

Antimicrobial Susceptibilities
of Selected Pathogens, 2006



Sampling Methodology

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

		<i>Campylobacter</i> spp. 1†	<i>Salmonella</i> Typhimurium 2†	Other <i>Salmonella</i> serotypes (non-typhoidal) 2†	<i>Shigella</i> spp. ‡	<i>Neisseria gonorrhoeae</i> 3	<i>Neisseria meningitidis</i> 4§	Group A <i>Streptococcus</i> 5†§	Group B <i>Streptococcus</i> 6†§	<i>Streptococcus pneumoniae</i> 7†§	<i>Haemophilus influenzae</i> 8†§	<i>Mycobacterium tuberculosis</i> 9†
Number of Isolates Tested		77	163	54	34	328	15	158	321	578	85	177
% Susceptible												
β-lactam antibiotics	amoxicillin									96		
	ampicillin		77	93	26			100	100		72	
	penicillin					4	100	100	100	81		
	cefixime					99						
	cefuroxime sodium									90	100	
	cefotaxime							100	100	92	100	
	ceftriaxone		96	94	100	100	100			92		
	meropenem						100			91	100	
Other antibiotics	ciprofloxacin	82 ¹	100	100	100	90	100					100
	levofloxacin						100	99	99	99		
	azithromycin	99										100
	erythromycin	99						91	63	80		
	clindamycin							99/93 ⁵	82/72 ⁶	94		
	chloramphenicol		82	94	94		100			99	100	
	gentamicin	96										
	spectinomycin					99						
	tetracycline	39				40		92		91	100	
	trimethoprim/sulfamethoxazole		96	96	71		47			78	88	
	vancomycin							100	100	100		
TB antibiotics	ethambutol											98
	isoniazid											90
	pyrazinamide											94
	rifampin						100				100	98

Trends, Comments, and Other Pathogens

1 <i>Campylobacter</i> spp.	Ciprofloxacin susceptibility was determined for all isolates (n=802). Only 40% of isolates from patients returning from foreign travel were susceptible to quinolones. Most susceptibilities were determined using 2006 CLSI breakpoints for <i>Campylobacter</i> . Susceptibility for gentamicin was based on a MIC ≤ 4 µg/ml, and for azithromycin was based on a MIC ≤ 2 µg/ml (no established CLSI breakpoints).
2 <i>Salmonella enterica</i> (non-typhoidal)	Antimicrobial treatment for enteric salmonellosis generally is not recommended.
3 <i>Neisseria gonorrhoeae</i>	In 2006, we tested 328 isolates for antibiotic resistance. 227 (69%) of the isolates were submitted by the Red Door Clinic in Minneapolis and 102 (30%) by Room 111 in Saint Paul. 256 isolates were associated with heterosexual transmission, and 0.8% were resistant to ciprofloxacin. 63 isolates were associated with men who have sex with men and 27% were resistant to ciprofloxacin.
4 <i>Neisseria meningitidis</i>	According to CLSI, MICs ≥ 8 µg/ml for nalidixic acid may correlate with diminished fluoroquinolone susceptibility. No isolates had a MIC > 1 µg/ml.
5 Group A <i>Streptococcus</i>	Of 15 isolates that were resistant to erythromycin, one was also resistant to clindamycin. The other 14 were susceptible, but 10 had inducible clindamycin resistance by D-test.
6 Group B <i>Streptococcus</i>	96% (24/25) of early-onset infant, 100% (21/21) of late-onset infant, 31% (4/13) of maternal, and 89% (272/302) of other invasive GBS cases were tested. Among 60 erythromycin-resistant, clindamycin-susceptible strains, 32 (53%) had inducible resistance to clindamycin by D-test. Overall, 72% (230/321) were susceptible to clindamycin and were D-test negative (where applicable). 80% (39/49) of infant and maternal cases were susceptible to clindamycin and were D-test negative (where applicable).
7 <i>Streptococcus pneumoniae</i>	The 578 isolates tested represented 91% of 634 total cases. Of these, 11% (66/578) had intermediate susceptibility and 8% (46/578) 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 = 2.0 µg/ml, resistant ≥ 4.0 µg/ml), 98% (566/578) and 98% (569/578) of isolates were susceptible to cefotaxime and ceftriaxone respectively. Isolates were screened for high-level resistance to rifampin; all were ≤ 2 µg/ml. 15% (86/578) of isolates were resistant to two or more antibiotic classes and 9% (52/578) were resistant to three or more antibiotic classes.
8 <i>Haemophilus influenzae</i>	28% of the isolates were nonsusceptible to ampicillin (26% were ampicillin-resistant and 2% were ampicillin-intermediate) and produced β-lactamase, but were susceptible to amoxicillin-clavulanate, which contains a β-lactamase inhibitor. Three isolates were multidrug-resistant to two antibiotics (trimethoprim/sulfamethoxazole and ampicillin).
9 <i>Mycobacterium tuberculosis</i> (TB)	National guidelines recommend initial four-drug therapy for TB disease, at least until first-line drug susceptibility results are known. Of the 27 drug-resistant TB cases reported in 2006, 23 (85%) were in foreign-born persons, including one of two multidrug-resistant (MDR-TB) cases (i.e., resistant to at least isoniazid [INH] and rifampin). One of the two MDR-TB cases also met the case definition for extensively drug-resistant TB (XDR-TB) (i.e., resistance to at least INH, rifampin, any fluoroquinolone, and at least one second-line injectable drug).
Community-associated Methicillin Resistant <i>Staphylococcus aureus</i> (CA-MRSA)	1,453 CA-MRSA cases were reported in 2006. Antimicrobial susceptibility testing was conducted on 493 isolates from CA-MRSA cases (425 isolates from cases < 18 years and 67 isolates from cases > 18 years*) 71% were susceptible to ciprofloxacin, 17% were susceptible to erythromycin, 97% were susceptible to mupirocin, (MIC < 4µg/ml) 99% were susceptible to rifampin, and 96% were susceptible to tetracycline. All isolates were susceptible to gentamicin, linezolid, trimethoprim/sulfamethoxazole, and vancomycin. 10% (38/381) of erythromycin-resistant, clindamycin-susceptible isolates tested positive for inducible clindamycin resistance (ICR) using the D-test. Overall, 87% (429/493) were susceptible to clindamycin and D-test negative (where applicable). * Several differences were noted when 2006 CA-MRSA isolate susceptibility results from cases < 18 years were compared to those > 18 years. Isolates from patients > 18 years were less likely to be susceptible to erythromycin (10% vs. 19%) and ciprofloxacin (60% vs. 73%). Isolates from cases > 18 years were also more likely to demonstrate ICR (22% vs. 8%) and therefore were less likely to be susceptible to clindamycin (70% vs. 89%) than were isolates from cases < 18 years.
<i>Bordetella pertussis</i>	Erythromycin susceptibility testing was performed on 41 <i>B. pertussis</i> isolates. All 41 were susceptible to erythromycin using provisional CDC breakpoints.
<i>Escherichia coli</i> O157:H7	Antimicrobial treatment for <i>E. coli</i> O157:H7 infection is not recommended.

Reportable Diseases, MN Rule 4605.7040

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**

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, 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.

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**

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**
Leptospirosis (Hansen's disease) (*Mycobacterium leprae*)
Leptospirosis (*Leptospira interrogans*)

Sentinel Surveillance (at sites designated by the Commissioner)

Methicillin-resistant *Staphylococcus aureus*

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Minnesota Department of Health
 625 North Robert Street
 PO Box 64975
 St. Paul, MN 55164-0975
www.health.state.mn.us

To Report a Case:

Fill out a Minnesota Department of Health case report form and mail to the above address. For diseases that require immediate reporting, or for questions about reporting, call the Acute Disease Investigation and Control Section at: 651-201-5414 or 1-877-676-5414 or fax form to 651-201-5743.

To Send an Isolate to MDH:

If you are sending an isolate by U.S. mail, use regulatory compliant transport packaging and send to: PO Box 64899, St. Paul, MN 55164. If you are using a courier, use transport packaging appropriate for the specific courier and send to: 601 North Robert Street, St. Paul, MN 55155. To request pre-paid transport labels (both mail and courier) and packaging, or for other assistance, call the Public Health Laboratory Specimen Handling Unit at: 651-201-4953.

The MDH Antibiogram is available on the MDH web site (<http://www.health.state.mn.us>). Laminated copies can be ordered from: Antibiogram, Minnesota Department of Health, Acute Disease Investigation and Control Section, 625 North Robert Street, PO Box 64975, St. Paul, MN 55164-0975.

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 (*Chlamydia psittaci*)
Retrovirus infection

Reye syndrome
Rheumatic fever (cases meeting the Jones Criteria only)
Rocky Mountain spotted fever (*Rickettsia rickettsii*, *R. canadensis*)
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**