Antimicrobial Stewardship in the Long-Term Care Setting

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OKLAHOMA STATE DEPARTMENT OF HEALTH

Objectives

Define antimicrobial stewardship

Break down the CDC Core Elements for antimicrobial stewardship in the long-term care setting

Review available resources for antimicrobial stewardship programs from OSDH

Antimicrobial Resistance

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What is antimicrobial resistance?

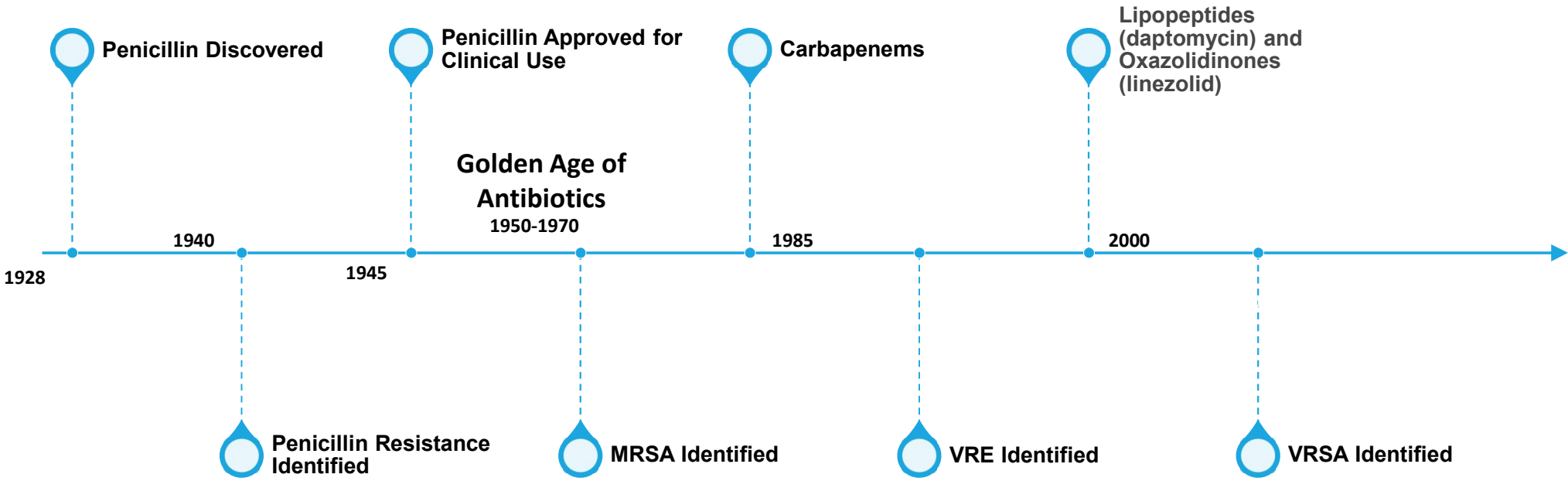
- Naturally occurring phenomenon consisting of genetic mutation and sharing of mutated genes for bacterial/fungal survival. Resistance mutations occur largely as a result of antimicrobial exposure.

- Due to the rapid spread and high mortality/morbidity associated with antimicrobial resistant infections, it is considered an urgent global public health threat.

CDC. Antibiotic Resistance Threats in the United States, 2019 and 2021-2022

Timeline of Antimicrobial Resistance

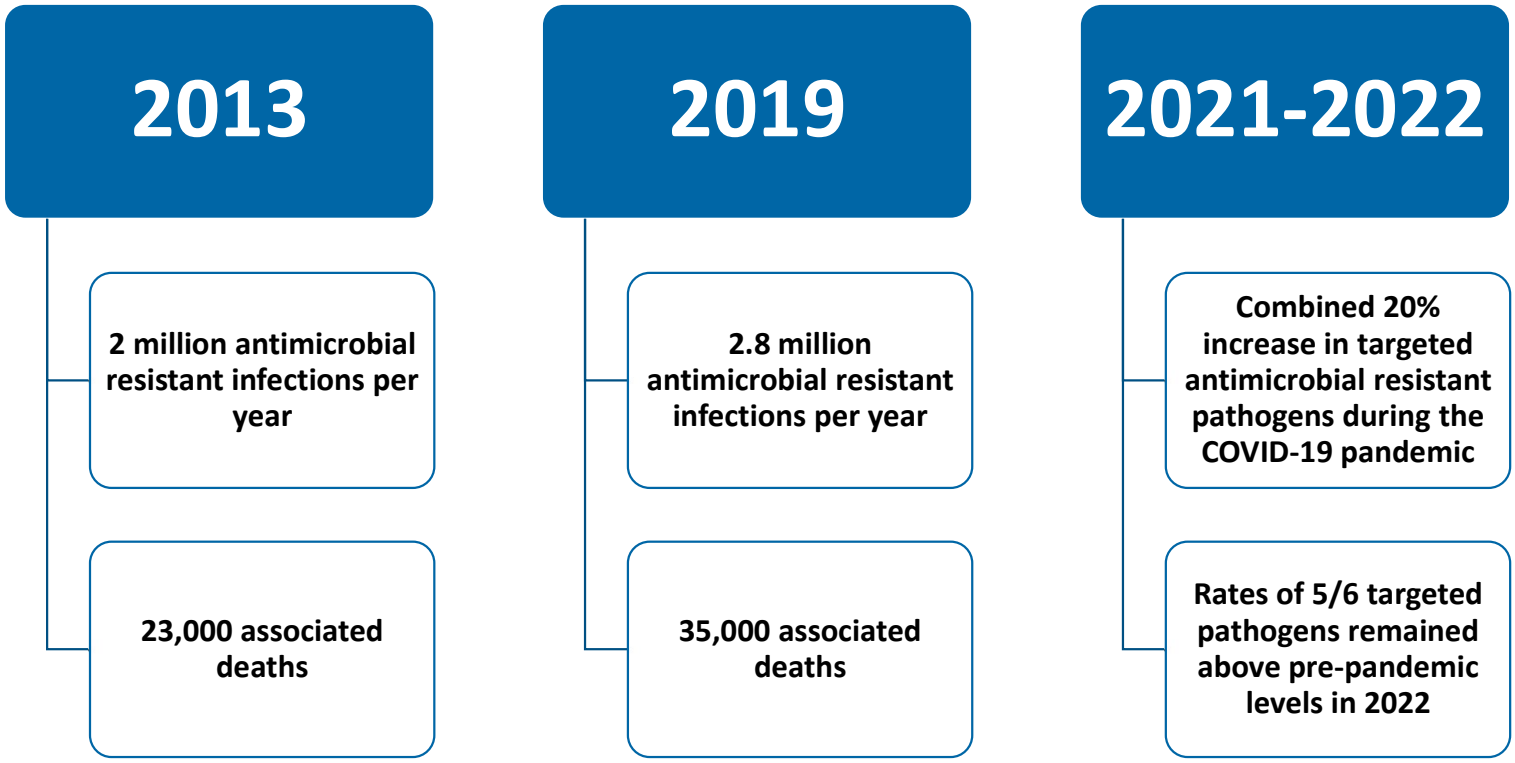
VRE was identified roughly 15 years before any antibiotics with activity entered the market



MRSA: methicillin resistant *Staphylococcus aureus*, VRE: vancomycin resistant *Enterococcus*, VRSA: vancomycin resistant *Staphylococcus aureus*

Current Opinion in Microbiology v51 p72-80

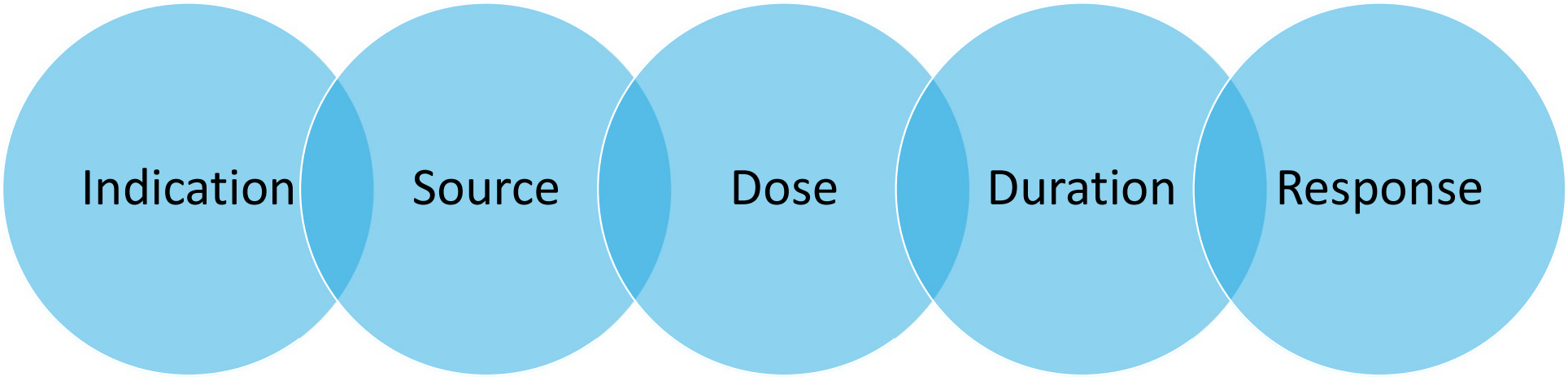
Impact of Resistance in the US



CDC. Antibiotic Resistance Threats in the United States, 2019 and 2021-2022

What is antimicrobial stewardship?

Stewarding the available antimicrobials by reducing misuse and unnecessary use. There are multiple factors to consider when selecting an antimicrobial, often the most crucial being whether it should be utilized at all.



CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Impacts of Antimicrobial Use

Antimicrobial resistance

- Appropriate and inappropriate use of antimicrobial contributes to development of resistance

Adverse medication effects

- Nephrotoxicity
- Bone marrow suppression
- Neurotoxicity
- Etc.

Clostridioides difficile

- Overgrowth of *C diff* occurs when the normal gut microbiota are suppressed with antibiotic use leading to colitis and potentially to severe disease.

CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Core Elements

- Leadership Commitment
- Accountability
- Stewardship/ Pharmacy Expertise
- Action
- Tracking
- Reporting
- Education

CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Leadership Commitment

Create a culture that supports antimicrobial stewardship

- Provide dedicated time to stewardship lead for prospective audit of antibiotic regimens
- Support stewardship implementation of initiatives and policies
- Meet regularly to understand resources and track progress

Accountability/ Stewardship Expertise

Designate leader or co-leaders to champion the program

- Empower existing personnel
- Medical director, director of nursing, consultant pharmacists, infection preventionist, nurses
- Infectious Diseases (ID) and/or antimicrobial stewardship training is recommended.
- Consider available training and certification programs.

CDC Training on Antibiotic Stewardship

CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Action

- Bug – Drug Mismatch Considerations
- Adverse Reaction Monitoring
- Facility Specific Treatment Pathways
- Antibiotic Allergy Interviews

CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Action: Penicillin Allergy De-labelling

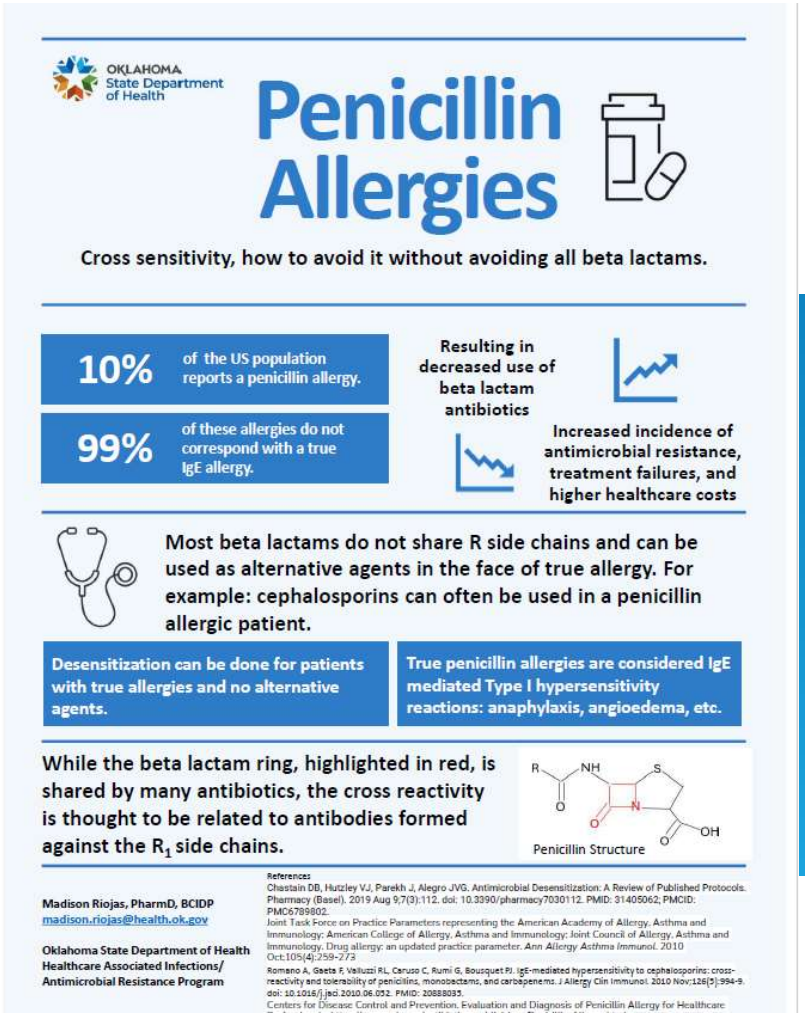
Penicillin allergy de-labeling can be a great initiative that makes a positive impact on patient care.

Avoidance of beta-lactam allergies due to penicillin allergies often results in overly broad and non-first-line therapy selections.

There are multiple tools to aid implementation

- Educational tools
- Cross reactivity charts
- PEN-FAST scoring

OSDH RESOURCES



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Penicillin Allergies

Cross sensitivity, how to avoid it without avoiding all beta lactams.

10% of the US population reports a penicillin allergy.

99% of these allergies do not correspond with a true IgE allergy.

Resulting in decreased use of beta lactam antibiotics

Increased incidence of antimicrobial resistance, treatment failures, and higher healthcare costs

Most beta lactams do not share R side chains and can be used as alternative agents in the face of true allergy. For example: cephalosporins can often be used in a penicillin allergic patient.

Desensitization can be done for patients with true allergies and no alternative agents.

True penicillin allergies are considered IgE mediated Type I hypersensitivity reactions: anaphylaxis, angioedema, etc.

While the beta lactam ring, highlighted in red, is shared by many antibiotics, the cross reactivity is thought to be related to antibodies formed against the R_1 side chains.

Penicillin Structure

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Oklahoma State Department of Health
Healthcare Associated Infections/
Antimicrobial Resistance Program

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Joint Task Force on Practice Parameters representing the American Academy of Allergy, Asthma and Immunology; American College of Allergy, Asthma and Immunology; Joint Council of Allergy, Asthma and Immunology. Drug allergy: an updated practice parameter. Ann Allergy Asthma Immunol. 2010 Oct;105(4):259-273
Romano A, Gaeta F, Valluzzi RL, Caruso C, Rumi G, Bousquet PJ. IgE-mediated hypersensitivity to cephalosporins: cross-reactivity and tolerability of penicillins, monobactams, and carbapenems. J Allergy Clin Immunol. 2010 Nov;126(5):994-9. doi: 10.1016/j.jaci.2010.06.052. PMID: 20688035.
Centers for Disease Control and Prevention. Evaluation and Diagnosis of Penicillin Allergy for Healthcare

Tracking: Outcomes

Adverse Effects

- Track rates of antimicrobial related adverse reactions
- Evaluate C. diff cases – assess for associated inappropriate antibacterial use

Treatment Failure Rates

- Monitor number of patients needing antimicrobial escalation or restart of antimicrobial therapy

Cost

- Look at the cost of various antimicrobials and identify cost savings related to stewardship interventions such as de-escalation or shortened duration of therapy

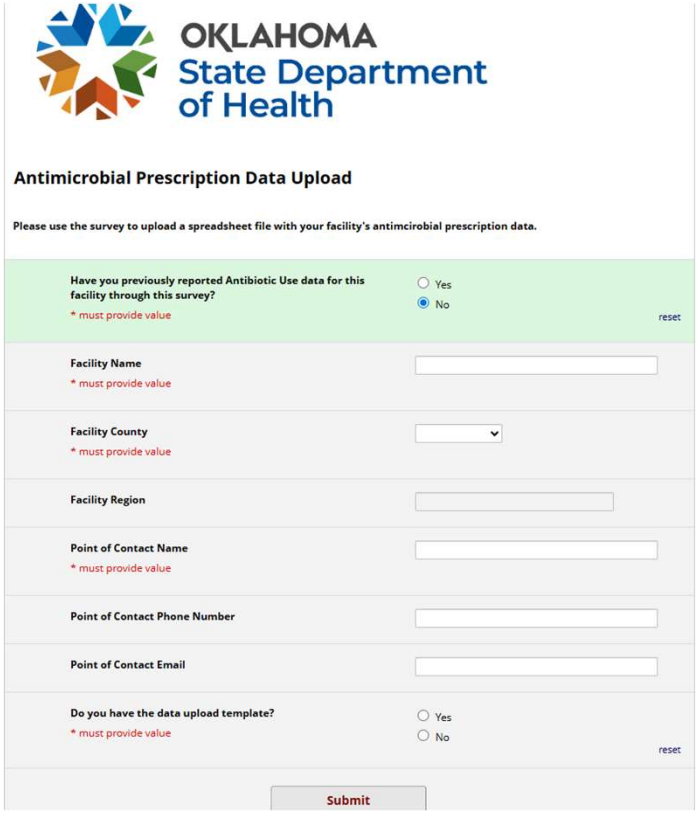
CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

Tracking: Antimicrobial Use

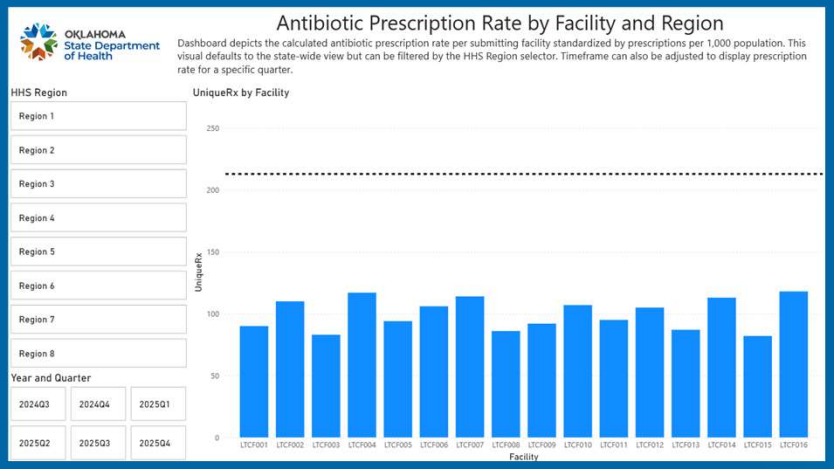
Barrier: There is no standardized platform for tracking antimicrobial use for long-term care patients to date.

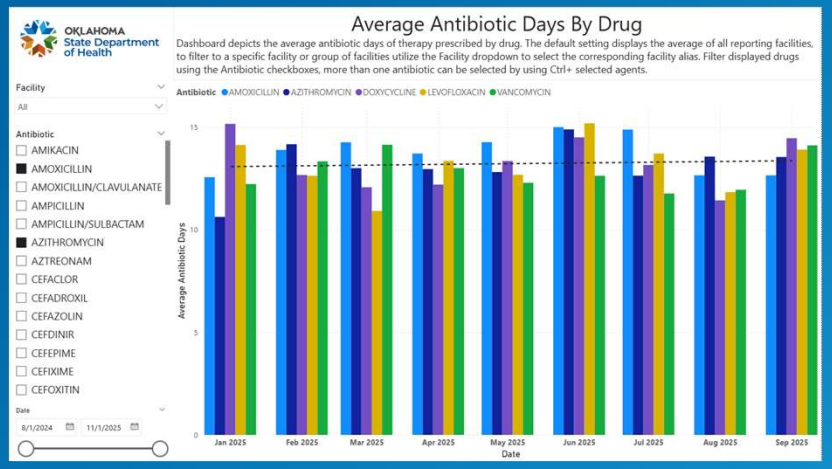
Opportunity: OSDH has designed an upload platform to allow facilities to voluntarily submit de-identified antibiotic prescription data that will then be displayed in a semi-private dashboard for submitters allowing for self tracking facility de-identified peer-to-peer comparison and national average comparisons

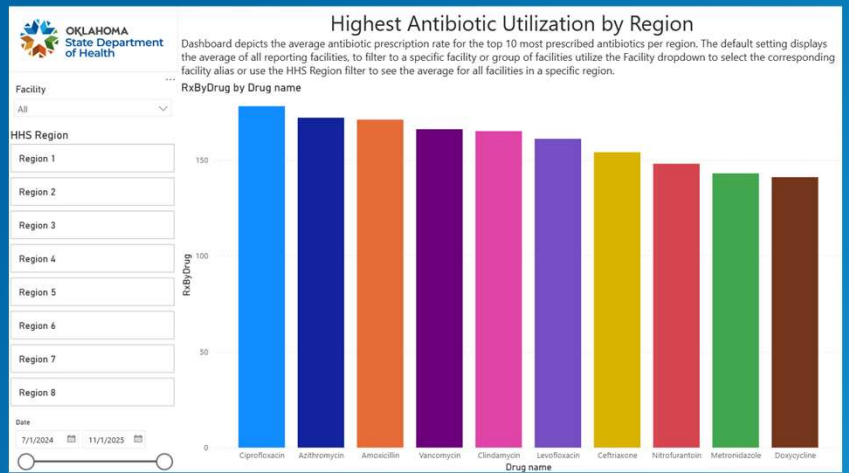
https://redcap.health.ok.gov/surveys/?s=7T9F9M77WX



Tracking: Antimicrobial Use



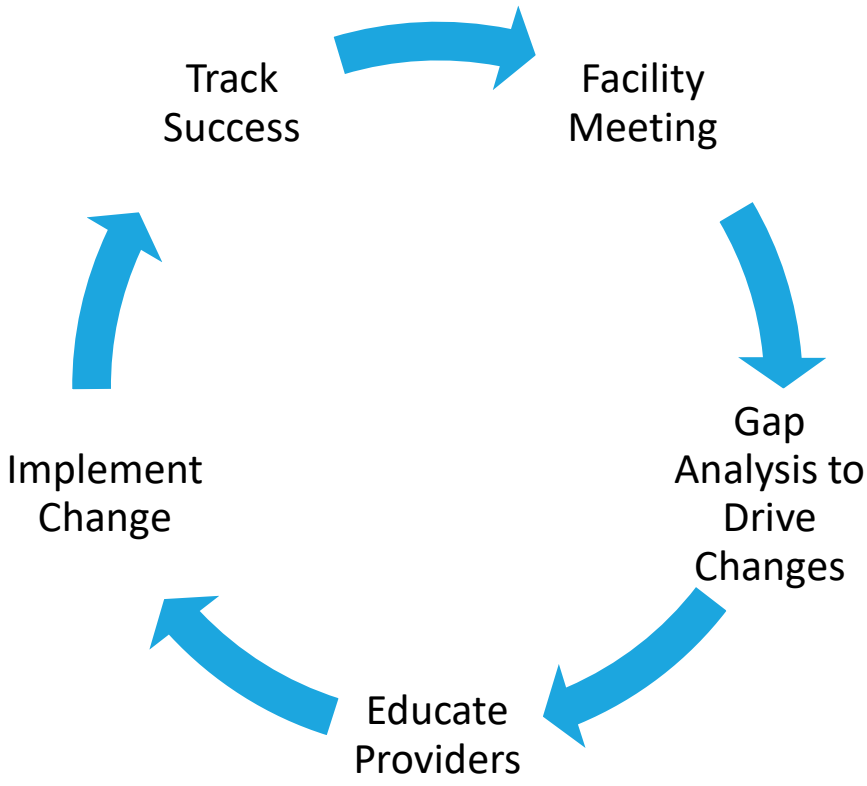




*Preliminary view of what the dashboard will look like using dummy data

Reporting

- Include prescribers, pharmacists, nurses, and leadership to address specific trends in antimicrobial utilization
- Use this opportunity to share national and regional trends with the conversation of local trends
- Sharing successes and challenges of prospective audit program can be a good way to initiate and maintain buy in



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Education

- Education is key to changing the way antimicrobials are prescribed.
- Utilization of multiple forms and resources is recommended.

CDC. *Core Elements of Antibiotic Stewardship for Nursing Homes*. 2015.

OSDH Antimicrobial Stewardship Resources

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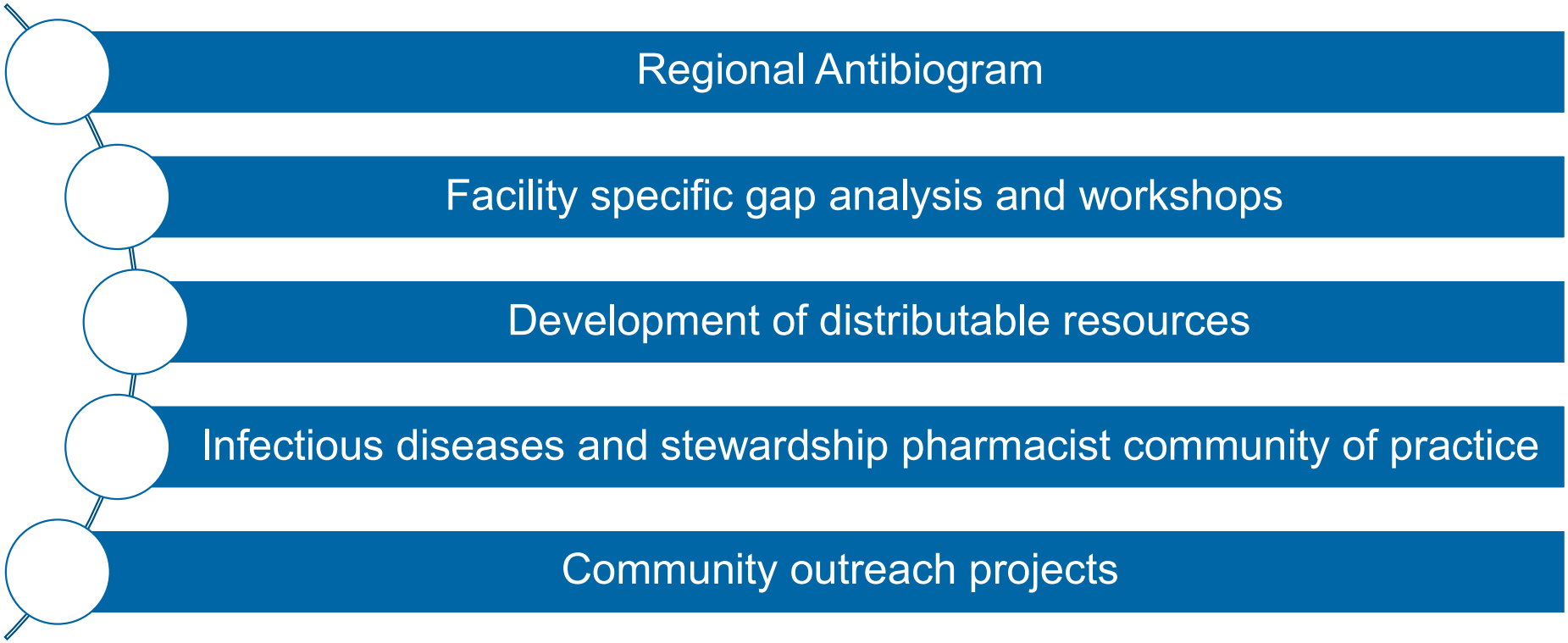
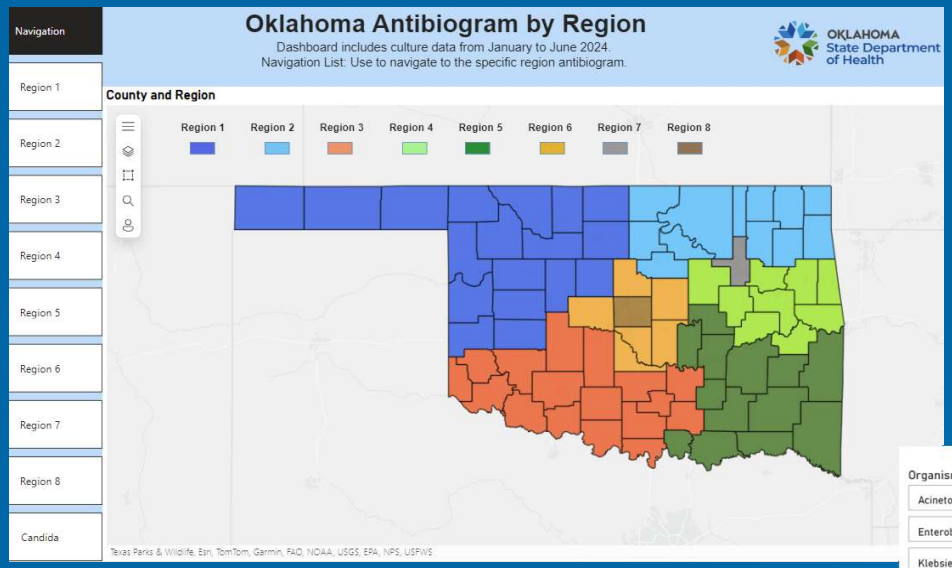
OSDH Antimicrobial Stewardship Focus Areas



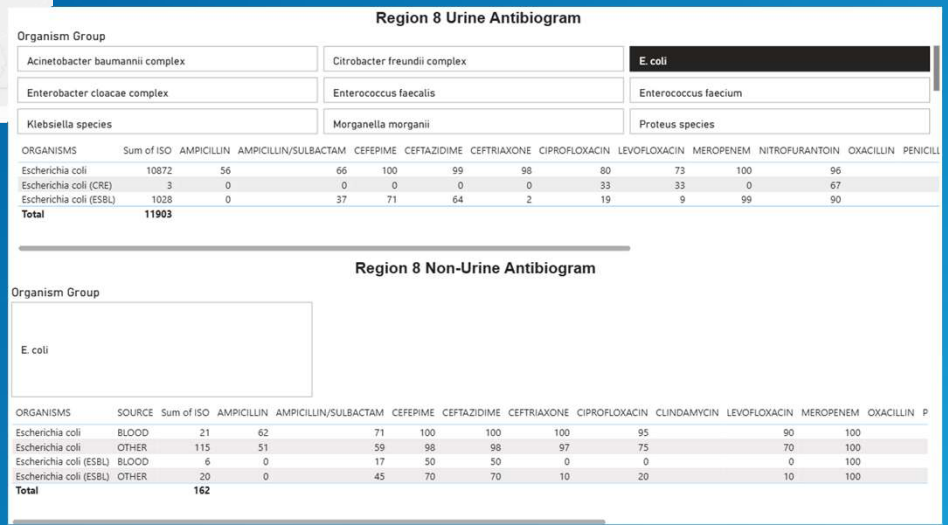
OSDH RESOURCES

Regional Antibiogram



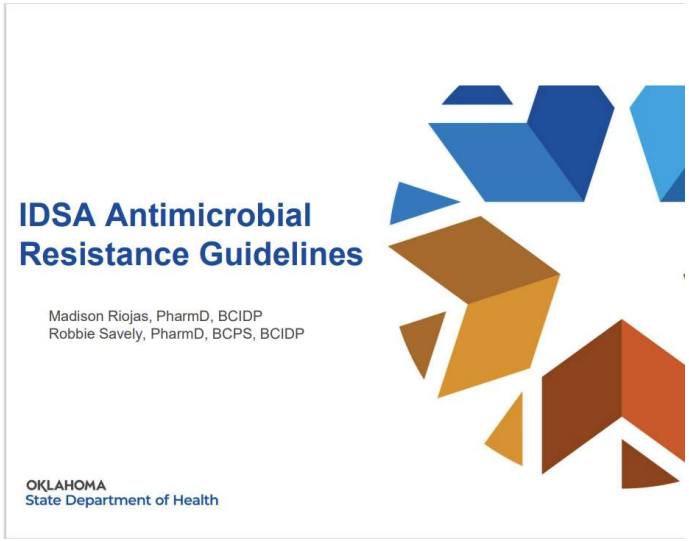
- **Antibiogram** – compilation of pathogens and susceptibility patterns for a set timeframe for a specific location
- Resource developed to aide empiric antibiotic therapy selection in instances where statistically significant antibiograms are limited or unavailable

- Dashboard access request available through the OSDH HAI website on the Antimicrobial Stewardship page Antimicrobial Stewardship Resources for Clinicians

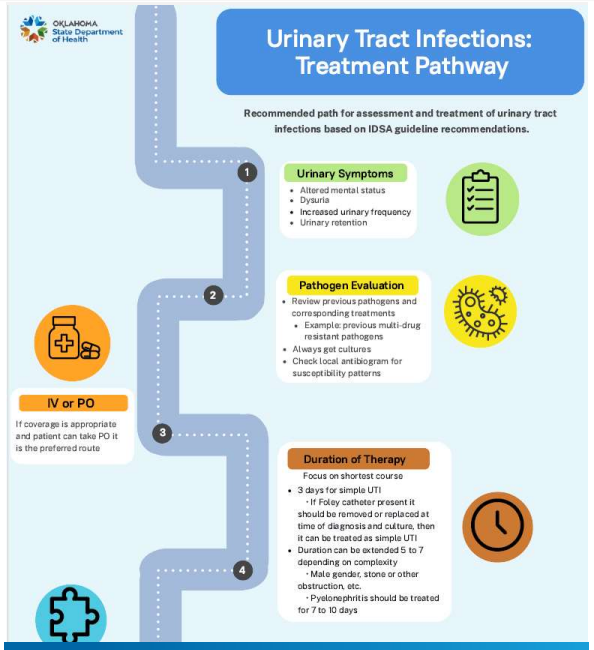


Webpage Resources

Patient Handouts and Flyers



Educational Slide Sets



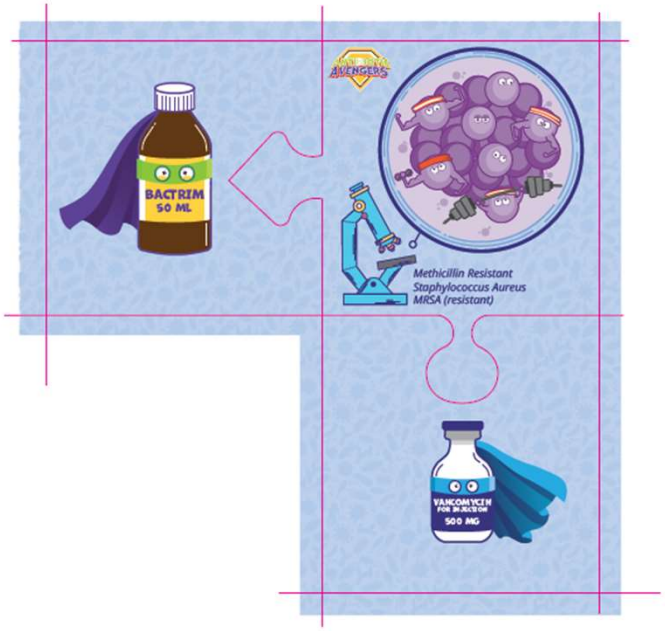
Infographics

Community of Practice

- Community email contact group for providing updates, asking questions, and generally connecting across the state
- Quarterly Antimicrobial Stewardship/Infectious Diseases topic webinars
  - Meetings held virtually only

- Email Madison.riojas@health.ok.gov to join

Community Outreach



US Antibiotics Awareness Week

November 18-24

National CDC led campaign to start the conversation about the importance of appropriately using antibiotics.

- Campaign focuses on communicating how the public can "Be Antibiotics Aware" and be good stewards of antibiotics.

- **OSDH strategies for 2025 include**:
  - Social media posts and advertisements
  - Patient facing flyers
  - Local news media interview
  - Webinars during the campaign week for outpatient clinicians
  - Promoting use of Antibiotic Avengers curriculum

US Antibiotics Awareness Week

Public Focused Flyers

- Ready to use flyers with for handing out to patients or displaying in common areas
- Utilize to remind or teach staff and residents key components of what they can do to promote appropriate antibiotic use
- Download flyers and access other resources from the [Appropriate Antibiotic Use](#) webpage

Fighting Antimicrobial Resistance Takes All of Us

Be Antibiotics Aware.

Common Respiratory Infections	Common Cause			Are Antibiotics Needed?
	Virus	Virus or Bacteria	Bacteria	
Common cold/runny nose	✓			No
Sore throat (except strep)	✓			No
COVID-19	✓			No
Flu	✓			No
Bronchitis/chest cold (in otherwise healthy children and adults)*		✓		No*
Middle ear infection		✓		Maybe
Sinus Infection		✓		Maybe
Strep throat			✓	Yes
Whooping cough			✓	Yes

Antibiotics are valuable tools for treating infections, but they can sometimes cause side effects and contribute to antimicrobial resistance.

Ask your health care professional or pharmacist about the appropriate time to use antibiotics and other ways to help you feel better if you have a virus.

*Studies show that in otherwise healthy children and adults, antibiotics for bronchitis won't help you feel better.

Learn more at Oklahoma.gov/health/antibiotics

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Fighting Antimicrobial Resistance Takes All of Us

U.S. Antibiotic Awareness Week

November 18-24, 2025

bit.ly/USAAW2025

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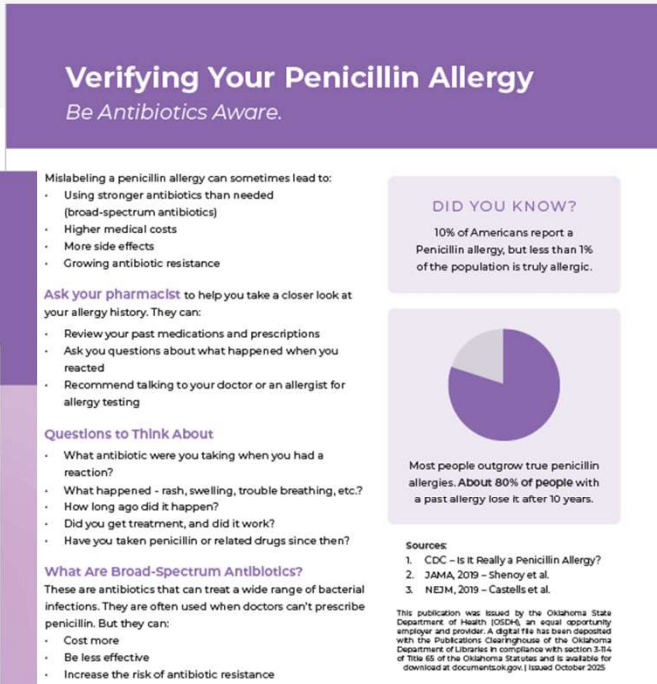

Verifying Your Penicillin Allergy

Be Antibiotics Aware.

Mislabeling a penicillin allergy can sometimes lead to:

- Using stronger antibiotics than needed (broad-spectrum antibiotics)
- Higher medical costs
- More side effects
- Growing antibiotic resistance

Ask your pharmacist to help you take a closer look at your allergy history. They can:

- Review your past medications and prescriptions
- Ask you questions about what happened when you reacted
- Recommend talking to your doctor or an allergist for allergy testing

Questions to Think About

- What antibiotic were you taking when you had a reaction?
- What happened - rash, swelling, trouble breathing, etc.?
- How long ago did it happen?
- Did you get treatment, and did it work?
- Have you taken penicillin or related drugs since then?

What Are Broad-Spectrum Antibiotics?

These are antibiotics that can treat a wide range of bacterial infections. They are often used when doctors can't prescribe penicillin. But they can:

- Cost more
- Be less effective
- Increase the risk of antibiotic resistance

DID YOU KNOW?

10% of Americans report a Penicillin allergy, but less than 1% of the population is truly allergic.

Most people outgrow true penicillin allergies. About 80% of people with a past allergy lose it after 10 years.

Sources:

1. CDC – Is It Really a Penicillin Allergy?
2. JAMA, 2019 – Shenoy et al.
3. NEJM, 2019 – Castells et al.

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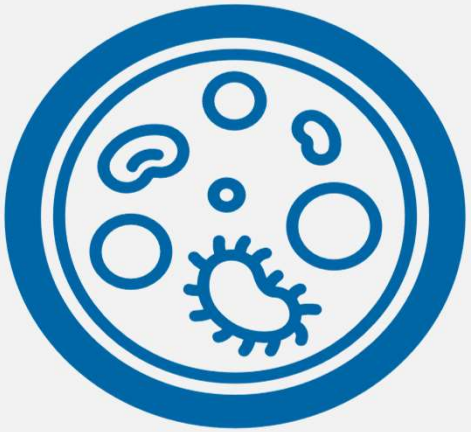
Ask your pharmacist today about verifying your penicillin allergy. It could lead to better care and better antibiotics for you.

OKLAHOMA State Department of Health | Infectious Disease Prevention and Response

Summary

Antibiotic use is a modifiable factor contributing to antimicrobial resistance

CDC Core Elements provide a road map for implementing and maintaining good stewardship practices



The OSDH Antimicrobial Stewardship Program seeks to support long-term care facility programs

Updates from the OSDH HAI/AR Team

Kim Southerland, RN, BSN, MPH, CIC

Trina Ryans, LPN

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Novel or Targeted Multidrug-resistant Organisms

Multidrug-resistant Organisms (MDROs) are organisms resistant to one or more classes of antimicrobial agents resulting in limited treatment options (e.g., MRSA, VRE, ESBL, etc.).

Novel and targeted MDROs:

- *Candida auris (C. auris) is an emerging multidrug-resistant fungus and is associated with significant health risks. Invasive infections associated with a high mortality rate.*

- *Carbapenemase-producing Enterobacterales, Pseudomonas spp., and Acinetobacter spp. are resistant to carbapenems **and** produce a carbapenemase gene. The presence of a carbapenemase gene renders multiple antimicrobial drug classes ineffective.*

Takeaways:
Highly drug-resistant
Associated with increased morbidity and mortality
Can easily spread in healthcare settings

Clinical infection vs colonization: How is it spread?

Infection refers to the presence of an organism that causes clinical symptoms.

Colonization refers to the presence of the organism without clinical expression (asymptomatic).

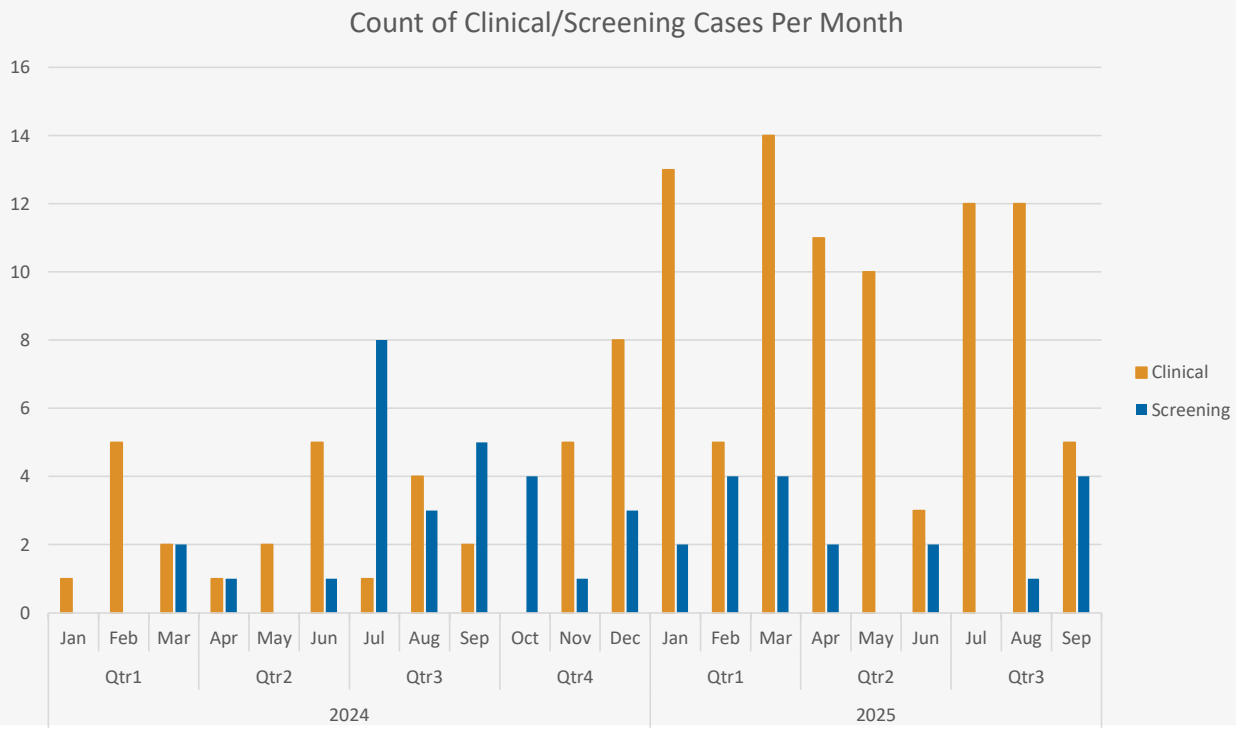
NOTE: Residents who are infected AND colonized can spread onto surfaces and objects around them and to other residents.

Transmission to other residents primarily occurs through contact with contaminated surfaces/equipment and/or contaminated hands of healthcare workers. Organisms can persist on surfaces for weeks.

Strict adherence to hand hygiene, EBP/TBP, and effective surface cleaning/disinfection is necessary to prevent spread.

Candida auris

- Highly communicable drug-resistant pathogen associated with high morbidity/mortality
  - Skin colonizer
  - Commonly used disinfectants in healthcare settings ineffective against *C. auris* (ensure use of a disinfectant from EPA List P or K)
- 2024 almost half detected through admission screening or point prevalence survey
- 2025 increase in clinical cases, C. auris clusters/outbreaks, less identified through colonization screening



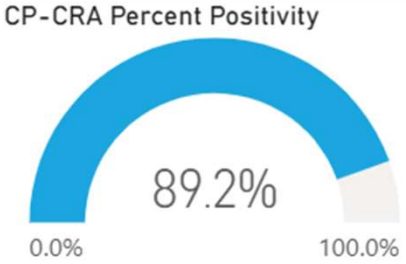
*preliminary data displayed

Carbapenemase-producing Organisms (CPO)

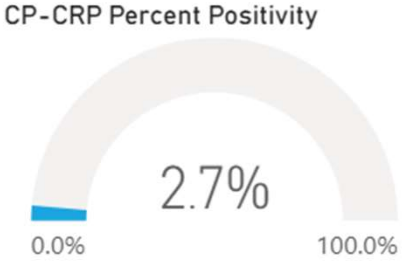
Carbapenemase gene production indicates a multidrug-resistant organism (MDRO) with a higher propensity to spread due to the various gene sharing capabilities of the pathogens.

Percent positivity for carbapenemase production in these MDROs varies by species

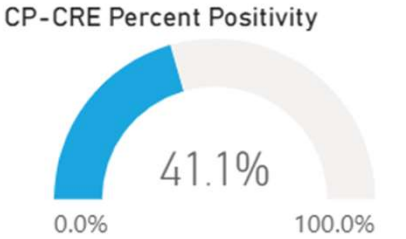
- *Acinetobacter* species – high likelihood for carbapenemase production
- *Pseudomonas* species – rarely carbapenemase producing
- *Enterobacteriaceae* – most commonly isolated MDROs but slightly less than half produce carbapenemase enzymes



Carbapenemase producing carbapenem resistant *Acinetobacter* species (CP-CRA)
Total isolates tested = 166
Isolates positive for CP gene = 148



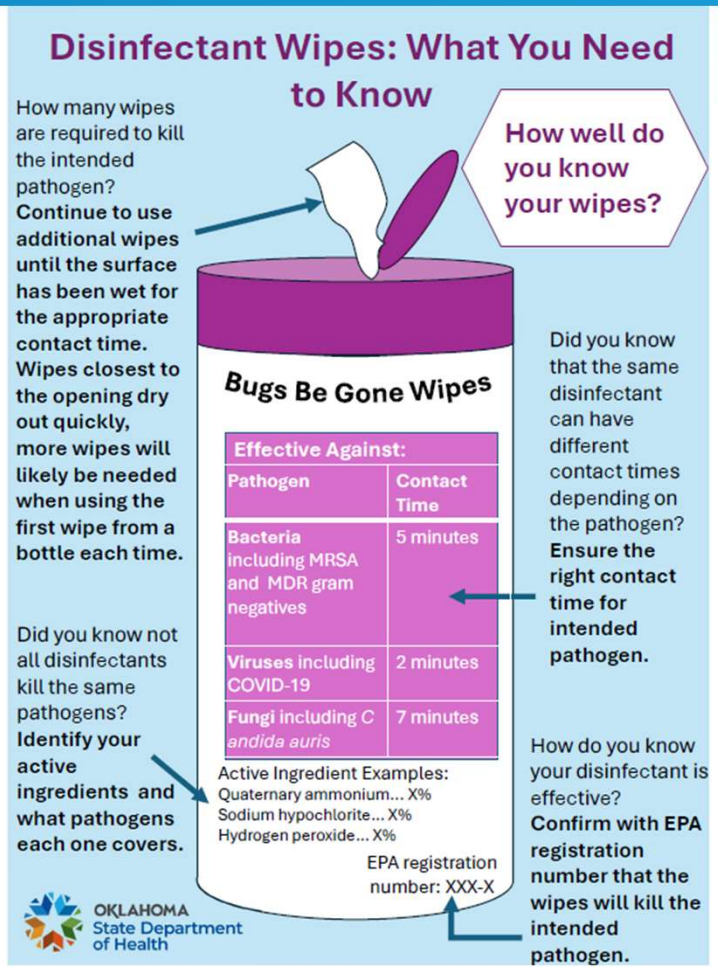
Carbapenemase producing carbapenem resistant *Pseudomonas* species (CP-CPA)
Total isolates tested = 828
Isolates positive for CP gene = 22



Carbapenemase producing carbapenem resistant *Enterobacteriaceae* (CP-CRE)
Total isolates tested = 616
Isolates positive for CP gene = 253

Infection Prevention Resources

- *Utilize the Health Care Associated Infections Prevention Program webpage to access resources developed to support infection prevention strategies in long-term care facilities, including:*
  - *Infographics on disinfectant wipes and Candida auris*
  - *Recordings and slide sets for previous educational webinar presentations*
  - *Links to commonly requested resources*



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Hutchings, Matthew I., Andrew W. Truman, and Barrie Wilkinson. "Antibiotics: Past, Present and Future." *Current Opinion in Microbiology*, vol. 51, 2019, pp. 72-80. https://doi.org/10.1016/j.mib.2019.10.008.

Thank you.

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