MINNESOTA DEPARTMENT OF HEALTH

DISEASE CONTROL NEWSLETTER

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Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 1998

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 (page 14) 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).

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 foodborne illnesses. Isolates for these pathogens are required to be submitted to MDH (indicated in Table 1). The MDH laboratory performs state-of-the-art microbiologic evaluation of isolates, such as pulsed-field gel electrophoresis, to determine whether isolates of selected pathogens are related and may therefore be associated with a common source.

Table 2 (page 16) summarizes the number of reports of selected communicable diseases submitted to MDH during 1998 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 1998-99 influenza season rather than the 1998 calendar year.

Arboviral Encephalitis

LaCrosse encephalitis (LAC) and Western equine encephalitis (WEE) are the primary arboviral encephalitides found in Minnesota. Confirmed cases are defined as those which were 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., $\leq$ two-fold change) antibody titer to the virus. Viral encephalitis is reportable in Minnesota, and arboviral encephalitis reports should promptly be submitted to MDH so that efforts may be made 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) mosqui-

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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* 0157: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) 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

toes. 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. During 1985-1997, 71 cases of LaCrosse encephalitis were reported to MDH; three to 12 cases were reported each year (median, five cases per year). During 1998, four probable cases were reported. The disease has been reported from 16 southeastern Minnesota counties (Figure 1). Highest incidence rates have been recorded in Houston County (mean annual incidence of 24 cases per 100,000 children [≤ 19 years old], range of 0 to 68 per 100,000). Disease onsets have been reported from June through September; most cases have onset between mid-July through mid-September (Figure 2).

Western equine encephalitis occurs infrequently in Minnesota, usually as part of a regional epidemic or epizootic (Midwestern states, southern Canada). There were no reported cases of WEE reported to MDH during 1998. The last reported cases of WEE in Minnesota residents occurred during 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

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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 (both considered to be dead-end hosts for the virus).

Campylobacteriosis

There were 1,006 cases of culture-confirmed *Campylobacter* infection reported to MDH in 1998 (21.5 per 100,000 population). *Campylobacter* continues to be the most commonly reported enteric pathogen in Minnesota (Figure 3). Of isolates submitted to MDH, 94% were *C. jejuni*. Fifty-four percent of cases resided in the seven-county Twin Cities metropolitan area. Fifty-three percent of cases were from 20 to 49 years of age, and an additional 15% of cases were less than 5 years of age. Sixty-two 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 fluoroquinolone antibiotics (e.g., ciprofloxacin), which are commonly used to treat infections with this organism. From 1992 to 1998, the proportion of quinolone-resistant *C. jejuni* increased from 1.3% to 10.2%. Peaks in the proportion of resistant isolates occurred during the winter months of each year and were associated with foreign travel (particularly to Mexico). However, domestically acquired quinolone-resistant *C. jejuni* infections increased significantly from 1996 to 1998. Quinolone-resistant *C. jejuni* were recovered from 14% of retail chicken products purchased in the seven-county metropolitan area in 1997; identical molecular subtypes were found among resistant isolates from chicken products and resistant isolates from domestically acquired human infections. Thus, the increase in domestically acquired resistant cases among humans is likely due largely to the use of fluoroquinolones in poultry in the United States, which began late in 1995.

Three foodborne outbreaks of campylobacteriosis were identified in 1998. In June, an outbreak in a Washington County restaurant led to 42

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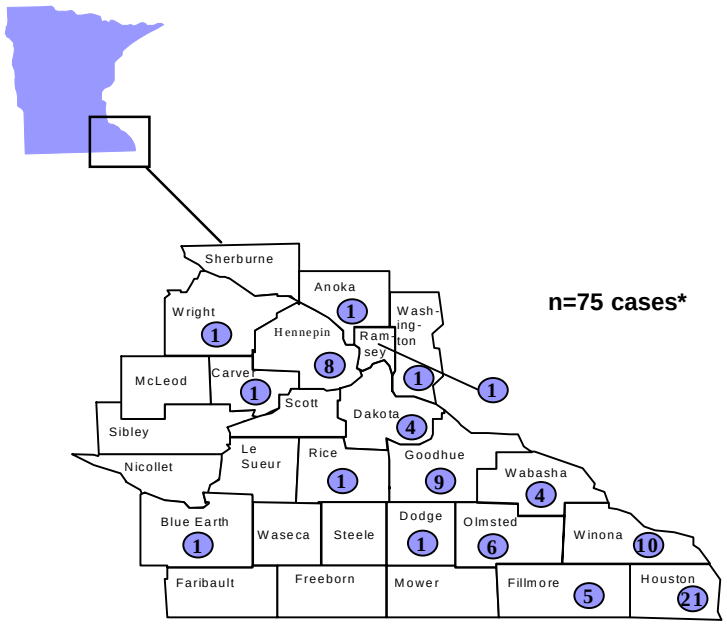
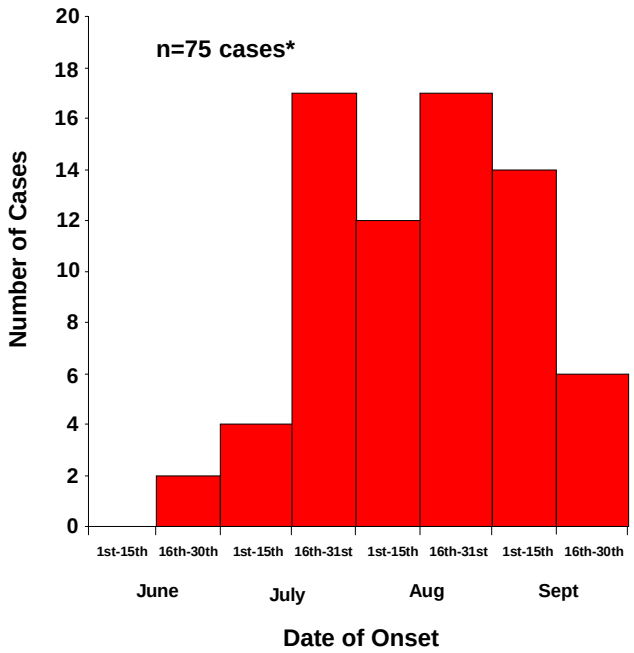
Figure 1. Reported Cases of LaCrosse Encephalitis by County of Residence, Minnesota, 1985-1998



*Cases include confirmed and probable cases.

Figure 2. Reported Cases of LaCrosse Encephalitis by Date of Onset, Minnesota, 1985-1998



*Cases include confirmed and probable cases. Three cases had unknown onset dates.

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health by District of Residence, 1998

Disease	Metropolitan (2,482,858)	Northwestern (149,731)	Northeastern (244,750)	Central (634,199)	West Central (219,312)	South Central (277,691)	Southeastern (440,013)	Southwestern (234,194)	Unknown Residence	Total (4,682,748)
	District (population; 1996 estimates*)									
Campylobacteriosis	546	23	24	112	28	46	173	54	0	1006
Cryptosporidiosis	40	4	1	20	8	16	64	20	0	173
Encephalitis - viral										
LaCrosse	1	0	0	0	0	0	3	0	0	4
Western	0	0	0	0	0	0	0	0	0	0
Escherichia coli 0157:H7 infection	130	0	4	44	4	2	20	5	0	209
Hemolytic Uremic Syndrome	9	0	0	2	2	0	6	1	0	20
Giardiasis	644	11	36	131	40	31	113	47	271	1324
Haemophilus influenzae invasive disease	47	3	3	8	5	3	6	2	0	77
HIV infection other than AIDS	193	0	1	7	0	6	7	2	10	226
AIDS cases (diagnosed in 1998)	167	1	0	5	1	2	5	0	0	181
Legionnaires' disease	4	1	3	0	0	0	1	3	0	12
Listeriosis	11	1	0	0	0	2	3	2	0	19
Lyme disease	154	0	5	79	0	7	15	1	0	261
Measles	0	0	0	0	0	0	0	0	0	0
Mumps	11	0	0	0	0	1	1	0	0	13
Neisseria meningitidis invasive disease	19	1	4	6	2	0	3	1	0	36
Pertussis	313	0	18	26	5	10	15	52	0	439
Salmonellosis	328	6	18	84	28	23	80	32	2	601
Sexually transmitted diseases**										
Chlamydia trachomatis - genital infections	5438	105	234	481	113	121	385	93	0	6970
Gonorrhea	2527	7	33	60	9	16	37	19	0	2708
Syphilis total	62	0	1	3	0	1	4	4	0	75
primary/secondary	9	0	0	0	0	0	0	0	0	9
early latent***	7	0	0	1	0	0	0	0	0	8
late latent****	46	0	1	2	0	1	4	4	0	58
Shigellosis	237	4	2	20	6	9	46	7	0	331
Streptococcus pneumoniae invasive disease (Twin Cities only)	506	--	--	--	--	--	--	--	--	506
Streptococcal invasive disease - Group A	105	6	10	19	3	7	18	5	0	173
Streptococcal invasive disease - Group B	145	6	8	21	9	17	12	11	0	229
Tetanus	0	0	0	0	0	0	0	0	0	0
Tuberculosis	123	2	7	2	1	3	21	2	0	161
Vancomycin Resistant Enterococci	105	0	7	11	4	7	13	2	0	149
Viral hepatitis, type A	76	4	9	19	9	16	5	7	0	145
Viral hepatitis, type B	57	0	3	4	1	1	5	0	0	71
Viral hepatitis, type C	9	0	1	7	0	1	1	0	0	19

*For sexually transmitted diseases, 1997 population estimates from the U.S. Census Bureau are used.
**Cases for which 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, Mahnomen, Norman, Otter Tail, Pope, Stevens, Traverse, Wilkin
South Central = Blue Earth, Brown, Faribault, LeSueur, McLeod, Martin, Meeker, Nicollet, Sibley, Waseca, Watonwan
Southeastern = Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona
Southwestern = Big Stone, Chippewa, Cottonwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Swift, Yellow Medicine

culture-confirmed cases of *C. jejuni* infection; an additional 152 probable cases were identified. Salads and sandwiches containing lettuce were associated with illness. Lettuce contaminated with juice from raw chicken was identified as the likely source of the outbreak. The other two outbreaks occurred at a Dakota County restaurant. One involved four culture-confirmed cases who ate at the restaurant on the same day in August; the second involved two culture-confirmed cases who ate at the restaurant on the same day in November. A specific food item was not implicated in either outbreak, but ample opportunities for cross contamination between raw and ready-to-eat foods were identified.

Cryptosporidiosis

During 1998, 173 cases of laboratory-confirmed *Cryptosporidium parvum* infection were reported to MDH (3.7 per 100,000 population). This is a decrease from the 242 cases reported in 1997. However, the large number of cases in 1997 was due in part to a waterborne outbreak of cryptosporidiosis associated with exposure at the Minnesota Zoo. The zoo outbreak accounted for 36% of all confirmed cryptosporidiosis cases reported in 1997. Three outbreaks of cryptosporidiosis were identified in 1998, accounting for 15 confirmed cases. Two of the outbreaks were associated with swimming pools; the other involved students at a veterinary school who had exposure to infected

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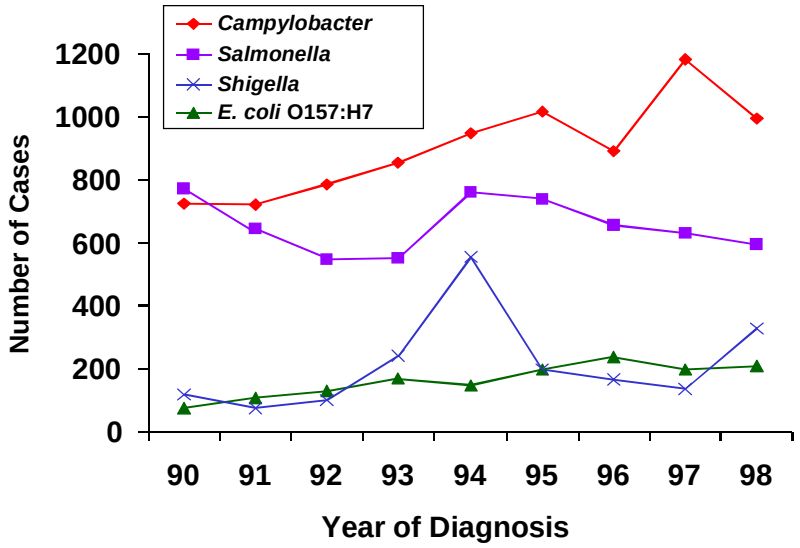
calves. Discounting outbreak-associated cases from both years, similar numbers of cases occurred in 1997 (153 cases) and 1998 (158 cases).

Demographic characteristics of cases in 1998 were similar to 1997. Sixty-four cases (37%) were from southeastern Minnesota and 40 (23%) were from the seven-county metropolitan area. Fifty-three percent of cases were male. Ages ranged from 5 months to 81 years, with a median age of 10 years. Children less than 10 years of age accounted for 47% of cases, and children less than five for 33% of cases. Sixty-five percent of non-outbreak associated cases occurred from June through October. Sixteen percent of cases were hospitalized, and 34% reported antibiotic treatment for their illness. Only two cases were known to be HIV-infected.

Figure 3. Reported Cases of *Campylobacter*, *Salmonella*, *Shigella*, and *Escherichia coli* O157:H7 Infection, Minnesota, 1990-1998



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

During 1998, 209 cases of culture-confirmed *E. coli* O157:H7 infection were reported to MDH (4.5 per 100,000 population). The five year (1994-1998) annual mean number of cases was 198 (range, 147 to 239) (Figure 3). Seventy-eight percent of cases in 1998 occurred during June through September. One hundred and thirteen cases (54%) were less than 10 years of age.

Five outbreaks of *E. coli* O157:H7 infection were identified in 1998. Three of the five outbreaks occurred in childcare settings (two childcare centers and one childcare home). These childcare outbreaks accounted for 40 cases among staff and children; five children were hospitalized, one with HUS. The fourth outbreak was associated with exposure to water at a swimming beach. Four children had cultured-confirmed *E. coli* O157:H7 infections; all isolates had an identical pulsed-field gel electrophoresis (PFGE) pattern. The fifth outbreak involved two cases who had attended a county fair; both children developed HUS. The specific source of infection for these two cases was not determined.

Twenty cases of HUS were reported in 1998. Nineteen of the HUS cases were post-diarrheal; of these,11 (58%) occurred during July through October. The annual mean number of HUS cases from 1994 through 1998 was 16 (range, eight to 29). During 1998, 11 of the 19 post-diarrheal cases (58%) were less than 6 years of age. All post-diarrheal HUS cases were hospitalized; the mean length of hospitalization was 8 days (range, 2 to 51 days). Two cases died; both of these cases were previously healthy adults. *E. coli* O157:H7 was isolated from stool in 11 HUS patients.

Giardiasis

During 1998, 1,324 cases of *Giardia lamblia* infection were reported to MDH (28.3 per 100,000 population). This represents a substantial 21% increase from the 1,098 cases reported in 1997 but is well within the range of cases reported from 1988 through 1997 (mean of 1,186 cases; range, 827 to 1,427). The median age of reported cases was 25 years. As in previous years, cases were clustered among children less than 5 years of age (23%) and adults ages 30 to 39 years (18%). Only 12% of cases were adults over 50 years of age. 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 childcare facilities. No foodborne or waterborne outbreaks of giardiasis were identified in 1998.

Haemophilus influenzae Invasive Disease

Seventy-seven cases of invasive *Haemophilus influenzae* disease were reported to MDH in 1998 (1.6 per 100,000 population). Cases ranged in age from 3 months to 97 years, with a median age of 54 years. Twenty-three cases (30%) had pneumonia, 22 (29%) had bacteremia without another focus of infection, and six (8%) had meningitis. Six deaths were reported.

Two cases (3%) were known to be type b (Hib), compared to seven cases in 1997. One of these cases occurred in a 3-month-old child who had been born prematurely. This child had received one Hib immunization as per the recommended schedule. The other case occurred in an adult. The child had meningitis and the adult had bacteremia without another focus of infection; both survived. Forty-two cases (55%) had untypeable isolates, six (8%) were type f, five (6%) were type e, and 22 were other types or unknown.

The six deaths occurred in cases ranging in age from 82 to 95 years. Four cases had significant underlying medical conditions. Three cases

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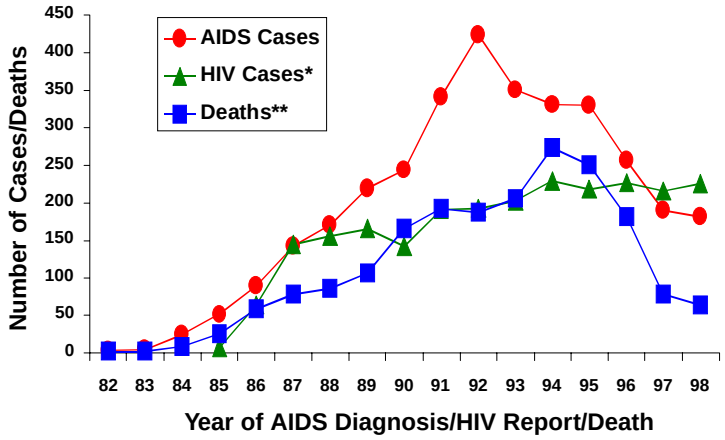
presented with pneumonia, one with bacteremia without another focus of infection, one with peritonitis, and one with septicemia. Isolates from four of the deaths were untypeable and from the other two deaths were unknown.

HIV Infection and AIDS

In 1998, 181 cases of AIDS were 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 1988 (171 cases) (Figure 4). The recent decline is in part due to the benefits of highly active antiretroviral therapy (HAART). The 1992 peak is likely due to the 1993 change in the AIDS surveillance case definition allowing for retrospective diagnoses. This change incorporated CD4+ T-lymphocyte counts of <200/uL in the absence of other AIDS-indicator diseases.

In addition to AIDS cases reported in 1998, 226 newly identified cases of HIV infection which had not progressed to AIDS by year end were reported in 1998 (4.8 per 100,000 population) (Figure 4). While newly identified HIV (non-AIDS) case incidence rates have remained constant or increased slightly in the past five years, this incidence is well below the peak number of cases reported in 1987 (406 cases). This peak number is not represented in Figure 4 to avoid duplication of reported cases which progressed from an HIV (non-AIDS) diagnosis to AIDS. The plateau in HIV (non-AIDS) reports during the last several years suggests that the epidemic may be stabilizing in Minnesota, since no changes have been made in surveillance methodology since 1993.

Figure 4. AIDS and HIV Cases by Year of Diagnosis, and AIDS Deaths by Year of Death, Minnesota, 1982-1998



*Excludes cases that subsequently were diagnosed with AIDS.
**Deaths occurring during a year are not necessarily related to cases diagnosed during that year.

New treatments for HIV infection have also led to a marked reduction in mortality. Deaths due to AIDS have declined substantially since 1994 (Figure 4). The 55 deaths in persons with a diagnosis of AIDS in 1998 was the lowest number reported in Minnesota since 1985 (n=26).

Several trends in reported AIDS/HIV cases continue to evolve. Male-to-male sex remains the most common exposure category for reported AIDS cases in 1998 (94 cases, 52%) but the proportion has declined steadily over time (Table 3). In contrast, the proportion of cases related to heterosexual contact has increased over time (Table 3). Notably, the proportion of female AIDS cases continues to increase; 20% of cases diagnosed in 1998 (36/181) were female compared to 17% of cases reported in 1997 (33/190) and 8% of cases reported prior to 1997 (252/2,993). An increasing proportion of AIDS cases continues to be identified in blacks, while the proportion of cases identified in whites is decreasing. In 1998, 34% of AIDS cases reported were identified as black, compared to 16% of cases reported prior to 1998. Conversely, in 1998, 52% of AIDS

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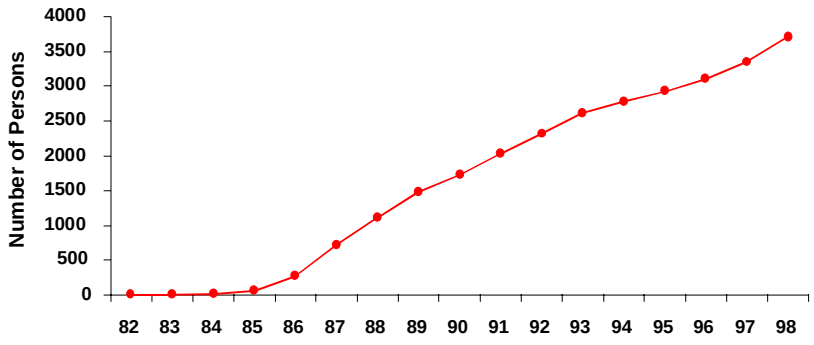
Table 3. Adult/Adolescent Cases of AIDS by Exposure Category, Sex, and Year of Diagnosis, Minnesota, 1982-1998

	Percentage of cases in exposure category								
	Pre-1997			1997			1998		
Exposure Category	**Male (n=2741)**	**Female (n=252)**	**Total (n=2993)**	**Male (n=157)**	**Female (n=33)**	**Total (n=190)**	**Male (n=145)**	**Female (n=36)**	**Total (n=181)**
Men Who Have Sex With Men	78	0	72	68	0	56	65	0	52
Injecting Drug Use (IDU)	6	23	8	10	30	13	12	14	12
Men Who Have Sex With Men and IDU	7	0	7	8	0	7	6	0	4
Hemophilia/Coagulation Disorder	2	<1	2	1	0	1	0	0	0
Heterosexual	1	50	5	2	39	8	2	44	10
Transfusion, Blood/Components	1	6	1	0	0	0	0	0	0
Mother with/at Risk for HIV Infection	<1	3	1	0	3	1	1	0	1
Other/Undetermined	4	18	5	12	27	15	15	42	20
Total	100	100	100	100	100	100	100	100	100

Figure 5. Persons Living with HIV/AIDS at Year End, Minnesota, 1982-1998



cases were identified as white compared to 77% of cases reported prior to 1998.

When 1998 HIV (non-AIDS) infection case data are compared to overall AIDS case data, the HIV (non-AIDS) trends are even more pronounced than the trends in AIDS cases described above. For example, male-to-male sex is the risk factor for 61% of reported HIV (non-AIDS) cases and 70% of AIDS cases. Heterosexual transmission accounts for 10% of HIV (non-AIDS) cases and 5% of AIDS cases. Females comprise 18% of HIV (non-AIDS) cases compared to 10% of AIDS cases. Whites comprise 75% of AIDS cases and 64% of HIV (non-AIDS) cases while blacks comprise 17% of AIDS cases and 28% of HIV (non-AIDS) cases. Injecting drug use as an exposure category accounts for 8% of AIDS cases and 12% of HIV (non-AIDS) cases.

Since 1985, 53 pediatric cases (<13 years of age) have been diagnosed with AIDS/HIV infection in Minnesota. Most of these children were diagnosed between 1987 and 1994, with the peak number of reported cases (n=8) in 1992. The majority (40 cases, 75%) were born to HIV-infected women and acquired their infection perinatally. With the increased identification of HIV infection in pregnant women and the increased use of antiretroviral therapy during pregnancy, reported pediatric cases have decreased, remaining constant at three cases per year since 1995.

As new treatments become available and the occurrence of AIDS is being delayed, following AIDS case diagnoses as a marker for the epidemic is becoming less useful. Assessing trends by looking at recent HIV infections provides a better mechanism to evaluate current transmission risk and effectiveness of prevention efforts. In addition, because of increased survival, a growing number of persons are living with HIV infection (Figure 5). These data emphasize the continued importance of monitoring the epidemic to better direct policy and prevention efforts.

Influenza

The first Minnesota influenza isolate for the 1998-1999 influenza season was confirmed by the MDH Public Health Laboratory on December 28, 1998; onset of symptoms for the case occurred on December 15, 1998. This represented a later start of influenza activity than seen in recent years. Since the 1990-91 season, the first influenza isolate has been confirmed in mid-November.

Influenza surveillance in Minnesota relies on passive reporting and submission of isolates from clinics/hospitals, laboratories, schools, and long-term care facilities. The surveillance systems used in schools and long-term care facilities have been in place since the 1995-96 influenza season. A Sentinel Physician Influenza Surveillance Network was initiated in Minnesota for the 1998-99 season. MDH plans on expanding the number of sites participating in the Sentinel Physician Network for the 1999-2000 influenza season.

The MDH Public Health Laboratory received 422 influenza isolates for confirmation and strain identification. Of the isolates received, 192 (45%) were identified as influenza type A (H3N2), 15 (4%) were influenza A but subtype was not available, and 212 (50%) were influenza type B/Beijing-like. Of the influenza A (H3N2) isolates antigenically characterized by MDH, all were similar to A/Sydney. Strains which circulated in Minnesota in 1998-99 were well matched to the strains included in the 1998-99 influenza vaccine. This is the first season since 1992-93 that influenza B strains predominated.

A probable outbreak of influenza in a school was 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 (i.e., myalgia, headache, cough, coryza, sore throat, chills). A possible influenza outbreak in a school was defined as a doubled absence rate, and symptoms reported among students that included two of the primary influenza symptoms and at least one secondary symptom.

Reports of probable influenza outbreaks were received from 141 schools in 54 counties throughout Minnesota. Possible outbreaks were reported in 81 schools from 40 counties. Schools began reporting influenza outbreaks in early January. Seventy percent (n=155) of probable and possible influenza outbreaks were reported during February. Since 1988-89, the number of schools reporting suspected influenza outbreaks has ranged from 38 schools in 20 counties in 1996-97 to a high of 441 schools in 71 counties in 1991-92.

Forty-three long-term care facilities reported confirmed or suspected influenza outbreaks. An influenza outbreak is suspected when three or more cases of cough and fever (≥101°F) or chills present in a single unit during a period of 48 to 72 hours. An influenza outbreak is confirmed when at least one resident has a positive culture or rapid-antigen test for influenza. In 32 (74%) long-term care facilities, influenza was laboratory confirmed; influenza type A was identified in 28 (88%) of these facilities. Twelve (28%) influenza outbreaks were

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reported in March – late in the influenza season. Since 1988-89, the number of long-term care facilities reporting influenza outbreaks has ranged from six facilities in 1990-91 to a high of 79 facilities in 1997-98.

Listeriosis

Listeriosis is caused by the bacterium *Listeria monocytogenes*. Cases are usually sporadic and occur most frequently in neonates, the elderly, and immunocompromised persons. Symptoms range from a mild febrile illness to acute meningoencephalitis with or without septicemia. Infections in pregnant women can result in abortion or stillbirth. In healthy adults, symptoms of listeriosis are generally mild or absent. The incubation period ranges from a few days to greater than 1 month, with a median of 3 weeks.

There were 19 cases of listeriosis, including two deaths, reported in 1998. Three of nine female cases were pregnant. Eleven cases were 50 years of age or older. Most cases were sporadic; however, two cases were linked to a nationwide outbreak of listeriosis. In December 1998, hot dogs and deli meats from a plant in Michigan were recalled after more than 40 cases of listeriosis nationwide were linked to products manufactured at the plant; this outbreak ultimately accounted for approximately 100 cases nationwide.

Lyme Disease

Lyme disease continues to be an important public health problem for residents and visitors to many counties in Minnesota. During 1998, 261 cases (5.6 per 100,000 population) meeting the national surveillance case definition for a confirmed case were reported to MDH (Figure 6). An additional 31 reports were classified as probable cases. These numbers are similar to the 256 confirmed cases and 29 probable cases reported in 1997.

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) 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 227 (87%) of 261 Lyme disease cases reported during 1998. Thirty-six cases (14%) had at least one late manifestation of Lyme disease and confirmation by a positive Western blot test. One hundred fifty-five cases

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Figure 6. Reported Cases of Lyme Disease, Minnesota, 1983-1998

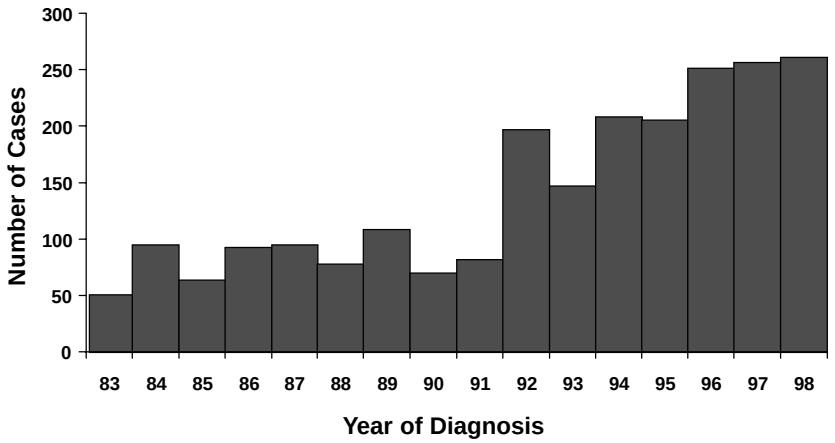
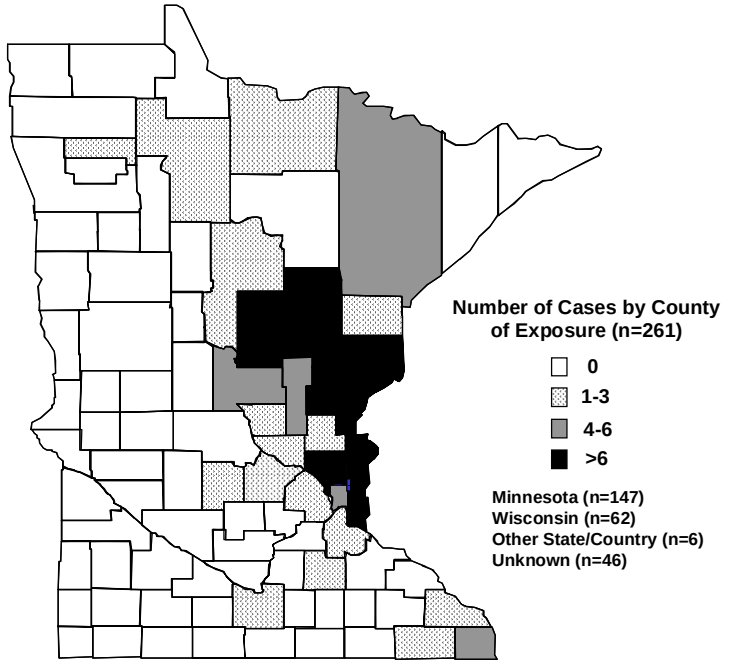


Figure 7. Reported Cases of Lyme Disease by County of Exposure, Minnesota, 1998



(59%) occurred in males. The median age of cases was 37 years (range, <1 to 89 years). Seventy-eight cases (30%) were less than 15 years of age. Onsets of illness peaked in June and July (27% and 41% of cases, respectively). Onset peaks correspond to the peak of nymphal *Ixodes scapularis* (deer tick, or black-legged tick) activity in Minnesota.

Similar to data from previous years, 154 (59%) of 1998 Lyme disease cases were residents of the seven-county metropolitan area. However, only 43 cases (16%) were likely exposed to infected *I. scapularis* 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 7). Residents from several east-central Minnesota counties continue to have the highest incidence rates of Lyme disease within Minnesota (e.g., Aitkin, Pine, Kanabec, and Crow Wing counties had rates of 65, 47, 43, and 39 cases per 100,000 residents, respectively).

In December 1998, the Food and Drug Administration licensed the first vaccine to aid in the prevention of Lyme disease. Official recommendations on the use of the Lyme disease vaccine have been developed by the Advisory Committee on Immunization Practices (ACIP); these recommendations are available at the MDH web site at www.health.state.mn.us or by calling the MDH Acute Disease Prevention Services Section at 612-676-5100 or 800-657-3970.

Malaria

In 1998, there were 76 cases of malaria (all imported) reported to MDH. This represents a 55% increase from the 49 cases reported in 1997 and is the highest number reported since the end of the Korean War. Cases ranged in age from 2 to 80 years, with a median age of 24 years. Fifty-eight cases (76%) were male. Blacks accounted for 57 cases (75%), whites for 11 (14%), Asians for four (5%), and unknown race for four (5%). Only 18 cases (24%) were known to be U.S. citizens, and 13 (17%) were born in the U.S. The majority of cases (92%) resided in the seven-county metropolitan area, including 52 cases (68%) in Hennepin County. The majority of cases (86%) had symptomatic infections, but 11 cases (14%) were immigrants to the U.S. that were asymptomatic at the time their infections were discovered by screening.

The *Plasmodium* species involved were *P. falciparum* in 31 cases (41%), *P. vivax* in 19 (25%), *P. malariae* in two (3%), and a mixed infection of *P. falciparum* and *P. vivax* in one (1%); the species of *Plasmodium* was not determined in 23 cases (30%). Fourteen cases (18%) reported taking medications to prevent malaria while traveling abroad. However, only four cases took antimalarial prophylaxis correctly preceding, during, and following travel abroad. All four cases in which correctly administered prophylaxis failed used mefloquine; two traveled to New Guinea, one to eastern Africa, and one to southern Africa and South America.

The geographical region of malarial infection included Africa (66 cases), Asia (nine cases), Central America (four cases), and North and South America (one case each); five cases traveled to more than one continent prior to the onset of symptoms. Twenty-nine countries were considered possible countries of origin of the malarial infections. The countries with the highest numbers were all in Africa and included Liberia (33 cases), the Ivory Coast (nine cases), Kenya (eight cases), and Nigeria (seven cases). There were no reported cases of locally acquired or blood transfusion-associated malaria in Minnesota in 1998.

The majority of persons diagnosed with malaria in Minnesota in 1998 were foreign-born. Minnesota continues to receive many refugees from throughout the world. Physicians and other healthcare providers should have a high index of suspicion for malaria in symptomatic persons who were born in or have traveled to countries where malaria is endemic. For more information on malaria and antimalarial prophylaxis see the CDC website at: http://www.cdc.gov/travel/index.htm .

Measles

No confirmed cases of measles were reported in Minnesota during 1998; however, 36 cases were reported during the previous 3 years. The epidemiologic characteristics of these cases reflect the patterns observed nationally since the 1989-91 resurgence in cases. These patterns include: 1) a shift in age groups with highest incidence from preschool-aged children to older age groups; 2) the increased importance of international importations in the spread of measles; and, 3) the spread in groups whose members do not routinely accept vaccination.[1]

Of the 36 cases reported during 1995-1997, 19 (53%) occurred in persons 18 to 40 years of age. Ten of the 36 cases (28%) were due to international importation; five cases were international importations resulting in spread to an additional five cases. One case (3%) was imported from another state. Twenty-four of the 36 cases (67%) occurred during an outbreak in a religious community during 1995 and 1996. This community, while not currently opposed to immunization, had objected to immunization at its inception and had not been systematic in subsequently immunizing its population.

Increased attention to reducing missed opportunities for vaccination in the preschool population is needed. High vaccination coverage levels among preschool- and school-aged children, and greater implementation and enforcement of the two-dose recommendation among high school and college students need to be achieved and sustained in all communities to ensure elimination of endemic measles transmission. The limited community transmission following recent cases is evidence that these goals are being achieved.

Maintaining a quality measles surveillance program is an essential component of a measles elimination strategy. Although measles activity is currently low in the U.S. and in Minnesota, importation of cases from outside the U.S. and the presence of groups with philosophical or religious exemption to vaccination require that surveillance for measles and other rash illnesses remains heightened. All suspect cases should be reported immediately to MDH. The CDC currently recommends serology testing for both measles and rubella for patients presenting with rash

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illnesses compatible with either disease.

Mumps

Thirteen cases of mumps were reported during 1998 (0.3 per 100,000 population). Ten cases were laboratory-confirmed, and three cases had a common source and were epidemiologically linked to each other. Of the ten laboratory-confirmed cases, two cases had both a positive serologic test for mumps IgM antibody and a four-fold rise in IgG levels, seven cases had only a positive serologic test for mumps IgM antibody, and one case demonstrated a shift in immune status following a clinically compatible illness (i.e., the case was IgG negative prior to onset of clinical symptoms and IgG positive two months later).

Three of 10 laboratory-confirmed cases (30%) were attributed to international importation; one case had traveled to Mexico, one to Peru, and one to Germany and the Netherlands. The other seven laboratory-confirmed cases had no travel or exposure history. The three epidemiologically linked cases had all traveled to Mexico together. There was no evidence of subsequent transmission to others from any of these cases.

Since 1989, an average of 11 mumps cases have been reported annually to MDH; the majority of these cases have occurred in adults. During 1998, nine of 13 cases (69%) were adults, three (23%) were preschoolers, and one (8%) was a school-aged child. Of the 13 cases reported in 1998, only one 20-year-old had documentation of having received two doses of MMR vaccine.

The shift in occurrence of mumps from the school-aged population to adults reflects the success of the two-dose MMR immunization strategy in reducing mumps incidence in those populations for whom it has been indicated. However, this shift also highlights the need to assess mumps immunization status of adults. The current recommendations for mumps vaccine extend to adults born in 1957 or later.

Because of the difficulty in distinguishing infectious parotitis (mumps) from other forms of parotitis and the possibility of false-positive mumps IgM serology, both IgM and IgG mumps-specific serologic testing is recommended for all sporadic cases. The IgM and acute IgG specimen should be drawn on or after the third day after swelling begins, and the convalescent IgG specimen should be drawn 3-5 weeks later. The acute and convalescent IgG serology tests should be run as paired sera.

Neisseria meningitidis

Invasive Disease

Thirty-six cases of *Neisseria meningitidis* invasive disease were reported in 1998 (0.8 per 100,000 population), compared to 40 cases in 1997. There were 15 cases (42%) of serogroup C, 10 cases (28%) of serogroup B, nine cases (25%) of serogroup Y, one case (3%) of serogroup W135, and one case which was not groupable.

Ages of cases ranged from 26 days to 79 years, with a mean age of 19 years. Fifty-three percent of the cases were from the Twin Cities metropolitan area. Twenty cases (56%) had meningitis, 13 (36%) had bacteremia without another focus of infection, one had pneumonia, one had septic arthritis, and one had pericarditis.

Four deaths occurred. Two deaths were attributed to serogroup Y and included a 37-year-old male and a 53-year-old female, both with meningococcemia. A 13-year-old male died of meningitis attributed to serogroup C. A 14-year-old male died of meningitis with *N. meningitidis* that was not groupable.

All cases except one were sporadic. A case reported at the end of 1998 was identified as part of an outbreak in which most cases occurred during January 1999. This outbreak of serogroup C meningococcal disease involved four cases (all American Indian; ages 5, 8, 13, 20 years) from the Duluth/Cloquet area. All of the case isolates were closely related by PFGE (three isolates were an identical subtype; the other isolate differed by one band). No direct contact was established between any of the cases.

Antibiotic prophylaxis was provided for all cases and close contacts. Vaccination clinics were set up on the Fond du Lac Reservation and in Duluth, and immunizations were provided for American Indians from the ages of 2 through 29 years living on or near the Fond du Lac Reservation and in the city of Duluth. Staff and students at the elementary school that the 8-year-old case attended were also immunized. Approximately 2,300 people were vaccinated. No additional cases were reported from the Duluth/Cloquet area following the vaccination clinics. However, a subsequent case with a matching PFGE subtype was reported in the Twin Cities area 4 weeks later. The case was an American Indian child who had close contact with persons from the Duluth/Cloquet area. A sibling was also hospitalized with similar symptoms, but the diagnosis of meningococcal disease was not culture-confirmed.

In the fall of 1998, MDH began collecting additional information on college-aged students in cooperation with CDC as part of a nationwide effort to determine if providing meningococcal vaccine to incoming college freshman would be an effective means of preventing disease in this age group. None of the cases reported in Minnesota in 1998 were identified as college students.

Pertussis

Four hundred thirty-nine cases of pertussis were reported in 1998 (9.4 per 100,000 population). This represents a continued increase in the incidence of pertussis seen in Minnesota in recent years. Laboratory confirmation was available for 197 (45%) of reported cases; 196 were confirmed by culture and one by polymerase chain reaction (PCR). The remainder of cases were epidemiologically linked to culture-confirmed cases (124, 28%) or met the clinical case definition (118, 27%). Three hundred thirteen cases (71%) occurred in residents of the Twin Cities metropolitan area. Two deaths due to pertussis were reported in 1998.

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 all (417, 95%) pertussis cases reported in 1998 experienced paroxysmal coughing, and over a third (156, 36%)

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Table 4. Risk of Pertussis Hospitalization by Age at Onset, Minnesota, 1998

Age at Onset	Total No. Cases	No. Hospitalized	Relative Risk	(95% Confidence Interval)
0-2 months	45	32	68.5	(21.9, 214)*
3-5 months	29	9	29.9	(8.6, 104)*
6-17 months	17	3	17.0	(3.7, 78)*
18 months-4 years	59	2	3.3	(0.6, 19)
≥5 years	289	3	Reference	
Total	439	49		

*p<0.001

experienced whooping. Post-tussive vomiting was reported in over half of cases (247, 56%). Nearly a third of cases (134, 31%) reported apnea.

Pertussis can affect persons of any age due to waning immunity following either natural infection or vaccination. During 1998, cases ranged in age from less than 1 month to 75 years. Seventy-four cases (17%) occurred in infants less than 6 months of age, and 76 (17%) occurred in children 6 months through 4 years of age. The largest proportion of cases in any age group (129, 29%) occurred in children from 5 to 12 years of age. Persons 13-17 years of age and persons ≥18 years of age, accounted for 52 (12%) and 108 (25%) cases, respectively. A school-based outbreak in greater Minnesota in December 1998 accounted for 30 cases, 17 (57%) of whom were school-aged children in fourth through ninth grades.

The severity of pertussis increases significantly with decreasing age; pertussis is most severe in infants and young children. Pneumonia was diagnosed in 14 cases (3%), nine (64%) of whom were less than 6 months of age. Forty-nine cases (11%) were hospitalized; forty-one of the hospitalized patients (84%) were less than 6 months of age. Compared to a reference group of cases 5 years of age or older, younger age groups were increasingly more likely to be hospitalized for pertussis (Table 4). Infants ≤2 months of age were nearly 70 times more likely than the reference group to have been hospitalized; infants from 3 to 5 months of age were 30 times more likely to have been hospitalized, and infants and children from 6 to 17 months of age were 17 times more likely to be hospitalized. The pertussis-related deaths occurred in a 27-day-old and a 2-month-old infant. These data reflect the increased severity of pertussis seen in children less than 1 year of age in Minnesota.

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. In Minnesota, infection in these age groups may result in exposure of unprotected infants at risk for the most severe consequences of infection. During 1998, 81 cases of pertussis were reported in infants less than 1 year of age. Investigations included collecting information about the case's likely source of exposure, i.e., person with an illness meeting the clinical case definition or with laboratory-confirmed pertussis. A likely source of exposure was identified for 43 cases in infants. Thirty-two of these cases (74%) likely were infected by an adult (most often parents, grandparents or another adult relative), nine cases (21%) likely were infected by children (usually siblings), and two cases (5%) likely were infected by adolescents.

Although unvaccinated children are at highest risk for pertussis, fully immunized children also may develop disease. Vaccine efficacy for currently licensed vaccines is estimated to be 71 to 84% in preventing serious pertussis disease. Evaluation of the vaccination status for 1998 pertussis cases 2 months to 15 years of age indicated that 179 of the 276 cases (65%) with a known vaccine history had received age-appropriate vaccination for pertussis (this includes infants between 2 and 5 months of age for whom a primary series is not yet indicated). One hundred seventy-one of the 232 cases (74%) 7 months through 15 years of age had received at least a primary series of three doses. Disease in those previously immunized is usually mild.[2] Of the 109 cases in persons 7 months to 7 years of age, 29 cases (27%) 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 who has received fewer than three doses of DTP vaccine before onset of illness.

Physicians should include pertussis in the differential diagnosis of cough illness in persons of all ages regardless of immunization status. Until 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.[3]

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 seven 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. The DFA should not be relied upon as laboratory confirmation; therefore, culture confirmation of all suspected pertussis cases should be attempted. Although a positive PCR result is considered confirmatory, it does not provide necessary information for molecular epidemiologic study or for drug susceptibility testing. Whenever possible, culture should be done in conjunction with PCR testing.

Molecular characterization of *B.*

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pertussis isolates using PFGE has recently become available. During 1998, *B. pertussis* isolates submitted to the MDH Public Health Laboratory were subtyped by PFGE, and antibiotic susceptibility testing was conducted by ETEST for erythromycin, ampicillin, and trimethoprim/sulfamethoxazole. Of the 196 culture-confirmed cases, 192 isolates (98%) were submitted for further testing. Twenty-three distinct PFGE patterns were identified; 11 of these patterns (48%) occurred in only a single case isolate. The four most common patterns accounted for 150 (78%) of the total isolates and occurred throughout the year. During the school-based outbreak noted above, all seven case isolates were the same PFGE type. Statewide, all isolates tested to date have had low minimum inhibitory concentrations (MIC's), falling within the reference range for susceptibility to the antibiotics evaluated.

Subtype-specific population-based surveillance for *B. pertussis* to date in Minnesota indicates genotypic diversity as well as strain stability, 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 resistance over time and allows for identification of rare resistant strains.

Rubella/Congenital Rubella Syndrome

One case of congenital rubella syndrome (CRS) was reported in a 6-week-old infant residing in greater Minnesota during 1998. This case was considered imported. The infant's mother had a history of exposure to rubella while residing in Mexico and developed rubella during her first month of pregnancy. She moved to Minnesota from Mexico when she was 4 months pregnant and was found to be immune to rubella upon beginning prenatal care in Minnesota. The newborn presented with congenital heart disease, microcephaly, and an enlarged liver. The case was laboratory-confirmed with a positive serologic test for rubella IgM. This case reflects the national increase in CRS cases occurring in Hispanic infants. During 1986-1996, Hispanic infants accounted for 45% of CRS cases; however, they represented only 15% of total births during this time period. This occurrence may be due in part to ongoing rubella outbreaks in Mexico.

This is the sixth year in a row without reported rubella in Minnesota. This may be due in part to the mild nature of rubella -- 25-50% of cases can be asymptomatic. However, a high prevalence of rubella immunity within the state more likely accounts for the lack of disease. Because of the high proportion of asymptomatic rubella cases and the potential for importation, the lack of reported cases should not be construed as a lack of disease risk. Although current rubella activity is low in the U.S. and in Minnesota, importation of cases from outside the U.S. and the presence of groups with philosophical or religious exemption to vaccination require that surveillance for rubella and other rash illnesses remains heightened. All suspect cases should be reported immediately to MDH. The CDC currently recommends serologic testing for both rubella and measles for patients presenting with rash illnesses compatible with either disease.

Salmonellosis

During 1998, 601 culture-confirmed cases of *Salmonella* infection were reported (12.8 per 100,000 population). This represents a 5% decrease from the 632 cases reported in 1997 (Figure 3). Sixty-one percent of cases were caused by the following five serotypes: *S. typhimurium* (201 cases); *S. enteritidis* (60 cases); *S. heidelberg* (43 cases); *S. braenderup* (35 cases); and, *S. newport* (26 cases). Thirty-two percent of cases were less than 10 years of age. Forty-three percent of cases were reported during June through September.

Four foodborne outbreaks of salmonellosis were reported in 1998. Two outbreaks occurred in restaurant settings. In June, eight patrons of one restaurant became ill; *S. heidelberg* was isolated from two patrons. Three of 117 employees were also culture positive for *Salmonella*. No common food source was identified. During October and November, four patrons at the other outbreak restaurant became ill with *S. braenderup* infection. Three of the four patrons reported eating salad items. Follow-up at the restaurant identified four of 39 employees who were culture positive for *Salmonella*. *Salmonella* was also recovered from the kitchen grill area and cutting boards. A third outbreak occurred at a wedding reception due to *S. typhimurium*. Seventeen of 53 guests (32%) were affected. Pork roast was associated with illness. Contamination of the pork may have occurred in a variety of ways during processing and preparation. The pork was inadequately re-heated before it was served. The fourth *Salmonella* outbreak was detected by identification of several isolates of *S. typhimurium* that shared a single previously rare PFGE subtype pattern. Thirty-two cases with this subtype pattern from 12 counties were identified from August through November; one additional case occurred in January, 1999. A case-control study implicated a frozen chicken Kiev product available at grocery stores throughout the state. Preliminary evidence from the USDA suggested that microwave cooking times and temperatures on the package label may be inadequate to kill *Salmonella*.

Sexually Transmitted Diseases

Rates of chlamydia infection, gonorrhea, syphilis, and chancroid are monitored by MDH through a passive, combined physician and laboratory-based sexually transmitted disease (STD) surveillance system. Due to the primarily passive reporting methodology for these STDs, the reported rates for these diseases underestimate the true incidence and prevalence rates. Furthermore, reported cases include both chronic (prevalent) and acute (incident) infections, making it difficult to discern trends in transmission.

Trends in chlamydia infection, gonorrhea, and syphilis rates by year of diagnosis for the years 1992 through 1998 are shown in Figure 8. The corresponding case numbers and rates for the last five years (1994-1998) also are presented in Table 5. STD cases reported for 1998 by residence, age, gender, and race/ethnicity are shown in Table 6. Brief summaries for each STD are reported below.

Chlamydia Infection

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. For 1998, 6,970 cases of chlamydia infection were reported (149 per 100,000 population). This rate

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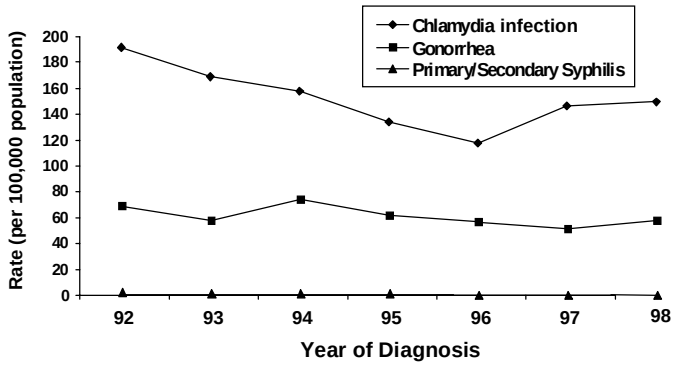
Figure 8. Rates* of Chlamydia Infection, Gonorrhea, and Syphilis, Minnesota, 1992-1998



* Number of cases per 100,000 population

represents a slight increase from the 1997 rate (146 per 100,000).

Reported chlamydia infections are geographically distributed throughout the state, although the rates are highest in Minneapolis and St. Paul. The rate in Minneapolis (800 cases per 100,000 population) was 1.5 times higher than the rate in St. Paul (528 per 100,000) and nearly 10 times higher than the rate in the suburban metropolitan area (84 per 100,000). The rate in greater Minnesota (70 per 100,000) was comparable to the rate for the suburban metropolitan area.

The rate of chlamydia infection among women (216 cases per 100,000 population) was approximately three times greater than the rate among men (80 per 100,000); this is due largely to more frequent screening among women. Of the 5,119 cases reported in women, 922 (18%) were pregnant at the time of diagnosis. For the 5,482 cases where information about symptoms was provided, 2,705 (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 yield similar findings. The chlamydia infection rate was greatest among 20- to 24-year-olds (826 cases per 100,000 population), while the next greatest rate was among 15- to 19-year-olds (749 per 100,000). The next highest rate of chlamydia infection occurred among adults 25 to 29 years of age (305 per 100,000).

The rate of chlamydia infection is highest in communities of color. The rate for blacks (1,777 cases per 100,000 population) was 27-fold higher than the rate for whites (65 per 100,000). Although blacks comprise only 3% of the population in Minnesota, 34% of the chlamydia cases occurred among blacks. The rates for American Indians (466 per 100,000) and Hispanics (522 per 100,000) were about seven to eight times greater than the rate for whites. The rate for Asians (260 per 100,000) was four times greater than the rate for whites.

Table 5. Number of Cases and Rates* of Chlamydia, Gonorrhea, and Syphilis, Minnesota, 1994-1998

	1994		1995		1996		1997		1998	
Disease	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Chlamydia	7124	157.5	6121	134.0	5418	117.6	6798	146.2	6970	148.8
Gonorrhea	3355	74.2	2819	61.7	2622	56.9	2437	52.4	2708	57.8
Syphilis Total	213	4.7	181	4.0	123	2.7	118	2.5	75	1.6
Primary/ Secondary	59	1.3	42	0.9	15	0.3	16	0.3	9	0.2
Early Latent**	83	1.8	55	1.2	29	0.6	20	0.4	8	0.2
Late Latent***	69	1.5	81	1.8	78	1.7	82	1.8	58	1.2
Congenital****	2	3.1	3	4.7	1	1.6	0	0.0	0	0.0

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

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. For 1998, 2,708 cases were reported (58 per 100,000 population). The trend of decreasing gonorrhea rates since 1994 appears to have been reversed in 1998; from 1997 to 1998, there was a 10% increase in cases. This increase occurred in Minneapolis and St. Paul, all age groups, both genders, and the Black, Hispanic, and Asian racial/ethnic groups. Laboratory data indicate that the increase is not due to more tests being done, but rather may be due to more positive tests. A new, more sensitive, and less invasive test recently has become available.

Gonorrhea cases occur infrequently outside the core urban populations; thus, gonorrhea morbidity is highest in Minneapolis and St. Paul. The rate in Minneapolis (490 cases per 100,000 population) was more than twice as high as the rate in St. Paul (225 per 100,000) and >60 times higher than the rate in greater Minnesota (8 per 100,000). The rate in the suburban metropolitan area was 22 cases per 100,000 population.

Adolescents and young adults also have the greatest risk for gonorrhea. The rate for 15- to 19-year-olds was 240 cases per 100,000 population, for 20- to 24-year-olds was 265 per

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Table 6. Number of Cases and Rates* of Chlamydia, Gonorrhea, and Syphilis by Residence, Age, Gender, and Race/Ethnicity, Minnesota, 1998

	Chlamydia		Gonorrhea		Syphilis	
Demographic Group	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
TOTAL	6970	149	2708	58	9	0.2
Residence						
Minneapolis	2579	800	1579	490	3	0.9
St. Paul	1237	528	527	225	3	1.3
Suburban	1622	84	421	22	3	0.2
Greater Minnesota	1532	70	181	8	0	0.0
Age						
<10 yrs	8	1	1	0	0	0.0
10-14 yrs	149	41	56	15	0	0.0
15-19 yrs	2680	749	858	240	1	0.3
20-24 yrs	2409	826	773	265	3	1.0
25-29 yrs	939	305	447	145	3	1.0
30-34 yrs	409	112	260	72	1	0.3
35-44 yrs	319	40	250	31	1	0.1
45+ yrs	57	4	63	4	0	0.0
Gender						
Male	1851	80	1265	55	5	0.2
Female	5119	216	1443	61	4	0.2
Race						
White	2863	65	512	12	1	<0.1
Black	2366	1777	1694	1272	6	4.5
American Indian	266	466	45	79	1	1.8
Asian	306	260	25	21	0	0.0
Other and Unknown**	1169	n.a.	432	n.a.	1	n.a.
Ethnicity						
Hispanic***	421	522	89	110	1	1.2

* Rate per 100,000 population

** No population data available to calculate rate

*** Persons of Hispanic origin may be of any race.

100,000, and for 25- to 29-year-olds was 145 per 100,000. The gonorrhea rates for men and women were comparable. For women, 193 (13%) of the 1,443 cases were pregnant at the time of diagnosis. Data about symptoms was reported for 2,244 gonorrhea cases; of these, 526 (23%) were asymptomatic.

Communities of color also are disproportionately affected by gonorrhea. Blacks accounted for 63% of the gonorrhea cases. The gonorrhea rate for blacks (1,272 cases per 100,000 population) was approximately 110-fold higher than the rate for whites (12 per 100,000). Likewise, the rates for American Indians (79 per 100,000) and Hispanics (110 per 100,000) were seven to nine times higher than the rate for whites. The rate for Asians (21 per 100,000 population) was about twice as high as the rate for whites.

Syphilis

Syphilis is caused by infection with the spirochete bacterium *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.

Primary and secondary syphilis cases typically are used for analysis of morbidity trends because they represent recently acquired infections.

Primary and Secondary Syphilis

The rate of primary and secondary syphilis in Minnesota is low compared to chlamydia and gonorrhea, and the rate has decreased dramatically since 1992. For 1992, 87 cases of primary/secondary syphilis were reported; for 1998, there were nine reported cases (0.2 per 100,000 population), representing a 90% reduction since 1992.

Syphilis now is exclusively an urban disease. No cases of primary/secondary syphilis were reported from greater Minnesota. The nine cases of primary/secondary syphilis were evenly distributed between the city of Minneapolis (three cases; rate of 0.9 per 100,000 population), the city of St. Paul (three cases; rate of 1.3 per 100,000), and the suburban metropolitan area (three cases; rate of 0.2 per 100,000).

The rate of primary/secondary syphilis among men was identical to the rate among women. Of the four primary/secondary syphilis cases reported for women, none were pregnant at the time of diagnosis. For primary/secondary syphilis, the highest rates occurred in persons 20 to 29 years of age. The primary/secondary syphilis rate for blacks (4.5 per 100,000 population) was nearly 200 times higher than the rate for whites (<0.1 per 100,000 population). For primary/secondary syphilis, six of the nine cases (67%) were among blacks. In 1998, there were no primary/secondary syphilis cases reported among Asians and only one case each among whites, American Indians, and Hispanics.

Congenital Syphilis

For 1998, no cases of congenital syphilis were reported in Minnesota.

Chancroid

No cases of chancroid have been reported in Minnesota since 1993.

Shigellosis

Three hundred thirty-one culture-confirmed cases of *Shigella* infection were reported in 1998 (7.1 per 100,000 population); 86% were due to *Shigella sonnei*. This represents a 140%

continued...

increase from the 138 cases reported in 1997 (Figure 3). This increase was due in large part to a foodborne outbreak of shigellosis that occurred in two restaurants in the metropolitan area during July and August. This outbreak involved 98 culture-confirmed cases and an additional 272 suspect cases.

Initially, these two restaurant outbreaks did not appear to be related; however, antimicrobial resistance profiles were identical among the *S. sonnei* isolates from both outbreaks. Isolates were resistant to trimethoprim-sulfamethoxazole (TMP-SMX), tetracycline, and ampicillin (AMP). The use of PFGE testing identified a common subtype pattern among *S. sonnei* isolates from both outbreaks, suggesting they had a common source. An extensive investigation revealed that both outbreaks were associated with fresh parsley that was grown on the same farm in Mexico.

MDH contacted the CDC and the Food and Drug Administration regarding these outbreaks to inquire if other states had reported increases in infections with or outbreaks due to *S. sonnei.* Subsequently, outbreaks were identified in California, Massachusetts, Florida, Alberta, and Ontario. MDH received isolates from each of these states and provinces, except Florida where no isolates were available. All isolates matched the Minnesota outbreak pattern. In each of these outbreaks fresh chopped parsley from the same farm in Mexico was liberally used on most menu items or on implicated food items.

In Minnesota, a secondary outbreak involving 31 culture-confirmed cases of *S. sonnei* infection occurred following the two restaurant outbreaks. The PFGE pattern of isolates from this outbreak matched the pattern from the two restaurant-associated outbreaks. This outbreak was associated with consumption of water at a county fair. The most likely source was an ill restaurant patron who attended the fair. The water system likely became contaminated as a result of a faulty plumbing system.

These outbreaks caused by a multidrug-resistant strain of *Shigella* highlight an emerging trend in Minnesota and the U.S. In Minnesota, every 5th isolate of *Shigella* received at MDH is tested for antimicrobial resistance. In 1998, 27 *S. sonnei* isolates were tested. Twenty-three isolates (85%) were resistant to TMP-SMX, 19 (70%) were resistant to AMP, and three (11%) were resistant to cephalothin. In addition, 17 isolates (63%) were resistant to both AMP and TMP-SMX. Resistance to AMP has remained consistently high, with a mean of 69% of isolates resistant over the last 4 years. However, the level of TMP-SMX resistance has increased significantly from the 36% observed in 1995. These levels of resistance are noteworthy since the recommended treatment for *Shigella* infections in the 1997 Red Book states that "for cases in which susceptibility in unknown or an ampicillin-resistant strain is isolated, the drug of choice is trimethoprim-sulfamethoxazole."

Streptococcus pneumoniae
Invasive Disease
Active surveillance for invasive pneumococcal disease has been conducted in the seven-county metropolitan area since April 1995. Among metropolitan area residents in 1998 there were 506 cases of invasive *S. pneumoniae* infection (20.3 per 100,000 population), including 30 deaths (6%). The incidence rate was similar to that seen in prior years. Two-thirds of cases occurred in the following age groups; children less than 2 years of age -- 152 cases (30%); children aged 2-4 years -- 55 cases (11%); and, adults 65 years and older -- 133 cases (26%).

Overall, pneumonia with an isolate from blood or pleural fluid was the most common infection type (246 cases, 49%). These infections were most common among adults aged 65 years and older (96 of 133 cases, 72%). Bacteremia without a known focus of infection occurred in 203 cases (40%); this was the predominant type of infection in children less than 2 years of age (99 of 152 cases, 65%) and in children aged 2 to 4 years (37 of 55 cases, 67%). There were 20 cases (4%) of meningitis, and 37 infections (7%) of other types, including otitis media, cellulitis, and sinusitis (each associated with a sterile site isolate).

Isolates for 473 cases (93%) were submitted to the MDH Public Health Laboratory for serotyping and antimicrobial susceptibility testing. For adults 65 years of age and older, 94 of 120 isolates (78%) were serotypes included in the 23-valent pneumococcal vaccine. Ninety-five isolates (20%) were non-susceptible to penicillin, including penicillin-intermediate (MIC 0.12-1.0 ug/ml) and resistant (MIC $\geq$2.0 ug/ml). This proportion was similar to that seen in 1997 (22%). There were 61 (13%) penicillin-resistant isolates; in 1997, 12% of isolates were penicillin-resistant. The 1997-98 results represent an increase in penicillin resistance from 1995-96, when 14% of isolates were penicillin non-susceptible, including 8% that were penicillin-resistant.

In 1998, 62 case isolates (13%) were non-susceptible (MIC $\geq$1.0 ug/ml) and 20 (4%) were resistant (MIC $\geq$2.0 ug/ml) to cefotaxime. Resistance to more than one antimicrobial drug class was seen in 76 case isolates (16%). Further information on pneumococcal resistance to various antimicrobial agents is available at http://www.health.state.mn.us/divs/dpc/ades/invasive.html .

Streptococcal Invasive Disease - Group A
One hundred seventy-three cases of invasive group A streptococcal (GAS) disease (3.7 per 100,000 population), including 23 deaths, were reported in 1998, compared to 150 cases in 1997. This increase is due in part to a change in the case definition for invasive GAS disease. Cases of necrotizing fasciitis and streptococcal toxic shock syndrome (STSS) having group A streptococci isolated only from non-sterile sites were included as cases beginning in 1998.

Ages for cases ranged from 7 months to 97 years, with a mean age of 47 years. Sixty-one percent of cases were residents of the seven-county metropolitan area. Ninety-one cases (53%) had cellulitis, 47 (27%) had bacteremia without another focus of infection, and 18 (10%) had primary pneumonia. Twenty-one cases (12%) had necrotizing fasciitis. Two cases had STSS; one also had necrotizing fasciitis and the other also had septic arthritis.

Of the 23 deaths, 10 (43%) had bacteremia without another focus of
continued...

infection, five (22%) had necrotizing fasciitis, four (17%) had pneumonia, three (13%) had cellulitis, and one (4%) had STSS.

Isolates were available for 149 cases (86%). Sixty-one different molecular subtypes were identified by PFGE. Forty subtype patterns were represented by only one isolate; other subtypes were represented by two to 20 isolates. Except for two cases who resided in the same nursing home, no direct links were noted between cases with identical subtypes. The deaths were distributed among 15 different subtypes, with no subtype accounting for more than three deaths.

In 1997, the Minnesota Emerging Infections Program began conducting surveillance for subsequent, related cases of invasive GAS 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 GAS disease. No culture-confirmed subsequent cases have been identified in Minnesota to date, although a household member of one case in 1997 was noted to have a serious infection that was clinically compatible with GAS disease.

Streptococcal Invasive Disease - Group B

Active surveillance for invasive group B streptococcal (GBS) disease has been ongoing since April 1995, as part of the Emerging Infections Program. Two hundred twenty-nine cases (4.9 per 100,000 population), including 28 deaths, were reported in 1998 . Cases include only those in which group B streptococcus was isolated from a normally sterile site (although in four cases placenta was the site). Sixty-three percent of cases occurred among residents of the Twin Cities metropolitan area. Forty-eight cases (21%) were infants less than 1 year of age and 95 cases (41%) were 60 years of age or older.

One hundred ten cases (48%) presented with bacteremia without another focus of infection. The other most common types of infection noted were cellulitis (13%), pneumonia (7%), osteomyelitis (5%), arthritis (3%), and meningitis (3%). In 181 cases (79%), the site of the isolate was blood only.

There were 52 cases of infant early-onset, late-onset or maternal GBS disease, compared to 66 cases in 1997. Two stillbirths/spontaneous abortions were associated with eight maternal invasive GBS infections. Group B streptococcus was isolated from placenta or tissue of two additional stillborn infants whose mothers were not identified as having invasive disease. Twenty-eight infants developed invasive disease within the first 6 days following birth (early onset disease) and 16 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 CDC Perinatal GBS Disease Prevention Project. Surveys of laboratories, prenatal care providers and pediatric providers were conducted to measure current laboratory practices and medical practices regarding testing, prophylaxis, and treatment of perinatal GBS disease. An important finding of the laboratory survey was that only 42% of laboratories (42 of 101) use selective broth (the recommended method) for culturing group B streptococcus and only 54% (55 of 101) receive appropriate specimens. An interesting finding of the prenatal-care provider survey was that only 76% of prenatal providers (108 of 142) who screened for group B streptococcus in pregnant women collected specimens from the recommended sites (vagina and rectum). Results of the laboratory survey and the prenatal-care provider survey may be obtained on-line at http:/www.health.state.mn.us/topic.html#disease or by contacting the Acute Disease Epidemiology Section at (612) 676-5414. Results of the pediatric provider survey will be made available when analysis is complete. Results of these surveys will be used to direct educational interventions regarding prevention of perinatal GBS disease.

Tetanus

No cases of tetanus were reported to MDH during 1998; however, a total of 12 cases were reported during the previous 5 years. Tetanus is preventable through adequate vaccination; cases occur almost exclusively among persons who are unvaccinated or inadequately vaccinated.[4] A recent serologic survey of immunity to tetanus found that although persons 6 to 39 years of age had a level of tetanus immunity of 80%, the prevalence of immunity dropped sharply with increasing age, until it reached 28% in persons 70 years of age or older.[5]

Tetanus spores are normal inhabitants of the human and animal intestine, and are present in soil contaminated with animal and human feces. Persons with tetanus frequently have a history of minor wounds not considered sufficiently severe by the person to warrant a visit to a health-care provider. Outdoor activities, including gardening, place non-immune persons at risk for tetanus. Health care providers who treat adults should use every opportunity to review the vaccination status of their patients and administer Td and other indicated vaccines as appropriate.

Tuberculosis

A 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 cases (3.7 per 100,000) in 1992. While the number of TB cases reported in many areas of the U.S. has declined for the past 6 years, the incidence of TB in Minnesota has fluctuated since 1992. The number of new TB cases in Minnesota recently increased 23% from 131 (2.9 per 100,000) in 1996 to 161 (3.5 per 100,000) in both 1997 and 1998.

TB in Minnesota occurs primarily in selected high-risk groups, including persons born outside the U.S., homeless persons, nursing home residents, HIV-infected individuals, and correctional facility inmates. The percentage of TB cases among foreign-born persons has increased significantly during the past 5 years, with 71% of TB cases occurring among this group in 1998 (Figure 9). TB incidence rates vary by race/ethnicity, with persons of color disproportionately affected by TB. Until recently, the highest TB incidence rates in Minnesota occurred among Asians; however, the incidence rate among blacks (47.9 per 100,000) has increased substantially during the past 3 years and now exceeds that among

continued...

Asians (44.3 per 100,000). The increased number of cases among blacks is due largely to TB disease among recent immigrants from Sub-Saharan Africa (Figure 10). The shifting epidemiology of TB in Minnesota reflects changes in the demographics of immigrant and refugee populations arriving in the state. In 1998, 54 (81%) of the 67 TB cases among blacks and 100% of the 51 TB cases among Asians occurred in persons born outside the U.S.

Of the 161 TB cases reported in Minnesota in 1998, six (4%) were homeless, five (3%) were nursing home residents, and two (1%) were correctional facility inmates at the time of diagnosis. Since 1984, when reporting of co-infection with TB and HIV was initiated in Minnesota, 49 cases of TB have been diagnosed in HIV-infected persons, including six cases reported in 1998. Active TB disease in an HIV-infected individual is an AIDS-defining condition.

The majority (76%) of TB cases in Minnesota occurred in the seven-county metropolitan area, particularly among residents of Hennepin (55%) and Ramsey (17%) counties. However, the percentage of TB cases occurring in greater Minnesota has increased during the past 2 years; 38 cases (24%) were observed outside the Twin Cities metropolitan area in 1998. The percentage of TB cases with extra-pulmonary sites of disease also increased in 1998, with 72 cases (45%) involving extra-pulmonary disease.

The emergence of multi-drug resistant TB is a critical public health concern in the U.S.; however, rates of drug-resistant TB have remained relatively low in Minnesota. In 1998, 26 (16%) cases of drug-resistant TB were reported in Minnesota, including 16 (10%) cases that were resistant to isoniazid (INH); no cases of multi-drug resistant (i.e., resistant to at least INH and rifampin) TB were reported in 1998. Of 11 multi-drug resistant TB cases reported since 1994, 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. Nine percent of all TB cases reported in Minnesota during 1994-1998 were resistant to at least INH. Since the annual incidence of INH resistance consistently exceeds 4%, all TB cases in Minnesota initially should receive four-drug therapy until drug sensitivities are known. Of the 26 drug-resistant TB cases reported in 1998, 21 (81%) occurred in persons born outside the U.S. These cases likely represent primary drug resistance acquired in a foreign country rather than secondary resistance resulting from nonadherence to prescribed therapy.

Figure 9. Number of Tuberculosis Cases by Country of Origin, Minnesota, 1989-1998

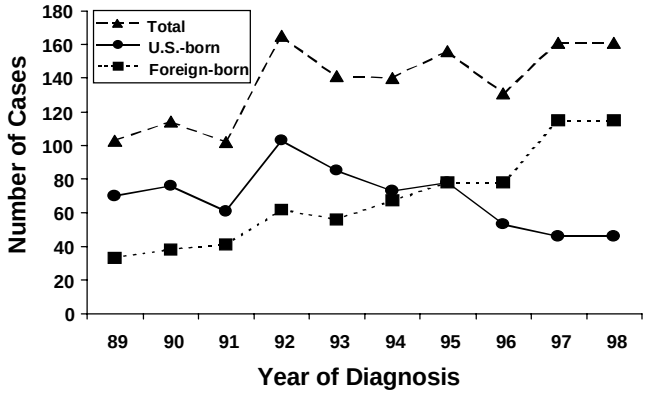
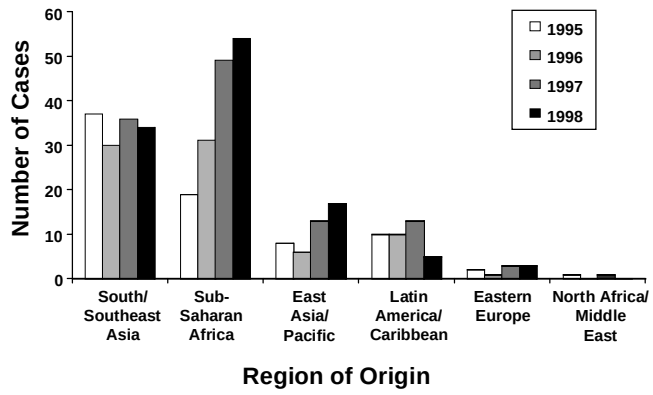


Figure 10. Foreign-Born Tuberculosis Cases by Region of Origin and Year of Diagnosis, Minnesota, 1995-1998



Unexplained Critical Illnesses and Deaths of Possible Infectious Etiology

Surveillance for unexplained critical illnesses and deaths of possible infectious etiology began in September 1995 as part of the Emerging Infections Program. To be included as a case, one must be a Minnesota resident between the ages of 1 and 49 years, previously healthy with no chronic medical conditions (e.g., diabetes), and must be critically ill or have died from an illness suggestive of an infectious etiology. Eighteen possible cases were reported to MDH in 1998. Twelve of these cases were subsequently excluded: five due to underlying conditions, four because etiologies (three of which were non-infectious) were subsequently determined, two because cases were not critically ill, and one because the case was not a Minnesota resident.

Of the remaining six cases, three presented with cardiac syndromes (two with myocarditis, one meeting the case definition for Kawasaki syndrome). Two cases presented with sepsis and one with neurologic symptoms. The cardiac cases were 1, 9, and 15 years of age. The sepsis cases were 33 and

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35 years of age, and the neurologic case was 31 years of age. Two of the cases with cardiac syndromes were fatal; the other four patients survived. One cardiac and one sepsis case resided in the seven-county metropolitan area; the remaining cases resided in greater Minnesota.

Laboratory specimens were available for each case and have been sent to CDC. No etiologies have been determined for any of the cases at this time. However, results are pending for several cases.

Vancomycin Resistant Enterococci

As part of the Emerging Infections Program, surveillance in Minnesota hospitals for vancomycin resistant enterococci (VRE) has been ongoing since July 1995. Cases include hospitalized patients with VRE isolated from a normally sterile site, a wound, or another source, excluding rectal, stool, and urine sources. In 1998, there were 173 incident cases reported, similar to the number reported in 1997 (n=171). Sterile site infections (blood and/or peritoneal fluid isolates) were reported in 57 cases (33%); the remaining infections were due to wounds (80 cases, 46%) or other sources (36 cases, 21%) including pulmonary secretions, bile, and indwelling devices.

Cases included Minnesota residents (149 cases, 86%) and non-residents (24 cases, 14%). In 1998, cases were more frequent among males (104 cases, 60%) than females (69 cases, 40%), though cases were more equally distributed in 1995-97 (males: 149 of 290 cases, 51%). In 1998, there were more VRE cases in the older age groups; 112 cases (65%) were 50 years of age or older. Length of hospitalization ranged from 1 to 254 days, with a median of 23 days. Thirty-five cases (20%) died, including 25 (14%) within 3 weeks of the culture date. However, in only two cases was VRE reported to be a contributing factor in the death.

The majority of cases (138, 80%) were reported from 21 hospitals in the seven-county metropolitan area, and the remaining 35 cases (20%) were reported from eight hospitals in greater Minnesota. Most hospitals reporting cases this year had reported cases in prior years, but three Twin Cities area hospitals and two greater Minnesota hospitals reported a VRE case for the first time in 1998.

Viral Hepatitis A

In 1998, 145 cases of hepatitis A virus (HAV) infection were reported (3.1 per 100,000 population), including one death. Seventy-six cases (52%) were residents of the seven-county metropolitan area, with 38 (26%) residing in Hennepin County. Seventy-seven cases (53%) were male. Of the 137 cases for whom race data were reported, 121 (88%) were white, 10 (7%) were black, four (3%) were Asian and two (1%) were American Indian. Although whites made up the greatest number of cases, incidence rates were higher among blacks (7.5 cases per 100,000), American Indians (3.5 per 100,000) and Asians (3.4 per 100,000). The rate among whites was 2.8 cases per 100,000. Hispanic ethnicity, which can be any race, was reported for seven cases (8.7 per 100,000). Cases ranged in age from 1 to 85 years; however, the majority of cases (96, 66%) occurred in children and young adults under 40 years of age.

Of the 145 reported cases, eight cases were unavailable for interview. Four outbreaks accounted for 25 (18%) of the 137 cases that were interviewed. Two of these outbreaks began in 1997, providing one case each in early 1998 (one childcare and one community-associated). One 1998 outbreak was childcare related (involving three cases); the other was a neighborhood outbreak which expanded to include 20 cases in three counties, primarily young children and their parents. Of the remaining 112 sporadic cases interviewed about risk factors, 34 (30%) had known contact with another case, eight (7%) were men who reported having sex with men, three (3%) had consumed raw shellfish, two (2%) were associated with childcare but unrelated to any known outbreaks, and one (1%) used needles to inject drugs. Foreign travel accounted for 21 cases (19%), 12 of whom had traveled to Mexico. None of these cases had received hepatitis A vaccine or immune globulin prior to travel. No risk factor could be identified for 43 (38%) of those interviewed.

Of cases reported in 1998, 29 (21%) occurred in risk groups recommended to receive hepatitis A vaccine: travelers to HAV-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 to developing countries in the future should be offered hepatitis A vaccine. Similarly, men who have sex with men should be educated about their risk and offered vaccine. Because the majority of cases acquired infection while in the U.S., and nearly a third had no identified risk factor, any person over 2 years of age who desires immunity to HAV infection also should be vaccinated.

Viral Hepatitis B

In 1998, there were 71 cases of acute hepatitis B virus (HBV) infection reported (1.5 per 100,000 population), including one death. Fifty-six cases (79%) were residents of the seven-county metropolitan area, with 32 (45%) residing in Hennepin County (Figure 11). More than half of cases (43, 61%) were male. Forty-seven cases (66%) were from 17 to 38 years of age. Forty cases (56%) were white, 14 (20%) were black, eight (11%) were Asian, and seven (10%) were American Indian; race was unreported in two (3%) cases. Although whites made up the greatest number of cases, incidence rates were higher among American Indians (12.3 cases per 100,000), blacks (10.5 per 100,000) and Asians (6.8 per 100,000). The rate among whites was 0.9 cases per 100,000 population. Hispanic ethnicity, which can be any race, was reported for four cases (5.0 per 100,000).

In previous years, documented asymptomatic seroconversions were excluded from the risk factor analysis of reported acute clinical cases in this summary. Because the overall number of acute HBV cases has been declining and the potential for seroconversion is routinely monitored in many settings, reported asymptomatic seroconversions will now be included in the analysis. In 1998, 18 of the 71 cases (25%) were documented asymptomatic seroconversions, including four perinatal infections. These four infants were immunized for HBV at birth; however, only one of them received all doses according to the recommended schedule.

Of the 71 reported cases, 65 (92%)

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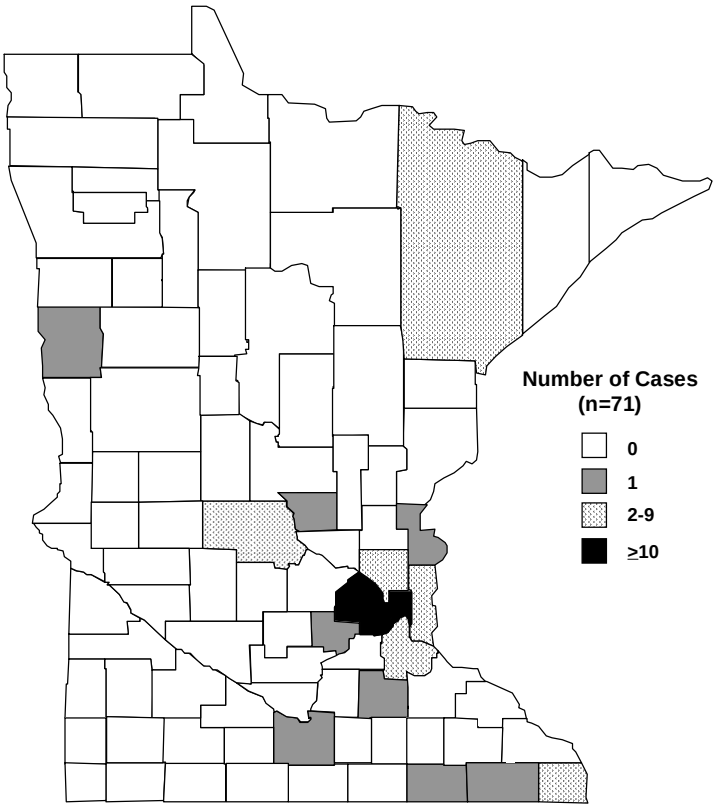
Figure 11. Reported Cases of Hepatitis B by County of Residence, Minnesota, 1998



were questioned about possible modes of transmission. Thirty-six cases (55%) reported likely mode of transmission as sexual; 14 cases reported heterosexual contact with a known carrier of hepatitis B surface antigen (HBsAg), 11 cases were men who reported having sex with men, 10 cases reported heterosexual contact with multiple partners within 6 months prior to onset of symptoms, and one case gave a recent history of multiple sex partners, with undocumented sexual preference. Five cases (8%) reported non-sexual contact with a HBsAg-positive person, two cases (3%) used needles to inject drugs and one case (2%) had received a tattoo within 6 months prior to onset of symptoms. An outbreak in a kidney dialysis unit involving patients and staff accounted for three cases (5%). No risk factors were identified for the remaining 18 cases (28%). The median age for this group was 30 years (range, 19 to 42 years); this age distribution suggests possible sexual transmission.

Most of the acute hepatitis B cases in 1998 had known risk factors for acquiring HBV infection. MDH currently recommends hepatitis B vaccination 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 1998, 19 acute clinical cases of hepatitis C virus (HCV) infection were reported. Ten cases (53%) were residents of Greater Minnesota (Benton, Blue Earth, Cass, Goodhue, St. Louis, and Stearns Counties), and nine were residents of the seven-county metropolitan area (Anoka, Hennepin, Ramsey, and Scott Counties). The median age of cases was 41 years (range, 27 to 49 years). Eleven cases (58%) were female. Thirteen cases (68%) were white, five cases (26%) were Native American, and one case (5%) was black. Nine cases (47%) reported using needles to inject drugs, four cases (21%) had heterosexual contact with a known anti-HCV positive partner within 6 months prior to onset of symptoms, one case reported having heterosexual contact with an anti-HCV positive partner *and* sharing needles to inject drugs, and one case (5%) reported having occupational exposure by needlestick. No risk factor could be determined for five cases (26%).

Detection of these acute cases was the result of the first year of an enhanced HCV surveillance effort. MDH received more than 2,400 positive anti-HCV antibody reports in 1998, most of which were described as chronic infections. These data highlight the epidemic of detection phenomenon which is characteristic of hepatitis C reporting. Persons who are infected with HCV should receive hepatitis A and B vaccines, unless they have evidence of immunity. Persons who have a history of blood transfusion prior to July 1992 should be tested for presence of HCV infection.

References

1. CDC. Measles--United States, first 26 weeks, 1994. MMWR 1994;43:673-676.
2. American Academy of Pediatrics. Pertussis. In: Peter G, ed. 1997 Red Book: Report of the Committee on Infectious Diseases. 24th ed. Elk Grove Village, IL. American Academy of Pediatrics;1997:398.
3. CDC. Pertussis Outbreak - Vermont, 1996. MMWR 1997;46:822-826.
4. CDC. Diphtheria, Tetanus and Pertussis: Recommendations for vaccine use and other preventive measures: Recommendations of the Immunization Practices Advisory Committee (ACIP). MMWR 1991;40(No. RR-10):2-3.
5. Gergen PJ, McQuillan GM, Kiely M, Ezzati-Rice TM, Sutter RW, Virella G. A population-based serologic survey of immunity to tetanus in the United States. N Engl J Med 1995;332:761-766.

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