MINNESOTA DEPARTMENT OF HEALTH

DISEASE CONTROL NEWSLETTER

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The Future of this Newsletter: A Message from Commissioner Dianne Mandernach

I want to apologize for a confusing announcement that was placed in the March/April 2006 issue of the *Disease Control Newsletter* (*DCN*) regarding the termination of future publication. **Let me clarify that the *DCN* will remain accessible in an electronic format.**

In an effort to improve efficiency, respect our resources, and evolve with changing business practices, I requested that agency newsletters transition from printed mailings to electronic format whenever possible. *This transition was not intended to cause any agency newsletter to be discontinued.*

The Minnesota Department of Health (MDH) takes pride in providing over 45 newsletters on various subjects, all of which are posted on the agency's website, and available electronically. I'd like to thank those who expressed their viewpoints on this topic and for the strong support for continuing electronic newsletter publications.

MDH greatly values its relationships with physicians, health professionals, and the public health community across Minnesota. Previous discussions with the Minnesota Board of Medical Practice and the Minnesota Medical Association indicate that electronic communication is becoming the preferred method of reaching their members. By partnering with these entities, new opportunities exist to make MDH publications even more accessible on other websites.

To access future issues of the *Disease Control Newsletter* please go to this link: www.health.state.mn.us/divs/idepc/newsletters/dcn/index.html and click on "Subscribe." Subscribers will automatically be notified by email when the next *DCN* is posted on the MDH website. To subscribe to other agency newsletters, go to: www.health.state.mn.us, go to the left column and click on "Subscribe to News."

Thank you for your interest in public health issues and the work of MDH. Your partnership is important in working together to improve the health of all Minnesotans.

Annual Summary of Communicable Diseases Reported to the Minnesota Department of Health, 2005

Introduction

Assessment of the population's health is a core public health function. Surveillance for communicable diseases is one type of assessment. Epidemiologic surveillance is the systematic collection, analysis, and dissemination of health data for the planning, implementation, and evaluation of health programs. The Minnesota Department of Health (MDH) collects information on certain infectious diseases for the purposes of determining disease impact, assessing trends in disease occurrence, characterizing affected populations, prioritizing control efforts, and evaluating prevention strategies. Prompt reporting allows outbreaks to be recognized in a timely fashion when control measures are most likely to be effective in preventing additional cases.

In Minnesota, communicable disease reporting is centralized, whereby reporting sources submit standardized report forms to MDH. Cases of disease are reported pursuant to Minnesota Rules Governing Communicable Diseases (MN Rules 4605.7000 - **continued on page 27**

Inside:

Table 1. Diseases Reportable to the Minnesota Department of Health

Report Immediately by Telephone

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

Report Within One Working Day

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

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

Methicillin-resistant *Staphylococcus aureus*

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

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

c Report on separate Sexually Transmitted Disease Report Card.

d Report on separate HIV Report Card.

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

Table 2. Cases of Selected Communicable Diseases Reported to the Minnesota Department of Health, by District of Residence, 2005

Disease	Metropolitan (2,746,987)	Northwestern (154,939)	Northeastern (322,193)	Central (690,953)	West Central (228,422)	South Central (285,218)	Southeastern (480,603)	Southwestern (223,484)	Unknown Residence	Total (5,132,799)
	District* (population per U.S. Census 2005 estimates)									
Anaplasmosis	52	8	20	99	0	0	7	0	0	186
Arboviral disease										
LaCrosse	2	0	0	0	0	0	0	0	0	2
West Nile	7	2	1	6	14	3	2	10	0	45
Campylobacteriosis	417	5	34	100	40	57	131	59	0	843
Cryptosporidiosis	26	1	12	33	17	13	34	30	0	166
Escherichia coli O157 infection	59	3	1	22	2	9	18	7	0	121
Hemolytic Uremic Syndrome	4	0	0	7	0	3	3	0	0	17
Giardiasis	932	11	47	94	12	33	94	18	0	1,241
Haemophilus influenzae invasive disease	22	1	3	11	5	3	5	3	0	53
HIV infection other than AIDS	198	0	5	4	0	3	3	6	3	222
AIDS (cases diagnosed in 2005)	141	2	8	10	0	4	5	6	1	177
Legionellosis	24	0	0	2	0	2	6	0	0	34
Listeriosis	12	0	0	0	0	0	2	1	0	15
Lyme disease	399	46	70	251	29	15	102	6	0	918
Meningococcal disease	11	0	0	2	1	0	2	0	0	16
Mumps	5	0	0	1	0	0	0	0	0	6
Pertussis	705	31	103	232	60	105	259	76	0	1,571
Salmonellosis	320	10	27	69	22	34	57	41	0	580
Sexually transmitted diseases*	11,122	317	734	1,101	191	502	909	356	643	15,875
Chlamydia trachomatis - genital infections	8,081	288	631	945	173	434	800	326	509	12,187
Gonorrhea	2,856	29	100	150	16	65	105	28	132	3,481
Syphilis, total	185	0	3	6	2	3	4	2	2	207
Primary/secondary	67	0	1	0	2	0	0	0	0	70
Early latent**	43	0	0	1	0	0	1	0	1	46
Late latent***	70	0	1	5	0	3	2	2	1	84
Congenital	2	0	0	0	0	0	0	0	0	2
Other	3	0	1	0	0	0	1	0	0	5
Chancroid	0	0	0	0	0	0	0	0	0	0
Shigellosis	64	0	1	6	1	13	5	6	0	96
Streptococcus pneumoniae invasive disease	313	20	32	74	32	35	65	25	0	596
Streptococcal invasive disease - Group A	62	3	12	15	3	13	12	2	0	122
Streptococcal invasive disease - Group B	190	12	17	47	17	13	28	10	0	334
Tuberculosis	165	0	3	3	0	4	18	6	0	199
Viral hepatitis, type A	27	1	1	4	1	2	0	0	0	36
Viral hepatitis, type B (acute infections only, not perinatal)	25	1	2	5	4	1	3	1	0	42
Viral hepatitis, type C (acute infections only)	5	1	2	5	0	1	1	0	0	15
Yersiniosis	6	0	1	4	1	0	5	1	0	18

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

**Duration ≤1 year

***Duration >1 year; Includes neurosyphillis

County Distribution within Districts

Metropolitan - Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington
Northwestern - Beltrami, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Pennington, Polk, Red Lake, Roseau
Northeastern - Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, St. Louis
Central - Benton, Cass, Chisago, Crow Wing, Isanti, Kanabec, Mille Lacs, Morrison, Pine, Sherburne, Stearns, Todd, Wadena, Wright
West Central - Becker, Clay, Douglas, Grant, Mahnomen, Norman, Otter Tail, Pope, Stevens, Traverse, Wilkin
South Central - Blue Earth, Brown, Faribault, LeSueur, McLeod, Martin, Meeker, Nicollet, Sibley, Waseca, Watonwan
Southeastern - Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona
Southwestern - Big Stone, Chippewa, Cottonwood, Jackson, Kandiyohi, Lac Qui Parle, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Swift, Yellow Medicine

4605.7800) which were recently updated (See "Revisions to the Communicable Disease Reporting Rule" in the May/June 2005 issue [vol 33. no. 3] of the *Disease Control Newsletter* [*DCN*]). The diseases listed in Table 1 (page 26) must be reported to MDH. As stated in the rules, physicians, health care facilities, laboratories, and veterinarians are required to report these diseases. Reporting sources may designate an individual within an institution to perform routine reporting duties (e.g., an infection control professional for a hospital). Data maintained by MDH are private and protected under the Minnesota Government Data Practices Act (Section 13.38). Provisions of the Health Insurance Portability and Accountability Act (HIPAA) allow for routine disease reporting without patient authorization.

Since April 1995, MDH has participated as an Emerging Infections Program (EIP) site funded by the Centers for Disease Control and Prevention (CDC) and, through this program, has

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implemented active hospital- and laboratory-based surveillance for several conditions, including selected invasive bacterial diseases and food-borne diseases.

Isolates for pathogens associated with certain diseases are required to be submitted to MDH (Table 1). The MDH Public Health Laboratory performs microbiologic evaluation of isolates, such as pulsed-field gel electrophoresis (PFGE), to determine whether isolates (e.g., enteric pathogens such as *Salmonella* and *Escherichia coli* O157:H7 and invasive pathogens such as *Neisseria meningitidis*) are related, and potentially associated with a common source. Testing of submitted isolates also allows detection and monitoring of antimicrobial resistance, which continues to be an important problem.

Table 2 summarizes cases of selected communicable diseases reported during 2005 by district of the patient's residence. Pertinent observations for some of these diseases are discussed below.

Incidence rates in this report were calculated using disease-specific numerator data collected by MDH and a standardized set of denominator data derived from U.S. Census data. Disease incidence may be categorized as occurring within the seven-county Twin Cities metropolitan area or outside of it (Greater Minnesota).

Anaplasmosis

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

HA case numbers increased from 139 cases in 2004 (2.8 per 100,000 population) to a record high of 186 cases (3.6 per 100,000 population) in 2005. One hundred twenty-seven (68%) case-patients reported in 2005 were male. The median age of case-patients was 57 years (range, 2 to 92 years). The peak in onsets of illness occurred in June and July (116 cases [62%]). Co-infections with Lyme disease and HA can occur from the same tick bite; during 2005, eight HA case-patients (4%) also had objective evidence of Lyme disease. The risk for HA is highest in many of the same Minnesota counties where the risk of Lyme disease is greatest, including Aitkin, Cass, Crow Wing, and Pine Counties.

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

Arboviral Disease

LaCrosse encephalitis and Western equine encephalitis historically have been the primary arboviral encephalitides found in Minnesota. During July 2002, West Nile virus (WNV) was identified in Minnesota for the first time. In 2005, WNV cases were reported from 43 states and the District of Columbia; nationwide, 3,000 human cases of WNV disease were reported, including 119 fatalities. The largest WNV outbreaks during 2005 occurred in California (880 cases), Illinois (252 cases), and South Dakota (229 cases).

In Minnesota, 45 cases of WNV disease were reported in 2005 (down from 148 cases in 2003). Twenty-seven (60%) case-patients had West Nile (WN) fever; 13 (29%) had encephalitis, and five (11%) had meningitis. The median age of all WN case-patients was 52 years (range, 26 to 82 years); WN encephalitis patients tended to be younger than in recent years (2005 median, 60 years; range 36-82 years, vs. 2003-2004 median, 74 years; range, 38 to 96 years). Three WN encephalitis patients (82, 76, and 36 years old) died from their illness. The 36-year-old patient had pre-existing health problems. Twenty-nine cases (64%) occurred among residents of western and southcentral Minnesota. The earliest case-patient had onset of symptoms on June 29; the latest on September 26. Similar to previous years, the peak in illness onsets was from July 15 through September 15 (31 [69%] cases).

The field ecology of WNV is complex. The virus is maintained in a mosquito-to-bird transmission cycle. Several mosquito and bird species may be involved in this cycle, and regional variation in vector and reservoir species is likely. In 2005, cooler than normal spring weather may have shortened the time period available for WNV to amplify efficiently between birds and mosquitoes, likely contributing to the reduced incidence. Interpreting the effect of weather on WNV transmission is extremely complex, leading to great difficulty in predicting how many people will become infected in a given year. WNV appears to be established throughout Minnesota; it will probably be present in the state to some extent every year. The disease risk to humans, however, will likely continue to be higher in central and western Minnesota where the primary moaquito vector, *Culex tarsalis*, is most abundant. Locally acquired cases of WNV remain absent in the northeastern third of Minnesota, which corresponds to the region where *Cx. tarsalis* is rare or absent.

During 2005, two cases of LaCrosse encephalitis were reported; both in members of the same family. The disease, which primarily affects children, is transmitted through the bite of infected *Aedes triseriatus* (Eastern Tree Hole) mosquitoes. Persons are exposed to infected mosquitoes in wooded or shaded areas inhabited by this mosquito species, especially in areas where water-holding containers (e.g., waste tires, buckets, or cans) that provide mosquito breeding habitats are abundant. From 1985 through 2005, 121 cases were reported from 20 southeastern Minnesota counties, with a median of six cases (range, 2 to 13 cases) reported annually. Disease onsets have been reported from June through September, but most onsets have occurred from mid-July through mid-September.

Campylobacteriosis

Campylobacter continues to be the most commonly reported bacterial enteric pathogen in Minnesota. There were 843 cases of culture-confirmed *Campylobacte*r infection reported in 2005 (16.4 per 100,000 population). This represents a 6% decline from the 896 cases reported in 2004, continuing a trend in which the number of *Campylobacter* cases has declined each year since 2000 (Figure 1). The median annual number of cases reported from 2000 to 2004 was 941 (range, 896 to 1,079). In 2005, 51% of cases occurred in people who resided outside the Twin Cities metropolitan area. Of the 745 *Campylobacter* isolates

confirmed and identified to species by MDH, 91% were *C. jejuni* and 7% were *C. coli*.

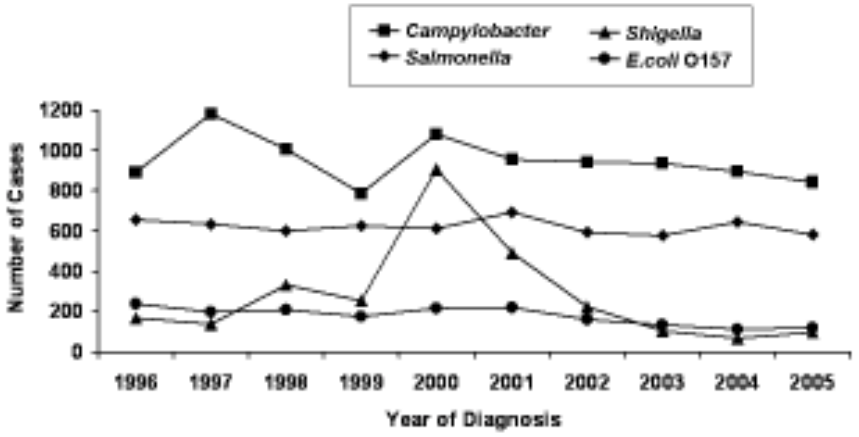
The median age of case-patients was 32 years (range, 1 month to 94 years). Sixty-seven percent of cases were between 20 and 49 years of age, and 16% were 5 years of age or younger. Fifty-seven percent of cases were male. Thirteen percent of case-patients were hospitalized; the median length of hospitalization was 2 days. Forty-nine percent of infections occurred during June through September. Of the 778 (92%) case-patients for whom data were available, 187 (24%) reported travel outside of the United States during the week prior to illness onset. The most common travel destinations were Mexico (n=58), Asia (n=36), Central or South America or the Caribbean (n=35), and Europe (n=34). There were no outbreaks of campylobacteriosis identified in 2005.

A primary feature of public health importance among *Campylobacter* cases was the continued presence of *Campylobacter* isolates resistant to fluoroquinoline antibiotics (e.g., ciprofloxacin), which are commonly used to treat campylobacteriosis. In 2005, the overall proportion of quinolone resistance among *Campylobacter* isolates tested was 22%. However, 67% of *C. jejuni* isolates from patients with a history of foreign travel, regardless of destination, during the week before illness onset were resistant to fluoroquinolones. Domestically-acquired quinolone-resistant *C. jejuni* infections have also increased in recent years. This increase likely is due largely to the use of fluoroquinolones in poultry (the primary source of *Campylobacter* for humans) in the United States, which began late in 1995. In 2005, 9% of *C. jejuni* isolates from patients who acquired the infection domestically were resistant to fluoroquinolones. Because of the public health risk associated with the use of fluoroquinolones in poultry, the United States Food and Drug Administration (FDA) withdrew the approval of enrofloxacin (a veterinary fluoroquinolone) for use in poultry in September 2005.

Cryptosporidiosis

During 2005, 166 confirmed cases of cryptosporidiosis (3.2 per 100,000 population) were reported. This is similar to the median number of cases reported annually from 1996 to 2004 (median, 173 cases; range, 81 to 242). The median age of case-patients in 2005 was 19 years (range, 4 months to 87 years). Children 10 years of age or younger accounted for 35% of cases. Fifty-two percent of cases occurred during July through October. The incidence of cryptosporidiosis in the Southwestern, West Central, and Southeastern districts (13.4, 7.4, and 7.1 cases per 100,000 population, respectively) was significantly higher than the statewide incidence. Only 26 (16%) reported cases occurred among residents of the Twin Cities metropolitan area (1.0 per 100,000 population). Thirty-two (19%) case-patients required hospitalization, for a median of 3 days (range, 1 to 11 days). One case-patient was known to be HIV-infected. Two outbreaks of cryptosporidiosis were identified during 2005; both occurred in child daycare settings (three confirmed cases for one outbreak and three confirmed cases plus one probable case for the second) with person-to-person transmission responsible for the cases.

Figure 1. Reported Cases of *Campylobacter*, *Salmonella*, *Shigella*, and *Escherichia coli* O157:H7 Infection, Minnesota, 1996-2005



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

During 2005, 121 culture-confirmed cases of *Escherichia coli* O157 infection (2.4 per 100,000 population) were reported. This represents a 10% increase from the 110 cases reported in 2004 and a 33% decrease from the median number of cases reported annually from 1997 to 2004 (median, 181 cases; range, 110 to 219). Fifty-nine (49%) cases occurred in the Twin Cities metropolitan area. The remaining 62 cases occurred throughout Greater Minnesota. One hundred two (84%) cases occurred during May through October. The median age of case-patients was 15.5 years (range, 1 to 83 years). Forty-six (38%) case-patients were hospitalized; the median duration of hospitalization was 3 days (range, 1 to 33 days).

Three *E. coli* O157 outbreaks were identified during 2005. One of these outbreaks was foodborne, associated with consumption of prepackaged nationally distributed lettuce salad. This outbreak resulted in 23 confirmed cases in Minnesota, two confirmed cases in Wisconsin, and one confirmed case in Oregon. There were two associated cases of hemolytic uremic syndrome (HUS). There was one daycare-associated outbreak of *E. coli* O157, resulting in seven confirmed cases and two cases of HUS. The route of transmission was likely person-to-person. There was one waterborne outbreak of *E. coli* O157, at a swimming beach, resulting in four confirmed cases. There were no associated HUS cases.

In 2005, 17 HUS cases were reported. There were no fatal cases. From 1997 to 2005, the median annual number of reported HUS cases in Minnesota was 15 (range, 9 to 25), and the overall case fatality rate was 7.6%. In 2005, the median age of HUS case-patients was 6 years (range, 1 to 58 years); all cases but one occurred in children. All 17 case-patients were hospitalized, with a median hospital stay of 11 days (range, 2 to 70 days). Fifteen of the 17 HUS cases reported in 2005 were

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post-diarrheal. *E. coli* O157:H7 was cultured from the stool of nine (53%) case-patients. No non-O157 shiga toxin-producing *E. coli* were isolated from case-patients. *E. coli* O157 serology was positive in three HUS patients with a negative stool culture.

Giardiasis

During 2005, 1,241 cases of *Giardia* infection (24.2 per 100,000 population) were reported. This represents an 11% decrease from the 1,398 cases reported in 2004; however, this figure is greater than the median number of cases reported annually from 1996 through 2004 (median, 1,098 cases; range, 851 to 1,556). Of the total number of *Giardia* cases for 2005, 697 (56%) represented positive tests during routine screenings of recent immigrants and refugees.

The median age for all case-patients reported in 2005 was 11 years (range, 3 months to 91 years). The median age among non-immigrant cases was 34 years (range, 6 months to 91 years). As in previous years, cases were clustered among children less than 5 years of age (28%); only 11% of cases were over 50 years of age. Overall, 3% of case-patients were hospitalized; 8% of case-patients over 50 years of age were hospitalized. There was one outbreak of giardiasis in Minnesota in 2005; the outbreak (seven cases) occurred in a child daycare setting with person-to-person transmission.

MDH began systematically interviewing cases of giardiasis in January 2002 to better characterize the illness and evaluate potential risk factors for infection. In 2004, 75% of the non-immigrant cases were interviewed. The symptoms most commonly reported by case-patients included diarrhea (95%), fatigue (78%), abdominal pain (77%), gas or bloating (77%), weight loss (67%) and nausea (65%); less commonly reported symptoms included vomiting (38%), and fever (30%). The median duration of diarrhea was 22 days (range, 1 to 212 days).

Case-patients were interviewed about potential exposures during the 14 days prior to their illness onset. Forty-one percent of interviewed case-patients reported traveling prior to their onset. Among travelers, 46% reported travel outside the United States. Nineteen percent of case-patients reported camping or hiking prior to onset, and 41% reported swimming or entering water. Forty-five percent of adult case-patients reported having children in their households; 48% of those case-patients had children in diapers. Twenty-six percent of adults reported changing a diaper prior to onset. Among pediatric cases, 31% of interviewed parents reported that their child had contact with a childcare setting prior to and/or during illness.

***Haemophilus influenzae* Invasive Disease**

Fifty-three cases of invasive *Haemophilus influenzae* disease (1.0 per 100,000 population) were reported in 2005. Case-patients ranged in age from newborn to 98 years (median, 62 years). Twenty (38%) case-patients had pneumonia, 20 (38%) had bacteremia without another focus of infection, two (4%) had meningitis, and 11 (21%) had other conditions. Five (9%) deaths were reported among these case-patients.

Of 47 *H. influenzae* isolates for which typing was performed at MDH, 13 (28%) were type f, two (4%) type a, one (2%) type e, one (2%) type b, and 30 (64%) were untypeable.

One case of type b (Hib) disease occurred in 2005, compared to two cases in 2004, and five cases in 2003. The 2005 Hib case occurred in an adult older than 30 who had significant underlying medical conditions. The case-patient had bacteremia and survived.

The five deaths occurred in patients ranging in age from newborn to 91 years. Four case-patients presented with pneumonia and one with bacteremia without another focus of infection. All case-patients had *H. influenzae* isolated from blood. Three had significant underlying medical conditions, including the premature newborn (29 weeks gestation). Four of the isolates from the five deceased case-patients were untypeable isolates and one isolate was serotype f.

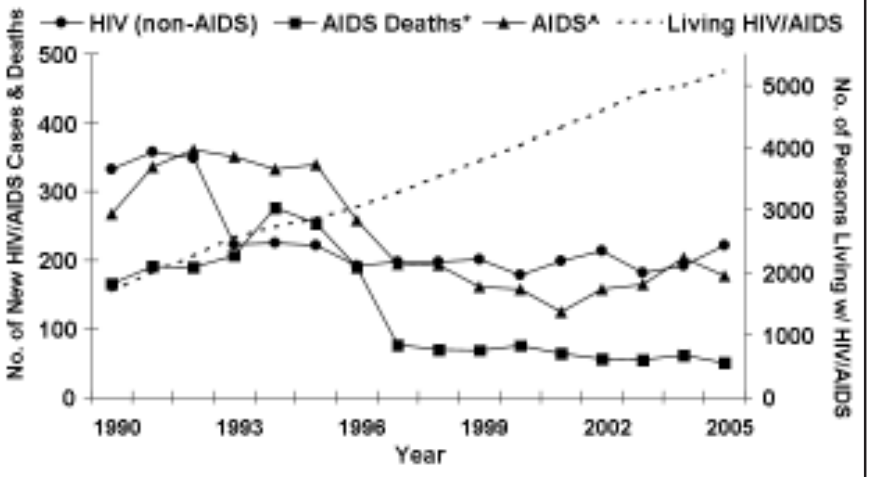
HIV Infection and AIDS

Surveillance for AIDS has been conducted in Minnesota since 1982. In 1985, when the FDA approved the first diagnostic test for HIV, Minnesota became the first state to make HIV infection a reportable condition; 43 states now require HIV infection reporting.

The incidence of HIV/AIDS in Minnesota is moderately low. In 2004, state-specific AIDS incidence rates per 100,000 population ranged from 0.8 in Montana to 39.7 in New York, with 4.3 cases per 100,000 population reported in Minnesota. Similar comparisons for HIV (non-AIDS) incidence rates are not possible, because some states only began HIV (non-AIDS) reporting recently.

As of December 31, 2005, a cumulative total of 7,824 cases of HIV infection have been reported, 4,812 AIDS cases and 3,012 HIV (non-AIDS) cases. Of these HIV/AIDS case-

Figure 2. HIV (non-AIDS) and AIDS Cases by Year of Diagnosis, and AIDS Deaths by Year of Death, Minnesota, 1990-2005



*Deaths among AIDS cases, regardless of cause

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

patients, 2,772 (35%) are known to have died.

The annual number of AIDS cases reported in Minnesota increased steadily from the beginning of the epidemic through the early 1990s, reaching a peak of 370 cases in 1992. Beginning in 1996, the annual number of new AIDS diagnoses, and deaths among AIDS case-patients, declined sharply, primarily due to new antiretroviral therapies, which delay the progression from HIV infection to AIDS and improve survival. In 2005, 177 new AIDS cases and 50 deaths among AIDS patients were reported (Figure 2).

The annual number of newly diagnosed HIV (non-AIDS) cases reported in Minnesota has remained fairly constant since the mid-1990s, with 222 reported in 2005. This trend, coupled with improved survival, has led to an increasing number of persons in Minnesota living with HIV or AIDS. Approximately 5,200 persons with HIV/AIDS were residing in Minnesota at the end of 2005.

Historically, and in 2004, nearly 90% (264/304) of new HIV infections (both HIV [non-AIDS] and AIDS at first diagnosis) reported in Minnesota occur in the Twin Cities metropolitan area. However, HIV or AIDS cases have been diagnosed in residents of more than 80% of counties statewide. HIV infection is most common in areas with higher population densities and greater poverty.

The majority of new HIV infections in Minnesota occur among males. Trends in the annual number of new HIV infections diagnosed among males differ by race/ethnicity. New infections occurred primarily among white males in the 1980s and early 1990s. Although whites still comprise the largest proportion of new HIV infections among males, the number of new infections in this population has decreased since 1991. In contrast to declining numbers of new HIV infections among white males, the decline among U.S.-born black males has been more gradual, falling from a peak of 81 new infections in 1992 to 38 new infections in 2005. The number of HIV infections diagnosed among Hispanic and African-born males has increased annually, with 17 and 20 new infections, respectively, diagnosed in 2005.

Females account for an increasing percentage of new HIV infections, from 10% of new infections in 1990 to 29% over the past few years. Trends in HIV infections diagnosed annually among females also differ by race/ethnicity. Early in the epidemic, whites accounted for the majority of newly diagnosed infections in women. Since 1991, the number of new infections among women of color has exceeded that of white women. The annual number of new HIV infections diagnosed among U.S.-born black females had remained stable at 20 or fewer cases the past 4 years, but increased to 28 new cases in 2005. During the same time period the number of new infections among African-born females increased greatly from 18 cases in 2000 to 33 in 2004. In 2005, 28 new cases were diagnosed in this group. The annual number of new infections diagnosed among Hispanic, American Indian, and Asian females is small, with 10 or fewer cases annually in each group.

Despite relatively small numbers of cases, persons of color are disproportionately affected by HIV/AIDS in Minnesota. In 2005, non-white men comprised approximately 12% of the male population in Minnesota and 37% of new HIV infections among men. Similarly, persons of color comprised approximately 11% of the female population and 74% of new HIV infections among women. It bears noting that race is not considered a biological cause of disparities in the occurrence of HIV, but instead race is a marker for other risk factors, including lower socioeconomic status and education.

Since the beginning of the HIV epidemic, male-to-male sex has been the predominant mode of exposure to HIV reported in Minnesota, although the number and proportion of new HIV infections attributed to men who have sex with men (MSM) have declined since 1991. In 1991, 69% (324/470) of new HIV infections were attributed to MSM (or MSM who also inject drugs); in 2005, this group accounted for 52% of new infections (158/304). However, current attitudes, beliefs, and unsafe sexual practices documented in surveys among MSM nationwide, and a current epidemic of syphilis among MSM, documented in Minnesota and elsewhere, warrant concern. Similar to syphilis increases in other U.S. cities and abroad, nearly 40% of the recent syphilis cases in Minnesota among MSM were co-infected with HIV, some for many years. "Burn out" from adopting safer sexual practices and exaggerated confidence in the efficacy of HIV treatments may be contributors to resurging risky sexual behavior among MSM. CDC recommends annual screening for sexually transmitted diseases (including HIV and syphilis) for sexually active MSM and more frequent screening for MSM who report sex with anonymous partners or in conjunction with drug use.

The number and percentage of HIV infections in Minnesota that are attributed to injection drug use have declined over the past decade for men and women, falling from 17% (80/470) of cases in 1991 to 1% (3/304) in 2005. Heterosexual contact with a partner who has or is at increased risk of HIV infection is the predominant mode of exposure to HIV for women. Eighty percent of 88 new HIV diagnoses among women in 2005 can be attributed to heterosexual exposure after re-distributing those with unspecified risk (Lansky A, et al. A method for classification of HIV exposure category for women without HIV risk information. *MMWR* 2001; 50[RR-6]:29-40).

Historically, race/ethnicity data for HIV/AIDS in Minnesota have grouped U.S.-born blacks and African-born persons together as "black." In 2001, MDH began analyzing these groups separately, and a marked trend of increasing numbers of new HIV infections among African-born persons was observed. In 2005, there were 48 new HIV infections reported among Africans. While African-born persons comprise less than 1% of the state's population, they accounted for 16% of all HIV infections diagnosed in Minnesota in 2005. Until recently, culturally specific HIV prevention messages have not been directed to African communities in Minnesota. Taboos and other cultural barriers make it challenging to deliver such messages and to connect HIV-infected individuals with prevention and treatment services. However in 2005, several African agencies were awarded HIV prevention funds to initiate and in some cases continue prevention programs in these communities. Additionally, collaborations between MDH, the Minnesota Department of Human Services, and

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community-based organizations serving African-born persons in Minnesota are continuing to address these complex issues.

Influenza

The Public Health Laboratory isolated influenza for the first time of the 2005-6 influenza season from a Minnesota resident on December 5, 2005, which represented an average start of activity. Since 1990-91, the first isolate typically has been between mid-November and mid-December. Influenza activity was sporadic in Minnesota until mid-January and didn't peak until the second week in March. A similar activity pattern was seen nationally.

Influenza surveillance relies on reporting of selective individual cases from clinics, hospitals, and laboratories, as well as outbreak reporting from schools and long-term care facilities. The current system for reporting outbreaks has been in place since the 1995-96 influenza season, and a Sentinel Provider Influenza Network was initiated in 1998-99 to conduct active surveillance. Twenty-seven sentinel sites participated during the 2005-6 season. While the program has surpassed its goal of 20 sentinel sites (i.e., one site per 250,000 population), MDH plans to expand the network to ensure sites represent all areas of the state. Clinics are particularly needed in northern and southern areas of the state where coverage is sparse.

In response to increasing influenza-related encephalitis cases in children in Japan and reports of severe influenza in pregnant women in the United States, enhanced influenza surveillance was implemented during the 2003-4 influenza season and has continued through the 2005-6 season. MDH requested reports of suspected or confirmed cases of influenza-related encephalopathy or encephalitis in children < 18 years of age, suspected or confirmed influenza-related deaths in children < 18 years of age, suspected or confirmed cases of influenza and staphylococcal co-infection, suspected or confirmed influenza in hospitalized pregnant women, and suspected cases of novel influenza. Surveillance initiated in 2003 in the Twin Cities metropolitan area to monitor influenza-related pediatric hospitalizations was also continued through the 2005-6 season.

No pediatric, influenza-related deaths were identified during the 2005-6 influenza season. Two cases of influenza-related encephalopathy were identified. These included a 10-year-old male of unknown race with history of renal disease, and an 18-year-old Asian male with no known underlying medical conditions. Onsets occurred in March 2006 and November 2005, respectively.

A probable outbreak of influenza-like illness (ILI) in a school is defined as a doubled absence rate with all of the following primary influenza symptoms reported among students: rapid onset, fever of $\geq$101º F, illness lasting 3 or more days, and at least one secondary influenza symptom (e.g., myalgia, headache, cough, coryza, sore throat, chills). A possible ILI outbreak in a school is defined as a doubled absence rate with reported symptoms among students including two of the primary influenza symptoms and at least one secondary influenza symptom. During the 2005-6 season, MDH received reports of probable ILI outbreaks from 116 schools in 40 counties throughout Minnesota and possible outbreaks in 81 schools in 30 counties. Since 1988-89, the number of schools reporting suspected influenza outbreaks has ranged from a low of 38 schools in 20 counties in 1996-97 to a high of 441 schools in 71 counties in 1991-92.

An ILI outbreak is suspected in a long-term care facility when three or more residents in a single unit present with a cough and fever ($\geq$101º F) or chills during a 48 to 72 hour period. An ILI outbreak is confirmed when at least one resident has a positive culture or rapid antigen test for influenza. Fifty facilities in 20 counties reported confirmed or suspected ILI outbreaks in 2005-6. In all 50 facilities, influenza was laboratory-confirmed by rapid tests or culture. Since 1988-1989, the number of long-term care facilities reporting ILI outbreaks has ranged from a low of six in 1990-91 to a high of 140 in 2004-5.

The highly pathogenic avian strain of influenza A (H5N1) continues to circulate in Southeast Asia while expanding to areas of Europe and Africa, causing illness in poultry and humans. The World Health Organization (WHO) reported on June 6, 2006 that a total of 225 human cases including 128 deaths have been confirmed since January 2003, with an overall case-fatality rate of 57%. Ten countries in Asia and Africa have reported human cases of avian influenza. Minnesota utilizes guidelines developed by the CDC to assess ill patients returning from affected countries. Currently, no cases of H5N1 have been identified in Minnesota or the United States. Although person-to-person spread of H5N1 has likely occurred in situations of very close contact, sustained person-to-person spread has not been demonstrated.

Listeriosis

Fifteen cases of listeriosis were reported during 2005. All 15 case-patients were hospitalized, and two died. The median age was 67 years (range, 0 to 90 years). One case was a neonate born at 28 weeks of gestation, hospitalized for 18 days; this case-patient survived. Eleven cases had *Listeria monocytogenes* isolated from blood, two from cerebral spinal fluid, one from joint fluid, and one from peritoneal fluid. None of the cases were associated with a recognized outbreak.

The 15 cases reported in 2005 represent a sharp increase from the five cases seen in 2004. From 2000 through 2004, the number of cases reported ranged from four to eight cases per year (median, 5 cases). The number of cases reported in 2005 is comparable to the number of cases reported during 1997-1999, when 17 to 19 cases were reported per year.

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

Lyme Disease

In 2005, 918 confirmed Lyme disease cases (17.9 cases per 100,000 population) were reported (Figure 3). This represents a 10% decrease from the record number of 1,023 (20.0 cases per 100,000 population) in 2004, but is markedly higher than the median

number of cases reported annually from 1996 through 2004 (median, 464 cases, range 252 to 1,023). In 2005, an additional 19 cases were classified as probable Lyme disease. Five hundred seventy-one (62%) confirmed case-patients in 2005 were male. The median age of case-patients was 39 years (range, 1 to 90 years). Physician-diagnosed erythema migrans was present in 730 (80%) cases. Two hundred twenty-three (24%) cases had at least one late manifestation of Lyme disease (including 167 with a history of objective joint swelling and 42 with cranial neuritis) and confirmation by a positive Western blot test. Eight (1%) Lyme disease cases in 2005 also had objective evidence of human anaplasmosis, another tick-borne disease transmitted by *Ixodes scapularis* (deer tick or blacklegged tick). Onsets of illness peaked in July (43% of cases), corresponding to the peak activity of nymphal *Ixodes scapularis* in mid-May through mid-July.

Three hundred ninety-nine (43%) cases occurred among residents of the Twin Cities metropolitan area. However, only 64 (10%) of 612 case-patients with known exposure likely were exposed to infected *I. scapularis* in metropolitan counties, primarily Anoka and Washington Counties. Most case-patients either resided in or traveled to endemic counties in east-central Minnesota or western Wisconsin. As in 2004, Crow Wing County continued to have the highest number of Lyme disease case exposures (124 [20%] of 612 cases). Risk for Lyme disease continues to be high in certain counties at the northern and western edges (Becker, Beltrami, Clearwater, Hubbard, and Itasca Counties) and southeastern edge (Houston County) of Minnesota's endemic area.

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

Meningococcal Disease

Sixteen cases of *Neisseria meningitidis* invasive disease (0.3 per 100,000 population) were reported in 2005, compared to 24 cases in 2004. There were six (38%) serogroup B cases, five (31%) serogroup C cases, and five (31%) serogroup Y cases. In addition, there was one culture-negative suspected case and one autopsy culture-positive probable case of meningococcal disease, that were positive by polymerase chain reaction (PCR) in the Public Health Laboratory.

Case-patients ranged in age from 3 months to 82 years, with a mean of 24 years. Sixty-nine percent of the cases occurred in the Twin Cities metropolitan area. Ten (63%) case-patients had bacteremia without another focus of infection, and six (38%) had meningitis. All cases were sporadic, with no definite epidemiologic links.

One death occurred among cases reported in 2005. An infant male died of bacteremia attributed to serogroup B. The probable case, a 17-year-old male with a positive PCR and serogroup B *N. meningitidis* isolated from an autopsy culture, died of meningitis.

In the spring of 2002, MDH in collaboration with CDC and other EIP sites nationwide, began a case-control study of risk factors for meningococcal disease among high school students in Minnesota. One probable serogroup B case, described previously, occurred among high school students in 2005.

In January 2005, a meningococcal polysaccharide-protein conjugate vaccine for serogroups A,C,Y, and W-135 (MCV4) was licensed for use in the United States for persons aged 11 to 55 years. The Advisory Committee on Immunization Practices (ACIP) and American Academy of Pediatrics (AAP) recommend immunization with the new vaccine at age 11-12 years or at high school entry as well as for college freshmen living in dormitories and other groups previously determined to be at high risk in the licensed age range. In addition to the high school student described previously whose serogroup was not covered in the vaccine, there was one case in an adolescent in 2005, a 12-year-old with serogroup Y disease. No cases were identified as college students. See page 44 for MCV4 recommendations.

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Strains of *Staphylococcus aureus* that are resistant to methicillin and all beta-lactam antibiotics are referred to as methicillin-resistant *Staphylococcus aureus* (MRSA). Traditional risk factors for healthcare-associated (HA) MRSA include recent hospitalization or surgery, residence in a long-term care facility, and renal dialysis.

In 1997, MDH began receiving reports of healthy young patients with MRSA infections. These patients had onset of their MRSA infections in the community and appeared to lack the established risk factors for MRSA. Although most of the reported infections were not severe, some resulted in serious

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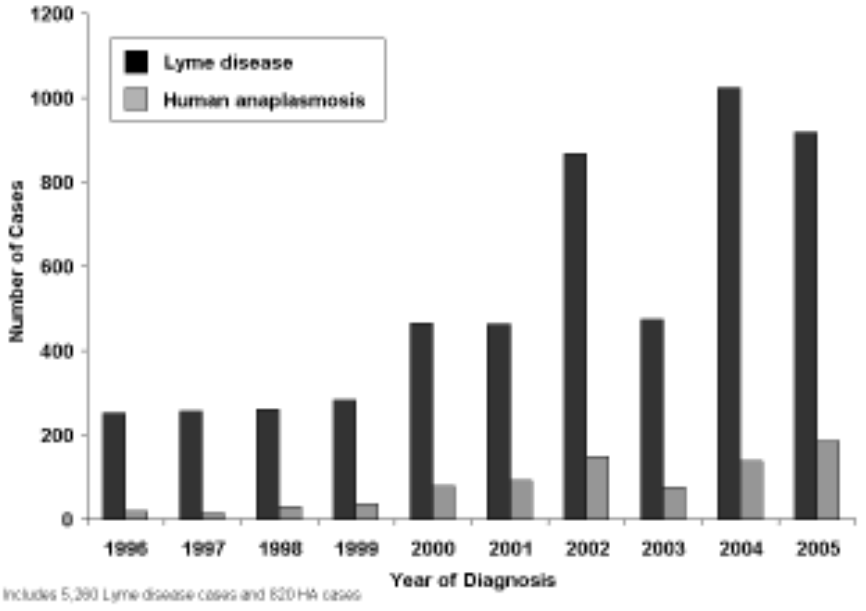
Figure 3. Reported Cases of Lyme Disease and Human Anaplasmosis (HA) in Minnesota, 1996-2005*



illness or death. Strains of MRSA cultured from persons without healthcare-associated risk factors for MRSA are now known as community-associated MRSA (CA-MRSA).

CA-MRSA is defined as: a positive culture for MRSA from a specimen obtained ≤ 48 hours of admission to a hospital; in a patient with no history of prior MRSA infection or colonization; no presence of indwelling percutaneous devices or catheters at the time of culture; and no history of hospitalization, surgery, residence in a long-term care facility, hemodialysis, or peritoneal dialysis in the year prior to the positive MRSA culture.

MDH initiated active surveillance for CA-MRSA at 12 sentinel hospital laboratories in January 2000. The laboratories (six in the Twin Cities metropolitan area and six in Greater Minnesota) were selected to represent various geographic regions of the state. Sentinel sites report all cases of MRSA identified at their facilities and submit all CA-MRSA isolates to MDH. The purpose of this surveillance is to determine demographic and clinical characteristics of CA-MRSA infections in Minnesota, to identify possible risk factors for CA-MRSA, and to identify the antimicrobial susceptibility patterns and molecular subtypes of CA-MRSA isolates. A comparison of CA- and HA-MRSA using sentinel site surveillance data from 2000 demonstrated that CA- and HA-MRSA differ demographically and clinically, and that their respective isolates are microbiologically distinct (Naimi, T., et al. Community-onset and healthcare-associated methicillin-resistant *Staphylococcus aureus* in Minnesota*. JAMA*. 2003;290(22):2976-84.)

In 2005, 2,955 cases of MRSA infection were reported to MDH by the 12 sentinel hospital laboratories. Thirty-four percent (1,004/2,955) of these cases were classified as CA-MRSA; 64% (1,904/2,955) were classified as HA-MRSA, and 2% (47/2,955) could not be classified. Isolates were received from 931 (93%) of the 1,004 CA-MRSA cases. To date, antimicrobial susceptibility testing has been completed on 514 (55%) and pulsed-field gel electrophoresis (PFGE) subtyping has been completed for 309 (33%) of these isolates.

Notable trends in total case numbers, PFGE subtypes, and antibiotic susceptibility patterns have been identified during the 6 years of CA-MRSA sentinel surveillance. CA-MRSA infections reported from the 12 sentinel surveillance sites have increased from 131 cases (12% of all MRSA infections reported) in 2000 to 1,004 cases (34% of total MRSA infections reported) in 2005.

MRSA is resistant to all beta-lactam antimicrobials and beta-lactams should no longer be used as the sole empiric therapy for severely ill patients whose infections may be staphylococcal in origin. However, all 2005 CA-MRSA isolates tested to date have been susceptible to linezolid, synercid, rifampin, and vancomycin and most CA-MRSA isolates were susceptible to trimethoprim-sulfamethoxazole (99%), gentamicin (99%), tetracycline (94%), clindamycin (90%), and ciprofloxacin (63%). Conversely, only 14% of CA-MRSA isolates in 2005 were susceptible to erythromycin.

The CDC classifies MRSA isolates into pulsed-field types (PFTs) (currently USA100-1200) based on genetic relatedness. (McDougal, L. et. al. Pulsed-field gel electrophoresis typing of oxacillin-resistant *Staphylococcus aureus* isolates from the United States: Establishing a national database. *J Clin Microbiol*. 2003;41:5113-20). CA-MRSA isolates are most often classified as PFT USA300 or USA400. In Minnesota, the predominant CA-MRSA PFT has changed dramatically over time. In 2000, 63% of CA-MRSA isolates were USA400 and 4% were USA300. In 2005, only 14% of CA-MRSA isolates were USA400 and 66% were USA300. Because USA400 isolates are much more likely than USA300 isolates to demonstrate inducible clindamycin resistance (ICR) on disk diffusion testing, the change in the predominant CA-MRSA PFT has also been associated with a decrease in the proportion of erythromycin-resistant, clindamycin-sensitive CA-MRSA isolates demonstrating ICR from 93% in 2000 to 12% in 2005.

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

Mumps

Six cases of mumps were reported to MDH during 2005; a total of 29 mumps cases were reported between 2000-2005. All six cases were reported between October and December.

Four (67%) of the case-patients were white, non-Hispanic females ages 13, 34, 38, and 53 years. One case-patient was a 48-year-old white, non-Hispanic male. The sixth case was a 7-year-old female of unknown race and ethnicity. The 7 and 13-year-old case-patients had a documented history of two doses of mumps-containing vaccine. The 34-year-old had a history of one dose of mumps-containing vaccine. The other three cases had no known history of vaccination for mumps. One adult female case-patient was hospitalized for one day for clinical complications including mastitis and oophritis; the adult male case-patient had orchitis. Including 2004 and 2005, eight of the 10 cases reported have occurred in adults, highlighting the need to assess the mumps immunization status of adults.

No source case was identified for four of the cases. Three cases were epidemiologically linked, including a 48-year-old index case with no known exposure, a 53-year-old household contact who developed symptoms 15 days after the index case's onset, and a 38-year-old co-worker of the household contact who subsequently developed symptoms 19 days later.

All six cases were laboratory confirmed by positive mumps IgM serology. Two cases were additionally verified by a demonstrated rise in serum IgG between acute and convalescent specimens. One other case was also confirmed by mumps virus isolation from a throat specimen.

Both IgM and IgG serologic testing as well as viral culture should all be performed on suspect mumps cases. False-positive indirect immunofluorescent antibody (IFA) tests for mumps IgM have been reported, particularly in persons who have been vaccinated for mumps. Mumps can be confirmed by viral culture of buccal swabs, throat swabs, urine, or spinal fluid specimens. Specimens for viral culture should be collected during the first 5 days of illness.

Pertussis
During 2005, 1,571 (30.6/100,000 population) cases of pertussis were reported in Minnesota representing a continuation of the increase first seen in 2004 when 1,368 cases reported in Minnesota. This increase occurred nationally as well, and may be attributable to several factors including increased awareness of pertussis among health care providers and the public, increased availability of more sensitive diagnostic testing using PCR, as well as a true increase in incidence. Laboratory confirmation was available for 1,096 (70%) cases; 115 (10%) were confirmed by culture, and 981 (90%) were confirmed by PCR. In addition to the laboratory-confirmed cases, 215 (14%) cases were epidemiologically linked to culture-confirmed cases, and 260 (17%) met the clinical case definition. Seven hundred five (45%) of the reported cases occurred in residents of the Twin Cities metropolitan area.

Paroxysmal coughing is the most commonly reported symptom. In 2005, 1,519 (97%) of the case-patients experienced paroxysmal coughing. Over one third (475, 30%) reported whooping. Although commonly referred to as "whooping cough," very young children, older individuals, and persons previously immunized may not have the typical "whoop" associated with pertussis. Post-tussive vomiting was reported in 749 (48%) of the cases. Four hundred eighty-four (31%) case-patients reported apnea. Infants and young children are at the highest risk for severe disease and complications. Pneumonia was diagnosed in 44 (3%) case-patients, 14 (32%) of whom were less than 18 months of age. Thirty-two (2%) case-patients were hospitalized; 23 (72%) of the hospitalized patients were younger than 6 months of age.

Due to waning immunity, either of natural infection or vaccine, pertussis can affect persons of any age. The disease is increasingly recognized in older children and adults; however, it is not clear whether it is a true increase or due to changes in surveillance and reporting. During 2005, case-patients ranged in age from 1 day to 83 years. Four hundred twenty-three (27%) cases occurred in persons 13 to 17 years of age. Five hundred five (32%) cases occurred in persons 18 years of age and older. Persons 5-12 years of age accounted for 24% (372) of all cases. Ninety-two (6%) of the total cases occurred in infants less than 6 months of age, and 178 (11%) occurred in children 6 months through 4 years of age. Age was unknown for one case.

Infection in older children and adults may result in exposure of unprotected infants who are at risk for the most severe consequences of infection. During 2005, 102 cases of pertussis were reported in infants less than 1 year of age. A likely source of exposure was identified for 49 (48%) cases; 33 (67%) were infected by adults 18 years of age and older, six (12%) were infected by an adolescent, and 10 (20%) were infected by a child less than 13 years of age. Fifty-three (52%) cases had no identified source of infection. For these cases, the source of infection was likely outside the household.

Although unvaccinated children are at highest risk for pertussis, fully immunized children may also develop disease. Disease in those previously immunized is usually mild. Efficacy for currently licensed vaccines is estimated to be 71% to 84% in preventing serious disease, but waning immunity begins approximately 3 years after the last dose of DTaP. Of the 863 case-patients who were 7 months to 15 years of age, 615 (71%) are known to have received at least a primary series of three doses. Of the 203 cases in persons 7 months through 6 years of age, 34 (17%) received fewer than three doses of DTP/DTaP vaccine before onset of illness, and were considered preventable cases, 29 (14%) of cases in this age group had unknown vaccine history.

MDH reporting rules require that clinical isolates of *Bordetella pertussis* be submitted to the Public Health Laboratory. Of the 115 culture-confirmed cases, 100% of the isolates were received and subtyped by PFGE and tested for antibiotic susceptibility to erythromycin, ampicillin, and trimethoprim-sulfamethoxazole. Twenty-two distinct PFGE patterns were identified; 11 of these patterns occurred in only a single case isolate. The two most common patterns identified accounted for 53 (46%) of the total isolates and they occurred throughout the year.

No cases of erythromycin-resistant *B. pertussis* have been identified in Minnesota since the first case was identified in October 1999. Statewide, all 1,155 other isolates tested to date have had low minimum inhibitory concentrations, falling within the reference range for susceptibility to the antibiotics evaluated. Only eight other erythromycin-resistant *B. pertussis* cases have been identified to date in the United States.

Laboratory tests should be performed on all suspected cases of pertussis. Culture of *B. pertussis* requires inoculation of nasopharyngeal mucous on special media and incubation for 7 to 10 days. However, *B. pertussis* is rarely identified late in the illness; therefore, a negative culture does not rule out disease. A positive PCR result is considered confirmatory in patients with a 2-week history of cough illness. PCR can detect non-viable organisms. Consequently, a positive PCR result does not necessarily indicate current infectiousness. Patients with a 3-week or longer history of cough illness, regardless of PCR result, may not benefit from antibiotic therapy. Cultures are necessary for molecular and epidemiologic studies and for drug susceptibility testing. Whenever possible, culture should be done in conjunction with PCR testing. Direct fluorescent antibody (DFA), provides a rapid presumptive diagnosis of pertussis; however, because both false-positive and false-negative results can occur, DFA tests should not be relied upon solely for laboratory confirmation. Serological tests are not standardized and are not acceptable for laboratory confirmation.

Pertussis booster vaccines licensed in 2005 for persons 10 years of age and older will help to decrease the incidence and transmission of pertussis in the community. The ACIP recommends the routine use of Tdap vaccines in adolescents aged 11-18 years in place of tetanus and diphtheria toxoids (Td) vaccines. See page 46 for more information.

Salmonellosis
During 2005, 580 culture-confirmed cases of *Salmonella* infection (11.3 per 100,000 population) were reported. This represents a 10% decrease from the 643 cases reported in 2004 and a 7% decrease from the median annual
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number of cases reported from 1996 to 2004 (median, 626 cases; range, 576 to 693) (Figure 1). Four serotypes, *S.* Enteritidis (130 cases) *S.* Typhimurium (120 cases), *S.* Newport (44 cases), and *S.* Heidelberg (27 cases) accounted for 55% of cases reported in 2005. There were six cases of *S.* Typhi infection. Three of the *S.* Typhi case-patients traveled internationally (India, Pakistan Ethiopia) and developed symptoms during their travel or within 2 weeks of their return; one case-patient arrived in the United States from Thailand approximately 3 months prior to the specimen collection date; one case-patient immigrated from Thailand 15 months prior to specimen collection; and one case-patient was a Hmong immigrant (immigration date unknown). Six percent of salmonellosis case-patients were less than 1 year of age, and 25% were 12 years of age or younger. Twenty-six percent of case-patients were hospitalized for their infection. Of 525 case-patients that were interviewed, 108 (21%) traveled internationally during the week prior to their illness onset.

A 78 year-old case-patient died. The case-patient was hospitalized for nearly 2 months for gastrointestinal symptoms. During her hospitalization, *S.* Typhimurium was isolated from a diverticular abscess.

Four outbreaks of salmonellosis were identified in 2005. All four outbreaks involved foodborne transmission.

Four *S.* Heidelberg cases with illness onsets in January through March reported eating frozen, microwaveable stuffed chicken products during the week before illness onset. The implicated product is a raw chicken product coated with a pre-browned breading that gives the appearance of being cooked. Products from a case-patient's home and product with the same production date purchased at the grocery store tested positive for *S.* Heidelberg.

A multi-state outbreak of *S.* Typhimurium infections associated with cake batter flavored ice cream from a national chain of ice cream shops was identified by MDH in June. Twenty-six cases were identified in nine states; five of those cases were Minnesota residents. Case-patients had onsets of illness from May through July. The source of contamination was cake mix that was incorporated in the ice cream without being cooked first.

From June through August, five *S.* Manhattan cases were identified. A case-control study found that illness was statistically associated with cilantro and pork. Two of the cases attended a funeral where pork and cilantro sandwiches were served. The remaining cases had eaten pork and/or cilantro in their homes.

An outbreak of *S.* Enteritidis infections associated with eating frozen, microwaveable, stuffed chicken products was identified in 2005. Four case-patients had onsets in August though December. Additional cases with onsets in 2006 are still being reported, so the investigation continues. This was the third outbreak in Minnesota associated with this type of chicken product since 1998. As a result, the United States Department of Agriculture has required label changes to more clearly identify this product as raw, and to have more adequate cooking instructions.

In addition to the four outbreaks in Minnesota, 11 *S.* Enteritidis cases were part of an outbreak at all-inclusive resorts in Jamaica during January and February. A total of 70 cases from 12 states were identified. The CDC collaborated with Jamaican authorities in the investigation. The outbreak was associated with eggs from a local farm. Pooling of eggs at the resorts, and cross-contamination of other foods most likely contributed to the outbreak. The *S.* Enteritidis phage-type and PFGE pattern were previously not known to be endemic to Jamaica. Local farms were devastated by Hurricane Ivan in 2004, and may have been repopulated with birds from the United States (where this phage-type and PFGE pattern are endemic). Three additional cases of *S.* Enteritidis of the same PFGE pattern were identified in Minnesota in travelers to Jamaica from May through October, after the investigation ended.

Sexually Transmitted Diseases

Active surveillance for gonorrhea and chlamydia was initiated in January 2002. This involves cross-checking laboratory-reported cases against cases reported by clinicians. Although both laboratories and clinical facilities are required to report STDs independently of each other, an episode of STD is not considered a case for surveillance purposes until a corresponding case report is submitted by a clinical facility. Additionally, case reports contain critical demographic and clinical information that is not available from laboratory reports. When a laboratory report is received but no corresponding case report is received within 45 days, MDH mails a reminder letter and case report form to the corresponding clinical facility. Cases of syphilis and chancroid are monitored through a mostly passive surveillance system. Herpes simplex virus and human papillomavirus infections are not reportable.

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

Chlamydia

Chlamydia trachomatis infection is the most commonly reported STD in Minnesota. In 2005, 12,187 chlamydia cases (248 per 100,000 population) were reported, representing a 5% increase from 2004 (Table 3).

Adolescents and young adults are at highest risk for acquiring chlamydial infection (Table 4). The chlamydia rate is highest among 20 to 24-year-olds (1,496 per 100,000 population), with the next highest rate among 15 to 19-year-olds (989 per 100,000). The incidence of chlamydia among adults 25 to 29 years of age (620 per 100,000) is considerably lower but has increased in recent years. The chlamydia rate among females (355 per 100,000) is more than twice the rate among males (138 per 100,000). This difference is likely due to more frequent screening among women.

The incidence of chlamydia infection is highest in communities of color (Table 4). The rate among blacks (1,535 per 100,000 population) is over 13 times higher than the rate among whites (115 per 100,000). Although blacks comprise approximately 4% of Minnesota's population, they account for 26% of reported chlamydia cases. Rates among Asian/Pacific Islanders (282 per 100,000), American Indians (512 per 100,000), and Hispanics (624

per 100,000) are over two to five times higher than the rate among whites.

Chlamydia infections occur throughout the state, with the highest reported rates in Minneapolis (717 per 100,000 population) and St. Paul (598 per 100,000). In 2005, the greatest increases for chlamydia have been seen in the suburbs and Greater Minnesota with increases of 9 percent and 6 percent respectively.

Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, is the second most commonly reported STD in Minnesota. In 2005, 3,481 cases (71 per 100,000 population) were reported, representing an increase of 18% from 2004 (Table 3).

Adolescents and young adults are at greatest risk for gonorrhea (Table 4), with incidence rates of 213 per 100,000 population among 15 to 19-year-olds, 320 per 100,000 among 20 to 24-year-olds, and 199 per 100,000 among 25 to 29-year-olds. Gonorrhea rates for males (65 per 100,000) and females (77 per 100,000) are comparable. Communities of color are disproportionately affected by gonorrhea, with 45% of cases reported among blacks. The incidence of gonorrhea among blacks (775 per 100,000) is approximately 35 times higher than the rate among whites (23 per 100,000). Rates among American Indians (118 per 100,000) and Hispanics (85 per 100,000) are approximately four to five times higher than among whites. The rate among Asian/Pacific Islanders (31 per 100,000) is similar to that among whites.

Gonorrhea rates are highest in the cities of Minneapolis and St. Paul (Table 4). The incidence in Minneapolis (333 per 100,000 population) is nearly 1.5 times the rate in St. Paul (238 per 100,000), seven times higher than the rate in the suburban metropolitan area (46 per 100,000), and 15 times higher than the rate in Greater Minnesota (22 per 100,000).

Quinolone-resistant *Neisseria gonorrhoeae*

While the overall rate of gonorrhea has stayed relatively constant over the past 3 years, the prevalence of quinolone-resistant *N. gonorrhoeae* (QRNG) has increased approximately five-fold from

continued...

Table 3. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Syphilis, Minnesota, 2001-2005

	2001		2002		2003		2004		2005	
Disease	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Chlamydia	8,369	170.0	10,118	206.0	10,807	220.0	11,601	236.0	12,187	248.0
Gonorrhea	2,708	55.0	3,050	62.0	3,237	66.0	2,957	60.0	3,481	71.0
Syphilis, Total	135	2.7	149	3.0	198	4.0	145	2.9	207	4.2
Primary/ Secondary	33	0.7	59	1.2	48	1.0	27	0.5	70	1.4
Early Latent	16	0.3	23	0.5	45	0.9	21	0.4	46	0.9
Late Latent*	81	1.6	65	1.3	105	2.1	95	1.9	84	1.7
Other	3	0.1	1	0.00	0	0.0	1	0.02	5	0.1
Congenital**	2	3.0	1	1.5	0	0.0	1	1.4	2	2.8
Chancroid	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0

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

Table 4. Number of Cases and Incidence Rates (per 100,000 population) of Chlamydia, Gonorrhea, and Primary/Secondary Syphilis by Residence, Age, Gender, and Race/Ethnicity, Minnesota, 2005

	Chlamydia		Gonorrhea		Syphilis	
Demographic Group	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Total	12,187	248	3,481	71	70	
*Residence**						
Minneapolis	2,742	717	1,274	333	42	11.0
St. Paul	1,718	598	684	238	8	2.8
Suburban**	3,621	184	898	46	17	0.9
Greater Minnesota	3,597	158	493	22	3	0.1
Age						
<15 years	132	12	36	3	0	0.0
15-19 years	3,703	989	797	213	1	0.3
20-24 years	4,823	1,496	1,033	320	7	2.2
25-29 years	1,982	620	636	199	9	2.8
30-34 years	822	233	346	98	9	2.5
35-44 years	560	68	432	52	28	3.4
≥45 years	165	10	201	12	16	1.0
Gender						
Male	3,364	138	1,571	65	67	2.8
Female	8,814	355	1,906	77	2	0.1
Transgender^^	9	---	4	---	1	---
Race^/Ethnicity						
White	4,980	115	976	23	55	1.3
Black	3,115	1,535	1,574	775	8	3.9
American Indian	415	512	96	118	1	1.2
Asian	475	282	53	31	1	0.6
Other	248	---	71	---	4	---
Unknown^^	2,954	---	711	---	1	---
Hispanic^^^	895	624	122	85	5	3.5

*Residence information missing for 509 chlamydia cases and 132 gonorrhea cases.
**Suburban is defined as the seven-county metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties), excluding cities of Minneapolis and St. Paul
^Case counts include persons by race alone. Population counts used to calculate results include race alone or in combination.
^^No comparable population data available to calculate rates
^^^Persons of Hispanic ethnicity may be of any race
Note: Data exclude cases diagnosed in federal or private correctional facilities

1.4% in 2003 to 6.8% in 2005. Of concern is the high prevalence among men who have sex with men (MSM), which has increased from 0% in 2002, to 8.9% in 2003, to 26.9% in 2004, and to 30% in 2005. As a result, fluoroquinolones (e.g. ciprofloxacin) are no longer recommended for treating gonorrhea in men with male sexual partners in Minnesota.

Syphilis

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

Primary and Secondary Syphilis

Although the incidence of primary/secondary syphilis in Minnesota is lower than that of chlamydia or gonorrhea (Table 3), the rate almost tripled in 2005. Seventy cases of primary/secondary syphilis (1.4 per 100,000 population) were reported in 2005 compared to 27 (0.5 per 100,000 population) cases in 2004.

Early Syphilis

In 2005, the number of early syphilis cases increased by 142 percent with 116 cases occurring in 2005 compared to 48 cases in 2004. The incidence in particular, is the highest amongst men who have sex with men (MSM). Of the 116 early syphilis cases in 2005, 109 (94%) occurred among men; 100 (92%) of these men reported having sex with other men; 38% of the MSM diagnosed with early syphilis were co-infected with HIV.

Congenital Syphilis

Two cases of congenital syphilis were reported in Minnesota in 2005 (Table 3).

Chancroid

Chancroid continues to be very rare in Minnesota. No cases were reported in 2005.

Shigellosis

During 2005, 96 culture-confirmed cases of *Shigella* infection (1.9 per 100,000 population) were reported (Figure 1). This represents a 41% increase from the 68 cases reported in 2004, and a 57% decrease from the median number of cases reported annually from 1999 to 2004 (median, 222 cases, range, 68 to 904).

In 2005, *S. sonnei* accounted for 68 (71%) cases, *S. flexneri* for 27 (28%), and *S. boydii* for 1 (1%). Case-patients ranged in age from 3 month to 77 years (median, 14 years). Forty-seven percent of case-patients were less than 10 years of age; children less than 5 years of age accounted for 26% of cases. Sixteen (17%) case-patients were hospitalized. Sixty-seven percent of case-patients resided in the Twin Cities metropolitan area, with 33% of all case-patients residing in Hennepin County.

One waterborne outbreak of shigellosis occurred in Minnesota in 2005. Seven confirmed *S. sonnei* cases were identified among people who swam at a beach in Carver County on July 9. That day, the well that served the changing house, toilets, handsinks, shower, and drinking fountain failed. Three portable toilets were provided for beach-goers. The National Weather Service reported a high temperature of 92ºF, and reports from Carver County Parks and case interviews indicated that the beach was heavily utilized that day. It is unclear how the beach water was initially contaminated; however, as *Shigella* is strictly a human pathogen, presumably the beach was contaminated by an ill beach-goer. The lack of changing facilities and handwashing sinks likely contributed to the outbreak.

Every tenth *Shigella* isolate received at MDH was tested for antimicrobial resistance. Ten isolates were tested in 2005; 40% were resistant to ampicillin, 50% were resistant to trimethoprim-sulfamethoxazole, and 20% were resistant to both ampicillin and trimethoprim-sulfamethoxazole.

***Streptococcus pneumoniae* Invasive Disease**

Statewide active surveillance for invasive *Streptococcus pneumoniae* (pneumococcal) disease began in 2002, expanded from the Twin Cities metropolitan area, where active surveillance has been ongoing since 1995. In 2005, 596 cases of invasive pneumococcal disease were reported, including 313 cases among Twin Cities metropolitan area residents, and 283 cases among residents of Greater Minnesota. Incidence rates overall, and by age group were similar between these two geographic regions. For example, there were 11.4 cases of invasive pneumococcal disease per 100,000 Twin Cities metropolitan area residents, and 11.9 cases per 100,000 residents of Greater Minnesota. By age group, annual incidence rates per 100,000 Twin Cities area residents and Greater Minnesota residents were, respectively, 27.4 and 21.3 cases among children aged 0-4 years; 3.6 and 3.5 cases among children and adults aged 5-39 years, 12.1 and 10.1 cases among adults 40-64 years, and 39.2 and 40.7 cases among adults aged 65 years and older.

In 2005, pneumonia accounted for 318 (53%) cases of invasive pneumococcal disease among all cases (i.e., those infections accompanied by bacteremia or isolation of pneumococci from another sterile site such as pleural fluid). The 170 pneumonia cases among Twin Cities area residents accounted for a similar proportion of all invasive disease in that group (54%) as the proportion among residents of Greater Minnesota (148 cases, 52%). Bacteremia without another focus of infection accounted for 211 (35%) cases statewide, including 103 (33%) cases in Twin Cities area residents and 108 (38%) cases in Greater Minnesota residents. Pneumococcal meningitis accounted for 30 (5%) cases statewide, including 14 (4%) of cases in Twin Cities area residents and 16 (6%) cases in Greater Minnesota residents. Forty-four patients with invasive pneumococcal disease died (7%); 6% (20) of case-patients who were Twin Cities area residents and 8% (24) of case-patients who were Greater Minnesota residents.

In 1999, the year before the pediatric pneumococcal conjugate vaccine (Prevnar, Wyeth-Lederle [PCV-7]) was licensed, the rate of invasive pneumococcal disease among children < 5 years in the Minneapolis-St. Paul metropolitan area was 111.7 cases/100,000. Over the years 2000-2002 there was a major downward trend in incidence in this age group (Figure 4). Compared with the lowest rate in 2002 (22.5 cases/100,000) the incidence rate in this age group increased slightly in the 3 following years, to 25.8 cases/100,000 in 2003, 29.0 cases/100,000 in 2004 and 27.4 cases/100,000 in 2005 (Figure 3). Based on the distribution of serotypes among

isolates from these cases, this increase was limited to disease caused by non-vaccine serotypes (i.e. serotypes other than the seven included in PCV-7) (Figure 3). This small degree of replacement disease due to non-PCV-7 serotypes, similar to that seen in other parts of the country, has been far outweighed by the declines in disease caused by PCV-7 serotypes. This trend supports the need for ongoing monitoring, however, because further increases due to non-vaccine serotypes are possible. In Figure 3 rates of invasive pneumococcal disease among adults aged ≥ 65 years are also shown by serotypes included and not included in PCV-7. Declines in incidence in this age group, particularly in disease due to PCV-7 serotypes have been observed elsewhere in the United States and are likely attributable to herd immunity from use of PCV-7 among children.

Of the 532 isolates submitted for 2005 cases, 46 (9%) were highly resistant to penicillin and 75 (14%) exhibited intermediate-level resistance; 92 isolates (17%) exhibited multi-drug resistance (i.e. high-level resistance to two or more drug classes). The proportion of isolates submitted from Greater Minnesota residents with high- or intermediate-level resistance to penicillin (48/235, 20%) was somewhat lower than the proportion from Twin Cities area residents (73/297, 25%) but the difference was not statistically significant. *S. pneumoniae* is one of several pathogens included in the MDH Antibiogram (see pages 49-50), which gives detailed antimicrobial susceptibility results of isolates tested at the Public Health Laboratory from 2005 cases, and is available to download on the MDH website at: www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/antibiogram.html.

Streptococcal Invasive Disease - Group A

One hundred twenty-two cases of invasive group A streptococcal (GAS) disease (2.4 per 100,000 population), including nine deaths, were reported in 2005, compared to 146 cases and 18 deaths in 2004. Ages of case-patients ranged from 1 month to 96 years (mean, 49 years). Fifty-one percent of case-patients were residents of the Twin Cities metropolitan area. Thirty-nine (32%) case-patients had cellulitis with bacteremia and 36 (30%) case-patients had bacteremia without another focus of infection. There were 14 (12%) cases of primary pneumonia and eight (7%) cases of necrotizing fasciitis. Eight (7%) case-patients had septic arthritis and/or osteomyelitis, and two (2%) had streptococcal toxic shock syndrome (STSS) accompanied by soft tissue infections. Ten (8%) case-patients were residents of long-term care facilities. None of the facilities had more than one case-patient.

The nine deaths included five cases of bacteremia without another focus of infection and one case of pneumonia. The three remaining fatal cases had bacteremia with cellulitis. The deaths occurred in persons ranging in age from 49 to 90 years. For the eight deaths in patients with known health histories, significant underlying medical conditions were reported for all of the cases.

Isolates were available for 115 (94%) cases, all were subtyped using PFGE; 59 different molecular subtypes were identified. Thirty-eight subtypes were represented by one isolate each; other subtypes were represented by two to 17 isolates each. No epidemiologic links were noted among cases with indistinguishable subtypes.

The deaths were distributed among nine different PFGE subtypes with no two deaths attributed to the same subtype.

Streptococcal Invasive Disease - Group B

Three hundred thirty-four cases of group B streptococcal invasive disease (6.5 per 100,000 population), including 22 deaths, were reported in 2005. These cases were those in which group B *Streptococcus* (GBS) was isolated from a normally sterile site; seven cases of miscarriage or stillbirth in which GBS was cultured from the placenta were also reported.

Overall, 142 (43%) cases presented with bacteremia without another focus of infection. The other most common types of infection were cellulitis (17%), arthritis (9%), pneumonia (7%), osteomyelitis (7%), and meningitis (4%). The majority (75%) of cases had GBS isolated from blood only. Fifty-seven percent of cases occurred among residents of the Twin Cities metropolitan area. Thirty-two (10%) case-patients were infants less than 1 year of age, and 163 (49%) were 60 years of age or older.

Forty-four cases of infant (early-onset or late-onset) or maternal GBS disease were reported, compared to 57 cases in 2004. Fifteen infants developed invasive disease within 6 days following birth (0.21 cases per 1,000 live births), and 17 infants became ill at 7 to 89 days of age. Seven stillbirths or spontaneous abortions were associated with 12 maternal invasive GBS infections.

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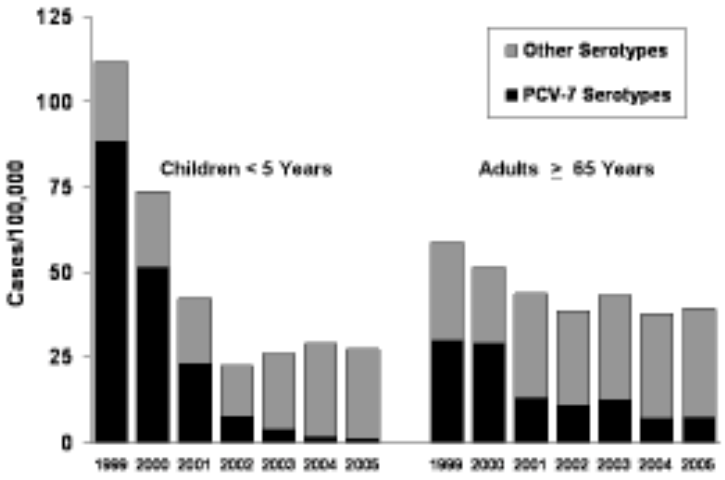
Figure 4. Invasive Pneumococcal Disease Incidence Among Children <5 Years and Adults ≥65 Years, by Year and Serotype, Seven County Twin Cities Metropolitan Area, 1999-2005



From 1997 to 2005, there were 230 early-onset disease cases reported, and 12 infants died. Forty-five infants were born at less than 37 weeks' gestation and accounted for 20% of early-onset cases. Bacteremia without another focus of infection (78%) was the most common type of infection in these early-onset cases, followed by pneumonia (13%) and meningitis (7%). The *Prevention of Perinatal Group B Streptococcal Disease, Revised Guidelines from CDC* published in August 2002 include the following key changes: the recommendation for universal prenatal screening of all pregnant women at 35 to 37' weeks gestation and updated prophylaxis regimens for women with penicillin allergies. In light of these revised guidelines, MDH reviewed the maternal charts for all 15 early-onset cases reported during 2005. Overall, 11 (73%) of 15 women who delivered GBS-positive infants underwent prenatal screening for GBS. Of these, three (27%) women were positive and eight (73%) women were negative. Among the four women who did not receive prenatal screening for GBS, one (25%) was screened upon admission to the hospital and prior to delivery of her infant. Among the 15 women of infants with invasive GBS disease, four (27%) received intrapartum antimicrobial prophylaxis (IAP). One of the three women with a positive GBS screening result received IAP. MDH continues to follow the incidence of GBS disease among infants, screening for GBS among pregnant women, and the use of IAP for GBS-positive pregnant women during labor and delivery.

Tuberculosis

While the number of cases of tuberculosis (TB) disease reported nationally has decreased each year since 1993, the incidence of TB in Minnesota increased throughout much of the 1990s and peaked at 239 TB cases (4.8 cases per 100,000 population) in 2001. In 2005, 199 new cases of TB disease (3.8 cases per 100,000 population) were reported in Minnesota, which represents a plateau following a 3-year decline in the incidence of TB that occurred from 2002 through 2004. Although the statewide incidence of TB disease is less than the national rate (4.8 cases per 100,000 population in 2005), the incidence rate in Minnesota exceeds the U.S. Healthy People 2010 objective of 1.0 case per 100,000 population (Figure 5).

The most distinguishing characteristic of the epidemiology of TB disease in Minnesota is the very large proportion of TB cases reported among foreign-born persons, which has averaged 81% over the past 5 years. In 2005, 173 (87%) new TB cases in Minnesota occurred in persons born outside the United States. This exceptionally high percentage of foreign-born TB cases reported in 2005 represents the largest proportion of foreign-born cases reported in Minnesota since 1992, when MDH began collecting data on TB case-patients' countries of birth. In contrast, 54% of TB cases reported nationwide in 2005 were foreign-born.

The 173 foreign-born TB case-patients reported in Minnesota during 2005 represent 31 different countries of birth. The most common region of birth among foreign-born TB cases reported in 2005 was sub-Saharan Africa (58%), followed by South/Southeast Asia (24%) (Figure 6). The ethnic diversity among these foreign-born TB cases reflects the unique and constantly changing demographics of immigrant and other foreign-born populations arriving in Minnesota. This diversity also poses significant challenges in providing culturally and linguistically appropriate TB prevention and control services for populations most affected by and at risk for TB in Minnesota.

Persons 15 years of age or older who arrive in the United States as immigrants or refugees receive a medical evaluation overseas that includes screening for pulmonary TB disease. Among 173 foreign-born persons who were diagnosed with TB disease in Minnesota during 2005, 119 (69%) were diagnosed less than 5 years after arriving in this country. Of 39 TB case-patients 15 years of age or older who were diagnosed within 12 months of their arrival in the United States and who arrived as immigrants or refugees, only seven (18%) had any TB-related conditions noted in their pre-immigration medical exams performed overseas. These findings highlight the need for clinicians to have a high index of suspicion for TB among newly arrived foreign-born persons, regardless of the results of medical exams performed overseas. Health care providers should pursue thorough screening, evaluation, and, if indicated, treatment of active TB disease or latent TB infection among patients who originate from regions where TB is endemic.

The majority (74%) of foreign-born TB case-patients reported in Minnesota in 2005 were 15 to 44 years of age, whereas only 30% of U.S.-born TB cases occurred among persons in this age category. In contrast, 47% of U.S.-born TB case-patients were 45 years of age or older. The proportion of pediatric patients (less than 15 years of age) was considerably larger among U.S.-born TB cases than among foreign-born cases (23% versus 8%, respectively), although most of the U.S.-born pediatric cases were children born in the U.S. to foreign-born parents (Figure 7). These first-generation U.S.-born children appear to experience an increased risk of TB disease that more closely resembles that of foreign-born persons. Presumably, these children may be exposed to TB as a result of travel to their parents' country of origin and/or visiting or recently arrived family members who may be at increased risk for TB acquired overseas.

Aside from foreign-born persons, other high-risk population groups comprise much smaller proportions of the TB cases reported in Minnesota, each representing less than 10% of cases diagnosed statewide. Among TB cases reported in 2005, substance abuse (including alcohol abuse and/or illicit drug use) was the most common of these other risk factors, with approximately 7% of TB case-patients having a history of substance abuse during the 12 months prior to their TB diagnosis. The percentage of TB cases in Minnesota with HIV co-infection has increased over the past 5 years yet remains less than that among all TB cases reported nationwide. Twelve (6%) of the 199 TB cases reported in Minnesota during 2005 were infected with HIV; eight (67%) of those HIV-infected TB case-patients were foreign born, including five persons from Ethiopia and one person each from Cameroon, China, and Liberia. Other risk groups such as homeless persons, correctional facility inmates, and residents of nursing homes each represented only 1-2% of TB cases reported in 2005.

Twenty-three (26%) of the state's 87 counties reported at least one case of TB disease in 2005, with the majority (83%) of cases occurring in the Twin

Cities metropolitan area, particularly in Hennepin (50%) and Ramsey (18%) counties, both of which have public TB clinics. Fifteen percent of TB cases occurred in the five suburban Twin Cities metropolitan counties (i.e., Anoka, Dakota, Carver, Scott, and Washington). Olmsted County, which maintains a public TB clinic staffed jointly by the Olmsted County Health Department and Mayo Clinic, represented 5% of TB cases reported statewide in 2005. The remaining 12% of cases occurred in primarily rural areas of Greater Minnesota. In 2005, the highest TB incidence rate statewide (8.6 cases per 100,000 population) was reported in Hennepin County, followed by Olmsted County (7.3 cases per 100,000 population) and Ramsey County (7.0 cases per 100,000 population).

Drug-resistant TB is a critical concern in the prevention and control of TB in Minnesota, as well as nationally and globally. The prevalence of drug-resistant TB in Minnesota, particularly resistance to isoniazid (INH) and multidrug resistance, exceeds comparable national figures. In 2005, 15 (10%) of 151 culture-confirmed TB cases were resistant to at least one first-line anti-TB drug (i.e., INH, rifampin, pyrazinamide, or ethambutol). In particular, 13 (9%) cases were resistant to INH, and four (3%) cases were multidrug-resistant (i.e., resistant to at least INH and rifampin). These data represent a decrease in the prevalence of any first-line drug resistance and INH-resistance in 2005. In comparison, from 2001 through 2004, the average annual prevalence of any first-line drug resistance among culture-confirmed TB cases in Minnesota was 17%, and the average prevalence of INH-resistance was 14%. In previous years, drug resistance has been considerably more common among foreign-born TB cases than among U.S.-born cases in Minnesota. In 2005, however, both INH resistance and multidrug-resistant (MDR)-TB were more common among U.S.-born TB cases than among foreign-born cases (10% versus 8%, and 5% versus 2%, respectively). Of particular concern, nine (38%) of 24 multidrug-resistant TB (MDR-TB) cases reported during the past 5 years (2001-2005) were resistant to all four first-line drugs. These nine pan-resistant MDR-TB case-patients represented seven different countries

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Figure 5. Tuberculosis Incidence Rates per 100,000 Population, United States and Minnesota, 1992-2005

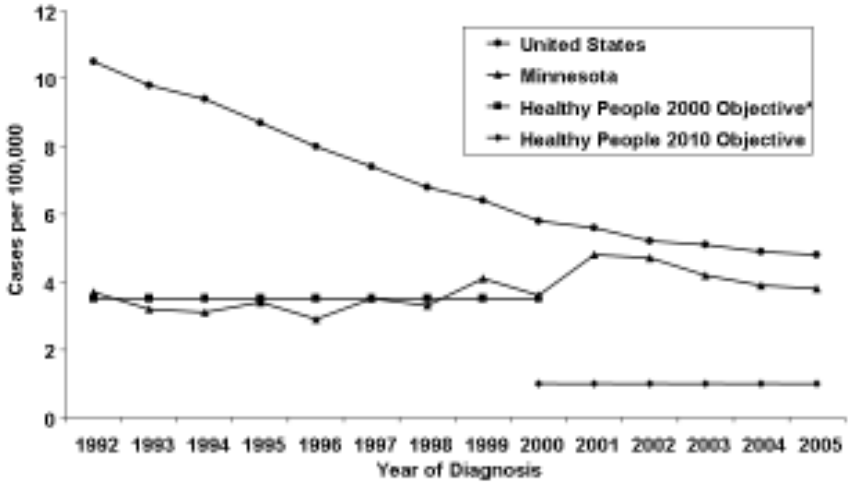


Figure 6. Foreign-Born Tuberculosis Cases by Region of Birth and Year of Diagnosis, Minnesota, 2001-2005

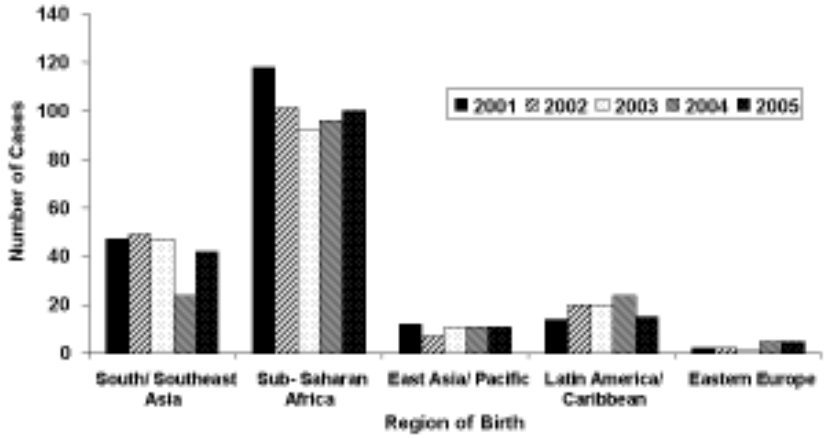
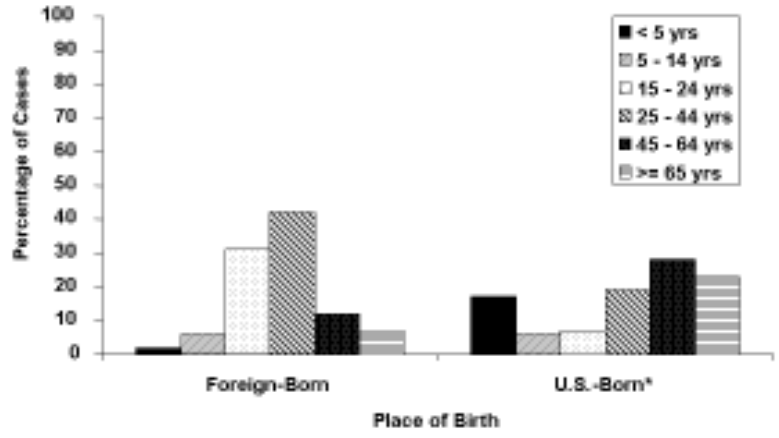


Figure 7. Tuberculosis Cases by Age Group and Place of Birth Minnesota, 2001-2005



of birth (i.e., one each from Ethiopia, Laos, Moldova, South Korea, and Thailand, and two each from Somalia and the United States). One of the two U.S.-born pan-resistant patients had resided in Africa for several years; the other was a young child infected by a foreign-born family member.

The epidemiology of TB in Minnesota highlights the need to support global TB elimination strategies, as well as local TB prevention and control activities targeted to foreign-born persons. TB in Minnesota occurs primarily, although not exclusively, among foreign-born persons, with TB case-patients representing many countries of origin and varied cultural backgrounds. Although the incidence of TB in Minnesota is less than the national rate, the prevalence of drug-resistant TB in Minnesota is high and extrapulmonary sites of disease are common, especially among foreign-born cases. The proportion of TB cases occurring in persons under 15 years of age in Minnesota exceeds the comparable figure nationally, with many of these children being born to foreign-born parents. These trends suggest that the incidence of TB in Minnesota is not likely to decrease in the foreseeable future.

Unexplained Critical Illnesses and Deaths of Possible Infectious Etiology

Surveillance for unexplained critical illnesses and deaths of possible infectious etiology began in September 1995. Any case should be reported, regardless of the patient's age or underlying medical conditions. A subset of cases (persons up to 49 years of age with no underlying medical conditions who died of apparent non-nosocomial infectious processes) are eligible for testing performed at CDC as part a special project. For cases not eligible for the CDC project, some testing may be available at MDH or CDC, at the physician's request.

Sixty-seven cases (32 deaths and 35 critical illnesses) were reported in 2005, compared to 52 cases in 2004. The cause(s) of illness subsequently were determined for 11 cases. Among the remaining 56 cases, 15 case-patients presented with respiratory symptoms; eight presented with shock/sepsis; 20 presented with neurologic symptoms; nine presented with cardiac symptoms; one presented with sudden unexpected death (SUD); one presented with hepatic symptoms; and two had illnesses that did not fit a defined syndrome. Case-patients with respiratory symptoms ranged from 4 months to 60 years of age; those with sepsis were 17 to 77 years of age; the neurologic case-patients were 1 month to 65 years of age; the cardiac case-patients were 13 and 73 years of age; the sudden unexpected death was 11 months of age; the hepatic case-patient was 17 years of age; and the case-patients without a defined syndrome were 43 and 72 years of age. Nine patients with respiratory symptoms, four patients with sepsis, two patients with neurologic symptoms, and seven patients with a cardiac syndrome died as did one patient with without a defined syndrome. Thirty patients resided in the Twin Cities metropolitan area, 16 case-patients resided in Greater Minnesota, and 10 case-patients were out-of-state residents hospitalized in Minnesota.

Thirteen cases were eligible for the CDC project (five respiratory, one sepsis, two neurologic, four cardiac case(s); and one SUD). Specimens were obtained for testing at MDH or CDC for 10 cases. Probable etiologies were established for two cases. A 34-year-old female who died with respiratory symptoms had positive 16s PCR tests for *Fusobacterium necrophorum* from tonsil and peritonsillar soft tissue samples. A 44-year-female who died with a shock/sepsis syndrome had immunohistochemical testing of multiple organ samples that were positive for *Staphylococcus aureus*. PCR testing of a blood sample was also positive for *S. aureus*.

Testing was also provided at MDH and/or CDC at the physician's request for 22 of the 43 cases that were not eligible for the CDC project. Probable etiologies were found for four of these cases. A young child with a critical illness and history of travel in China had positive PCR tests of a nasopharyngeal sample for respiratory syncytial virus and picornavirus. A 23-year-old female with a critical illness and exposure and symptoms compatible with rat-bite fever had positive 16s PCR results of a blood sample for *Streptobacillus moniliformis*. A 40-year-old asplenic male who died of shock/sepsis had immunohistochemical tests of multiple organ samples that were positive for *Streptococcus pneumoniae*. A postmortem blood sample also had a positive PCR result for *S. pneumoniae*. A 50-year-old male who died of a respiratory syndrome had immunohistochemical test results of a lung sample that were positive for *S. pneumoniae* and a PCR test result of a lung sample that was positive for picornavirus.

Viral Hepatitis A

In 2005, 36 cases of hepatitis A (0.7 per 100,000 population) were reported. Twenty-seven (75%) case-patients were residents of the Twin Cities metropolitan area, including 15 (56%) residents of Hennepin or Ramsey Counties. Thirty-one (86%) of the cases were male. Case-patients ranged in age from 3 to 66 years (median age, 25 years). Race was reported for 25 (69%) cases, of whom 20 (80%) were white, 4 (16%) were black, and one (4%) was of unknown race. No cases have been reported in American Indians since 2002. The incidence rate of hepatitis A in American Indians declined steadily from 10.4 per 100,000 population in 1999 to 6.0, 3.7, and 2.5 per 100,000, respectively, in 2000, 2001, and 2002 demonstrating the success of targeted immunization efforts initiated in 1999. Hispanic ethnicity was reported for eight cases (5.6 per 100,000).

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

Of the 36 cases, a risk factor was identified for 27 (75%). Seven (26%) had known exposure to a confirmed hepatitis A case. Four of these persons, in two separate households, became infected following exposure to a close contact, representing missed opportunities to administer immune globulin. Two cases were household contacts of two children in the same household who were adopted from Liberia. One case was a close contact of a foreign-born, adopted child.

Of the remaining 20 (74%) cases with a risk factor identified, 19 (95%) were associated with travel. Of these 19, 13 (68%) traveled to Mexico or South America, two of whom reported consuming raw shellfish. One additional case with no travel history reported consuming raw shellfish. Nine (25%) cases did not report any known

exposure or risk factors; however, two had contact with a household member enrolled in a childcare center. Young children infected with hepatitis A are often asymptomatic or have mild illness, but are efficient transmitters of disease.

Viral Hepatitis B

In 2005, 42 cases of acute hepatitis B virus (HBV) infection (0.8 per 100,000) were reported, with no deaths. The age of case-patients ranged from 19 to 60 years (median, 39 years). All 42 cases were laboratory-confirmed. Thirty-six (86%) of these case-patients had clinical symptoms, and two (5%) had documented asymptomatic seroconversions. Twenty-five (60%) were residents of the Twin Cities metropolitan area, including 16 (64%) in Hennepin County and five (20%) in Ramsey County. Twenty-eight (67%) cases were male, and 21 (50%) were adolescents or young adults between 13 and 39 years of age. Twenty (48%) were white, 13 (31%) were black, four (10%) were Asian, and one (2%) was American Indian; race was unknown for four (10%) cases. One (2%) case-patient was of Hispanic ethnicity. Although the majority of cases were white, incidence rates were higher among blacks (7.6 per 100,000), Asians (2.8 per 100,000), and Hispanics (0.7 per 100,000) than among non-Hispanic whites (0.3 per 100,000).

Twenty-six (62%) of the 42 case-patients were interviewed regarding possible modes of transmission. Nineteen (73%) reported having sexual contact with one or more partners within 6 months prior to onset of symptoms, four (21%) of whom reported sexual contact with two or more partners. Of those reporting sexual activity, eight (42%) females reported only male partners, seven (37%) males reported only female partners, three (16%) males reported only male partners, and one (5%) male reported both male and female partners. Eleven (26%) case-patients reported having contact with a known carrier of hepatitis B surface antigen (HBsAg), 10 (91%) of whom reported the contact as sexual. Three (7%) case-patients reported using needles to inject drugs, one (2%) received a body piercing within 6 months prior to onset of symptoms, and two (5%) case-patients reported a recent history of blood transfusion. (A case-patient may report more than one risk factor.)

Hepatitis B vaccine has been available since 1982, yet it continues to be underutilized in persons at greatest risk of infection. A large proportion of hepatitis B case-patients identified risk factors for sexual transmission; therefore, health care providers should discuss the need for HBV testing and vaccination with at-risk patients, including all unvaccinated adolescents, young adults, and patients seen for other sexually transmitted diseases.

In addition to the 42 hepatitis B cases, four perinatal infections were identified in infants who tested positive for HBsAg during post-vaccination screening performed between 9 and 15 months of age. All four perinatal infections occurred in infants identified through a public health program that works to ensure appropriate prophylactic treatment of infants born to HBV-infected mothers. The infants were born in the United States and had received hepatitis B immune globulin and three doses of hepatitis B vaccine in accordance with the recommended schedule (i.e., were treatment failures). Despite these treatment failures, the success of the public health prevention program is demonstrated by the fact that an additional 344 infants born to HBV-infected women during 2004 had post-serologic testing demonstrating no infection.

Viral Hepatitis C

In 2005, 15 cases of acute hepatitis C virus (HCV) infection were reported. Twelve (80%) of these case-patients had clinical symptoms, and three (20%) were asymptomatic, laboratory-confirmed cases. Eleven (73%) case-patients resided in Greater Minnesota. The median age was 29 years (range, 19 to 50 years). Eleven (73%) case-patients were male. Twelve (80%) were white, non-mixed race; one (7%) was white and American Indian; and two (13%) were of unknown race.

Among the 15 case-patients, 10 (67%) reported using needles to inject drugs. Two (13%) case-patients had sexual contact with a known anti-HCV-positive partner within 6 months prior to onset of symptoms; three (20%) had a recent tattoo. (A case-patient may report more than one risk factor.)

MDH received more than 2,600 reports of newly identified anti-HCV-positive persons in 2005, the vast majority of whom are chronically infected. Because most cases are asymptomatic, medical providers are encouraged to consider each patient's risk for HCV infection to determine the need for testing. Patients for whom testing is indicated include: persons with past or present injecting drug use; recipients of transfusions or organ transplants before July 1992; recipients of clotting factor concentrates produced before 1987; persons on chronic hemodialysis; persons with persistently abnormal alanine aminotransferase levels; healthcare, emergency medical, and public safety workers after needle sticks, sharps, or mucosal exposures to HCV-positive blood; and children born to HCV-positive women. Infants born to HCV-infected mothers should be tested at 12 to 18 months of age, as earlier testing tends to reflect maternal antibody status. Persons who test positive for HCV should be screened for susceptibility to hepatitis A and B virus infections and immunized appropriately.

Recommended Childhood and Adolescent, and Adult Immunization Schedules, Minnesota, 2006

There are several changes to the *Childhood and Adolescent* and the *Adult Immunization Schedules, Minnesota, 2006*. Both schedules consolidate recommendations of national advisory bodies such as the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics, and the American Academy of Family Physicians. In addition, the Minnesota Immunization Practices Advisory Committee (MIPAC) reviews the schedules and, as necessary, suggests modifications specific to Minnesota. Color copies are available on the Minnesota Department of Health web site at: www.health.state.mn.us/

immunize or by calling the MDH at (651) 201-5503 or 800-657-3970.

Overview of Changes: New Vaccines and Recommendations
In 2005 the U. S. Food and Drug Administration (FDA) approved four new vaccine products: a meningococcal conjugate, four-valent (MCV4) vaccine; two tetanus, reduced-diphtheria, and acellular pertussis (Tdap) vaccines for adolescents and adults; and a vaccine combining measles, mumps, and rubella with varicella (MMRV). Additionally, the FDA approved supplemental license applications for two new hepatitis A vaccine products for children age 12 months and older, and the ACIP approved revised hepatitis B recommendations for children in June 2005 and for adults in October 2005.

Changes to the Childhood and Adolescent Immunization Schedule

Hepatitis B
ACIP recommendations stress the importance of the birth dose to further reduce the incidence of missed treatment of infants born to HBsAg-positive women. In reviewing current state data, MIPAC has further stressed the importance of giving that first dose within 12 hours of birth, since the purpose of that dose is to provide a safety net for infants.

Tetanus, reduced-diphtheria toxins, and acellular pertussis (Tdap)
With the availability of two new Tdap products, ACIP now recommends that a single dose of Tdap be given in place of the Td booster usually given at the 11- to 12-year-old well-child visit. Adolescents ages 13-18 years who missed their Td booster should also receive Tdap. The new products are intended for use in individuals who have previously completed their childhood DTP/DTaP vaccination series. However, ACIP recommends that Tdap can be used as one of the doses in the three-dose primary series for previously unvaccinated persons age 10 or 11 years and older, depending on the product used (e.g., Boostrix is licensed for persons age 10 through 18 years, and Adacel is licensed for persons age 11 through 64 years). Adolescents ages 11-18 years who received Td, but not Tdap, may receive a dose of Tdap. An interval of 5 years between receipt of Td and Tdap is encouraged.

Meningococcal vaccination
In January 2005 the FDA licensed MCV4 for persons 11 through 64 years of age. ACIP recommends that all children at age 11-12 years, as well as adolescents at high school entry (15 years of age), receive a dose of MCV4. They also recommend that college freshmen living in dormitories be vaccinated with MCV4 or with meningococcal polysaccharide vaccine (MPSV). Children who are at risk for invasive meningococcal disease should also receive meningococcal vaccination. At-risk children 2 through 10 years of age should receive MPSV, and those age 11 years and older can receive MCV4.

The market demand for MCV4 has exceeded the currently available supply. As a result, it is recommended that health care providers defer the routine administration of MCV4 at the 11-12 year old immunization visit. Once supply is restored, that recommendation should resume with catch-up at age 15 years for children who were previously deferred.

Hepatitis A
The incidence of hepatitis A disease has decreased dramatically since the implementation of hepatitis A vaccination — particularly in targeted populations. Geographical areas targeted for routine vaccination now have rates of disease lower than the national average. In an effort to sustain these reduced rates and to move toward a greater reduction in overall disease burden across the nation, ACIP now recommends that all infants receive the hepatitis A vaccination series at 1 year of age (12-23 months). The series includes two doses given 6 months apart.

Influenza
A new indication for influenza vaccination has been added to the childhood schedule. Influenza vaccine should be given to children age 6 months and older with any condition (e.g., cognitive dysfunction, spinal cord injury, seizure disorder, or other neuromuscular disorder) that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk of aspiration.

Measles, mumps, rubella, and varicella (MMRV)
A new vaccine that combines measles, mumps, and rubella (MMR) with varicella, was made available in the fall of 2005. This vaccine can be used when both doses (MMR and varicella) are indicated and neither dose is contraindicated. MMRV is licensed for use in children ages 12 months through 12 years. ACIP recommends that in a varicella outbreak, a second dose is indicated.

Changes to the Adult Immunization Schedule

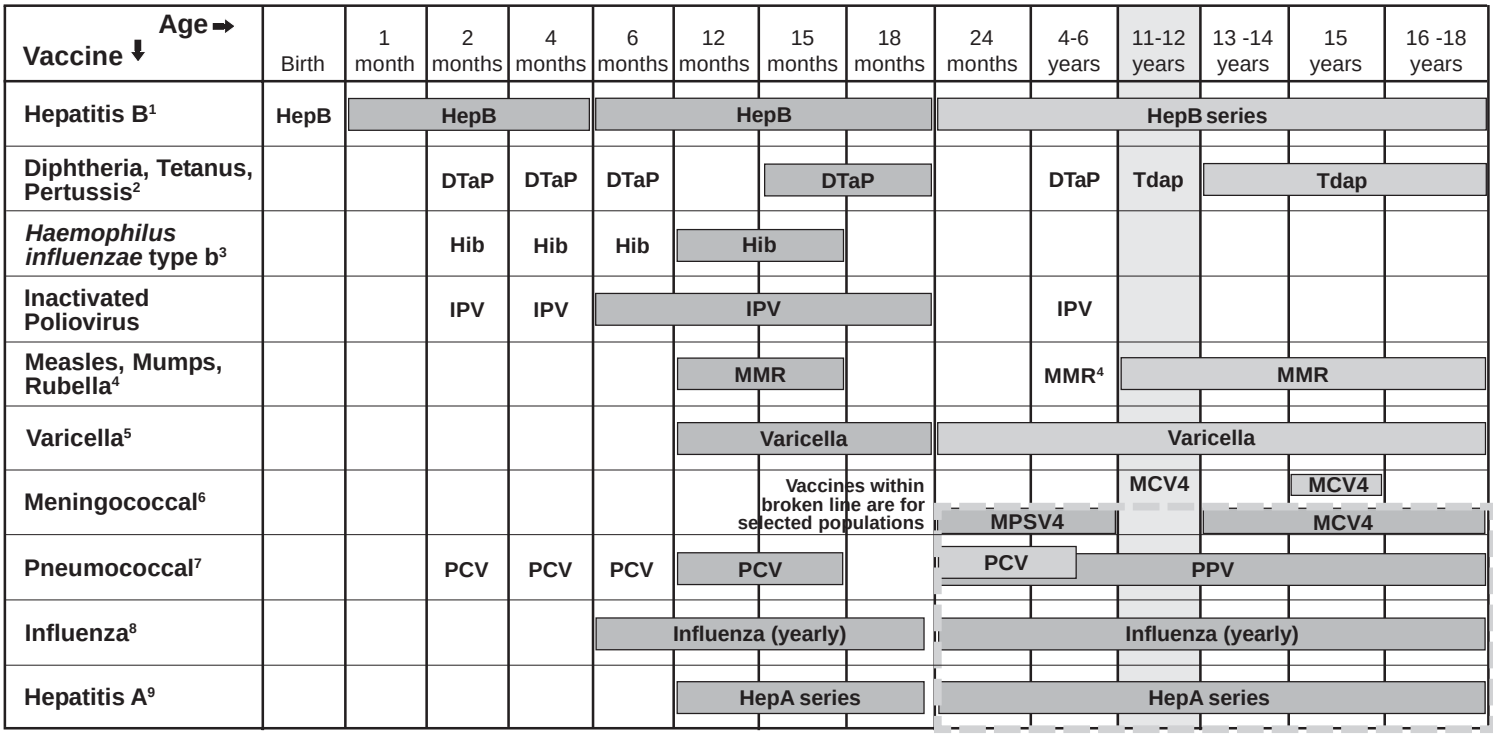
Tetanus, reduced-diphtheria, and acellular pertussis (Tdap)
A single dose of Tdap is now recommended for adults under 65 years of age in place of their 10-year booster dose of Td. Tdap is also recommended for adults having close contact with infants under 12 months of age (e.g., parents of infants, childcare providers, healthcare workers). Providers may use an interval as short as 2 years from the most recent dose that contained the tetanus toxoid.

Hepatitis B
The percentage of at-risk adults who are vaccinated against hepatitis B remains low, even though recommendations have existed for over 30 years. However, the new hepatitis B recommendations approved by the ACIP in October 2005 focus on implementation activities at the provider level, not a change in the schedule itself. The recommendations stress that healthcare settings serving adults at risk for hepatitis B disease should implement systems (e.g., standing orders, routine screening) to provide routine hepatitis B vaccination. Such settings include STD clinics, correctional institutions, dialysis units, HIV/STD screening programs, and chemical dependency treatment centers.

Meningococcal vaccination
The new four-valent meningococcal conjugate vaccine (MCV4) should be given to persons under age 55 years of age who are at risk of invasive disease or who have increased risk of exposure. Meningococcal four-valent polysaccharide vaccine (MPSV4) is an acceptable alternative when MCV4 is unavailable.

Recommended Childhood and Adolescent Immunization Schedule Minnesota * 2006

Chart must be used with guidelines below*



Guidelines: This schedule is for children through age 18 years. It indicates the recommended ages for routine administration of childhood vaccines licensed as of January 1, 2006. Any dose not given at the recommended age should be given at any subsequent visit when indicated and feasible. Indicates age groups that warrant special effort to administer those vaccines not previously given. Additional vaccines may be licensed and recommended during the year. Licensed combination vaccines may be used whenever any components of the combination are indicated and FDA-licensed for use, and the vaccine's other components are not contraindicated. Consult the manufacturers' package inserts for detailed recommendations.

Range of recommended ages **Catch-up vaccination** **Preadolescent assessment**

1. Hepatitis B (hepB): All infants should receive monovalent hepB vaccine within 12 hours of birth and before hospital discharge.
   Infants born to HBsAg-positive mothers should receive hepB and 0.5mL hepatitis B immune globulin (HBIG) at separate sites within 12 hours of birth. Test these infants for HBsAg and antibody to HBsAg (anti-HBs) at age 12 months (no earlier than age 9 months).
   Infants born to mothers whose HBsAg status is unknown should receive hepB-1 within 12 hours of birth. Maternal blood should be drawn as soon as possible to determine the mother's HBsAg status. If the HBsAg test is positive, the infant should receive 0.5mL of HBIG as soon as possible (within 7 days of birth).
   Completing the hepB vaccination series: Only monovalent hepB vaccine can be used for doses given before age 6 weeks. Monovalent or combination vaccine containing hepB may be used to complete the series. Four doses of hepB may be administered when a birth dose is given. The 2nd dose should be given at age 1-2 months, except for combination vaccines that cannot be administered before age 6 weeks. If monovalent hepB is used for the series, the dose at 4 months is not needed. The final dose in the vaccination series (3rd or 4th dose) should be given at age 6-18 months, but not before age 24 weeks.
2. Diphtheria, tetanus, and acellular pertussis (DTaP): DTaP-4 may be given as early as age 12 months if at least 6 months have passed since DTaP-3 and the child is unlikely to return at age 15-18 months. The final dose should be given at age ≥4 years.
   Tdap (tetanus and diphtheria toxoids and acellular pertussis, for adolescents) is recommended at age 11-12 years, as well as those ages 13-18 years, who have completed the childhood DTP/DTaP series and not received a Td booster dose. Subsequent tetanus and diphtheria toxoids (Td) are recommended every 10 years.
3. *Haemophilus influenzae* type b (Hib) conjugate: If PRP-OMP (PedvaxHIB or Comvax) is given at ages 2 and 4 monrhs, a Hib dose at 6 months is not required. Do not use DTaP/Hib combination products for the 1st, 2nd, or 3rd doses (primary series). Use any Hib conjugate vaccine as a booster. The final dose in the series should be given at age ≥12 months.
4. Measles, mumps, rubella (MMR): MMR-2 is recommended at age 4-6 years but may be given during any visit, provided at least 4 weeks have elapsed since MMR-1 and both doses are given at age ≥12 months. Those who have not received a 2nd dose should do so by age 11-12 years.
5. Varicella (Var): Varicella vaccine is recommended at any visit at age ≥12 months for susceptible children, i.e., those who lack a reliable history of chickenpox. Susceptible persons age ≥13 years should receive 2 doses given at least 4 weeks apart.
6. Meningococcal (MCV4): Meningococcal conjugate vaccine (MCV4) should be given to all children at age 11-12 years, as well as to unvaccinated adolescents at high school entry (age 15 years). Unvaccinated college freshmen living in dormitories should also be vaccinated, preferably with MCV4, although meningococcal polysaccharide vaccine (MPSV4) is an acceptable alternative. Those age ≥2 years at risk for invasive meningococcal disease (e.g., anatomic or functional asplenia, terminal complement deficiencies) should receive meningococcal vaccine – MPSV4 for children age 2 through 10 years; MCV4 for children age 11 years and older.
7. Pneumococcal: The 7-valent pneumococcal conjugate vaccine (PCV) is recommended for all children age 2-23 months and for certain children age 24-59 months. The final dose in the series should be given at age ≥12 months.
   Pneumococcal polysaccharide vaccine (PPV) is recommended in addition to PCV for certain high-risk groups, age ≥2 years. See *MMWR* 2000;49(RR-9):1-35.
8. Influenza: Influenza vaccine is recommended annually for children age 6–23 months because they are at substantially increased risk for influenza-related hospitalizations. It also is recommended for children age ≥2 years with certain risk factors including, but not limited to, asthma, cardiac disease, sickle cell disease, HIV, and diabetes. See *MMWR* 2005;54 [RR-8]:1-44. Children age ≥2 years who are household contacts of at-risk persons, including infants age <6 months, should also be vaccinated. Other children wishing to obtain immunity may be vaccinated. For healthy persons age 5-49 years, the intranasally administered live-attenuated influenza vaccine (LAIV) is an acceptable alternative to the intramuscular trivalent inactivated influenza vaccine (TIV). See *MMWR* 2003;52(RR-13):1-8. Children receiving TIV should receive the age-appropriate dosage: 0.25mL if age 6-35 months or 0.5mL if age ≥3 years. Children age ≤8 years who are receiving influenza vaccine for the first time should receive 2 doses separated by ≥4 weeks following a dose of TIV and 6 weeks following a dose of LAIV.
9. Hepatitis A (hepA): HepA is recommended for all children at 1 year of age. The 2 doses in the series should be administered at least 6 months apart. Additionally, give hepA vaccine to children and adolescents who are at increased risk of infection, as defined by ACIP*.

Based on recommendations of the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP), and endorsed by the Minnesota Immunization Practices Advisory Committee of the Minnesota Department of Health.

For Children and Adolescents Who Start Late or Who Are >1 Month Behind

The tables below give catch-up schedules and minimum intervals between doses for children who have delayed immunizations. There is no need to restart a vaccine series regardless of the time that has elapsed between doses. Use the chart appropriate for the child's age. Footnotes apply to both charts.

Catch-up schedule for children age 4 months through 6 years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Diphtheria, Tetanus, Pertussis	**6 weeks**	**4 weeks**	**4 weeks**	**6 months**	**6 months[1]**
Inactivated Poliovirus	**6 weeks**	**4 weeks**	**4 weeks**	**4 weeks[2]**	
Hepatitis B[3]	**Birth**	**4 weeks**	**8 weeks** (and 16 wks after 1st dose)		
Measles, Mumps, Rubella[4]	**12 months**				
Varicella	**12 months**				
***Haemophilus influenzae* type B[5]**	**6 weeks**	**4 weeks** If 1st dose given at age <12 months **8 weeks (as final dose)** If 1st dose given at age 12-14 months **No further doses needed** If 1st dose given at age ≥15 months	**4 weeks[6]** If current age <12 months **8 weeks (as final dose)[6]** If current age ≥12 months and 2nd dose given at age <15 months **No further doses needed** If previous dose given at age ≥15 months	**8 weeks (as final dose)** This dose only necessary for children age 12 months to 5 years who received 3 doses before age 12 months	
Pneumococcal[5]	**6 weeks**	**4 weeks** If 1st dose given at age <12 months and current age <24 months **8 weeks (as final dose)** If 1st dose given at age ≥12 months or current age 24-59 months **No further doses needed** For healthy children if 1st dose given at age ≥24 months	**4 weeks** If current age <12 months **8 weeks (as final dose)** If current age ≥12 months **No further doses needed** For healthy children if previous dose given at age ≥24 months	**8 weeks (as final dose)** This dose only necessary for children age 12 months to 5 years who received 3 doses before age 12 months	

Catch-up schedule for children age 7 through 18 years

Vaccine	Minimum Interval Between Doses		
	Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Booster Dose
Tetanus, Diphtheria[7]	**4 weeks**	**6 months**	**6 months** if 1st dose given at age <12 months and current age <11 years; otherwise **5 years**
Inactivated Poliovirus[8]	**4 weeks**	**4 weeks**	
Hepatitis B	**4 weeks**	**8 weeks** (and 16 weeks after 1st dose)	
Measles, Mumps, Rubella	**4 weeks**		
Varicella[9]	**4 weeks**		

1. DTaP: The 5th dose is not necessary if the 4th dose was given after the 4th birthday.
2. IPV: The 4th dose is not necessary in an all-IPV or all-OPV schedule if the 3rd dose was given after the 4th birthday. If both OPV and IPV were given as part of a series, a total of 4 doses should be given, regardless of the child's current age.
3. HepB: All children and adolescents who have not been immunized against hepatitis B should begin the hepB vaccination series during any visit. Providers should make special efforts to immunize children who were born in, or whose parents were born in, areas of the world where hepatitis B virus infection is moderately or highly endemic.
4. MMR: The 2nd dose of MMR is recommended routinely at age 4-6 years but may be given earlier if desired.
5. Hib and/or PCV: Vaccine is not generally recommended for children age ≥5 years.
6. Hib: If current age is <12 months and 1st and 2nd doses were PRP-OMP (PedvaxHIB or ComVax [Merck]), the 3rd (and final) dose should be given at age 12-15 months and at least 8 weeks after the 2nd dose.
7. Td/Tdap: Adolescent Tdap may be substituted for one of the doses in a primary catch-up series or as a booster if age appropriate for Tdap. A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose.
8. IPV: Vaccine is not generally recommended for persons age ≥18 years.
9. Varicella: Give to all susceptible children and adolescents. If the adolescent is age ≥13 years, 2 doses are needed.

Reporting Adverse Reactions

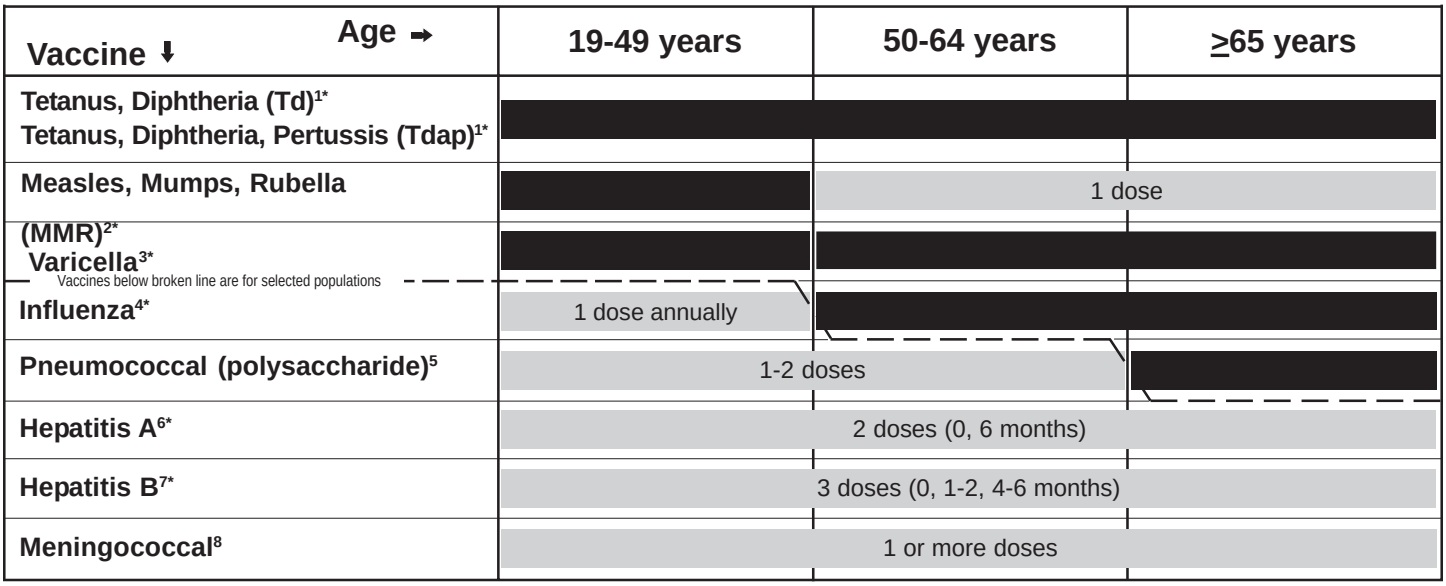
Report adverse reactions to vaccines through the federal Vaccine Adverse Event Reporting System (V.A.E.R.S.). For information on reporting reactions following vaccines administered by private clinics, call the 24-hour national toll-free information line, 800-822-7967. You may also visit www.vaers.hhs.gov. Report reactions to vaccine administered in public clinics to the Minnesota Department of Health, 651-201-5414 or toll-free 877-676-5414.

Disease Reporting

Report suspected cases of vaccine-preventable diseases to the local health department or to the Minnesota Department of Health, P.O. Box 64975, St. Paul, MN 55164-0975, 651-201-5414 or toll-free 877-676-5414.

Recommended Adult Immunization Schedule, 2006

Chart must be used with footnotes below*



*Covered by the Vaccine Injury Compensation Program (see back for more information)

For all persons in this category who meet the age requirements and who lack evidence of immunity (e.g., lack documentation of vaccination or have no evidence of prior infection)

Recommended if some other risk factor is present (e.g., based on medical, occupational, lifestyle, or other indications)

1. **Tetanus and Diphtheria (Td) and Tetanus, Diphtheria and Pertussis (Tdap):** Tdap is now recommended for adults age <65 years in place of their 10-year booster dose of Td. Tdap is also recommended for adults having close contact with infants age <12 months (e.g., parents of infants, child care providers, healthcare workers). Providers may use an interval as short as 2 years since the most recent tetanus toxoid-containing vaccine. All previously unvaccinated adults should complete a 3-dose primary series of Td. Tdap may be used for 1 of the 3 doses of the primary series in adults age <65 years. Td is recommended every 10 years as a booster for adults age ≥65 years and older.
2. **Measles, Mumps, Rubella:** Adults born before 1957 are considered naturally immune. Adults born in 1957 or later should receive 1 dose of MMR vaccine. Some adults may need 2 doses given not less than 4 weeks apart (e.g., college students, those working in healthcare facilities, and international travelers).
3. **Varicella:** Administer varicella vaccine as 2 doses separated by 4-8 weeks, to all susceptible adults, particularly those who will have close contact with persons at high risk for serious complications (i.e., healthcare workers and family contacts of immunocompromised persons). Pregnant women should be assessed for immunity to varicella and if susceptible, vaccinated in the immediate postpartum period. Evidence of immunity includes persons born in the U.S. before 1966, persons born in the U.S. between 1966 and 1997 who recall a history of varicella disease (either physician, parental, or self report), persons with a history of herpes zoster, documentation of vaccination, or laboratory evidence of immunity.
4. **Influenza:** Administer influenza vaccine annually to all adults age ≥50 years, additionally, give to adults with chronic conditions that increase their risk of complications of influenza including, cardiac and pulmonary disorders, metabolic diseases (including diabetes), renal dysfunctions, hemoglobinopathies, immunosuppression, and conditions that can compromise respiratory function or the handling of respiratory secretions (e.g., cognitive disorder, spinal cord injury, neuromuscular or seizure disorder). Also, give to household contacts, caregivers and healthcare workers of those in the above risk categories. Adults living with or providing out-of-home care to infants age <6 months should also receive annual influenza vaccination. Any adult wishing to reduce the likelihood of becoming ill with influenza may be vaccinated.
5. **Pneumococcal:** Give pneumococcal polysaccharide vaccine (PPV) to all adults age ≥65 years; and those age <65 years with chronic cardiovascular disease, chronic pulmonary disease, diabetes mellitus, alcoholism, cirrhosis, CSF leaks, functional or anatomic asplenia, HIV infection, malignancy, chronic renal failure, nephrotic syndrome, or if receiving immunosuppressive chemotherapy. Routine revaccination of immunocompetent adults previously vaccinated with PPV is not recommended; however, a one-time revaccination is recommended if a person was vaccinated ≥5 years previously and either was age <65 years when first vaccinated and is now age ≥65 years, or is at highest risk for invasive pneumococcal infection as defined by ACIP.
6. **Hepatitis A:** Give 2 doses of hepatitis A vaccine, 6 months apart to adults at increased risk for infection with hepatitis A virus (HAV). Populations at risk include persons traveling to or working in countries with intermediate to high rates of HAV, men who have sex with men, persons who use street drugs, persons with chronic liver disease, persons with clotting factor disorders, and persons working with HAV in research settings or with HAV-infected primates. Other adults wishing to obtain immunity may also be vaccinated.
7. **Hepatitis B:** Give 3 doses of hepatitis B vaccine at intervals of 0, 1, and 6 months to all at-risk adults. Indications grouped by risk are as follows. *Occupational*: healthcare workers, public safety workers, persons in training for medicine, dentistry, nursing, laboratory technology, and other allied health professions. *Behavioral*: injection-drug users, persons with more than one sex partner in the previous 6 months, persons with a recently acquired STD or a client of an STD clinic, men who have sex with men. *Other*: household contacts and sex partners of persons with chronic hepatitis B virus (HBV) infection, clients and staff of institutions for the developmentally disabled, inmates, and international travelers who will be in countries with high or intermediate prevalence of HBV for ≥6 months.
8. **Meningococcal:** Give meningococcal conjugate vaccine (MCV4) to adults age ≤55 years at-risk of invasive disease or with increased risk of exposure. Vaccinate adults with terminal complement component deficiencies, anatomic or functional asplenia, as well a persons traveling to countries with endemic meningococcal disease, military recruits, lab workers working with *N. meningitidis*, and college freshmen who will be living in dormitories. **Meningococcal polysaccharide vaccine (MPSV4)** is available for adults age >55 years who have the above risk factors. MPSV4 is an acceptable alternative when MCV4 is unavailable. For adults who have previously received MPSV4, revaccination may be necessary 5 years following initial vaccination for persons remaining at risk of meningococcal disease. The use of MCV4 for adults age 55 years and younger is preferred. For those age >55 years, MPSV4 is acceptable for revaccination. Recommendations for revaccination following MCV4 are pending.

Catch-Up Schedule and Minimum Intervals for Adults

For any vaccine given in a series, it is not necesary to start over. Refer to the table below for recommended "catch-up" schedule and minimum intervals between doses. Determine the number of previous doses of each vaccine received, find that number in the first column, and read across to the appropriate column for the next dose(s) and minimum interval(s).

Number of previous doses of each vaccine	Doses to be given and minimum intervals from previous dose for adults ≥19 years			
	First dose	**Second dose**	**Third dose**	**Booster dose**
None	**Tetanus, Diphtheria (Td)** **Tetanus, Diphtheria, Pertussis (Tdap)**	**Td:** 4 weeks after 1st dose	**Td:** 6 months after 2nd dose	**Td:** 10 years after completion of the primary series or since last booster dose
	Mealses, Mumps, Rubella (MMR)	**MMR:** 4 weeks after 1st dose		
	Pneumococcal (PPV)	**PPV:** 5 years after 1st dose for those who received 1st dose at <65 years and are now ≥65 years, or who are at highest risk for pneumococcal infection		
	Hepatitis A (HAV)	**HAV:** 6 months after 1st dose		
	Hepatitis B (HBV)	**HBV:** 4 weeks after 1st dose	**HBV:** 8 weeks after 2nd dose when catching up final dose; for an accelerated schedule the 3rd dose cannot be given sooner than 4 months after the 1st dose	
	Varicella	**Varicella:** 4 weeks after 1st dose		
One				
Two				
Three				

Guidelines for Patients with an Incomplete or Nonexistent Vaccine History

- This catch-up schedule must be used together with the guidelines printed on the previous page.
- Use all opportunities to assess the vaccination status of adult patients. At age 50, give a Tdap or Td (unless a dose has been given in the previous 10 years) and evaluate for risk factors for pneumococcal and other vaccine-preventable diseases.
- If patient has started a series (e.g., HBV) but not completed it, continue where he/she left off. Never restart a series of any vaccine (*exception: oral typhoid vaccine in some situations*).
- MMR and varicella vaccines can be given at the same visit. If not given simultaneously, they must be separated by at least 4 weeks.
- Patients do not need measles, mumps, and/or rubella vaccine if they were born before 1957, have lab evidence of immunity, or (for measles/mumps only) have physician-diagnosed disease history. Consider vaccinating women born before 1957 who may become pregnant and do not have lab evidence of immunity or physician-diagnosed disease.
- For adult patients who are refugees or immigrants, provide vaccinations as you would for any other adult patient. Translations of foreign vaccine terms and vaccine products can be found in the *MDH Provider's Guide to Immunizations* or on the MDH web site: www.health.state.mn.us/immunize.
- Patients age 18 years or older, including foreign-born adults, do not need polio vaccination unless they are traveling to a country where wild poliovirus still exists.
- A Mantoux test can be administered simultaneously with any live or inactivated vaccine. If the patient already received MMR or varicella vaccine, the Mantoux test must be delayed for at least 4 weeks after the MMR or varicella; if the Mantoux was applied first, any vaccine, including MMR and varicella, can be given at any time.
- Count only vaccinations that are well documented (i.e., including *month, year,* and preferably, *day* of vaccination). If no documentation exists, assume the patient is unvaccinated. It is always better to vaccinate when in doubt, rather than miss an opportunity to provide protection.

***Vaccine Injury Compensation Program**

When vaccinating adults with vaccines covered by the Vaccine Injury Compensation Program, a Vaccine Information Statement (VIS) must be given each time the patient receives the vaccine. The date of the edition of VIS given and date that the VIS was provided to the patient must be documented in the clinic/patient record. Other required documentation includes dates of vaccination, name of the vaccine, manufacturer, and lot number; and name, address, and title of the individual who administered the vaccine. The most current VISs can be downloaded from the MDH website at: www.health.state.mn.us/immunize.

Reporting Adverse Reactions

Report adverse reactions to vaccines through the federal Vaccine Adverse Event Reporting System (VAERS).For information on reporting reactions following vaccines administered by private clinics, call the 24-hour national toll-free information line, 800-822-7967. You may also visit . Report reactions to vaccine administered in public clinics to the Minnesota Department of Health, 651-201-5414 or toll-free 877-676-5414.

Disease Reporting

Report suspected cases of vaccine-preventable diseases to the local health department or to the Minnesota Department of Health, P.O. Box 64975, St. Paul, MN 55164-0975, 651-201-5414 or toll-free 877-676-5414.

Antimicrobial Susceptibilities of Selected Pathogens, 2005

On the following pages is the *Antimicrobial Susceptibilities of Selected Pathogens, 2005*, a compilation of antimicrobial susceptibilities of selected pathogens submitted to MDH during 2005 in accordance with Minnesota Rule 4605.7040. Because a select group of isolates is submitted to MDH, it is important to read the notes entitled "Sampling Methodology" and "Trends, Comments, and Other Pathogens." Please note the data on inducible clindamycin resistance for Group A and B *Streptococcus* and community associated methicillin resistant *Staphylococcus aureus*

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

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

	Trends, Comments and Other Pathogens
1 *Campylobacter* spp.	Ciprofloxacin susceptibility was determined for all isolates (n=746). Only 34% of isolates from patients returning from foreign travel were susceptible to quinolones. Susceptibilities were determined using 2005 CLSI (formerly NCCLS) breakpoints for *Enterobacteriaceae*. Susceptibility for erythromycin was based on an MIC < 4.0 µg/ml.
2 *Salmonella enterica* (non-typhoidal)	Antimicrobial treatment for enteric salmonellosis generally is not recommended.
3 *Neisseria gonorrhoeae*	In 2005, we tested 392 *Neisseria gonorrhoeae* isolates for antibiotic resistance including 286 (73%) from a Minneapolis STD clinic and 106 (27%) from a St. Paul STD clinic.
4 *Neisseria meningitidis*	One isolate had intermediate susceptibility (MIC of 0.12 µg/ml) and one was resistant (MIC of 0.5 µg/ml) to penicillin per the newly established CLSI (formerly NCCLS) breakpoints for *N. meningitidis*. CLSI suggests that MICs ≥ 8 µg/ml for nalidixic acid may correlate with diminished fluoroquinolone susceptibility. None of our isolates had an MIC > 2 µg/ml.
5 Group A *Streptococcus*	Of 9 isolates that were resistant to erythromycin, 1 was also resistant to clindamycin. The other 8 were susceptible but each had inducible clindamycin resistance by D-test.
6 Group B *Streptococcus*	100% (15/15) of early-onset infant, 94% (16/17) of late-onset infant, 58% (7/12) of maternal, and 90% (257/287) of other invasive GBS cases were tested. Among 48 erythromycin-resistant, clindamycin-susceptible strains, 26 (54%) had inducible resistance to clindamycin by D-test. Overall, 74% (217/293) were susceptible to clindamycin and were D-test negative (where applicable). 56% (22/39) of infant and maternal cases were susceptible to clindamycin and were D-test negative (where applicable).
7 *Streptococcus pneumoniae*	The 532 isolates tested represented 89% of 596 total cases. Of these, 14% (75/532) had intermediate susceptibility and 9% (46/532) were resistant to penicillin. Reported above are the proportions of case-isolates susceptible by meningitis breakpoints for cefotaxime and ceftriaxone (intermediate = 1.0 µg/ml, resistant ≥ 2.0 µg/ml). By nonmeningitis breakpoints (intermediate = 2.0µg/ml, resistant ≥ 4.0 µg/ml) 96% (509/532) and 99% (526/532) of isolates were susceptible to cefotaxime and ceftriaxone, respectively. Isolates were screened for high-level resistance to rifampin at a single MIC; all were ≤ 2.0 µg/ml. 17% (92/532) of isolates were resistant to two or more antibiotic classes and 12% (65/532) were resistant to 3 or more antibiotic classes.
8 *Haemophilus influenzae*	All ampicillin-resistant isolates produced ß-lactamase and were susceptible to amoxicillin-clavulanate, which contains a ß-lactamase inhibitor. Four percent of the isolates were ampicillin-intermediate and ß-lactamase negative. Only one isolate was resistant to 2 or more antibiotics.
9 Mycobacterium tuberculosis (TB)	National guidelines recommend initial four-drug therapy for TB disease, at least until first-line drug susceptibility results are known. In 2005, both resistance to isoniazid and multidrug-resistant TB (MDR-TB) were more common among U.S.-born TB cases than among foreign-born cases (10% versus 8%, and 5% versus 2%, respectively). One of the four MDR-TB cases was resistant to all four first-line TB drugs.
Community-associated Methicillin Resistant *Staphylococcus aureus* (CA-MRSA)	998 CA-MRSA cases were reported in 2005. 93% (925/998) had an isolate submitted and antimicrobial susceptibility testing was conducted on 80% (285/355) of the isolates with culture dates from January – June. 13% were susceptible to erythromycin, 60% were susceptible to ciprofloxacin, 93% were susceptible to tetracycline, 98% were susceptible to mupirocin, and 99% were susceptible to gentamicin and trimethoprim/sulfamethoxazole. All isolates were susceptible to linezolid, synercid, rifampin, and vancomycin. 14% (31/215) of erythromycin-resistant, clindamycin-susceptible isolates tested positive for inducible clindamycin resistance using the D-test. Overall 78% (221/285) were susceptible to clindamycin and D-test negative (where applicable).
Bordetella pertussis	160/161 isolates tested were susceptible to erythromycin using provisional CDC breakpoints. One isolate appeared to have reduced susceptibility to erythromycin. This isolate is undergoing further investigation.
Escherichia coli O157:H7	Antimicrobial treatment for *E. coli* O157:H7 infection is not recommended.

continued...

Antimicrobial Susceptibilities of Selected Pathogens, 2005

MINNESOTA MDH DEPARTMENT OF HEALTH

Sampling Methodology
† all isolates tested
‡ ~10% sample of statewide isolates received at MDH
# ~20% sample of statewide isolates received at MDH
§ isolates from a normally sterile site

	Campylobacter spp. [1‡]	*Salmonella* Typhimurium [2†]	Other *Salmonella* serotypes (non-typhoidal) [2‡]	*Shigella* spp. [#]	*Neisseria gonorrheae* [3]	*Neisseria meningitidis* [4†§]	Group A *Streptococcus* [5†§]	Group B *Streptococcus* [6†§]	*Streptococcus pneumoniae* [7†§]	*Haemophilus influenzae* [8†§]	*Mycobacterium tuberculosis* [9†]
Number of Isolates Tested	79	112	45	10	392	16	111	293	532	46	151
	% Susceptible										
ß-lactam antibiotics: amoxicillin									94		
ß-lactam antibiotics: ampicillin		68	93	60			100	100		63	
ß-lactam antibiotics: penicillin					3	88	100	100	77		
ß-lactam antibiotics: cefixime					100						
ß-lactam antibiotics: cefuroxime sodium									87	96	
ß-lactam antibiotics: cefotaxime							100	100	90	100	
ß-lactam antibiotics: ceftriaxone		94	98	100	100	100			92		
ß-lactam antibiotics: meropenem						100			90	100	
Other antibiotics: ciprofloxacin	79[1]	100	100	100	92	100				100	
Other antibiotics: levofloxacin						100	100	99	99		
Other antibiotics: azithromycin					32					98	
Other antibiotics: erythromycin	100						92	67	77		
Other antibiotics: clindamycin							99/92[5]	83/74[6]	91		
Other antibiotics: chloramphenicol		76	96	60		100			99	100	
Other antibiotics: gentamicin	97										
Other antibiotics: spectinomycin					100						
Other antibiotics: tetracycline	44				34		89		90	100	
Other antibiotics: trimethoprim/sulfamethoxazole		96	96	50		63	89		77	89	
Other antibiotics: vancomycin							100	100	100		
TB antibiotics: ethambutol											97
TB antibiotics: isoniazid											91
TB antibiotics: pyrazinamide											97
TB antibiotics: rifampin						100				100	97

12th Annual Emerging Infections in Clinical Practice and Public Health Conference November 2-3(half-day), 2006

Program Includes:

Travel Medicine:

- Keynote: Infections in Travelers - Martin Cetron, MD, Centers for Disease Control and Protection
- Malaria - Chandy John, MD, MS
- Amebiasis - Jonathan Ravdin, MD

Immigrant Health Issues:

- Health Issues of Immingrants - Patricia Walker, MD, DTMT& H
- Tuberculosis in Minnesota - David Williams, MD
- Panel Discussion with Case Vignettes - Drs. Cetron, John, Ravdin, Walker, Williams

Infections in the Special Host:

- Intravascular Devices - Larry Baddour, MD
- Transplant Recipients - Jo-anne van Burik, MD
- Infections in Patients on TNF Inhibitors - Robert Orenstein, DO
- Infections in Diabetics - Elie Berbari, MD

continued...

12th Annual Emerging Infections in Clinical Practice and Public Health Conference, November 2-3 (half-day), 2006 Hilton Downtown Minneapolis

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

Emerging Infections Conference Program (Cont'd)

- Keynote: Respiratory Infections - John Williams, MD, Vanderbilt University
- Prevention of Urinary Tract Infections - James Johnson, MD
- Zoonoses- Jeff Bender, DVM, MS
- Keynote: Diagnosis and Treatment of *C. difficile* - Dale N. Gerding, MD, Loyola University
- Basic Science: Apoptosis - Andrew Badley, MD
- Hot Topics from MDH - Richard Danila, PhD, MPH
- Human Rights and Emerging Infections - Steve Miles, MD
- Pandemic Influenza Update - Michael T. Osterholm, PhD, MPH

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