THE CROSSROAD BETWEEN:

Antimicrobial Resistance

Antimicrobial Stewardship

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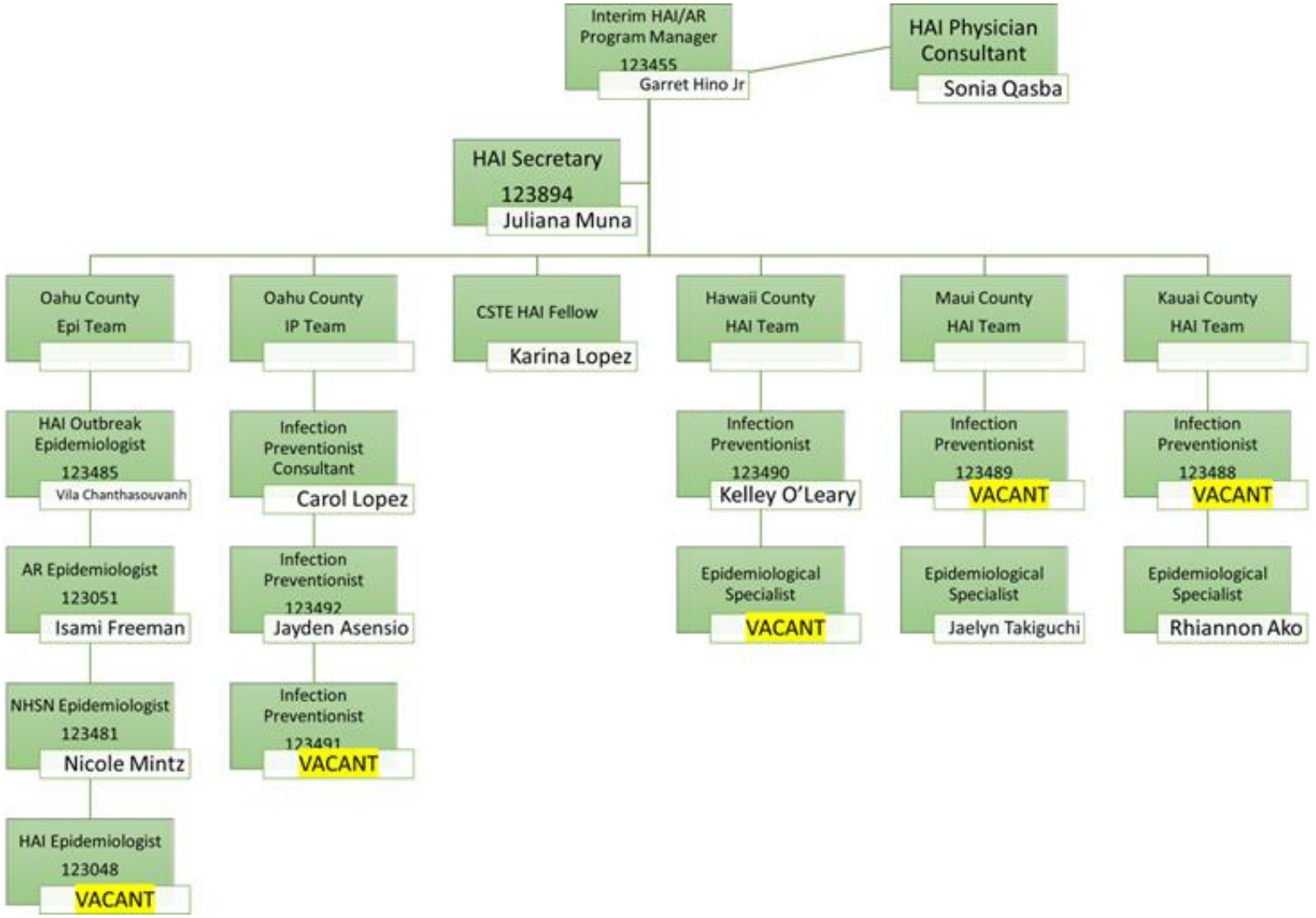
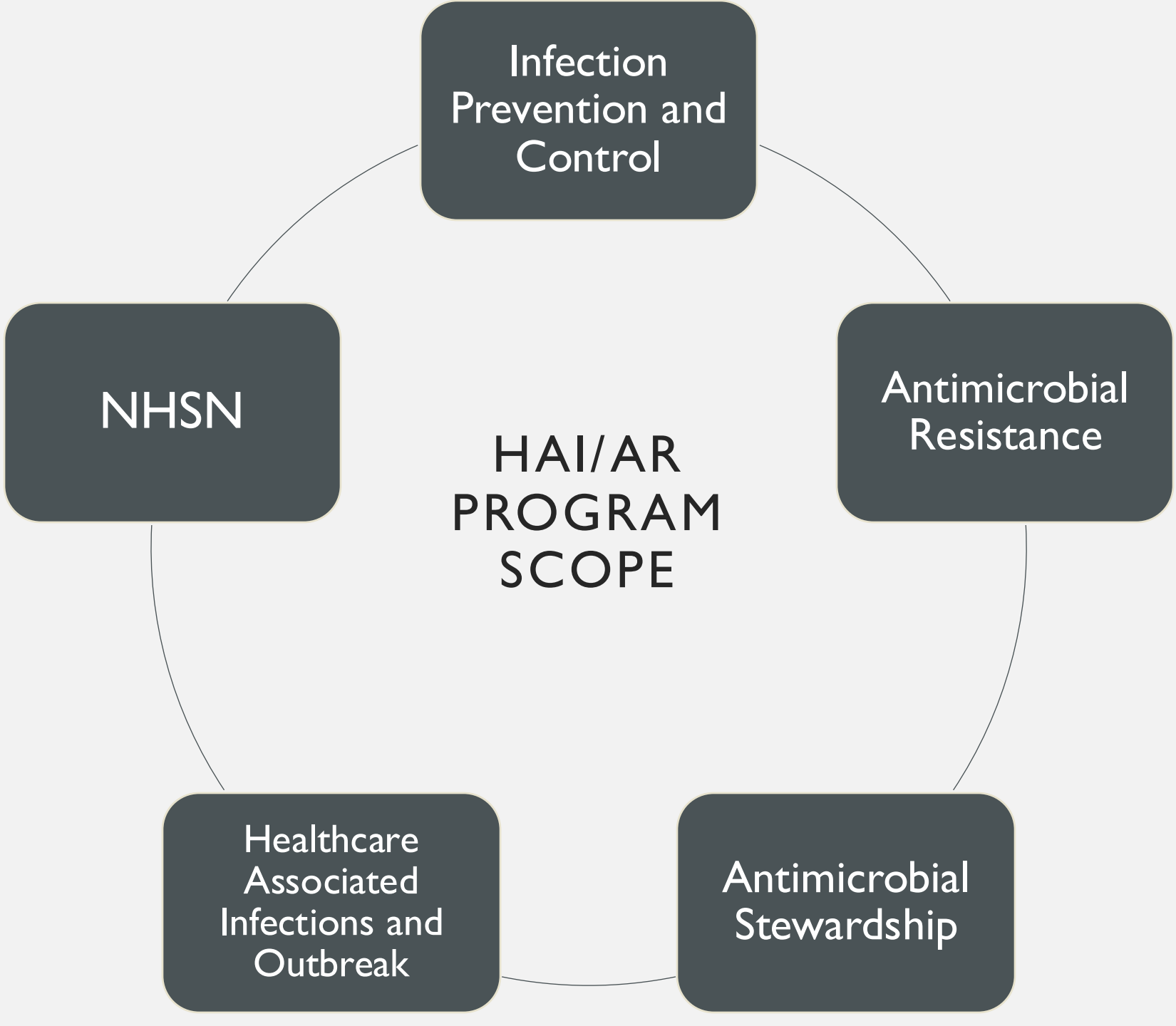
Hawaii State Department of Health | Disease Outbreak Control Division

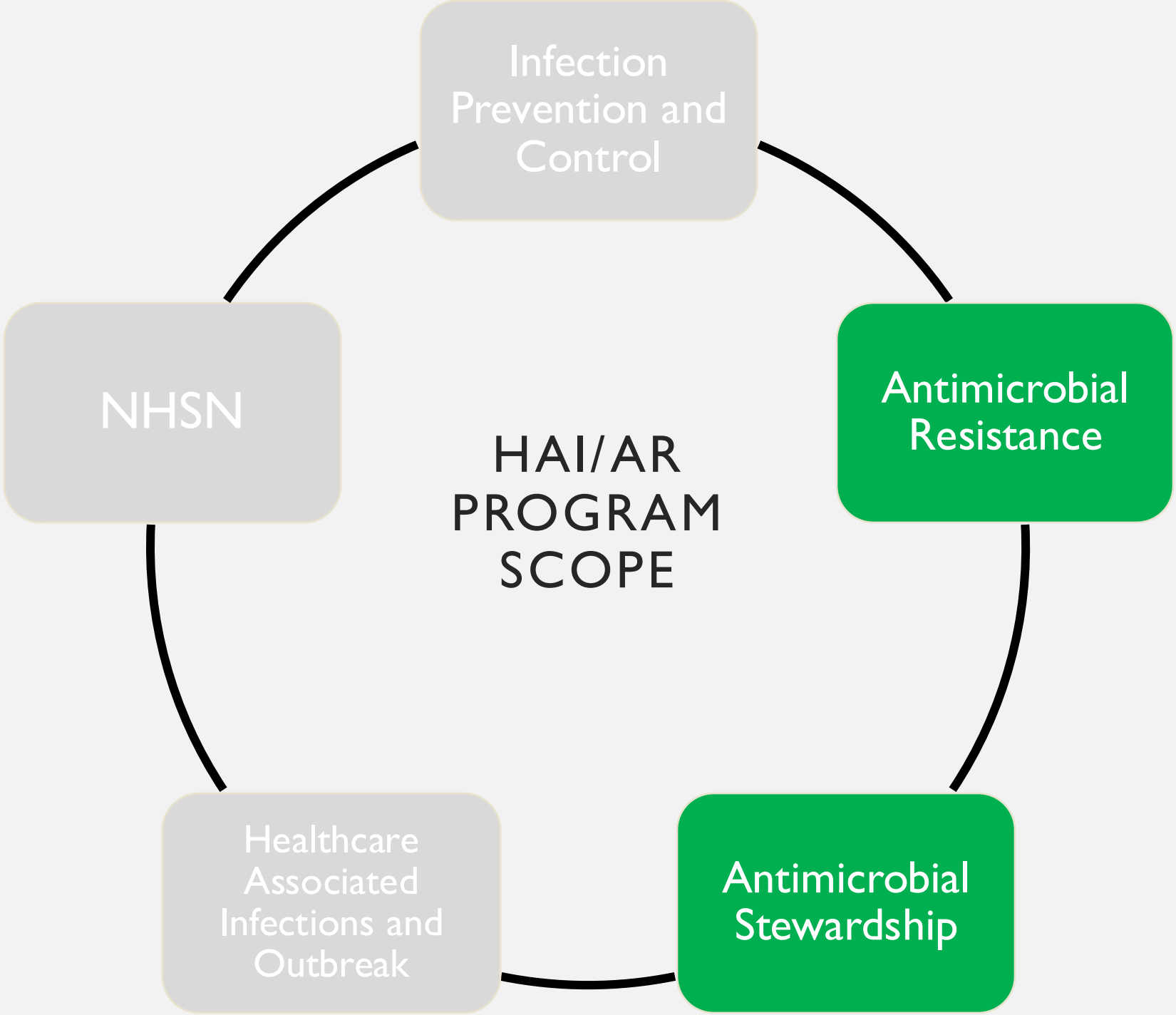
Healthcare Associated Infections/Antimicrobial Resistance (HAI/AR) Program

HAWAII DOH
HAI/AR PROGRAM

HAWAII HAI/AR PROGRAM ORGANIZATIONAL CHART




Infection Prevention and Control
Antimicrobial Resistance
Antimicrobial Stewardship
Healthcare Associated Infections and Outbreak
NHSN
HAI/AR PROGRAM SCOPE


Infection Prevention and Control
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HAI/AR PROGRAM SCOPE

OBJECTIVES

- Review the threats of antimicrobial resistance in the U.S.
- Discuss the trends of antimicrobial resistance observed in Hawaii
- Understanding the role of antimicrobial stewardship in preventing antimicrobial resistance
- Determine how healthcare facilities can optimize and implement ASP

BACKGROUND – ANTIMICROBIAL RESISTANCE

Antimicrobial Resistance (AMR) happens when bacteria and fungi develop the ability to defeat the drugs designed to kill them

Resistant infections can be difficult, and sometimes impossible, to treat.

HOW DOES AMR HAPPEN?

01

Time:

AMR is a naturally occurring process

02

Exposure:

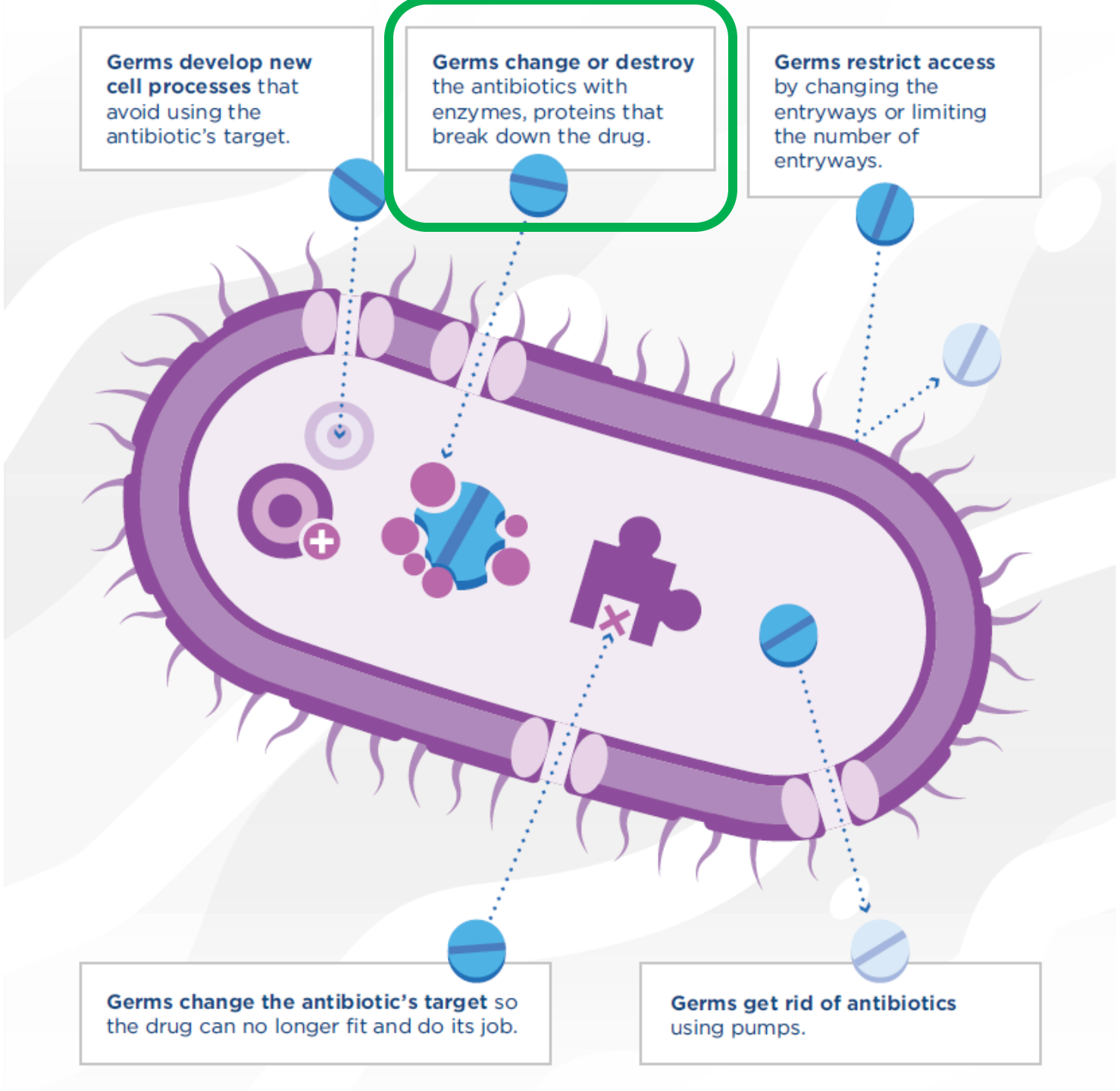
AMR is driven by exposure to antibiotics and antifungals

03

Spread:

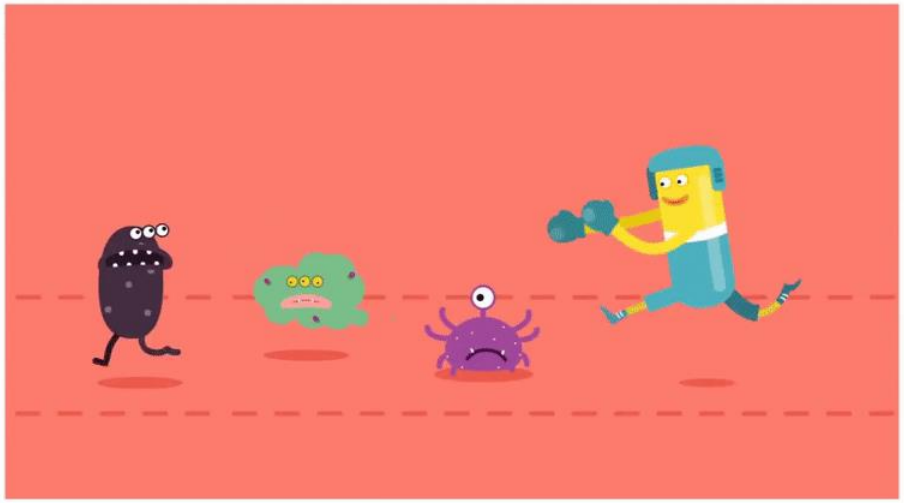
Germs and their resistance mechanisms can be spread from person-to-person

HOW DOES BACTERIA AND FUNGI FIGHT BACK AGAINST ANTIBIOTICS?

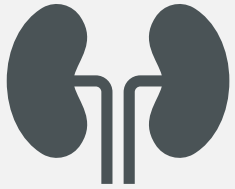


WHAT IS A CARBAPENEM RESISTANT ORGANISM (CRO)?

- Germs that are resistant to one or several antibiotics called carbapenems.
- Carbapenems are broad spectrum antibiotics reserved to treat infections due to resistant pathogens
- Antibiotics in this class include:
  - Meropenem
  - Imipenem
  - Ertapenem
  - Doripenem (Discontinued)



WHO IS AT RISK FOR CARBAPENEM-RESISTANT ORGANISMS?



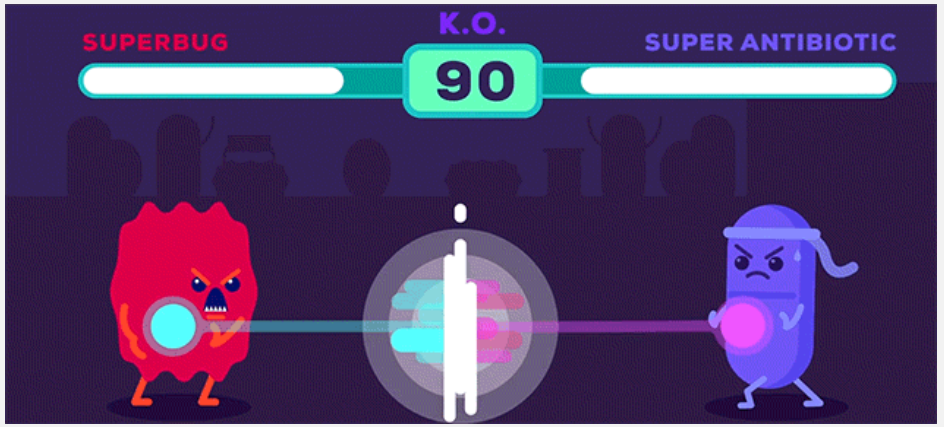
Require devices like ventilators, urinary catheters, or intravenous catheters (indwelling lines)

Taking long courses of certain antibiotics

Have weakened immune systems

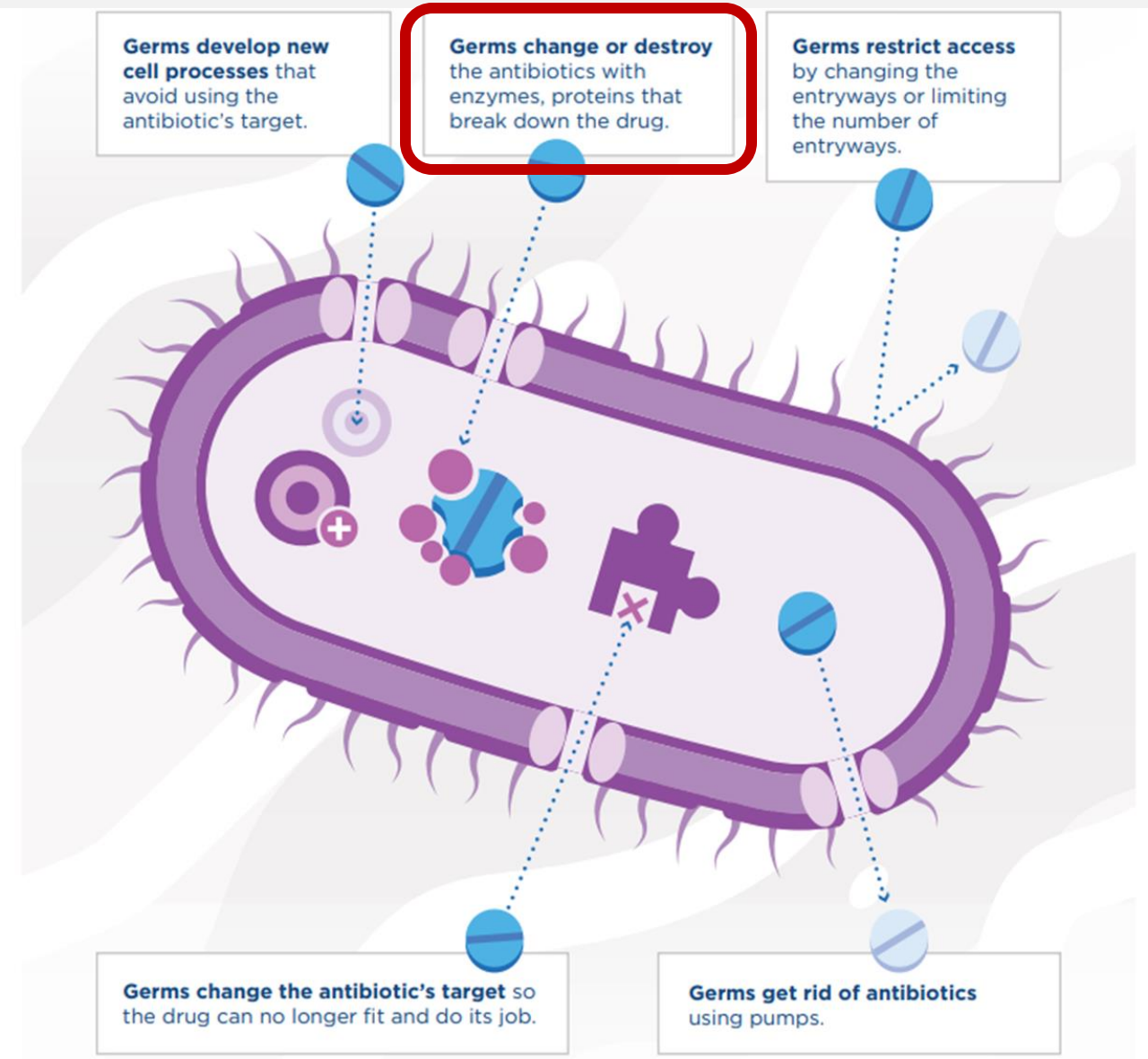
CARBAPENEM-RESISTANT ORGANISMS

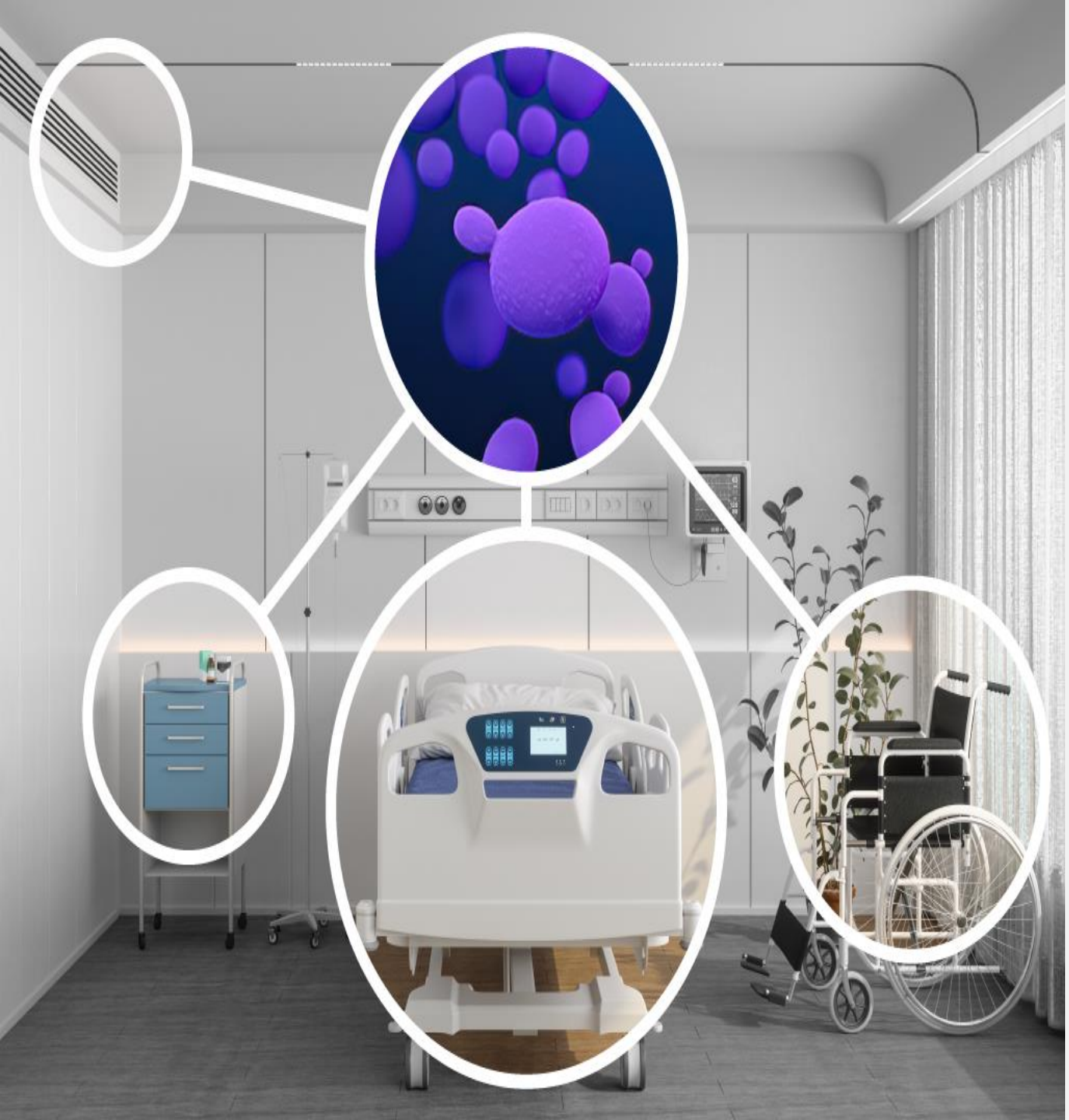
- Organisms of greatest concern:
  - Carbapenem-Resistant Enterobacterales (CRE)
  - Carbapenem-Resistant Pseudomonas aeruginosa (CRPA)
  - Carbapenem-Resistant Acinetobacter baumannii (CRAB)
- These CROs have the ability to produce enzymes called carbapenemases, which break down carbapenem drugs and most other beta-lactam drugs.
  - These are referred to as Carbapenemase-producing CROs (CP-CROs or CPOs)



CP-CRO RESISTANCE MECHANISMS

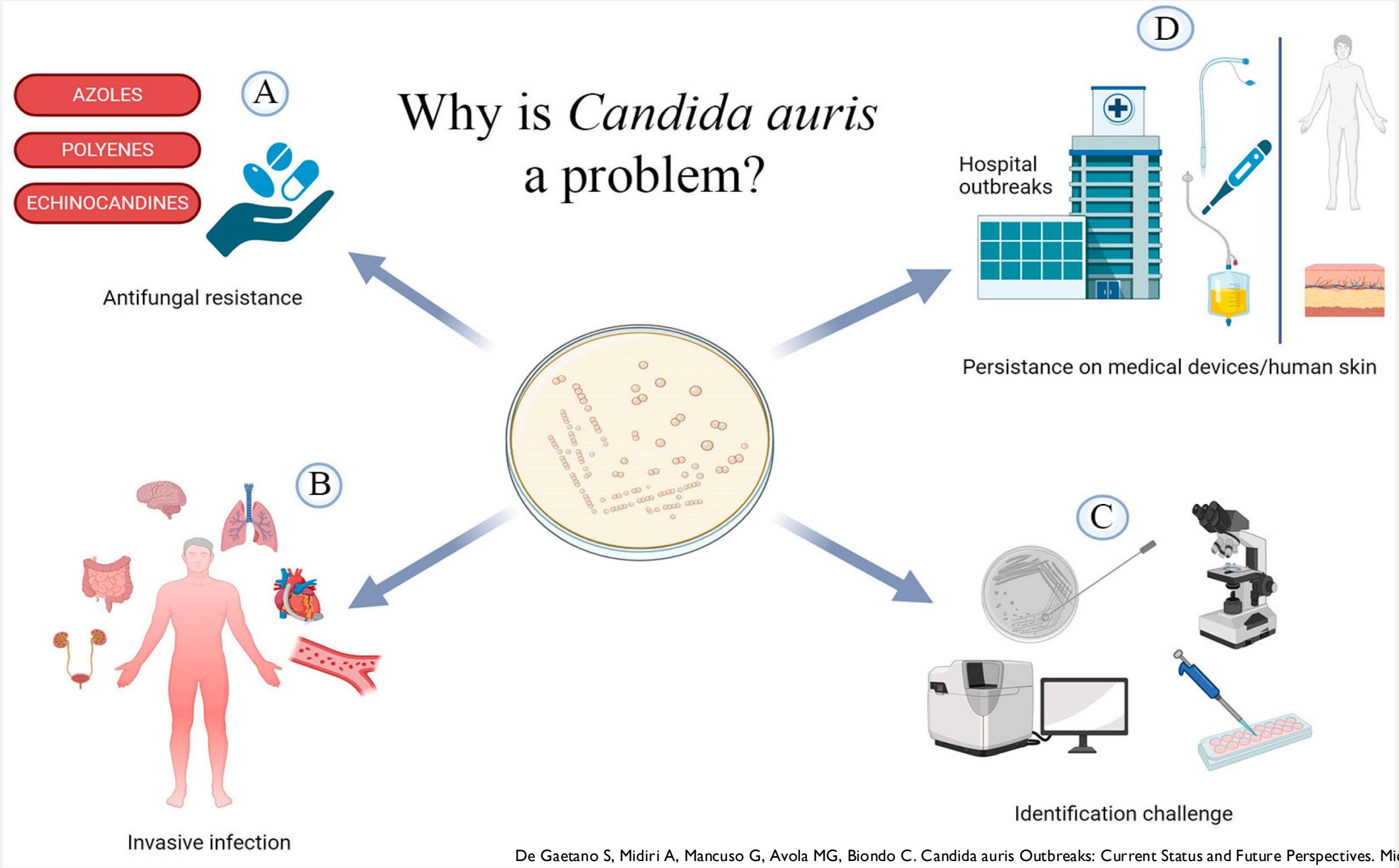
- Enzyme Producing (CP-CRO)
  - **"Big 5" Carbapenemases** – antibiotic inactivating enzymes (hydrolyze)
    - VIM
    - OXA
    - IMP
    - NDM
    - KPC





THE FUNGUS AMONG US: CANDIDA AURIS

- A yeast in the *Candida* species that can cause life-threatening illness
- Risk factors:
  - Immunosuppressed
  - Invasive medical devices
- Resistant to some or all antifungal medications



De Gaetano S, Midiri A, Mancuso G, Avola MG, Biondo C. Candida auris Outbreaks: Current Status and Future Perspectives. Microorganisms. 2024; 12(5):927. https://doi.org/10.3390/microorganisms12050927

AMR IN THE UNITED STATES

AMR is an urgent global public health threat

- Killing at least 1.27 million people worldwide
- Associated with nearly 5 million deaths in 2019

In the U.S.

- More than 2.8 million AMR infections occur each year
- More than 35,000 people die as a result

ANTIBIOTIC RESISTANCE THREATS IN THE UNITED STATES

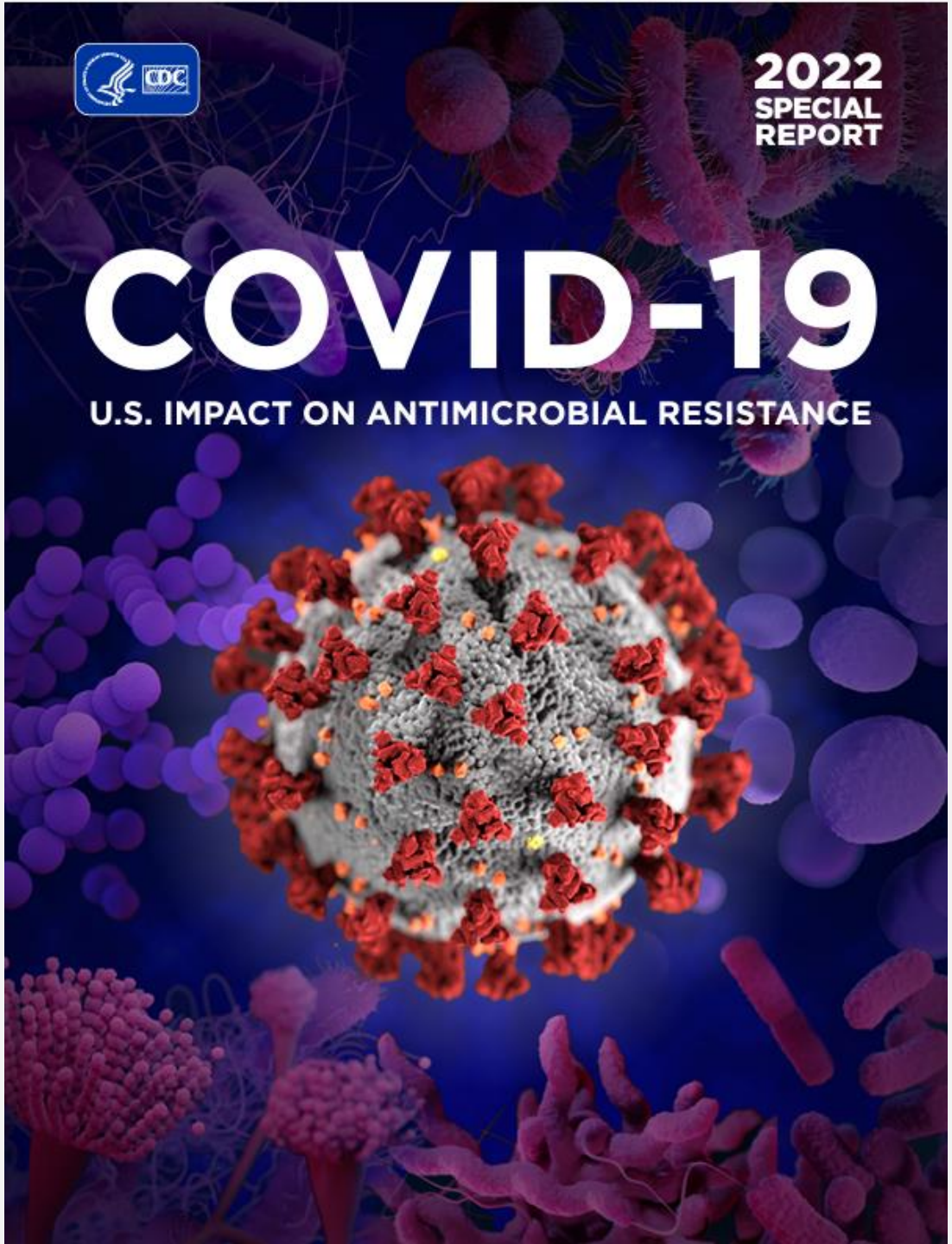
2019

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

Revised Dec. 2019

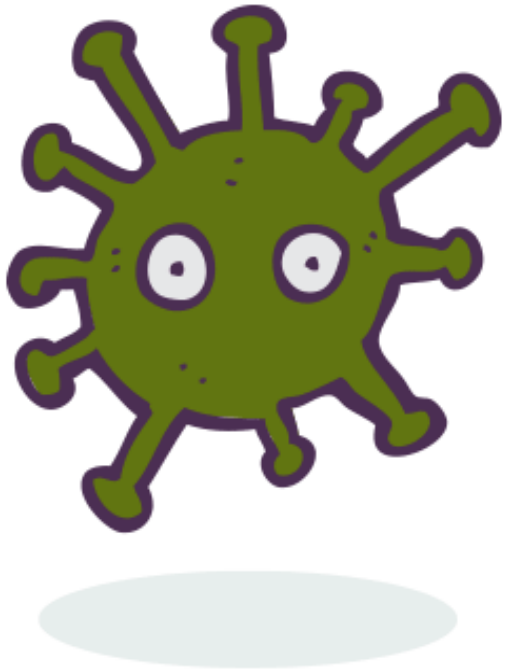
CDC AR THREATS REPORT - 2019
SERIOUS THREATS

CDC AR THREATS REPORT - 2019
URGENT THREATS


2022
SPECIAL
REPORT
COVID-19
U.S. IMPACT ON ANTIMICROBIAL RESISTANCE

IMPACT OF COVID-19 ON AMR

- The U.S. lost progress in combating AMR in 2020 due, in large part, to effects of COVID-19 pandemic
- During the first year of the pandemic, more than 29,400 people died from AMR infections
- Nearly 40% of the people got the infection while they were in the hospital



IMPACT OF COVID-19 ON ANTIBIOTIC USE

- Hospitals:
  - From March 2020 to October 2020, almost 80% of patients hospitalized with COVID-19 received an antibiotic
  - Increase use of ceftriaxone and azithromycin was observed which reflected difficulties in distinguishing COVID-19 from Community-Acquired Pneumonia (CAP)

IMPACT OF COVID-19 ON ANTIBIOTIC USE

- Nursing Homes:
  - Antibiotic use spiked alongside surges of COVID-19 cases but remained lower overall
  - Azithromycin use was 150% higher in April 2020 and 82% higher in December 2020 than the same months in 2019
  - In 2021, antibiotic use overall was, on average, 5% lower than 2019 likely due to fewer nursing home residents during this time.

ANTIMICROBIAL RESISTANCE THREATS in the United States, 2021-2022

CDC used new data[1] to analyze the U.S. burden of the following antimicrobial-resistant pathogens typically found in healthcare settings:

Carbapenem-resistant Enterobacterales (CRE)

Carbapenem-resistant *Acinetobacter*

Candida auris (*C. auris*)

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Vancomycin-resistant Enterococcus (VRE)

Extended-spectrum beta-lactamase (ESBL)-producing Enterobacterales

Multidrug-resistant (MDR) *Pseudomonas aeruginosa*

CDC previously reported that the burden of these pathogens increased in the United States in 2020 in the COVID-19 Impact Report. The information below describes the burden in the two following years, 2021 and 2022, and compares against 2019 data.

AMR THREATS IN THE U.S., 2021-2022

Six bacterial antimicrobial-resistant hospital-onset infections increased by a combined 20%, peaking in 2021, and remaining above pre-pandemic levels in 2022

In 2022, rates for all but one of these pathogens (MRSA) remained above pre-pandemic levels

Number of reported clinical cases of Candida auris increased nearly five-fold from 2019 to 2022

	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

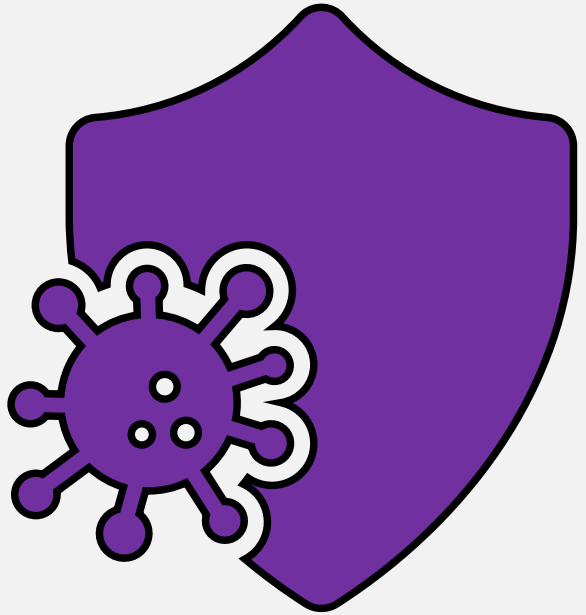
* Threat level for each pathogen, as categorized in CDC's *Antibiotic Resistance Threats in the United States, 2019*.

** 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.

ACTIONS AGAINST AMR

- Supported by American Rescue Plan Act funding, health departments invested in proven strategies and initiatives including:
  - More than 9,000 prevention-based infection control assessments in healthcare facilities
  - More than 5,300 outbreak responses to novel multidrug-resistant germs
  - More than 90,000 healthcare workers trained in infection prevention and control



HEALTH DEPARTMENTS COMBAT AMR

- Participating in CDC's Antimicrobial Resistance Laboratory Network by submitting isolates
- Supporting local responses to prevent spread
- Supporting aggressive responses to all usual resistance
- Working with local partners and healthcare facilities to track and prevent healthcare-associated, foodborne and community infections caused by AR germs
- Using data to improve antibiotic and antifungal use and keep them effective for life-threatening infections
- Leading or supporting improvements to antibiotics and antifungal use in people animals and plants

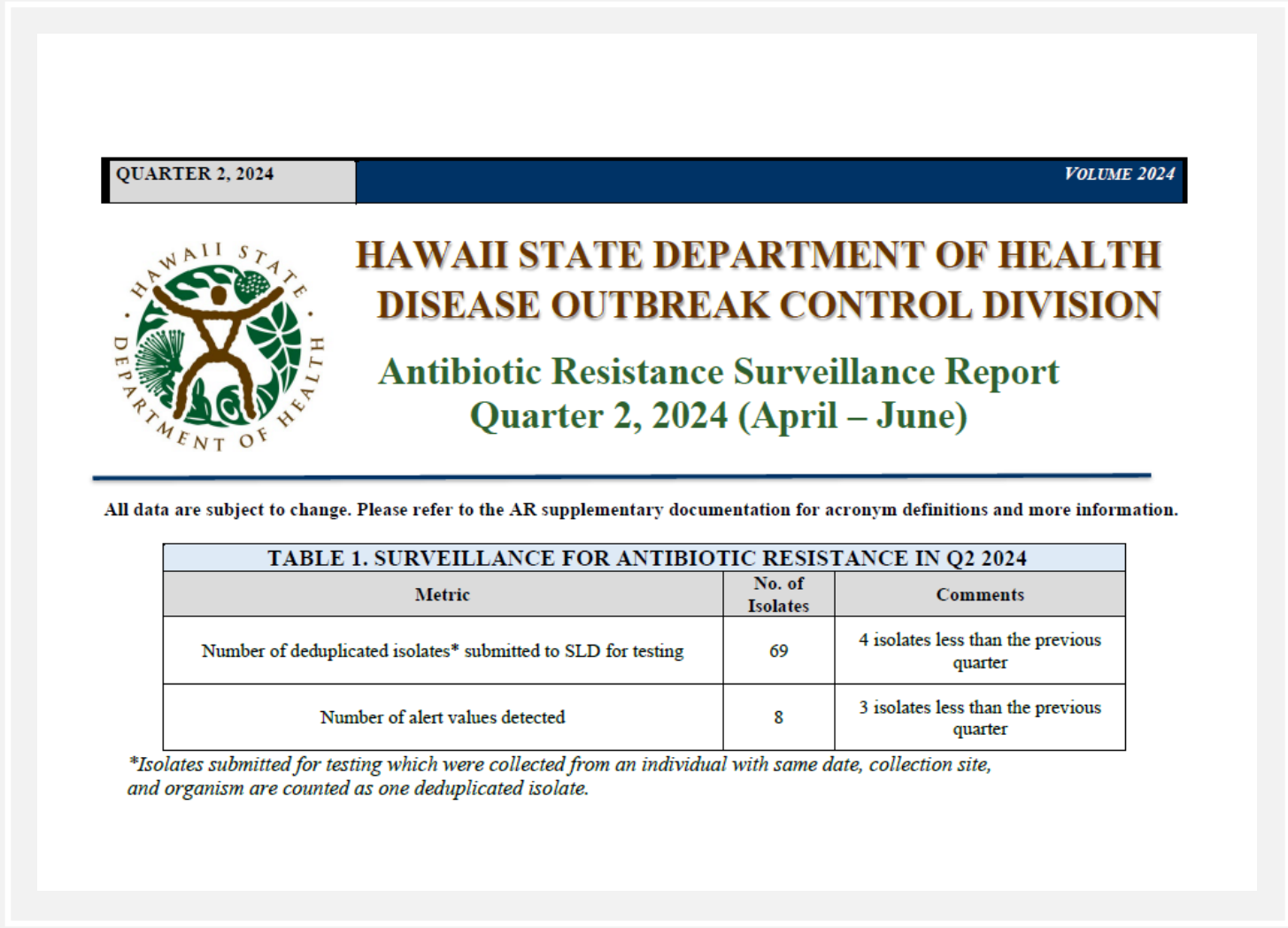
AMR IN PARADISE

AMR DETECTION AND SURVEILLANCE

- *Candida auris*
- CP-CRE, CP-CRPA, CP-CRAB
  - VIM
  - OXA
  - IMP
  - NDM
  - KPC

HAWAII HAI/AR PROGRAM QUARTERLY AR REPORT

- Report is organized by the AR Epidemiologist, Isami Freeman
- Released on a quarterly cadence and distributed to healthcare staff only
- Distributed with a supplementary document for AR surveillance



QUARTER 2, 2024 VOLUME 2024

HAWAII STATE DEPARTMENT OF HEALTH
DISEASE OUTBREAK CONTROL DIVISION

Antibiotic Resistance Surveillance Report
Quarter 2, 2024 (April – June)

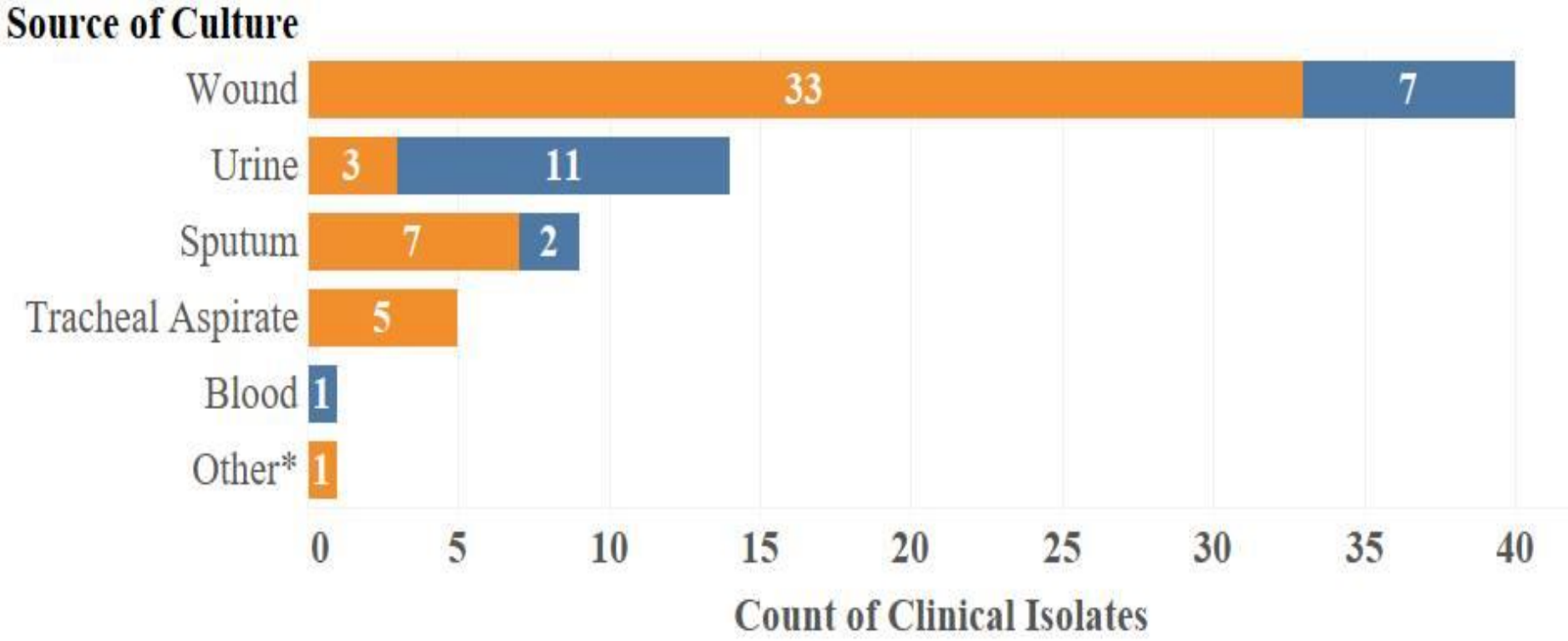
All data are subject to change. Please refer to the AR supplementary documentation for acronym definitions and more information.

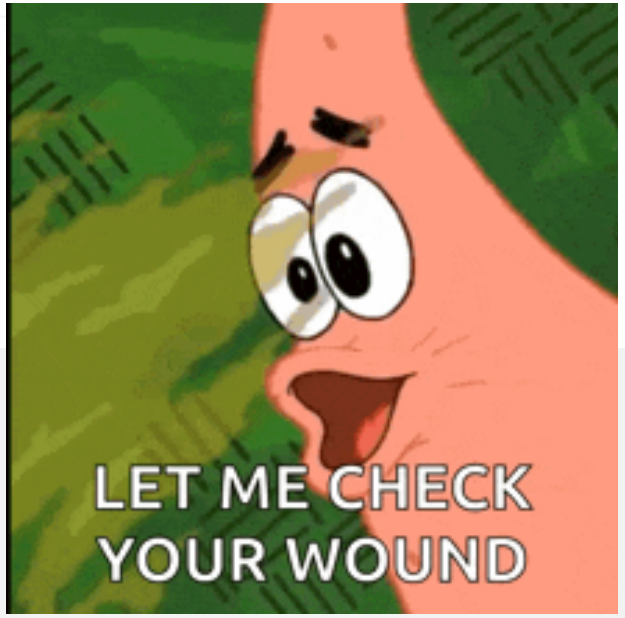
TABLE 1. SURVEILLANCE FOR ANTIBIOTIC RESISTANCE IN Q2 2024

Metric	No. of Isolates	Comments
Number of deduplicated isolates* submitted to SLD for testing	69	4 isolates less than the previous quarter
Number of alert values detected	8	3 isolates less than the previous quarter

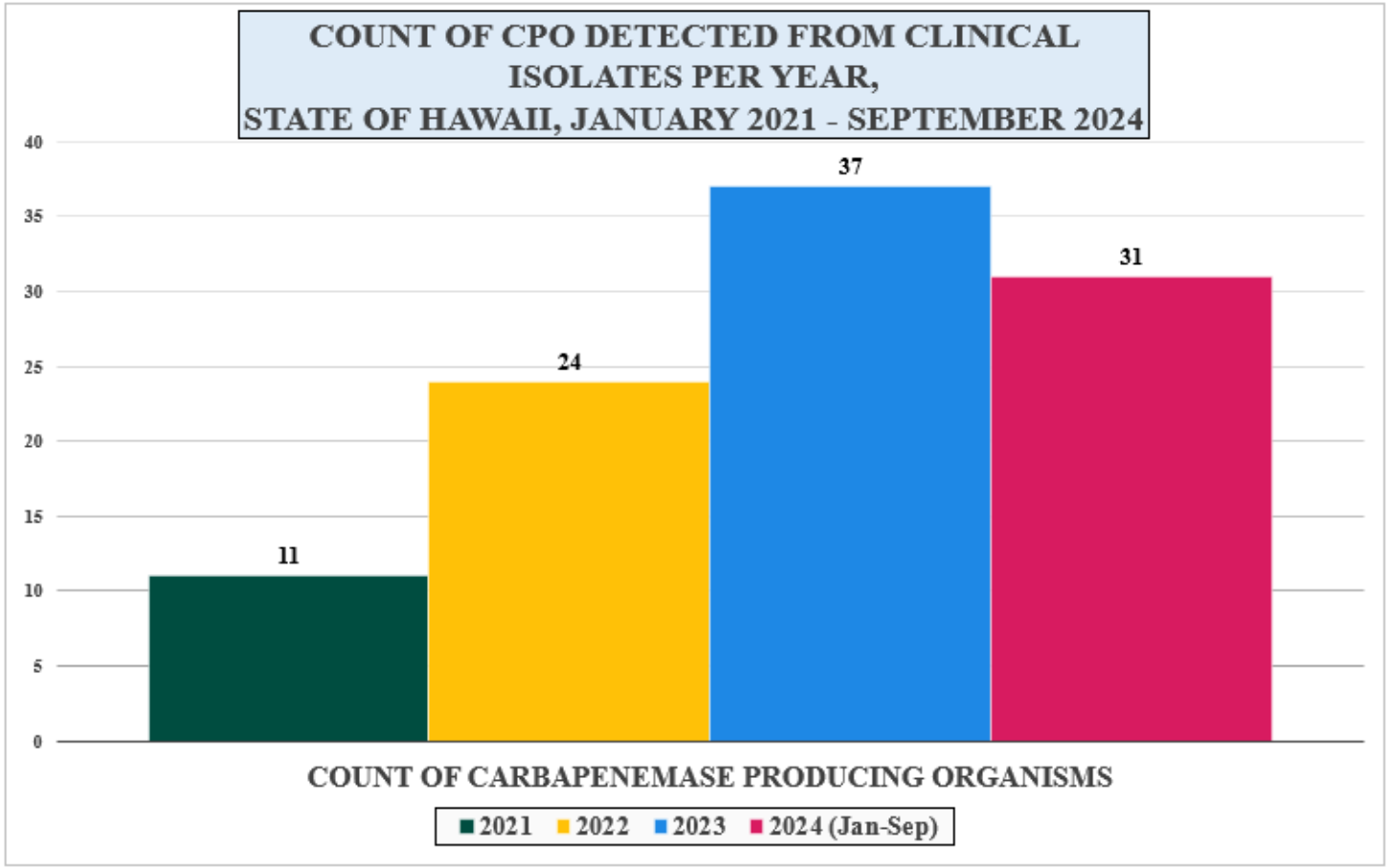
Isolates submitted for testing which were collected from an individual with same date, collection site, and organism are counted as one deduplicated isolate.

SPECIMEN COLLECTION SITE OF CRO ISOLATES SENT TO HAWAII SLD, Q3 2024





AMR IN HAWAII



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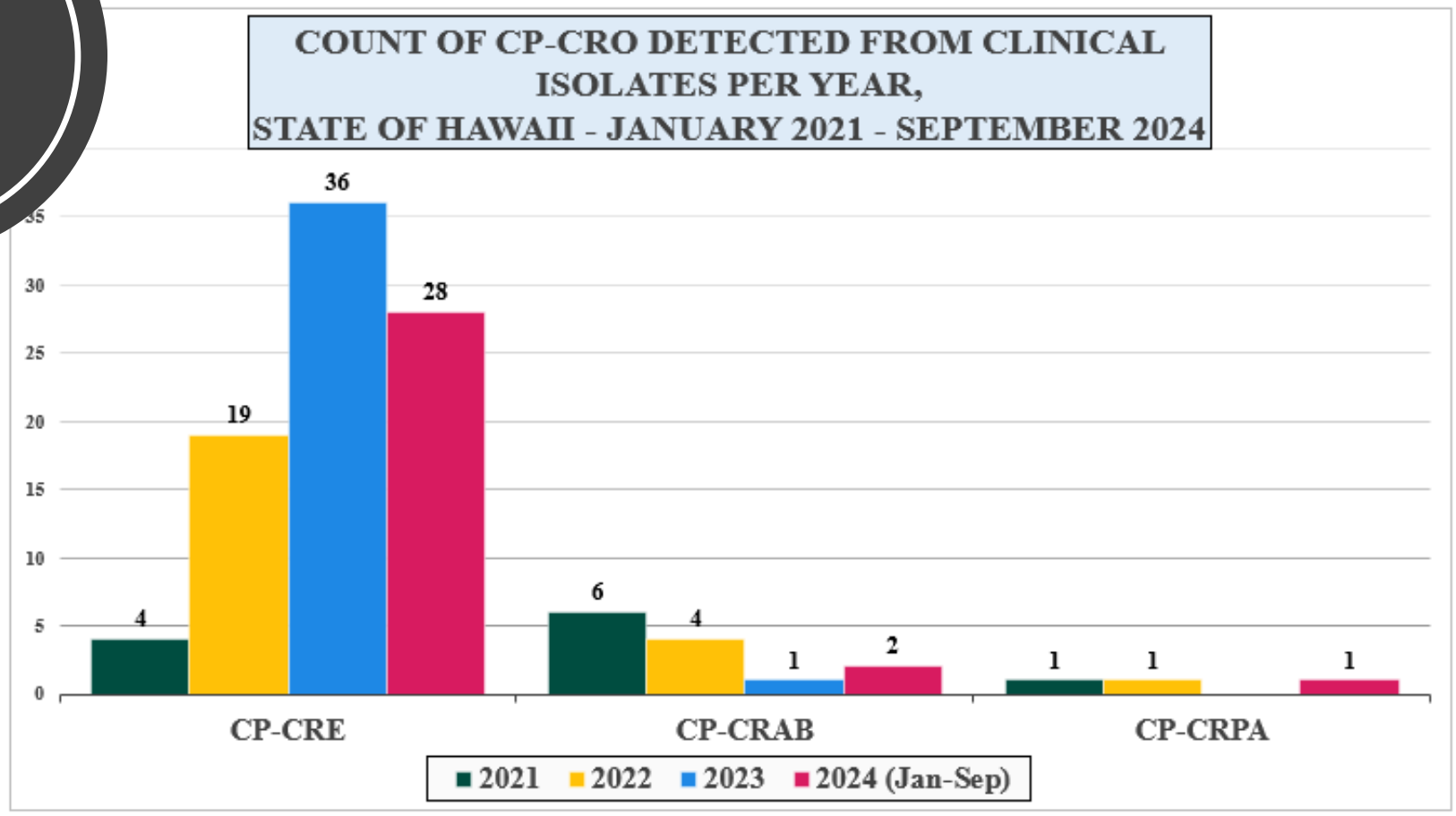
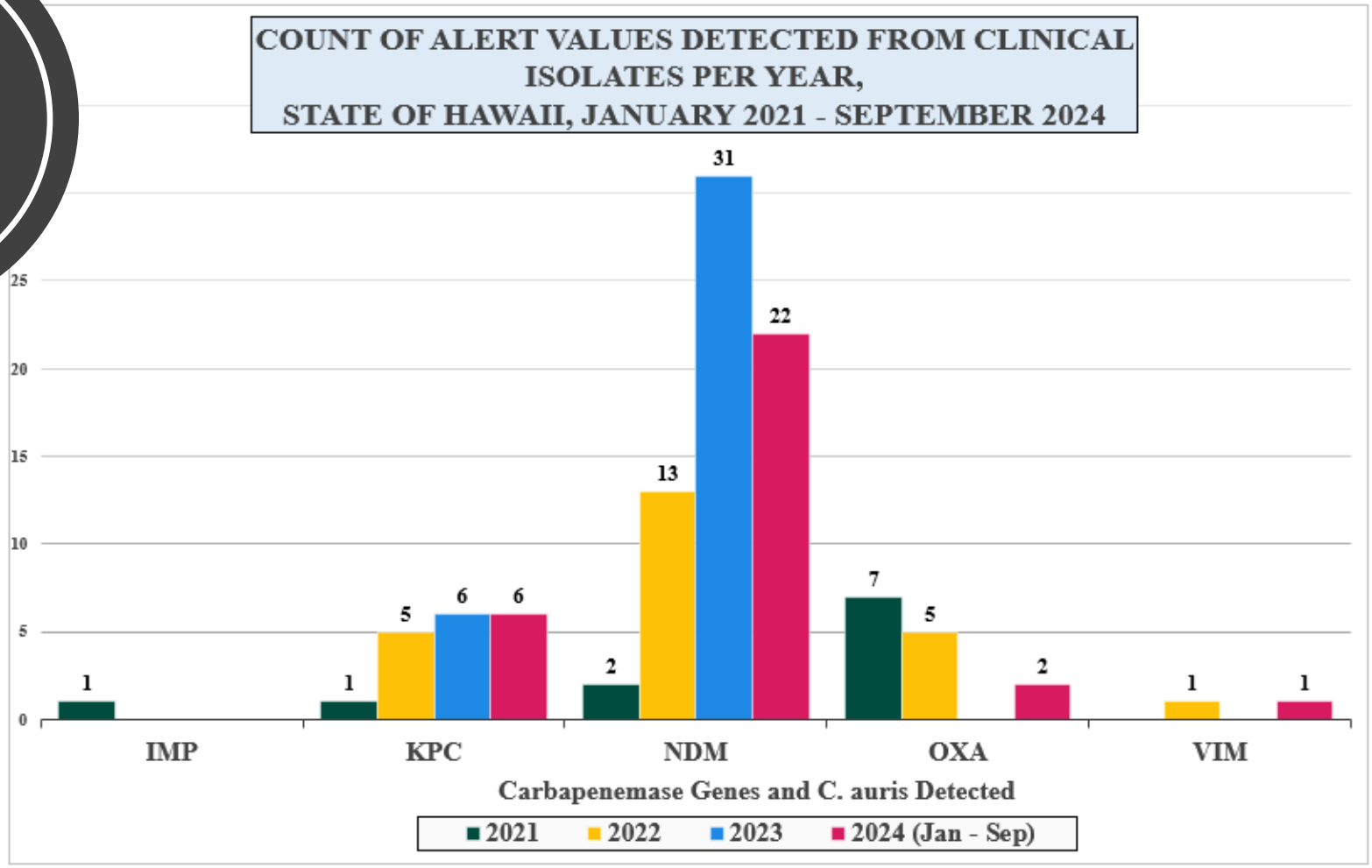


AMR IN HAWAII



CDC AR THREATS REPORT - 2019
URGENT THREATS

AMR IS CLOSER THAN YOU THINK…

Wound Culture with Gram stain(cent)

Report Status	FINAL
Gram Stain:	
NO ORGANISMS SEEN	
NO WBCS SEEN	
Culture	3+ ACINETOBACTER BAUMANNII
SENSITIVITY VERIFIED BY REPEAT ANALYSIS	

Microbiology Susceptibility Panel 1

Amikacin	R	Ampicillin/Sulbactam	R
Cefepime	R	Ceftazidime	R
Ceftriaxone	R	Ciprofloxacin	R
Gentamicin	R	Imipenem	R
Levofloxacin	R	Piperacillin/Tazobactam	R
Tobramycin	R	Trimeth/Sulfa	R

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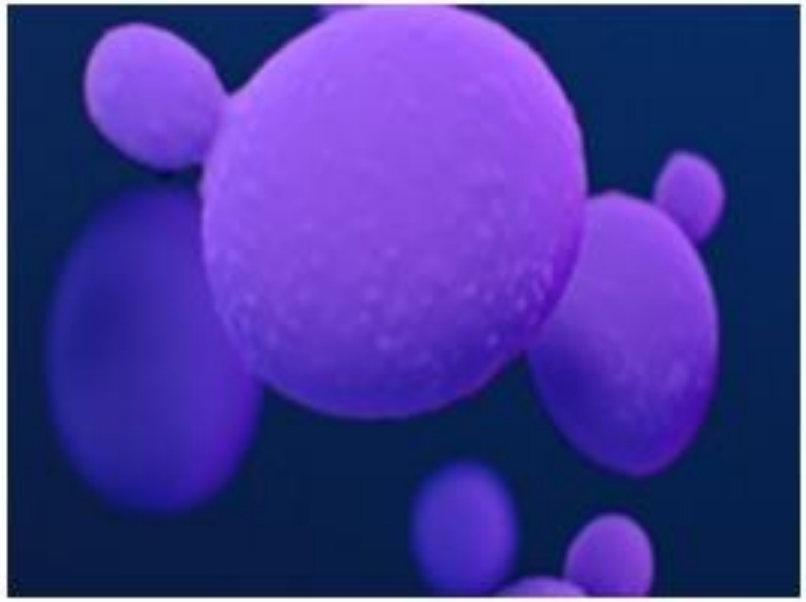
Tobramycin	R	Trimeth/Sulfa	R

EXPANDED SUSCEPTIBILITY TEST

Susceptibility by Broth Microdilution

Analyte/Drug	Value	Units	Results/Interpretation
Amikacin	>32	µg/mL	Resistant
Ampicillin	>16	µg/mL	No CLSI Interpretation
Ampicillin/Sulbactam	>16	µg/mL	Resistant
Aztreonam	>16	µg/mL	No CLSI Interpretation
Cefazolin	>16	µg/mL	No CLSI Interpretation
Cefepime	>16	µg/mL	Resistant
Ceftazidime	>16	µg/mL	Resistant
Ceftazidime/Avibactam	>16	µg/mL	No CLSI Interpretation
Ceftolozane/Tazobactam	>16	µg/mL	No CLSI Interpretation
Ceftriaxone	>32	µg/mL	Resistant
Ciprofloxacin	>2	µg/mL	Resistant
Ertapenem	>8	µg/mL	No CLSI Interpretation
Gentamicin	>8	µg/mL	Resistant
Imipenem	>8	µg/mL	Resistant
Levofloxacin	>8	µg/mL	Resistant
Meropenem	>8	µg/mL	Resistant
Minocycline	>8	µg/mL	Resistant
Nitrofurantoin	>64	µg/mL	No CLSI Interpretation
Piperacillin/Tazobactam	>64	µg/mL	Resistant
Tetracycline	>8	µg/mL	Resistant
Tigecycline	≤1	µg/mL	No CLSI Interpretation
Tobramycin	>8	µg/mL	Resistant
Trimetho/Sulfa	>2	µg/mL	Resistant

BRACE YOURSELVES

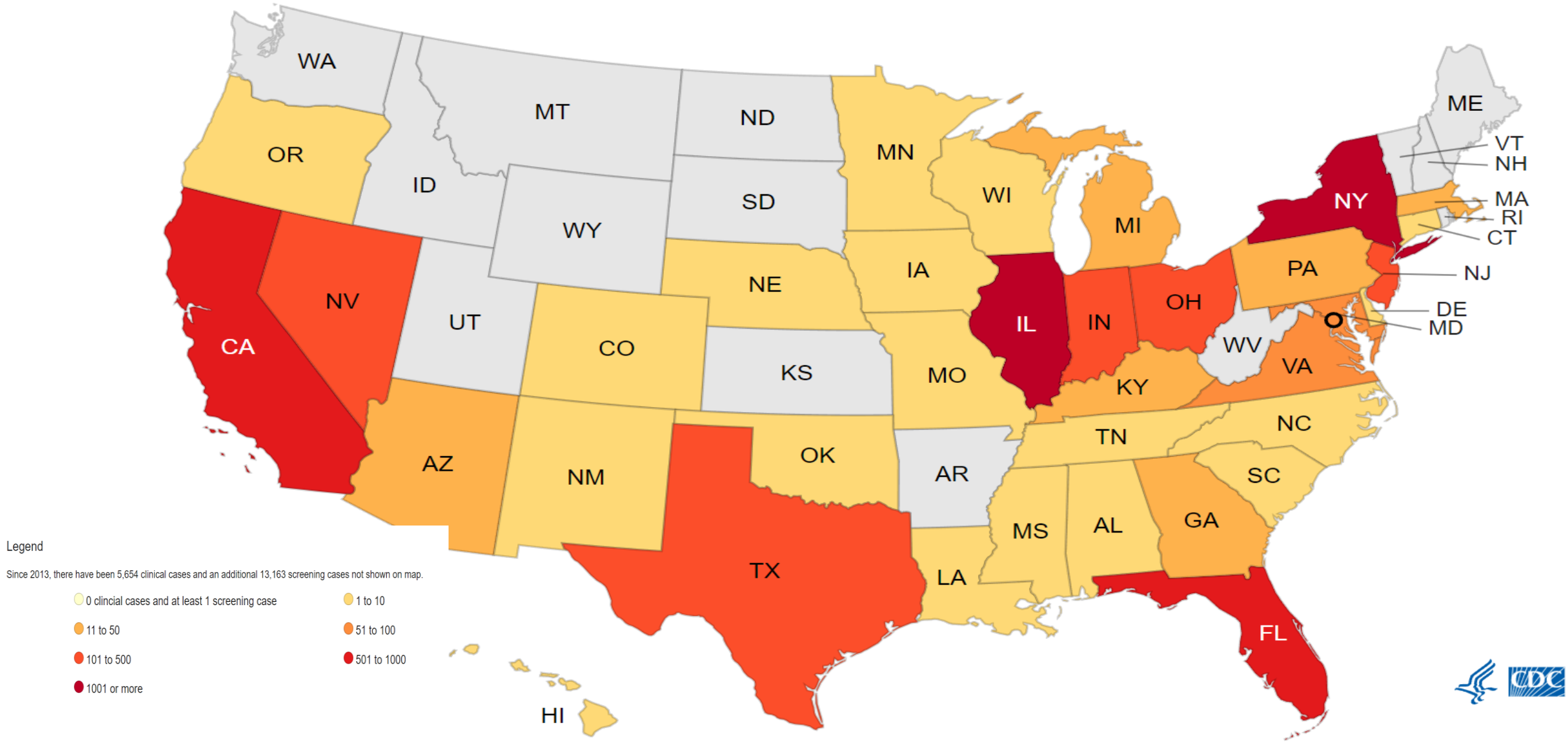


CANDIDA AURIS IS HERE

CDC AR THREATS REPORT - 2019
URGENT THREATS

Clinical Cases of *C. auris* Reported in the U.S.

All years



Legend

Since 2013, there have been 5,654 clinical cases and an additional 13,163 screening cases not shown on map.

- 0 clincial cases and at least 1 screening case
- 1 to 10
- 11 to 50
- 51 to 100
- 101 to 500
- 501 to 1000
- 1001 or more

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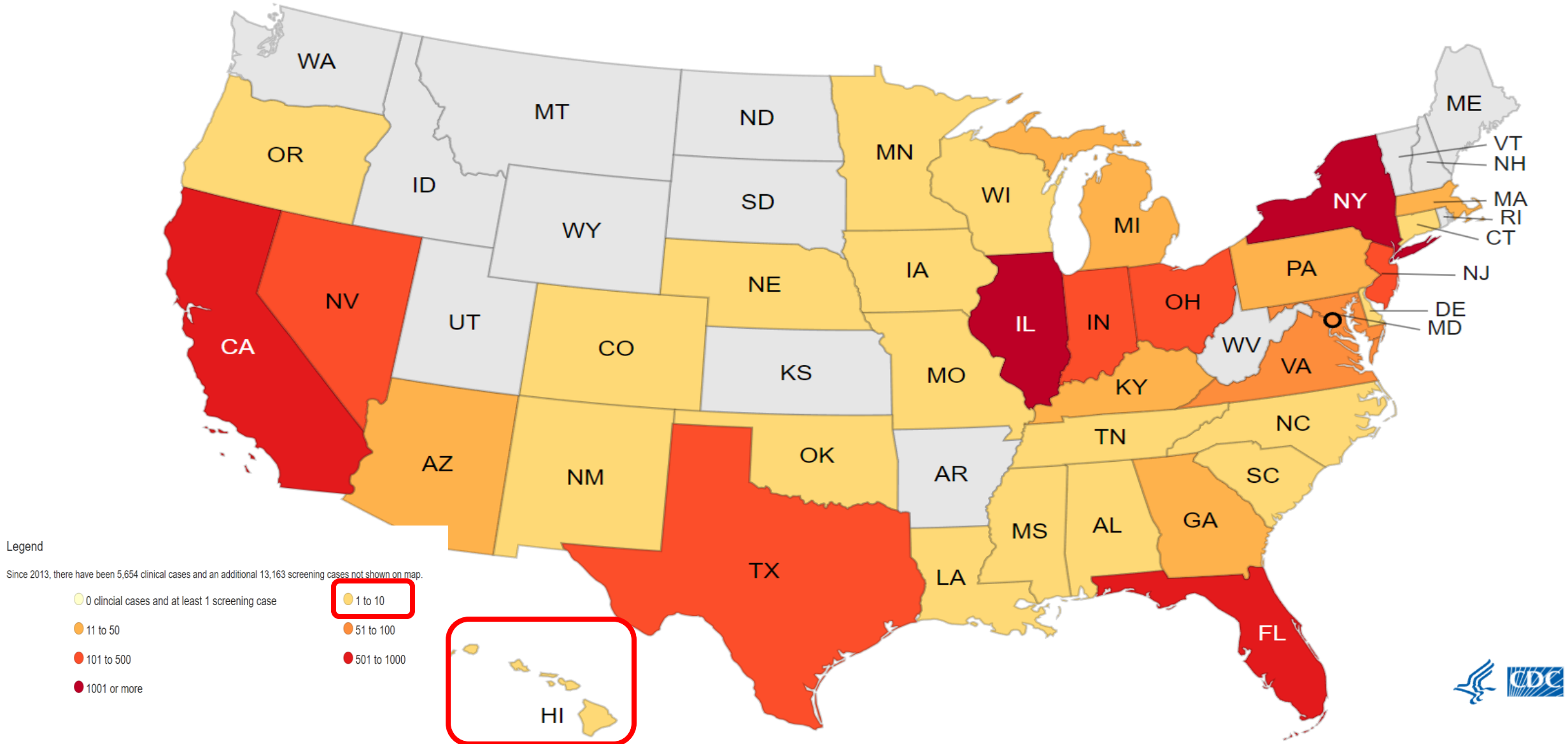

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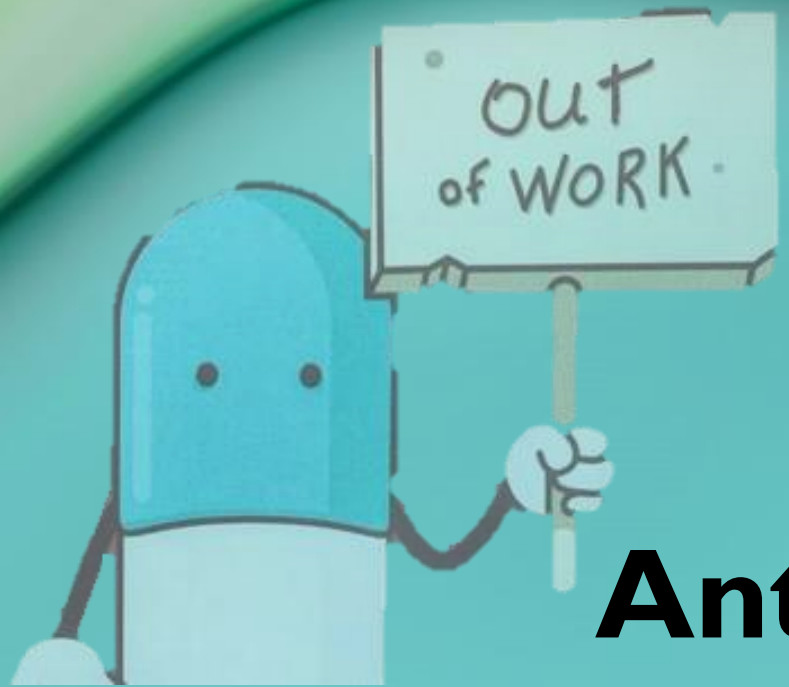
Antimicrobial Resistance



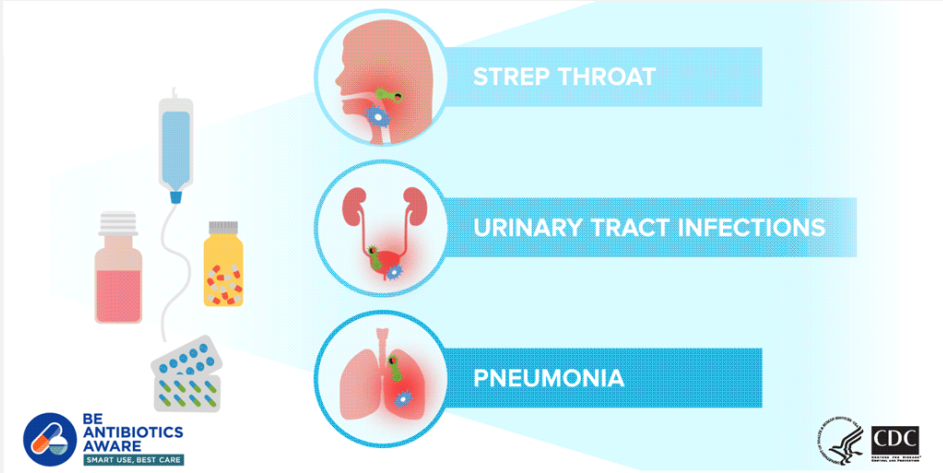
Antimicrobial Stewardship

ANTIMICROBIAL USE AND RESISTANCE

- Antimicrobials are drugs that kill germs called bacteria and stop their growth
- Anytime antimicrobials are used, they can cause side effects and contribute to antimicrobial resistance
- Reminder – Antibiotics aren't always the answer when you're sick!

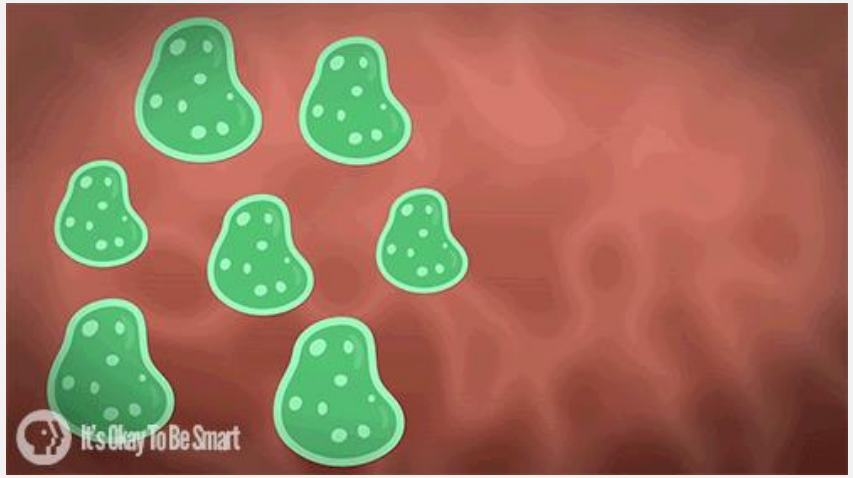
APPROPRIATE ANTIBIOTIC USE

- Unnecessary antibiotic use
  - Example: When a patient takes an antibiotic they don't need, like for colds and flu or for bacterial infections that don't always need antibiotics (i.e., sinus infections and some ear infections)
- Misuse of antibiotics
  - Example: When a person takes the wrong antibiotic, the wrong dose of an antibiotic or an antibiotic for the wrong length of time



WHY SHOULD I CARE?

- Poor Antimicrobial Stewardship → Antimicrobial Resistance
- Using antibiotics appropriately helps to combat AR and ensures these lifesaving drugs will be available in the future



The Joint Commission

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

WHY SHOULD I CARE?

AR infections require extended hospital stays, follow-up doctor visits, and costly and toxic alternative treatments

Too many antibiotics are being used unnecessarily and are misused, which threatens the effectiveness of these important drugs

If antimicrobials lose their effectiveness, we lose the ability to treat infections and control these public health threats

AR also impacts veterinary and agriculture industries

IDSA
Infectious Diseases Society of America

SHEA
The Society for Healthcare Epidemiology of America

The Joint Commission

SIDP
SOCIETY OF INFECTIOUS DISEASES PHARMACISTS

ashp
pharmacists advancing healthcare®

WHAT IS ANTIMICROBIAL STEWARDSHIP?

- The effort to measure and improve how antibiotics are being prescribed by clinicians and used by patients
- CDC's Core Elements of Antimicrobial Stewardship guide efforts to improve antibiotic use for providers and facilities

CDC CORE ELEMENTS FOR ANTIMICROBIAL STEWARDSHIP

Leadership Commitment
Dedicate human and financial resources for state and local health department antibiotic stewardship programs.

Accountability
Designate a leader or co-leaders, such as physician and pharmacist, responsible for the health department antibiotic stewardship program.

Stewardship Expertise
Ensure that the antibiotic stewardship program leader or co-leaders have expertise and experience implementing stewardship activities.

Action
Support the implementation of antibiotic stewardship activities by leveraging local partners or stewardship collaboratives.

Tracking
Monitor stewardship activities and antibiotic use data to inform and assess stewardship actions across the spectrum of health care.

Reporting
Report data on stewardship activities and antibiotic use to health department leadership, local partners, stewardship collaboratives, healthcare professionals and the public.

Education
Provide antibiotic stewardship education to healthcare professionals and the public to optimize antibiotic use.

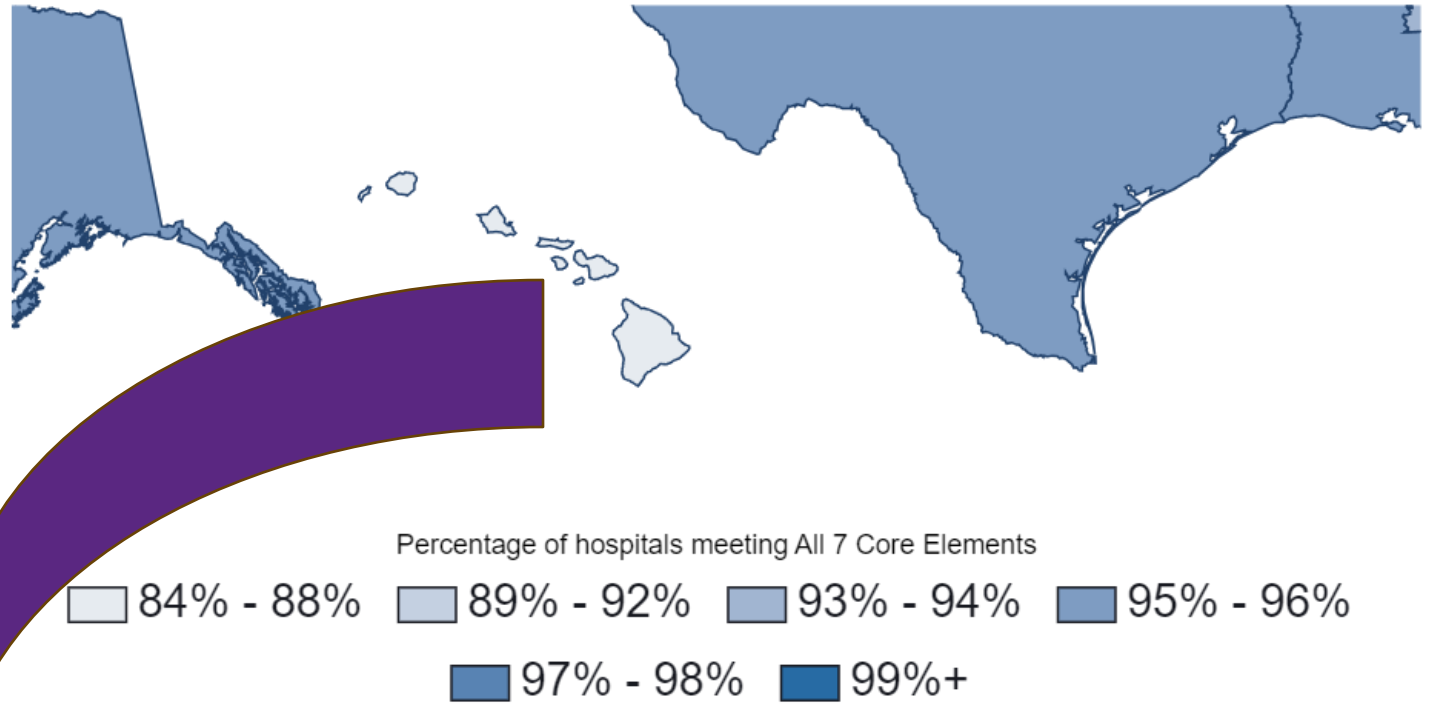
HOSPITAL ANTIBIOTIC STEWARDSHIP BY STATE

YEAR 2022

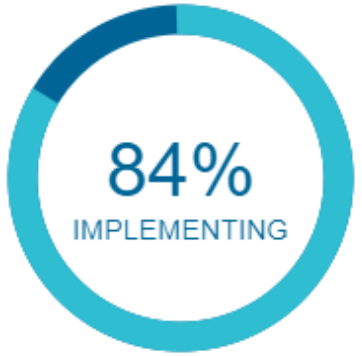
CORE ELEMENT ALL 7 CORE ELEMENTS

This map shows the variation by state in the percentage of U.S. hospitals that report implementation of CDC's Core Elements of hospital antibiotic stewardship programs by year. Implementation of the Core Elements is visualized in this graphic by aggregating acute care hospital responses to the NHSN Annual Hospital Survey by state. Each hospital answers questions related to antibiotic stewardship and responses are later mapped to the seven Core Elements: leadership commitment, accountability, pharmacy expertise, action, tracking, reporting, and education. Click on a state to see more information on that state's Core Element uptake.

HOSPITALS IMPLEMENTING ALL 7 CORE ELEMENTS IN 2022



HOSPITALS MEETING ALL 7 CORE ELEMENTS IN HAWAII



21 Hospitals Implementing

25 Hospitals Reporting

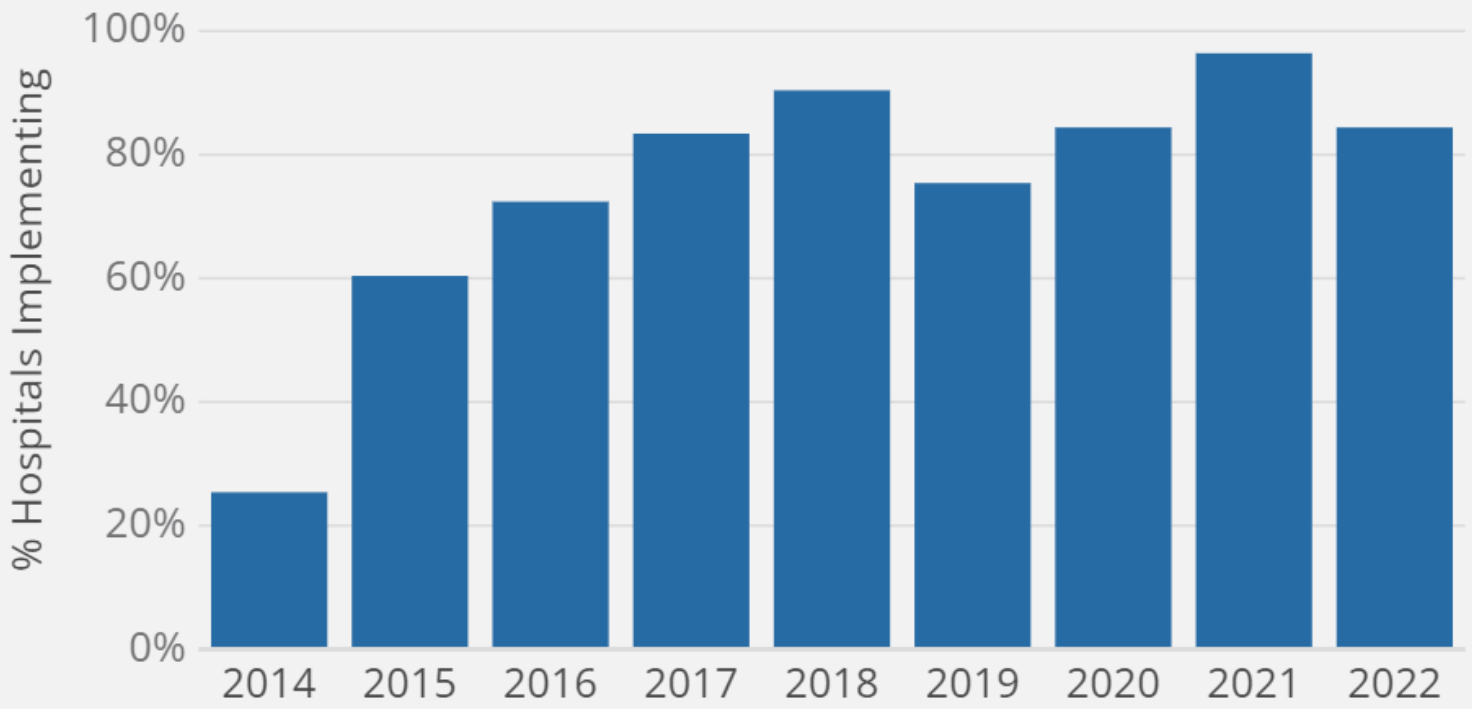
CHANGES OVER TIME IN HOSPITAL ANTIBIOTIC STEWARDSHIP (AS)

CORE ELEMENT ALL 7 CORE ELEMENTS

STATE HAWAII

This graphic shows the change over time from 2014 to 2022 in hospital implementation of antibiotic stewardship programs by state and Core Element.

HOSPITALS IMPLEMENTING ALL 7 CORE ELEMENTS IN HAWAII OVER TIME



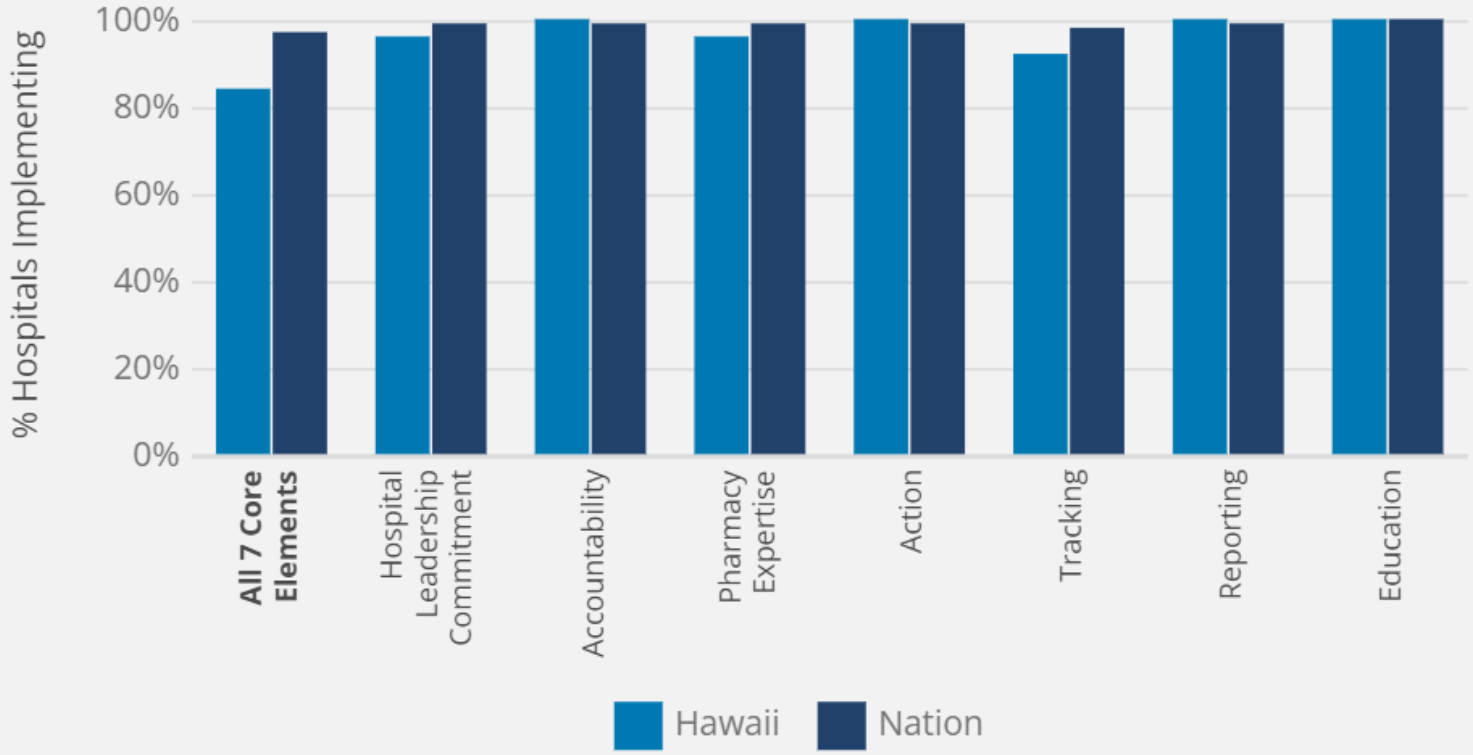
HOSPITAL ANTIBIOTIC STEWARDSHIP (AS) IMPLEMENTATION BY CORE ELEMENT

YEAR 2022

This graphic shows the percent of Hawaii and national hospitals that meet each of the seven core elements in 2022.

Visit the Stewardship Profile to learn more about Antibiotic Stewardship reporting.

HOSPITAL STEWARDSHIP CORE ELEMENT REPORTING IN HAWAII IN 2022

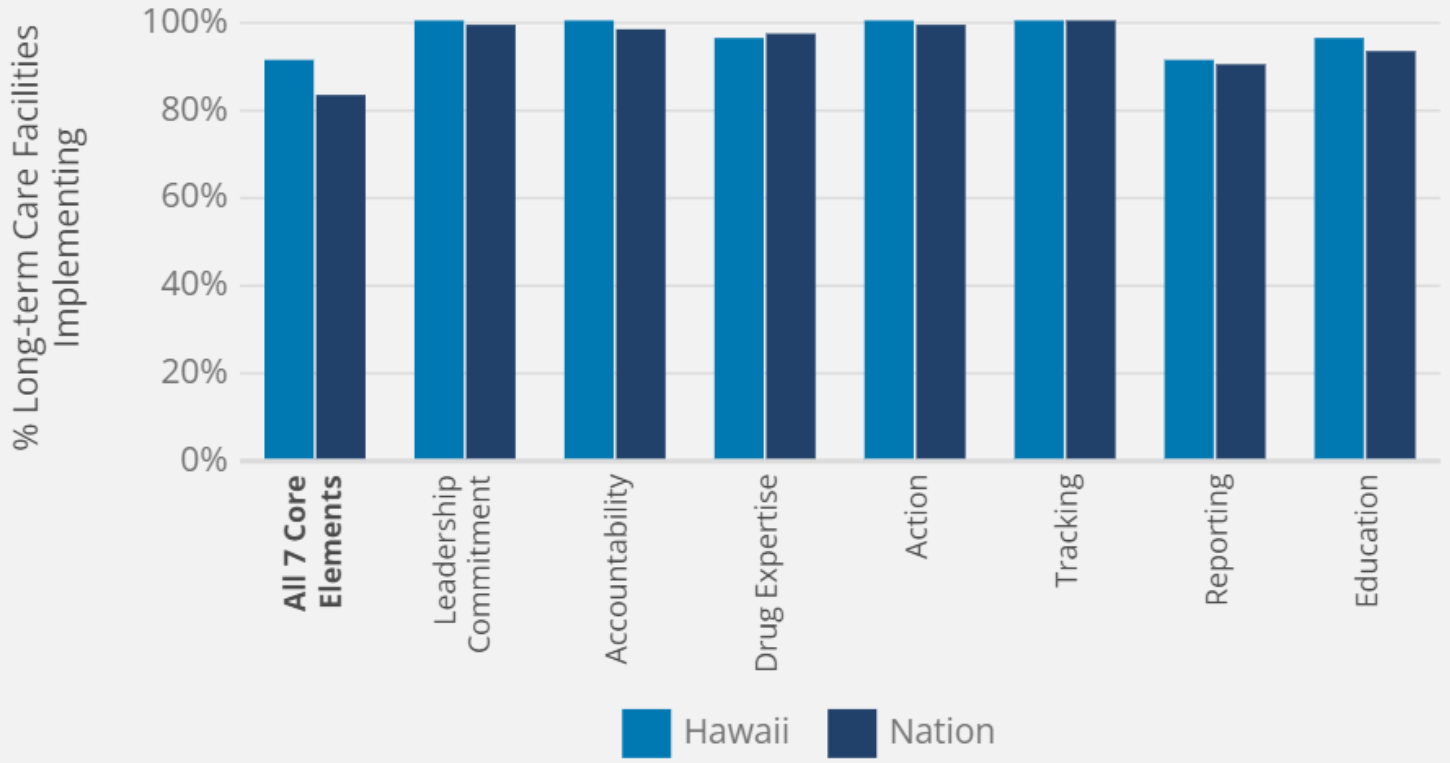


LONG-TERM CARE ANTIBIOTIC STEWARDSHIP (AS) IMPLEMENTATION BY CORE ELEMENT

YEAR 2022

This graphic shows the percent of long-term care facilities that report the implementation of each core element of antibiotic stewardship in 2022. Hover over a bar in the graphic to see the percentage of long-term care facilities reporting the implementation of each core element.

LONG-TERM CARE CORE ELEMENT REPORTING IN HAWAII IN 2022



HAWAII ANTIMICROBIAL STEWARDSHIP COLLABORATIVE (HASC) SURVEY 2024

51 Survey Responses

- Acute Care Facilities – 21 Respondents
- LTCF/Outpatient Facilities – 30 Respondents

Acute Care Facilities

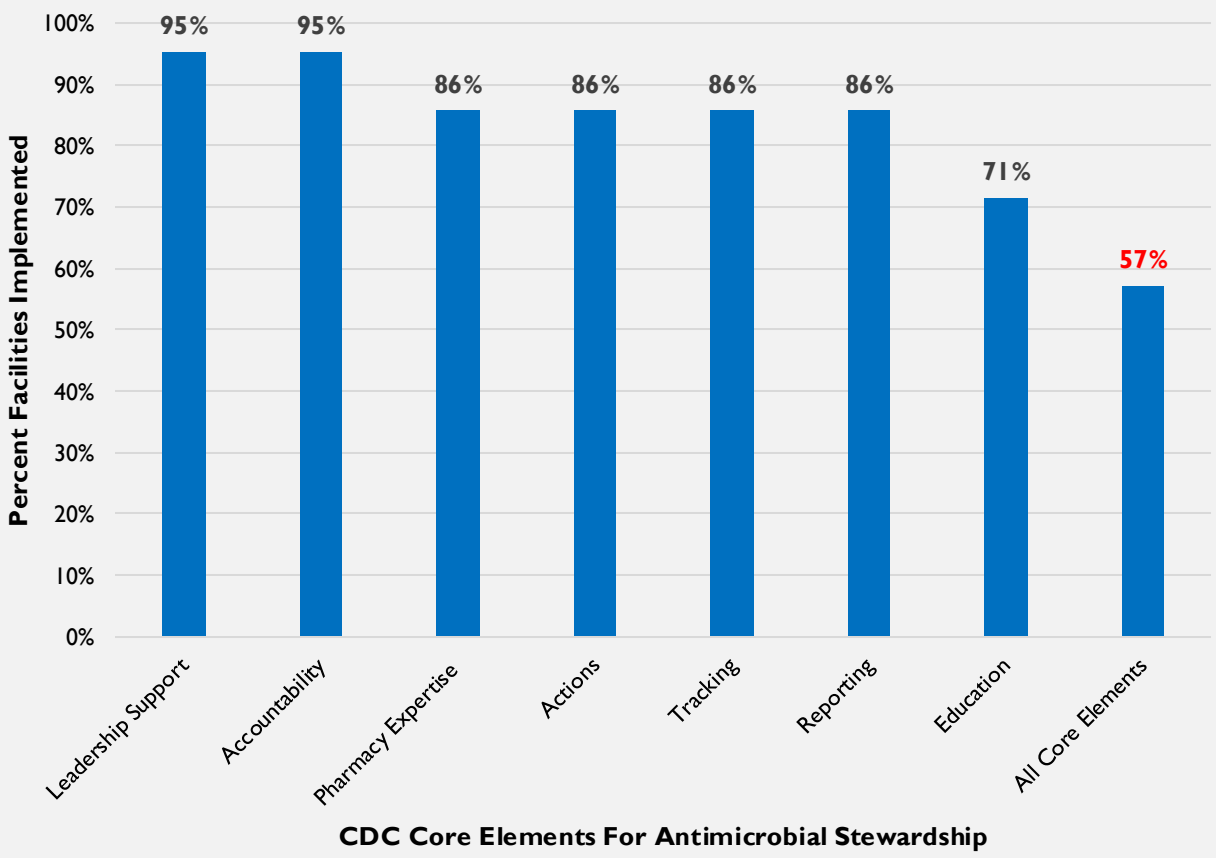
- 17/21 (81%) have staff devoted to ASP ≤50% of the time
- Most of these facilities (14/17) have staff devoted to ASP only 0-25% ☹

LTC/Outpatient Facilities

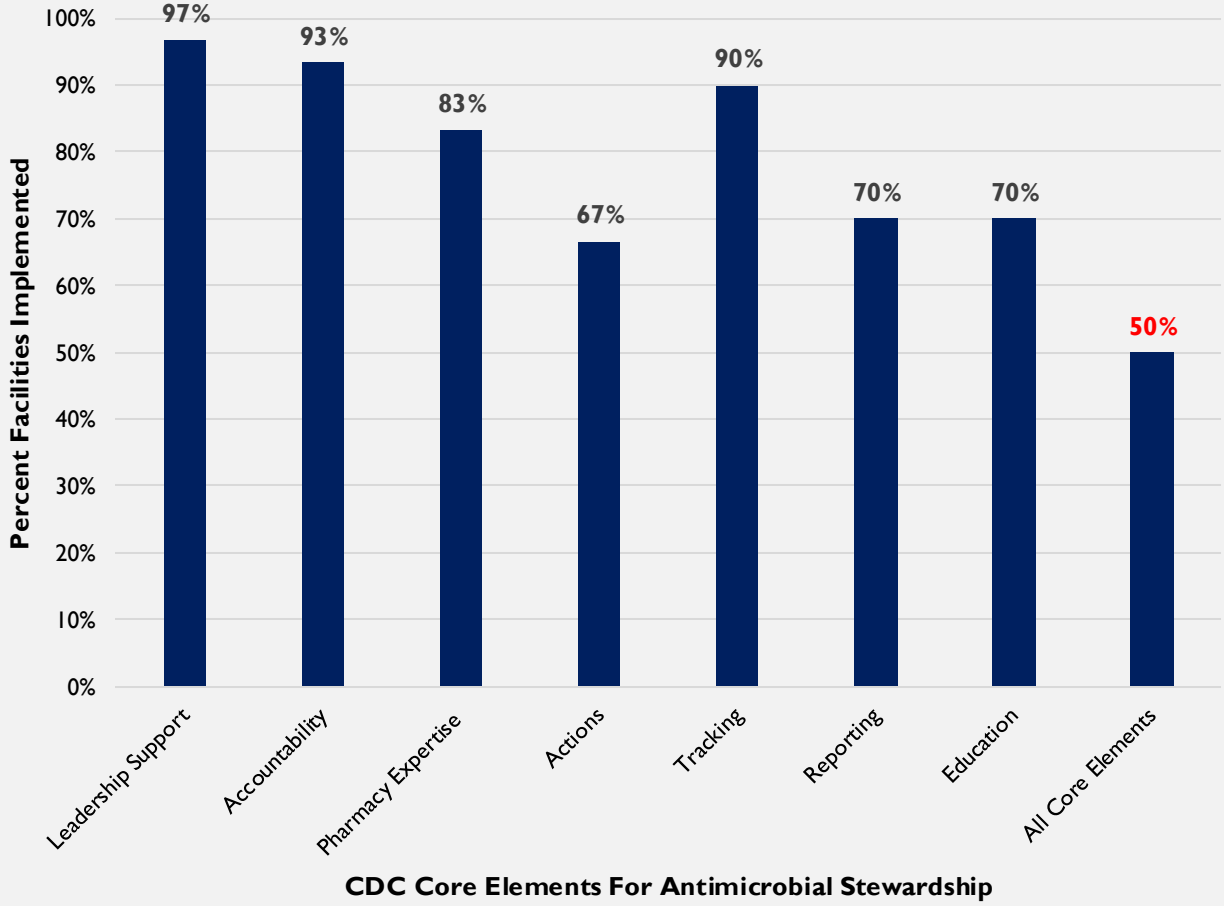
- 23/30 (77%) have staff devoted to ASP ≤50% of the time
- Half of these facilities (12/23) have staff devoted to ASP only 0-25% ☹

HASC SURVEY 2024
ASP CORE ELEMENTS IMPLEMENTATION

HASC **Acute Care** Facility Survey 2023 (N=21)



HASC **LTC/Outpatient** Facility Survey 2023 (N=30)



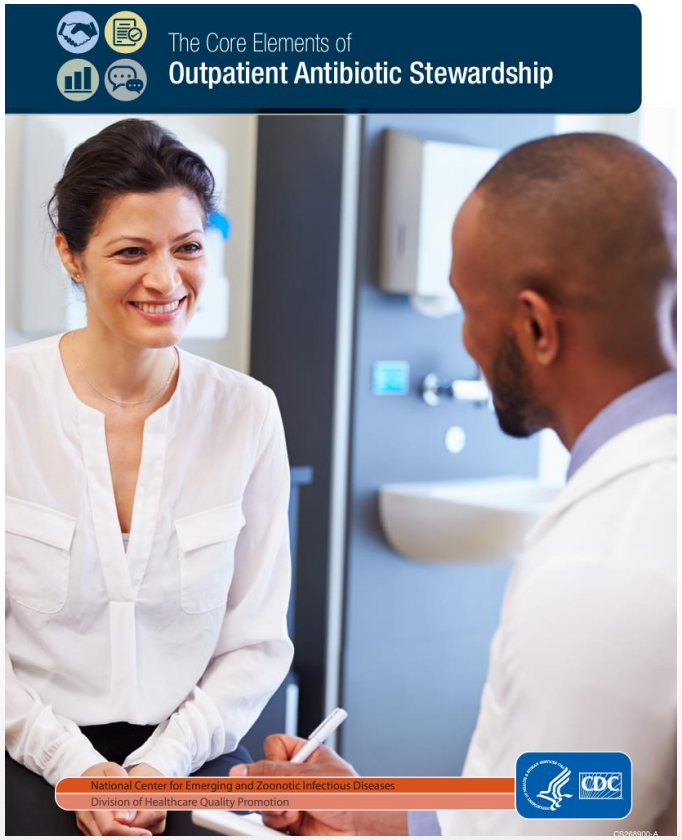
Accessible version: https://www.cdc.gov/antibiotic-use/core-elements/nursing-homes.html

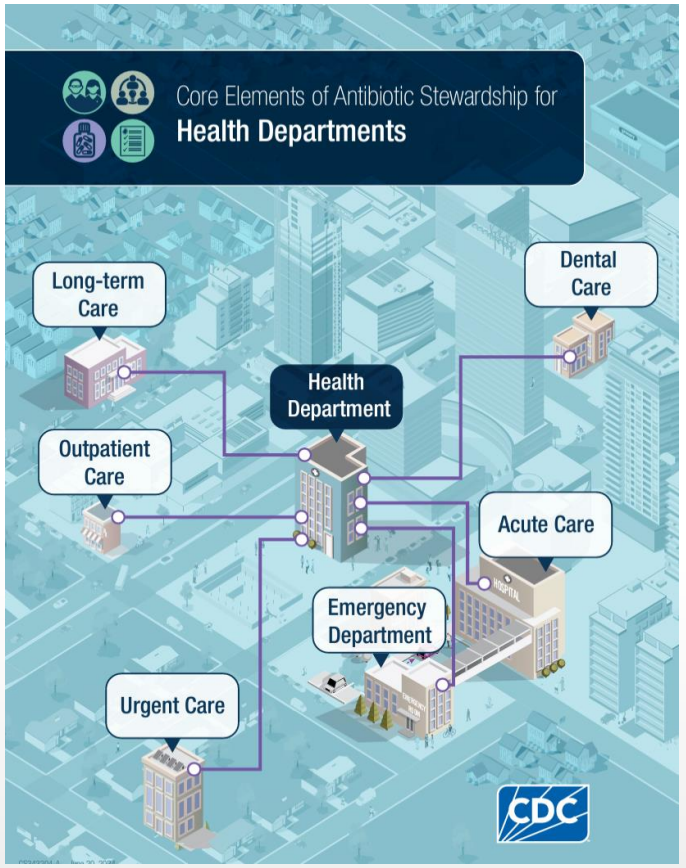
The Core Elements of Antibiotic Stewardship for Nursing Homes

The Core Elements of Hospital Antibiotic Stewardship Programs: 2019

Centers for Disease


Implementation of
Antibiotic Stewardship Core Elements
at Small and Critical Access Hospitals
AMBULANCE
MAIN ENTRANCE / EMERGENCY
American Hospital Association
HRSA
Federal Office of Rural Health Policy
PEW
CDC
Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases
Cover photo courtesy of Geisinger Jersey Shore Hospital


The Core Elements of
Outpatient Antibiotic Stewardship
National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion
CDC


Core Elements of Antibiotic Stewardship for
Health Departments
Long-term Care
Dental Care
Health Department
Outpatient Care
Acute Care
Emergency Department
Urgent Care
CDC

Accessible version: https://www.cdc.gov/antibiotic-use/core-elements/nursing-homes.html

The Core Elements of Antibiotic Stewardship for Nursing Homes

Leadership Commitment

Nursing home leaders commit to improving antibiotic use. Facility leadership, both owners and administrators, as well as regional and national leaders if the facility is part of a larger corporation, can demonstrate their support in the following ways:

Write statements in support of improving antibiotic use to be shared with staff, residents and families

Include stewardship-related duties in position descriptions for the medical director, clinical nurse leads, and consultant pharmacists in the facility

Communicate with nursing staff and prescribing clinicians the facility's expectations about use of antibiotics and the monitoring and enforcement of stewardship policies

Create a culture, through messaging, education, and celebrating improvement, which promotes antibiotic stewardship

Accountability

Nursing homes identify individuals accountable for the antibiotic stewardship activities who have the support of facility leadership:

Empower the medical director to set standards for antibiotic prescribing practices for all clinical providers credentialed to deliver care in a nursing home and be accountable for overseeing adherence. To be effective in this role, the medical director should review antibiotic use data (see Tracking and Reporting section) and ensure best practices are followed in the medical care of residents in the facility.[10]

Empower the director of nursing to set the practice standards for assessing, monitoring and communicating changes in a resident's condition by front-line nursing staff. Nurses and nurse aides play a key role in the decision-making process for starting an antibiotic. The knowledge, perceptions and attitudes among nursing staff of the role of antibiotics in the care of nursing home residents can significantly influence how information is communicated to clinicians who are deciding whether to initiate antibiotic therapy. Therefore the importance of antibiotic stewardship is conveyed by the expectations set by nursing leadership in the facility.

Engage the consultant pharmacist in supporting antibiotic stewardship oversight through quality assurance activities such as medication regimen review and reporting of antibiotic use data.

Nursing home antibiotic stewardship leads utilize existing resources to support antibiotic stewards' efforts by working with the following partners:

Infection prevention program coordinator

Infection prevention coordinators have key expertise and data to inform strategies to improve antibiotic use. This includes tracking of antibiotic starts, monitoring adherence to evidence-based published criteria[12,13] during the evaluation and management of treated infections, and reviewing antibiotic resistance patterns in the facility to understand which infections are caused by resistant organisms. When infection prevention coordinators have training, dedicated time, and resources to collect and analyze infection surveillance data, this information can be used to monitor and support antibiotic stewardship activities.

Consultant laboratory

Nursing homes contracting laboratory services can request reports and services to support antibiotic stewardship activities. Examples of laboratory support for antibiotic stewardship include developing a process for alerting the facility if certain antibiotic-resistant organisms are identified, providing education for nursing home staff on the differences in diagnostic tests available for detecting various infectious pathogens (e.g., EIA toxin test vs. nucleic amplification tests for *C. difficile*), and creating a summary report of antibiotic susceptibility patterns from organisms isolated in cultures. These reports, also known as antibiograms, help inform empiric antibiotic selection (i.e., before culture results are available) and monitor for new or worsening antibiotic resistance.[14]

State and local health departments

Nursing homes benefit from the educational support and resources on antibiotic stewardship and infection prevention which are provided by the Healthcare-Associated Infection (HAI) Prevention programs at state and local health departments.

Drug Expertise

Nursing homes establish access to individuals with antibiotic expertise to implement antibiotic stewardship activities. Receiving support from infectious disease consultants and consultant pharmacists with training in antibiotic stewardship can help a nursing home reduce antibiotic use and experience lower rates of positive *C. difficile* tests.[11] Examples of establishing antibiotic expertise include:

Work with a consultant pharmacist who has received specialized infectious diseases or antibiotic stewardship training. Example training courses include the Making a Difference in Infectious Diseases (MAD-ID) antibiotic stewardship course (http://mad-id.org/antimicrobial-stewardship-programs/), and the Society for Infectious Diseases Pharmacists antibiotic stewardship certificate program (https://sidp.org/Stewardship-Certificate).

Partner with antibiotic stewardship program leads at the hospitals within your referral network.

Develop relationships with infectious disease consultants in your community interested in supporting your facility's stewardship efforts.

Take Action through Policy and Practice Change to Improve Antibiotic Use

Nursing homes implement prescribing policies and change practices to improve antibiotic use. The introduction of new policies and procedures which address antibiotic use should be done in a step-wise fashion so staff become familiar with and not overwhelmed by new changes in practice. Prioritize interventions based on the needs of your facility and share outcomes from successful interventions with nursing staff and clinical providers. Below are brief descriptions of policy and practice changes. For more details, see *Appendix A: Policy and practice actions to improve antibiotic use.*

Policies that support optimal antibiotic use
Ensure that current medication safety policies, including medication regimen review, developed to address Centers for Medicare and Medicaid Services (CMS) regulations[15–17] are being applied to antibiotic prescribing and use.

Broad interventions to improve antibiotic use
Standardize the practices which should be applied during the care of any resident suspected of an infection or started on an antibiotic. These practices include improving the evaluation and communication of clinical signs and symptoms when a resident is first suspected of having an infection, optimizing the use of diagnostic testing, and implementing an antibiotic review process, also known as an "antibiotic time-out," for all antibiotics prescribed in your facility. Antibiotic reviews provide clinicians with an opportunity to reassess the ongoing need for and choice of an antibiotic when the clinical picture is clearer and more information is available.

Pharmacy interventions to improve antibiotic use
Integrate the dispensing and consultant pharmacists into the clinical care team as key partners in supporting antibiotic stewardship in nursing homes. Pharmacists can provide assistance in ensuring antibiotics are ordered appropriately, reviewing culture data, and developing antibiotic monitoring and infection management guidance in collaboration with nursing and clinical leaders.

Infection and syndrome specific interventions to improve antibiotic use
Identify clinical situations which may be driving inappropriate courses of antibiotics such as asymptomatic bacteriuria or urinary tract infection prophylaxis[18,19] and implement specific interventions to improve use.

Tracking and Reporting Antibiotic Use and Outcomes

Nursing homes monitor both antibiotic use practices and outcomes related to antibiotics in order to guide practice changes and track the impact of new interventions. Data on adherence to antibiotic prescribing policies and antibiotic use are shared with clinicians and nurses to maintain awareness about the progress being made in antibiotic stewardship. Clinician response to antibiotic use feedback (e.g., acceptance) may help determine whether feedback is effective in changing prescribing behaviors. Below are examples of antibiotic use and outcome measures. For more details, see *Appendix B: Measures of antibiotic prescribing, use and outcomes*.

Process measures: Tracking how and why antibiotics are prescribed

Perform reviews on resident medical records for new antibiotic starts to determine whether the clinical assessment, prescription documentation and antibiotic selection were in accordance with facility antibiotic use policies and practices. When conducted over time, monitoring process measures can assess whether antibiotic prescribing policies are being followed by staff and clinicians.

Antibiotic use measures: Tracking how often and how many antibiotics are prescribed

Track the amount of antibiotic used in your nursing home to review patterns of use and determine the impact of new stewardship interventions. Some antibiotic use measures (e.g., prevalence surveys) provide a snap-shot of information; while others, like nursing home initiated antibiotic starts and days of therapy (DOT) are calculated and tracked on an ongoing basis.[20,21] Selecting which antibiotic use measure to track should be based on the type of practice intervention being implemented. Interventions designed to shorten the duration of antibiotic courses, or discontinue antibiotics based on post-prescription review (i.e., "antibiotic time-out"), may not necessarily change the rate of antibiotic starts, but would decrease the antibiotic DOT.

Antibiotic use data from nursing homes to improve antibiotic stewardship efforts is important both for individual facility improvements and for public health action. Expansion of electronic health records in nursing homes will allow for facilities to obtain systems which integrate pharmacy and laboratory data and make antibiotic use and resistance data to inform stewardship efforts more accessible to facility staff and leadership. CDC is working closely with many nursing home partners including providers, long-term care pharmacies, and professional organizations, to develop an Antibiotic Use (AU) reporting option for nursing homes within the CDC's National Healthcare Safety Network (NHSN). The NHSN AU option allows for standardized antibiotic use data, submitted electronically, to be aggregated and summarized for developing facility-adjusted national benchmarks.

Antibiotic outcome measures: Tracking the adverse outcomes and costs from antibiotics

Monitor clinical outcomes such as rates of *C. difficile* infections, antibiotic-resistant organisms or adverse drug events to demonstrate that antibiotic stewardship activities are successful in improving patient outcomes. Nursing homes already tracking these clinical outcomes for their infection prevention program can submit data on *C. difficile* and selected antibiotic-resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenem-resistant *Enterobacteriaceae* (CRE) into the CDC's NHSN Laboratory-identified event reporting module for long-term care facilities.

Education

Nursing homes provide antibiotic stewardship education to clinicians, nursing staff, residents and families. Effective educational programs address both nursing staff and clinical providers on the goal of an antibiotic stewardship intervention, and the responsibility of each group for ensuring its implementation.[3,22] There are a variety of mechanisms for disseminating antibiotic education to nursing home staff including flyers, pocket-guides, newsletters or electronic communications; however, interactive academic detailing (e.g., face-to-face interactive workshops) has the strongest evidence for improving medication prescribing practices.[23]

Nursing homes sustain improvements by incorporating both education and feedback to providers. One nursing home antibiotic stewardship intervention demonstrated a sustained reduction in antibiotic use for two years after the intervention by linking education with feedback on physician prescribing practices.[24] Another study showed a 64% reduction in inappropriate antibiotic use (i.e., prescriptions which did not adhere to guidelines), by providing feedback on individual physician prescribing practices and adherence to the guidelines over 12 months.[25]

Nursing homes engage residents and their family members in antibiotic use and stewardship educational efforts to ensure clinicians have their support to make appropriate antibiotic use decisions. Working with residents and families will reduce the perception that their expectations may be a barrier to improving antibiotic use in nursing homes.[26,27]

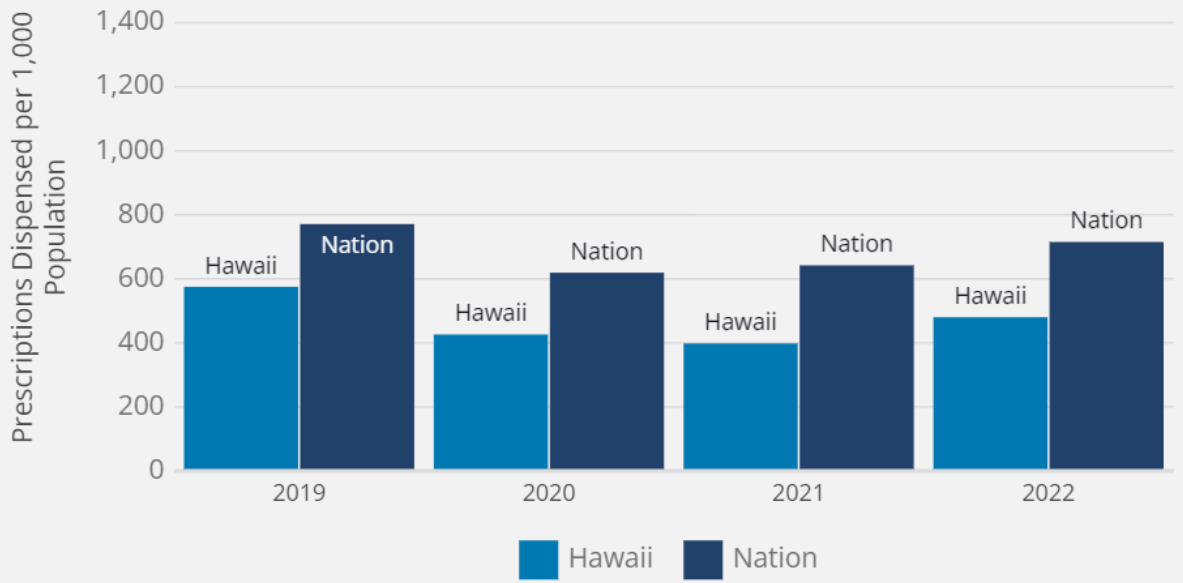
ANTIBIOTIC USE: OUTPATIENT FACILITY HAWAII, 2022

CHANGES OVER TIME IN OUTPATIENT ANTIBIOTIC PRESCRIPTION RATES

All antibiotics | Select antibiotics

This graph shows the changes over time of outpatient antibiotic prescriptions for all antibiotic classes dispensed per 1,000 population in Hawaii, compared to national data.

CHANGES OVER TIME IN OUTPATIENT ANTIBIOTIC PRESCRIPTION RATES (ALL ANTIBIOTICS)

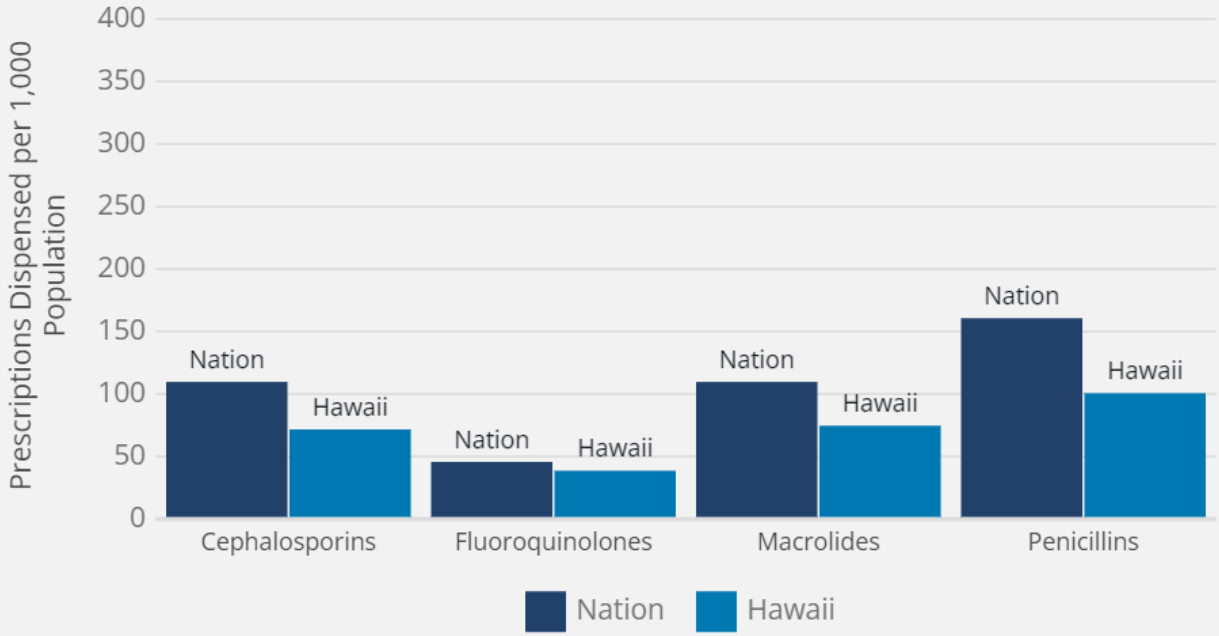


OUTPATIENT ANTIBIOTIC PRESCRIPTION RATES BY ANTIBIOTIC CLASS

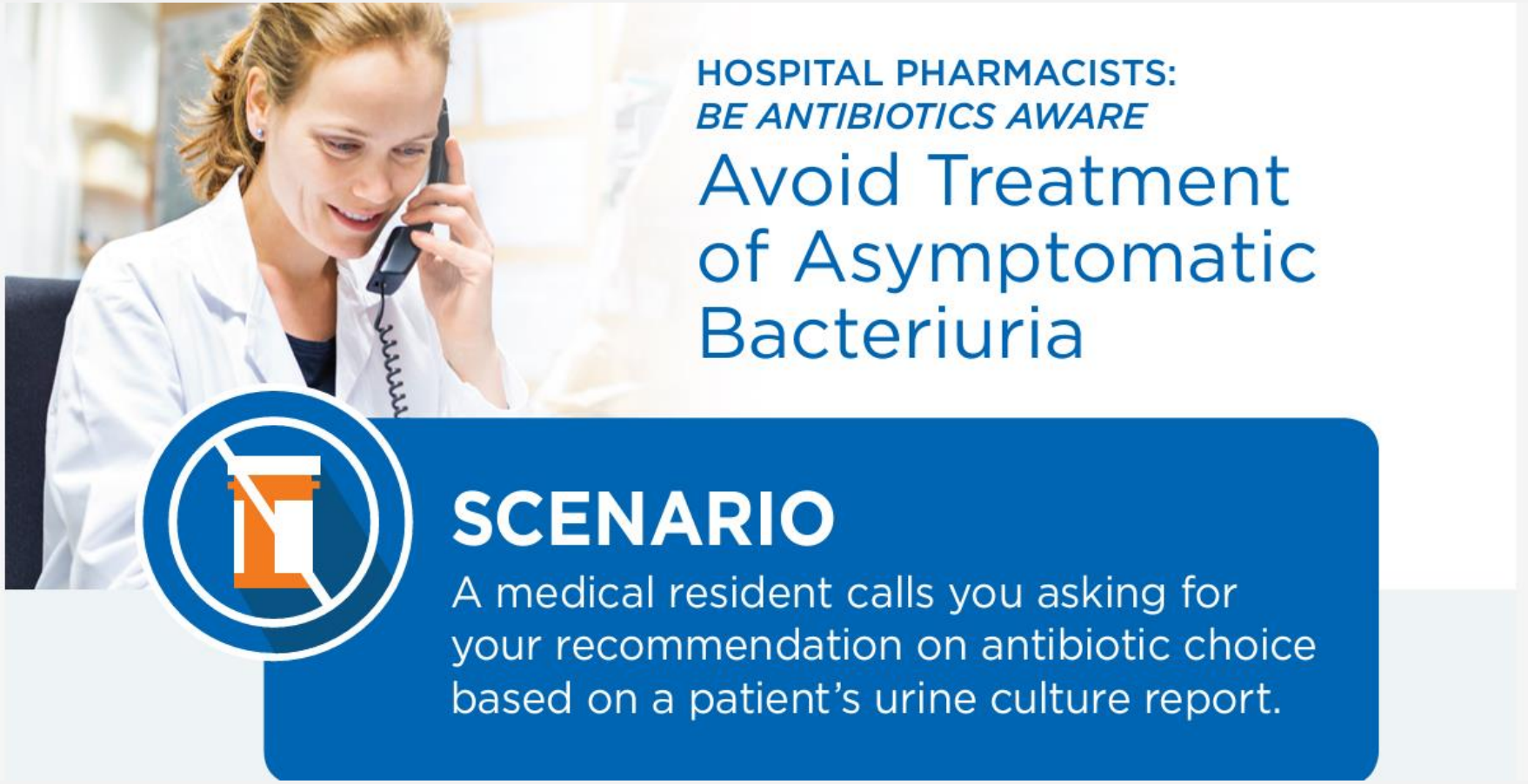
YEAR 2022

This graph shows outpatient antibiotic prescriptions for selected antibiotic classes dispensed per 1,000 population in Hawaii, compared to national data in 2022.

OUTPATIENT ANTIBIOTIC PRESCRIPTION RATES BY ANTIBIOTIC CLASS IN 2022



WE HAVE SOMETHING TO SETTLE… TREATING ASYMPTOMATIC BACTERIURIA

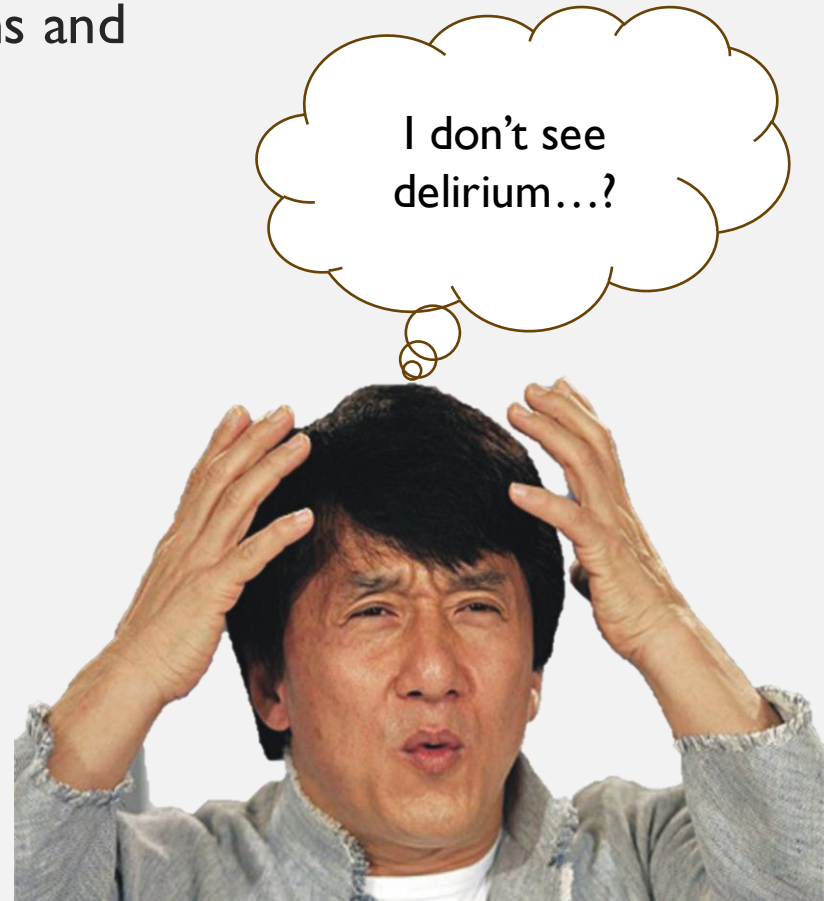


WHAT IS ASYMPTOMATIC BACTERIURIA?

- Isolation of bacteria in urine culture from a patient without signs or symptoms of urinary tract infection (UTI)
- A positive urine culture result (with or without pyuria) alone does not meet criteria for initiation of antibiotics according to IDSA guidelines
  - Exceptions include pregnancy and invasive genitourinary procedures

WE CAN HELP AVOID UNNECESSARY TREATMENT BY:

- Prompting the provider to consider if the patient has signs and symptoms consistent with UTI prior to making a recommendation for treatment:
  - Urinary urgency
  - Urinary frequency
  - Dysuria
  - Suprapubic pain
  - Flank pain
  - Pelvic discomfort
  - Acute hematuria
  - Fever



Clinical Infectious Diseases

IDSA FEATURES

IDSA Infectious Diseases Society of America · hivma hiv medicine association · OXFORD

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America[a]

Lindsay E. Nicolle,[1] Kalpana Gupta,[2] Suzanne F. Bradley,[3] Richard Colgan,[4] Gregory P. DeMuri,[5] Dimitri Drekonja,[6] Linda O. Eckert,[7] Suzanne E. Geerlings,[8] Béla Köves,[9] Thomas M. Hooton,[10] Manisha Juthani-Mehta,[11] Shandra L. Knight,[12] Sanjay Saint,[13] Anthony J. Schaeffer,[14] Barbara Trautner,[15] Bjorn Wullt,[16] and Reed Siemieniuk[17]

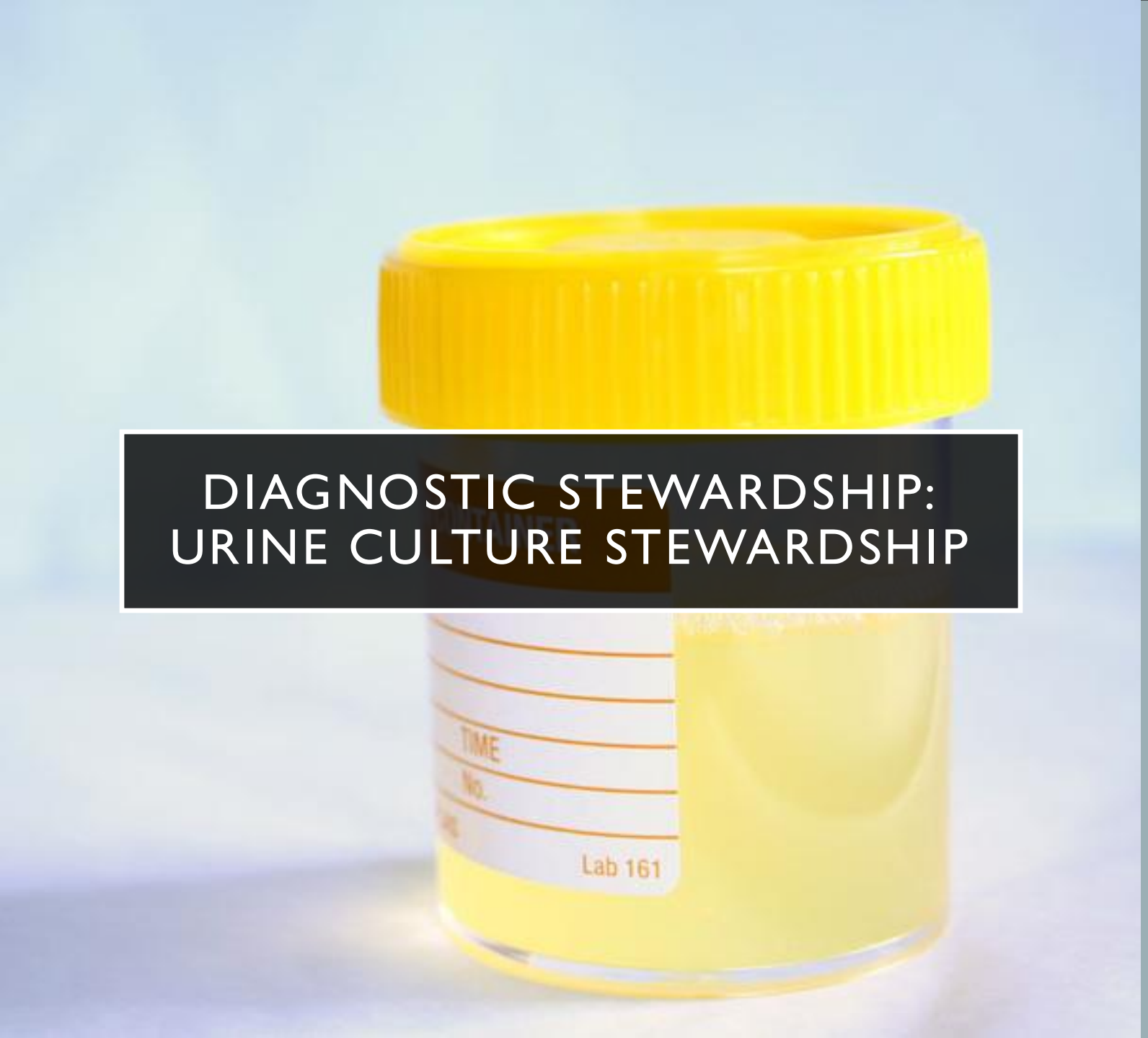
[1]Department of Internal Medicine, School of Medicine, Rady Faculty of Health Sciences, University of Manitoba, Winnipeg, Canada; [2]Division of Infectious Diseases, Veterans Affairs Boston Healthcare System and Boston University School of Medicine, West Roxbury, Massachusetts; [3]Division of Infectious Diseases, University of Michigan, Ann Arbor; [4]Department of Family and Community Medicine, University of Maryland, Baltimore; [5]Division of Pediatric Infectious Diseases, Department of Pedi
Madison; [6]Division of Infectious Diseases, University of Minnesota, Minneapolis; [7]Department of Obstetrics and Gynec
[8]Department of Internal Medicine, Amsterdam University Medical Center, The Netherlands; [9]Department of Urology, So
Diseases, University of Miami, Florida; [11]Division of Infectious Diseases, Yale School of Medicine, New Haven, Connec
Colorado; [13]Department of Internal Medicine, Veterans Affairs Ann Arbor and University of Michigan, Ann Arbor; [14]Depa
Health Services Research, Department of Medicine, Baylor College of Medicine, Houston, Texas; [16]Division of Microbio
Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Ontario, Canada

V. In an Older, Functionally or Cognitively Impaired Patient, Which Nonlocalizing Symptoms Distinguish ASB From Symptomatic UTI?

Recommendations

1. In older patients with functional and/or cognitive impairment with bacteriuria and delirium (acute mental status change, confusion) and without local genitourinary symptoms or other systemic signs of infection (eg, fever or hemodynamic instability), we recommend assessment for other causes and careful observation rather than antimicrobial treatment (*strong recommendation, very low-quality evidence*).

WHAT ELSE CAN WE DO TO AVOID THIS?
HINT: LOOK UPSTREAM



DIAGNOSTIC STEWARDSHIP: URINE CULTURE STEWARDSHIP

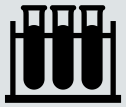
- Prevalence of asymptomatic bacteriuria (ASB) in patients without indwelling urinary catheters is more common in:
  - Women
  - Elderly
  - Patients with urogenital abnormalities
  - Institutionalized patients
  - Certain comorbidities

APPROPRIATE USES OF URINE CULTURE

- Dysuria, urgent or frequent urination, suprapubic pain or tenderness, flank pain of costovertebral angle tenderness, acute hematuria, or pelvic discomfort
- New onset or worsening sepsis with no identifiable cause
- Fever or altered mental status **without** evidence of another source on history, physical examination, or laboratory testing
- Screening for asymptomatic bacteriuria (ASB)
  - Early pregnancy
  - Prior to certain urology procedures

INAPPROPRIATE USES OF URINE CULTURE

Odorous, cloudy, or discolored urine in the absence of other localizing signs/symptoms



Reflect urine cultures based on urinalysis results, such as pyuria, in the absence of other indications

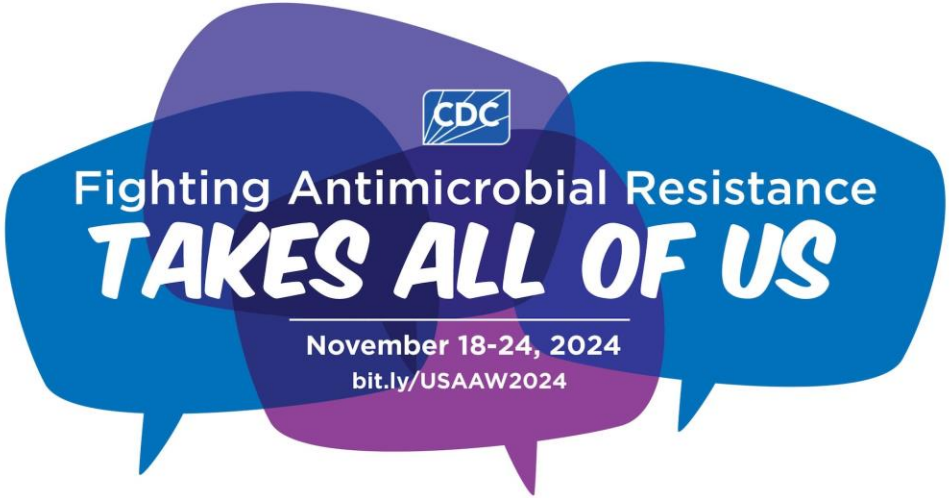
Urine culture to document response to therapy unless symptoms fail to resolve (i.e., clear culture)

Screening for ASB and preoperative evaluations in most groups

HOW ELSE CAN I BE INVOLVED?

BE PROACTIVE IN ANTIMICROBIAL STEWARDSHIP!

- Join the Hawaii Antimicrobial Stewardship Collaborative (HASC)
  - Acute Care Facility Work Group
  - LTC/Outpatient Work Group
  - **Contact me at: garret.hino@doh.hawaii.gov**
- Participate in U.S. Antibiotic Awareness Week (USAAW)
  - When: November 18th-24th, 2024
  - Purpose: To raise awareness of the importance of appropriate antimicrobial use and the threat of antimicrobial resistance poses to people, animals, plants, and their shared environment



MAHALO FOR LISTENING!
ANY QUESTIONS?

Email: Garret.Hino@doh.Hawaii.gov