



Alaska Antimicrobial Stewardship Collaborative (A2SC) announces the Alaska specific **Community-Acquired Pneumonia (CAP) Treatment Guidelines**. These clinical guidelines are intended to aid in the selection of antimicrobial therapy for patients residing in Alaska who present with community acquired pneumonia. Treatment guidelines available for the following Alaska care setting:

- ❖ Adult Inpatient CAP Treatment Guidelines
- ❖ Adult Ambulatory CAP Treatment Guidelines
- ❖ Pediatric Inpatient CAP Treatment Guidelines
- ❖ Pediatric Ambulatory CAP Treatment Guidelines

These guidelines will help Alaska physicians and pharmacists ensure patients receive the right antibiotic at the right time and only when necessary. As a companion to the guidelines the 2019 Alaska State Antibigram is also available to help guide the best antibiotic choice.

Community-Acquired Pneumonia Guidelines are available for download on the A2SC website: <https://www.ashnha.com/antimicrobial-stewardship/>

The Alaska 2019 Antibigram is available for download: <https://www.ashnha.com/wp-content/uploads/2021/05/AK-2019-Antibiograms-5-5-21.pdf>

Antibiotics save lives, but any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. In U.S. doctors' offices and emergency departments, at least 47 million antibiotic prescriptions each year are unnecessary, which makes improving antibiotic prescribing and use a national priority.

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## ***About Alaska Antimicrobial Stewardship Collaborative***

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The Alaska Antimicrobial Stewardship Collaborative (A2SC) is an active partnership of hospitals and other health care stakeholders dedicated to developing innovative strategies to ensure appropriate antibiotic use. A2SC's goal is a simple one: all patients in Alaska will receive the right antibiotic at the right time and only when necessary.



The emergence of antibiotic-resistant bacteria caused by the misuse and overuse of antibiotics is pushing the healthcare industry to re-evaluate how medicine is practiced. Together we will accelerate positive changes to achieve this critical goal. Visit our [website](https://www.ashnha.com/antimicrobial-stewardship/) for more information: <https://www.ashnha.com/antimicrobial-stewardship/>

## Alaska Antimicrobial Stewardship Collaborative ADULT Inpatient Community-Acquired Pneumonia (CAP) Guideline

Major Criteria	Minor Criteria	Severity and Risk Factor Considerations
<ul style="list-style-type: none"> <li>• Septic shock with need for vasopressors</li> <li>• Respiratory failure requiring mechanical ventilation</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory rate ≥ 30 breaths/min</li> <li>• Pao<sub>2</sub>/Fio<sub>2</sub> ratio ≤ 250</li> <li>• Multilobar infiltrates</li> <li>• Confusion/disorientation</li> <li>• Uremia (BUN ≥ 20 mg/dl)</li> <li>• Leukopenia (WBC &lt; 4,000 cells/μl)</li> <li>• Thrombocytopenia (plts &lt; 100,000/μl)</li> <li>• Hypothermia (&lt; 36° C)</li> <li>• Hypotension requiring aggressive fluid resuscitation</li> </ul>	<p><b>NOTE:</b> Prior categorization of healthcare-associated pneumonia (HCAP) has been abandoned. The following are <b>NOT</b> predictive of multi-drug resistant pneumonia and should <b>NOT</b> be used alone as an indication for empiric broad-spectrum coverage:</p> <ul style="list-style-type: none"> <li>• Hospitalized in an acute care hospital for 2 or more days within 90 days of infection</li> <li>• Resided in a nursing home or long term care facility</li> <li>• Received recent chemotherapy or wound care in last 30 days</li> <li>• Attended a hemodialysis clinic in the last 30 days</li> </ul>

### Treatment Recommendations

Infection	Standard Treatment	Hospitalized within 90 days PLUS IV antibiotics <sup>#</sup>	Prior MRSA in Respiratory Culture <sup>#</sup>	Prior <i>Pseudomonas</i> in Respiratory Culture <sup>#</sup>	Duration
<b>Non-Severe</b>	<p><b>Preferred Therapy:</b></p> <ul style="list-style-type: none"> <li>○ Ceftriaxone 1g IV q24hr <b>PLUS</b> Azithromycin 500mg PO/IV q24hr x3 days</li> </ul> <p><b>Anaphylactic β-Lactam Allergy:</b><sup>¥</sup></p> <ul style="list-style-type: none"> <li>○ Levofloxacin 750mg PO/IV q24hr</li> </ul>	<p>Empiric treatment for MRSA or <i>P. aeruginosa</i> <b>not recommended</b></p> <p>Escalate based upon culture results</p>	<p><b>Preferred Therapy:</b></p> <ul style="list-style-type: none"> <li>○ Vancomycin 15mg/kg x1 then (Pharmacy to Dose)</li> <li>○ Ceftriaxone 1g IV q24hr <b>PLUS</b> Azithromycin 500mg PO/IV q24hr x3 days</li> </ul> <p><b>Anaphylactic β-Lactam Allergy:</b><sup>¥</sup></p> <ul style="list-style-type: none"> <li>○ Vancomycin 15mg/kg x1 then (Pharmacy to Dose)</li> <li>○ <b>PLUS</b> Levofloxacin 750mg PO/IV q24hr</li> </ul>	<p><b>Preferred Therapy:</b></p> <ul style="list-style-type: none"> <li>○ Cefepime 2gm IV q8hr <b>PLUS</b> Azithromycin 500mg PO/IV q24hr x3 days</li> </ul> <p><b>Anaphylactic β-Lactam Allergy:</b><sup>¥</sup></p> <ul style="list-style-type: none"> <li>○ Levofloxacin 750mg PO/IV q24hr <b>PLUS</b> Aztreonam 2gm IV q8hr</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>5 days</b> for patients <b>without</b> immunosuppression or structural lung disease</li> <li>○ <b>7 days</b> for patients with <b>moderate</b> immunosuppression<sup>&amp;</sup> or structural lung disease</li> <li>○ <b>10-14 days</b> for poor clinical response, initial inappropriate treatment, or <b>significant</b> immunosuppression</li> </ul> <p>Patients should be afebrile for 48-72hr and demonstrate signs of clinical stability before therapy is discontinued</p>
<b>Aspiration pneumonia</b>		Addition of anaerobic therapy is <b>NOT</b> recommended unless lung abscess or empyema is suspected.			
<b>Suspected<sup>+</sup> or confirmed Influenza</b>		<b>Oseltamivir 75mg PO BID x5 days</b>			
<b>Oral options to consider for de-escalation of β-lactam (total duration IV + PO as above)**</b>		<p><b>Preferred Therapy:</b></p> <ul style="list-style-type: none"> <li>○ Amoxicillin 1g PO TID<sup>^</sup></li> <li>○ Augmentin 875mg BID                             <ul style="list-style-type: none"> <li>▪ <b>Consider additional</b> amoxicillin 1g BID in addition to <b>Augmentin</b> for CAP complicated by empyema, asplenia or Strep pneumo PenG MIC 2-4</li> </ul> </li> </ul> <p><b>Non-Anaphylactic Penicillin Allergy:</b></p> <ul style="list-style-type: none"> <li>○ Cefuroxime axetil 500mg PO BID</li> </ul>			

### Consideration

<sup>#</sup> Prior positive cultures within 1 year. If empiric treatment for MRSA or *P. aeruginosa*, blood and respiratory cultures should be collected prior to antibiotic administration

<sup>¥</sup> If patient reports penicillin allergy, inquire about onset and severity of symptoms, as well as prior beta-lactam exposure and update patient medical record. Severe or life-threatening allergic reactions may include: anaphylaxis, angioedema, urticaria, Stevens-Johnson Syndrome (SJS), etc.

Dosage recommendations based upon an assumed CrCl > 60 ml/min. If patient has diminished renal function, doses should be dose-reduced.

<sup>+</sup> Certain patient populations are at a higher risk for influenza related complications and may require treatment in absence of confirmed influenza. Refer to local guidelines.

<sup>\*\*</sup> Patient should complete macrolide therapy

<sup>^</sup> Strep pneumo and/or cefinase negative H.influenzae / M.cattarrhalis use high-dose amoxicillin

<sup>&</sup> Severe immunosuppression: Neutropenia (WBC < 4 or ANC < 500), HIV+ with CD4 < 200, active chemotherapy, undergone solid organ transplant on active immunosuppression, Moderate immunosuppression: all other diseases (including long-term steroid use with prednisone at 10mg/day or equivalent)

# Alaska Antimicrobial Stewardship Collaborative (A2SC) Adult Ambulatory Community-Acquired Pneumonia (CAP) Treatment Guideline

## Common Etiologies

## Diagnostic Criteria Tools

**Bacterial:** *S. pneumoniae*, *H. influenzae*, *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*, *M. catarrhalis*

**Respiratory viruses:** influenza A & B, adenovirus, respiratory syncytial virus, parainfluenza, COVID-19

## Pneumonia Severity Index (PSI) Scoring Tool

Demographics	Comorbidities	Physical Exam/Vitals	Labs/Imaging
<ul style="list-style-type: none"> <li>Age (1 point per year)</li> <li>-Male (Age)</li> <li>-Female (Age -10)</li> <li>Nursing home residency +10</li> </ul>	<ul style="list-style-type: none"> <li>Neoplasia +30</li> <li>Liver disease +20</li> <li>Heart Failure +10</li> <li>Cerebrovascular disease +10</li> <li>Renal disease +10</li> </ul>	<ul style="list-style-type: none"> <li>Confusion +20</li> <li>Resp rate &gt;30 +20</li> <li>SBP &lt;90 +20</li> <li>Temperature &lt;35C or &gt;40C +15</li> <li>HR &gt;125 bpm +15</li> </ul>	<ul style="list-style-type: none"> <li>Arterial pH &lt;7.35 +30</li> <li>BUN &gt;30mg/dL +20</li> <li>Sodium &lt;130 +20</li> <li>Glucose &gt;250 +10</li> <li>Hematocrit &lt;30% +10</li> <li>Pleural Effusion +10</li> <li>PaO2 &lt;60 +10</li> </ul>

Risk Class (Points)	Mortality (%)	Recommended site of care
I (<50)	0.1	Outpatient
II (51-70)	0.6	Outpatient
III (71-90)	2.8	Outpatient or brief inpatient
IV (91-130)	8.2	Inpatient
V (>130)	29.2	Inpatient

## Symptoms

- Productive cough
- Chest pain
- Dyspnea/Shortness of breath
- Diminished breath sounds
- Crackles not cleared with coughing
- Abdominal pain
- +/- Fever

## Testing/Imaging

- Chest x-ray
  - Pulse Oximetry
- PCR respiratory pathogen panel testing is discouraged in the ambulatory setting.
- If concern for viral respiratory illnesses, influenza or COVID PCR can be ordered

## Duration of Therapy

- Typically healthy, no structural lung disease: **5 days**
- Moderately immunocompromised, suspected or proven MRSA or *P. aeruginosa*, or moderate structural lung disease (ie. diabetes, asplenia): **7 days**

## Antibiotic Selection

### Preferred Treatment

### Alternatives

**Azithromycin monotherapy is no longer recommended in any circumstance for treatment of community-acquired pneumonia due to local resistance rates >25%.**

**No comorbidities or risk factors for MRSA or *Pseudomonas aeruginosa***

- **Amoxicillin 1gm PO TID x5-7 days**

- **Doxycycline 100mg PO BID x5-7 days**

**Comorbidities present\***

- Comorbidities including chronic heart, lung, liver, or renal disease; diabetes mellitus; alcoholism; malignancy; asplenia

- **Amoxicillin/Clavulanate 875mg/125mg PO BID x 5-7 days PLUS**
- **Azithromycin 500mg PO daily x 3 days**

**Non-anaphylactic PCN allergy:**

- **Cefuroxime 500mg PO BID x 5-7 days PLUS**
- **Azithromycin 500mg PO daily x 3 days**

**Anaphylactic PCN allergy:**

- **Levofloxacin 750mg PO daily x 5 days**

**Risk factors for MRSA or *Pseudomonas aeruginosa***

- Prior respiratory isolation of MRSA or *P. aeruginosa*; OR
- Recent hospitalization AND receipt of parenteral antibiotics in previous 90 days

- **Treatment should be based on previous culture & susceptibility, IV antimicrobials may be required**

## CONSIDERATIONS

- \*Consider additional **Amoxicillin 1g** BID in addition to **Augmentin** for CAP complicated by empyema, asplenia or *Strep pneumoniae* PenG MIC 2-4
- For patient diagnosed with influenza, it is recommended to also treat with anti-influenza agents; most benefit is seen if started within 48 hours of symptom onset

# Alaska Antimicrobial Stewardship Collaborative (A2SC)

## Pediatric (>3mo) Inpatient Community Acquired Pneumonia (CAP) Treatment Guideline

Initial Testing/Imaging	Inpatient Admission Criteria	
<ul style="list-style-type: none"> <li>• Vital Signs: VS including BP and Pulse Oximetry</li> <li>• Labs:               <ul style="list-style-type: none"> <li>– Blood work: CBC with differential, CRP, blood culture</li> <li>– Viral Testing: Influenza PCR during influenza season and COVID</li> <li>– Sputum gram stain and culture: if intubating, collect at time of initial ET tube placement; consider testing in older children who can produce sputum sample</li> <li>– Urinary antigen detection testing is not recommended in children; false-positive tests are common.</li> </ul> </li> <li>• Radiography:               <ul style="list-style-type: none"> <li>– AP and lateral CXR</li> </ul> </li> </ul>	Pediatric Floor	PICU
	<ul style="list-style-type: none"> <li>• Respiratory distress</li> <li>• SpO2 &lt;90% on room air</li> <li>• Unable to tolerate PO</li> <li>• Suspected or documented CAP caused by pathogen with increased virulence (ex. CA-MRSA)</li> <li>• Concerns about observation at home, inability to be comply with therapy, inability to be followed up</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory support: Intubated or requiring non-invasive positive pressure ventilation</li> <li>• Concern for respiratory failure</li> <li>• Concern for sepsis</li> <li>• FiO2 needs HNFC &gt;50% to keep saturation ≥92%</li> <li>• Altered mental status</li> </ul>

### Treatment Selection

#### Suspected Bacterial Pneumonia

Most Common Pathogens: *Streptococcus pneumoniae*, *Haemophilus influenzae*

Demographics	Parenteral Treatment	Oral Step-Down
Previously healthy AND Fully immunized	<p><u>Preferred:</u> <b>Ampicillin</b> 50mg/kg IV q6hr (max 12g/day)</p> <p><u>Alternatives:</u>  <i>Non-Type 1 β-Lactam Allergy:</i> <b>Ceftriaxone</b> 50mg/kg IV q24hr (max 2g/day)  <i>Type 1 β-Lactam Allergy:</i> <b>Levofloxacin</b>            &lt;5 years: 10mg/kg IV BID (max dose 750mg/day)            &gt;5 years: 10mg/kg IV q24hr (max dose 750mg/day)</p>	<p>Antibiotic choice:</p> <ul style="list-style-type: none"> <li>• If culture positive: based on cultures and susceptibilities.</li> <li>• If culture negative: refer to Ambulatory CAP Treatment Guidelines</li> </ul>
Not appropriately immunized with PCV13 + Hib OR Suspicion for <i>H. influenzae</i> OR Severe disease and/or Complicated Pneumonia	<p><u>Preferred:</u> <b>Ceftriaxone</b> 50mg/kg IV q24hr (max 2g/day)</p> <p><u>Alternatives:</u> <i>Type 1 β-Lactam Allergy:</i> <b>Levofloxacin</b>            &lt;5 years: 10mg/kg IV/PO BID (max dose 750mg/day)            &gt;5 years: 10mg/kg IV/PO q24hr (max dose 750mg/day)</p>	<p>Antibiotic Duration:</p> <ul style="list-style-type: none"> <li>• Uncomplicated pneumonia: complete a 10 day course</li> <li>• Complicated pneumonia: dependent on clinical response, in general 2-4 week course</li> </ul>
Suspicion for <i>S. aureus</i>	<p><u>In addition</u> to one of the above antibiotics, <u>add:</u>  <b>Clindamycin</b> 10mg/kg IV q6hr (max 900mg/dose)            For PICU or Severe Infection: <b>Vancomycin</b> 15mg/kg IV q6hr (max 4g/day)</p>	<p>Antibiotic choice: Based on cultures and susceptibilities            Antibiotic duration: May require longer treatment</p>

#### Suspected Atypical Pneumonia

Most Common Pathogens: *Mycoplasma pneumoniae*, *Chlamydophila pneumoniae*

Demographics	Preferred Treatment	Oral Step-Down
In ≥5yo empirically add macrolide if atypical CAP cannot be ruled out	<b>Azithromycin</b> 10mg/kg IV daily x 1-2 days then transition to oral step down if possible (max 500mg/dose)	<b>Azithromycin</b> 10mg/kg PO daily to complete a 3 day course (max 500mg/dose)

#### Suspected Viral Pneumonia

Most Common Pathogens: Influenza A & B, Adenovirus, Respiratory Syncytial Virus, Parainfluenza

Most common in <5yo	No antimicrobial therapy is necessary. If influenza positive, see influenza guidelines for treatment algorithm.
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### CONSIDERATIONS

- Children should show clinical signs of improvement within 48-72 hours allowing de-escalation of therapy based on available culture results and consideration of transition to oral step-down therapy
- If no improvement or worsening pursue further diagnostic work up as indicated, consider broadening antibiotics and formal infectious disease consultation

*REFERENCES: Bradley IDSA CAP Infants & Children 2011; AAP endorsed; Ficar B, et al. Azithromycin: 3-Day Versus 5-Day Course in the Treatment of Respiratory Tract Infections in Children. J Chemother. 1997;9(1):38-43.*

*Kogan R, et al. Comparative Randomized Trial of Azithromycin versus Erythromycin and Amoxicillin for Treatment of Community-acquired Pneumonia in Children. Pediatr Pulmonol. 2003; 35(2):91-8. Approved A2SC Advisory April 2021*



# Alaska Antimicrobial Stewardship Collaborative (A2SC)

## Pediatric (≥3mo) Ambulatory Community Acquired Pneumonia (CAP) Treatment Guideline

Criteria for Respiratory Distress	Criteria For Outpatient Management	Testing/Imaging for Outpatient Management
<ul style="list-style-type: none"> <li>• Tachypnea, in breaths/min:                             <ul style="list-style-type: none"> <li>• Age 0-2mo: &gt;60</li> <li>• Age 2-12mo: &gt;50</li> <li>• Age 1-5yo: &gt;40</li> <li>• Age &gt;5yo: &gt;20</li> </ul> </li> <li>• Dyspnea</li> <li>• Retractions</li> <li>• Grunting</li> <li>• Nasal flaring</li> <li>• Apnea</li> <li>• Altered mental status</li> <li>• Pulse oximetry &lt;90% on room air</li> </ul>	<ul style="list-style-type: none"> <li>• Mild CAP: no signs of respiratory distress</li> <li>• Able to tolerate PO</li> <li>• No concerns for pathogen with increased virulence (ex. CA-MRSA)</li> <li>• Family able to carefully observe child at home, comply with therapy plan, and attend follow up appointments</li> </ul> <p style="text-align: center; font-style: italic;">If patient does not meet outpatient management criteria refer to inpatient pneumonia guideline for initial workup and testing.</p>	<ul style="list-style-type: none"> <li>• Vital Signs: Standard VS and Pulse Oximetry</li> <li>• Labs: No routine labs indicated                             <ul style="list-style-type: none"> <li>• Influenza PCR during influenza season</li> <li>• COVID testing</li> <li>• Blood cultures if not fully immunized OR fails to improve/worsens after initiation of antibiotics</li> <li>• Urinary antigen detection testing is not recommended in children; false-positive tests are common.</li> </ul> </li> <li>• Radiography: No routine CXR indicated                             <ul style="list-style-type: none"> <li>• AP and lateral CXR if fails initial antibiotic therapy</li> <li>• AP and lateral CXR 4-6 weeks after diagnosis if recurrent pneumonia involving the same lobe</li> </ul> </li> </ul>

### Treatment Selection

#### Suspected Viral Pneumonia

**Most Common Pathogens: Influenza A & B, Adenovirus, Respiratory Syncytial Virus, Parainfluenza**

Most common in <5yo	<p><b>No antimicrobial therapy is necessary.</b></p> <p>If influenza positive, see influenza guidelines for treatment algorithm.</p>
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#### Suspected Bacterial Pneumonia

**Most Common Pathogens: Streptococcus pneumoniae, Haemophilus influenzae**

Demographics	Preferred Treatment	Treatment Alternatives for β-Lactam Allergy
Previously healthy AND Appropriately Immunized for Age	<b>Amoxicillin</b> 45mg/kg PO BID (Max dose 4000mg/day) x5 days*	<p><u>Non-anaphylactic β-Lactam Allergy:</u></p> <p><b>Cefprozil suspension</b> 15mg/kg PO BID (max 1000mg/day) x5 days*</p> <p><b>Cefuroxime tablets</b> 15mg/kg PO BID (Max 1000mg/day) x5 days*</p>
Not appropriately immunized with PCV13 + Hib OR Suspicion for <i>H. influenzae</i>	<p><b>Amoxicillin/clavulanate</b></p> <p>&lt;40kg: (<b>ES 600mg/42.5mg/5mL</b>) 45mg/kg PO BID or 15mg/kg PO TID (Max dose 4000mg/day) x5 days*</p> <p>&gt;40kg: 875mg/125mg PO BID <b>PLUS Amoxicillin</b> 1g PO BID x5 days*</p>	<p><u>Anaphylactic β-Lactam Allergy:</u></p> <p><b>Levofloxacin</b></p> <p>&lt;5 years: 10mg/kg PO BID (Max dose 750mg/day) x5 days*</p> <p>&gt;5 years: 10mg/kg PO daily (Max dose 750mg/day) x5 days*</p>

#### Suspected Atypical Pneumonia

**Most Common Pathogens: Mycoplasma pneumoniae, Chlamydomphila pneumoniae**

Demographics	Preferred Treatment	Alternatives
Most common in ≥5yo In ≥5yo macrolide may be empirically added if there is no clinical evidence that distinguishes bacterial from atypical CAP	<b>Azithromycin</b> 10mg/kg PO daily (Max dose 500mg/day) x3 days	<p>For children &gt;7yo:</p> <p><b>Doxycycline</b> 1-2 mg/kg PO BID (Max dose 200mg/day) x10 days</p>

### CONSIDERATIONS

- \*Exclusion criteria for short course therapy includes: pneumonia with atypical pathogens, hospital acquired pneumonia (admission for >48 hours in previous 2 months, CAP in previous month, or lung abscess in previous 6 months), empyema or necrotizing pneumonia, preexisting pulmonary disease, congenital heart disease, history of aspiration, malignant neoplasm, immunodeficiency, or kidney dysfunction.
- Children should show clinical signs of improvement within 48-72 hours

*Approved A2SC Advisory April 2021*

**REFERENCES:** Bradley IDSA CAP Infants & Children 2011; AAP endorsed. Ficnar B, et al. Azithromycin: 3-Day Versus 5-Day Course in the Treatment of Respiratory Tract Infections in Children. *J Chemother.* 1997;9(1):38-43. Kogan R, et al. Comparative Randomized Trial of Azithromycin versus Erythromycin and Amoxicillin for Treatment of Community-acquired Pneumonia in Children. *Pediatr Pulmonol.* 2003; 35(2):91-8. Pernica JM et al. Short-Course Antimicrobial Therapy for Community-Acquired Pneumonia: The SAFER Randomized Clinical Trial. *JAMA Pediatrics.* 2021; Published online March 08, 2021.

## 2019 Alaska State Antibiogram

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. 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.

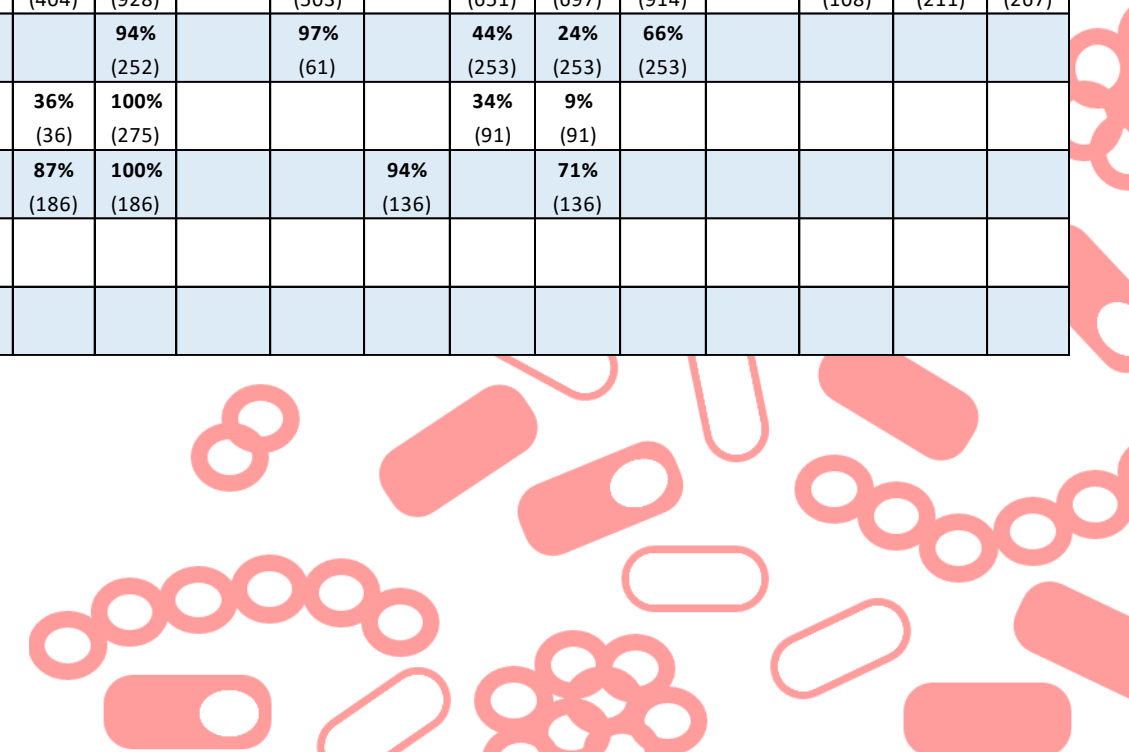
- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when 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. 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were 3 cases of CRE reported in Alaska in 2019. None were carbapenemase-producing.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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 Norton Sound Regional Medical Center.

**Important note: This year, a number of facilities did not make antibiograms. The decrease in data means there will not be regional antibiograms for the Northern Region, and there are substantially fewer data points in the Southeast region.**

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

## Statewide data

Species	Penicillin	Ampicillin	Oxacillin	Ampicillin-sulbactam	Amoxicillin	Cefazolin	Ceftriaxone	Cefotaxime	Ciprofloxacin	Levofloxacin	Moxifloxacin	Daptomycin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Gent Syn	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin	Quinupristin-dalfopristin	Rifampin	Tigecycline	Strep syn
Total <i>Staphylococcus aureus</i>	4% (2539)	0% (292)	62% (5293)	53% (625)	55% (625)	58% (1961)	63% (643)		66% (3318)	69% (5299)	69% (1545)	97% (292)	80% (5273)	48% (3725)	99% (5299)	99% (4440)		98% (4884)	99% (3978)	93% (5299)	100% (4435)	100% (1546)	99% (2007)	100% (1464)	
MSSA	7% (1350)	0% (121)	S (5293)	97% (290)	100% (290)	100% (1141)	NED		89% (2088)	92% (2904)	100% (971)	100% (169)	85% (3068)	70% (1888)	100% (3086)	99% (1635)		99% (2937)	99% (2527)	97% (2904)	99% (2923)	100% (972)	94% (1168)		
MRSA	0% (943)	0% (95)	R (5293)	0% (60)	0% (60)	NED	0% (235)		29% (1489)	32% (2010)	31% (648)	93% (123)	69% (2216)	10% (1414)	99% (2224)	99% (1708)		97% (2224)	99% (1563)	87% (2010)	98% (1919)	99% (648)	93% (183)		
<i>Staphylococcus lugdunensis</i>	48% (111)		85% (153)						98% (153)	99% (153)			79% (153)	79% (153)	100% (153)	99% (153)		100% (149)	100% (149)	96% (153)	100% (111)		100% (111)		
Coag-negative <i>Staphylococcus</i> (inc. <i>S. epidermidis</i> )	13% (670)	0% (139)	48% (1144)	44% (136)	43% (136)	41% (269)	48% (241)		76% (779)	78% (1085)	82% (150)	NED	65% (1091)	38% (830)	99% (1142)	88% (816)		58% (1144)	97% (621)	86% (1087)	99% (1076)	100% (141)	99% (362)		
<i>Enterococcus faecalis</i>	99% (881)	99% (909)				R	R	R	87% (611)	94% (860)		100% (143)	R	11% (404)	99% (928)	R	82% (503)	R	97% (651)	26% (697)	99% (914)	R	42% (108)	100% (211)	74% (267)
<i>Enterococcus</i> spp.	90% (253)	90% (253)							62% (210)	67% (253)					94% (252)		97% (61)		44% (253)	24% (253)	66% (253)				
Group B <i>Streptococcus</i>	100% (275)	S											49% (275)	36% (36)	100% (275)				34% (91)	9% (91)					
<i>Streptococcus pneumoniae</i> (all)	93% (98)				98% (44)	100% (38)	97% (78)	99% (143)		100% (186)			95% (136)	87% (186)	100% (186)			94% (136)		71% (136)					
<i>S. pneumoniae</i> - non-CSF	80% (295)						99% (270)	99% (295)																	
<i>S pneumoniae</i> - meningitis	76% (292)						93% (270)	95% (295)																	



**Statewide data**

Species	Amoxicillin+ clavulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Cefotaxime	Cefotetan	Cefoxitin	Cephalothin	Aztreonam	Gentamicin	Tobramycin	Amikacin	Ertapenem	Imipenem	Meropenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Tetracycline	Nitrofurantoin
<i>Acinetobacter baumannii</i>			<b>98%</b> (48)	<b>83%</b> (48)				<b>81%</b> (48)							<b>98%</b> (48)	<b>98%</b> (48)					<b>98%</b> (48)	<b>98%</b> (48)	<b>96%</b> (48)		
<i>Citrobacter freundii</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>92%</b> (93)	<b>R</b>	<b>R</b>	<b>85%</b> (92)	<b>87%</b> (92)	<b>99%</b> (78)	NED	<b>R</b>	<b>R</b>		<b>87%</b> (75)	<b>95%</b> (91)	<b>97%</b> (93)	<b>100%</b> (78)	<b>100%</b> (33)	<b>98%</b> (48)	<b>100%</b> (61)	<b>85%</b> (93)	<b>97%</b> (93)	<b>86%</b> (64)	<b>91%</b> (30)	<b>97%</b> (89)
<i>Klebsiella aerogenes</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>93%</b> (113)	<b>R</b>	<b>R</b>	<b>88%</b> (113)	<b>87%</b> (99)	<b>100%</b> (83)	<b>47%</b> (53)	<b>R</b>	<b>R</b>		<b>84%</b> (82)	<b>100%</b> (113)	<b>100%</b> (91)	<b>100%</b> (88)	<b>100%</b> (48)	<b>70%</b> (56)	<b>100%</b> (94)	<b>99%</b> (113)	<b>99%</b> (113)	<b>98%</b> (113)	<b>99%</b> (69)	<b>29%</b> (77)
<i>Enterobacter cloacae</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>87%</b> (350)	<b>R</b>	<b>R</b>	<b>80%</b> (244)	<b>84%</b> (285)	<b>98%</b> (288)	NED	<b>R</b>	<b>R</b>		<b>82%</b> (219)	<b>98%</b> (350)	<b>97%</b> (317)	<b>83%</b> (243)	<b>96%</b> (134)	<b>91%</b> (141)	<b>99%</b> (301)	<b>97%</b> (350)	<b>97%</b> (350)	<b>92%</b> (350)	<b>93%</b> (198)	<b>39%</b> (335)
<i>Escherichia coli</i>	<b>86%</b> (4789)	<b>57%</b> (8962)	<b>64%</b> (7650)	<b>98%</b> (9028)	<b>79%</b> (9395)	<b>88%</b> (4324)	<b>95%</b> (9420)	<b>96%</b> (8139)	<b>97%</b> (7344)	<b>63%</b> (2233)	<b>98%</b> (2222)	<b>93%</b> (4784)	<b>50%</b> (2222)	<b>89%</b> (4470)	<b>93%</b> (9420)	<b>94%</b> (8255)	<b>99%</b> (4242)	<b>99%</b> (4329)	<b>99%</b> (4415)	<b>99%</b> (5937)	<b>86%</b> (9420)	<b>85%</b> (9420)	<b>80%</b> (9420)	<b>80%</b> (4725)	<b>96%</b> (9376)
<i>Klebsiella oxytoca</i>	<b>86%</b> (97)	<b>0%</b> (41)	<b>65%</b> (216)	<b>95%</b> (216)	<b>57%</b> (155)	<b>88%</b> (153)	<b>94%</b> (216)	<b>99%</b> (184)	<b>97%</b> (180)		NED	<b>91%</b> (101)		<b>96%</b> (148)	<b>99%</b> (216)	<b>99%</b> (196)	<b>100%</b> (159)	<b>98%</b> (65)	<b>100%</b> (101)	<b>99%</b> (155)	<b>97%</b> (216)	<b>97%</b> (216)	<b>96%</b> (216)	<b>96%</b> (97)	<b>82%</b> (203)
<i>Klebsiella pneumoniae</i>	<b>98%</b> (468)	<b>R</b>	<b>87%</b> (1174)	<b>98%</b> (1174)	<b>85%</b> (1202)	<b>94%</b> (522)	<b>97%</b> (1206)	<b>98%</b> (1012)	<b>98%</b> (1013)	<b>92%</b> (219)	<b>100%</b> (219)	<b>93%</b> (564)	<b>82%</b> (384)	<b>97%</b> (630)	<b>98%</b> (1206)	<b>98%</b> (1059)	<b>17%</b> (3630)	<b>99%</b> (482)	<b>99%</b> (513)	<b>99%</b> (757)	<b>96%</b> (1206)	<b>97%</b> (1206)	<b>93%</b> (1206)	<b>86%</b> (455)	<b>42%</b> (1187)
<i>Proteus mirabilis</i>	<b>95%</b> (206)	<b>86%</b> (478)	<b>90%</b> (488)	<b>99%</b> (526)	<b>76%</b> (524)	<b>95%</b> (243)	<b>97%</b> (390)	<b>99%</b> (309)	<b>99%</b> (310)	<b>97%</b> (111)	<b>100%</b> (111)	<b>56%</b> (248)	<b>94%</b> (111)	<b>98%</b> (296)	<b>94%</b> (526)	<b>95%</b> (479)	<b>100%</b> (271)	<b>99%</b> (221)	<b>16%</b> (211)	<b>100%</b> (317)	<b>92%</b> (526)	<b>94%</b> (526)	<b>91%</b> (526)	<b>R</b>	<b>R</b>
<i>Pseudomonas aeruginosa</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>95%</b> (837)	<b>R</b>	<b>R</b>	<b>R</b>	<b>92%</b> (763)	<b>93%</b> (766)	<b>R</b>	<b>R</b>	<b>R</b>		<b>70%</b> (450)	<b>90%</b> (846)	<b>97%</b> (834)	<b>92%</b> (521)	<b>R</b>	<b>86%</b> (329)	<b>94%</b> (591)	<b>87%</b> (846)	<b>83%</b> (846)	<b>R</b>	<b>R</b>	<b>R</b>
<i>Serratia marcescens</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>85%</b> (82)	<b>R</b>	<b>R</b>	<b>98%</b> (82)	<b>99%</b> (82)	<b>99%</b> (82)		<b>R</b>	<b>R</b>		<b>99%</b> (82)	<b>100%</b> (83)	<b>94%</b> (83)	<b>100%</b> (81)	<b>100%</b> (37)	NED	<b>100%</b> (81)	<b>99%</b> (83)	<b>99%</b> (83)	<b>99%</b> (83)	NED	<b>R</b>





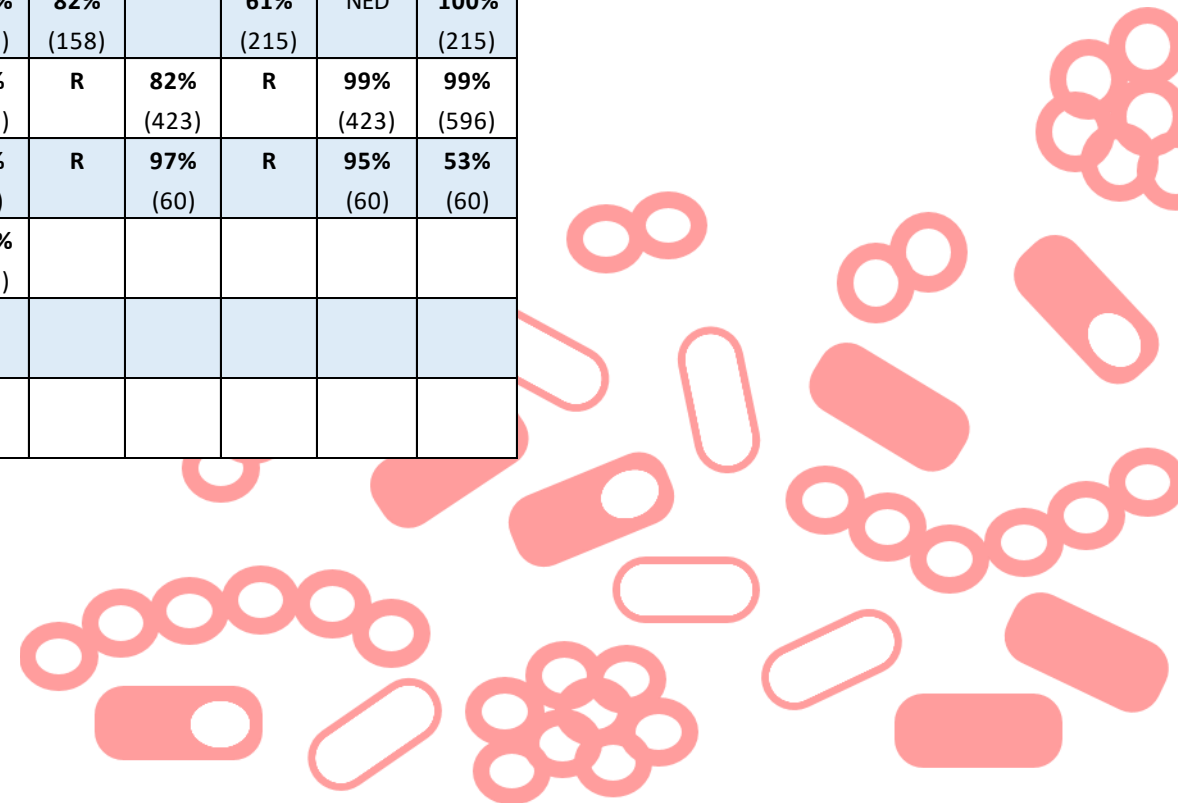
## 2019 Alaska State Antibigram: Anchorage-Mat-Su Region

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. 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.

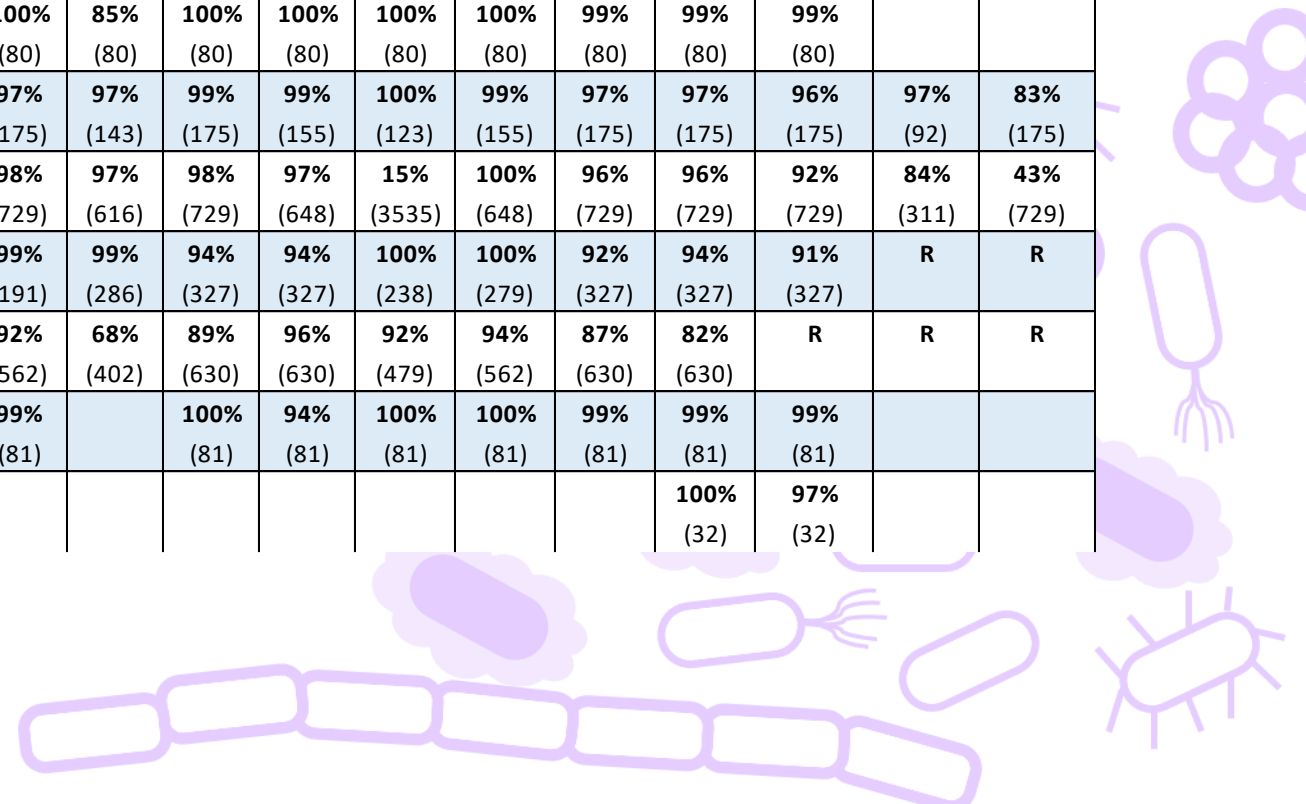
- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were 3 cases of CRE in Anchorage/Mat-Su residents in 2019.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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
  - Mat-Su Regional Medical Center
  - Providence Alaska Medical Center

**Anchorage+  
Mat-Su Region**

Species	Penicillin	Ampicillin	Oxacillin	Cefazolin	Ceftriaxone	Cefotaxime	Ciprofloxacin	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Gent Syn	Trimethoprim-sulfamethoxazole	Linezolid	Nitrofurantoin
Total <i>Staphylococcus aureus</i>			<b>60%</b> (3410)	<b>57%</b> (1862)			<b>64%</b> (1862)	<b>67%</b> (3410)	<b>79%</b> (3410)	<b>47%</b> (1862)	<b>100%</b> (3410)	<b>99%</b> (3410)		<b>97%</b> (2995)	<b>100%</b> (2995)	<b>100%</b> (3410)
MSSA	<b>5%</b> (1107)		<b>S</b>	<b>100%</b> (1141)			<b>91%</b> (1323)	<b>94%</b> (2139)	<b>85%</b> (2321)	<b>72%</b> (1141)	<b>100%</b> (2321)	<b>100%</b> (1141)		<b>98%</b> (2321)	<b>100%</b> (1923)	<b>100%</b> (2321)
MRSA			<b>R</b>				<b>26%</b> (1031)	<b>28%</b> (1405)	<b>66%</b> (1619)	<b>10%</b> (817)	<b>100%</b> (1619)	<b>99%</b> (1405)		<b>97%</b> (1619)	<b>100%</b> (1201)	<b>100%</b> (1619)
Coag-negative <i>Staphylococcus</i>	NED		<b>43%</b> (477)	NED			NED	<b>71%</b> (420)	<b>57%</b> (477)	NED	<b>100%</b> (477)	<b>84%</b> (420)		<b>47%</b> (477)	NED	<b>99%</b> (477)
<i>Staphylococcus epidermidis</i>	<b>3%</b> (102)		<b>39%</b> (215)	<b>23%</b> (91)			<b>66%</b> (136)	<b>61%</b> (158)	<b>55%</b> (215)	NED	<b>100%</b> (215)	<b>82%</b> (158)		<b>61%</b> (215)	NED	<b>100%</b> (215)
<i>Enterococcus faecalis</i>	<b>99%</b> (596)	<b>99%</b> (596)		<b>R</b>	<b>R</b>	<b>R</b>	<b>89%</b> (311)	<b>93%</b> (528)	<b>R</b>		<b>99%</b> (596)	<b>R</b>	<b>82%</b> (423)	<b>R</b>	<b>99%</b> (423)	<b>99%</b> (596)
<i>Enterococcus faecium</i>	<b>57%</b> (60)	<b>58%</b> (60)		<b>R</b>	<b>R</b>	<b>R</b>	NED	<b>60%</b> (60)	<b>R</b>	NED	<b>78%</b> (60)	<b>R</b>	<b>97%</b> (60)	<b>R</b>	<b>95%</b> (60)	<b>53%</b> (60)
<i>Streptococcus pneumoniae</i> (all)						<b>100%</b> (100)		<b>100%</b> (125)	NED	<b>87%</b> (125)	<b>100%</b> (125)					
<i>S. pneumoniae</i> - non-CSF	<b>80%</b> (295)				<b>99%</b> (270)	<b>99%</b> (295)										
<i>S pneumoniae</i> - meningitis	<b>76%</b> (292)				<b>93%</b> (270)	<b>95%</b> (295)										



Species	Amoxicillin+ clavulanic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Cefuroxime	Cefuroxime-axetil	Ceftriaxone	Ceftazidime	Cefepime	Aztreonam	Gentamicin	Tobramycin	Amikacin	Meropenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Tetracycline	Nitrofurantoin
<i>Acinetobacter baumannii</i>			98% (46)	85% (46)					83% (46)			98% (46)	98% (46)		98% (46)	98% (46)	98% (46)	96% (46)		
<i>Citrobacter freundii</i>	R	R	R	91% (74)	R	R		84% (74)	85% (74)	99% (74)	86% (74)	95% (74)	99% (74)	100% (61)	100% (61)	82% (74)	96% (74)	82% (45)	NED	96% (74)
<i>Enterobacter cloacae</i>	R	R	R	83% (253)	R	R		79% (154)	82% (214)	99% (253)	81% (214)	98% (253)	98% (253)	81% (214)	99% (253)	96% (253)	98% (253)	94% (253)	93% (138)	43% (253)
<i>Escherichia coli</i>	85% (2838)	56% (4559)	63% (5017)	97% (5017)	90% (5017)	86% (3296)	78% (3723)	93% (5017)	96% (4181)	96% (5017)	88% (4181)	92% (5017)	94% (5017)	99% (3723)	100% (4559)	83% (5017)	83% (5017)	81% (5017)	81% (2838)	97% (5017)
<i>Klebsiella aerogenes</i>				91% (80)				84% (80)	85% (80)	100% (80)	85% (80)	100% (80)	100% (80)	100% (80)	100% (80)	99% (80)	99% (80)	99% (80)		
<i>Klebsiella oxytoca</i>	86% (92)		69% (175)	94% (175)	47% (115)	90% (112)	95% (123)	94% (175)	99% (143)	97% (175)	97% (143)	99% (175)	99% (155)	100% (123)	99% (155)	97% (175)	97% (175)	96% (175)	97% (92)	83% (175)
<i>Klebsiella pneumoniae</i>	96% (311)	R	86% (729)	98% (729)	95% (729)	92% (392)	86% (535)	96% (729)	98% (616)	98% (729)	97% (616)	98% (729)	97% (648)	15% (3535)	100% (648)	96% (729)	96% (729)	92% (729)	84% (311)	43% (729)
<i>Proteus mirabilis</i>	94% (143)	85% (279)	90% (327)	99% (327)	94% (327)	96% (191)		98% (191)	100% (150)	99% (191)	99% (286)	94% (327)	94% (327)	100% (238)	100% (279)	92% (327)	94% (327)	91% (327)	R	R
<i>Pseudomonas aeruginosa</i>	R	R	R	94% (630)				R	90% (547)	92% (562)	68% (402)	89% (630)	96% (630)	92% (479)	94% (562)	87% (630)	82% (630)	R	R	R
<i>Serratia marcescens</i>				85% (81)				99% (81)	99% (81)	99% (81)		100% (81)	94% (81)	100% (81)	100% (81)	99% (81)	99% (81)	99% (81)		
<i>Stenotrophomonas maltophilia</i>									47% (32)								100% (32)	97% (32)		



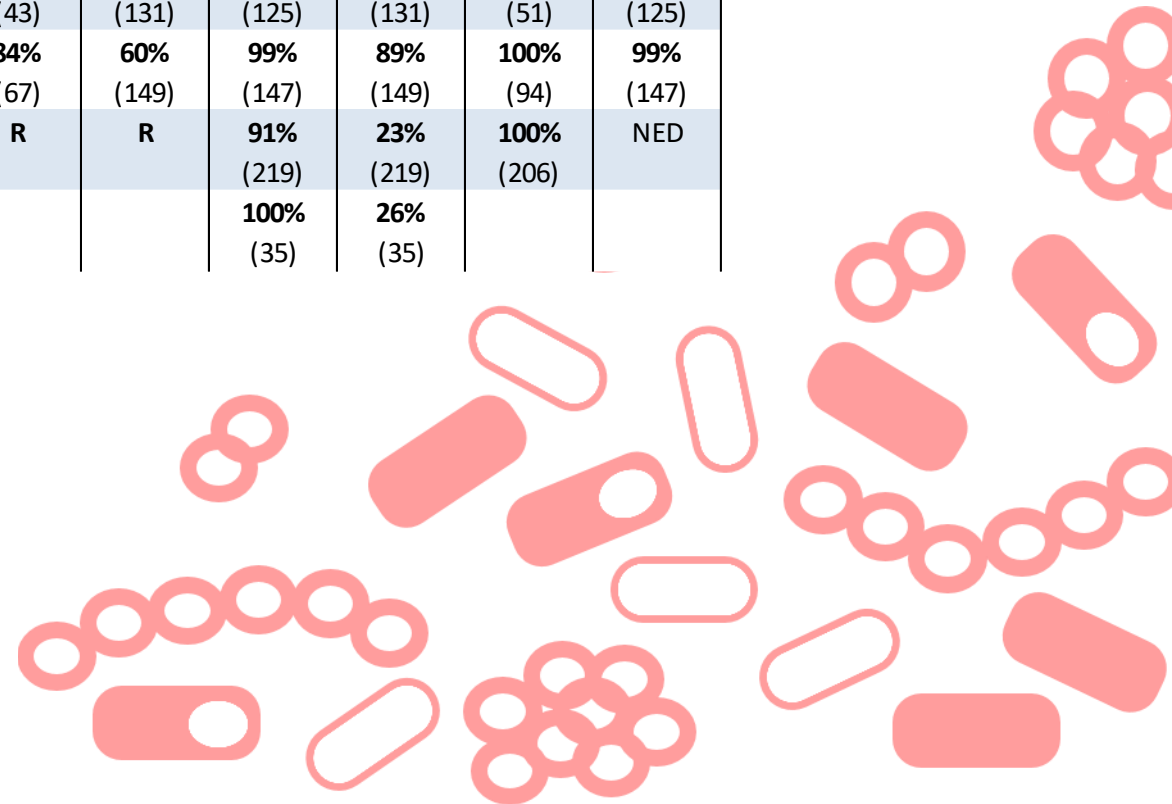
## 2019 Alaska State Antibiogram: Gulf Coast Region

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. 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.

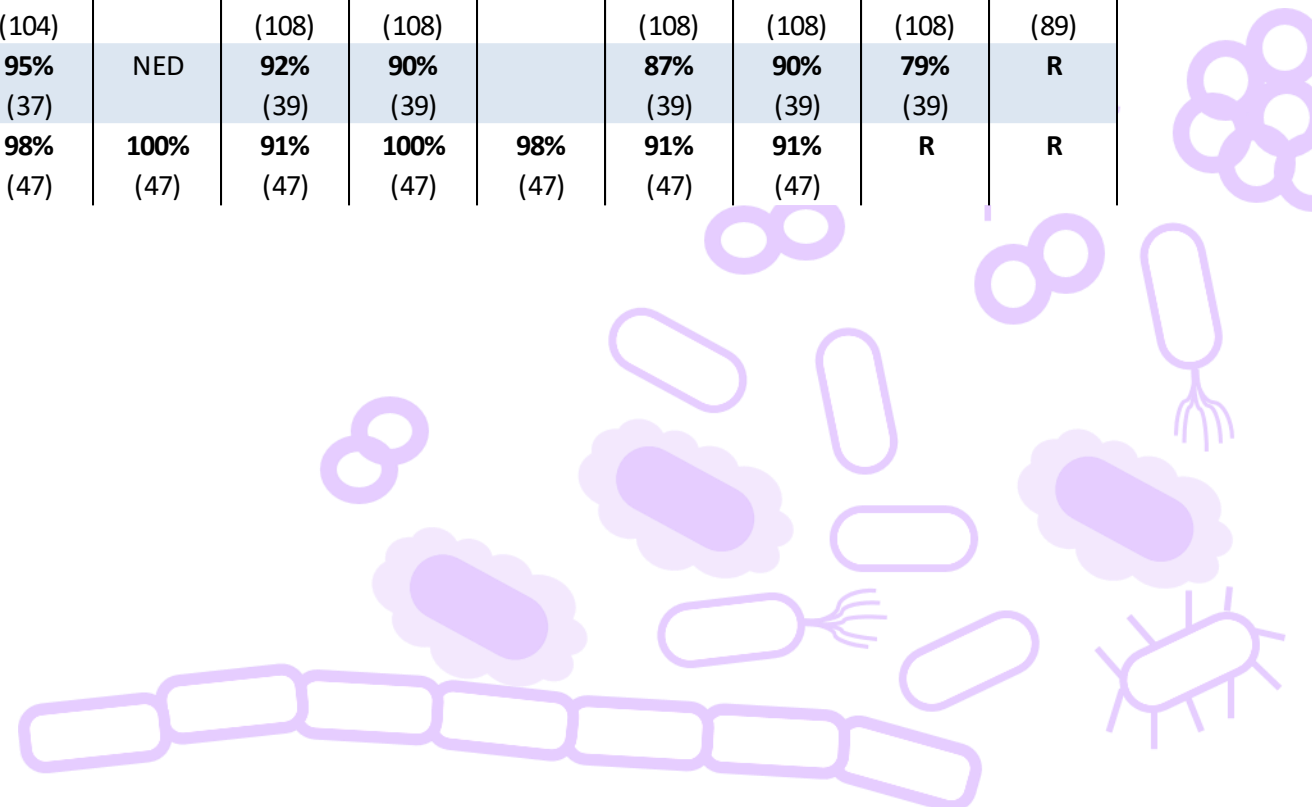
- **Methodology:** Individual hospitals prepared their own facility antibiograms, which were shared with the Alaska Section of Epidemiology. Aggregated susceptibility percentages were calculated as the proportion of all tested isolates for the region that were susceptible. Values are only reported when 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were no cases of CRE in a Gulf Coast resident in 2019.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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
  - Providence Valdez Medical Center

**Gulf Coast  
Region data**

Species	Penicillin	Ampicillin	Oxacillin	Ciprofloxacin	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Gentamicin	Trimethoprim-sulfamethoxazole	Linezolid	Tetracycline	Nitrofurantoin	Rifampin
Total <i>Staphylococcus aureus</i>	9% (338)		62% (350)	63% (356)	64% (356)	82% (331)	43% (331)	100% (356)	99% (146)	99% (356)	99% (338)	94% (356)	100% (159)	97% (338)
MSSA	16% (196)		S	84% (208)	85% (208)	88% (191)	65% (191)	100% (208)	98% (86)	99% (208)	99% (196)	96% (208)	100% (91)	100% (196)
MRSA	0% (125)		R	29% (131)	31% (131)	73% (123)	7% (123)	100% (131)	100% (43)	98% (131)	99% (125)	91% (131)	100% (51)	92% (125)
<i>Staphylococcus epidermidis</i>	10% (147)		50% (149)	68% (147)	69% (147)	72% (120)	38% (120)	100% (149)	84% (67)	60% (149)	99% (147)	89% (149)	100% (94)	99% (147)
<i>Enterococcus faecalis</i>	100% (219)	100% (219)		84% (219)	96% (219)	R	7% (85)	100% (219)	R	R	91% (219)	23% (219)	100% (206)	NED
Group B <i>Streptococcus</i>	100% (40)	S			97% (35)	43% (40)	36% (36)	100% (40)			100% (35)	26% (35)		



<b>Gulf Coast Region data</b>	Amoxicillin+ clavulanamic acid	Ampicillin	Ampicillin+Sulbactam	Piperacillin+Tazobactam	Cefazolin	Cefuroxime	Ceftriaxone	Ceftazidime	Cefepime	Gentamicin	Tobramycin	Imipenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin
<i>Escherichia coli</i>	<b>88%</b> (64)	<b>58%</b> (583)	<b>66%</b> (583)	<b>99%</b> (583)	<b>91%</b> (583)	<b>95%</b> (519)	<b>96%</b> (583)	<b>98%</b> (560)	<b>100%</b> (64)	<b>95%</b> (583)	<b>90%</b> (583)	<b>100%</b> (583)	<b>89%</b> (583)	<b>89%</b> (583)	<b>83%</b> (583)	<b>99%</b> (543)
<i>Klebsiella pneumoniae</i>	<b>100%</b> (13)	<b>R</b>	<b>88%</b> (108)	<b>100%</b> (108)	<b>98%</b> (104)			<b>100%</b> (104)	NED	<b>100%</b> (108)	<b>100%</b> (108)		<b>98%</b> (108)	<b>98%</b> (108)	<b>96%</b> (108)	<b>46%</b> (89)
<i>Proteus mirabilis</i>		<b>72%</b> (39)	<b>79%</b> (39)	<b>100%</b> (39)	<b>78%</b> (37)	<b>88%</b> (33)	<b>92%</b> (39)	<b>95%</b> (37)	NED	<b>92%</b> (39)	<b>90%</b> (39)		<b>87%</b> (39)	<b>90%</b> (39)	<b>79%</b> (39)	<b>R</b>
<i>Pseudomonas aeruginosa</i>	<b>R</b>	<b>R</b>	<b>R</b>	<b>100%</b> (47)	<b>R</b>	<b>R</b>	<b>R</b>	<b>98%</b> (47)	<b>100%</b> (47)	<b>91%</b> (47)	<b>100%</b> (47)	<b>98%</b> (47)	<b>91%</b> (47)	<b>91%</b> (47)	<b>R</b>	<b>R</b>





## 2019 Alaska State Antibigram: Interior Region

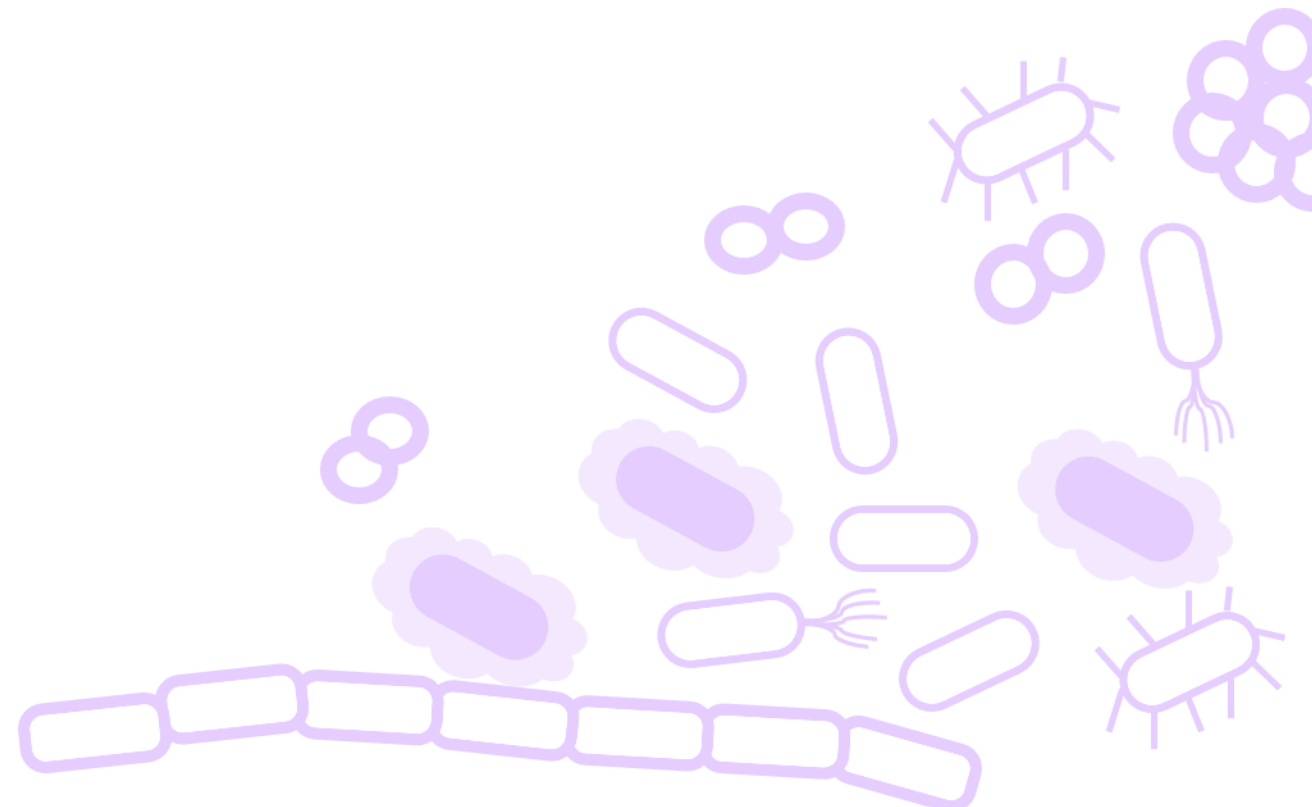
The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. These data were aggregated from the antibiograms produced by Alaska hospitals in order to create aggregate regional resistance pattern summaries. These antibiograms 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were no cases of CRE in a Interior resident in 2019.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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:
  - Fairbanks Memorial Hospital
  - Bassett Army Community Hospital

<b>Interior Region data</b>														
<b>Species</b>	Penicillin	Ampicillin	Cefotaxime	Ceftriaxone	Cefuroxime	Oxacillin	Ciprofloxacin	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Trimethoprim-sulfamethoxazole	Tetracycline	Nitrofurantoin
Coag-negative <i>Staphylococcus</i>						<b>55%</b> (251)	<b>78%</b> (251)	<b>78%</b> (251)	<b>69%</b> (251)	<b>45%</b> (251)	<b>99%</b> (251)	<b>56%</b> (251)	<b>83%</b> (251)	<b>99%</b> (251)



<b>Interior Region data</b>	Amoxicillin+ clavulanic acid	Ampicillin	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Gentamicin	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin	Tobramycin
<i>Escherichia coli</i>		<b>64%</b> (1647)	NED	<b>27%</b> (1647)	<b>97%</b> (1647)	<b>95%</b> (1647)	<b>90%</b> (1647)	<b>90%</b> (1647)	<b>96%</b> (1647)	<b>91%</b> (1647)	<b>95%</b> (1647)
<i>Klebsiella spp.</i>			<b>96%</b> (165)	<b>33%</b> (197)	<b>98%</b> (197)	<b>98%</b> (197)	<b>98%</b> (197)	<b>98%</b> (197)	<b>93%</b> (197)	<b>31%</b> (197)	<b>99%</b> (197)



## 2019 Alaska State Antibiogram: Southeast Region

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were no cases of CRE reported in a Southeast resident in 2019.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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
  - PeaceHealth Ketchikan Medical Center

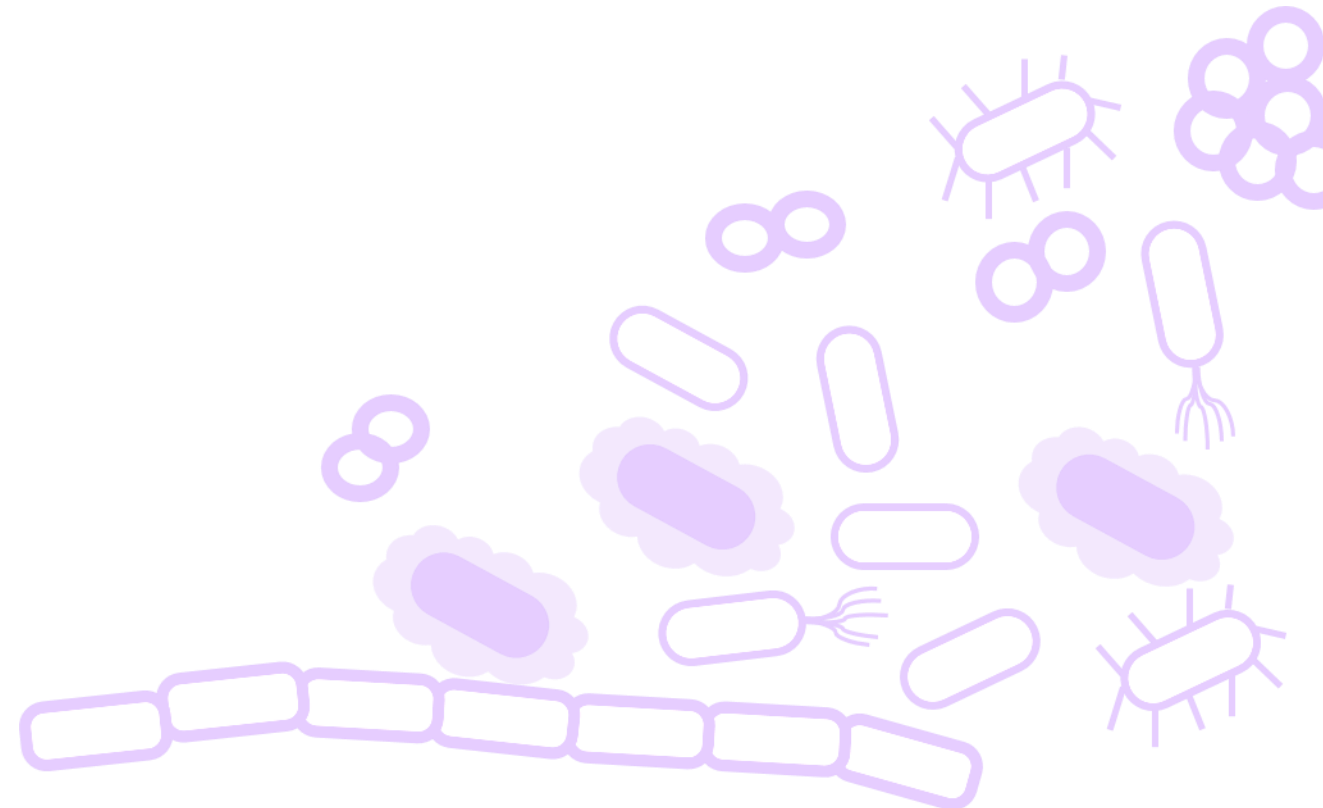
**Southeast  
Region data**

Species	Ampicillin	Oxacillin	Ciprofloxacin	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Trimethoprim-sulfamethoxazole	Tetracycline	Nitrofurantoin
Total <i>Staphylococcus aureus</i>		<b>69%</b> (356)	<b>71%</b> (356)	<b>71%</b> (356)	<b>83%</b> (356)	<b>51%</b> (356)	<b>100%</b> (356)	<b>94%</b> (356)	<b>96%</b> (356)	<b>100%</b> (356)
<i>Enterococcus faecalis</i>	<b>100%</b> (53)		<b>87%</b> (53)	<b>87%</b> (53)	<b>R</b>	<b>9%</b> (53)	<b>100%</b> (53)	<b>R</b>		<b>94%</b> (53)



**Southeast  
Region data**

Species	Ampicillin	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Ceftazidime	Cefepime	Cefoxitin	Gentamicin	Tobramycin	Ertapenem	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Nitrofurantoin
<i>Escherichia coli</i>	<b>57%</b> (719)	<b>98%</b> (719)	<b>93%</b> (719)	<b>96%</b> (719)	<b>97%</b> (719)	<b>99%</b> (719)	<b>94%</b> (719)	<b>95%</b> (719)	<b>96%</b> (719)	<b>100%</b> (719)	<b>90%</b> (719)	<b>89%</b> (719)	<b>79%</b> (719)	<b>97%</b> (719)
<i>Klebsiella pneumoniae</i>	R	<b>97%</b> (92)	<b>95%</b> (92)	<b>93%</b> (92)	<b>93%</b> (92)	<b>97%</b> (92)	<b>96%</b> (92)	<b>98%</b> (92)	<b>97%</b> (92)	<b>100%</b> (92)	<b>92%</b> (92)	<b>92%</b> (92)	<b>91%</b> (92)	<b>40%</b> (92)
<i>Proteus mirabilis</i>	<b>97%</b> (36)	<b>100%</b> (36)	<b>97%</b> (36)	<b>100%</b> (36)	<b>100%</b> (36)	<b>100%</b> (36)	<b>97%</b> (36)	<b>97%</b> (36)	<b>97%</b> (36)	<b>100%</b> (36)	<b>94%</b> (36)	<b>94%</b> (36)	<b>94%</b> (36)	<b>R</b>
<i>Pseudomonas aeruginosa</i>	<b>R</b>	<b>97%</b> (39)		<b>R</b>	<b>90%</b> (39)	<b>90%</b> (39)		<b>100%</b> (39)	<b>100%</b> (39)		<b>85%</b> (39)	<b>82%</b> (39)	<b>R</b>	



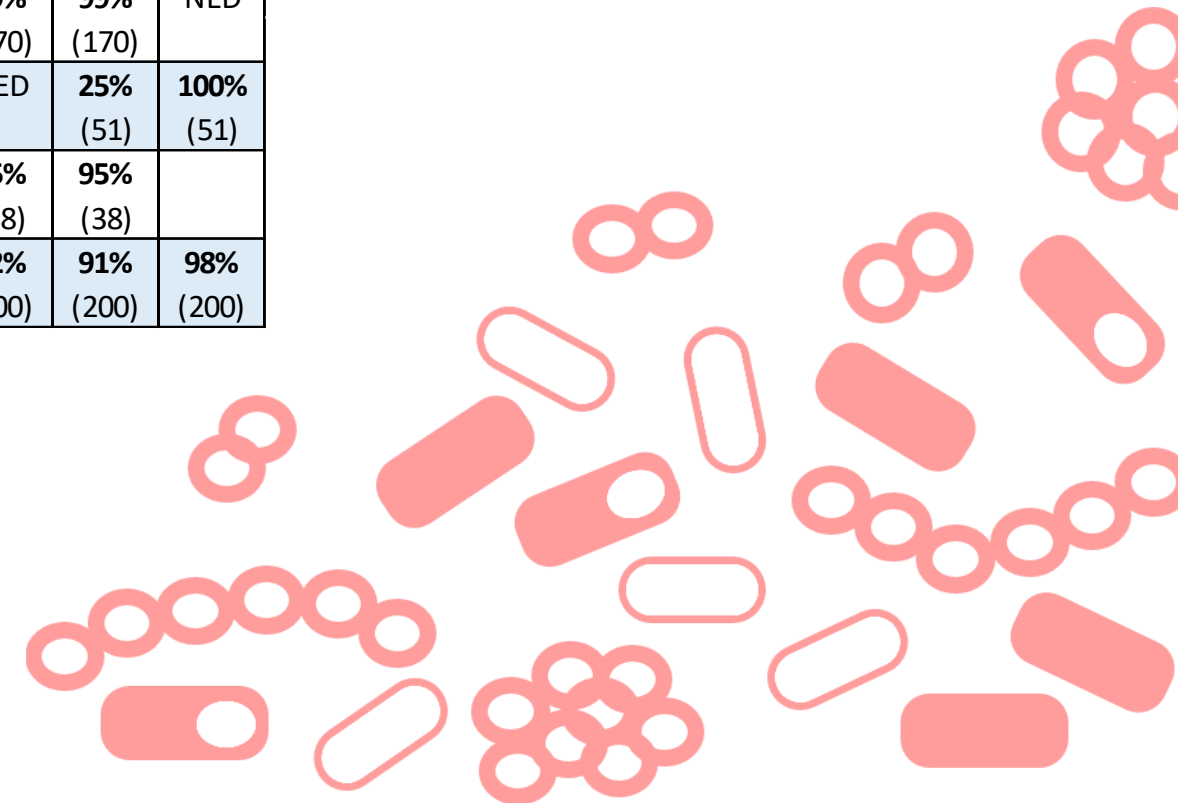


## 2019 Alaska State Antibigram: Southwest Region

The following tables show the proportion of isolates of various bacterial species that tested susceptible to various antibiotics during 2019. 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 is reportable to the Alaska Section of Epidemiology.
  - Carbapenem-resistant Enterobacteriaceae (CRE): there were no cases of CRE reported in a Southwest resident in 2019.
- **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 bacteria-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 drug-bug combination or <30 isolates were tested.
- **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:
  - Kakanak Hospital
  - Yukon-Kuskokwim Delta Regional Hospital

<b>Southwest Region data</b>												
<b>Species</b>	Penicillin	Cefotaxime	Ceftriaxone	Cefuroxime	Oxacillin	Levofloxacin	Clindamycin	Erythromycin	Vancomycin	Trimethoprim-sulfamethoxazole	Tetracycline	Nitrofurantoin
Total <i>Staphylococcus aureus</i>	<b>9%</b> (532)		NED		<b>68%</b> (532)	<b>80%</b> (532)	<b>92%</b> (532)	<b>54%</b> (532)	<b>99%</b> (532)	<b>100%</b> (532)	<b>99%</b> (532)	<b>100%</b> (509)
MSSA	<b>13%</b> (362)				<b>S</b>	<b>95%</b> (362)	<b>94%</b> (362)	<b>74%</b> (362)	<b>100%</b> (362)	<b>100%</b> (362)	<b>99%</b> (362)	<b>100%</b> (362)
MRSA	NED				<b>R</b>	<b>50%</b> (170)	<b>90%</b> (170)	<b>11%</b> (170)	<b>99%</b> (170)	<b>99%</b> (170)	<b>99%</b> (170)	NED
<i>Enterococcus faecalis</i>	<b>98%</b> (51)					<b>98%</b> (51)	NED	<b>42%</b> (51)	<b>100%</b> (51)	NED	<b>25%</b> (51)	<b>100%</b> (51)
<i>Streptococcus pneumoniae</i>	<b>92%</b> (38)	<b>97%</b> (35)	<b>97%</b> (38)	<b>100%</b> (38)		<b>100%</b> (38)	<b>97%</b> (38)	<b>89%</b> (38)	<b>100%</b> (38)	<b>95%</b> (38)	<b>95%</b> (38)	
Coagulase-negative <i>Staph</i>	<b>16%</b> (200)				<b>53%</b> (200)	<b>93%</b> (200)	<b>75%</b> (200)	<b>39%</b> (200)	<b>99%</b> (200)	<b>82%</b> (200)	<b>91%</b> (200)	<b>98%</b> (200)



<b>Southwest Region data</b>											
<b>Species</b>	Amoxicillin+ clavulanic acid	Ampicillin	Piperacillin+Tazobactam	Cefazolin	Ceftriaxone	Gentamicin	Ciprofloxacin	Levofloxacin	Trimeth+Sulfa	Tetracycline	Nitrofurantoin
<i>Enterobacter cloacae</i>	<b>0%</b> (33)	<b>0%</b> (33)	<b>100%</b> (33)	<b>0%</b> (33)	<b>85%</b> (33)	<b>97%</b> (33)	<b>100%</b> (33)	<b>100%</b> (33)	<b>94%</b> (33)	<b>100%</b> (33)	<b>39%</b> (33)
<i>Escherichia coli</i>	<b>89%</b> (1165)	<b>50%</b> (1165)	<b>99%</b> (1165)	<b>91%</b> (1165)	<b>97%</b> (1165)	<b>92%</b> (1165)	<b>85%</b> (1165)	<b>85%</b> (1165)	<b>71%</b> (1165)	<b>77%</b> (1165)	<b>98%</b> (1165)
ESBL <i>E. coli</i>	<b>80%</b> (40)	<b>0%</b> (40)	<b>98%</b> (40)	<b>0%</b> (40)	<b>0%</b> (40)	<b>83%</b> (40)	<b>45%</b> (40)	<b>45%</b> (40)	<b>43%</b> (40)	<b>38%</b> (40)	<b>100%</b> (40)
<i>Klebsiella pneumoniae</i>	<b>98%</b> (66)	<b>0%</b> (66)	<b>97%</b> (66)	<b>92%</b> (66)	<b>97%</b> (66)	<b>100%</b> (66)	<b>100%</b> (66)	<b>100%</b> (66)	<b>98%</b> (66)	<b>89%</b> (66)	<b>53%</b> (66)
<i>Proteus mirabilis</i>	<b>100%</b> (47)	<b>91%</b> (47)	<b>100%</b> (47)	<b>96%</b> (47)	<b>96%</b> (47)	<b>96%</b> (47)	<b>98%</b> (47)	<b>98%</b> (47)	<b>94%</b> (47)	<b>0%</b> (47)	<b>0%</b> (47)

