2012 ANTIBIOGRAM FOR SELECTED BACTERIA OF PUBLIC HEALTH AND CLINICAL SIGNIFICANCE: ISOLATES COLLECTED BY CLINICAL LABORATORIES IN MONTANA

The Montana Department of Public Health and Human Services monitors antimicrobial susceptibility testing (AST) and has provided a statewide antibiogram annually since 2005. For the 2012 analyses, AST data were collected from 26 laboratories (red pins with black dots on map) and over 40,000 isolates were tested throughout the state. Data from each participating laboratory are compiled to create a statewide antibiogram using the methodology described by the Clinical and Laboratory Standards Institute (CLSI). Data are presented as the mean ± standard error of the mean (SEM) and variability is also assessed through the calculation of a coefficient of variation (CV). When the CV exceeds 20% it is annotated on the antibiogram and can be due to a single outlier, low sample number, or significant differences amongst values reported by each facility. The utilization of CLSI performance standards (M100 Table) is paramount to successful antimicrobial identification and guidance of treatment. Most variability in the 2012 AST data could be attributed to facility-dependent factors such as patient population. There are other instances of improbable results that include: 46 isolates of K. pneumoniae reported as ampicillin-susceptible, 244 isolates of P. aeruginosa reported as cefepime-resistant, continued reporting of penicillin susceptibility for methicillin-resistant S. aureus (MRSA) isolates, and 23 isolates of methicillin-susceptible S. aureus (MSSA) reported as not susceptible to oxacillin (likely a clerical error).

The present analyses include the reporting of resistant organisms of major public health significance. Of the isolates reported for the Enterobacteriaceae family (E. coli, K. pneumoniae, Enterobacter spp.), 183 (0.4%) were not susceptible to carbapenems. Only 82 potentially resistant isolates had been submitted to the MT Public Health Laboratory (PHL) for confirmation. Of these, only 15 isolates were positive using the modified Hodge test. Carbapenem-resistant Enterobacteriaceae (CRE) are categorized as “urgent threats” in a recently published CDC document, and every one of these isolates should be forwarded to the MT PHL. Another finding was the reporting of isolates of the Enterococcus species as not susceptible to vancomycin. Of isolates differentiated and reported as E. faecalis or E. faecium, 110 (4% of total tested; down from 6% in 2011) were reported as not susceptible to vancomycin. The aforementioned CDC report lists these organisms as “serious threats”, with vancomycin-resistant Enterococcus (VRE)-associated illness causing more than 1000 deaths per year in the U.S.

Over 2000 isolates are designated as MRSA for 2012 (33% of all S. aureus isolates differentiated as MRSA or MSSA), numbers that are roughly equal to those found in the 2011 analyses. Over twice that number of isolates (>4000) are reported as MSSA; however, 2 of these isolates are reported as not susceptible to vancomycin (i.e. VISA and VRSA). This is a significant decrease from the 2011 report, where a dozen unconfirmed VISA/VRSA isolates were reported. This change may have been due to a true decrease in the number of VISA/VRSA reported or, more than likely, due to absence of data from those laboratories which reported in 2011 but not in 2012.

According to MT PHL 2012 records, VISA/VRSA isolates from three separate patients were submitted for confirmation. Of these, one was VISA/VRSA negative (also MRSA negative), two were VISA positive by E-test, and one was referred to the CDC. Broth microdilution did not confirm VISA in this case. VISA/VRSA have been designated “concerning threats” and, although their incidence may be low, the infections prove extremely difficult to treat. Please note that, under the updated rules in the Laboratory Reporting of Communicable Diseases in Montana, all suspected or confirmed isolates of CRE and VISA/VRSA must be submitted to the state Public Health Laboratory for confirmation and further characterization.
2012 Montana Antibiogram. Data were collected from January 1 through December 31. The antibiogram reflects data submitted by 26 clinical laboratories throughout the state (see map). Note: data are presented for surveillance purposes only and should not be used solely in the determination of therapy for individual patients. Number of isolates tested for each drug is displayed in red font; percentage of isolates susceptible to each drug (expressed as mean ± SEM) is shown in black font; *data from five laboratories or fewer (minimum of two); green square indicates variability in the data set with a coefficient of variation (CV) greater than 20%; gray square indicates either no tests performed or fewer than thirty isolates submitted; orange square indicates a possible reporting error or isolates that are a cause of concern.

5) Mean ± SEM was calculated using the percent susceptible submitted by each laboratory for each drug/organism combination. N values (i.e. number of laboratory submittals) ranged from 2 to 26.