Behind the Mask:

Fundamentals of Antimicrobial Stewardship

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Richard Hankins MD
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Meet our Subject Matter Experts

Lauren Musil BSN, RN

Lauren is an Infection Preventionist with a background as Registered Nurse. She has a wide variety of healthcare experience having worked in neurology, neurosurgery, ambulatory surgery, home health and with the Nebraska Biocontainment unit. As an IP, her primary focus has been in critical care, oncology, VAE prevention and as the IP to the Nebraska Biocontainment Unit. Her recent work has been spent in a grant funded role to develop innovative tools to aid IPs in rural and remote settings.

Alisha Sheffield MSN, RN CIC

Alisha is an Infection Preventionist and Registered Nurse with 21 years of experience in a variety of healthcare settings including ambulatory, acute care, and surgical areas. Over the past 13 years, she has worked as an Infection Preventionist in outpatient surgery as well as at a large academic medical center. Her recent work has focused on utilizing her IPC expertise to develop infection control tools and resources to assist Infection Preventionists in under-resourced settings.

Richard Hankins MD

Dr. Hankins is an assistant professor of Infectious Diseases at Nebraska Medicine, with a focus on infection control and antimicrobial stewardship. He has research interests in antimicrobial stewardship, outpatient parenteral antimicrobial therapy, device-related infections, and infection control in dentistry.

Jenna Preusker PharmD, BCPS, BCIDP

Jenna is an infectious diseases pharmacist who serves as the Pharmacy Program Coordinator for the Nebraska Antimicrobial Stewardship Assessment and Promotion Program and also serves as the Healthcare Associated Infections and Antimicrobial Resistance Pharmacist at Nebraska DHHS. Her primary role is Antimicrobial Stewardship outreach across Nebraska to hospitals, long-term care facilities, outpatient clinics, dialysis centers, and dental clinics, working to build stewardship program infrastructure across facilities.

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- The views and opinions expressed during this webinar are those of the presenters and do not necessarily reflect those of the University of Nebraska Medical Center or The Nebraska Medical Center.

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Objectives

- Describe antimicrobial use, emerging resistance, and their impact in healthcare systems
- Identify the critical components of effective antimicrobial stewardship practices in healthcare settings
- Interpret evidence-base guidelines, regulatory requirements, and standards to ensure compliance and best practices
- Discuss the Infection Preventionist's role in antimicrobial stewardship
- Synthesize knowledge of stewardship practices to develop collaborative approaches, foster accountability, and promote quality infection prevention practices across interdisciplinary teams.

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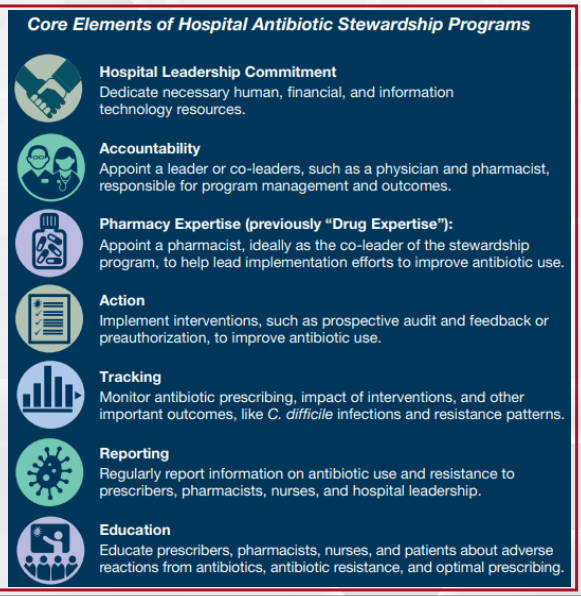
Background

- 30% of all antibiotics in the United States are considered unnecessary or suboptimal
- Optimizing antimicrobials can:
  - Reduce treatment failures
  - Reduce C. difficile infections
  - Reduce adverse events
  - Reduce antibiotic resistance
  - Reduce hospital costs and length of stay
- In 2014 the CDC released the Core Elements of Hospital Antimicrobial Stewardship Programs

Fridkin MMWR 2014



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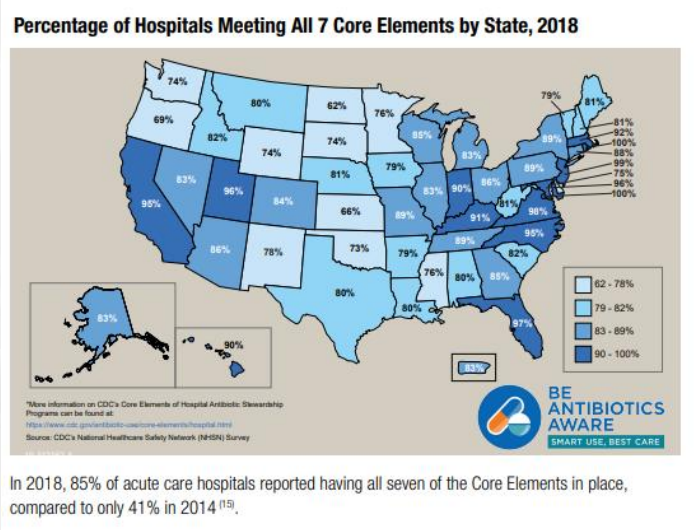
Background

- 85% of acute care hospitals reported having all 7 elements in place by 2018
- 95% of acute care hospitals reported having all 7 elements in place by 2021

O'Leary OFID 2024



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Hospital Leadership Commitment

- Support from C Suite
- Adequate staffing, including a stewardship "Champion"
- Integrating stewardship into hospital quality improvement and patient safety
- Supporting enrollment and reporting to NHSN
- Ensure collaboration with:
  - Clinicians
  - Department heads
  - Infection Preventionists and Epidemiologists
  - Microbiology
  - Information Technology
  - Nursing

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Accountability

- Designated Leader or Co-Leader
  - If leader is not a physician, a physician should be designated as point of contact.
- Regular stewardship "rounds" or reviews

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Pharmacy Expertise

- A pharmacist designated as leader or co-leader of the program
  - Infectious disease-trained pharmacist are beneficial in larger facilities

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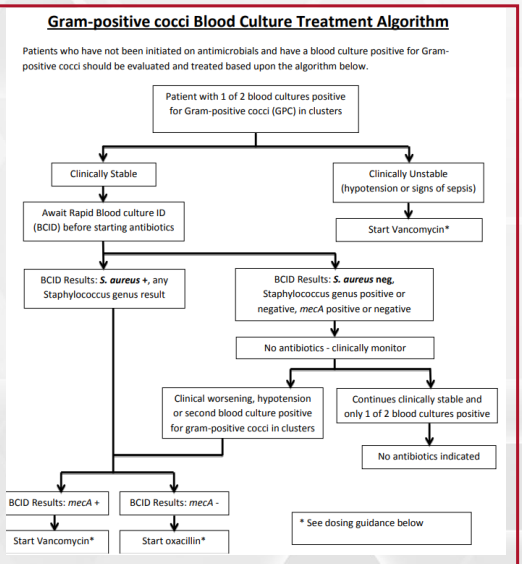
Action

- **Preauthorization**
  - Improves initial empiric treatment
  - Requires the availability of stewardship expertise
- **Audit and Feedback**
  - External review of antimicrobial use
  - Often treatment is compared to guidelines
  - Can be improved with "Handshake Stewardship"
- **Facility Specific treatment guidance**
  - Antibiograms
- ***Common Infection Based Interventions***
  - Pneumonia
  - UTI
  - SSTI
  - *Staphylococcus aureus* infections
  - CDI



Neeman. 2014. UNMC

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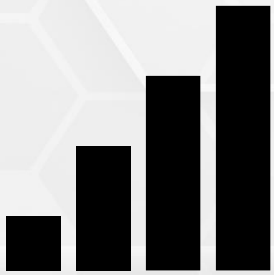
Tracking

- Antibiotic Use Measures
- Outcome Measures
- Process Measures for Quality Improvement



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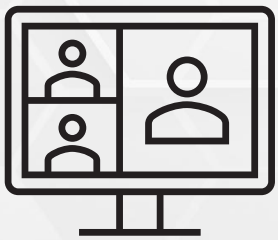
Reporting

- Regular updates for clinical staff and leadership
  - Antimicrobial resistance reporting made along with Infection Prevention and Epidemiology
- Regular updates on antimicrobial use
  - Considerations on wide variance in use
  - Peer comparisons for similar diagnoses



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Education

- Education most effective when paired with interventions assessed by outcomes
- Various forms
  - Didactic presentations
  - Electronic messaging
  - Hospital specific guidelines
  - Handshake stewardship

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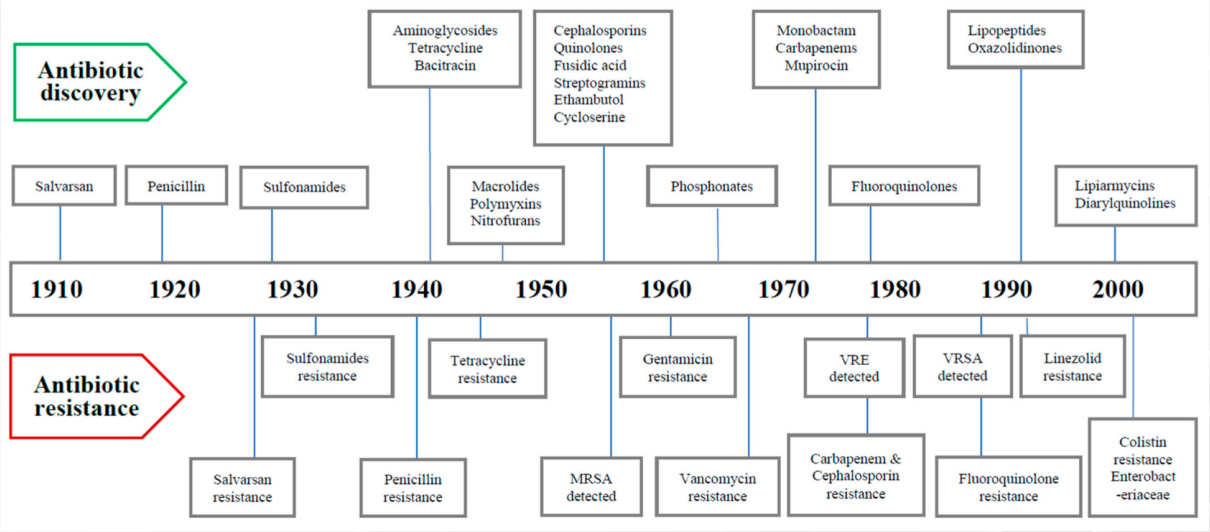
Background



Salam Healthcare 2023

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Antibiotics- Misuse

- National administrative database review of 323 hospitals in 2010 found 55.7% of patients received antibiotic during their hospitalization
- Review of antibiotic use found that prescriptions could be improved 37.2% of scenarios
- Models estimate that 30% reduction in antimicrobials would lead to a reduction in CDI of ~26%

Fridkin MMWR 2014

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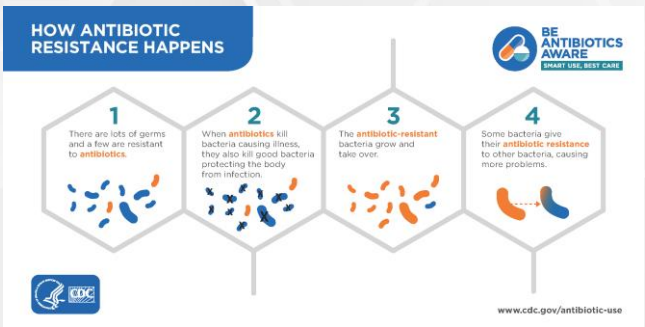
Evolving Resistance Patterns

- Urgent Threats
- Carbapenem-resistant *Acinetobacter baumanii* (CRAb)
- *Candida auris*
- *Clostridioides difficile*
- Carbapenem-resistant Enterobacteriales
- Drug resistant *Neisseria gonorrhoeae*



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Evolving Resistance Patterns

AR Threats

	Threat	Change in Rates or Number of Infections***			
		2020 vs. 2019	2021 vs. 2020	2022 vs. 2021	2022 vs. 2019
URGENT*	Hospital-onset CRE	Increase	Increase	Stable	Increase
URGENT*	Hospital-onset Carbapenem-resistant *Acinetobacter*	Stable	Stable	Stable	Increase**
URGENT*	Clinical Cases of *C. auris*	Increase	Increase	Increase	Increase
SERIOUS*	Hospital-onset MRSA	Increase	Stable	Decrease	Stable
SERIOUS*	Hospital-onset VRE	Increase	Increase	Stable	Increase
SERIOUS*	Hospital-onset ESBL-producing Enterobacterales	Increase	Stable	Stable	Increase
SERIOUS*	Hospital-onset MDR *Pseudomonas aeruginosa*	Increase	Increase	Stable	Increase

* Threat level for each pathogen, as categorized in CDC's Antibiotic Resistance Threats in the United States, 2019.
** There was no statistically significant difference in rate of hospital-onset carbapenem-resistant *Acinetobacter* in 2020, 2021, and 2022 when compared to the previous year. However, there was a statistically significant increase in rate of hospital-onset carbapenem-resistant *Acinetobacter* in 2022 when compared to 2019.
*** Hospital-onset rates were described using multivariable models for all threats except *C. auris*. Please note that in above table, stable indicates there was no statistically significant increase or decrease, decrease indicates a statistically significant decrease where p<0.05, and increase indicates a statistically significant increase where p<0.05, for all threats except for *C. auris*. Increases or decreases in *C. auris* were indicated by changes in the number of clinical cases reported nationally without hypothesis testing.

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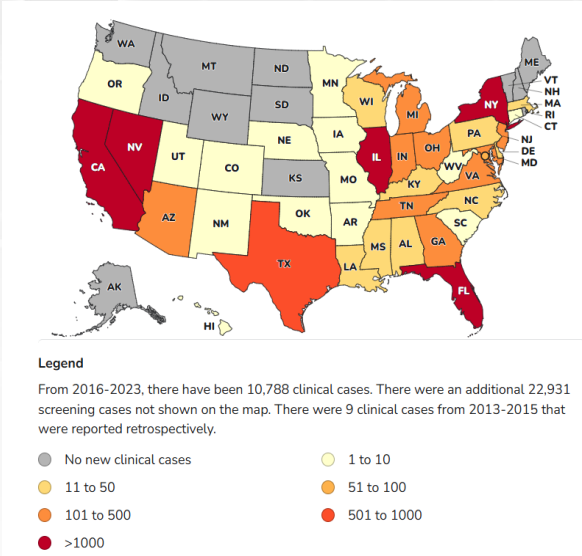
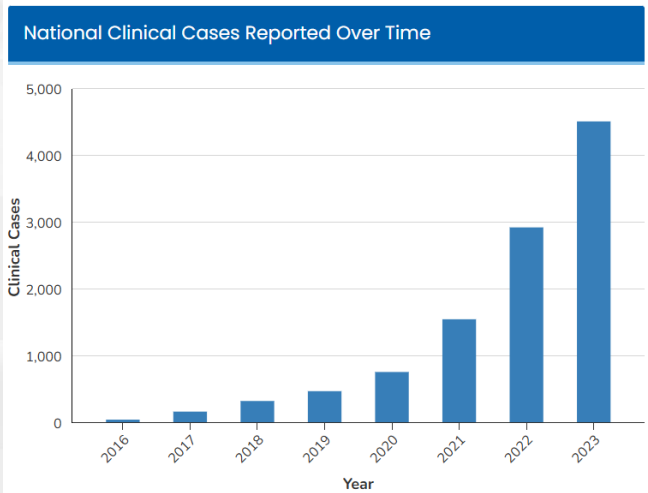
Candida auris





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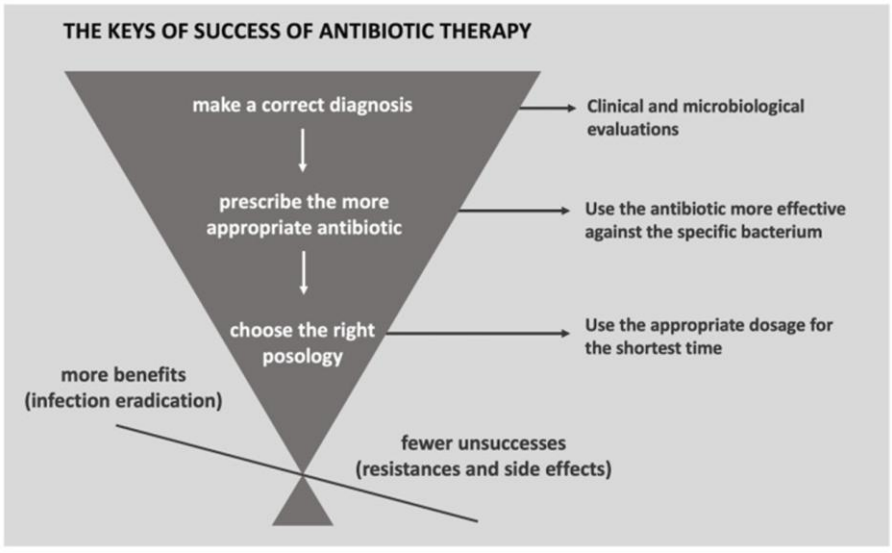
Impact- Why we care



Antibiotics are not always the "SAFE" options

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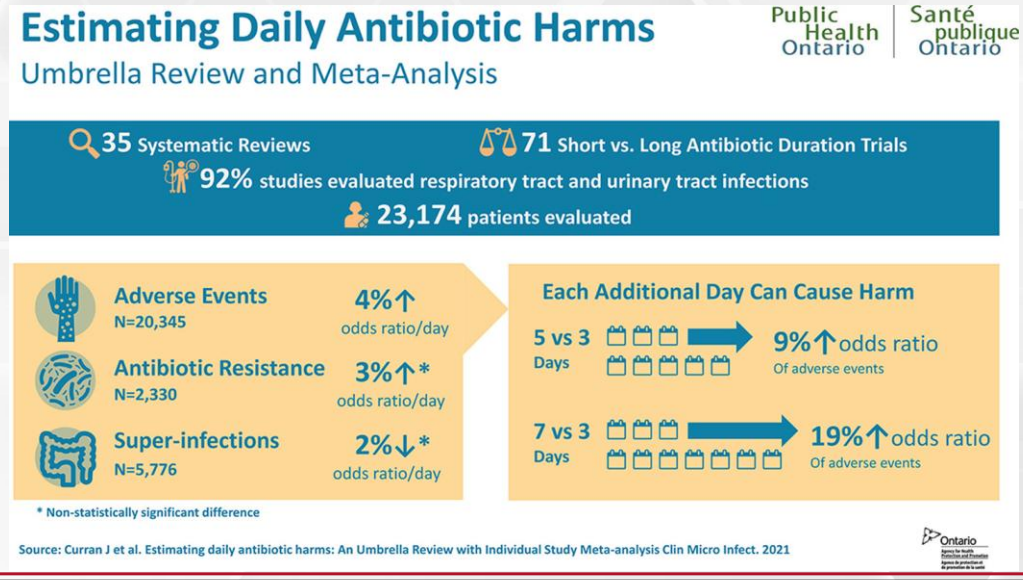
Impact



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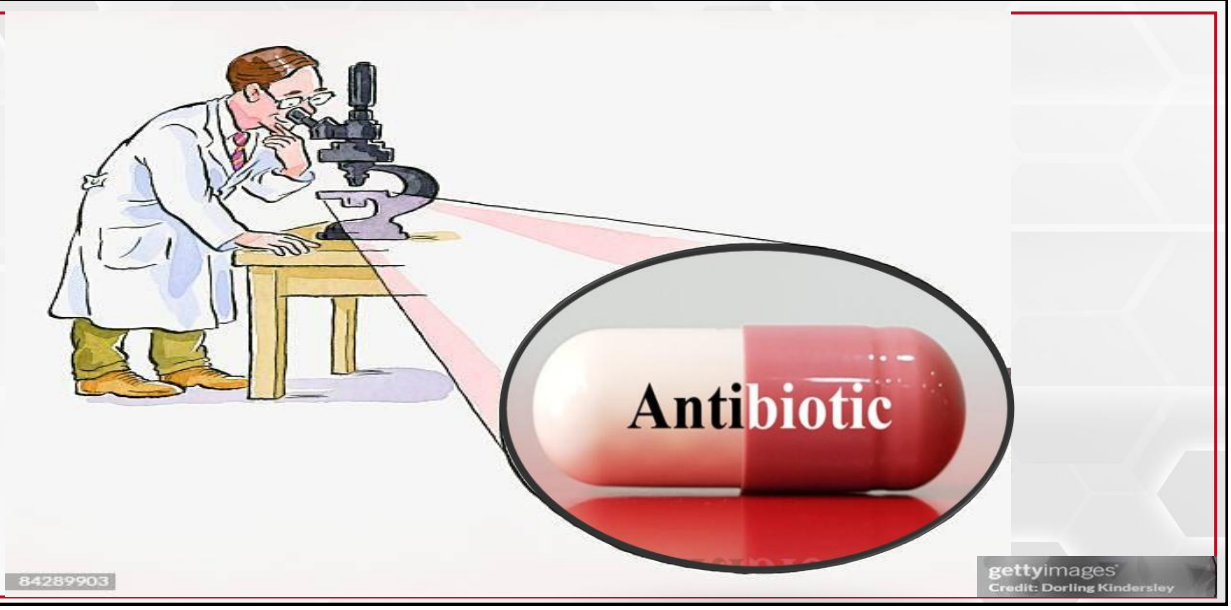
IP Role in Antibiotic Stewardship



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IP Role in Antibiotic Stewardship

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Why IPs Care

STEWARDSHIP INTERVENTIONS

- Prevents MDROs
- Reduces CDI
- Supports IP Surveillance and Reporting
- Aligns with Regulatory Standards
- Protects Patient Safety and Outcomes
- Strengthens Outbreak Response

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What is ASP?

ASP goals: optimize therapy, improve outcomes, reduce resistance, reduce adverse events (e.g., C. difficile).

Interdisciplinary nature: pharmacy, physicians, nursing, infection prevention, microbiology, leadership.

CDC Core Elements (for acute care & outpatient as relevant).

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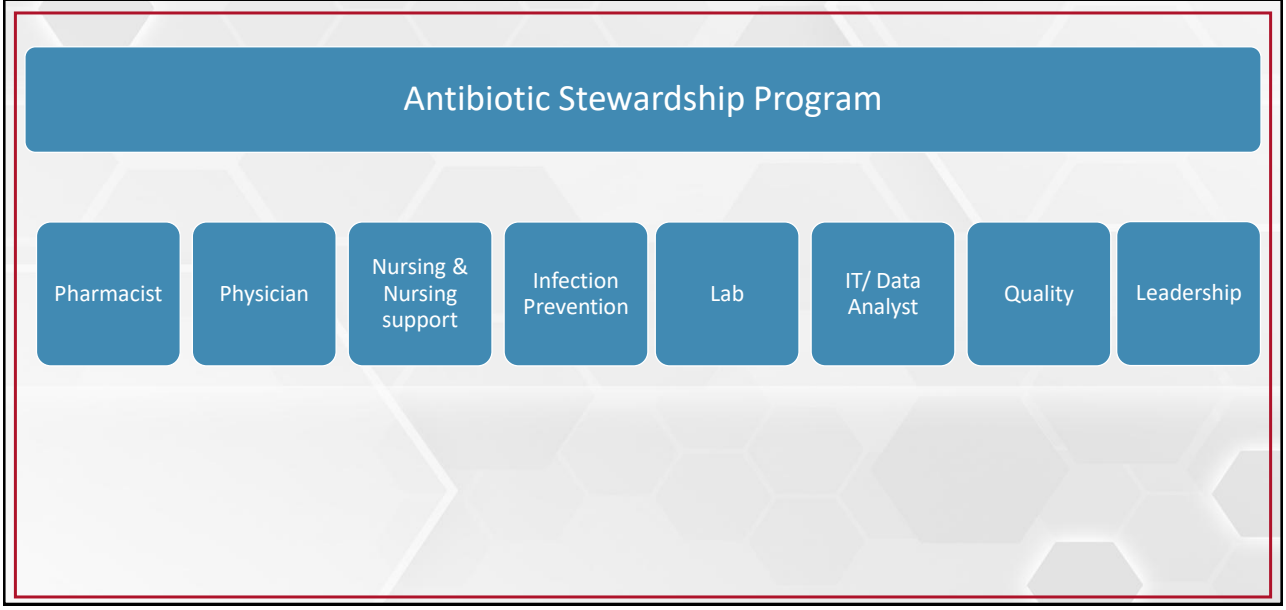
ASP Team



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ASP Core Elements

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National Action Plan for Combating Antibiotic Resistant Bacteria

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National Action Plan For Combatting Antibiotic Resistant Bacteria

- Slow resistance and prevent the spread of infections
- Accelerate research for new antibiotics, treatments and vaccines
- Strengthen one health surveillance
- Develop and use rapid diagnostic tests.
- Expand international collaboration for prevention and control and research

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Why IPs are Key

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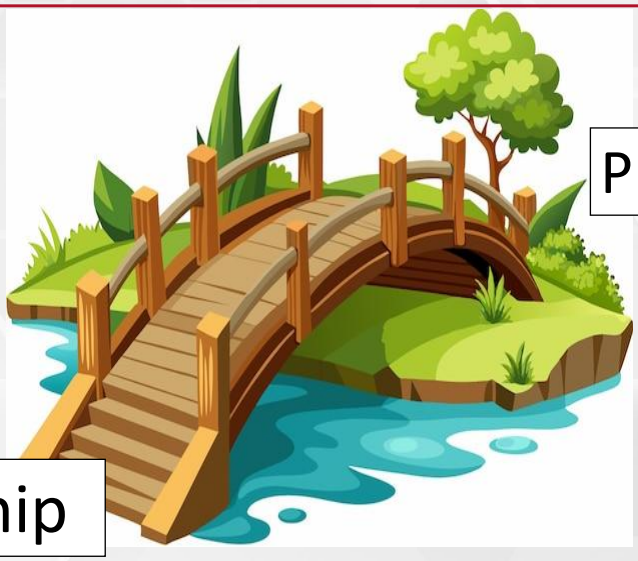

Prevention

Stewardship

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IP's Core Responsibilities in ASP

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Antibiotic Use and Resistance (AUR)

Required via CMS's Promoting Interoperability Program

Provides a mechanism for facilities to report and analyze antimicrobial data as part of their antimicrobial stewardship efforts

AU	AR
Antibiotic Use reporting Which antibiotics are being used, by whom, how much	Antibiotic Resistance reporting Which organisms are resistant, resistance patterns over time

- **Both reported to NHSN**
- **Data drives stewardship efforts, benchmarking and public health action**

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AUR

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AU
Antimicrobial Use

- Antimicrobial days/1000 *days present*
- SAAR- Standardized Antimicrobial Administration Ratio

$$SAAR = \frac{\text{Observed Antimicrobial Use}}{\text{Predicted Antimicrobial Use}}$$

AR
Antimicrobial Resistance

- Proportion susceptible
- SRIR- Standardized Resistant Infection Ratio

$$SRIR = \frac{\text{Observed Resistant Infections}}{\text{Predicted Resistant Infections}}$$

- pSIR- Pathogen-specific Standardized Infection Ratio

$$pSIR = \frac{\text{Observed Infections}}{\text{Predicted Infections}}$$

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Resource

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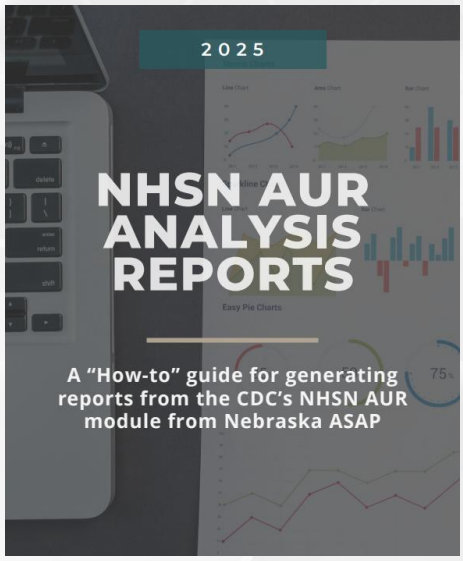

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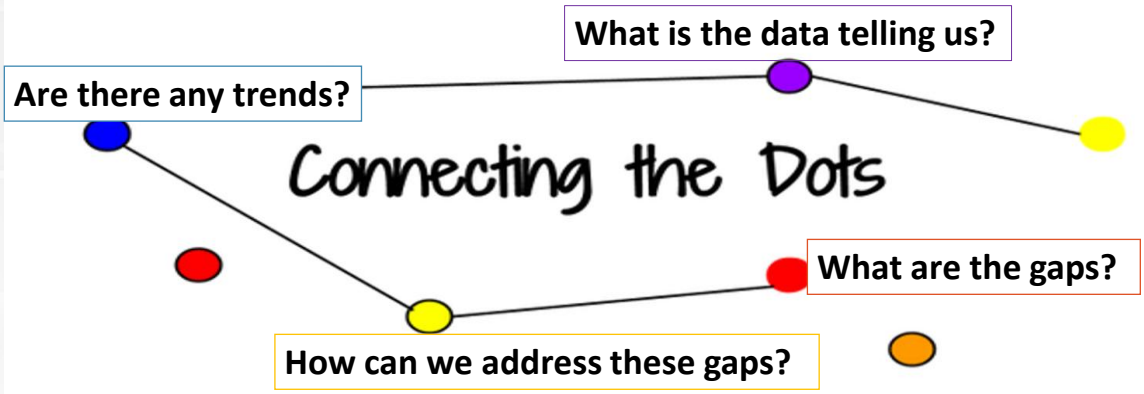
IP role in AUR



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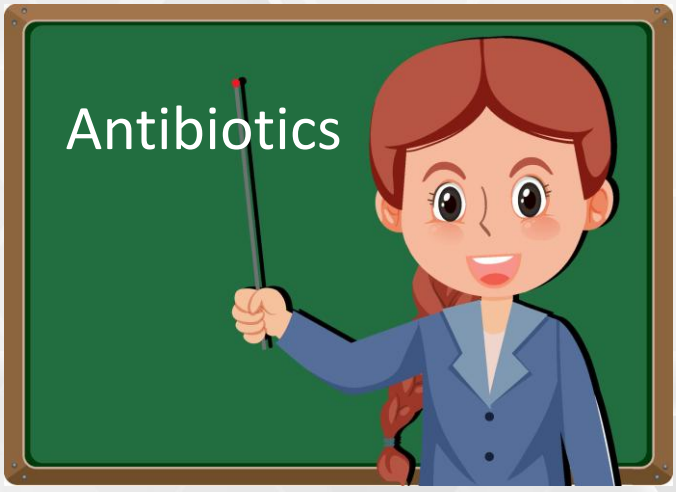
Education & Behavior Change

- Train nurses, ancillary staff, and providers
- Safe culture of questioning inappropriate antibiotics.
- Patient education
- Use case studies or audit data to reinforce best practices.



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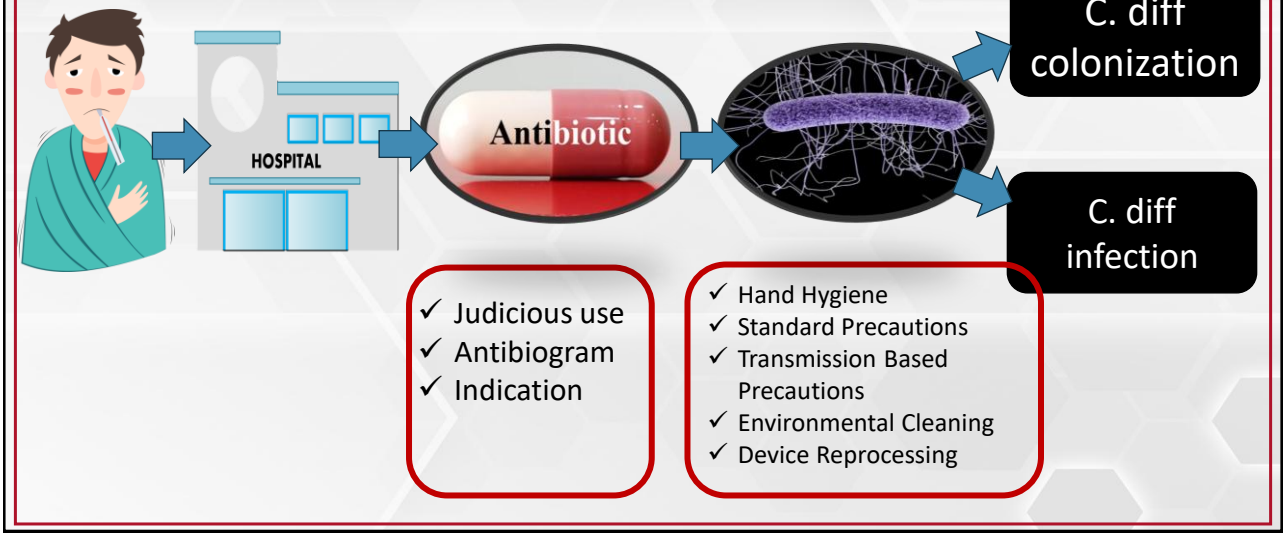
Infection Prevention & ASP Successes



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Common Challenges

Culture change • Provider pushback • "We've always done it this way"	Limited authority	Data access and interpretation	Time/ Competing priorities
Communication	Removal from isolation	Persistent MDRO positives	Broad order panels for all pts • E.g., UA for all admits
Isolation adherence	Cost to support ASP team	FTE & Bandwidth for ASP team	Patient Populations

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Application to Practice

✓Know your facility's antibiotic use metrics

✓Learn how to read an antibiogram

✓Establish regular touchpoints with pharmacy/ASP team

✓Identify quick wins: peri-op prophylaxis, UTI stewardship, respiratory stewardship

✓Use infection prevention rounds to observe and escalate antibiotic concerns

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Antibiotic stewardship programs are more effective when implemented alongside IPC measures

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- Next Office Hours and Future Webinars are TBD pending funding

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Questions

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- If you have a questions
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    OR
  - Enter your question into the chat

- If you have additional questions that are not answered, you can email us at ***infoforipslice@nebraskamed.com***

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