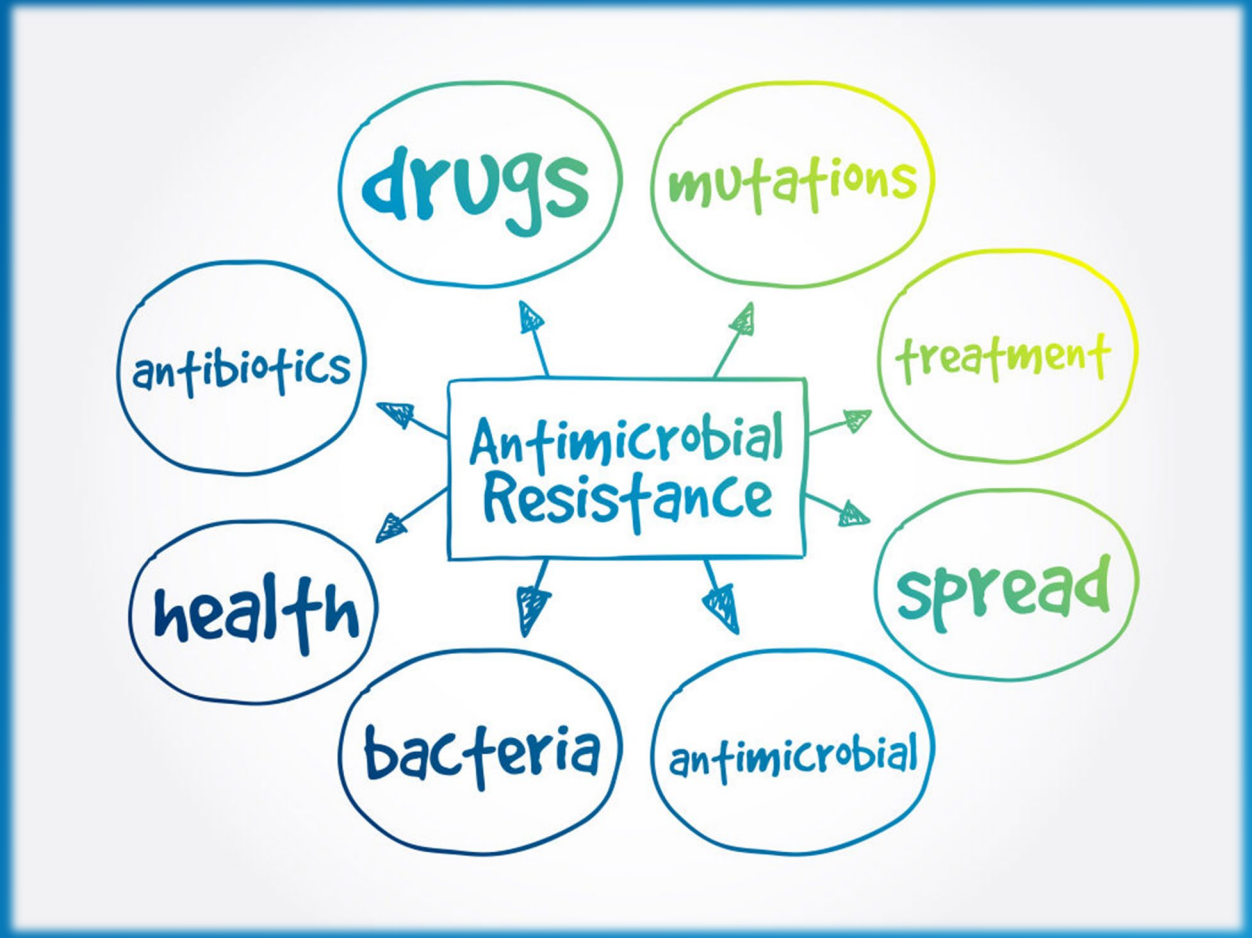
Antimicrobial Resistance

OKLAHOMA
State Department
of Health



Agenda

1. Define Antimicrobial Resistance
2. Discuss how it spreads
3. Talk about Prevention
4. Look at Facts & Statistics
5. Info on ARLN

What Antimicrobial Resistance Is

An overview

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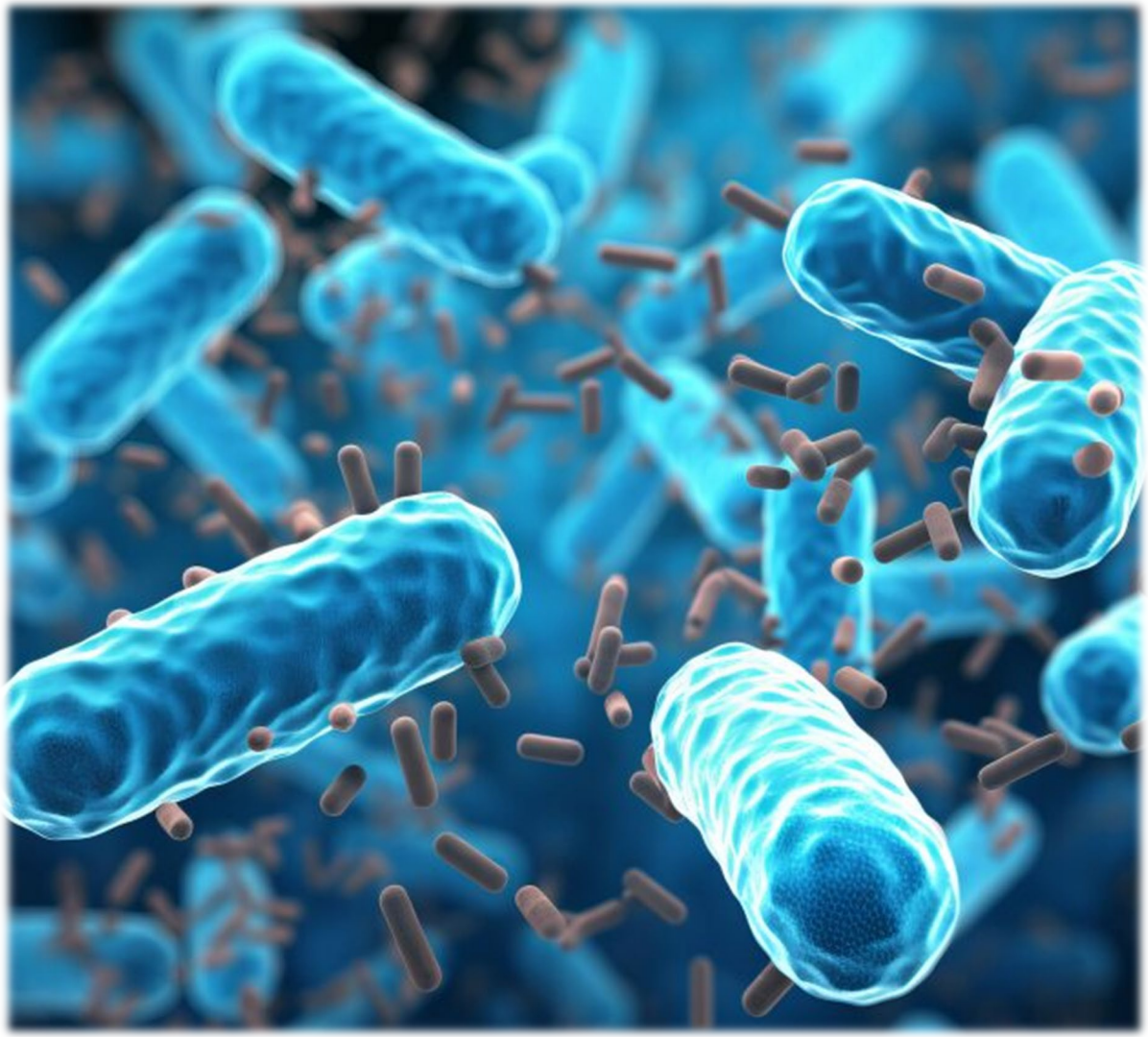
Antimicrobial Resistance (AR) happens when germs develop the ability to defeat the drugs designed to kill them.



Are Antimicrobial Resistance and Antibiotic Resistance the same thing?

Antimicrobial Resistance (AMR)

- Refers to the ability of microorganisms (bacteria, fungi, viruses, and parasites) to develop resistance to antimicrobial drugs, making infections harder to treat.
- This means that the drugs that were once effective in treating these infections are no longer as effective or may become completely ineffective.
- AMR is a global public health threat, as resistant infections can lead to longer hospital stays, higher healthcare costs, and increased mortality.

Antibiotic Resistance (AR)

- A specific type of AMR that occurs when bacteria develop resistance to antibiotics, which are drugs used to treat bacterial infections.
- This resistance can develop through various mechanisms, including mutations in the bacteria's DNA or the transfer of resistance genes between bacteria.
- Antibiotic resistance is a major concern, as it can lead to infections that are difficult or impossible to treat with available antibiotics.

How antimicrobial-resistant germs can spread in healthcare facilities

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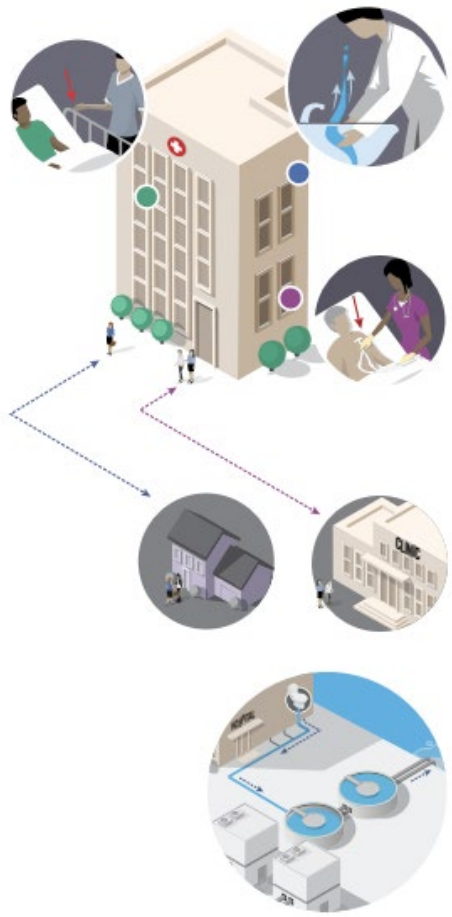
Some of the deadliest antimicrobial-resistant germs spread within and across healthcare facilities.

A Complex Web: Everything is Connected

Healthcare Facilities

Antibiotic-resistant germs, including new and emerging resistance, can spread within and between healthcare facilities. These germs can cause infections in patients, called healthcare-associated infections (HAIs), and can spread to the community or environment (soil, water).



- Antibiotics save lives. However, any time antibiotics are used, the drugs can cause side effects and contribute to the development of antibiotic resistance.
- Germs can survive in plumbing (e.g., sink drains, toilets). The germs can splash back onto people or move to wastewater treatment plants.
- Without appropriate infection control actions, germs can spread to people from other people on surfaces like bedrails or the hands of healthcare workers.
- Procedures and medical devices (e.g., catheters) help treat patients, but can be pathways for germs to enter the body and cause infections.
- Germs can move with patients when they are transferred from one healthcare facility to another, or go home.
- Germs can cause infections in the community when healthcare settings do not stop their spread.
- Human waste (poop) can carry traces of previously consumed antibiotics and antibiotic-resistant germs. Waste goes to treatment plants and is released as treated waste water. This can contribute to antibiotic resistance in the environment, including contaminating lakes and streams.

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These resistant germs can spread in the following ways:

- Without appropriate infection control actions, germs can spread to people from other people on surfaces like bedrails or the hands of health care workers.
- During procedures like surgery and the use of medical devices like catheters and ventilators that help treat patients.
- With patients when they are transferred from one health care facility to another or go home.
- Fecal waste (poop) can carry traces of previously consumed antibiotics, antifungals and antimicrobial-resistant germs.
- Germs can cause infections in the community when healthcare settings do not stop their spread.

Prevention

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critical efforts to prevent HAIs and slow the spread of resistance include:

- Preventing infections related to procedures.
- Preventing the spread of germs through infection prevention and control.
- Improving the use of antibiotics and antifungals.

Health Departments Are Combating Antibiotic Resistance (AR)

State and local health departments fight antibiotic resistance, but more support is needed as new resistance continues to emerge.

Lab Data are Enhancing Local Response

- Rapidly detect AR through CDC's Antibiotic Resistance Laboratory Network
- Inform local responses to prevent spread

Gaps in Lab Capacity can Allow Germs to Spread Undetected

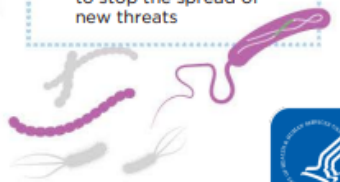
- New types of resistance are constantly emerging and spreading
- Labs need specialized workforce to implement and use new technologies

Prevention & Containment are Stopping Spread

- Support aggressive responses to all unusual resistance
- Work with local partners and healthcare facilities to track and prevent healthcare-associated, foodborne, and community infections caused by antibiotic-resistant germs

More Boots on the Ground Needed to Stop Transmission

- More infection control responses are needed as new threats emerge in healthcare and the community
- Poor access to the best data tools can hurt efforts to learn about resistant germs and affected people
- Containment responses can be labor intensive and lab-epidemiology coordination is essential to stop the spread of new threats

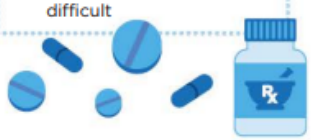


Improving Antibiotic Use Slows Development of AR

- Use data to improve antibiotic use and keep antibiotics effective for life-threatening infections, including those that can lead to sepsis
- Lead or support improvements to antibiotic use in humans, animals, and the environment

Changing Prescribing Habits & Expectations Require Investment

- Improving antibiotic use across settings (healthcare, farms, the environment) is complex and needs tailored interventions
- Tracking antibiotic use in settings like nursing homes and long-term care facilities often does not exist or is difficult



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Facts & Statistics

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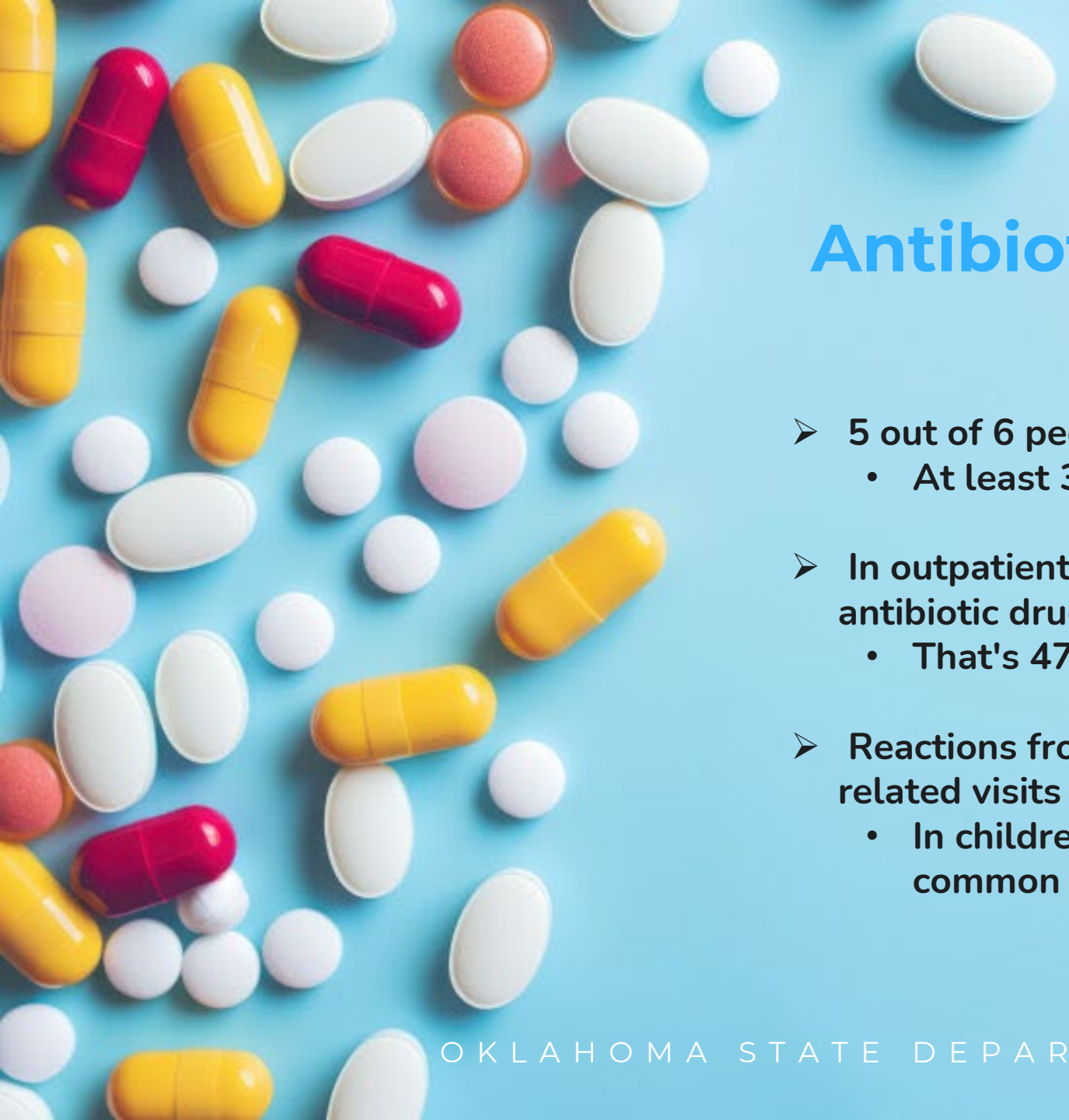
Highlights

AR is an urgent global public health threat, killing at least 1.27 million people worldwide and associated with nearly 5 million deaths in 2019, according to a report released in The Lancet.2

In the U.S., more than 2.8 million antimicrobial-resistant infections occur each year. More than 35,000 people die as a result, according to CDC's 2019 AR Threats Report.

When *C. diff*—a bacterium that is not typically resistant but can cause deadly diarrhea and is associated with antibiotic use—is added, the U.S. toll of all the threats in the AR Threats Report exceeds 3 million infections and 48,000 deaths.

The estimated national cost to treat infections caused by six antimicrobial-resistant germs frequently found in health care can be substantial—more than $4.6 billion annually, according to a collaborative CDC study



Antibiotic and antifungal use in the U.S.

- 5 out of 6 people are prescribed an antibiotic each year.
  - At least 30% of this antibiotic use is unnecessary.
- In outpatient doctors' offices specifically, 1 out of every 3 antibiotic drugs prescribed is unnecessary.
  - That's 47 million unnecessary prescriptions.
- Reactions from antibiotics cause 1 out of 5 medication-related visits to the emergency room (ER).
  - In children, reactions from antibiotics are the most common cause of medication-related ER visits.

ARLN

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Antimicrobial Resistance Laboratory Network

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Purpose

The AR Lab Network works with laboratories nationwide to identify, track, and respond to emerging and enduring antimicrobial-resistant threats including, but not limited to:

Carbapenem-resistant Enterobacterales (CRE)	MBL-producing Enterobacterales	Carbapenem-resistant *Pseudomonas aeruginosa* (*P. aeruginosa*)	Carbapenem-resistant *Acinetobacter baumannii* (*A. baumannii*)	Azole-resistant *Aspergillus fumigatus* (*A. fumigatus*)
Antifungal-resistant *Candida*, including *Candida auris* (*C. auris*)	Drug-resistant *Neisseria gonorrhoeae* (*N. gonorrhoeae* or gonorrhea)	Drug-resistant *Mycobacterium tuberculosis* (*M. tuberculosis* or Tuberculosis (TB))	Drug-resistant *Streptococcus pneumoniae* (*S. pneumoniae*)	*Clostridioides difficile* (C. diff or C. difficile)

How labs work together

Resources

Antimicrobial Resistance in Health Care:

https://www.cdc.gov/antimicrobial-resistance/causes/healthcare.html

Controlling the Spread of Antimicrobial Resistance:

https://www.cdc.gov/antimicrobial-resistance/prevention/index.html#cdc_prevention_pre-health-departments-combat-ar

Facts & Statistics:

https://www.cdc.gov/antimicrobial-resistance/data-research/facts-stats/index.html

ARLN:

Https://www.cdc.gov/antimicrobial-resistance-laboratory-networks/php/about/domestic.html

Questions?

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THANK YOU