

# CHALLENGES and SOLUTIONS for ANTIBIOTIC STEWARDSHIP for INPATIENT, OUTPATIENT, and NURSING HOME FACILITIES

Evelyn Cook, RN, CIC

Zachary Willis, MD, MPH

Christine E. Kistler, MD, MASc

December 7<sup>th</sup>, 2022



# STRENGTHENING HAI/AR PROGRAM CAPACITY

- ▶ Funded under the *American Rescue Plan Act of 2021*
- ▶ Broadly intended to provide critical resources to state, local and territorial health departments
  - ▶ Support of a broad range of healthcare infection prevention and control (IPC) activities
  - ▶ Epidemiologic surveillance related activities to detect, monitor, mitigate and prevent the spread of SARS-CoV-2
  - ▶ Address healthcare associated infections (HAI)
  - ▶ Antimicrobial resistance (AR)



▶ NCDHHS and SPICE activities intended to further strengthen and expand HAI/AR programs include four project areas:

- ▶ Project I. HAI/AR Program Network for Prevention and Response
- ▶ **Project II. Antibiotic Stewardship**
- ▶ Project III. Enhancing Use of National Healthcare Safety Network (NHSN)
- ▶ Project IV. Project Firstline

*NC Clinical Antibiotic Stewardship Partners (NC CLASP) is a new initiative created to support antibiotic stewardship efforts in outpatient, acute care, and nursing home settings across the state.*



NC DEPARTMENT OF  
**HEALTH AND  
HUMAN SERVICES**

<https://www.ncdhhs.gov/>



<https://spice.unc.edu/>



HOME

ABOUT

FACILITY TYPE

COURSES

BROWSE ALL RESOURCES

SPICE TRAINING VIDEOS

LINKS



# Statewide Program for Infection Control & Epidemiology

Promoting prevention and control of healthcare associated infections through education and consultation across the healthcare spectrum.

 ISOLATION SIGNAGE

 JOIN A LISTSERV

 ASK SPICE

 ANTIBIOTIC STEWARDSHIP NC CLASP

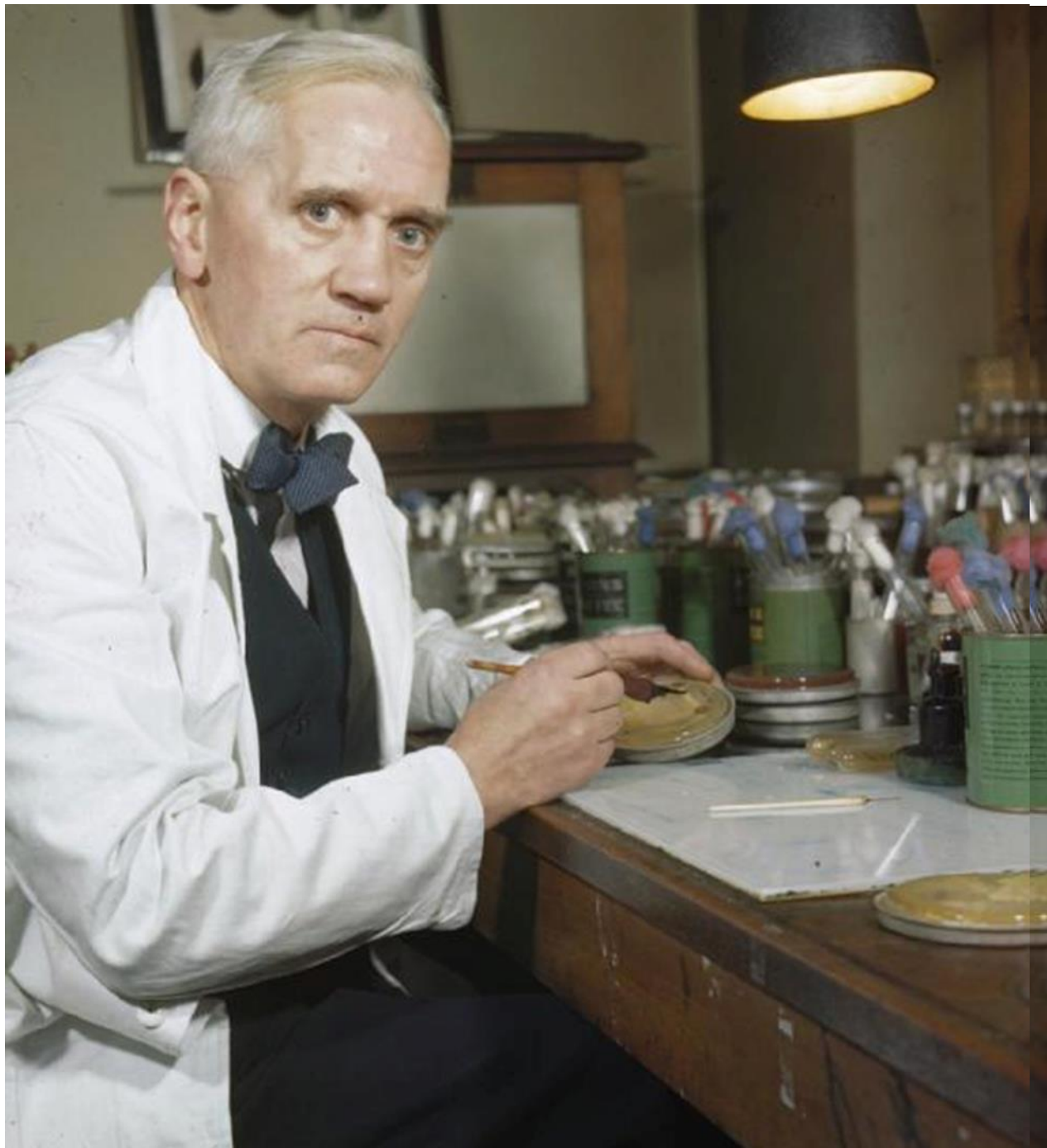
<https://spice.unc.edu/>

# THE NORTH CAROLINA CLINICAL ANTIBIOTIC STEWARDSHIP PARTNERS (NC CLASP)

- ▶ All the information from today's session will be on our website <https://spice.unc.edu/ncclasp/>



# **ANTIMICROBIAL RESISTANCE AND ANTIMICROBIAL STEWARDSHIP**



The microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out.... In such cases the **thoughtless person playing with penicillin is morally responsible for the death** of the man who finally succumbs to infection with the penicillin-resistant organism.

Sir Alexander Fleming,  
6/14/1945, *New York Times*



## ANTIBIOTIC RESISTANCE THREATS in the United States, 2013



U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

Estimated minimum number of illnesses and deaths caused by antibiotic resistance\*:

At least  **2,049,442** illnesses,  
 **23,000** deaths

*\*bacteria and fungus included in this report*

Estimated minimum number of illnesses and death due to *Clostridium difficile* (*C. difficile*), a unique bacterial infection that, although not significantly resistant to the drugs used to treat it, is directly related to antibiotic use and resistance:

At least  **250,000** illnesses,  
 **14,000** deaths

<https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf>



# CDC's 2019 AR Threats Report: **PREVENTION WORKS.**

**↓ 18%** fewer deaths from antibiotic resistance overall since 2013 report

**↓ 28%** fewer deaths from antibiotic resistance in hospitals since 2013 report

## AND DECREASES IN INFECTIONS CAUSED BY:

**↓ 41%** Vancomycin-resistant *Enterococcus*

**↓ 33%** Carbapenem-resistant *Acinetobacter*

**↓ 29%** Multidrug-resistant *Pseudomonas aeruginosa*

**↓ 25%** Drug-resistant *Candida*

**↓ 21%** Methicillin-resistant *Staphylococcus aureus* (MRSA)

**STABLE** Carbapenem-resistant Enterobacteriaceae (CRE) & drug-resistant tuberculosis (TB disease cases)

# WHAT WAS WORKING?

## ▶ Infection Prevention

- ▶ Known MDRO infections:
  - ▶ Screening, isolation
  - ▶ Information sharing between facilities
  - ▶ Surveillance
- ▶ Reduction in Hospital-Acquired Infections
  - ▶ CLABSI, VAP, CAUTI

## ▶ Antimicrobial Stewardship

- ▶ Stopping or avoiding unnecessary Abx
- ▶ Targeting antimicrobials
- ▶ Reducing durations
- ▶ Judicious use of broad-spectrum drugs



**2022  
SPECIAL  
REPORT**

# COVID-19

**U.S. IMPACT ON ANTIMICROBIAL RESISTANCE**



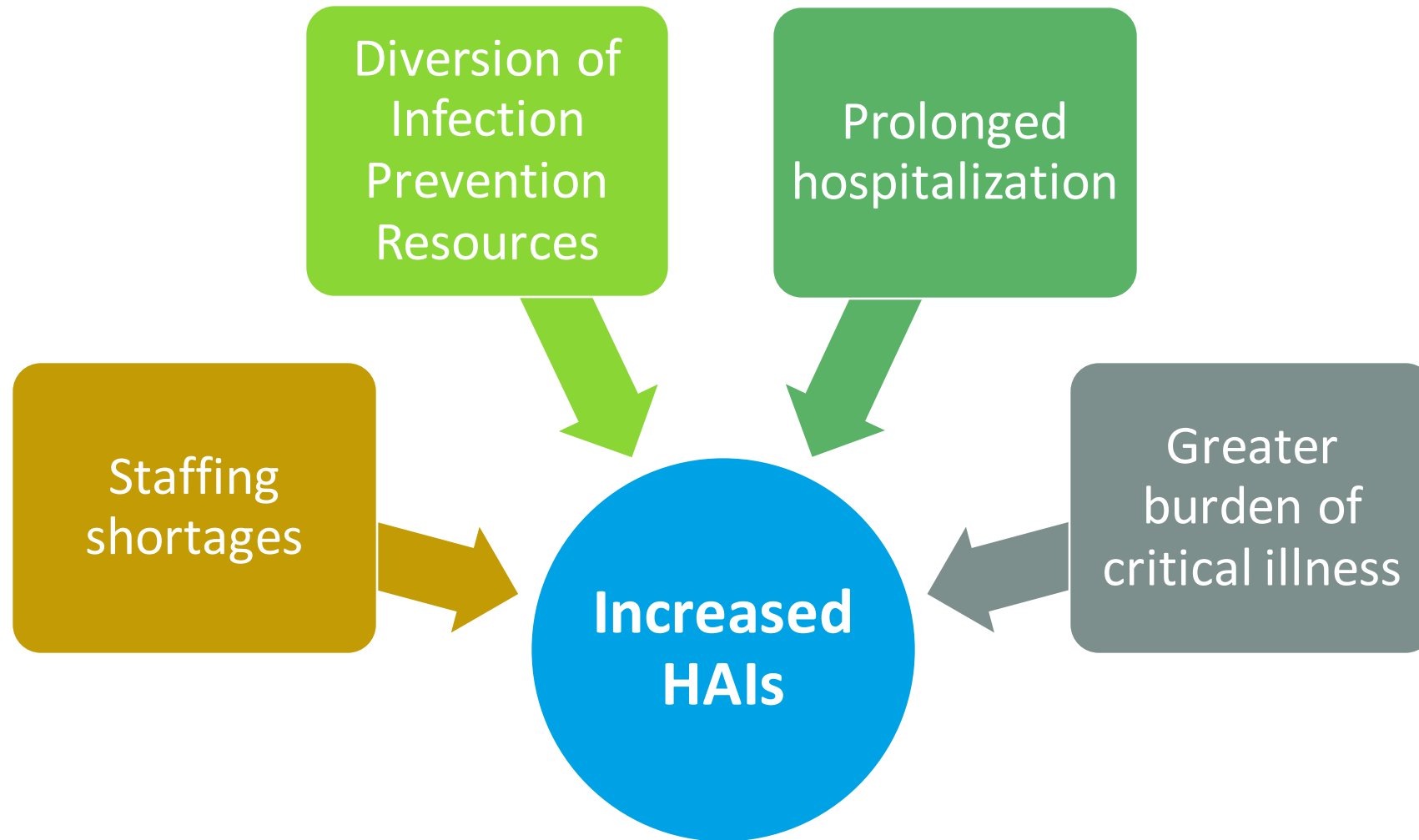
**Available data show an alarming increase in resistant infections starting during hospitalization, growing at least 15% from 2019 to 2020.**

- Carbapenem-resistant *Acinetobacter* (+78%)
- Antifungal-resistant *Candida auris* (+60%)\*
- Carbapenem-resistant Enterobacterales (+35%)
- Antifungal-resistant *Candida* (+26%)
- ESBL-producing Enterobacterales (+32%)
- Vancomycin-resistant Enterococcus (+14%)
- Multidrug-resistant *P. aeruginosa* (+32%)
- Methicillin-resistant *Staphylococcus aureus* (+13%)

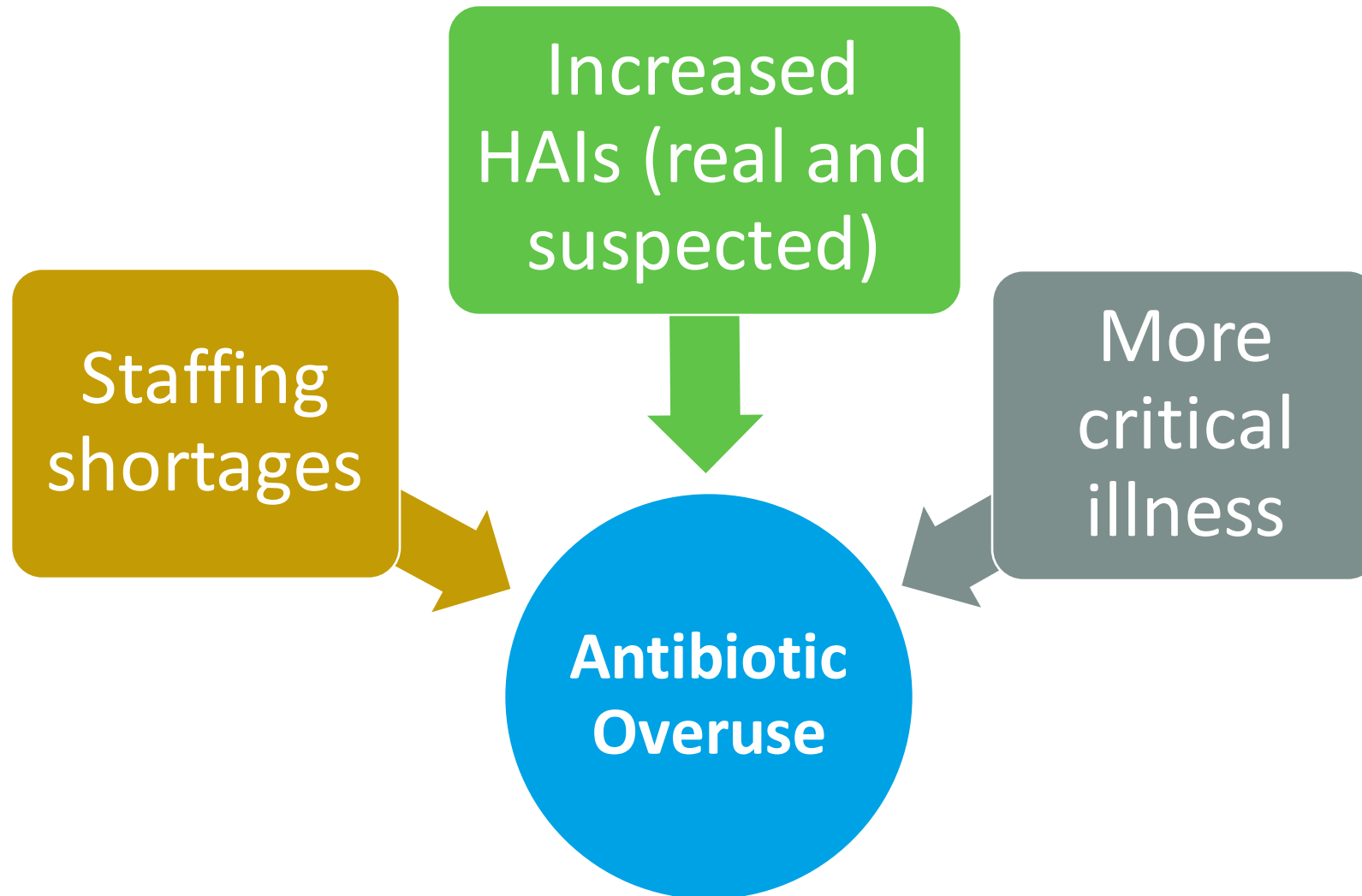
# WHY DID ANTIMICROBIAL RESISTANCE GET WORSE IN THE PANDEMIC?

- ▶ SARS-CoV-2 is a virus
- ▶ Outpatient antibiotic prescribing dropped significantly in 2020

# WHY DID ANTIMICROBIAL RESISTANCE GET WORSE IN THE PANDEMIC?



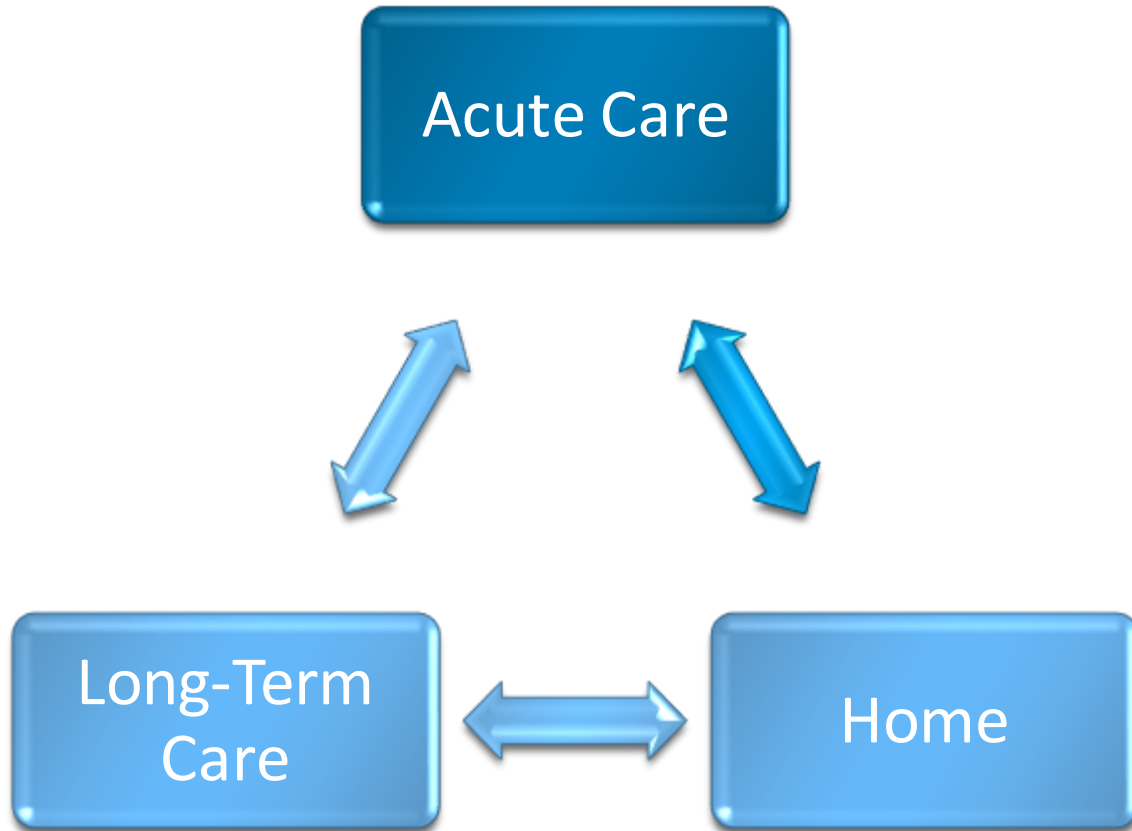
# WHY DID ANTIMICROBIAL RESISTANCE GET WORSE IN THE PANDEMIC?



# ANTIMICROBIAL STEWARDSHIP LANDSCAPE

- ▶ ASPs began in large hospitals
  - ▶ Antimicrobial resistance problems; access to experts and data
  - ▶ Joint Commission Standard went into effect 2017
  
- ▶ How to do stewardship in:
  - ▶ Smaller community hospitals?
  - ▶ Long-term care facilities?
  - ▶ Outpatient setting?

# CARE CONTINUUM



- Patients move between acute care hospitals, long-term care, and home
- AR pathogens move with the patients
- A gap in infection prevention or antibiotic stewardship in one location creates problems for all



# NEED FOR OUTPATIENT STEWARDSHIP

80-90% of all antibiotic consumption by outpatients

At least **30%** of outpatient antibiotics are unnecessary

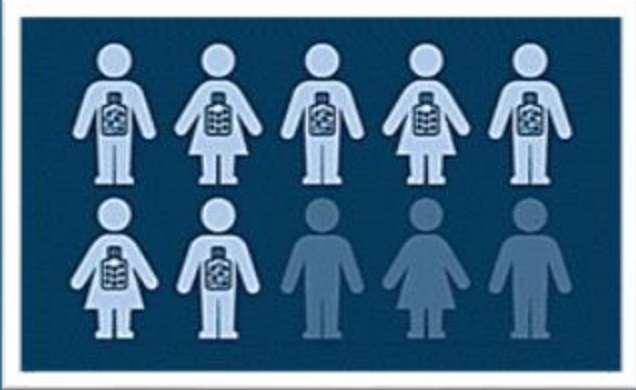
**50%** of antibiotics for acute respiratory infections are unnecessary

**\$10.7 billion** spent annually on outpatient antibiotics

Nearly **five times** more antibiotics prescribed in highest-use state compared to lowest-use state

# ANTIBIOTIC STEWARDSHIP IN NURSING HOMES

**4.1 million** Americans are admitted to or reside in a nursing home in any year



Up to 70% of nursing home residents receive at least 1 antibiotic a year



Up to 75% of antibiotics are prescribed inappropriately

<https://www.cdc.gov/antibiotic-use/core-elements/pdfs/Infographic-Antibiotic-Stewardship-Nursing-Homes-508.pdf>

# NC CLASP OVERVIEW

➤ **NC CLASP is a new initiative created to support acute care, outpatient, and nursing home settings to improve antibiotic stewardship and the health of our patients.**



# NC CLASP OVERVIEW

- **NC CLASP is a new initiative created to support acute care, outpatient, and nursing home settings to improve antibiotic stewardship and the health of our patients.**



# WHAT CAN NC CLASP DO FOR YOU?

- **Provide a judgment-free forum for learning from experts and peers**
- **Interactive educational sessions**
  - Regularly scheduled for each setting
  - Focused on key antibiotic stewardship issues
  - Utilize case discussions



# WHAT CAN NC CLASP DO FOR YOU?

- ▶ **Mentoring and Coaching**
  - ▶ Experts in Infectious Diseases, Quality Improvement, and Geriatrics ready to help
  - ▶ Q&A sessions to discuss your needs
  
- ▶ **Templates**
  - ▶ For policies
  - ▶ For procedures
  - ▶ For tracking tools



# WHAT CAN NC CLASP DO FOR YOU?

## ➤ Priority setting

- Help healthcare settings and administrators identify internal priorities

## ➤ Assistance with data and analytics

- help you review prescribing patterns by healthcare setting





## EDUCATIONAL SUPPORT

- ▶ Clinical providers (MD, DO, NP, PA, PharmD)
- ▶ Nursing staff (RNs, LPNs, CNAs)
- ▶ Patients and families

<https://www.cdc.gov/antibiotic-use/pdfs/AU-nursing-home-trifold-brochure-P.pdf>  
<http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes>



North Carolina  
Clinical Antibiotic  
Stewardship Partners

## Do You Need Antibiotics?

Information about antibiotics for nursing home residents and their families



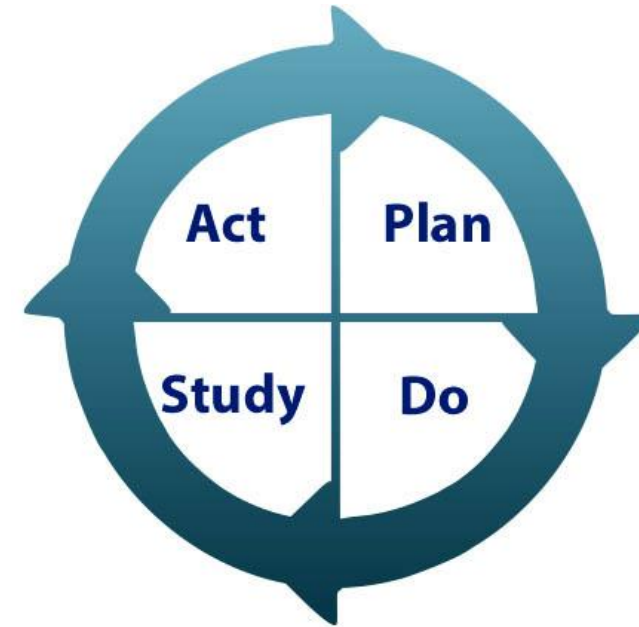
**BE  
ANTIBIOTICS  
AWARE**  
SMART USE, BEST CARE





# WHAT CAN NC CLASP DO FOR YOU?

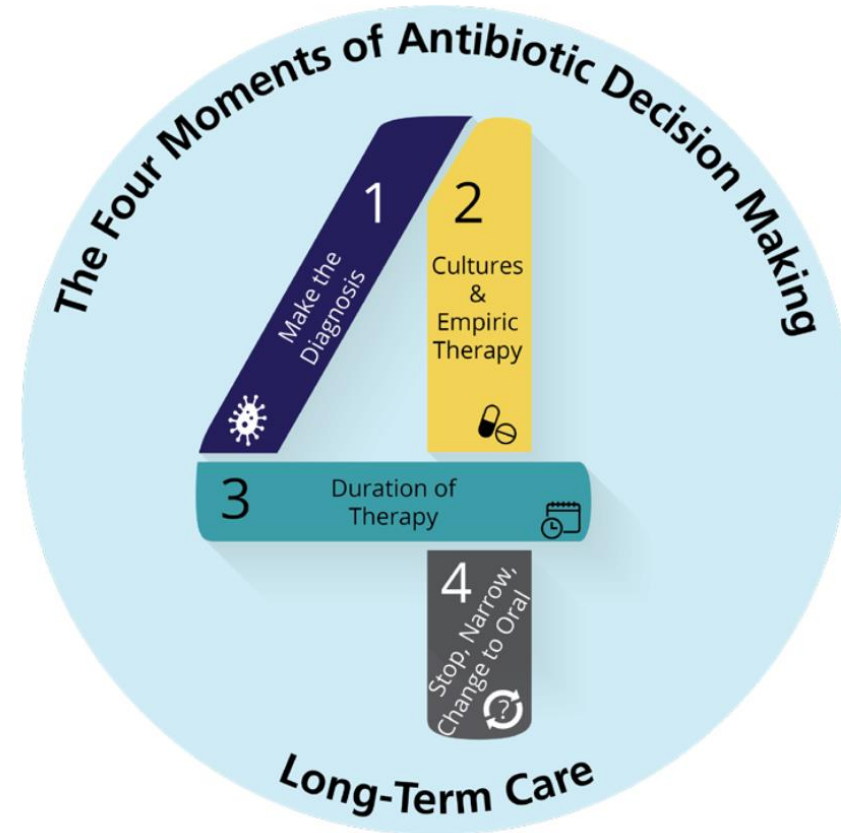
- **Quality improvement support: Help you get SMART on outcomes important to your setting**
  - Specific
  - Measurable
  - Achievable
  - Relevant
  - Time-bound



# WHAT CAN NC CLASP DO FOR YOU?

## Key Topics

- ▶ Creating a Culture of Safety
- ▶ Developing and Improving Your Stewardship Program
- ▶ Learning Best Practices for Common Infectious Syndromes
- ▶ Review the 4 Moments AHRQ Framework



The Long-Term Care Toolkit from AHRQ,  
<https://www.ahrq.gov/antibiotic-use/long-term-care/index.html>

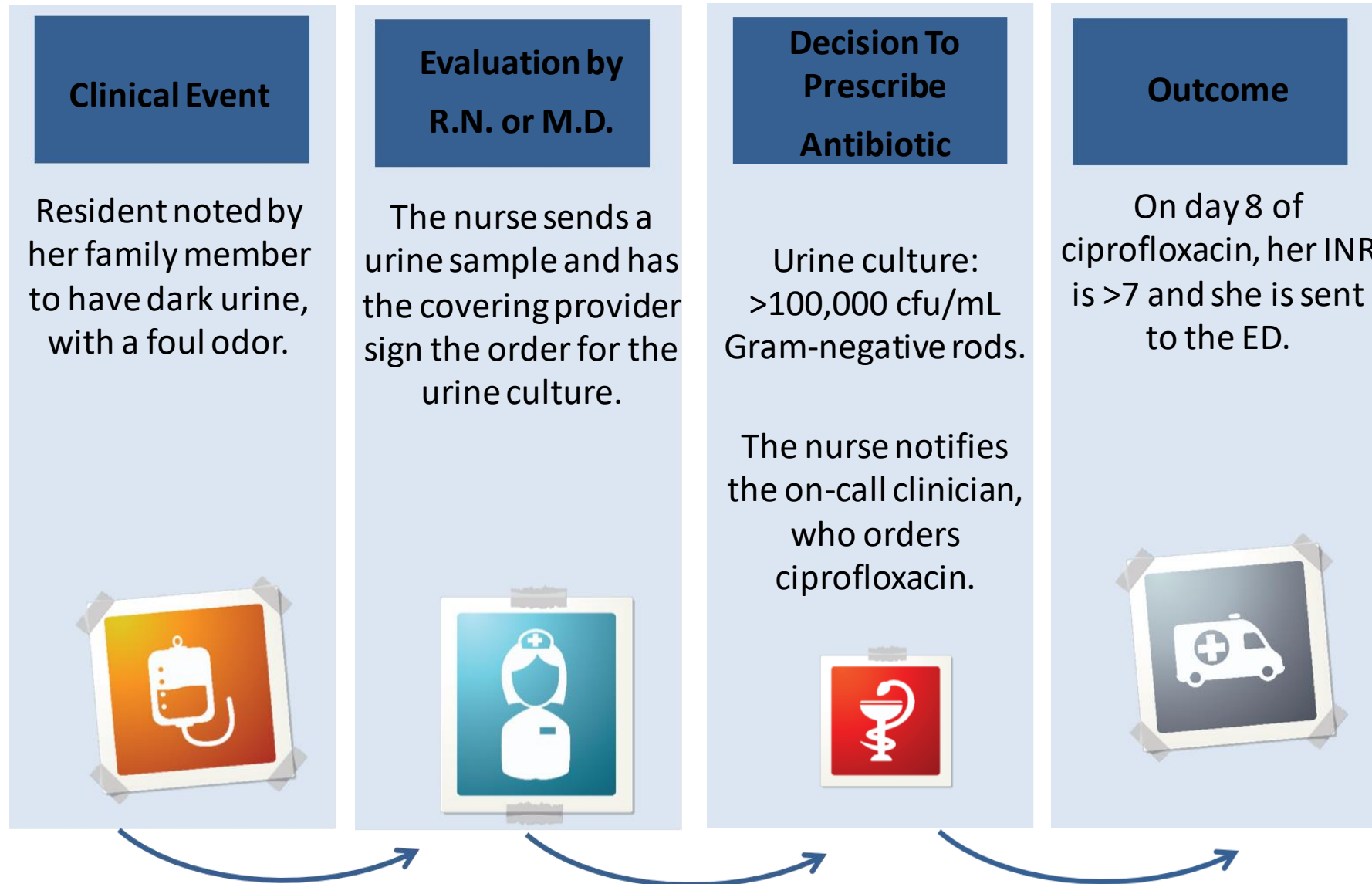


# NC CLASP COLLABORATIVE SERIES

- ▶ For all settings we want to conduct regularly scheduled virtual meetings education, quality improvement, and mentoring and coaching sessions.
- ▶ Antibiotic stewardship isn't isolated to one setting. We want to provide support for each of the following health care settings: acute care hospitals, outpatient clinics, and nursing facilities.



# EXAMPLE OF HOW NC CLASP CAN HELP YOU



# IDENTIFYING THE PROBLEMS—1

## Clinical Event



Son notes resident has dark urine, with a foul odor. Her son states the last time she had a dark urine she had a UTI. He wants her to be tested.

### PROBLEM:

No discussion with the family or attempt to educate.

# IDENTIFYING THE PROBLEMS—2

## Clinical Event



Son notes resident has dark urine, with a foul odor. Her son states the last time she had a dark urine she had a UTI. He wants her to be tested.

### PROBLEM:

No discussion with the family or attempt to educate.

## Evaluation by R.N. or M.D.



The nurse sends the urine sample and then asks the on-call covering clinician to sign the order.

### PROBLEM:

No diagnostic criteria used to evaluate the resident.

# IDENTIFYING THE PROBLEMS—3

## Clinical Event



Son notes resident has dark urine, with a foul odor. Her son states the last time she had a dark urine she had a UTI. He wants her to be tested.

### PROBLEM:

No discussion with the family or attempt to educate.

## Evaluation by R.N. or M.D.



The nurse sends the urine sample and then asks the on-call covering clinician to sign the order.

### PROBLEM:

No diagnostic criteria used to evaluate the resident.

## Decision To Prescribe Antibiotic



Urine culture grows > 100,000 cfu/mL Gram-negative rods. The nurse notifies the on-call provider, who orders ciprofloxacin.

### PROBLEM(S):

No evaluation of resident. No review of guidelines to determine if therapy is indicated.

# IDENTIFYING THE PROBLEMS—4

## Clinical Event



Son notes resident has dark urine, with a foul odor. Her son states the last time she had a dark urine she had a UTI. He wants her to be tested.

**PROBLEM:**  
No discussion with the family or attempt to educate.

## Evaluation by R.N. or M.D.



The nurse sends the urine sample and then asks the on-call covering clinician to sign the order.

**PROBLEM:**  
No diagnostic criteria used to evaluate the resident.

## Decision To Prescribe Antibiotic



Urine culture grows > 100,000 cfu/mL Gram-negative rods. The nurse notifies the on-call provider, who orders ciprofloxacin.

**PROBLEM(S):**  
No evaluation of resident. No review of guidelines to determine if therapy is indicated.

## Outcome

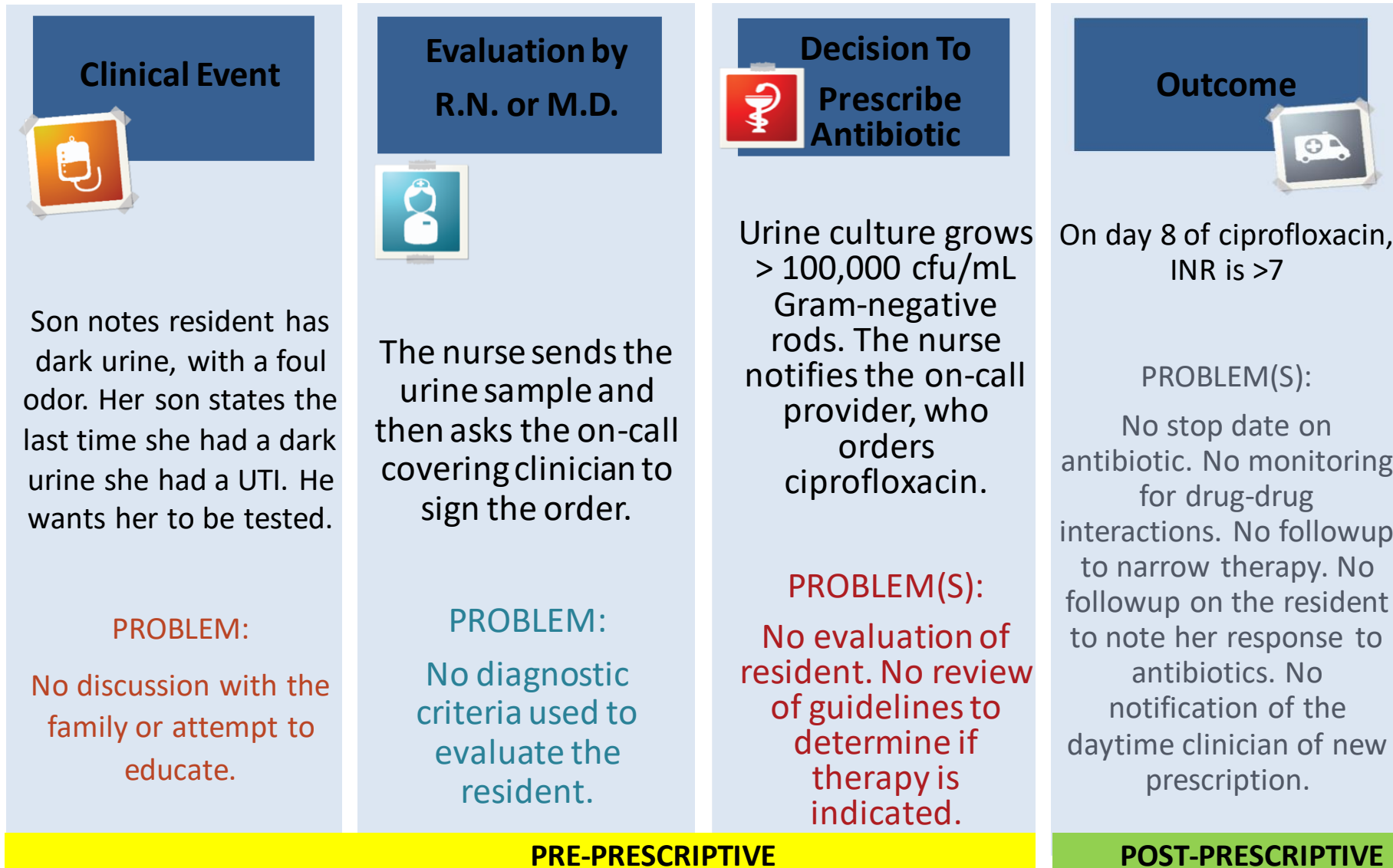


On day 8 of ciprofloxacin, INR is >7

**PROBLEM(S):**  
No stop date on antibiotic. No monitoring for drug-drug interactions. No follow-up to narrow therapy. No follow-up on the resident to note her response to antibiotics. No notification of the daytime clinician of new prescription.



# IDENTIFYING THE PROBLEMS—5



## CASE #2

- ▶ A 37-year-old male is recovering in SICU after a motor vehicle collision with multiple injuries.
- ▶ On hospital day 6, he develops fever to 38.7 C, with no signs of sepsis or increased support requirements. Chest X-ray is unchanged from prior. No sign of wound infection.
- ▶ Blood, urine, and respiratory cultures are obtained. He is started on broad-spectrum antibiotics (vancomycin plus cefepime)

## CASE #2 CONTINUED

- ▶ After 48 hours, he has had no further fever.
  - ▶ Blood culture: no growth to date
  - ▶ Urine culture: final negative
  - ▶ Respiratory culture: 3+ *Pseudomonas aeruginosa*
- ▶ He receives cefepime for 7 days for presumed VAP
- ▶ Three days after completing antibiotics, he has another fever to 38.4.
  - ▶ Antibiotics initially held, but blood and respiratory cultures repeated
  - ▶ Another ETT aspirate returns positive three days later for *Pseudomonas aeruginosa*
  - ▶ Cefepime is restarted
- ▶ Patient develops diarrhea and abdominal distention. *C. difficile* test is positive.

## CASE #2: GAPS

- ▶ “Pan-culture” for new fever in the ICU
  - ▶ Blood culture reasonable; other sites should be symptom-directed
- ▶ Overdiagnosis of “VAP”
  - ▶ Pneumonia should be accompanied by chest X-ray changes, increased oxygen requirement, increased sputum production
- ▶ Repeat respiratory cultures often stay positive after treatment

## CASE #3

- ▶ A six-year-old girl presents to her pediatrician with a sore throat. She has also had fever up to 100.7, cough, and runny nose for two days.
  - ▶ She has been treated for strep throat three times in the last six months
  - ▶ Mom reports that the symptoms are “always the same”
- ▶ After rooming the patient, the MA obtains a throat swab for Group A Strep antigen testing, which is positive
- ▶ The pediatrician examines the patient and does not see typical signs of streptococcal pharyngitis. But he prescribes amoxicillin.
- ▶ The patient’s mother asks for a referral to ENT for tonsillectomy

## CASE #3: GAPS

- ▶ Failure to recognize Group A streptococcal colonization
  - ▶ May persist for months
- ▶ Missed opportunity to educate parent/family
- ▶ Diagnostic testing obtained before complete evaluation
- ▶ Incorrect diagnosis → unnecessary antibiotics, possibly surgical referral

# NC CLASP

[HTTPS://SPICE.UNC.EDU/NCCLASP/](https://spice.unc.edu/ncclasp/)



HOME ABOUT FACILITY TYPE COURSES BROWSE ALL RESOURCES SPICE TRAINING VIDEOS LINKS 

A photograph of several green and white antibiotic capsules scattered on a light-colored surface. The capsules are in various orientations, some lying flat and others slightly tilted. The background is softly blurred.

## NORTH CAROLINA CLINICAL ANTIBIOTIC STEWARDSHIP PARTNERS (NC CLASP)

### Stay in Touch

*To receive additional information or to express interest in partnering, please complete this form:*

- I am interested in more information on NC CLASP.
- I would like to participate in NC CLASP.

