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Combined Antibiogram for Hospitals with >50 beds – Alaska, 2001

Background

In 1997, the Arctic Investigations Program (AIP), Centers for Disease Control and Prevention (CDC), summarized facility antibiograms from the five >100-bed hospitals in Alaska.[1] Although this method has limitations in capturing complete and representative data, summary antibiograms provide a rapid and simple estimate of community-specific antimicrobial susceptibilities.[2,3] To update the 1997 AIP study, we compiled hospital antibiogram data through 2001.

Methods

Annual facility antibiograms were requested from Alaska hospitals with >50 beds. Data fields were similar to the 1997 AIP study with several fields added as suggested by a recent study.[4] Data were not available in a uniform manner from each facility with respect to specimen collection site (i.e., sterile or not), or patient location (i.e., in- versus out-patient).

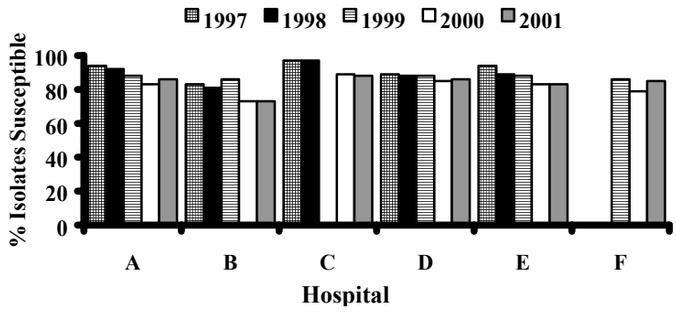
Results

Susceptibility data from 2001 were compiled for select bacteria and antimicrobials (Table 1). Of the eight hospitals providing data, seven used automated Vitek machines (Vitek Systems) to assess resistance for most organisms; one facility used an automated MicroScan (Dade-Behring, Inc.). For *Streptococcus pneumoniae*, four facilities used E-tests to assess resistance; two each used manual MicroStrips (Dade-Behring, Inc.) or traditional Kirby-Bauer disk diffusion. For some facilities, supplemental confirmatory methods were also used, e.g., oxacillin disk diffusion for *Staphylococcus aureus*.

Discussion

Susceptibilities of particular antimicrobials to organisms varied among hospitals, as did the number of isolates from each species evaluated (Table 1). More extensive data with additional bacteria-antimicrobial combinations and 5-year (1997-2001) trends of select combinations are available elsewhere.[5] One combination, *Staphylococcus aureus* and oxacillin, worth mentioning here, demonstrated a downward trend in susceptibility over time for most facilities with at least 3 years of data (Figure 1). Trends were significant ($p < 0.01$) by Chi-squared statistics for Facilities A, B, C, and E.

Figure 1. *Staphylococcus aureus* Isolates, % Susceptible to Oxacillin, Alaska, 1997-2001.



MRSA or methicillin-resistant *S. aureus* (assessed by resistance to oxacillin) has been associated with outbreaks of boils or other skin infections in Alaska.[6] Monitoring statewide and facility-specific resistance trends can help document the future public health burden of MRSA in Alaska.

Although antibiogram summaries yield less specific information compared to prospective or active surveillance, they can provide a quick overview of susceptibilities in the State and be used to monitor possible trends in resistance. In the future, other bacteria can be added as they gain in relevance or concern, or other antimicrobials added as usage or resistance patterns change.

References

1) Combined antibiogram for Alaska hospitals with >100 beds, 1997. AIP/CDC www2.cdc.gov/ncidod/aip/AR/Antimicrobial%20Resistance.asp.
2) Chin AE, Hedberg K, Cieslak PR, et al. Tracking drug-resistant *Streptococcus pneumoniae* in Oregon: An alternative surveillance method. *Emerg Inf Dis* 1999;5(5):688-693.
3) Stein CR, Weber DJ, Kelley M. Using hospital antibiogram data to assess regional pneumococcal resistance to antibiotics. *Emerg Inf Dis* 2003;9(2): 211-216.
4) Fridkin SK, Hill HA, Volkova NV, et al. Temporal changes in prevalence of antimicrobial resistance in 23 U.S. hospitals. *Emerg Inf Dis* 2002;8(7): 697-701.
5) Alaska Section of Epidemiology, unpublished data.
6) Baggett HC, Hennessy TW, Leman R, et al. An outbreak of community-onset methicillin-resistant *Staphylococcus aureus* skin infections in southwestern Alaska. *Infect Control Hosp Epidemiol* 2003;24(6):397-402.

Table 1. Combined Antibiogram, % Isolates Susceptible (# Tested), for Hospitals with >50 Beds – Alaska, 2001.

Hospital	A	B	C	D	E	F	H*	I	% Susceptible
Pseudomonas aeruginosa									
gentamicin	89 (35)	87 (173)	75 (99)	87 (127)	71 (630)	91 (33)	85 (20)	100 (21)	75–100
ciprofloxacin	74 (35)	69 (173)	64 (99)	80 (128)	70 (630)	79 (33)	85 (20)	67 (21)	64–85
ceftazidime	74 (35)	84 (173)	82 (99)	---	94 (630)	88 (33)	100 (20)	76 (21)	74–100
Streptococcus pneumoniae									
penicillin	72 (18)	93 (14)	100 (16)[a]	68 (63)	69 (177)	94 (16)[b]	100 (8)	57 (14)	57–100
erythromycin	83 (18)	---	---	71 (63)	72 (158)	---	100 (8)	50 (14)	50–100
3rd gen. cephalosporin	---	100 (13)	---	85 (62)	87 (177)	---	100 (8)	79 (14)	79–100
Klebsiella pneumoniae									
ciprofloxacin	100 (85)	99 (184)	94 (80)[c]	99 (119)	95 (324)	100 (35)[c]	100 (30)	100 (33)	94–100
cefazolin	99 (85)	87 (184)	89 (80)[c]	97 (119)	96 (324)	83 (35)[c]	94 (30)	85 (33)	83–99
Enterococcus spp.									
ampicillin	---	96 (141)	89 (89)	96 (210)	97 (476)	---	100 (21)	100 (40)[d]	89–100
vancomycin	100 (38)	100 (141)	93 (89)	99 (208)	99 (476)	100 (11)	100 (21)	98 (40)[d]	93–100
gentamicin-500	84 (38)	91 (141)	---	---	86 (173)	0 (11)	---	---	0–91
Staphylococcus aureus									
oxacillin	86 (108)	73 (701)[c]	88 (184)	86 (351)	83 (1115)	85 (91)	82 (67)	91 (112)	73–91

--- Indicates isolates not evaluated for a particular antibiotic.
*Antibiogram for Hospital G was not available for 2001.
[a]Oxacillin implies penicillin activity.
[b]Only blood and CSF isolates tested.
[c]Results included all *Klebsiella spp.* isolates.
[d]Only *Enterococcus faecalis* isolates tested.
[e]Results reported for all coagulase-positive staphylococci.

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