State of Alaska Epidemiology Bulletin

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Regional Antibiogram Project — Alaska, 2014–2015

Background

Antibiograms are profiles of antimicrobial resistance and susceptibility patterns for bacterial isolates. Hospitals make antibiograms for health care providers to help them select appropriate "presumptive" antimicrobial therapy for their patients until specific individual laboratory test results are available. The Alaska Antimicrobial Stewardship Collaborative (A2SC) recommended developing both state and regional antibiograms to support antimicrobial stewardship programs.

Statewide and regional antibiograms are helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area. Of particular use in Alaska, where many hospitals are very small, aggregating data yields a larger sample size, facilitating pattern recognition. Statewide and regional antibiograms also help public health practitioners detect and monitor large-scale resistance trends.

Methods

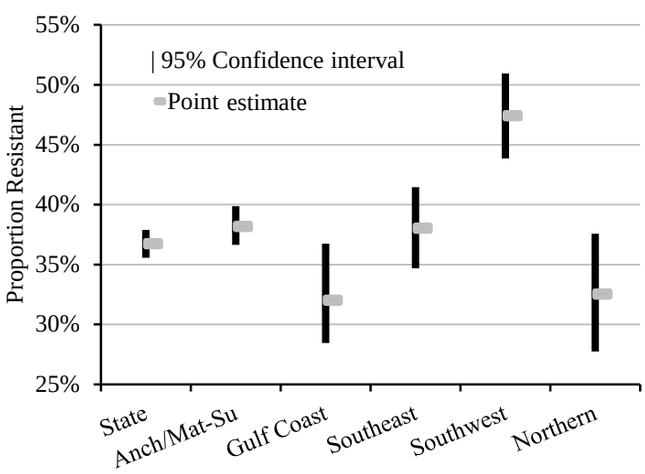
In February 2016, the Alaska Section of Epidemiology (SOE) requested hospital microbiologists statewide to submit the most recent antibiogram data they had available that represented a 12-month consecutive period during 2014–2015. SOE multiplied the percent susceptible displayed on the antibiogram by the number of tested isolates for each species to calculate the number of susceptible isolates. Numbers were summed by region and state and percentages were calculated. Regions were based on the Bureau of Labor and Workforce Development regions. Data were edited following the best practices suggested by the Clinical and Laboratory Standards Institute (CLSI).[1]

Regions were compared for certain resistance phenotypes of particular interest, such as the proportions of *Staphylococcus aureus* resistant to methicillin, *Escherichia coli* resistant to fluoroquinolones, and *Pseudomonas aeruginosa* resistant to piperacillin-tazobactam. For comparisons between regions, Clopper-Pearson binomial confidence intervals were calculated.

Results

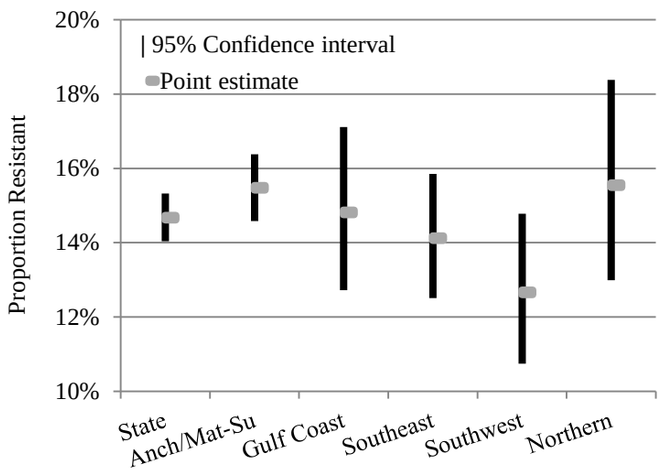
Eighteen health care facilities provided antibiogram data. Limited results are presented here; more comprehensive results are available online.[2] Statewide, 37% of *S. aureus* isolates were resistant to methicillin; the proportion of methicillin-resistant *S. aureus* (MRSA) isolates in the Southwest region was significantly higher than all other regions (Figure 1).

Figure 1. Proportion of *S. aureus* Isolates Resistant to Methicillin (MRSA), by Region — Alaska, 2014 and 2015



Statewide, 15% of *E. coli* isolates were resistant to ciprofloxacin, a fluoroquinolone. The proportion of isolates resistant to ciprofloxacin did not differ significantly between regions (Figure 2); similar results were obtained for levofloxacin.[2] There were no significant regional differences for *P. aeruginosa* resistance to piperacillin-tazobactam.[2]

Figure 2. Proportion of *E. coli* Isolates Resistant to Ciprofloxacin, by Region — Alaska, 2014 and 2015



Discussion

Statewide antibiograms for Alaska are now available online.[2] In 2001, a partial antibiogram for hospitals with >50 beds was created, which indicated that 9%–27% of *S. aureus* were resistant to methicillin.[3] This is lower than the 2014–2015 statewide value (37%), indicating that the proportion of MRSA appears to have risen over the past 15 years.

No comparisons to national estimates were made, as national data from a similar source population were not available.

There are some important limitations to these results. First, the hospitals differed in their methods of deciding which bacterial isolates undergo antimicrobial susceptibility testing and the actual testing methods. Second, isolates are classified by hospital region, which may not always be the region of patient residence. Finally, hospitals used different 12-month periods of data between January 2014 to December 2015.

Recommendations

1. Health care facilities should engage in antibiotic stewardship activities to protect the efficacy of antibiotics and prevent future harm to patients.
2. Antibiotic stewardship programs at health care facilities should monitor trends in antibiotic resistance over time, and consider comparing their results with those of their region.
3. Health care providers interested in antibiotic stewardship in Alaska and A2SC should visit the following link for more information: http://www.ashnha.com/antimicrobial-stewardship/

Acknowledgements

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References

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(Contributed by: Anna Frick, MPH, Section of Epidemiology.)