2023 Alaska State Antibiogram

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2023. These data were aggregated from the antibiograms produced by Alaska hospitals to create aggregate regional resistance pattern summaries. These antibiograms can be helpful for health care providers in selecting appropriate empiric antimicrobial therapy for their patients until specific individual laboratory test results are available. They can also be helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area.

- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when more than one facility provided data for the given species-antibiotic combination and when at least 30 total isolates are included. Intrinsic resistance is indicated with an "R", following the guidance of CLSI document M100-S24. Tribal health facilities and many smaller hospitals customarily include both inpatient and outpatient isolates, while some hospitals may only include inpatients.
- **Multi-Drug Resistant Organisms of Note:**
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA): no cases of VRSA have ever been reported in Alaska. VRSA stopped being reportable to Section of Epidemiology in 2023.
  - Carbapenem-resistant Enterobacterales (CRE): there were 31 cases of CRE reported in 2023. Six were carbapenemase-producing, which are described in the Region sections.
  - Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): there were 37 cases of CRPA reported in 2022. The increase is likely at least partly due to improvements in reporting. None were carbapenemase-producing.
  - Carbapenem-resistant *Acinetobacter baumanii* (CRAB): One case of CRAB was reported in 2023; it was not carbapenemase-producing.
  - *Candida auris:* One case of *C. auris* was identified in an Alaska resident. This case was associated with an outbreak occurring at a healthcare facility in a different state.
- **Limitations:** Individual facilities often use different methods to test for antimicrobial susceptibility, different methods to build their antibiograms, and different antibiotics in their pharmacies. These factors limit interpretation of these data. Additionally, antimicrobial susceptibility testing done in the laboratory does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- **Contributing Facilities:** Thanks to all the hospitals in Alaska for participating in this project to the extent of their ability. These statewide data include all the hospitals used in the Regional Antibiograms, plus Fairbanks Memorial Hospital.

For more information and the methods used for the analyses, please see the "Regional Antibiogram Project — Alaska, 2014–2015" Epidemiology *Bulletin*.

Species	Penicillin	Ampicillin	Oxacillin	Ampicillin-sulbactam	Amoxicillin	Cefazolin	Ceftriaxone	Cefotaxime	Ciprofloxacin	Levofloxacin	Daptomycin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Gent Syn	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin
Total *Staphylococcus aureus*	**14%** (526)		**64%** (4722)	**57%** (246)	**53%** (68)	**61%** (2008)	NED		**72%** (1687)	**70%** (3199)	**99%** (531)	**84%** (4717)	**54%** (1062)	**99%** (4722)	**99%** (2517)		**97%** (4722)	**99%** (4542)	**95%** (4523)	**99%** (3069)
MSSA	**23%** (246)		**S**		**100%** (36)		**100%** (422)		**93%** (527)	**93%** (1517)	**99%** (140)	**88%** (2460)	**65%** (129)	**100%** (2475)	**99%** (1057)		**97%** (2439)	**100%** (2326)	**96%** (2321)	**100%** (1463)
MRSA	**0%** (116)		**R**						**17%** (161)	**20%** (741)	**87%** (167)	**77%** (1538)	**11%** (101)	**99%** (1562)	**98%** (650)		**96%** (1562)	**100%** (1527)	**95%** (950)	**100%** (902)
Staphylococcus lugdunensis			**91%** (183)			**91%** (104)			**99%** (72)	**99%** (90)		**81%** (167)	**79%** (61)	**100%** (178)	**100%** (90)		**99%** (178)	**100%** (177)	**94%** (178)	**100%** (148)
Coag-negative *Staphylococcus* (inc. *S. epidermidis*)	**9%** (327)		**47%** (853)			**42%** (346)	**44%** (280)		**83%** (552)	**84%** (786)	**99%** (261)	**64%** (777)	**35%** (216)	**99%** (853)	**93%** (447)		**73%** (807)	**99%** (728)	**83%** (741)	**98%** (639)
Enterococcus faecalis	**100%** (661)	**99%** (1086)				**R**	**R**	**R**	**94%** (878)	**93%** (1002)	**89%** (357)	**R**	**16%** (322)	**99%** (1086)	**R**	**86%** (664)	**R**	**99%** (702)	**30%** (967)	**99%** (763)
Enterococcus spp. (inc. *E. faecium*)	NED	**31%** (85)							**19%** (47)	**29%** (72)				**48%** (85)		**100%** (30)		**100%** (84)	**35%** (72)	**38%** (64)
Group B *Streptococcus*	**98%** (97)	**S**					**94%** (34)	**91%** (34)		**96%** (83)		**64%** (84)	**53%** (34)	**98%** (118)				**100%** (69)	**24%** (80)	
Streptococcus pneumoniae (all)	**94%** (258)						**99%** (217)	NED		**96%** (338)		**94%** (253)	**91%** (153)	**97%** (338)			**76%** (294)	**100%** (216)	**93%** (248)	
S pneumoniae - meningitis	**89%** (175)						**95%** (175)	NED												

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

Species	Amoxicillin+ clavulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Cefoxitin	Aztreonam	Gentamicin	Tobramycin	Amikacin	Ertapenem	Imipenem	Meropenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Tetracycline	Nitrofurantoin
Citrobacter freundii	**R**	**R**	**R**	**89%** (106)	**R**	**R**	**84%** (106)	**87%** (106)	**100%** (115)	**R**	**86%** (64)	**94%** (115)	**94%** (115)	**100%** (40)	**94%** (54)	**100%** (42)	**100%** (64)	**93%** (106)	**86%** (113)	**86%** (106)	**94%** (34)	**94%** (104)
Klebsiella aerogenes	**R**	**R**	**R**	**88%** (169)	**R**	**R**	**85%** (169)	**88%** (169)	**99%** (156)	**R**	**90%** (93)	**100%** (126)	**100%** (108)	NED			**99%** (136)	**99%** (169)	**98%** (169)	**99%** (169)	**98%** (84)	**32%** (114)
Enterobacter cloacae	**R**	**R**	**R**	**85%** (372)	**R**	**R**	**81%** (270)	**83%** (385)	**95%** (373)	**R**	**83%** (228)	**98%** (385)	**98%** (302)	**100%** (121)	**90%** (118)	**92%** (99)	**98%** (275)	**96%** (385)	**96%** (373)	**95%** (385)	**92%** (176)	**41%** (291)
Escherichia coli	**85%** (4539)	**59%** (9075)	**68%** (8376)	**97%** (9075)	**85%** (8559)	**91%** (911)	**95%** (8766)	**97%** (8265)	**97%** (9075)	**96%** (2290)	**96%** (2907)	**92%** (9075)	**94%** (6272)	**99%** (2766)	**99%** (3595)	**99%** (2446)	**99%** (6380)	**84%** (8685)	**82%** (8934)	**81%** (7419)	**86%** (1978)	**98%** (7178)
ESBL E. coli	**43%** (93)		**41%** (44)	**90%** (93)								**58%** (93)					**98%** (93)	**30%** (93)	**31%** (87)	**59%** (93)		**99%** (87)
Klebsiella oxytoca	**87%** (127)		**79%** (270)	**96%** (270)	**68%** (111)	**86%** (59)	**95%** (292)	**98%** (270)	**99%** (292)	**96%** (91)	**96%** (171)	**99%** (292)	**99%** (269)	**100%** (127)	**98%** (66)	**100%** (76)	**100%** (194)	**97%** (270)	**98%** (288)	**95%** (292)		**91%** (241)
Klebsiella pneumoniae	**97%** (541)	**R**	**89%** (1084)	**96%** (1119)	**88%** (1100)	**93%** (167)	**97%** (1194)	**98%** (1119)	**98%** (1170)	**82%** (337)	**97%** (640)	**98%** (1194)	**97%** (1038)	**100%** (449)	**99%** (485)	**100%** (321)	**99%** (786)	**95%** (1119)	**93%** (1173)	**94%** (1194)	**88%** (388)	**46%** (1128)
Proteus mirabilis	**98%** (295)	**86%** (611)	**93%** (553)	**99%** (611)	**73%** (595)	**96%** (91)	**97%** (595)	**98%** (569)	**98%** (592)	**94%** (144)	**98%** (217)	**94%** (611)	**95%** (523)	**100%** (207)	**99%** (228)	**23%** (154)	**99%** (378)	**92%** (520)	**92%** (601)	**89%** (611)	**R**	**R**
Pseudomonas aeruginosa	**R**	**R**	**R**	**92%** (819)	**R**	**R**	**R**	**93%** (780)	**93%** (798)	**R**	NED	**92%** (207)	**99%** (621)	**100%** (161)	**R**	**62%** (199)	**94%** (579)	**89%** (780)	**84%** (797)	**R**	**R**	**R**
Serratia marcescens	**R**	**R**	**R**	**80%** (41)	**R**	**R**	NED	**81%** (68)	**87%** (68)	**R**	**86%** (58)	**100%** (37)	**85%** (68)				**95%** (58)	**82%** (68)	**72%** (58)	**100%** (37)	NED	**R**

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

2023 Alaska State Antibiogram: **Anchorage-Mat-Su Region**

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2022. These data were aggregated from the antibiograms produced by Alaska hospitals to create aggregate regional resistance pattern summaries. These antibiograms can be helpful for health care providers in selecting appropriate empiric antimicrobial therapy for their patients until specific individual laboratory test results are available. They can also be helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area.

- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when more than one facility provided data for the given species-antibiotic combination. Intrinsic resistance is indicated with an "R", following the guidance of CLSI document M100-S24.
- **Multi-Drug Resistant Organisms of Note:**
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA): no cases of VRSA have ever been reported in Alaska. VRSA stopped being reportable to Section of Epidemiology in 2023.
  - Carbapenem-resistant Enterobacterales (CRE): there were 11 cases of CRE reported in Anchorage/Mat-Su residents in 2023. Three were carbapenemase-producing, including one NDM+ *E. coli*, one VIM+ *Enterobacter cloacae,* and one *Enterobacter* that was phenotypically positive for carbapenemase production most likely mediated by an imipenemase gene.
  - Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): there were 30 cases of CRPA reported in Anchorage/Mat-Su residents in 2023. None were carbapenemase-producing.
- **Limitations:** Individual facilities often use different methods to test for antimicrobial susceptibility, different methods to build their antibiograms, and different antibiotics in their pharmacies. These factors limit interpretation of these data. Additionally, antimicrobial susceptibility testing done in the laboratory does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- **Contributing Facilities:** Thanks to the following facilities for providing data in support of this project:
  - Alaska Native Medical Center
  - Alaska Regional Hospital
  - Providence Alaska Medical Center

Species	Penicillin	Ampicillin	Oxacillin	Ceftriaxone	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin
Total *Staphylococcus aureus*			**62%** (2948)		**67%** (1512)	**83%** (2948)		**100%** (2948)	**99%** (1422)	**96%** (2948)	**99%** (2858)	**95%** (2858)	**100%** (1550)
MSSA			**S**		**92%** (994)	**87%** (1885)		**100%** (1885)	**99%** (917)	**96%** (1885)	**100%** (1804)	**95%** (1808)	**100%** (998)
MRSA			**R**		**21%** (593)	**77%** (1227)		**100%** (1227)	**98%** (544)	**96%** (1227)	**100%** (1214)	**96%** (647)	**100%** (697)
Coag-negative *Staphylococcus*			**59%** (97)		**93%** (60)	**70%** (96)	NED	**100%** (97)	**95%** (60)	**79%** (97)	**100%** (96)	**90%** (97)	**100%** (40)
Staphylococcus epidermidis			**41%** (176)		**81%** (176)	**56%** (176)	NED	**100%** (176)	NED	**62%** (176)	NED		**100%** (88)
Enterococcus faecalis	NED	**100%** (388)		**R**	**97%** (332)	**R**		**100%** (388)	**R**	**R**	**100%** (260)	**29%** (332)	**100%** (98)
Streptococcus pneumoniae (all)	**100%** (126)			NED	**99%** (206)	**91%** (175)	**90%** (31)	**100%** (206)		**81%** (175)	**100%** (175)	**93%** (175)	
S pneumoniae - meningitis	**89%** (175)			**95%** (175)									
Staphylococcus lugdunensis			**89%** (112)			**81%** (112)		**100%** (112)		**99%** (112)	**100%** (111)	**94%** (112)	

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

Species	Amoxicillin+ clavulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Aztreonam	Gentamicin	Tobramycin	Meropenem	Ciprofloxacin	Levofloxacin	Trimethoprim-sulfamethoxazole	Nitrofurantoin
Citrobacter freundii	**R**	**R**	**R**	**87%** (52)	**R**	**79%** (52)	**85%** (52)	**100%** (61)	**85%** (52)	**90%** (61)	**90%** (61)	**100%** (52)	**87%** (52)	**74%** (61)	**90%** (52)	**92%** (61)
Enterobacter cloacae	**R**	**R**	**R**	**81%** (197)	**R**	**77%** (102)	**81%** (197)	**97%** (197)	**84%** (194)	**98%** (197)	**98%** (197)	**98%** (194)	**94%** (197)	**92%** (197)	**95%** (197)	**47%** (143)
Escherichia coli	**89%** (2060)	**57%** (4305)	**67%** (3915)	**97%** (4305)	**90%** (4098)	**94%** (4305)	**97%** (3915)	**96%** (4305)	NED	**91%** (4305)	**93%** (4305)	**99%** (3901)	**80%** (3915)	**78%** (4305)	**77%** (2649)	**98%** (2442)
Klebsiella aerogenes				**80%** (93)		**81%** (93)	**87%** (93)	**100%** (93)	**90%** (93)	**100%** (93)	**100%** (93)	**99%** (93)	**98%** (93)	**96%** (93)	**100%** (93)	NED
Klebsiella oxytoca	**94%** (63)		**80%** (131)	**95%** (131)		**94%** (153)	**98%** (131)	**98%** (153)	**97%** (130)	**97%** (153)	**97%** (153)	**100%** (130)	**96%** (131)	**97%** (153)	**95%** (153)	**91%** (111)
Klebsiella pneumoniae	**95%** (249)	**R**	**88%** (531)	**95%** (531)	**93%** (547)	**95%** (606)	**97%** (531)	**96%** (606)	**96%** (527)	**98%** (606)	**96%** (606)	**100%** (527)	**92%** (531)	**90%** (606)	**93%** (606)	**42%** (551)
Proteus mirabilis	**100%** (85)	**83%** (253)	**90%** (253)	**100%** (253)	**79%** (253)	**98%** (253)	**99%** (253)	**100%** (253)	NED	**94%** (253)	**95%** (253)	**98%** (247)	**88%** (253)	**88%** (253)	**85%** (253)	**R**
Pseudomonas aeruginosa	**R**	**R**	**R**	**89%** (466)		**R**	**93%** (427)	**95%** (466)	NED	**92%** (49)	**99%** (466)	**93%** (417)	**90%** (427)	**83%** (466)	**R**	**R**
Serratia marcesens				NED		NED	**94%** (48)	**83%** (48)	**83%** (48)	NED	**81%** (48)	**94%** (48)	**77%** (48)	**68%** (48)	NED	

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

2023 Alaska State Antibiogram: **Gulf Coast Region**

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2021. These data were aggregated from the antibiograms produced by Alaska hospitals to create aggregate regional resistance pattern summaries. These antibiograms can be helpful for health care providers in selecting appropriate empiric antimicrobial therapy for their patients until specific individual laboratory test results are available. They can also be helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area.

- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when more than one facility provided data for the given species-antibiotic combination. Intrinsic resistance is indicated with an "R", following the guidance of CLSI document M100-S24.
- **Multi-Drug Resistant Organisms of Note:**
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA): no cases of VRSA have ever been reported in Alaska. VRSA stopped being reportable to Section of Epidemiology in 2023.
  - Carbapenem-resistant Enterobacterales (CRE): there were 9 cases of CRE reported in Gulf Coast residents in 2023.
  - Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): there were 4 cases of CRPA reported in Gulf Coast residents in 2023.
- **Limitations:** Individual facilities often use different methods to test for antimicrobial susceptibility, different methods to build their antibiograms, and different antibiotics in their pharmacies. These factors limit interpretation of these data. Additionally, antimicrobial susceptibility testing done in the laboratory does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- **Contributing Facilities:** Thanks to the following facilities for providing data in support of this project:
  - Central Peninsula Hospital
  - South Peninsula Hospital

Species	Penicillin	Ampicillin	Oxacillin	Ciprofloxacin	Levofloxacin	Daptomycin	Clindamycin	Erythromycin	Vancomycin	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin	Rifampin
Total *Staphylococcus aureus*	**12%** (285)		**59%** (285)	**61%** (285)	**62%** (285)	**90%** (239)	**73%** (280)		**100%** (285)	**99%** (285)	**100%** (285)	**90%** (244)	NED	**98%** (285)
MSSA	**20%** (169)		**S**	**89%** (169)	**91%** (169)	NED	**86%** (156)	NED	**100%** (169)	**100%** (169)	**100%** (169)	**94%** (128)	**100%** (78)	**99%** (169)
MRSA			**R**	**20%** (116)	**21%** (116)	**84%** (135)	**57%** (124)		**100%** (116)	**97%** (116)	**100%** (116)	**86%** (116)		**97%** (116)
Staphylocccus epidermidis	**10%** (204)		**48%** (204)	**78%** (204)	**78%** (204)	**99%** (204)	**68%** (145)		**100%** (204)	**67%** (201)	**99%** (204)	**81%** (204)	**100%** (151)	**99%** (204)
Enterococcus faecalis	**100%** (255)	**100%** (255)		**90%** (255)	**98%** (255)	**99%** (255)	**R**		**100%** (255)	**R**	NED	**27%** (255)	**99%** (226)	NED
Group B *Streptococcus*	**95%** (37)	**94%** (35)			**95%** (37)		NED	**53%** (34)	**100%** (35)		NED	**26%** (35)		

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

	Amoxicillin+ clavanulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Gentamicin	Tobramycin	Ertapenem	Meropenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin
Escherichia coli	**74%** (995)	**64%** (995)	**69%** (995)	**99%** (995)	**95%** (995)	**99%** (995)	**99%** (995)	**100%** (995)	**95%** (995)	**97%** (995)	**99%** (995)	**100%** (995)	**89%** (995)	**89%** (854)	**85%** (995)	**98%** (964)
Klebsiella pneumoniae	**92%** (154)	**R**	**92%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**99%** (154)	**97%** (154)	**98%** (133)	**98%** (154)	**47%** (143)
Proteus mirabilis	**94%** (64)	**81%** (64)	**94%** (64)	**100%** (64)	**89%** (64)	**94%** (64)	**97%** (64)	**97%** (64)	**95%** (64)	**95%** (64)	**100%** (64)	**100%** (64)	NED	**100%** (54)	**97%** (64)	**R**
Pseudomonas aeruginosa	**R**	**R**	**R**	**98%** (104)	**R**	**R**	**94%** (104)	**96%** (104)	NED	**99%** (104)		**95%** (104)	**94%** (104)	**87%** (85)	**R**	**R**

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

2023 Alaska State Antibiogram: **Southeast Region**

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2021. These data were aggregated from the antibiograms produced by Alaska hospitals to create aggregate regional resistance pattern summaries. These antibiograms can be helpful for health care providers in selecting appropriate empiric antimicrobial therapy for their patients until specific individual laboratory test results are available. They can also be helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area.

- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when more than one facility provided data for the given species-antibiotic combination. Intrinsic resistance is indicated with an "R", following the guidance of CLSI document M100-S24.
- **Multi-Drug Resistant Organisms of Note:**
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA): no cases of VRSA have ever been reported in Alaska. VRSA stopped being reportable to Section of Epidemiology in 2023.
  - Carbapenem-resistant Enterobacterales (CRE): there were three cases of CRE reported in Southeast residents in 2023, including two carbapenemase-producers. The carbapenemase-producing organisms were VIM+ *Enterobacter cloacae* and *Klebsiella varicola,* both isolated from the same patient.
  - Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): there were two cases of CRPA reported in Southeast residents in 2023.
- **Limitations:** Individual facilities often use different methods to test for antimicrobial susceptibility, different methods to build their antibiograms, and different antibiotics in their pharmacies. These factors limit interpretation of these data. Additionally, antimicrobial susceptibility testing done in the laboratory does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- **Contributing Facilities:** Thanks to the following facilities for providing data in support of this project:
  - Bartlett Regional Hospital
  - SEARHC Mt. Edgecumbe Hospital
  - PeaceHealth Ketchikan General Hospital

Species	Penicillin	Ampicillin	Oxacillin	Ciprofloxacin	Levofloxacin	Daptomycin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Gent Syn	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin	Strep Syn
Total *Staphylococcus aureus*	**11%** (164)		**73%** (475)	**73%** (388)	**74%** (388)	**99%** (224)	**87%** (475)	**58%** (388)	**99%** (475)	**99%** (388)		**95%** (475)	**99%** (388)	**95%** (475)	**100%** (475)	
Staphylocccus epidermidis (including *S. epidermidis)*	NED		**51%** (91)	**87%** (62)	**87%** (62)		**51%** (91)	**29%** (62)	**100%** (91)			**64%** (58)	**99%** (62)	**76%** (91)	**100%** (91)	
Enterococcus faecalis	NED	**99%** (184)		**95%** (156)	**97%** (156)		**R**		**99%** (184)	**R**	**92%** (156)	**R**	**100%** (156)	**37%** (156)	**99%** (184)	**96%** (156)

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Gentamicin	Tobramycin	Ertapenem	Imipenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin
Enterobacter cloacae						**88%** (33)	**100%** (33)	**100%** (33)		**91%** (33)	**94%** (33)	**100%** (33)	**100%** (33)	**97%** (33)	
Escherichia coli	**66%** (1392)	**74%** (1083)	**97%** (1392)	**92%** (1083)	**94%** (1083)	**97%** (972)	**98%** (1392)	**94%** (1392)	**94%** (972)	**99%** (1392)	**99%** (1083)	**86%** (1392)	**82%** (1392)	**82%** (1392)	**98%** (1392)
Klebsiella pneumoniae	**R**	**91%** (121)	**96%** (121)	**96%** (121)	**98%** (121)	**99%** (121)	**100%** (121)	**100%** (121)	NED	**100%** (121)	**100%** (121)	**98%** (121)	**95%** (121)	**98%** (121)	**54%** (121)
Proteus mirabilis	**84%** (111)	NED	**99%** (111)	**96%** (95)	**98%** (95)	**100%** (69)	**96%** (111)	**90%** (111)	**90%** (111)	**100%** (69)		**86%** (69)	**86%** (111)	**85%** (111)	**R**
Pseudomonas aeruginosa	**R**	**R**	**88%** (84)	**R**	**R**	**86%** (84)	**86%** (84)	**100%** (51)	**100%** (51)		**75%** (67)	**70%** (84)	**70%** (84)	**R**	**R**

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

2023 Alaska State Antibiogram: **Southwest Region**

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2021. These data were aggregated from the antibiograms produced by Alaska hospitals in order to create aggregate regional resistance pattern summaries. These antibiograms can be helpful for health care providers in selecting appropriate empiric antimicrobial therapy for their patients until specific individual laboratory test results are available. They can also be helpful for determining antibiotic stewardship priorities within hospitals and emerging resistance patterns in a broader service area.

- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when more than one facility provided data for the given species-antibiotic combination. Intrinsic resistance is indicated with an "R", following the guidance of CLSI document M100-S24.
- **Multi-Drug Resistant Organisms of Note:**
  - Vancomycin-resistant *Staphylococcus aureus* (VRSA): no cases of VRSA have ever been reported in Alaska. VRSA stopped being reportable to Section of Epidemiology in 2023.
  - Carbapenem-resistant Enterobacterales (CRE): there was one case of CRE reported in a Southwest resident in 2023.
  - Carbapenem-resistant *Pseudomonas aeruginosa* (CRPA): there was one case of CRPA reported in a Southwest resident in 2023.
- **Limitations:** Individual facilities often use different methods to test for antimicrobial susceptibility, different methods to build their antibiograms, and different antibiotics in their pharmacies. These factors limit interpretation of these data. Additionally, antimicrobial susceptibility testing done in the laboratory does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- **Contributing Facilities:** Thanks to the following facilities for providing data in support of this project:
  - Yukon Kuskokwim Delta Regional Hospital
  - Kanakanak Hospital

Species	Ampicillin	Oxacillin	Ciprofloxacin	Levofloxacin	Daptomycin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin	Strep Syn
Total *Staphylococcus aureus*		**64%** (553)	**74%** (553)	**75%** (553)	**100%** (68)	**90%** (553)	**50%** (62)	**99%** (553)	**99%** (68)	**99%** (553)	**99%** (550)	**98%** (485)	**100%** (491)	
MSSA (including *S. epidermidis)*		**S**	**95%** (354)	**95%** (354)	**100%** (36)	**95%** (352)	**74%** (34)	**100%** (354)	NED	**99%** (318)	**99%** (353)	**99%** (318)	**100%** (320)	**97%** (36)
MRSA		**R**	**3%** (32)	**3%** (32)		**88%** (167)		**97%** (199)		**98%** (199)	**99%** (197)	**96%** (167)		**100%** (32)
Enterococcus faecalis	**99%** (66)		**92%** (66)	**42%** (66)		**R**		**100%** (66)	**R**	**R**	**100%** (31)	**45%** (31)	**98%** (62)	

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

	Amoxicillin+ clavanulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Gentamicin	Meropenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin
Enterobacter aerogenes				**100%** (61)		**87%** (61)	**89%** (61)	**100%** (48)			**100%** (61)	**100%** (61)		**31%** (58)
Enterobacter cloacae				**97%** (70)		**89%** (70)	**91%** (70)	**88%** (58)	**99%** (70)		**100%** (70)	**100%** (70)	**97%** (70)	**21%** (58)
Escherichia coli	**86%** (1175)	**51%** (1175)	**59%** (1175)	**98%** (1175)	**90%** (1175)	**95%** (1175)	**95%** (1175)	**95%** (1175)	**91%** (1175)	**99%** (1175)	**87%** (1175)	**87%** (1175)	**80%** (1175)	**98%** (1172)
Klebsiella pneumoniae	**96%** (103)	**R**	**85%** (103)	**99%** (103)	**95%** (103)	**98%** (103)	**98%** (103)	**99%** (79)	**99%** (103)		**97%** (103)	**99%** (103)	**95%** (103)	**55%** (103)
Proteus mirabilis	**99%** (88)	**94%** (88)	NED	**99%** (88)	**94%** (88)	**93%** (88)	**92%** (88)	**93%** (69)	**99%** (88)		**99%** (88)	**100%** (88)	**100%** (88)	**R**
Pseudomonas aeruginosa	**R**	**R**	**R**	**97%** (62)	**R**	**R**	**89%** (62)	**80%** (41)	NED	**98%** (41)	**89%** (62)	**92%** (59)	**R**	**R**

Legend:

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The bottom value in parentheses in each square indicates the number of tested isolates for that species-antibiotic combination.
- "R" indicates intrinsic resistance to that antibiotic, while "S" indicates definitional susceptibility.
- "NED" indicates that there was Not Enough Data to report the value: either only one facility reported data for that species-antibiotic combination or <30 isolates

Alaska statewide invasive bacterial disease surveillance antimicrobial susceptibility data, 2022-2023

Alaska statewide invasive bacterial disease surveillance

The Alaska Division of Public Health and U.S. Centers for Disease Control and Prevention Arctic Investigations Program (AIP) maintain statewide laboratory-based surveillance for invasive disease caused by *Haemophilus influenzae*, *Streptococcus agalactiae* (group B *Streptococcus*), *Streptococcus pyogenes* (group A *Streptococcus*), *Streptococcus pneumoniae*, and *Neisseria meningitidis*. Invasive disease due to each of these five pathogens is a reportable condition in Alaska. The surveillance system objectives are to track the epidemiologic trends of these diseases in Alaska, monitor the emergence of antimicrobial resistance, and monitor the effectiveness of vaccination programs.

Methods

A case was defined as an Alaska resident with *H. influenzae*, *S. agalactiae*, *S. pyogenes*, *S. pneumoniae*, or *N. meningitidis* isolated from or with bacterial DNA detected in a normally sterile site (e.g., blood or cerebrospinal fluid). Hospital-based laboratories statewide notified the Alaska Division of Public Health of a case and sent sterile site isolates to AIP for confirmation, subtyping, and antimicrobial susceptibility testing. For *S. agalactiae*, *S. pyogenes*, and *S. pneumoniae*, antimicrobial susceptibility was estimated using whole genome sequencing. For *H. influenzae*, ETEST was used to determine minimum inhibitory concentration (MIC) for each antibiotic tested. Clinical and Laboratory Standards Institute (CLSI) criteria were used to determine if an isolate was susceptible. Antimicrobial susceptibility testing was not performed for *N. meningitidis*.

Legend

- The top value in each square is the percent of isolates of that species that tested susceptible to that antibiotic.
- The lower value in each square indicates the number of tested isolates for that species-antibiotic combination.
- “—" designates not tested.

Use and limitations

- Healthcare providers should follow national and local treatment guidelines when selecting an antibiotic and consult an infectious disease physician when needed. Pharmacists or antimicrobial stewards should be consulted to answer questions regarding pharmacokinetics and pharmacodynamics for specific drug-bacteria combinations.
- An antibiogram can help inpatient healthcare providers understand antimicrobial resistance patterns for specific bacterial pathogens in Alaska. However, it is always important to take individual patient-level factors into account when selecting empiric therapy.
- When choosing an antibiotic, healthcare providers should consider the patient’s age, immune status, and clinical status, as well as the site of infection and drug penetration to that site, recent antimicrobial treatment, and previous history of antimicrobial-resistant infections.
- Antimicrobial susceptibility testing does not always predict how effective that drug will be when used to treat a patient. Data are not stratified by infection site, which influences antibiotic choice and effectiveness.
- Invasive isolates do not necessarily reflect isolates from non-invasive sites or the general community. These data may reflect cultures taken from patients who have experienced treatment failure or who are more seriously ill than the general population.

Alaska statewide invasive bacterial disease surveillance antimicrobial susceptibility data, 2022-2023

Table. Antimicrobial susceptibility of isolates from Alaska statewide surveillance for invasive bacterial disease in 2022–2023

	Ampicillin	Penicillin	Ceftriaxone	Clindamycin	Erythromycin	Tetracycline	Vancomycin	Trimethoprim-sulfamethoxazole	Levofloxacin	Meropenem	Rifampin
Haemophilus influenzae	73% (56)	--	100% (56)	--	--	--	--	--	--	100% (56)	100% (56)
Streptococcus agalactiae	--	100% (119)	100% (119)	57% (119)	45% (119)	26% (119)	100% (119)	--	--	--	--
Streptococcus pyogenes	--	100% (350)	100% (348)	82% (350)	82% (350)	67% (350)	100% (350)	--	--	--	--
Streptococcus pneumoniae	--	See below	See below	98% (465)	94% (467)	97% (467)	100% (467)	53% (467)	100% (467)	99% (467)	--
• Meningitis	--	97% (467)	99% (467)	--	--	--	--	--	--	--	--
• Non-meningitis	--	100% (467)	100% (467)	--	--	--	--	--	--	--	--