. Serological testing was performed on all household contacts, and all showed immunity to measles.

The final case-patient was a 2-week-old infant. The infant's laboratory tests were incongruent. The measles IgM test was negative; however, the viral culture was positive for measles. Genotyping performed at CDC identified a measles genotype common in Vietnam. Serologic testing of family members, including the child's mother, indicated that all were immune to measles. No source case was identified.

International importation is an important source of measles transmission in the U.S. Two of the four measles cases reported in Minnesota during 2001 were international importations, and at least one likely was exposed to an imported case. During the past 5 years, eight (57%) of the 14 measles cases reported in Minnesota were imported.

Methicillin-Resistant *Staphylococcus aureus*

Strains of *Staphylococcus aureus* that are resistant to methicillin and all beta-lactam antibiotics are referred to as methicillin-resistant *Staphylococcus aureus* (MRSA). Such strains first were recognized in the U.S. in the late 1960s. 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 from health care facilities in Minnesota describing increasing numbers of healthy young patients presenting with infections caused by MRSA. These patients had onset of their MRSA infections in the community and appeared to have none of the established risk factors for MRSA. Although most of the reported infections were not severe, some resulted in serious illness or death.¹

In 1999, Minnesota Rules Governing Communicable Diseases were amended to require designated sentinel hospitals to report cases of MRSA. In addition, cases of community-onset MRSA (CO-MRSA) that cause serious illness or death were made reportable.

To be classified as a case of CO-MRSA, a patient must have no history of any of the following: a positive culture for MRSA obtained more than 48 hours after admission to a hospital (if admitted); prior MRSA infection or colonization; or hospitalization, surgery, residency in a long-term care facility, hemodialysis, peritoneal dialysis, or indwelling percutaneous devices or catheters within 1 year prior to the positive MRSA culture.

MDH initiated active surveillance for CO-MRSA in January 2000 at 12 sentinel hospital laboratories statewide. The laboratories (six in the seven-county Twin Cities metropolitan area and six in greater Minnesota) were selected to represent various geographic regions of the state. Currently, sentinel sites report all cases of MRSA identified at their facilities and send all CO-MRSA isolates to MDH. The purpose of this surveillance system is to monitor the incidence of CO-MRSA infections in Minnesota, to identify possible risk factors for CO-MRSA, and to identify the antibiotic susceptibility patterns and molecular subtypes of CO-MRSA isolates. Additionally, MDH has begun testing selected CO-MRSA isolates for inducible clindamycin resistance and possible *S. aureus* virulence factors, such as Pantone-Valentine leukocidin.

During 2001, 1,374 cases of MRSA infection were reported by sentinel sites. Twelve percent of these cases were classified as CO-MRSA; 87% were classified as health care-

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associated MRSA (HA-MRSA), and 1% could not be classified. The MDH Public Health Laboratory received CO-MRSA isolates from 155 (92%) cases; to date, antimicrobial susceptibility testing and molecular subtyping by PFGE has been completed for 152 (98%) of these isolates. CO-MRSA patients were, on average, younger than patients with HA-MRSA (29 years vs. 61 years) and more likely to have MRSA isolated from the skin (73% vs. 28%). CO-MRSA isolates typically belonged to one particular PFGE clonal group that is distinct from the clonal group most common to HA-MRSA isolates.

All CO-MRSA isolates submitted in 2001 were susceptible to rifampin, trimethoprim-sulfamethoxazole, and vancomycin; 98% were susceptible to gentamicin; 94% were susceptible to tetracycline; 83% were susceptible to clindamycin; 76% were susceptible to ciprofloxacin, and 43% were susceptible to erythromycin. Drug susceptibility data reported from retrospective studies (1996-1998)² and sentinel surveillance (2000-2001) have demonstrated a significant decrease in CO-MRSA susceptibility to ciprofloxacin, clindamycin, and erythromycin over time. Additionally, inducible clindamycin resistance has been demonstrated in many erythromycin-resistant/clindamycin-sensitive isolates.

In 2001, MDH received two reports of fatal necrotizing CO-MRSA pneumonia in young, previously healthy persons. MDH is interested in receiving all reports of necrotizing pneumonia due to *S. aureus* (methicillin-sensitive or resistant).

References:

1. Centers for Disease Control and Prevention. Four pediatric deaths from community-acquired methicillin-resistant *Staphylococcus aureus*: Minnesota and North Dakota, 1997-1999. *MMWR* 1999; 48:707-10.
2. Naimi TS, LeDell KH, Boxrud DJ, et al. Epidemiology and clonality of community-acquired methicillin-resistant *Staphylococcus aureus* in Minnesota, 1996-1998. *Clin Infect Dis* 2001; 33:990-6.

Mumps

Six cases of mumps were reported during 2001; 34 cases have been reported in Minnesota in the last 5 years. Four of the six case-patients reported in 2001 were white, non-Hispanic adults, with ages ranging from 43 to 62 years. All four adult cases had no (or unknown) mumps vaccination history. Two case-patients were children. A 4-year-old patient born in

the Dominican Republic had an unknown immunization history. An 8-year-old patient was a white, non-Hispanic female with a history of one dose of MMR at 15 months of age. Adults represent an increasing proportion of mumps cases reported in Minnesota, highlighting the need to assess adults' immunization status and to implement recommendations for mumps vaccination for those born in 1957 or later.

All six cases reported in 2001 were laboratory-confirmed by positive IgM serology; however, none had convalescent serum specimens collected to demonstrate a rise in serum IgG antibody. Both IgM and IgG serologic testing should be performed on suspected mumps cases, since false-positive indirect immunofluorescent antibody tests for mumps IgM have been reported. Serologic specimens for mumps IgM should be drawn on or after the third day of swelling. Specimens for acute and convalescent serum IgG should be drawn as soon as possible after onset of swelling and 3-5 weeks later; tests should be run as paired sera. Mumps also can be confirmed by viral culture using throat washings, urine, or spinal fluid specimens. Specimens for viral culture should be collected during the first 5 days of illness.

Neisseria meningitidis Invasive Disease

Twenty-seven cases of *Neisseria meningitidis* invasive disease (0.6 per 100,000 population) were reported in 2001, compared to 22 cases in 2000. The distribution of serogroups among case isolates was similar to 2000, with 11 (41%) serogroup C cases, nine (33%) serogroup B cases, and seven (26%) serogroup Y cases.

Ages of case-patients ranged from 1 month to 85 years, with a mean of 29 years. Forty-eight percent of the cases occurred in the Twin Cities metropolitan area. Twelve (44%) cases had meningitis; nine (33%) had bacteremia without another focus of infection; three (11%) had bacteremia with pneumonia, and three (11%) had septic arthritis. Two serogroup B cases with nearly identical PFGE subtype patterns reported having had close contact with the same individual, but these two case-patients did not have known direct contact with each other. All other cases were sporadic, with no apparent epidemiologic links.

Four deaths occurred. An 85-year-old female died of pneumonia, and a 19-year-old male died of meningitis; both were attributed to serogroup C. A 49-year-old male died of meningococemia, and a 15-year-old male died of meningitis due to serogroup Y.

An increase in the proportion of meningococcal disease attributed to serogroup Y was noted in Minnesota in the latter half of the 1990s; the majority of cases occurred in elderly persons, and most of those cases presented as pneumonia. Serogroup Y continued to account for a significant proportion of meningococcal disease in Minnesota in 2001, but cases were younger and presented with more severe disease, such as meningococemia.

Since the fall of 1998, MDH has collected additional information on college-aged students with *Neisseria 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 CDC 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 W135 are covered by the quadrivalent vaccine. One serogroup C case reported in Minnesota in 2001 occurred in a college student. In the spring of 2002, MDH began a case-control study of risk factors for meningococcal disease among high school students in Minnesota, in collaboration with CDC and other EIP sites nationwide.

Pertussis

Three hundred eight cases of pertussis (6.3 per 100,000 population) were reported during 2001, compared with 575 cases in 2000. Laboratory confirmation was available for 204 (66%) cases, of which 105 were confirmed by culture and 99 by polymerase chain reaction. The remainder of cases either were epidemiologically linked to culture-confirmed cases (24%) or met a clinical case definition (10%). Two hundred seven (67%) cases occurred among residents of the seven-county Twin Cities metropolitan area. No deaths due to pertussis were reported in 2001.

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Very young children, older individuals, and previously immunized persons may not exhibit the typical "whoop" associated with pertussis ("whooping cough"); paroxysmal coughing is the most commonly reported symptom. In 2001, nearly all (94%) reported cases had paroxysmal coughing, and 37% experienced whooping. Post-tussive vomiting was reported in over half (56%) of the cases; 36% reported apnea.

Due to waning immunity following natural infection or vaccination, pertussis can affect persons of any age and increasingly is recognized in older children and adults. Case-patients in 2001 ranged from 7 days to 80 years of age. Thirty five (11%) cases occurred in infants less than 6 months of age, and 74 (24%) occurred in children 6 months to 4 years of age. The most common age group among cases was children 5-12 years. Persons 13-17 years of age and persons 18 years of age or older accounted for 13% and 24% of cases, respectively.

The severity of pertussis increases with decreasing age; pertussis is most severe in infants and young children. Pneumonia was diagnosed in 18 (6%) cases, seven (39%) of whom were less than 18 months of age. Thirty (10%) cases were hospitalized, of which 17 (57%) were infants less than 6 months of age.

In Minnesota, pertussis infection in older children and adults may result in exposure of unprotected infants, who are most at risk for severe consequences of infection. During 2001, 43 cases of pertussis were reported in infants less than 1 year of age. A likely source of exposure was identified for 17 (40%) cases, of whom eight likely were infected by an adult and nine likely were infected by children. Of the remaining 26 (60%) cases with no identified source of infection, exposure likely occurred outside the household.

Although unvaccinated children are at highest risk for pertussis, fully immunized children also can develop disease. Vaccine efficacy for currently licensed vaccines is approximately 71-84% for preventing serious disease. Evaluation of the vaccination status of pertussis case-patients 2 months to 15 years of age indicated that 105 (56%) of 187 cases with a known vaccine history had received age-appropriate

immunization for pertussis. (This includes infants 2-5 months of age, for whom a primary series is not yet indicated.) Among 169 case-patients 7 months to 15 years of age, 147 (87%) had received at least a primary series of three doses. Disease in previously immunized persons usually is mild. Of 88 cases among children 7 months to 7 years of age, 16 (18%) were considered preventable-i.e., the patient had received fewer than three doses of DTP vaccine before onset of illness.

Physicians should include pertussis in the differential diagnosis of coughing illnesses in persons of all ages, regardless of immunization status. Until an approved booster vaccination for pertussis is available to protect older children and adults, prompt diagnosis and treatment of cases and prophylaxis of contacts are the only options for limiting transmission.

Of 105 culture-confirmed cases reported in 2001, 93 (89%) had *B. pertussis* isolates subtyped by pulsed-field gel electrophoresis (PFGE) and tested for antibiotic susceptibility to erythromycin, ampicillin, and trimethoprim/sulfamethoxazole using ETEST. Twelve distinct PFGE patterns were identified; five of these patterns occurred in only a single case isolate. The two most common patterns accounted for 76 (82%) isolates.

The first case of erythromycin-resistant *B. pertussis* in Minnesota was identified in October 1999. Statewide, all 798 other isolates tested to date have had low minimum inhibitory concentrations, falling within the reference range for susceptibility to erythromycin and the other antibiotics evaluated. Only five other erythromycin-resistant *B. pertussis* cases have been identified in the U.S.

Salmonellosis

During 2001, 693 culture-confirmed cases of *Salmonella* infection (14.1 per 100,000 population) were reported. This is similar to the number of cases reported since 1996 (601 to 656 cases per year, or 12.1 to 14.2 per 100,000 population) (Figure 1). Four serotypes, *S. Typhimurium* (200 cases), *S. Enteritidis* (133 cases), *S. Heidelberg* (52 cases), and *S. Newport* (48 cases), accounted for 62% of cases. Twenty-four percent of the case-patients were hospitalized for their infection. Four persons died within 2 weeks of their

specimen collection date (two had *S. Hadar* isolates isolated from blood, one had *S. Subspecies II Salamae* isolated from stool, and one had *S. group B* isolated from urine). Twenty-five percent of case-patients were less than 10 years of age. Fifty-eight percent of cases were diagnosed during May through September.

Three food-borne outbreaks of salmonellosis were identified in 2001. One occurred at a hotel banquet facility, and two occurred in restaurants. In April, attendees at a food stylist convention became ill with *S. Enteritidis* infection after consuming eggs Benedict prepared with unpasteurized shell-eggs. Fifteen convention attendees and three banquet facility workers were culture-positive for *S. Enteritidis*. The second outbreak took place during July in a restaurant setting. This outbreak resulted in 12 culture-confirmed *S. Enteritidis* infections among patrons and two culture-confirmed infections among employees of the restaurant. Shell-eggs from Ohio were the most likely vehicle for infection. The third food-borne outbreak of salmonellosis occurred in August. This outbreak occurred at a buffet-style restaurant and resulted in nine culture-confirmed *S. Newport* infections among patrons. Although no single food vehicle was identified, the investigation revealed ample opportunity for cross-contamination of ready-to-eat foods by raw chicken.

Six non-foodborne outbreaks of salmonellosis also were identified in 2001. One outbreak was due to contact with an animal product; three occurred at child daycare settings; one occurred at a private home; and one occurred at a nursing home. In May, 34 culture-confirmed cases of *S. Typhimurium* infection were identified in children from two elementary schools and their family members. Children at the two schools dissected owl pellets as part of science club. In one of the schools, the owl pellets were dissected directly on a school cafeteria table. The children did not wash their hands after the science activity, and the table was not cleaned before snacks were served on the same table. Samples collected from owl pellets, fecal matter from the owl that produced the pellets, and frozen chicks used to feed the owl also yielded *S. Typhimurium* isolates that were identical to the outbreak
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strain by pulsed-field gel electrophoresis. All three child daycare outbreaks were due to person-to-person transmission. One took place in May, resulting in two *S. Oranienburg* cases; the other two were investigated in July, resulting in two culture-confirmed *S. Montevideo* cases in one daycare and three *S. Typhimurium* cases in the other. An outbreak at a party in a private home resulted in two *S. Miami* cases in July. The vehicle and mode of transmission were not identified. In August, three *S. Newport* cases due to person-to-person transmission occurred in a nursing home.

Sexually Transmitted Diseases

Laboratory-confirmed cases of chlamydia, gonorrhea, syphilis, and chancroid are monitored by MDH through a passive, physician- and laboratory-based surveillance system. Other common sexually transmitted diseases (STDs) caused by viral pathogens, such as herpes simplex virus and human papillomavirus, are not reportable.

Chlamydia

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. In 2001, 8,323 cases (169 per 100,000 population) were reported. This incidence rate represents a 1% decrease from 2000 and the first time since 1997 that chlamydia rates have not increased (Figure 6, Table 3).

Adolescents and young adults are most at risk for acquiring chlamydia infection (Table 4). The chlamydia rate is highest among 20-24-year-olds (963 per 100,000 population), with the next highest rate among 15-19-year-olds (763 per 100,000 population). The incidence of chlamydia among adults 25-29 years of age (387 per 100,000 population) is markedly less, and rates among older age groups are even lower. The incidence of chlamydia infection among women (242 per 100,000 population) is more than twice the rate among men (95 per 100,000 population); however, this difference primarily 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 (1,268 per 100,000 population) is approximately 17 times higher than the rate among whites (75 per 100,000 population). Although blacks comprise approxi-

mately 3.5% of Minnesota's population, 31% of chlamydia cases occur among blacks. The incidence among American Indians (428 per 100,000 population) and Hispanics (527 per 100,000 population) are six to seven times higher than the rate among whites, and the rate among Asians (240 per 100,000 population) is three times higher than among whites.

Chlamydia infections occur throughout the state, with the highest rates in Minneapolis (687 per 100,000 population) and St. Paul (533 per 100,000 population). The incidence in the suburban Twin Cities metropolitan area (104 per 100,000 population) is similar to that in greater Minnesota (93 per 100,000 population).

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. In 2001, 2,701 cases (55 per 100,000 population) were reported, reversing a trend of increasing rates that began in 1997 (Figure 6, Table 3).

Adolescents and young adults are at greatest risk for gonorrhea (Table 4), with incidence rates of 209 per 100,000 population among 15-19-year-olds, 259 per 100,000 population among 20-24-year-olds, and 140 per 100,000 population among 25-29-year-olds. Gonorrhea rates for men (51 per 100,000 population) and women (59 per 100,000 population) are comparable. Communities of color are disproportionately affected by gonorrhea, with 54% of cases among blacks. The incidence of gonorrhea among blacks (719 per 100,000 population) is

48 times higher than the rate among whites (15 per 100,000 population). Similarly, rates among American Indians (86 per 100,000 population) and Hispanics (79 per 100,000 population) are five to six times higher than among whites. The incidence among Asians (32 per 100,000 population) is more than twice the rate among whites.

Cases of gonorrhea are concentrated in core urban populations of Minneapolis and St. Paul (Table 4). The incidence in Minneapolis (341 per 100,000 population) is 1.7 times higher than the rate in St. Paul (197 per 100,000 population), 13 times higher than the rate in the suburban Twin Cities metropolitan area (27 per 100,000 population), and 26 times higher than the rate in greater Minnesota (13 per 100,000 population).

Syphilis

Syphilis is caused by the spirochete *Treponema pallidum*. Surveillance data for primary and secondary syphilis typically are used to monitor morbidity trends, because they represent recently acquired infections. Trends in the occurrence of syphilis are difficult to assess due to the generally low numbers of cases.

Primary and Secondary Syphilis

The incidence of primary/secondary syphilis in Minnesota is lower than that for chlamydia or gonorrhea (Figure 6, Table 3). Thirty-three cases of primary/secondary syphilis (0.7 per 100,000 population) were reported in 2001; the incidence rate increased 133% from 2000 to 2001. The rate of early latent syphilis decreased 25% during this **continued...**

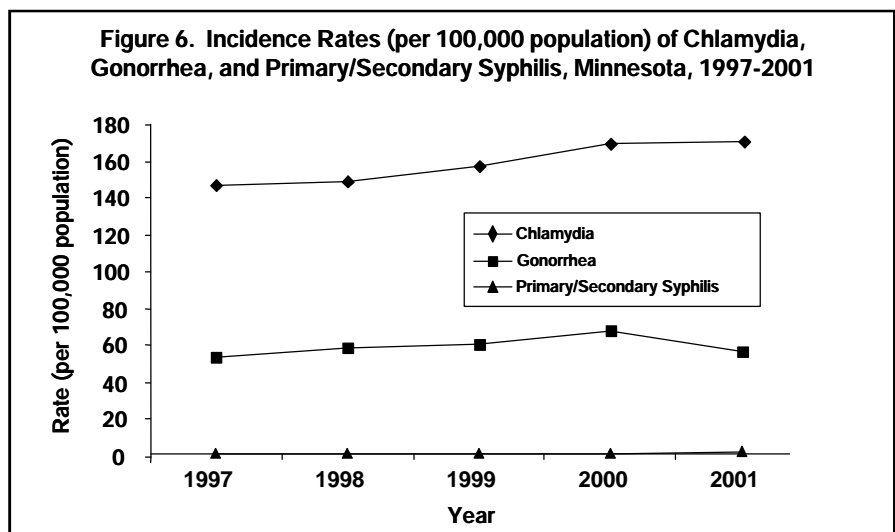


Table 3. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Syphilis, Minnesota, 1997-2001

Disease	1997		1998		1999		2000		2001		Change in Rate 2000/2001
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	
Chlamydia	6,804	146	6,996	149	7,459	158	8,102	170	8,323	169	-1%
Gonorrhea	2,438	53	2,716	58	2,830	60	3,160	66	2,701	55	-17%
Syphilis Total	118	2.5	78	1.7	72	1.5	79	1.7	134	2.7	59%
Primary/											
Secondary	16	0.3	9	0.2	10	0.2	16	0.3	33	0.7	133%
Early Latent*	20	0.4	8	0.2	9	0.2	18	0.4	16	0.3	-25%
Late Latent**	82	1.8	61	1.3	52	1.1	43	0.9	80	1.6	78%
Congenital***	0	0	0	0.0	1.0	1.5	2	3.0	2	3.0	0%
Chancroid	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0%

* Duration ≤1 year
 ** Duration >1 year
 *** Rate per 100,000 live births

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, 2001

Demographic Group	Chlamydia		Gonorrhea		Primary/Secondary Syphilis	
	No.	Rate	No.	Rate	No.	Rate
Total	8,323	169	2,701	55	33	0.7
<i>Residence</i>						
Minneapolis	2,628	687	1,303	341	23	6.0
St. Paul	1,530	533	565	197	5	1.7
Suburban*	2,058	104	533	27	5	0.3
Greater Minnesota	2,107	93	300	13	0	0.0
<i>Age</i>						
<10 years	4	1	0	0	0	0.0
10-14 years	124	33	40	11	0	0.0
15-19 years	2,857	763	781	209	2	0.5
20-24 years	3,104	963	834	259	4	1.2
25-29 years	1,237	387	448	140	4	1.3
30-34 years	536	152	253	72	4	1.1
35-44 years	392	48	270	33	16	1.9
≥45 years	69	4	75	5	3	0.2
<i>Gender</i>						
Male	2,313	95	1,240	51	17	0.7
Female	6,010	242	1,461	59	16	0.6
<i>Race</i>						
White	3,329	75	658	15	7	0.2
Black	2,574	1,268	1,460	719	24	11.8
American Indian	347	428	70	86	1	1.2
Asian	403	240	54	32	0	0.0
Other or Unknown**	1,670	---	459	---	1	---
<i>Ethnicity</i>						
Hispanic***	756	527	113	79	0	0.0

* Seven-county metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties), excluding cities of Minneapolis and St. Paul
 ** No population data available to calculate rates
 *** Persons of Hispanic origin may be of any race

time.

The highest rates of primary/secondary syphilis occurred among 25-29-year-olds (Table 4). Men and women had similar rates of primary/secondary syphilis (0.7 and 0.6 per 100,000 population, respectively). The primary/secondary syphilis rate among blacks (11.8 per 100,000 population) was nearly 60 times higher than the rate among whites (0.2 per 100,000 population). Twenty-four (73%) cases of primary/secondary syphilis occurred among blacks, and seven (21%) occurred among whites.

Syphilis primarily is an urban disease (Table 4). No cases of primary/secondary syphilis were reported from greater Minnesota. The majority (70%) of cases occurred in Minneapolis (23 cases, 6.0 per 100,000 population), with the remaining cases evenly distributed between St. Paul (5 cases, 1.7 per 100,000 population) and the suburban Twin Cities metropolitan area (5 cases, 0.3 per 100,000 population).

Congenital Syphilis

Two cases of congenital syphilis (3.0 per 100,000 live births) were reported in Minnesota during 2001.

Chancroid

Chancroid continues to be very rare in Minnesota; no cases were reported in 2001.

Although overall incidence rates for STDs in Minnesota are lower than those in many other areas of the U.S., certain population subgroups in Minnesota have very high STD rates. Specifically, STDs disproportionately affect adolescents, young adults, and persons of color.

Shigellosis

During 2001, 493 culture-confirmed cases of *Shigella* infection (10.0 per 100,000 population) were reported (Figure 1). This represents a 45% decrease from the 904 cases reported in 2000 (the largest number of *Shigella* cases ever reported in Minnesota) and a 68% increase from the median number of cases reported annually from 1997 to 2000 (median, 293 cases; range, 138 to 904).

In 2001, *Shigella sonnei* accounted for 450 (93%) cases, *S. flexneri* for 29 (6%), *S. dysenteriae* for three (1%), and **continued...**

S. boydii for two (<1%); nine isolates were not serotyped. Case-patients ranged in age from 1 month to 84 years (median, 10 years). Fifty-one percent of case-patients were less than 10 years of age; children less than 5 years of age accounted for 30% of cases. Seventy-six (15%) cases were hospitalized. Fifty-five percent of all *Shigella* cases resided in the seven-county Twin Cities metropolitan area, including 31% in Hennepin County and 9% in Ramsey County. The shigellosis incidence rates in the Northwestern and Southwestern districts (31.6 and 27.0 cases per 100,000 population, respectively) were significantly higher than those statewide. Community outbreaks, primarily outbreaks among children in elementary schools, accounted for the high rates of shigellosis in these two districts. The Southeastern district had the lowest rate of shigellosis (2.4 per 100,000 population).

Twenty-five outbreaks of shigellosis were identified in 2001; all were due to *S. sonnei*. These outbreaks resulted in at least 280 illnesses, including 165 culture-confirmed cases (representing 37% of reported *S. sonnei* cases). The outbreaks occurred in a variety of settings, including child daycare centers and homes (18 outbreaks) and elementary schools (six outbreaks).

Every tenth isolate of *Shigella* received at MDH was tested for antimicrobial resistance, but only one isolate was included from each outbreak. Forty-six isolates were tested in 2001. Resistance to ampicillin decreased from 94% of isolates in 2000 to 83% in 2001, while resistance to trimethoprim-sulfamethoxazole increased from 10% of isolates in 2000 to 22% in 2001. The percentage of isolates that were resistant to both ampicillin and trimethoprim-sulfamethoxazole increased from 6% in 2000 to 15% in 2001.

***Streptococcus pneumoniae* Invasive Disease**

In 2001, 340 cases of invasive *Streptococcus pneumoniae* infection were reported among residents of the seven-county Twin Cities metropolitan area, representing a 22% decrease from the 438 cases reported in 2000. Rates of invasive disease varied considerably by age, and rates of illness among children less than 2 years of age decreased most dramatically during 2001. Figure 7 compares mean annual

rates by age group from the years 1996-1999 with those from 2000 and 2001. This decrease in rates among infants and young children likely is attributable to use of the new pediatric polysaccharide-protein conjugate vaccine (PCV-7), Prevnar®, licensed in 2001. This vaccine covers seven of the serotypes that most frequently cause invasive pneumococcal infections in children.

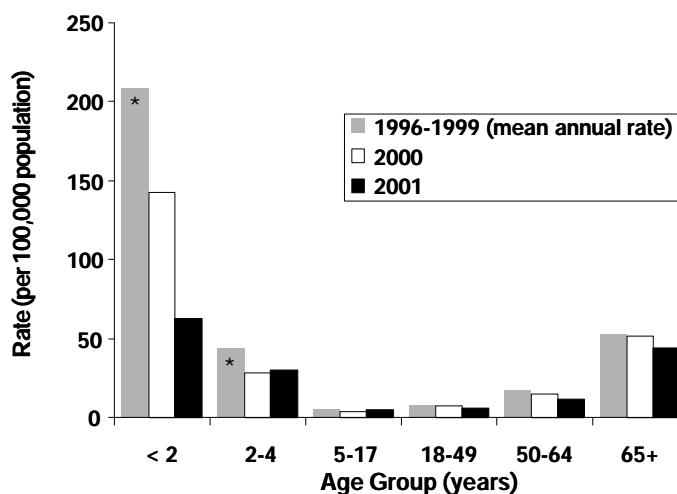
Pneumonia accounted for 173 (51%) of the invasive pneumococcal infections reported in 2001, including only those accompanied by bacteremia or isolation of pneumococci from another sterile site, such as pleural fluid. In 2001, 17

(5%) cases of pneumococcal meningitis occurred among Twin Cities residents. Bacteremia without another known focus of infection accounted for 125 (37%) cases. Although the total number of cases fell in 2001, the proportions of common infections among total cases was similar to prior years. Thirty (9%) case-patients died, representing a slightly but not significantly higher proportion of deaths among cases than in 2000.

Of 72 case isolates from children less than 5 years of age, 39 (54%) were serotypes included in the PCV-7 vaccine. Of 102 isolates from adults 65

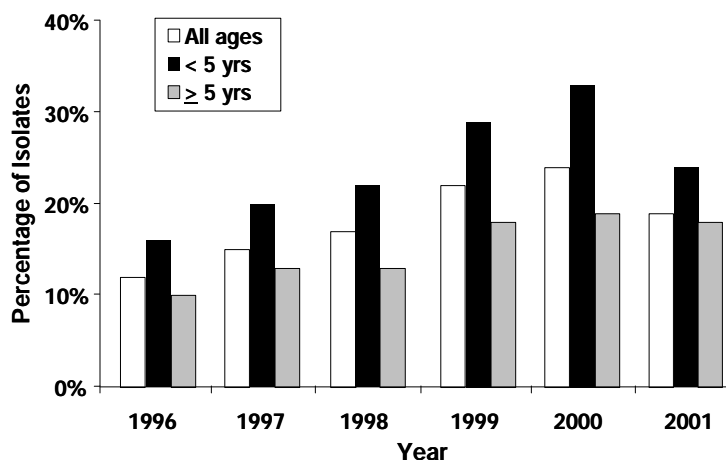
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Figure 7. Mean Annual Incidence Rates of Invasive Pneumococcal Infections by Age, Twin Cities Metropolitan Area, 1996-2001



* These two rates were calculated using intra-censal population estimates, which are based on 1990 census totals. Other 1996-99 rates were based on straight-line interpolation of yearly population totals between 1990 and 2000 census data. Rates for 2000 and 2001 were based on 2000 census totals.

Figure 8. Proportion of Invasive Pneumococcal Isolates Resistant to Two or More Drug Classes by Age, Seven-County Twin Cities Metropolitan Area, 1996-2001



years of age or older, 82 (80%) were serotypes included in the 23-valent polysaccharide pneumococcal vaccine.

Among 304 invasive *S. pneumoniae* case isolates with drug susceptibility results, 69 (23%) were non-susceptible to penicillin, which is slightly but not significantly less than the comparable percentage in 2000 (27%; 109/410). The percentage of isolates from young children that were non-susceptible to penicillin also decreased from 2000 to 2001, falling from 38% (39/103) to 30% (12/40) among children less than 2 years of age and from 35% (46/133) to 28% (20/71) among children less than 5 years of age, respectively. However, neither change was statistically significant. This reduction or leveling-off of penicillin non-susceptibility contrasts with prior years. In 1996, 14% (60/425) of all case isolates were penicillin-non-susceptible, and this percentage rose each year through 2000.

Similarly, the percentage of case isolates resistant to erythromycin fell from 25% (104/410) in 2000 to 19% (58/304) in 2001. Prior to 2001, resistance to this macrolide antibiotic had increased quickly; the percentage of erythromycin-resistant isolates increased each year, from 9% (38/425) in 1996 through 2000. The decrease in erythromycin-resistant isolates in 2001 occurred principally among young children. The percentage of erythromycin-resistant isolates among children less than 2 years of age decreased from 42% (43/103) in 2000 to 18% (7/40) in 2001 ($p < 0.01$); among children less than 5 years of age, the comparable percentages decreased from 37% (49/133) to 21% (15/71) during the same period ($p = 0.02$). Among isolates from persons 5 years of age or older, the reduction in erythromycin resistance was not statistically significant (20% [55/277] in 2000 vs. 18% [43/233] in 2001).

Prior to 2001, multidrug-resistant invasive pneumococcal isolates (i.e., those that are resistant to two to six drug classes) have been increasingly common. In 1996, 12% (51/425) of isolates were multidrug-resistant; this proportion increased each year through 2000 to 24% (97/410) but decreased to 19% (59/304) in 2001. The percentage of multidrug-resistant isolates among children less than 2 years of age decreased from 36% (37/103) in 2000

to 23% (9/40) in 2001; among children less than 5 years of age, the comparable percentage decreased from 33% (44/133) to 24% (17/71) during the same period. Since 1996, multidrug-resistant strains have been isolated more frequently from young children with invasive infections than from older individuals (Figure 8). The predominance of resistance among isolates from young children also is seen for most antibiotics tracked in our surveillance system and has been reported elsewhere. Also, the actual incidence of drug-resistant invasive infections among children less than 2 years of age decreased drastically in 2001.

The seven pneumococcal serotypes in the PCV-7 vaccine account for a large proportion of pediatric strains and represent the majority of antibiotic-resistant infections. Therefore, the decreased occurrence of these resistant strains among invasive case isolates may be attributed to increasing use of this new pediatric vaccine.

Additional information on antimicrobial susceptibility results for pneumococcal isolates submitted to MDH from 1996 to 2001 is available on the MDH web site (<http://www.health.state.mn.us/divs/dpc/ades/invbact/s-pneumo.pdf>).

Streptococcal Invasive Disease - Group A

Two hundred cases of invasive group A streptococcal (GAS) disease (4.1 per 100,000 population), including 15 deaths, were reported in 2001, compared to 149 cases and 13 deaths in 2000. Ages of case-patients ranged from 1 month to 97 years (mean, 47 years). Fifty-nine percent of case-patients were residents of the seven-county Twin Cities metropolitan area. Thirty-seven (19%) cases had bacteremia without another focus of infection, 47 (24%) had cellulitis, and 16 (8%) had primary pneumonia. Seventeen (9%) cases had necrotizing fasciitis. Six (3%) cases had streptococcal toxic shock syndrome (STSS); three STSS cases also had necrotizing fasciitis, and two others had peritonitis.

Of the 15 deaths, four (27%) had bacteremia without another focus of infection, and four had necrotizing fasciitis, including one patient who also had STSS and one who also had pneumonia. The remaining fatal cases had bacteremia with another focus of infection, including two (13%) with

pneumonia, two (18%) with cellulitis, and one (7%) each with necrotizing fasciitis and septic arthritis. The deaths occurred in persons 35 to 91 years of age. Significant underlying medical conditions were reported for all but three of the deaths.

Isolates were available for 174 (87%) cases, of which 166 were subtyped using pulsed-field gel electrophoresis (PFGE). Fifty-three different molecular subtypes were identified. Thirty-two subtype patterns were represented by one isolate each; other subtypes were represented by two to 38 isolates each. No epidemiologic links were noted among cases with identical subtypes, except for one pair of cases from the same nursing home. The deaths were distributed among eight different subtypes, with five (33%) deaths attributed to the most common PFGE subtype (5/38 [13%] of cases with that subtype). No other subtype accounted for more than two deaths.

Streptococcal Invasive Disease - Group B

Two hundred seventy-three cases of Group B streptococcal invasive disease (5.5 per 100,000 population), including 19 deaths, were reported in 2001. These cases included those in which group B *Streptococcus* (GBS) was isolated from a normally sterile site, in addition to six cases involving a miscarriage or stillbirth in which placenta was the site of disease.

Overall, 118 (43%) cases presented with bacteremia without another focus of infection. The other most common types of infection were cellulitis (12%), arthritis (8%), osteomyelitis (6%), pneumonia (5%), and meningitis (5%). The majority (72%) of cases had GBS isolated from blood only. Fifty-two percent of cases occurred among residents of the seven-county Twin Cities metropolitan area. Forty-five (16%) case-patients were infants less than 1 year of age, and 110 (40%) were 60 years of age or older.

Fifty-three cases of infant (early-onset or late-onset) or maternal GBS disease were reported, compared to 71 cases in 2000. Twenty-two infants developed invasive disease within 6 days following birth (i.e., early-onset disease), and 17 infants became ill at 7 to 89 days of age (i.e., late-onset disease). Eight stillbirths or spontaneous abortions **continued...**

were associated with 14 maternal invasive GBS infections. From 1997 to 2001, 1,355 cases of GBS invasive disease were reported; 1,034 (76%) were adult non-maternal; 142 (10%) were early-onset; 96 (7%) were late-onset; 69 (5%) were maternal; and 14 (1%) were among children 90 days to 14 years of age. During this time period, 142 women had infants who developed early-onset GBS disease. Sixty-five percent of case-patients were white, 6% were black, 10% were other races, and 25% were of unknown race. Seven infants died. Twenty infants born at less than 37 weeks gestation accounted for 17% of early-onset cases. Bacteremia without focus (80%) was the most common type of infection, followed by pneumonia (15%) and meningitis (7%).

In 1996, CDC, the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists released consensus guidelines urging prenatal care providers to use risk-based or screening-based approaches to prevent perinatal GBS disease.¹ In light of these guidelines, MDH reviewed the maternal charts for 140 (99%) of 142 early-onset cases. Thirty-eight (27%) women had prenatal screening for GBS; of these, 13 (34%) were positive, 23 (61%) were negative, and two (5%) had an unknown result. Among those who were screened, 85% either did not receive screening for vaginal and rectal sites at greater than 34 weeks gestation or did not have documentation of the site or date of screening. Overall, 16% of mothers of infants with invasive GBS disease received intrapartum antimicrobial prophylaxis (IAP). For women with risk factors and positive GBS cultures, regardless of site and date, 67% received IAP. Among women with risk factors and unknown or negative cultures, 30% received IAP, and 56% of women with no risk factor and a GBS-positive culture were given IAP.

In August 2002 the Perinatal Group B Streptococcal (GBS) Disease Prevention guidelines were revised (<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5111a1.htm>). Key changes from the 1996 guidelines include the recommendation for universal prenatal screening for all pregnant women at 35-37 weeks gestation, as well as updated prophylaxis regimens for women with penicillin allergy.²

References:

- Centers for Disease Control and Prevention. Prevention of perinatal group B streptococcal disease: a public health perspective. MMWR 1996; 45: (RR-7)1-24.
- Centers for Disease Control and Prevention. Prevention of perinatal group B streptococcal disease, revised guidelines from CDC. MMWR 2002; 51: (RR-11)1-23.

Tuberculosis

While the number of tuberculosis (TB) cases reported nationally has decreased each year since 1993, the incidence of TB in Minnesota is increasing. In 2001, 239 new cases of TB disease (4.9 per 100,000 population) were reported statewide. This represents a 34% increase since 2000 (178 cases) and the largest number of cases reported since the early 1970s. For the third consecutive year, the incidence of TB disease in Minnesota remains at or above the national goal (for the year 2000) of 3.5 per 100,000 population.

The epidemiology of TB in Minnesota is distinct nationally, with the most significant factor being the very high percentage of TB cases that occur among foreign-born persons. In 2001, 194 (81%) cases occurred in persons born outside the U.S. (Figure 9). This trend reflects the unique and changing demographics of immigrant populations arriving in the state, particularly persons arriving from regions of the world where TB is prevalent. The most common regions of origin for foreign-born persons with TB disease reported in 2001 include sub-Saharan Africa (e.g., Somalia, Liberia, and Ethiopia) (61%) and South/Southeast Asia (e.g., Laos and Vietnam) (24%) (Figure 10). More than half (55%) of foreign-born TB

cases were less than 30 years of age, while the most common (36%) age group among U.S.-born cases was those 60 years of age or older.

Among the 194 foreign-born persons diagnosed with TB disease in Minnesota during 2001, 60 (31%) were diagnosed within 12 months of arrival in the U.S., and an additional 37 (19%) were diagnosed 2 to 5 years after arriving in this country. All individuals who arrive in the U.S. as either immigrants or refugees receive a medical evaluation overseas to identify conditions (such as infectious pulmonary TB disease) of public health concern. In 2001, only seven (13%) immigrants/refugees diagnosed in Minnesota with TB disease within 12 months of their arrival in the U.S. had any TB-related conditions noted in the results of their pre-immigration medical exams. These findings highlight the need for clinicians not to rely exclusively on the overseas exam to identify TB disease among newly arrived foreign-born persons; 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.

Other less frequent risk factors among TB cases in Minnesota included homelessness (5%), HIV infection (3%), incarceration in a correctional facility (1%), and residence in a nursing home (1%). Twenty-eight (32%) of the state's 87 counties reported at least **continued...**

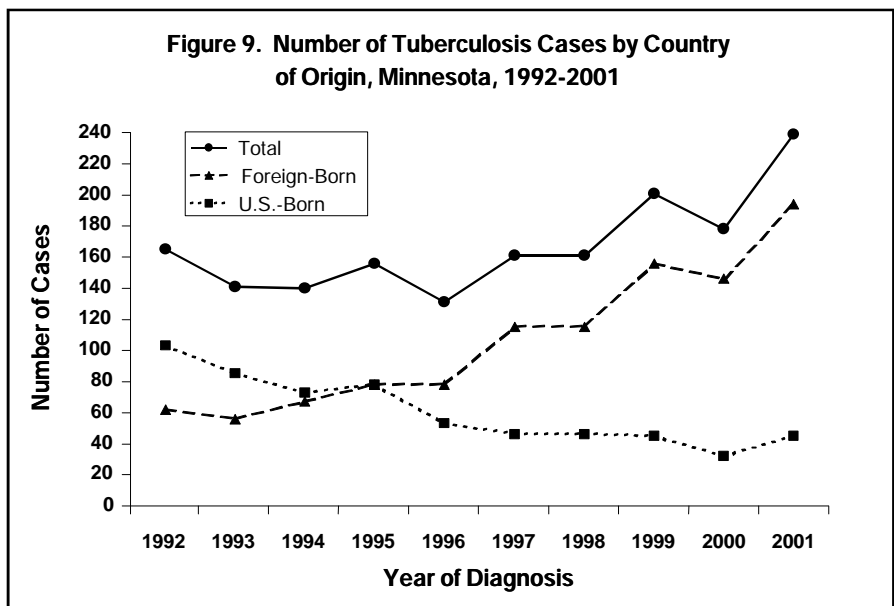


Figure 10. Foreign-Born Tuberculosis Cases by Region of Origin and Year of Diagnosis, Minnesota, 1997-2001

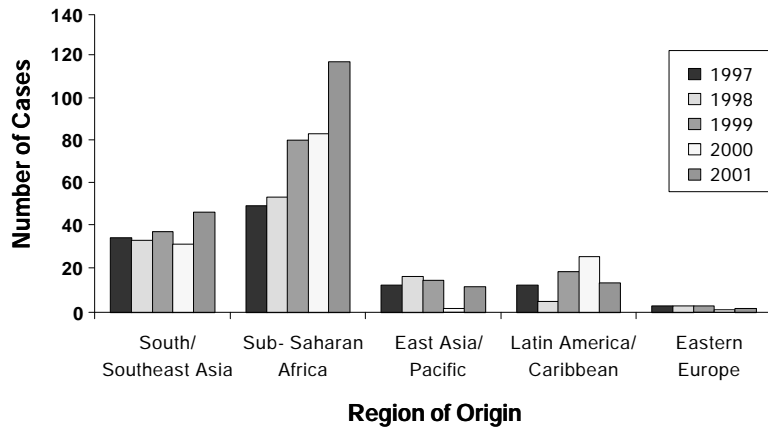


Table 5. Cases of Drug-Resistant Tuberculosis by Place of Birth and Year, Minnesota, 1997-2001

Year	Foreign-Born Cases		U.S.-Born Cases	
	Cases with Susceptibility Results*	Resistant No. (%)	Cases with Susceptibility Results*	Resistant No. (%)
1997	91	19 (21)	43	2 (5)
1998	92	23 (25)	42	4 (10)
1999	131	29 (22)	35	1 (3)
2000	115	34 (30)	26	3 (12)
2001	156	46 (29)	39	10 (26)
Total	585	151 (26)	185	20 (11)

*Culture-confirmed cases with drug susceptibility results available

one case of TB disease in 2001, with the majority (83%) of TB cases in the seven-county Twin Cities metropolitan area, particularly among residents of Hennepin (59%) and Ramsey (18%) counties. The incidence rate of TB disease increased 34% (from 9.3 to 12.5 cases per 100,000 population) in Hennepin County and 74% (from 4.7 to 8.2 cases per 100,000 population) in Ramsey County.

Drug-resistant TB is a critical public health and clinical concern, both globally and locally. The prevalence of drug resistance among TB cases reported in Minnesota exceeds comparable figures nationally. In 2001, 56 (29%) cases of drug-resistant TB were reported in Minnesota among 195 culture-confirmed cases for whom drug susceptibility results were available, including 23 (12%) cases resistant to isoniazid and four (2%) cases of multidrug-resistant TB (MDR-TB) (i.e., resistant to at least isoniazid and rifampin). National guidelines indicate

initial four-drug therapy (i.e., isoniazid, rifampin, pyrazinamide, and ethambutol or streptomycin) for all TB cases in areas where the prevalence of INH resistance is 4% or greater; accordingly, all TB cases in Minnesota initially should receive a four-drug regimen, at least until drug susceptibility results are known.

These drug susceptibility data in Minnesota represent an increase in drug resistance overall and, most notably, among U.S.-born persons. The percentage of drug-resistance among foreign-born cases (29%) was relatively stable in 2001. However, among U.S.-born cases, the percentage of drug resistance more than tripled, from an average of 8% during 1997-2000 to 26% in 2001 (Table 5). Of the 10 U.S.-born drug-resistant cases reported in 2001, eight (80%) were resistant to streptomycin (which was the only anti-TB drug to which five of those cases were resistant). Although streptomycin is the least

commonly used of the five first-line anti-TB medications, this trend is concerning and without explanation. Of 56 persons with drug-resistant TB disease reported in 2001, 46 (82%) were born outside the U.S., including all four MDR-TB cases, suggesting that the majority of drug-resistant TB in Minnesota (and all cases of MDR-TB reported to date) represent primary drug resistance acquired overseas, rather than secondary resistance resulting from nonadherence to prescribed therapy. However, the increasing prevalence of drug resistance among U.S.-born cases, in particular, raises concern that drug-resistant TB in Minnesota increasingly may be the result of transmission locally.

More detailed TB surveillance data and other TB-related resources (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 as part of the EIP. MDH requests that any cases of unexplained critical illness or deaths that appear to have possibly infectious causes be reported, regardless of the patient's age or underlying conditions. A subset of reported cases (i.e., persons 1-39 years of age with no serious underlying conditions who died of apparent non-nosocomial infectious processes) will be eligible for testing performed at CDC as part of the core surveillance 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-five possible cases were reported in 2001, compared to 17 cases in 2000; the increase may be attributed partially to heightened awareness among providers and broader active surveillance activities related to bioterrorism concerns at the end of the year. Providers subsequently determined causes of illness for 15 cases. Two deaths remain unexplained, but there was no evidence to suggest infectious causes for either case.

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Of the remaining 18 cases, 10 presented with respiratory symptoms, five with neurologic symptoms, and three with shock/sepsis. The respiratory cases ranged from 1 to 64 years of age; the neurologic cases were 18, 36 (2 cases), 40, and 59 years of age, and the sepsis cases were 56, 60, and 78 years of age. Three patients with respiratory syndromes and one patient with a neurologic syndrome died. Nine respiratory case-patients, two neurologic case-patients, and one sepsis case-patient resided in the seven-county Twin Cities metropolitan area; the remaining cases resided in greater Minnesota, except for one neurologic case-patient who was a Wisconsin resident hospitalized in Minnesota. One case, the death of a 1-year-old with a respiratory syndrome, was eligible for inclusion in the CDC project. Autopsy specimens were sent to CDC; preliminary tests have not identified an etiology.

CDC has proposed that each EIP site carry out hospital-based, syndrome-specific surveillance projects in addition to the core project involving surveillance for unexplained deaths. Projects studying critical illnesses and deaths due to unknown causes of meningococcal and respiratory failure may begin at several hospitals in Minnesota later this year.

Viral Hepatitis A

In 2001, 47 cases of hepatitis A (1.0 per 100,000 population) were reported. Thirty (64%) case-patients were residents of the seven-county Twin Cities metropolitan area, with 14 (30%) residing in Hennepin or Ramsey counties. Thirty-four (72%) case-patients were male. Of 46 cases for whom race was known, 39 (85%) were white, two (4%) were black, two (4%) were Asian, and three (7%) were American Indian. Although the majority of case-patients was white, incidence rates were higher among American Indians (3.7 per 100,000 population), Asians (1.2 per 100,000 population), and blacks (1 per 100,000 population) than among whites (0.9 per 100,000 population). Three case-patients (2.1 per 100,000 population) reported Hispanic ethnicity (which can be of any race). Case-patients ranged in age from 1 to 76 years; 21 (45%) cases occurred among adults 25 to 44 years of age.

In 2001, seven (15%) cases of hepatitis

A were associated with a single outbreak. The outbreak which involved residents of Carver, Sibley, and Nicollet counties, began with the infection of two family members and resulted in five additional cases. Three case-patients from the index family reported recent travel to Central America. The second-generation cases were linked to either a dinner party hosted by the index family or a summer gathering that the index family attended. The third-generation cases were not linked to a specific event, but were contacts of second-generation cases.

Two (4%) cases of hepatitis A were associated with a restaurant in Kewaunee County, Wisconsin. The index case (a Wisconsin resident) was a food-handler at the restaurant who reported recent travel to Mexico. Immune globulin prophylaxis was given to 94 people, including 33 restaurant employees. Only two documented cases of hepatitis A were linked to the food-handler; both case-patients were Minnesota residents.

Of the remaining 38 sporadic cases of hepatitis A reported in 2001, a risk factor for infection was identified for 23 (61%). Thirteen (34%) cases were associated with travel, eight (62%) of whom traveled to South America or Mexico. Six (16%) case-patients had known contact with another case; six (16%) case-patients were men who had sex with men, and one (3%) case-patient had consumed raw shellfish. Four (11%) cases (all adults) were associated with child daycare settings but were not related to any known outbreaks. Young children infected with hepatitis A often are asymptomatic or experience mild illness, yet are efficient transmitters of disease. Twenty (53%) of the sporadic cases occurred among persons for whom hepatitis A vaccine is indicated; one case-patient reported both travel history and being a man who had sex with men. Persons who travel to hepatitis A endemic countries and men who have sex with men should be educated about their risk of hepatitis A and offered hepatitis A vaccine.

Viral Hepatitis B

In 2001, 44 cases of acute hepatitis B virus (HBV) infection (0.9 per 100,000 population) were reported, with no deaths. Thirty-five (80%) case-patients were residents of the seven-county Twin Cities metropolitan area, with 27

(61%) cases in Hennepin County. Twenty-nine (66%) case-patients were male; 27 (61%) were young adults from 17 to 39 years of age. Twenty-three (52%) case-patients were white, 14 (32%) were black, three (7%) were Asian, and three (7%) were American Indian; race was unknown for one (2%) case. Although the majority of case-patients were white, incidence rates were higher among blacks (6.9 per 100,000 population), American Indians (3.7 per 100,000 population), and Asians (1.8 per 100,000 population) than among whites (0.5 per 100,000 population). Hispanic ethnicity (which can be of any race), was reported for two case-patients (1.4 per 100,000 population).

Ten (23%) of the 44 reported cases were patients with documented asymptomatic seroconversions. In addition, six perinatal infections were identified in infants who tested positive for hepatitis B surface antigen (HBsAg) during post-vaccination screening. This is the first year that perinatal HBV infections have been counted separately from acute cases in adults. All six infants began hepatitis B immunoprophylaxis (i.e., hepatitis B immune globulin and HBV vaccine) at birth and completed the three-dose vaccine series. Five of these infants were age-appropriately vaccinated with second and third doses, and one was delayed in the receipt of the second dose.

Thirty-eight (86%) of the HBV case-patients were interviewed regarding possible modes of transmission. For 23 (61%) of those cases, the likely mode of transmission was sexual. Seven (18%) case-patients were men who reported having sex with men; seven (18%) 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 three (8%) gave recent histories of sex with an HBsAg-positive partner with undocumented sexual preference. One (3%) case-patient used needles to inject drugs. One (3%) case resulted from occupational exposure of an unvaccinated health care worker. In addition to the six perinatal cases, one (3%) case involved non-sexual contact with an HBsAg-positive person. Risk factors for acquiring HBV infection were not identified for the remaining 12 **continued...**

(32%) cases. The median age among these 12 case-patients and the six who were unavailable for interviews was 41 years (range, 20 to 68 years), which is consistent with possible sexual transmission.

The Minnesota School Immunization Law now requires HBV immunization for all children entering kindergarten and seventh grade who are not exempted. While the annual number of reported acute HBV infections in Minnesota is slowly decreasing, cases continue to occur among adolescents and adults who are at risk, despite national recommendations to vaccinate them. Due to the continued high rate of sexually transmitted HBV infections, health care providers should discuss the need for HBV testing and immunization with at-risk patients.

Viral Hepatitis C

In 2001, 31 cases of acute hepatitis C virus (HCV) infection were reported. Twenty of these cases had clinical symptoms, and eleven were asymptomatic seroconversions. Eleven (35%)

case-patients were residents of the seven-county Twin Cities metropolitan area, and 20 (65%) case-patients resided in greater Minnesota. The median age among case-patients was 30 years (range, 18 to 53 years). Fifty-two percent of case-patients were female. Eighteen (58%) case-patients were white, eight (26%) were American Indian, three (10%) were black, and race was unreported for two (6%) case-patients of Hispanic ethnicity. Although the majority of case-patients were white, incidence rates were higher among American Indians (9.9 per 100,000 population), blacks (1.5 per 100,000 population) and Hispanics (1.4 per 100,000 population) than among whites (0.4 per 100,000 population).

Among the 31 case-patients, 17 (55%) reported using needles to inject drugs. A cluster investigation of eight cases among injecting drug users was initiated after three cases were identified through routine testing of plasma donors. Initiation of injecting drug use had occurred within 6 months of symptom onset or asymptomatic

seroconversion. These eight cases occurred among young adults 18 to 32 years of age residing in Hennepin County or northern Minnesota.

Four (13%) of the remaining case-patients had sexual contact with a known anti-HCV positive partner within 6 months prior to onset of symptoms, and two (6%) case-patients identified occupational exposures. No risk factor was determined for eight (26%) cases.

More than 2,600 reports of newly identified anti-HCV positive persons, most of whom are chronically infected, were reported to MDH in 2001. The 31 acute cases represent 1% of those recently diagnosed. Since most cases are asymptomatic, medical providers are encouraged to review patients' risk factors for HCV infection to determine the need for testing. Persons who test positive for HCV should be screened for susceptibility to hepatitis A and hepatitis B and immunized appropriately.

Annual Emerging Infections in Clinical Practice and Emerging Health Threats Conference - November 15, 2002 - Hyatt Regency, Minneapolis, MN

(See description on p. 40)

REGISTRATION FORM - PLEASE PRINT OR TYPE

Name _____
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MAIL TO: E Emerging Infections Conference
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Registration Fees

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- \$110 Retired Minnesota physician
- \$75 Fairview-University Medical Center/Medical School/Academic Health Center faculty or staff
- \$75 Minnesota Department of Health staff
- \$75 Non-Physician staff of Fairview-University Medical Center
- Medical resident/fellow Medical student (fee waived, excludes lunch; limited space available; pre-registration required)

8th Annual Emerging Infections in Clinical Practice and Emerging Health Threats Conference - November 15, 2002

We are pleased to co-sponsor this conference again this year.

Highlights include:

- Dr. Marci Layton, New York City Department of Health, speaking about the medical and public health response to terrorism in New York;
- Dr. Philip Tarr, University of Washington School of Medicine, on the medical management of diarrhea, *E. coli*

O157:H7, and HUS;

- Dr. Cynthia Whitney, CDC, on pneumococcal disease treatment, antibiotic resistance, and prevention;
- Dr. Scott Fridkin, CDC, on resistant *S. aureus* in the community and in healthcare settings;
- Dr. Michael Osterholm, University of Minnesota, on bioterrorism preparedness from the national perspective;

- Local experts discussing judicious antibiotic use; and
- A bioterrorism table-top exercise with a panel of local medical and public health experts.

The registration form is on page 39. Please register early, as enrollment will fill quickly.

Jan K. Malcolm, Commissioner of Health

Division of Infectious Disease Epidemiology, Prevention and Control

Harry F. Hull, M.D. Division Director & State Epidemiologist
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