MINNESOTA DEPARTMENT OF HEALTH

Disease Control Newsletter

Volume 26, Number 5 (pages 37-52) July/August 1998

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 1997

Introduction

Assessment is considered 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 can send a standardized report card to the Surveillance Coordinator at the MDH Acute Disease Epidemiology Section. These reports are monitored daily and are entered into the Acute and Communicable Disease Reporting System (ACDRS). This system compiles surveillance information on cases 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 must be reported to MDH. As stated in this rule, physicians, health-care facilities, medical laboratories, veterinarians and veterinary medical laboratories are required to report. These reporting sources may designate an individual within the institution to perform routine reporting duties (e.g., an infection control practitioner for a hospital). Data maintained by MDH are private and are protected under the Minnesota Government Data Practices Act (Section 13.38).

Table 2 summarizes the number of reports of selected communicable diseases submitted to MDH during 1997 by district of residence. Pertinent observations for some of these diseases are discussed below. A summary of influenza surveillance data is included; however, these data do not appear in Table 2 because the influenza surveillance system is based on reported outbreaks rather than on individual cases and covers the 1997-98 influenza season rather than the 1997 calendar year.

Arboviral Encephalitis

LaCrosse encephalitis (LAC) and Western equine encephalitis (WEE) are the primary arboviral encephalitides found in Minnesota. 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., $\leq$ twofold change) antibody titer to an arbovirus. Viral encephalitis is reportable in Minnesota, and arboviral encephalitis reports should promptly be submitted to MDH so that efforts may be undertaken to prevent further cases.

LaCrosse encephalitis is the most commonly reported arbovirus infection in Minnesota. The disease, which primarily affects children, is transmitted through the bite of infected *Aedes triseriatus* (Eastern Tree Hole) mosquitoes. Children are exposed to infected mosquitoes in wooded or shady areas used by this mosquito, especially in areas where water-holding containers (e.g., waste tires, buckets, and cans) are abundant, and are utilized as mosquito breeding habitat. Between 1985 and 1996, 66 cases of LaCrosse encephalitis were reported to MDH; three to 12 cases were reported each year (median, five cases per year). During 1997, two confirmed cases and three probable cases were reported. The disease is known to be endemic in 13 southeastern Minnesota counties. Highest incidence rates have been recorded in Houston County (mean incidence of 23 cases per 100,000 children $\leq$19 years old, range of 0 to 68 cases/100,000 children). Disease onsets have been reported from June through September, with a peak in August (39% of reports during 1985 through 1996).

continued...

Table 1. Diseases Reportable to the Minnesota Department of Health

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

*Report immediately by telephone (612) 623-5414
**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

Western equine encephalitis occurs infrequently in Minnesota, usually as part of a regional epidemic or epizootic (Midwestern states, southern Canada). Epidemics are spaced at irregular intervals, and the last reported cases of WEE in Minnesota residents were reported in 1983 (one case) and 1975 (15 cases). The virus is transmitted to humans and horses through the bite of *Culex tarsalis* mosquitoes in years where virus-infected vector populations are relatively high. The mosquitoes usually feed on birds, and maintain WEE virus in a mosquito-bird cycle. However, in mid-summer when vector populations are rising, a significant part of the mosquito feeding may switch to mammalian hosts such as humans and horses (considered to be dead-end hosts for the virus).

There were no human cases of WEE reported to MDH during 1997, despite record flooding across much of western Minnesota during the spring. Because of this large amount of potential vector mosquito habitat, MDH staff conducted extensive vector surveillance in western Minnesota from June through August. High numbers of *Culex tarsalis* mosquitoes were detected at many monitoring locations in mid-July, but the population peak was short lived, and numbers decreased significantly by mid-August. No evidence of virus was found in a

continued...

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health by District of Residence, 1997

Disease	Metropolitan (2,482,858)	Northwestern (143,731)	Northeastern (244,750)	Central (634,199)	West Central (219,312)	South Central (277,691)	Southeastern (440,013)	Southwestern (234,194)	Unknown Residence (0)	Total (4,682,748)
	District (population)									
Campylobacteriosis	679	18	46	150	42	37	141	68	0	1181
Cryptosporidiosis	98	3	2	34	6	24	50	25	0	242
Encephalitis - viral										
LaCrosse	2	0	0	0	0	0	0	0	0	2
Western	0	0	0	0	0	0	0	0	0	0
Escherichia coli O 157:H7 infection	99	4	9	35	5	10	27	10	0	199
Hemolytic Uremic Syndrome	3	1	0	4	0	1	1	2	0	12
Giardiasis	705	16	26	141	34	19	128	29	0	1098
Haemophilus influenzae invasive disease	35	0	7	3	1	4	4	3	0	57
HIV infection other than AIDS	195	0	2	2	1	1	2	2	16	221
AIDS cases (diagnosed in 1997)	162	1	2	7	1	2	3	3	0	181
Legionnaires' disease	6	0	1	1	0	0	1	0	0	9
Listeriosis	12	0	0	2	0	0	4	0	0	18
Lyme Disease	137	2	8	91	1	3	13	1	0	256
Measles	6	0	0	0	1	1	0	0	0	8
Mumps	6	0	0	1	0	0	0	0	0	7
Neisseria meningitidis invasisve disease	25	0	2	5	1	2	5	1	0	41
Pertussis	431	2	5	32	13	23	20	21	0	547
Salmonellosis	391	8	14	66	28	39	57	29	0	632
Sexually transmitted disease										0
Chlamydia trachomatis - genital infections	5238	107	276	411	115	132	384	116	n.a.*	6779
Gonorrhea	2238	12	27	60	6	24	64	4	n.a.*	2435
Syphilis total	84	0	3	9	0	3	10	6	n.a.*	115
primary/secondary	15	0	0	0	0	0	1	0	n.a.*	16
early**	32	0	0	1	0	1	1	0	n.a.*	35
late latent***	52	0	3	8	0	2	9	6	n.a.*	80
Shigellosis	101	1	1	10	1	4	16	4	0	138
Streptococcus pneumoniae invasive disease (Twin Cities only)	467	-	-	-	-	-	-	-	-	467
Streptococcal invasive disease - Group A	94	7	9	24	3	2	8	4	0	151
Streptococcal invasive disease - Group B	173	4	9	25	7	16	12	5	0	251
Tentanus	0	0	0	0	0	0	1	0	0	1
Tuberculosis	130	1	1	5	1	1	17	5	0	161
Vancomycin Resistant Enterococci	174	8	6	21	6	12	14	3	0	244
Viral hepatitis, type A	146	4	12	24	21	6	23	7	0	243
Viral hepatitis, type B	45	1	2	6	2	0	5	1	0	62
Viral hepatitis, type C	3	0	0	1	0	0	2	1	0	7

*Cases for which residence is unknown are assigned the geographic location of the reporitng clinic
**Includes primary, secondary, and early latent infections; duration <1 year
***Likely 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, Mahnomen, Norman, Otter Tail, Pope, Stevens, Traverse, Wilkin
South Central = Blue Earth, Brown, Faribault, LeSueur, McLeod, Martin, Meeker, Nicollet, Sibley, Waseca, Watonwan
Southeastern = Dodge, Filmore, Freeeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona
Sourthwestern = Big Stone, Chippewa, Conttonwwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Swift, Yellow Medicine

sample of these mosquitoes or in three sentinel chicken flocks located near the Twin Cities metropolitan area.

Campylobacteriosis

There were 1,181 cases of *Campylobacter* infection reported to MDH in 1997 (25.2 per 100,000 population). *Campylobacter* continues to be the most commonly reported enteric pathogen in Minnesota. Ninety-two percent of isolates were submitted to MDH. Of these, 94% were *C. jejuni*. Demographic and seasonal characteristics of the cases were similar to previous years. Fifty-seven percent of cases resided in the seven-county metropolitan area. The majority of cases were adults 20 to 49 years of age (54%). Fifty-four percent of infections were reported from June through September.

The primary feature of public health importance was the continued emergence of *C. jejuni* that are resistant to ciprofloxacin, a quinolone antibiotic commonly used to treat infections with this organism. From 1992 to 1997, the proportion of quinolone-resistant *C. jejuni* isolates increased from 1.3% to 9.8%. Peaks in the proportion of resistant isolates occurred during the winter months of each year, and were associated with foreign travel (particularly to Mexico). Results of a case-comparison study in 1996 and 1997 also associated resistance with quinolone use prior to stool culture. However, prior quinolone use could account for at most 20% of cases.

Although cases occurring in winter were associated with travel, an increase in domestically acquired resistant cases was also noted in 1996 and 1997. Because poultry is known to be the major reservoir for *Campylobacter*, the MDH and the Minnesota Department of Agriculture conducted a *Campylobacter*

continued...

survey of domestic chicken products purchased from retail markets in the Minneapolis-St. Paul metropolitan area. Ninety-one samples were collected between September and November 1997.

Campylobacter jejuni was isolated from 67 (74%) and *C. coli* from 19 (21%) of the chicken samples. Resistant *Campylobacter* organisms were isolated from 18 products (20%), including a variety of products from whole chickens to boneless, skinless breasts. Molecular subtyping revealed an association between resistant *C. jejuni* strains from chicken products and domestically acquired human cases. Thus, the increase in domestically acquired resistant cases among humans is likely due to the use of fluoroquinolones in poultry in the United States, which began late in 1995.

One waterborne outbreak of campylobacteriosis occurred during October 1997 among Minnesota Army National Guard personnel returning from a training exercise in Greece. Twenty-nine confirmed and 77 probable *C. jejuni* infections were associated with this outbreak. Three cases were hospitalized. All isolates were resistant to ciprofloxacin. Illnesses were associated with drinking bottled (non-carbonated) water on October 14, 1997. Ninety-eight (98%) of 100 cases interviewed and 55 (89%) of 62 controls reported drinking bottled water on that date (Odds Ratio=10.6; p<0.01).

Cryptosporidiosis

In 1997, 242 cases of laboratory-confirmed *Cryptosporidium* infections were reported to MDH (5.2 per 100,000 population). This represents a large increase from the 81 cases reported in 1996 and is due in part to a waterborne outbreak of cryptosporidiosis associated with exposure at the Minnesota Zoo in June and July and in part due to the initiation of active laboratory-based surveillance for *Cryptosporidium* infection which began on January 1, 1997. The zoo outbreak involved 73 confirmed cases, and nine with secondary exposure. These cases accounted for 36% of all confirmed cryptosporidiosis cases reported in 1997. The remaining 160 sporadic cases (not directly linked to the zoo outbreak) still represent a substantial increase over the number reported in 1996.

The zoo outbreak occurred mostly in children and was associated with playing in a water sprinkler fountain. The outbreak was recognized when a cluster of cases of gastrointestinal illness occurred in a group of 10 children who had played at the zoo on June 29. An initial investigation of registered groups who had visited the zoo June 28-30 demonstrated that 11 of 11 cases played in the water sprinkler fountain versus seven (6%) of 109 controls (Relative Risk=undefined; p<0.001). The zoo closed the fountain area on July 11.

A public announcement was also issued on July 11, and persons with gatrointestinal illness following zoo exposure were asked to contact their physician and to call MDH. Over 400 persons called and were interviewed regarding illness history and zoo exposure. A total of 369 cases were identified, including 73 (28%) that were laboratory confirmed. Age data were available for 351 cases; the median age was 6 years. The median duration of illness was 7 days; six patients were hospitalized. It is likely an infected child playing in the fountain area was the initial source of contamination.

Of the total cases of *Cryptosporidium* reported in 1997, 98 (40%) were from the Twin Cities metropolitan area. Sixty-five (67%) of these cases were related to the zoo outbreak. Excluding outbreak-associated cases, southeastern Minnesota contributed the largest number of cases (29%), followed by the southwestern region (24%).

When outbreak-associated cases are excluded, 107 (67%) of the sporadic cases occurred from July through October. Fifty-three percent of sporadic cases were male. Ages of the sporadic cases ranged from 1 month to 88 years, with a median age of 9 years. The majority of reported infections occurred in children less than age 10 (53%). Only one case was known to be HIV-infected.

***Escherichia coli* O157:H7 and Hemolytic Uremic Syndrome (HUS)**

E. coli O157:H7 was identified as an enteric pathogen in 1982, and continues to be the major cause of hemolytic uremic syndrome (HUS) in children and is a common cause of hemorrhagic gastroenteritis. During 1997, 199 cases of *E. coli* O157:H7 infection were reported to MDH (4.2 per 100,000). This is consistent with the mean number of 191 cases reported each year between 1993 and 1997. Eighty-one percent of the 1997 cases occurred between June and September. Fifty-six percent of cases were females and 128 cases (64%) were under 10 years of age. In 1997, three outbreaks of *E. coli* O157:H7 infection were identified.

One outbreak involved two neighborhood day care homes in late June and early July. Nineteen (70%) of 27 children in the two homes tested positive for *E. coli* O157:H7. Another day care-related outbreak also occurred in June and involved six cases. The third outbreak occurred in September in Olmsted County and involved six community members as well as nine children and three kitchen staff at a local junior high school. The community cases were identified through routine PFGE typing of isolates submitted to MDH. Both the school-related cases and the community cases had the same PFGE pattern. Despite extensive investigation, no food item was implicated. No further cases of this subtype pattern of *E. coli* O157:H7 were subsequently identified among Minnesota residents during the fall. This outbreak was likely caused by a contaminated perishable product that quickly moved through a regional food distribution chain. No other states during this time reported a similar increase in the *E. coli* O157:H7 subtype pattern identified in this outbreak.

Ten cases of post-diarrheal HUS were reported in 1997. Seven (70%) of the 10 cases were under 5 years of age. Two cases were from the Twin Cities metropolitan area. Eight (80%) of cases had onset of diarrhea in July and August. *E. coli* O157:H7 was isolated from stool samples of five patients. The mean length of hospitalization was 14 days (range, 4 to 35 days).

Giardiasis

In 1997, 1,098 cases of *Giardia lamblia* infection were reported to MDH (23.5 per 100,000 population). This represents a slight increase from the 988 cases reported in 1996, but is well within the range of cases reported from 1987 through 1996 (mean of 1,216). The median age of reported cases was

continued...

Table 3. Cases of AIDS by Exposure Category and Year of Diagnosis, Minnesota, 1982-1997

Exposure Category	Pre-1996 No. (%)		1996 No. (%)		1997 No. (%)	
	Male	Female	Male	Female	Male	Female
Men Who Have Sex With Men	1986 (79)	0 (0)	160 (74)	0 (0)	100 (67)	0 (0)
Injecting Drug Use (IDU)	151 (6)	47 (22)	17 (8)	9 (23)	13 (9)	9 (29)
Men Who Have Sex With Men and IDU	189 (7)	0 (0)	13 (6)	0 (0)	13 (9)	0 (0)
Hemophilia/Coagulation Disorder	69 (3)	1 (<1)	2 (1)	0 (0)	1 (<1)	0 (0)
Heterosexual	20 (1)	107 (50)	4 (2)	18 (46)	3 (2)	13 (42)
Transfusion, Blood/Components	21 (1)	16 (8)	0 (0)	0 (0)	0 (0)	0 (0)
Mother with/at Risk for HIV Infection	7 (<1)	8 (4)	1 (<1)	0 (0)	0 (0)	1 (3)
Other/Undetermined	83 (3)	33 (16)	19 (9)	12 (31)	20 (13)	8 (26)
Total	2526 (100)	212 (100)	216 (100)	39 (100)	150 (100)	31 (100)

25 years. As in previous years, cases were clustered among children less than 5 years of age (23%) and adults ages 30 to 39 (19%). Only 12% of cases were adults 50 years of age or older. The distribution of cases by age continues to suggest 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 day care. No foodborne or waterborne outbreaks of giardiasis were identified in 1997.

Haemophilus influenzae Invasive Disease

Fifty-seven cases of invasive *Haemophilus influenzae* disease were reported to MDH in 1997 (1.2 per 100,000 population). Cases ranged in age from newborn to 98 years, with a median age of 55 years. Twenty-six cases (46%) had pneumonia, 13 (23%) had bacteremia without another focus of infection, and three (5%) had meningitis. Eleven deaths were reported.

Seven cases (13%) were known to be type b (Hib), compared to four cases in 1996. Two of these cases occurred in children; both had bacteremia and both survived. One, a 3-month-old child, had received one Hib immunization as per the recommended schedule and the other, a one-year-old child, had received no immunizations. The other cases occurred in adults ranging in age from 18 to 81 years. Two had bacteremia without another focus of infection, two had pneumonia, and one had *H. influenzae* type b isolated from a surgical specimen. Twenty-one of the cases (38%) had untypeable isolates, 11 cases were attributed to type f and 18 were other types or unknown.

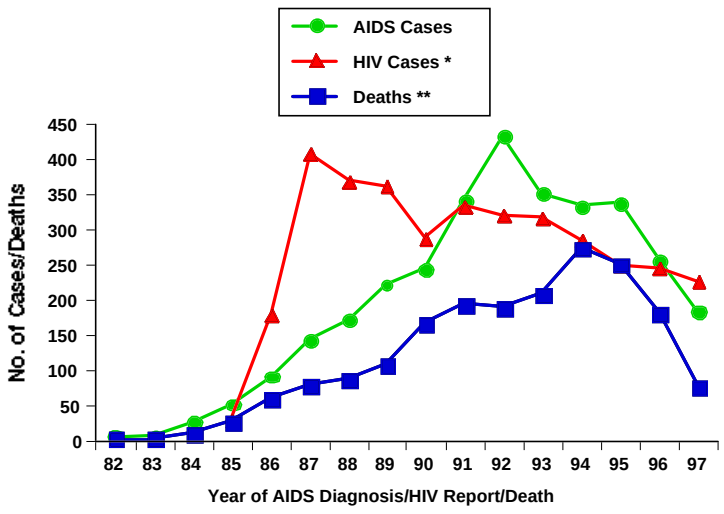
The 11 deaths occurred in cases ranging in age from 49 to 98 years, with a mean age of 77 years. All except one were noted to have significant underlying medical conditions. Five cases presented with pneumonia, three with bacteremia without another focus of infection, one with meningitis, one with peritonitis, and one with a lung abscess. Four of the deaths had type f isolates, three were untypeable, one had type e, and three were unknown.

HIV Infection and AIDS

In 1997, 181 cases of AIDS were diagnosed and reported to MDH (3.9 per 100,000 population). This reflects a continuing decline in the reported annual incidence of AIDS cases since 1992 and the lowest reported annual incidence since 1989 (N=220) (Figure 1). The 1992 peak is likely attributed to the 1993 change in the AIDS surveillance case definition allowing for retrospective diagnoses. This change

continued...

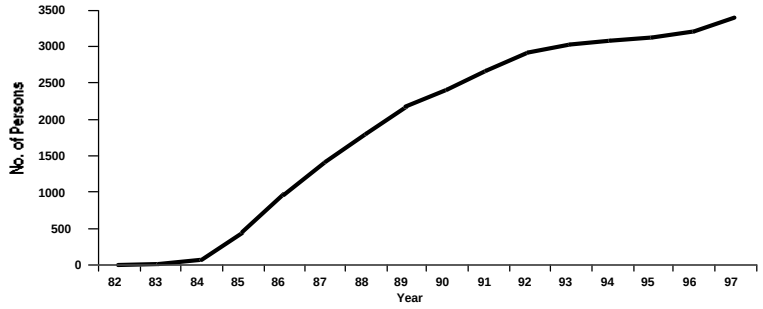
Figure 1. AIDS and HIV Cases by Year of Diagnosis, and AIDS Deaths by Year of Death, Minnesota, 1982-1997



* Includes cases which subsequently were diagnosed with AIDS

** Deaths occurring during interval are not necessarily related to cases diagnosed during interval

Figure 2. Persons Living with AIDS/HIV, Minnesota, 1982-1997



incorporated CD4+ T-lymphocyte counts of <200/mL in the absence of other AIDS-indicator diseases.

In addition to AIDS cases reported in 1997, 221 diagnosed non-AIDS cases of HIV infection, which had not progressed to AIDS by year end, were reported in 1997 (4.7 per 100,000 population). As with AIDS cases, this represents a continuing decline in reported cases. The annual number of HIV case reports peaked in 1987 (406 cases) and has been declining since that time (Figure 1). This decrease in AIDS cases and HIV reports suggest that the epidemic may be declining in Minnesota, since no changes have been made in surveillance methodology during this time.

New treatments for HIV infection have led to a marked reduction in mortality. Deaths due to AIDS/HIV have significantly declined since 1992. The number of deaths due to AIDS/HIV in 1997 (n=76) was the lowest number reported in Minnesota since 1986.

Several trends continue to evolve in reported AIDS/HIV cases. First, male-to-male sex remained the most common exposure category for reported AIDS cases in 1997 (N=100, 55%) but the proportion has declined steadily over time. In contrast, the proportion of cases related to injecting drug use and heterosexual contact has increased over time (Table 3). Second, the proportion of female AIDS cases continues to increase; 17% of cases diagnosed in 1997 (N=31) were female compared to 8% of the cases reported cumulatively prior to 1997 (N=251).

Third, an increasing proportion of AIDS cases continues to be identified in blacks, while there has been a decrease in the proportion of cases identified in whites. In 1997, 59% of AIDS cases were white, compared to 78% of cases reported prior to 1997. Similarly, 30% of 1997 cases were black compared to 16% of cases reported prior to 1997.

When overall AIDS case data are compared to HIV infection (non-AIDS) case data, these trends appear more pronounced. For example, male-to-male sex accounts for 71% of all AIDS cases and 62% of the cases of HIV infection. In addition, heterosexual transmission accounts for 5% of the AIDS cases and 10% of HIV infection cases. Injecting drug use as an exposure category accounts for 8% of all AIDS cases and 12% of HIV infection cases. The overall proportion of female AIDS cases is 9% compared to 17% of HIV cases. Whites comprise 77% of the AIDS cases and blacks 16%, while 64% of HIV infection cases are white and 27% are black.

Forty-seven children have been diagnosed with AIDS/HIV infection to date. The majority (n=36) were born to HIV-infected women and acquired their infection perinatally. Through blinded HIV seroprevalence surveys of childbearing women, it is estimated that three to seven Minnesota infants were born HIV-infected each year from 1991 to 1995. With the identification of HIV infection in pregnant women and the increased use of antiretroviral therapy during pregnancy, the number of infected infants born each year since 1995 is likely to have decreased.

As the AIDS/HIV epidemic evolves, with new treatments becoming available, following AIDS case diagnoses as a marker for the epidemic is becoming less useful, since the occurrence of AIDS is being delayed. Assessing trends by looking at recent HIV infections provides a better mechanism to evaluate current transmission risk and effectiveness of prevention efforts. Although the incidence of AIDS/HIV infection has declined, several hundred

continued...

Figure 3. Influenza Isolates Received at MDH by Type of Isolate and Week of Receipt, Minnesota, 1998

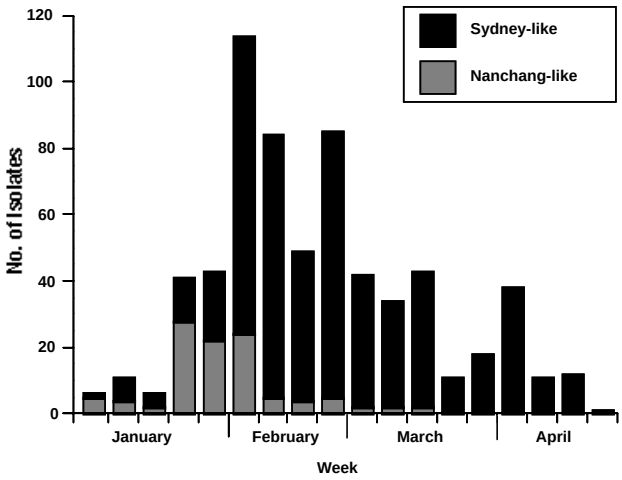
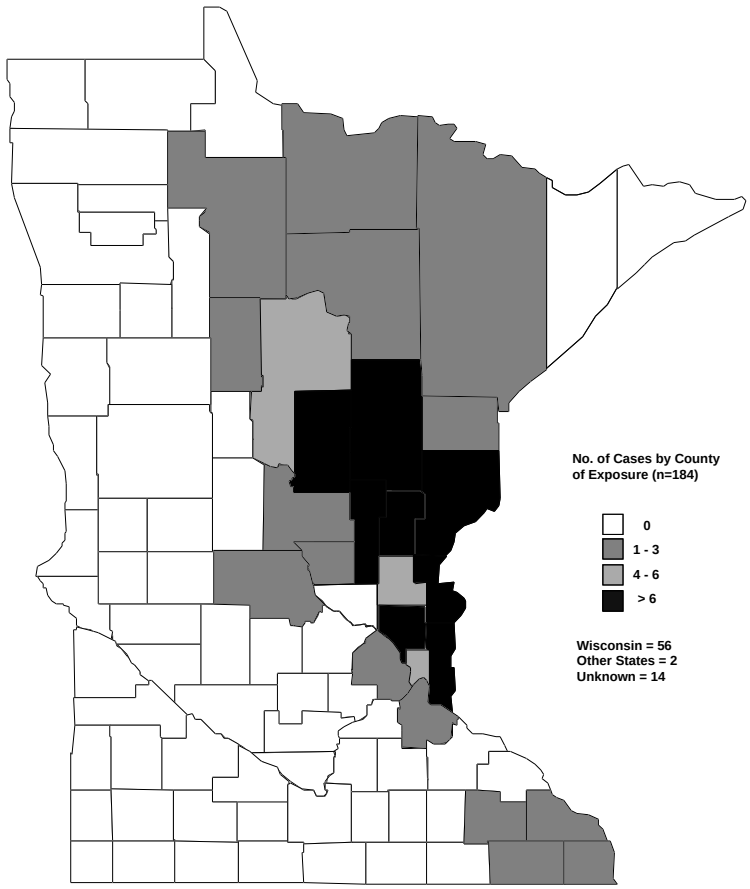


Figure 4. Reported Cases of Lyme Disease by County of Exposure, Minnesota, 1997



new infections continue to occur annually. In addition, because of increased survival, a growing number of persons are HIV-infected (Figure 2). Monitoring the epidemic continues to be important to direct prevention efforts and to allocate services.

Influenza

During the 1997-98 influenza season, A/Sydney (H3N2) emerged as the predominant strain isolated in Minnesota. A/Sydney was first identified in New Zealand and Australia during June 1997. The first A/Sydney virus was identified in the continental United States in November 1997. By the end of January, A/Sydney was identified as circulating widely throughout the U.S. Of the influenza A (H3N2) isolates antigenically characterized by CDC, 81% were similar to the A/Sydney strain (1).

The MDH Public Health Laboratory received 662 influenza specimens for confirmation and further typing. Of the specimens received, five were influenza A but subtype was not available, 656 (99%) were identified as influenza type A (H3N2), and one (<1%) was influenza type B, Bejing-like. Of the 656 influenza A (H3N2) isolates antigenically characterized by MDH, 111(17%) were similar to A/Nanchang, and 545 (83%) were similar to A/Sydney. Among the influenza A (H3N2) viruses, the proportion that was A/Sydney-like increased from 14% prior to January, to 96% in March and 100% in April (Figure 3).

Influenza surveillance in Minnesota relies on passive submission of isolates and reporting from schools and nursing homes. The reporting systems used by school districts and nursing homes have been in place since the 1995-96 influenza season. A probable influenza outbreak in a school is defined as a double absentee rate with all of the following primary symptoms among students: rapid onset, fever of 101 F or greater, illness lasting 3 days or more, and one or more secondary symptoms (i.e., myalgia, headache, cough, coryza, sore throat, chills). A possible influenza outbreak in a school is defined as a double absentee rate, and students with any two of the primary symptoms and one or more of the secondary symptoms.

Reports of probable influenza outbreaks were received from 224 schools in 54 counties throughout Minnesota; six of these schools reported having at least one student with culture-confirmed influenza. Another 127 schools from 41 counties reported possible outbreaks. Schools began reporting suspected influenza outbreaks during early November. One third (129, 37%) of the suspected outbreaks occurred during the week of January 18, 1998. Since 1988-89, the number of schools reporting suspected influenza outbreaks has ranged from a high of 441 schools in 71 counties in 1991-92, to 38 schools in 20 counties in 1996-97.

Seventy-nine nursing homes reported confirmed or suspected outbreaks of influenza. In 40 nursing homes (51%), influenza was laboratory confirmed; influenza type A was identified in 39 (98%).

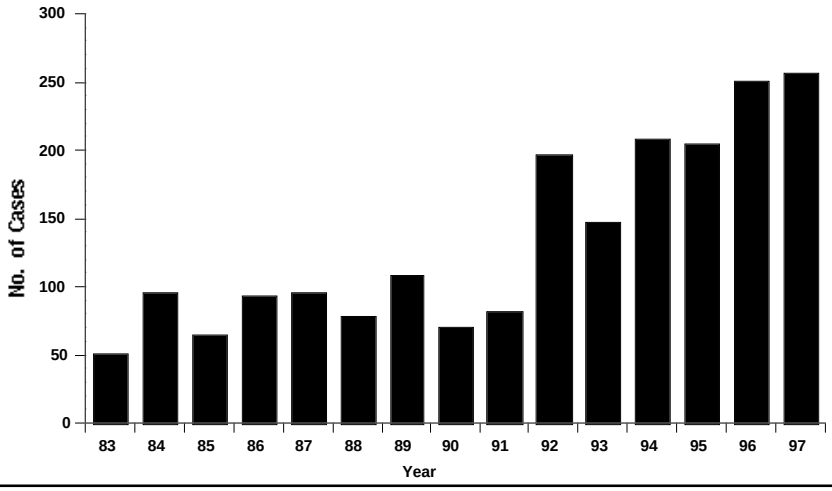
Lyme Disease

Lyme disease continues to be an important public health problem for residents and visitors to many counties in Minnesota. During 1997, 256 cases of Lyme disease (5.5 cases per 100,000 population), meeting the national surveillance case definition, were reported to MDH. An additional 29 reports were classified as probable cases of Lyme disease. These numbers are similar to the 251 cases and 34 probable cases reported in 1996.

The national surveillance case definition 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 as acceptable 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. As new testing methods such as polymerase chain reaction (PCR)

continued...

Figure 5. Reported Cases of Lyme Disease, Minnesota, 1983-1997



probes become available, the surveillance case definition will be appropriately modified. 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.

Physician-diagnosed EM was present in 216 (84%) of 256 Lyme disease cases reported during 1997. Forty-three cases (17%) had at least one late manifestation of Lyme disease confirmed by a positive Western blot test. One hundred fifty-seven cases (61%) occurred in males. The median age of cases was 33 years (range, 1 to 87 years). Onsets of illness peaked in June, July, and August (16%, 40%, and 24% of cases, respectively). These data correspond to the peak of nymphal *Ixodes scapularis* (deer tick, or black-legged tick) activity in the state.

Similar to data from previous years, 137 (54%) of the 1997 Lyme disease cases were residents of the seven-county Twin Cities metropolitan area. However, only 43 (17%) of the cases were likely exposed to infected *I. scapularis* ticks in metropolitan area counties. Most cases continue to be reported in patients who either live in, or travel to endemic counties in east-central Minnesota, or western Wisconsin (Figure 4). Residents from several east-central counties continue to have the highest incidence rates of Lyme disease in the state (e.g., Pine, Kanabec, and Crow Wing counties had rates of 77, 65, and 59 per 100,000 residents, respectively, during 1997).

Despite extensive Lyme disease education efforts by MDH, we have been unable to detect a decrease in Lyme disease incidence in Minnesota (Figure 5). In a 1995 survey of three Lyme disease-endemic communities (Mora, Pine City, North Oaks), MDH found that residents of these areas knew much of the basic information about deer ticks and Lyme disease. Most survey respondents reported taking measures to prevent the disease (e.g., 83% of the survey respondents reported checking themselves or others for ticks either "some" or "most" of the time). Therefore, in addition to tick prevention measures, MDH continues to stress the importance of early diagnosis and treatment of Lyme disease. Two human Lyme disease vaccines are currently under review by the FDA, and may be available to the public soon.

Measles

Eight cases of measles were reported to MDH during 1997 (0.2 per 100,000 population). All eight cases were considered imported; three were international importations, four were import-related spread (i.e., cases within two generations of an imported case), and one was likely imported from another state. All eight cases were laboratory confirmed with a positive serologic test for measles IgM antibody. The cases ranged in age from 14 months to 39 years.

The international importations came from Vietnam, Germany and Brazil. Four cases occurred following exposure to the Brazilian case. The index case for this cluster was a 16-year-old Brazilian with rash onset within 10 days after arrival to the U.S. The patient sought medical care at a clinic just outside the Minneapolis-St. Paul metropolitan area. Two subsequent cases were exposed at the clinic. The first was an unvaccinated 21-month-old who entered the clinic 20 minutes after the index case had left. The second clinic exposure was a 33-year-old who reported face-to-face contact with the index case. Despite multiple alerts to medical professionals in the area and his self-report of exposure, this case was not correctly diagnosed by health professionals until his daughter developed measles. In the interim, he was hospitalized with pneumonia and dehydration. His 14-month-old daughter developed measles 8 days later. She was unvaccinated, despite a visit to the clinic requesting vaccination following her father's exposure. Finally, a 28-year old developed measles following exposure to the 21-month old at a family party. This case indicated he had been immunized as a child.

The 1997 cases illustrate the increasing importance of international importations. Also apparent is the need to reduce missed opportunities for vaccination. Invalid contraindications and unnecessary delay in administering vaccine directly or indirectly accounted for four (50%) of the 1997 measles cases.

Mumps

Seven cases of mumps were reported during 1997 (0.2 per 100,000 population). All were laboratory confirmed with a positive serologic test for mumps IgM antibody. Three of the cases were attributed to international importations from India, Sri Lanka, and Bangladesh. The cases ranged in age from 2 to 57 years; four of the cases were adults. The three cases occurring in pre- and middle-school-aged children each had documentation of one mumps immunization; immunization histories were unknown for the remaining four cases. Six of the cases resided in the Minneapolis-St. Paul metropolitan area. The 1997 cases were not epidemiologically linked and there was no evidence of subsequent transmission to others.

continued...

Since 1988, a majority of mumps cases have occurred in adults and adolescents, and this past year reflects a continuation of this shift in mumps epidemiology in Minnesota. These cases highlight the need to assess mumps immunization status of adults. The current recommendations for mumps vaccine extend to adults born in 1957 or later.

Reported cases may underestimate the true burden of mumps disease in the state. Only those cases with laboratory confirmation or epidemiologic link to a confirmed case are reported as cases. Because of the difficulty in distinguishing infectious parotitis (mumps) from other forms of parotitis and the need to accurately report symptomatic disease, mumps-specific serologic testing is recommended for all sporadic cases.

***Neisseria meningitidis* Invasive Disease**

Forty cases of *Neisseria meningitidis* invasive disease were reported in 1997 (0.9 per 100,000), the same as reported in 1996. All cases were sporadic with no outbreaks identified. There were 15 cases of serogroup C (38%), 13 cases of serogroup Y (33%), and 12 cases of serogroup B (30%).

Ages of cases ranged from 26 days to 94 years, with a median age of 14 years. Serogroup Y cases were typically older with a median age of 63 years while serogroup B cases had a median age of <1 year and serogroup C cases had a median age of 9 years. Sixty percent of the cases were from the Twin Cities metropolitan area. Twenty cases (50%) had meningitis, 14 (35%) had bacteremia without another focus of infection, four (10%) had pneumonia, one had pericarditis, and one had otitis. There was no significant variation by gender, race, residence, or type of infection among serogroups.

Five deaths occurred. Two deaths were attributed to serogroup B and included a 66-year-old female with meningococcemia and a 21-year-old male with meningitis. Two were attributed to serogroup Y, a 17-year-old male with meningococcemia and an 87-year-old female with pneumonia. Serogroup C was identified in a 26-year-old female who died of meningitis.

It appears that in most instances, antibiotic prophylaxis of household and other close contacts is an effective strategy for prevention of subsequent cases. While eight cases were school age and one case attended college, no subsequent cases were identified in schools and no school-based outbreaks occurred.

Pertussis

Five hundred forty-seven cases of pertussis were reported in 1997 (11.7 per 100,000 population). This represents the highest number of reported cases since 1955 and a 26% increase since the previous peak of 433 in 1996. This increase may, in part, be due to improved recognition and diagnosis of pertussis. Culture-confirmation was available for 249 (46%) of reported cases; the remainder of cases were epidemiologically linked to culture-confirmed cases (138, 25%) or met the clinical case definition (160, 29%). Four hundred thirty-one (79%) of the cases occurred in residents of the Twin Cities metropolitan area. There were no pertussis deaths reported in 1997.

The cases ranged in age from <1 month to 78 years, with 94 (17%) <6 months of age. Pneumonia was diagnosed in 20 cases (4%), nine of whom were <6 months of age. Seventy-seven (14%) of cases were hospitalized; 57 (74%) of the hospitalized patients were younger than 6 months of age with an average length of hospitalization of 6.2 days. These data reflect the increased severity of illness seen in children <1 year of age.

Although often referred to as "whooping cough," very young children, older individuals and persons previously immunized may not have the typical "whoop" generally associated with pertussis. Paroxysmal coughing is the most commonly occurring symptom in reported cases. In Minnesota nearly a third (166, 30%) of the pertussis cases reported in 1997 experienced whooping, while nearly all (508, 93%) experienced paroxysmal coughing. Post-tussive vomiting was reported in over half (296, 54%) of the cases. One hundred fifty cases (27%) reported apnea.

Evaluation of the vaccination status for 1997 pertussis cases 2 months of age to 15 years of age indicated that 199 (61%) of the 326 cases with a known vaccine history had received age-appropriate immunization for pertussis. (This includes infants between 2 and 5 months of age for whom a completed primary series is not yet indicated but for whom at least one dose of vaccine should have been received.) One hundred ninety-nine (60%) of the 332 cases 7 months through 15 years of age had received at least a primary series of three doses. Of the 88 cases in persons 7 months to 7 years of age, 28 cases (32%) were considered to be preventable. A preventable case is defined as a case of pertussis occurring in a patient who is 7 months through 7 years of age and has received fewer than three doses of DTP vaccine before onset of illness.

Historically, pertussis has shown a seasonal peak in Minnesota with the majority of case onsets during June, July and August. This is the third year in which the peak incidence has shifted toward the fall, with 317 (58%) of cases occurring in September, October, November or December; more than half of those cases (208, 66%) had onsets in October or November. This shift in month of onset reflects changes seen in age-specific incidence over the last 3 years. The largest proportion of cases (157, 29%) occurred in children between 5 and 12 years of age, reflecting increasing transmission in the school-age population. A school-based outbreak in a private school (K-12) in the Minneapolis-St. Paul metropolitan area during October/November accounted for 30 cases and was described in the November/December 1997 *Disease Control Newsletter.* In addition, persons 13 to 17 years of age and persons 18 years of age and older accounted for 97 (18%) and 124 (23%) of all cases, respectively.

Pertussis is increasingly recognized as a disease that affects older children and adults. Even among highly vaccinated populations, waning immunity leads to a substantial population of susceptible older children and adults. By approximately 12 years of age, most of the population is susceptible. Infection in adolescents and young adults may result in exposure of unprotected infants at risk for the most severe consequences of infection. Physicians should include pertussis in the differential diagnosis of cough illness lasting 2 weeks in persons of all ages. Until

continued...

approved booster vaccination for pertussis is available to protect older children and adults, the prompt diagnosis and treatment of cases and prophylaxis of contacts are the only options for limiting transmission.

Laboratory tests should be performed on all suspected cases of pertussis. Culture of *Bordetella pertussis* requires inoculation of nasopharyngeal mucous on special media such as Regan-Lowe or Bordet-Gengou and incubation for 7 days. However, *B. pertussis* is a fastidious organism and is rarely found late in the illness. Therefore a negative culture does not necessarily rule out disease. The direct flourescent antibody (DFA) test provides a rapid presumptive diagnosis of pertussis, but both false-positive and false-negative results can occur. DFA should not be relied upon as a criterion for laboratory confirmation; therefore, culture confirmation of all suspected pertussis cases should be attempted. In addition, culture confirmation provides additional molecular epidemiologic information on cases.

Molecular characterization of *B. pertussis* isolates using pulsed-field gel electrophoresis (PFGE) has recently become available. MDH reporting rules were revised in 1995 to require that all clinical isolates of *B. pertussis* be submitted to the Public Health Laboratory. During 1997, all *B. pertussis* isolates were subtyped by PFGE. Of the 248 culture-confirmed cases, 245 (99%) isolates were submitted for further testing. Twenty-nine distinct PFGE patterns were identified; 11 (38%) of these patterns occurred in only a single case isolate. The six most common patterns identified accounted for 192 (78%) of the total isolates and occurred throughout the year. During the school-based outbreak noted above, PFGE was used to classify cases as outbreak-associated or community-acquired.

Subtype-specific population-based surveillance for *B. pertussis* in Minnesota supports genotypic diversity (i.e., a variety of strains are present at any given time in the population) as well as strain stability (i.e., strains tend to persist over time once identified in the population), and serves as a baseline to monitor temporal and geographic trends. In addition, ongoing population-based antimicrobial resistance testing can be used to detect subtle shifts in minimum inhibitory concentrations over time and allows for identification of the emergence of resistant strains.

Salmonellosis

During 1997, 632 cases of *Salmonella* infection were reported (13.5 per 100,000 population). This represents a 4% decrease from the 656 cases reported in 1996. It also continues a trend in annual decreases in reported cases of salmonellosis since 1994, when a nationwide outbreak of *S. enteritidis* infections associated with Schwan's ice cream occurred. The five most common serotypes identified in 1997 were *S. typhimurium* (179), *S. enteritidis* (116), *S. newport* (41), *S. heidelberg* (31), and *S. braenderup* (28). These five serotypes, which were also the most common serotypes reported in 1996, accounted for 63% of all isolates. Forty-four percent of cases were reported between the months of June and September.

Two foodborne outbreaks of *Salmonella* infection were reported in 1997. One outbreak involved four cases of *S. braenderup* with onsets over 4 months. Illness was associated with a single restaurant. Stool samples from all employees were tested for *Salmonella; S. braenderup* was isolated from three. Additionally, two environmental samples from a cutting board and the cold bar area were positive for *S. braenderup*. The PFGE patterns from the environmental isolates were identical to the patron and employee isolate patterns. Transmission likely occurred from infected food-workers or from environmental surfaces. The original source could not be determined.

In August, Minneapolis Health Department received a foodborne complaint from two individuals who became ill after eating together at a restaurant 6 days earlier. During that same week, the MDH Public Health Laboratory confirmed four cases of *S. newport* infection. All four had eaten at one of several outlets of the restaurant that had been the subject of the complaint. Between July 26 and August 6, a total of 17 patrons of this restaurant chain developed illness caused by *S. newport* with a common molecular subtype pattern. Fourteen of the cases reported eating cold salads that contained chicken. Environmental health investigation of a central commissary that supplied restaurant outlets revealed that chicken-containing salads were being stored at above recommended temperatures. Four employees at the various restaurant outlets were found to be infected with *S. newport*; three denied being ill. The ill employee became ill at the same time as restaurant patrons and reported eating cold chicken-containing salads. Three of the infected employees had the outbreak-associated subtype and one had a pattern that differed slightly. During December, two additional restaurant patrons were identified with *S. newport* infections after eating cold chicken-containing salads. One was the same as the previous outbreak-associated strain and the other differed somewhat. Follow-up employee, environmental, and food cultures taken after these last two cases were negative. This outbreak appeared to be due to improper handling of chicken at the central commissary. Recommendations were made to change procedures at the commissary to eliminate cross contamination, and the management decided to reduce handling of raw chicken by purchasing cooked chicken instead.

Sexually Transmitted Diseases

Rates of chlamydia infection, gonorrhea, and syphilis are monitored by MDH through combined physician and laboratory-based surveillance. A comparison of case numbers by year of diagnosis for the years 1993 through 1997 is presented in Table 4. Cases reported for 1997 by residence, gender, race/ethnicity, and age are shown in Table 5. Brief summaries for each disease are reported below.

Chlamydia Infection

Chlamydia trachomatis infection continues to be the most commonly reported sexually transmitted disease (STD) in Minnesota. Reported cases include both chronic (prevalent) and acute (incident) infections, making it difficult to discern trends in transmission. For 1997, 6,779 cases of chlamydia infection were diagnosed and reported (145 per 100,000 population). The trend of decreasing chlamydia rates since 1993 appears to have been reversed in 1997; from 1996 to 1997, there was a 24% increase in the rate of chlamydia. This increase occurred in all geographic regions of the state, both

continued...

Table 4. Cases and Rates* of Chlamydia, Gonorrhea and Syphilis, Minnesota, 1993-1997

Disease	1993 No.	1993 Rate	1994 No.	1994 Rate	1995 No.	1995 Rate	1996 No.	1996 Rate	1997 No.	1997 Rate
Chlamydia	7069	158	7124	158	6121	134	5418	117	6779	145
Gonorrhea	2386	53	3355	74	2819	62	2621	57	2435	52
Syphilis Total	246	5.5	213	4.7	181	4.0	123	2.7	115	2.5
Primary/Secondary	64	1.4	59	1.3	42	0.9	15	0.3	16	0.3
Early**	153	3.4	142	3.1	97	2.1	44	1.0	35	0.7
Late latent***	84	1.9	69	1.5	81	1.8	78	1.7	80	1.7

*Rate per 100,000 population

**Includes primary, secondary and early latent infections; duration <1 year

***Likely duration >1 year

genders, all racial/ethnic groups, and all persons 15 years of age or older. The rates for individuals less than 15 years of age remained the same.

Reported chlamydia infections are geographically distributed throughout the state, although the rates are highest in Minneapolis and St. Paul. The rate in Minneapolis (683 per 100,000 population) was 1.6 times higher than the rate in St. Paul (422 per 100,000 population) and 7.8-fold higher than the rate in the suburban metropolitan area (87 per 100,000 population). The rate in greater Minnesota (70 per 100,000 population) was comparable to the rate for the suburban metropolitan area.

The rate of chlamydia infection among women (213 per 100,000 population) was approximately 3 times larger than the rate among men (74 per 100,000 population) which largely is due to more frequent screening among women. Of the 5,065 cases reported for women, 892 (18%) were pregnant at the time of diagnosis. For the 5,440 cases where information about symptoms was provided, 2,668 (49%) were asymptomatic.

Cross-sectional studies have uniformly shown that adolescents and young adults are most at risk for acquiring chlamydia infection, and surveillance data show similar findings. The chlamydia rate was highest among 15- to 19-year olds (802 per 100,000 population), while the next highest rate was among 20- to 24-year olds (774 per 100,000 population). The rate of chlamydia infection among 15- to 24-year olds (788 per 100,000 population) was 4-fold higher than the rate among 25- to 34-year olds (182 per 100,000 population).

The rate of chlamydia infection is highest in communities of color. The rate in blacks (1,721 per 100,000 population) was 24-fold higher than the rate in whites (71 per 100,000 population). In other words, although blacks comprise only 3% of the population in Minnesota, 34% of the chlamydia cases occurred among blacks. The rates in American Indians (414 per 100,000 population) and Hispanics (512 per 100,000 population) were about 6 to 7 times greater than the rate in whites. The rate for Asians (200 per 100,000 population) was nearly 3 times greater than the rate for whites.

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. For 1997, 2,435 cases were diagnosed and reported (52 per 100,000 population). The gonorrhea rate has been gradually decreasing. Since 1994, the gonorrhea rate has decreased 30% from 74 cases per 100,000 population in 1994. However, the rates in the

continued...

Table 5. Cases of Chlamydia, Gonorrhea, and Syphilis by Residence, Gender, Race/Ethnicity and Age; Minnesota; 1997

	Chlamydia No. (%)	Gonorrhea No. (%)	Early Syphilis* No. (%)
TOTAL	6779 (100)	2435 (100)	35 (100)
Residence			
Minneapolis	2488 (37)	1422 (58)	24 (69)
St. Paul	1141 (17)	382 (16)	1 (3)
Suburban	1609 (24)	434 (18)	7 (20)
Greater MN	1541 (23)	197 (8)	3 (9)
Gender			
Male	1714 (25)	1119 (46)	18 (51)
Female	5065 (75)	1316 (54)	17 (49)
Race			
White	2997 (44)	598 (25)	7 (20)
Black	2304 (34)	1411 (58)	26 (74)
Am. Indian	248 (4)	69 (3)	0 (0)
Asian	221 (3)	17 (1)	0 (0)
Other	254 (4)	59 (2)	0 (0)
Unknown	755 (11)	281 (12)	2 (6)
Ethnicity			
Hispanic**	370 (5)	78 (3)	1 (3)
Age			
< 10	13 (0)	1 (0)	0 (0)
10-14	123 (2)	43 (2)	0 (0)
15-19	2607 (38)	728 (30)	3 (9)
20-24	2353 (35)	685 (28)	5 (14)
25-29	989 (15)	411 (17)	9 (26)
30-34	363 (5)	270 (11)	6 (17)
35-44	273 (4)	239 (10)	10 (29)
45+	58 (1)	58 (2)	2 (6)

*Includes primary, secondary and early latent infections; duration <1 year

** Persons of Hispanic origin may be of any race

suburban metropolitan area, in greater Minnesota, and among American Indians increased between 1996 and 1997.

Gonorrhea cases occur infrequently outside the core urban populations; thus, gonorrhea morbidity is highest in Minneapolis and St. Paul. The rate in Minneapolis (390 per 100,000 population) was 2.8-fold higher than the rate in St. Paul (141 per 100,000 population) and 43 times higher than the rate in greater Minnesota (9 per 100,000 population). The rate in the suburban metropolitan area was 23 per 100,000 population.

Adolescents and young adults have the greatest risk for gonorrhea. The rate for 15- to 19-year-olds was 224 per 100,000 population, the rate for 20- to 24-year-olds was 225 per 100,000, and the rate for 25- to 29-year-olds was 126 per 100,000. The gonorrhea rates for men and women were comparable. For women, 173 (13%) of the 1,316 cases were pregnant at the time of diagnosis. Data about the presence or absence of symptoms was reported for 2,101 gonorrhea cases; of these, 454 cases (22%) had no symptoms.

Communities of color also are disproportionately affected by gonorrhea; blacks accounted for 58% of the gonorrhea cases. The gonorrhea rate for blacks (1,054 per 100,000 population) was approximately 75-fold higher than the rate for whites (14 per 100,000 population). Likewise, the rates for American Indians (115 per 100,000 population) and Hispanics (108 per 100,000 population) were at least 7.5 times higher than the rate for whites. The rate for Asians (15 per 100,000 population) was similar to the rate for whites.

Syphilis

Syphilis is caused by infection with the spirochete *Treponema pallidum*. The initial (primary) stage of infection includes a genital ulcer that is usually painless. A secondary stage occurs a few weeks to months later with flu-like symptoms, skin rash, hair loss, and lymphadenopathy. The infection subsequently progresses to a latent stage without symptoms. If untreated, late complications may develop, including neurologic and cardiovascular abnormalities.

The term “early syphilis” refers to cases of primary, secondary, and early latent infection (<1 year duration). Disease intervention efforts focus on persons with early syphilis, since persons in the early stages of infection pose the greatest risk for transmission. Early syphilis cases also are used for analysis of morbidity trends because they represent recently acquired infections.

Early Syphilis

The rate of early syphilis in Minnesota is low compared to chlamydia and gonorrhea and the rate has decreased dramatically since 1993 in Minnesota. For 1993, 153 cases of early syphilis were diagnosed and reported; for 1997, there were 35 cases of early syphilis, a 78% reduction since 1993. The rate of early syphilis for 1997 was 0.7 per 100,000 population.

Syphilis is almost exclusively an urban disease. Only three of the 35 cases of early syphilis were reported from greater Minnesota (a rate of 0.1 per 100,000 population). The early syphilis rate in Minneapolis (7 per 100,000 population) was more than 17-fold higher than the rates in St. Paul (0.4 per 100,000 population) and the suburban metropolitan area (0.4 per 100,000 population).

The rate of early syphilis among men was virtually identical to the rate among women. Of the 17 early syphilis cases reported for women, three (18%) were pregnant at the time of diagnosis. The early syphilis rate for blacks (19 per 100,000 population) was nearly 118 times higher than the rate for whites (0.2 per 100,000 population). For early syphilis, almost 75% of the cases were among blacks. In 1997, there were no early syphilis cases reported among American Indians or Asians and only one case reported among Hispanics. For early syphilis, the highest rates occurred in persons aged 20 to 29 years.

Congenital Syphilis

For surveillance purposes, a presumptive case of congenital syphilis includes a child born to a mother with untreated syphilis, or a child born to a mother who was treated <30 days before delivery, regardless of the findings in the infant. Thus, an infant without signs or symptoms of syphilis will be reported as a case if the mother was untreated at the time of delivery. Infants with a reactive treponemal test also may meet the case definition if specific clinical and laboratory findings are present. For 1997, no cases of congenital syphilis were reported in Minnesota.

Shigellosis

One hundred thirty-eight cases of *Shigella* infection were reported in 1997 (3.0 per 100,000 population); 66% were *Shigella sonnei.* This represents a continuing decline in the number of *Shigella* isolates since 1994. There was no distinct seasonality to these infections, and 36% occurred in children under 10 years of age.

Antimicrobial sensitivity testing was performed on 46 *Shigella* isolates during 1997. As in 1996, 34 (74%) were resistant to ampicillin and 21 (46%) were resistant to trimethoprim-sulfamethoxazole. Between 1995 and 1997, 23 (96%) of 24 *S. flexneri* isolates and 27 (29%) of 80 *S. sonnei* isolates were resistant to multiple antibiotics. These proportions did not change over the 3-year period.

Streptococcus pneumoniae

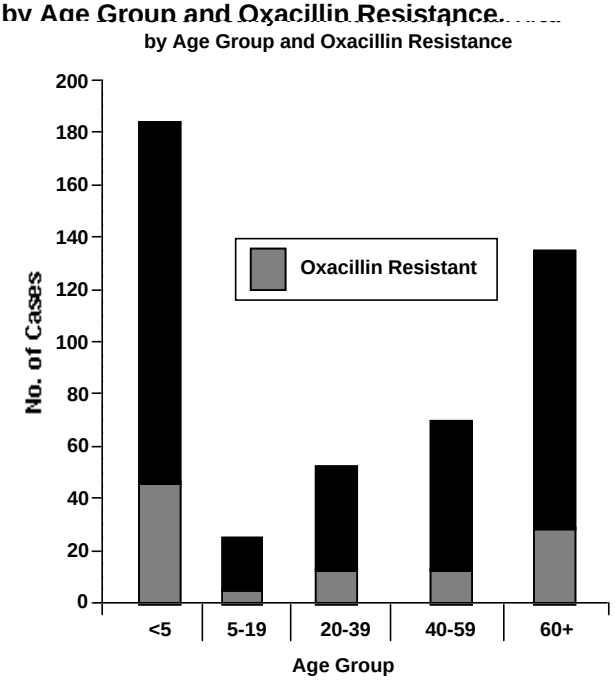
Active surveillance for invasive disease caused by *Streptococcus pneumoniae* has been conducted in the Twin Cities metropolitan area since April 1995. Four hundred sixty-seven cases, including 33 deaths, occurred in residents of the seven-county Twin Cities metropolitan area during 1997 (18.8 per 100,000 population). The age distribution for these cases was similar to that seen in the previous year (Figure 6), with most cases occurring among children under age 5 and among adults aged 60 and over.

The most common types of infection varied by age. Among cases overall, pneumonia with a sterile site isolate accounted for most cases (215 cases, 46%) followed by bacteremia without focus (194 cases, 42%) and meningitis (17 cases, 4%).

Of the 467 cases from the Twin Cities metropolitan area, 106 case isolates (23%) were found to be resistant by oxacillin screening. This proportion represents an increase over that seen in 1996 (13%) and that seen during the 9 months of surveillance conducted in 1995 (14%). The age distribution for

continued...

Figure 6. Cases of Invasive *Streptococcus pneumoniae* by Age Group and Oxacillin Resistance.



both oxacillin sensitive and resistant 1997 cases is shown in Figure 6.

Of the 123 cases occurring among adults 65 years of age and older, serotyping results of isolates submitted to the MDH Public Health Laboratory were completed for 117 (95%). Of these isolates, 89 (76%) had serotypes that are included in the 23-valent pnemococcal polysaccharide vaccine. This is a smaller proportion than seen in 1996: 117 cases occurred in the same age group, 110 isolates were serotyped, and 94 (85%) were serotypes included in the vaccine. Further monitoring of serotype results is needed to determine if this represents a real change in the occurrence of invasive disease caused by specific serotypes. Although vaccination histories were not obtained for cases, and it is not known what proportion of these cases may represent vaccine failure, these results underline the importance of pneumococcal vaccine for adults aged 65 and older, for members of high risk groups, and for those with chronic illnesses.

Streptococcal Invasive Disease - Group A

One hundred fifty-one cases of invasive group A streptococcal disease, including 14 deaths, were reported in 1997 (3.2 per 100,000 population). Ages for cases ranged from 3 months to 91 years, with a mean age of 47 years. Sixty-two percent of cases were residents of the Twin Cities metropolitan area.

Fifty-one cases (34%) presented with bacteremia without another focus of infection. Four cases were identified as having streptococcal toxic shock syndrome (STSS); three of them also had necrotizing fasciitis and one also had pneumonia. Nineteen other cases (13%) with primary pneumonia were reported as were 10 other cases (7%) with necrotizing fasciitis. Twenty-six cases (17%) of cellulitis were also reported.

Of the deaths, nine (64%) were reported to have bacteremia without another focus of infection, four (29%) had pneumonia and three (21%) had streptococcal toxic shock syndrome (STSS).

Isolates were available for 133 (88%) of cases. Fifty-one different molecular subtypes were noted by PFGE molecular subtyping. Thirty-five subtypes had only one isolate; other subtypes had multiple (two to 28) isolates. Except for a nursing home outbreak described below, no direct links were noted between cases with identical subtypes. The deaths were distributed between 10 different subtypes with no subtype accounting for more than two deaths. One cluster was identified in a nursing home in April 1997 through monitoring PFGE subtypes. In retrospect, the first two cases occurred in January and December of 1996. Three additional cases occurred in March and April of 1997. All of the cases had the same PFGE molecular subtype. A case in the community having the same molecular subtype was found to have visited the nursing home (visiting the same unit where three of the cases resided) prior to becoming ill in May. MDH assisted the facility in performing throat cultures on all staff and residents of the unit where the last three cases occurred. Two residents and two staff members had positive cultures for the same molecular subtype of group A streptococcus as identified in the cases. All of them were treated with antibiotics and no additional cases occurred.

In 1997, the Minnesota Emerging Infections Program began conducting surveillance for subsequent, related cases of invasive group A streptococcal disease among household contacts of index patients. Case households are contacted 30 days after onset of illness to determine if any other household members developed invasive group A streptococcal disease. While no culture-confirmed subsequent cases have been identified to date, a household member for one case was noted to have a serious infection that was clinically compatible with group A streptococcal disease.

Streptococcal Invasive Disease - Group B

Active surveillance for invasive group B streptococcal disease has been ongoing since April 1, 1995, as part of the Emerging Infections Program. Two hundred fifty-one cases, including 13 deaths, were reported in 1997 (5.4 per 100,000 population). These cases include only those in which group B streptococcus was isolated from a normally sterile site, not including urine. Sixty-nine percent of the cases occurred among residents of the Twin Cities metropolitan area. Fifty-two cases (21%) were children <1 year of age and 101 cases (40%) were 60 years of age or older.

One hundred six cases (42%) presented with bacteremia without another focus of infection. The other most common types of infection noted were

continued...

Table 6. Cases of Tuberculosis by Risk Catetgory, Minnesota, 1993-1997

Risk Category *	1993 (N=141) No. (%)	1994 (N=140) No. (%)	1995 (N=156) No. (%)	1996 (N=131) No. (%)	1997 (N=161) No. (%)	Cumulative (N=729) No. (%)
Foreign-born	56 (40)	67 (48)	78 (50)	78 (60)	115 (71)	394 (54)
Nursing Home Resident	7 (5)	10 (7)	9 (6)	3 (2)	2 (1)	31 (4)
Homeless	13 (9)	4 (3)	11 (7)	7 (5)	6 (4)	41 (6)
HIV-infected	5 (4)	6 (4)	8 (5)	4 (3)	6 (4)	29 (4)
Inmate	2 (1)	3 (2)	3 (2)	5 (4)	2 (1)	15 (2)

* Risk categories are not mutually exclusive

cellulitis (15%), pneumonia (6%), arthritis (6%), and meningitis (4%). In 160 cases (64%) the site of the isolate was blood only.

There were 67 mother-infant pairs with pregnancy-associated group B streptococcal disease compared to 60 pairs in 1996. Five stillbirths and spontaneous abortions were associated with 11 maternal invasive group B streptococcal infections. Group B streptococcus was isolated from a placenta or tissue of five additional stillborn infants whose mothers were not identified as having invasive disease. Thirty-three infants developed invasive disease within the first 6 days following birth (early onset disease) and 18 infants became ill at 7 to 90 days of age (late onset disease).

Minnesota was one of two Emerging Infections Program sites selected in September 1997 to participate in the Perinatal Group B Streptococcal Disease Prevention Project. Surveys of laboratories, prenatal care providers, and pediatric providers are underway to measure current practices. Results of these surveys will be used to determine strategies to improve implementation of CDC guidelines for group B streptococcal disease prevention. Ongoing disease surveillance data will be used to assess the effectiveness of this demonstration project in decreasing the incidence of neonatal group B streptococcal disease.

Tuberculosis

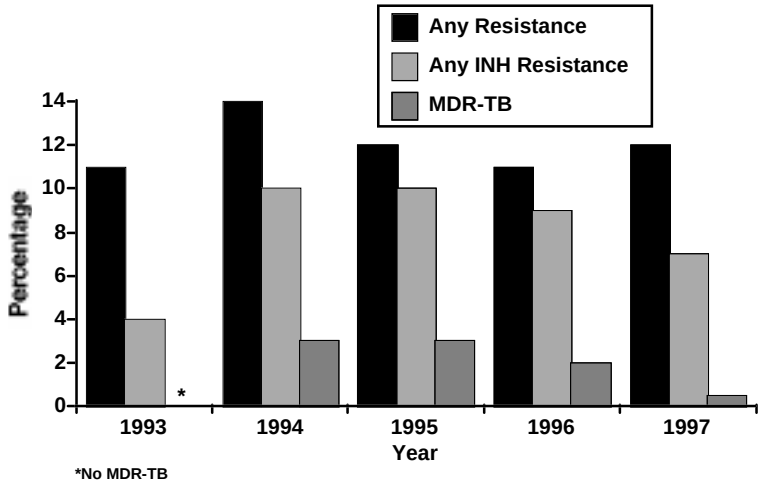
A national resurgence of tuberculosis (TB) occurred in the U.S. in the mid-1980's and early 1990's. During this period, the incidence of TB in Minnesota increased from its lowest level of 91 cases (2.1 per 100,000 population) in 1988 to a recent high of 165 (3.7 per 100,000) cases in 1992. Since 1992, the incidence of TB in Minnesota has shown a generally decreasing trend consistent with declining case numbers reported recently in many areas of the U.S. However, the number of new TB cases reported in Minnesota in 1997 increased 23%, from 131 (2.9 per 100,000) in 1996 to 161 (3.4 per 100,000) in 1997.

TB occurs in Minnesota primarily in selected high-risk groups, including persons born outside the U.S., homeless persons, HIV-infected individuals, nursing home residents, and correctional facility inmates (Table 6). During the past 5 years (1993-1997), 54% of all TB cases reported in Minnesota have occurred in persons born outside the U.S. In 1997 this proportion continued to increase substantially for the fifth consecutive year, with 71% of new TB cases occurring among this group. In contrast, 39% of TB cases reported nationally occur among foreign-born persons. Of the 161 TB cases reported in Minnesota in 1997, six (4%) were homeless, two (1%) were correctional facility inmates, and two (1%) were nursing home residents at the time of diagnosis. Since 1984, when reporting of coinfection with TB and HIV was initiated in Minnesota, 43 cases of TB have been diagnosed in HIV-infected persons, including six cases reported in 1997. Active TB disease in an HIV-infected individual is an AIDS-defining condition. The majority (81%) of TB cases in Minnesota occur in the Twin Cities metropolitan area, particularly among residents of Hennepin (54%) and Ramsey (18%) Counties.

TB incidence rates vary by race/ethnicity, with persons of color disproportionately affected by TB. The majority of TB cases among persons of color in Minnesota occur among persons born outside the U.S. In 1997, 100% of 50 TB cases among Asians, 92% of 13 cases among Hispanics, and 74% of 66 cases among blacks occurred among foreign-born persons. Until recently, the highest TB incidence rates in Minnesota have occurred among Asians; however, the incidence rate among blacks (49.3 per 100,000) has increased substantially during the past 2 years and now exceeds that among Asians (45.2 per 100,000). These trends reflect the changing demographics of populations immigrat-

continued...

Figure 7. Percentage of TB Isolates with Drug-Resistance by Type of Resistance and Year, Minnesota, 1993-1997



ing to Minnesota from countries with highly endemic rates of TB disease.

The emergence of multi-drug resistant TB is a critical public health and clinical concern in the U.S. In 1997, 19 (12%) of TB cases were drug-resistant, including one (<1%) case which was resistant to both isoniazid (INH) and rifampin, the two primary drugs used to treat TB. Of 11 multi-drug resistant TB cases reported during 1993-1997, eight were resistant to INH, rifampin, and at least two other drugs. Current national guidelines recommend initial four-drug therapy for all TB cases in areas where the prevalence of INH resistance is 4% or greater. Eight percent of all TB cases reported in Minnesota during 1993-1997 were resistant to at least INH, with annual rates of INH resistance ranging from 4% in 1993 to 10% in 1994-1995 (Figure 7). Since the annual incidence of INH resistance consistently has exceeded 4% in recent years, all TB cases in Minnesota should initially receive four-drug therapy, until drug sensitivities are known. Of the 19 drug-resistant TB cases reported in 1997, 17 (89%) occurred in persons born outside the U.S. These cases likely represent primary drug resistance acquired in their country of origin rather than secondary resistance resulting from nonadherence to prescribed therapy.

Vancomycin Resistant Enterococci
Voluntary surveillance for vancomycin resistant enterococci (VRE) has been ongoing since July 1995 as part of the Emerging Infections Program. Cases include patients hospitalized in Minnesota and who have VRE isolated from a normally sterile site, or from any wound, and starting in 1997, those with VRE isolated from urine. During 1997 there were 301 total cases, an increase from 101 cases in 1996. Of the 1997 cases, 135 (45%) were reported due to isolation of VRE from urine. The remaining 166 cases reflect a 64% increase over VRE cases from 1996; these 166 cases meet the same case definition as that used in 1996.

Both Minnesota residents and non-residents were included as cases; 244 (81%) of the 1997 cases were among Minnesota residents; 174 (58%) were residents of the seven-county Twin Cities metropolitan area and 70 (23%) were from greater Minnesota. In 1997 cases were reported from 36 Minnesota hospitals with 20 (56%) of these located in the seven-county Twin Cities metropolitan area. This represents an increased number of facilities from the previous year when cases were reported from 21 hospitals, 16 (76%) from the Twin Cities metropolitan area.

Nearly one-half (46%) of the cases were age 60 and older. Fifty-seven cases (19%) died; in five cases VRE was reported to be a contributing factor to death.

Viral Hepatitis A
In 1997, 243 cases of hepatitis A virus (HAV) infection were reported (5.2 per 100,000 population), with one death. This represents an increase over the number of cases reported in 1996 (n=176). Hepatitis A cases were at a low level in 1988 (with approximately 100 cases reported). Case numbers gradually increased to a peak of 884 in 1992 and then have since declined.

In 1997, 147 cases (60%) were residents of the Twin Cities metropolitan area, with 93 (38%) residing in Hennepin County. Of the 228 cases for whom data were reported, 207 (91%) were white, eight (4%) were black, seven (3%) were Native American and six (3%) were Asian. Hispanic ethnicity was reported for 24 cases.

Five outbreaks accounted for 31 (20%) of the 153 cases cases that were questioned about possible modes of transmission. Three of these outbreaks were associated with child day care (involving 12, 10 and two cases); one outbreak was restaurant-related (including four cases); and another outbreak involved a nursing home. Of the remaining 122 sporadic cases questioned about risk factors, 44 (29%) had known contact with another case, 28 (18%) were men who reported having sex with men, 10 (7%) had consumed raw shellfish, and two (1%) were associated with child day care but unrelated to any known outbreaks. Foreign travel accounted for 38 (25%) of the cases, 20 of whom had traveled to Mexico. None of these cases had received hepatitis A vaccine or immune globulin prior to travel.

Of cases reported in 1997, over one-quarter occurred in risk groups recommended to receive hepatitis A vaccine: travelers to endemic areas and men who have sex with men. We encourage health-care providers to educate their patients about the risk of hepatitis A associated with foreign travel. Patients who may be traveling in the future to developing countries, including Mexico, should be offered hepatitis A vaccine. Similarly, men who have sex with men should be educated about their risk and offered vaccine. Any other person over age 2 years who desires immunity to HAV infection also should be vaccinated.

Viral Hepatitis B
The number of acute clinical HBV cases has been declining over the past few years in Minnesota. The average number of cases reported annually for the previous five years is 73. In 1997, 62 cases of acute hepatitis B virus (HBV) infection were reported (1.3 per 100,000 population). Sixteen of these cases were documented asymptomatic seroconversions. Of the 46 acute clinical cases, 37 (80%) were 15 to 39 years of age, and one was a child <15 years of age. Twenty-four (52%) were white, 15 (33%) were black, four (9%) were Asian and one (2%) was American Indian; race was unreported in two (4%) cases. Slightly more than half (25, 54%) of the cases were male. Thirty-four cases (74%) were residents of the Twin Cities metropolitan area.

Of the 46 acute clinical cases, 41 (89%) were questioned about possible modes of transmission. Six (13%) were men who reported having sex with men, six (13%) had heterosexual contact with a known carrier of hepatitis B surface antigen (HBsAg), four (9%) used needles to inject drugs, one (2%) with unknown sexual preference had heterosexual contact with an HBsAg carrier *and* used needles to inject drugs, one (2%) had sexual contact with an HBsAg carrier and 11 (24%) cases had a history of multiple sex partners within 6 months prior to onset of symptoms. No clinical cases were reported as a result of occupational exposure. No risk factors for acquiring HBV infection were identified for the remaining 12 (26%) cases. The median age for this group was 28 years (range, 10 to 55 years); this age distribution suggests possible sexual transmission.

Most of the acute hepatitis B cases in 1997 had known risk factors for

continued...

acquiring HBV infection. MDH policy currently recommends hepatitis B vaccine for all children and adolescents not previously vaccinated and for all adults who are at increased risk of infection. The 1998 Minnesota Legislature amended the School Immunization Law to require hepatitis B immunization for kindergartners beginning in school year 2000-01 and for seventh graders beginning in school year 2001-02.

Viral Hepatitis C

In 1997, seven cases of acute hepatitis C virus (HCV) infection were reported. Four cases (57%) were residents of Greater Minnesota (Chippewa, Fillmore, Rice and Stearns Counties), and three were residents of the Twin Cities metropolitan area (Anoka, Hennepin, and Ramsey Counties). The median age of cases was 33 years (range, 22 to 47 years). Five cases (71%) were male. Two cases (29%) reported using needles to inject drugs and one case (14%) had heterosexual contact with a known anti-HCV positive partner within 6 months prior to onset of symptoms. No risk factor could be determined for two cases (29%). The remaining two cases were unavailable to be interviewed about possible modes of transmission. No clinical cases were reported as a result of occupational exposure.

Acute HCV infections are not easily diagnosed, as most cases are asymptomatic. The MDH has recently developed a reporting system to monitor diagnosis of chronic HCV infection. Data on date of diagnosis (i.e., positive laboratory report), age, gender, race and possible mode of transmission will be obtained and analyzed. Data will be used to better describe the epidemiology of HCV infection in Minnesota. Persons infected with HCV should receive hepatitis A and B vaccines, unless they have evidence of immunity.

References

1. CDC. Update: Influenza Activity-United States and Worldwide, 1997-98 Season, and Composition of the 1998-99 Influenza Vaccine. MMWR 1998;47:280-284.

CHANGING YOUR ADDRESS?
Please correct the address below and send it to:
DCN MAILING LIST
Minnesota Dept of Health
717 Delaware Street, Box 9441
Minneapolis, MN 55440