

Antimicrobial Susceptibilities of Selected Pathogens, 2009



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>Mycobacterium tuberculosis</i> 8†
Number of Isolates Tested	83	103	46	7	122	16	170	408	639	120

% Susceptible

β-lactam antibiotics	amoxicillin									88	
	ampicillin		81	85	86		94	100	100		
	penicillin					0	94	100	100	75	
	cefixime					100					
	cefuroxime sodium									84	
	cefotaxime							100	100	87	
	ceftriaxone		98	96	100	100	100			87	
	meropenem						100			87	

Other antibiotics	ciprofloxacin	76 ¹	99	100	100	92	100				
	levofloxacin						100	99	99	99	
	azithromycin	98				100	100				
	erythromycin	98						86	58	72	
	clindamycin							98/91 ⁵	75/66 ⁶	87	
	chloramphenicol		85	94	86					99	
	gentamicin	82									
	spectinomycin					100					
	tetracycline	34					37		93	87	
	trimethoprim/sulfamethoxazole		94	96	14		75			79	
	vancomycin							100	100	100	

TB antibiotics	ethambutol									98
	isoniazid									90
	pyrazinamide									93
	rifampin						100			98

Trends, Comments, and Other Pathogens

1 <i>Campylobacter</i> spp.	Ciprofloxacin susceptibility was determined for all isolates (n=823). Only 30% of isolates from patients returning from foreign travel were susceptible to quinolones. Most susceptibilities were determined using 2009 CLSI breakpoints for <i>Campylobacter</i> . Susceptibilities for gentamicin and azithromycin were based on an MIC ≤ 2µg/ml.
2 <i>Salmonella enterica</i> (non-typhoidal)	Antimicrobial treatment for enteric salmonellosis generally is not recommended.
3 <i>Neisseria gonorrhoeae</i>	Routine resistance testing for <i>Neisseria gonorrhoeae</i> by MDH PHL was discontinued in 2008. Susceptibility results were obtained from the CDC Regional Laboratory in Cleveland, Ohio, and are for isolates obtained through the Gonococcal Isolate Surveillance Program. Isolates (n =122) were received from the Red Door Clinic in Minneapolis. 85% were susceptible to cefpodoxime. Resistance criteria for cefixime, cefpodoxime, and azithromycin have not been established; data reflect reduced susceptibility using provisional breakpoints [minimum inhibitory concentration (MIC) ≥0.5 µg/ml, ≥0.5 µg/ml, and ≥ 2.0µg/ml, respectively].
4 <i>Neisseria meningitidis</i>	In 2009, 1 case-isolate demonstrated intermediate susceptibility to penicillin and ampicillin, as well as resistance to trimethoprim/sulfamethoxazole. There were no 2009 case-isolates with ciprofloxacin resistance. In 2008, 2 isolates obtained from cases occurring in northwestern Minnesota had nalidixic acid MICs >8 µg/ml and ciprofloxacin MICs of 0.25 µg/ml, indicative of resistance.
5 Group A <i>Streptococcus</i>	The 170 isolates tested represent 90% of 189 total cases. Among 19 erythromycin-resistant, clindamycin-susceptible isolates, 11 (58%) had inducible resistance to clindamycin by D-test.
6 Group B <i>Streptococcus</i>	100% (16/16) of early-onset infant, 100% (21/21) of late-onset infant, 50% (3/6) of maternal, and 90% (368/411) of other invasive GBS cases were tested. Among 71 erythromycin-resistant, clindamycin-susceptible isolates, 36 (51%) had inducible resistance to clindamycin by D-test. Overall, 66% (270/408) were susceptible to clindamycin and were D-test negative (where applicable). 75% (30/40) of infant and maternal cases were susceptible to clindamycin and were D-test negative (where applicable).
7 <i>Streptococcus pneumoniae</i>	The 639 isolates tested represented 93% of 686 total cases. Reported above are the proportions of case-isolates susceptible by meningitis breakpoints for cefotaxime, ceftriaxone (intermediate = 1.0 µg/ml, resistant ≥ 2.0 µg/ml) and penicillin (resistant ≥ 0.12 µg/ml). By nonmeningitis breakpoints (intermediate = 2.0 µg/ml, resistant ≥ 4.0 µg/ml), 92% (590/639) of isolates were susceptible to cefotaxime and ceftriaxone. By nonmeningitis breakpoints (intermediate = 4.0 µg/ml, resistant ≥ 8.0 µg/ml), 90% (575/639) of isolates were susceptible to penicillin. Isolates were screened for high-level resistance to rifampin at a single MIC; all were ≤ 2 µg/ml. 21% (136/639) of isolates were resistant to two or more antibiotic classes and 17% (111/639) were resistant to three or more antibiotic classes. (CLSI also has breakpoints for oral penicillin V; refer to the most recent CLSI recommendations for information).
8 <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 20 drug-resistant TB cases reported in 2009, 17 (85%) were in foreign-born persons, including 2 of the 3 multidrug-resistant (MDR-TB) cases for 2009 (i.e., resistant to at least isoniazid [INH] and rifampin). There were no cases of extensively drug-resistant TB (XDR-TB) (i.e., resistance to at least INH, rifampin, any fluoroquinolone, and at least one second-line injectable drug).
Invasive methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	3,401 cases of MRSA infection were reported in 2009 through 12 sentinel sites, of which 206 (6%) were invasive (blood isolates were 77% of 206). Of these invasive cases, 72% (149/206) had an isolate submitted and antimicrobial susceptibility testing conducted. Of invasive cases with an isolate, 77% were epidemiologically classified as healthcare-associated. Susceptibilities were as follows: 100% to daptomycin, doxycycline, linezolid, minocycline, quinupristin/dalfopristin, and vancomycin; 99% to gentamicin, mupirocin, rifampin, tetracycline, trimethoprim/ sulfamethoxazole; 25% to levofloxacin; 9% to erythromycin. 52% were susceptible to clindamycin by broth microdilution; however, an additional 31 isolates (21%) were positive for inducible clindamycin resistance by D-test (32% susceptible and D-test negative). Of community-associated (CA) cases (71% of 48 had isolates), susceptibilities were as follows: 100% to daptomycin, doxycycline, gentamicin, linezolid, minocycline, quinupristin/dalfopristin, rifampin, trimethoprim/sulfamethoxazole, vancomycin; 97% to mupirocin, tetracycline; 62% to levofloxacin; 15% to erythromycin. 74% were susceptible to clindamycin by broth microdilution; however, an additional 4 isolates (17%) were positive for inducible clindamycin resistance by D-test (62% susceptible and D-test negative). In addition to sentinel reporting, MDH received reports of 3 case isolates (1 MRSA and 2 MSSA) with intermediate resistance to vancomycin (MIC 4-8 µg/ml).
<i>Bordetella pertussis</i>	In 2009 no cases of pertussis were tested for susceptibility in Minnesota. Nationally, only 11 erythromycin-resistant <i>B.pertussis</i> cases have been identified to date.
<i>Escherichia coli</i> O157:H7	Antimicrobial treatment for <i>E. coli</i> O157:H7 infection is not recommended.

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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

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**
- Cronobacter (Enterobacter) sakazakii* (infants under 1 year of age) a**
- 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**
- Giardiasis (*Giardia lamblia*)**
- Gonorrhea (*Neisseria gonorrhoeae*) c**
- Guillain-Barre' syndrome**
- 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**
- 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 (*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**
- Yersinia* spp., enteric (*Yersinia* spp.) a**

Sentinel Surveillance (at sites designated by the Commissioner)

Methicillin-resistant *Staphylococcus aureus*
Clostridium difficile

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.