Antimicrobial Stewardship and Resistance

Beverly Burt, RN, BSN, CIC

Disclosures of Conflict of Interest

Beverly Burt, RN, BSN, CIC has nothing to disclose.

Objectives

- Explain how antibiotic resistance occurs
- Name four antibiotic resistance threats in the United States
- Discuss the core elements of an Antibiotic Stewardship Program

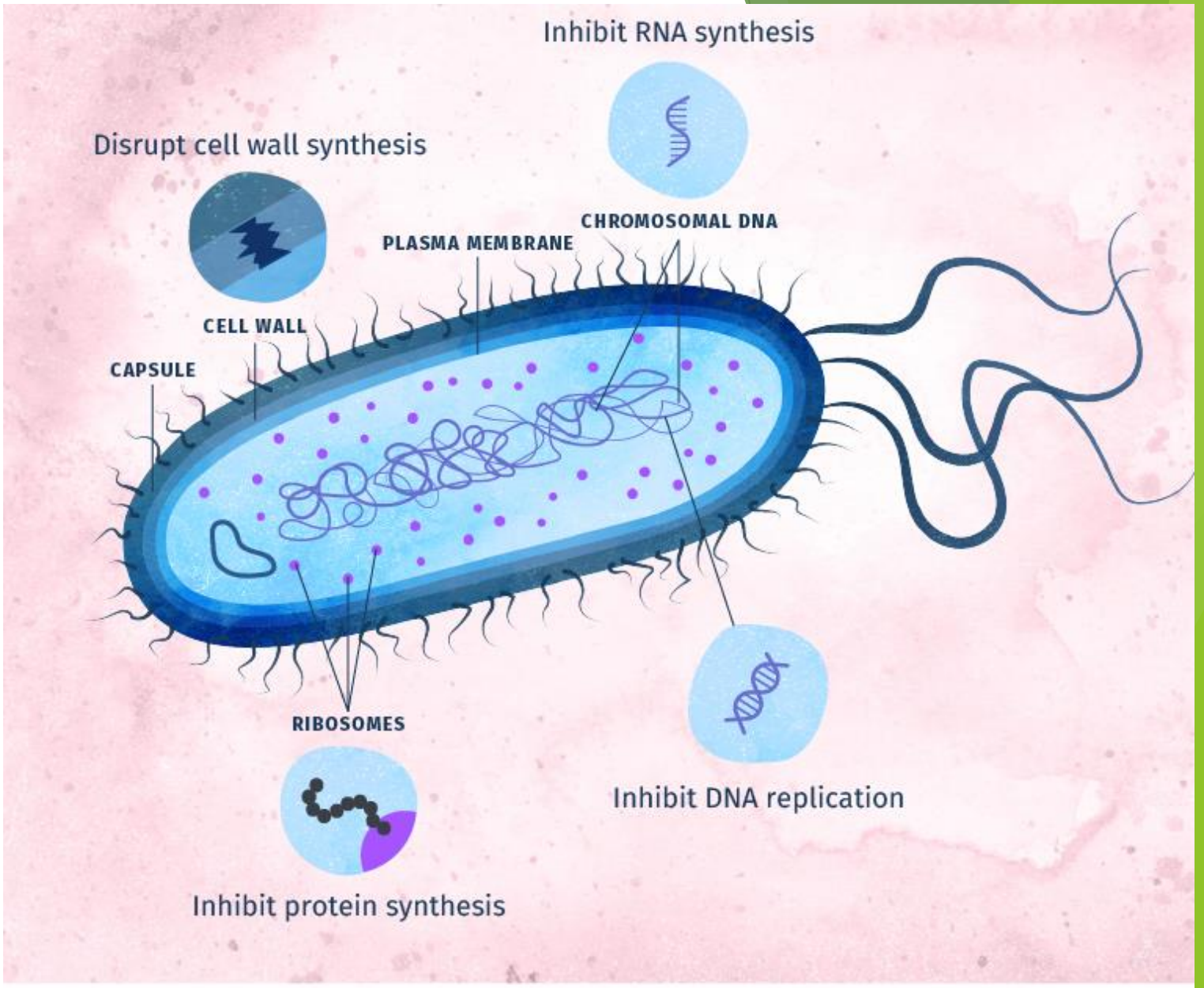
How does Antimicrobial Resistance Occur?

Antibiotic Resistance

- Antibiotic resistance occurs when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them.
- Antibiotics and antifungals
  - Pressure bacteria and fungi to adapt
  - May also kill helpful germs that protect our body from infection
- The antimicrobial-resistant germs
  - Survive and multiply
  - Have resistance traits in their DNA that can spread to other germs.

How Antibiotic Resistance Happens | CDC

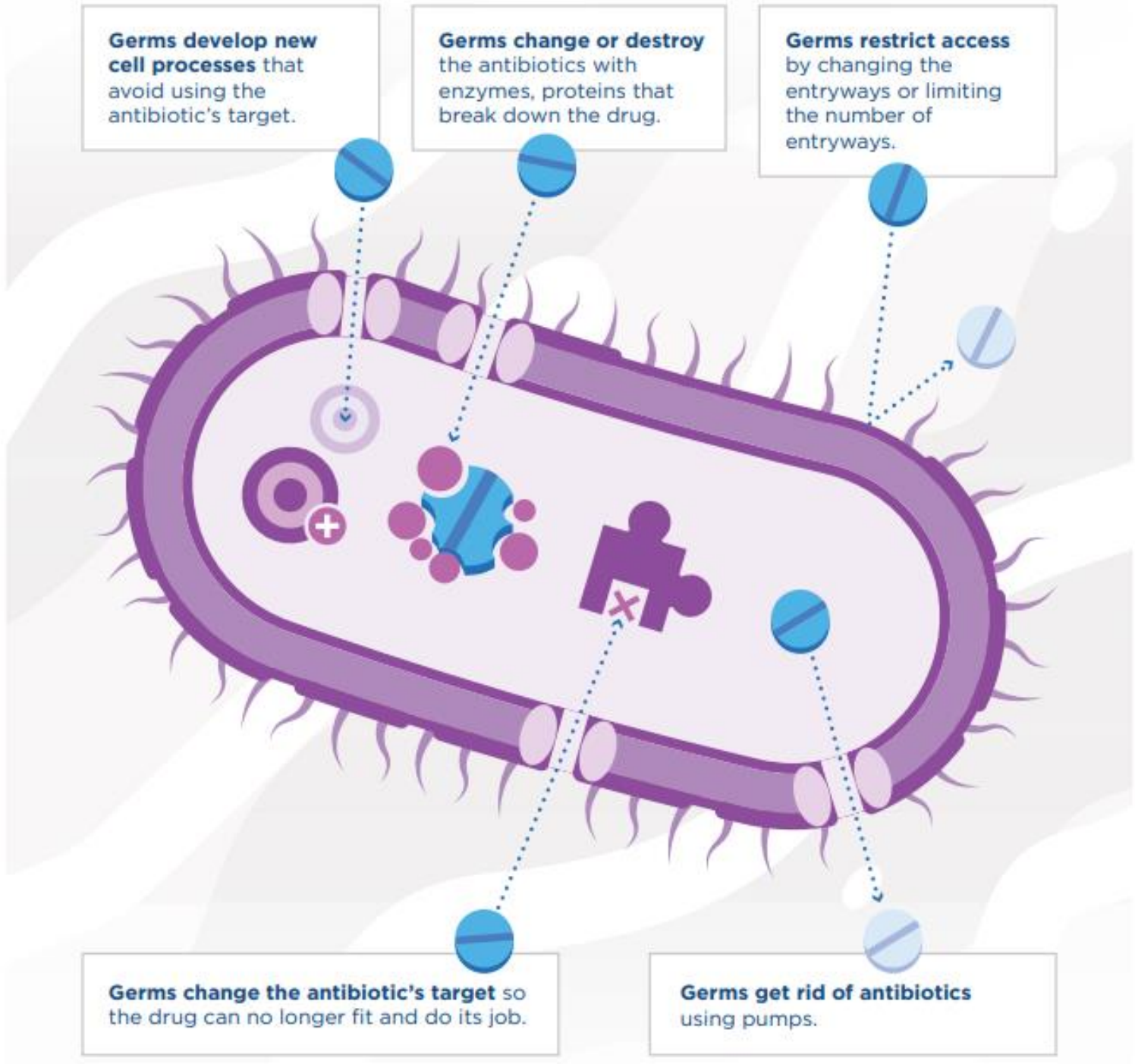
Ways Antibiotics Affect Bacterial Cells



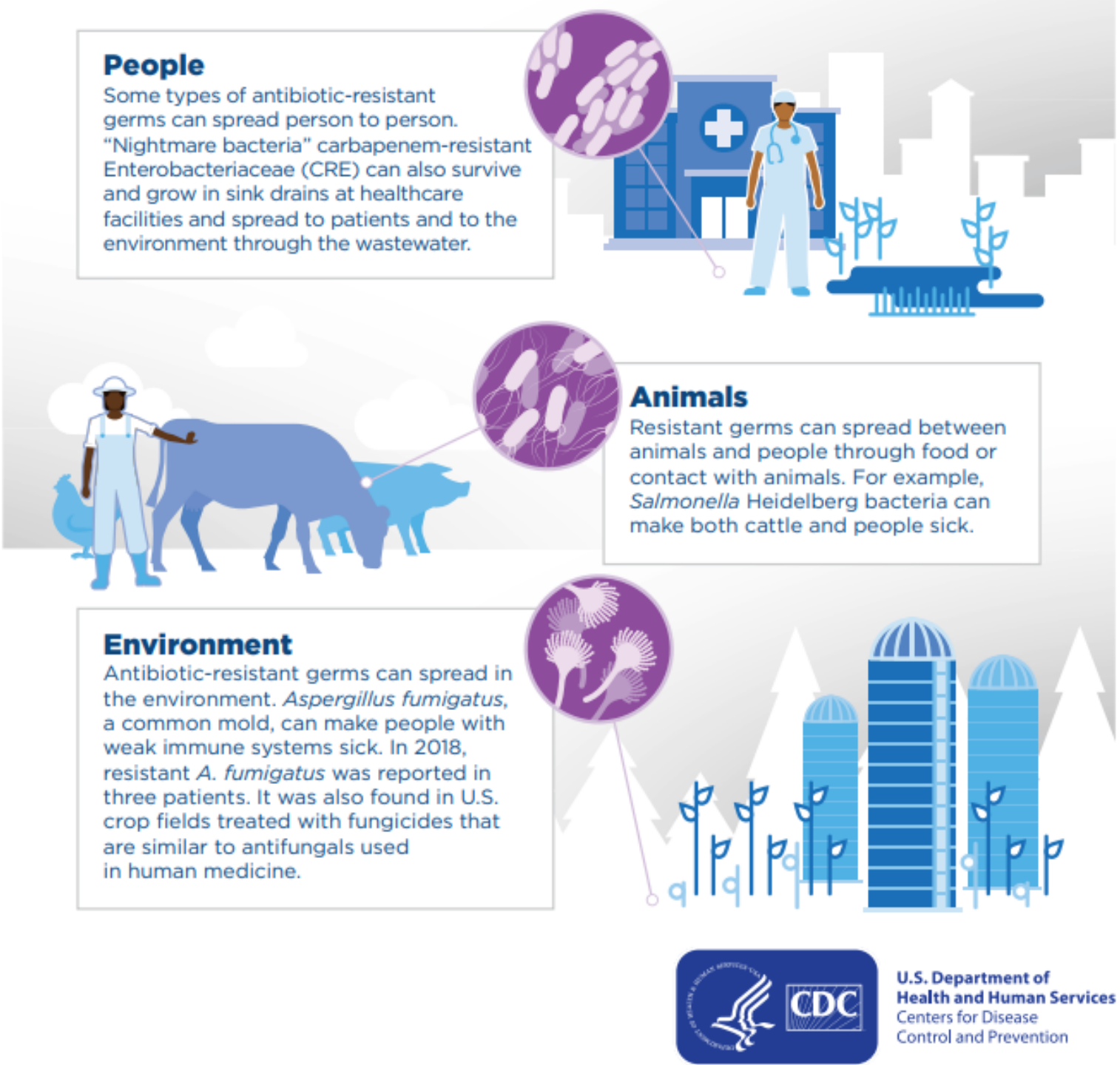
Milken Institute School of Public Health
THE GEORGE WASHINGTON UNIVERSITY

ANTIBIOTIC RESISTANCE ACTION CENTER

How Bacteria and fungi Fight Back Against Antibiotics

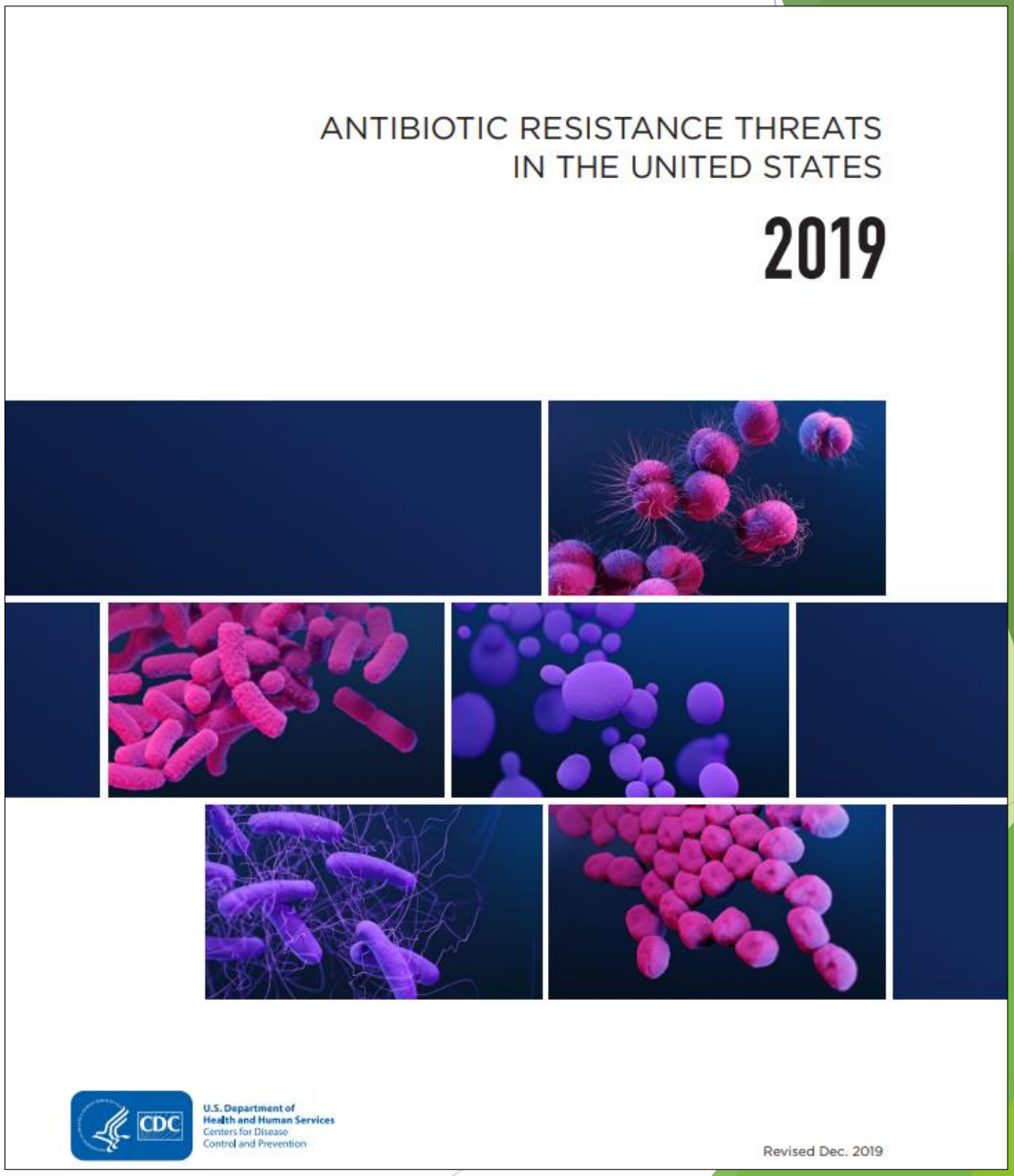


Examples of How Antibiotic Resistance Affects Humans, Animals and the Environment



Antibiotic Resistance Threats in the United States

First Published in 2013



Antibiotic Resistance Threats in the United States, 2019 (cdc.gov)

Background

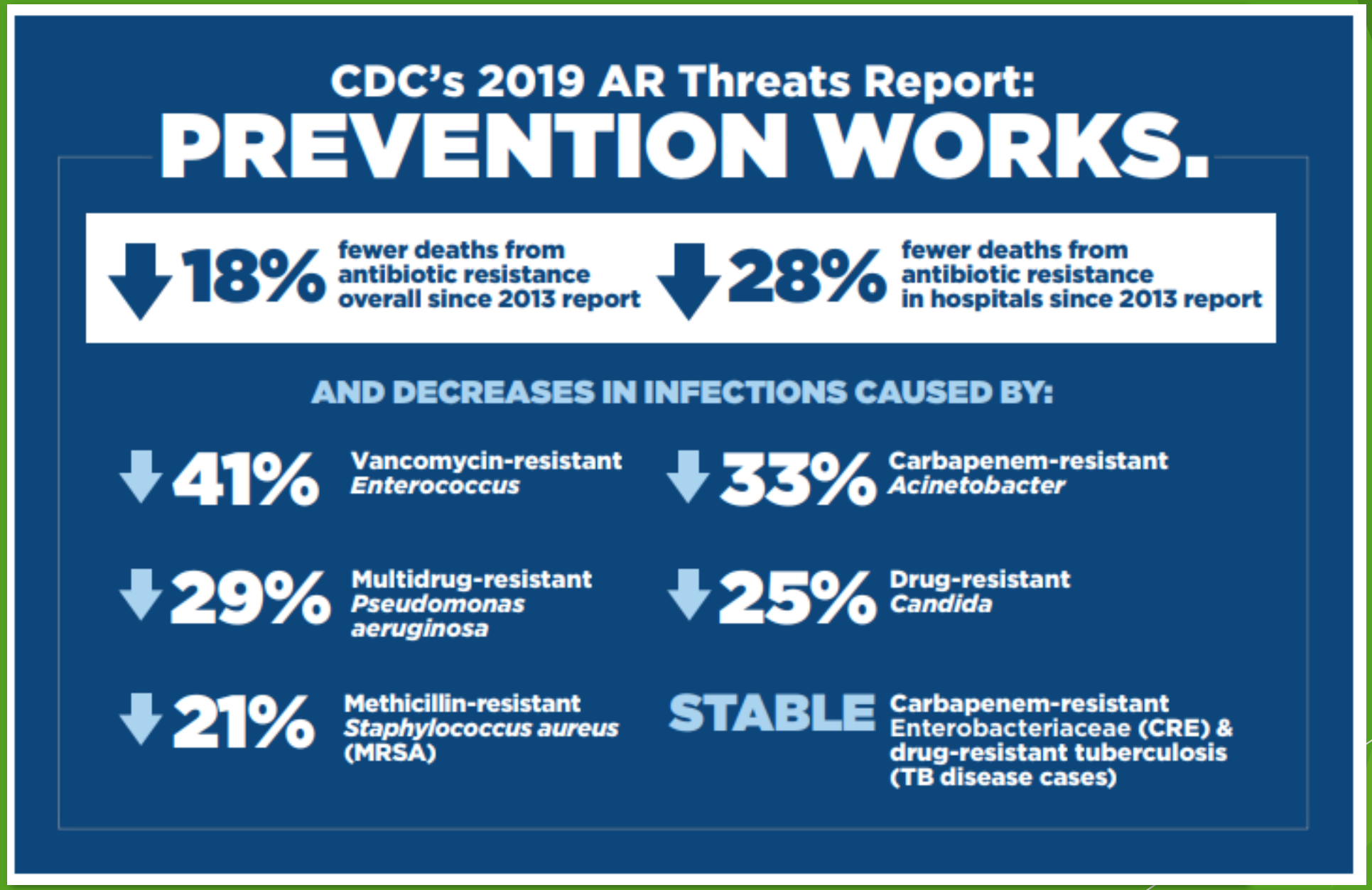
- Greater than 2.8 million antimicrobial-resistant infections in the US each year
  - >35,000 people die as a result
- 223,900 cases of *Clostridioides difficile* occurred in the US in 2017
  - 12,800 people died as a result

⬆315% Erythromycin-resistant invasive group A Strep

⬆124% Drug-resistant *Neisseria gonorrhoeae*

⬆50% ESBL-producing Enterobacteriaceae

Antibiotic Resistance Threats in the United States, 2019 (cdc.gov)


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)

CDC Strategies That Work In Healthcare

- Preventing device- and procedure-related infections, such as from urinary catheters or central lines
- Stopping the spread of resistant germs within and between healthcare facilities
- Containing emerging threats through early detection and aggressive response
- Tracking and improving appropriate antibiotic use
- Infection prevention and control in non-hospital settings, such as long-term care facilities

CDC Strategies That Work In Communities

- Widespread use of vaccines to prevent infections and spread
- Routine tuberculosis and gonorrhea screening for at-risk groups and prompt treatment
- Using safer sex practices
- Safe food handling and preparation
- Improving antibiotic use everywhere

CDC's 2019 AR Threat Report Listed Three Categories of Threats

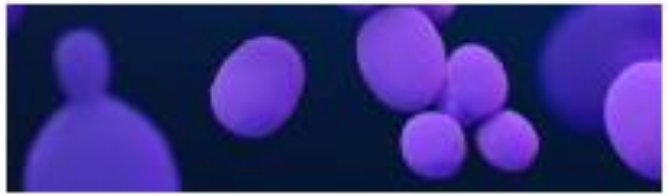
- Urgent
- Serious
- Concerning

18 Pathogens

- Threats assessed according to seven factors:
  - Clinical impact
  - Economic impact
  - Incidence
  - 10-year projection of incidence
  - Transmissibility
  - Availability of effective antibiotics
  - Barriers to prevention

Urgent Threats

CARBAPENEM-RESISTANT
ACINETOBACTER



CANDIDA AURIS

CLOSTRIDIOIDES DIFFICILE

CARBAPENEM-RESISTANT
ENTEROBACTERIACEAE

DRUG-RESISTANT
NEISSERIA GONORRHOEAE

Serious Threats

DRUG-RESISTANT
CAMPYLOBACTER

DRUG-RESISTANT
CANDIDA

ESBL-PRODUCING
ENTEROBACTERIACEAE

VANCOMYCIN-RESISTANT
ENTEROCOCCI

MULTIDRUG-RESISTANT
PSEUDOMONAS AERUGINOSA

DRUG-RESISTANT
NONTYPHOIDAL *SALMONELLA*

Serious Threats (Cont.)

DRUG-RESISTANT
***SALMONELLA* SEROTYPE TYPHI**

DRUG-RESISTANT
SHIGELLA

METHICILLIN-RESISTANT
STAPHYLOCOCCUS AUREUS

DRUG-RESISTANT
STREPTOCOCCUS PNEUMONIAE

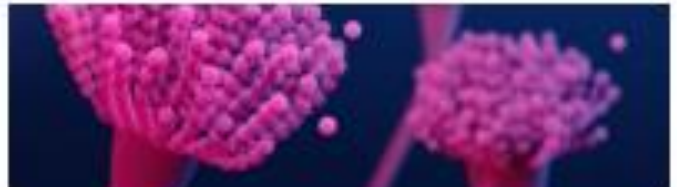
DRUG-RESISTANT
TUBERCULOSIS

Concerning Threats

ERYTHROMYCIN-RESISTANT
GROUP A *STREPTOCOCCUS*

CLINDAMYCIN-RESISTANT
GROUP B *STREPTOCOCCUS*

Watch List



AZOLE-RESISTANT
ASPERGILLUS FUMIGATUS

DRUG-RESISTANT
MYCOPLASMA GENITALIUM

DRUG-RESISTANT
BORDETELLA PERTUSSIS

CDC Proposed Five Core Actions

Infection prevention & control

- Preventing infections

Tracking and data:

- Share data and improve data collection

Antibiotic use and access:

- Improve appropriate use of antibiotics, reduce unnecessary use, and ensure improved access

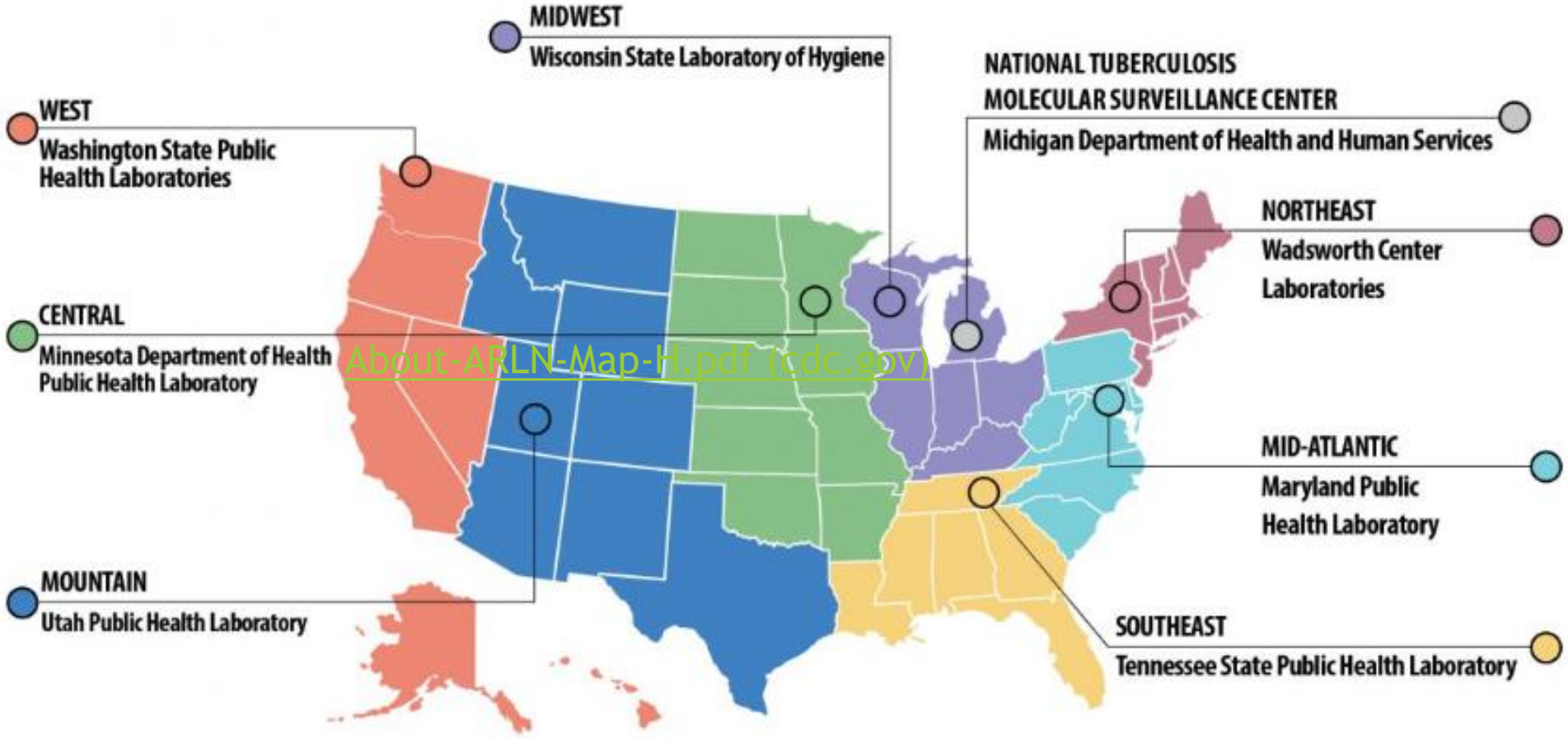
Vaccines, therapeutics, and diagnostics:

- Invest in development and improved access to vaccines, therapeutics, and diagnostics

Environment and sanitation:

- Keep antibiotics and antibiotic-resistant threats from entering the environment: sanitation & safe water

CDC's Antibiotic Resistance (AR)Lab Networks

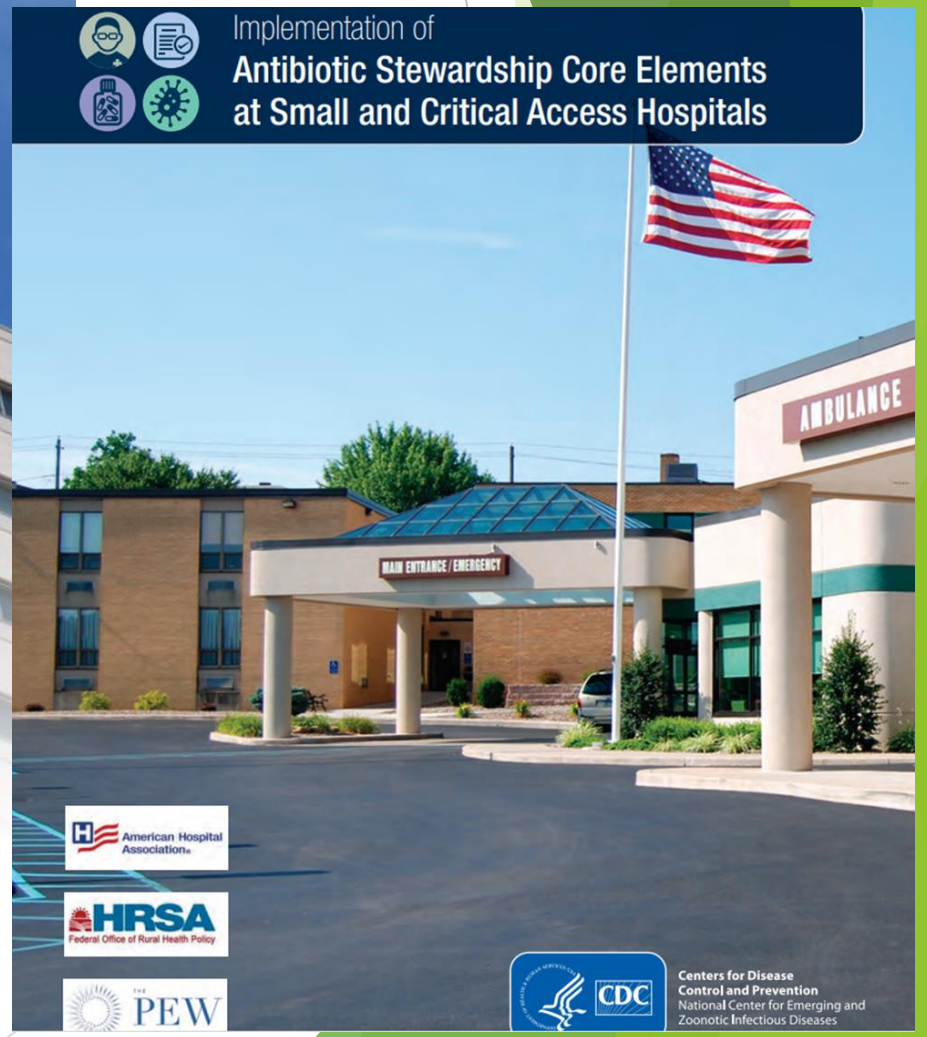


About the AR Lab Network | CDC

ARLABnetwork

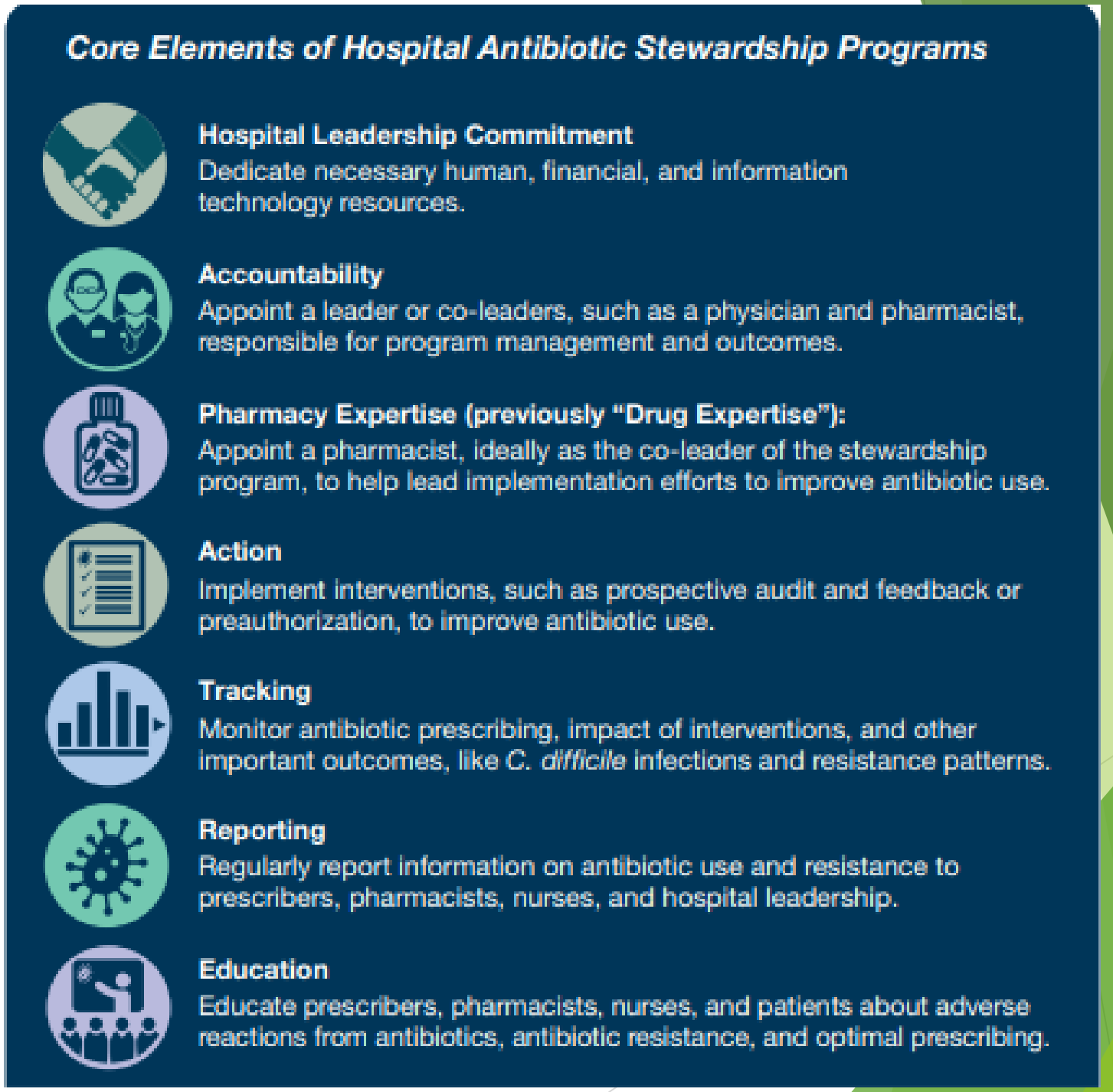
Antibiotic Stewardship (AS) Programs

CDC Antibiotic Stewardship Resources



First Published in 2014

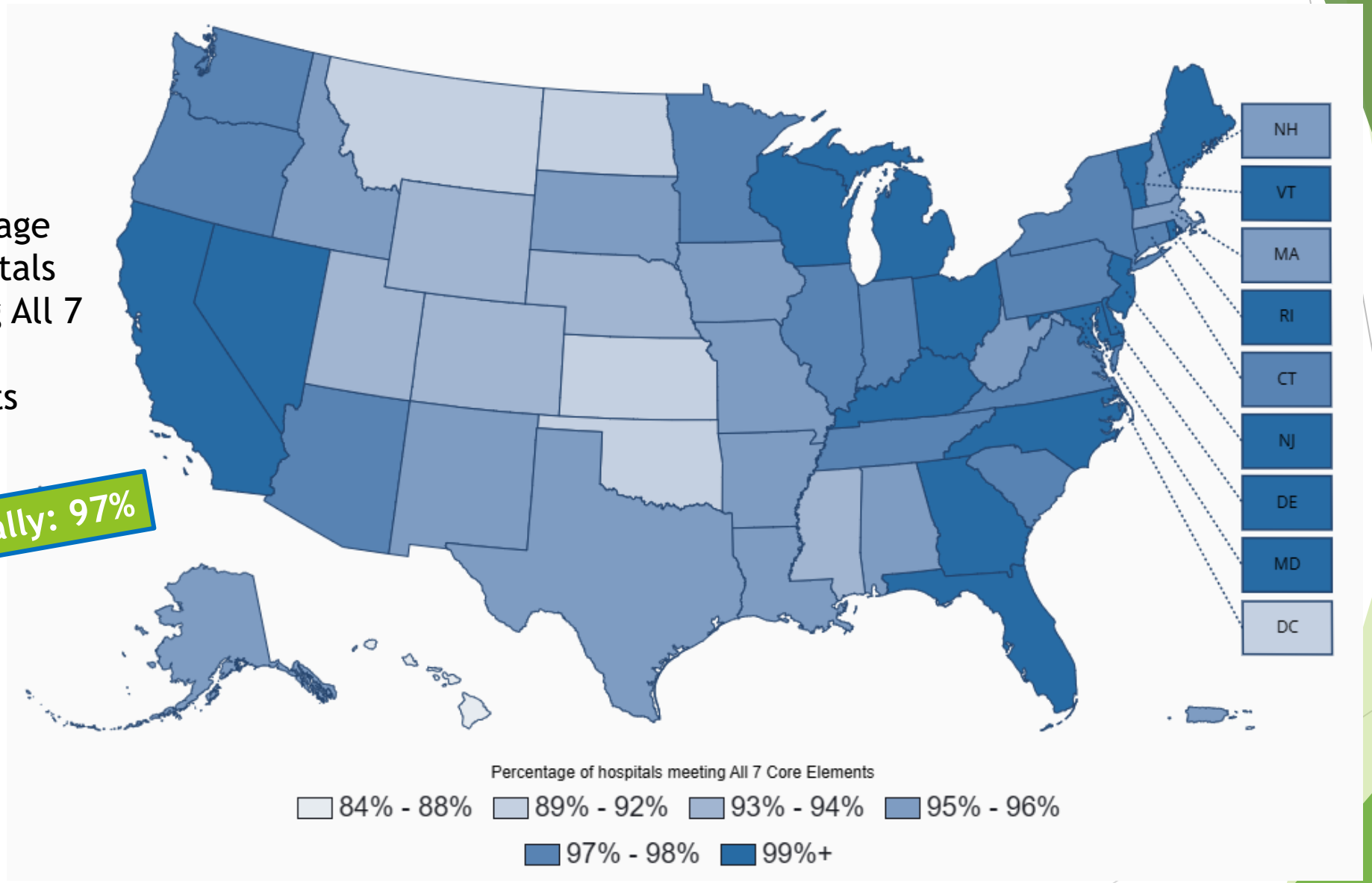
[The Core Elements of Hospital Antibiotic Stewardship Programs (cdc.gov)]



Hospitals Antibiotic Stewardship by State -2022

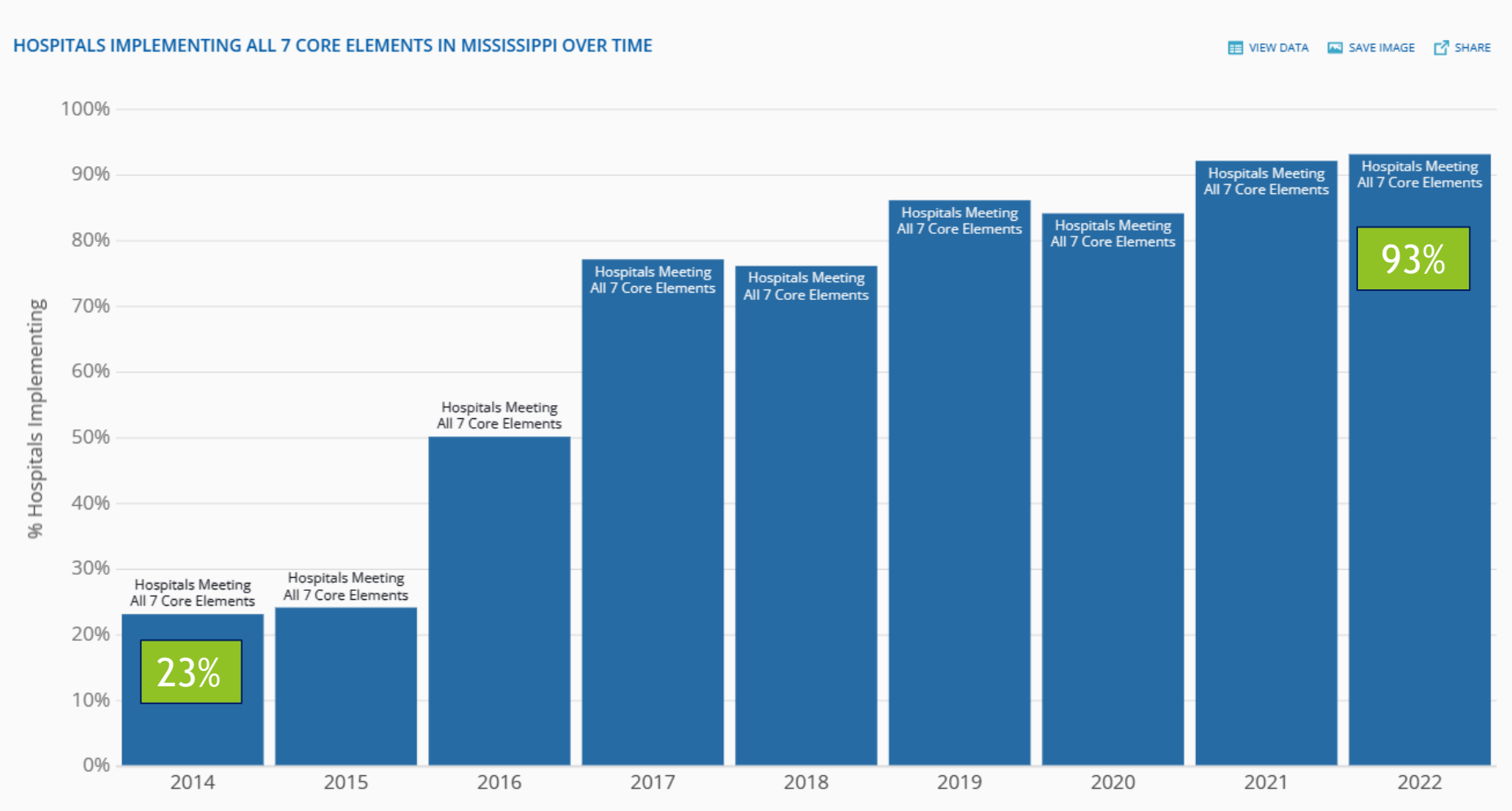
Percentage of hospitals meeting All 7 Core Elements

Nationally: 97%



Hospital Antibiotic Stewardship | A.R. & Patient Safety Portal (cdc.gov)

Percentage of Hospitals Implementing All 7 Core Elements Over Time In Mississippi

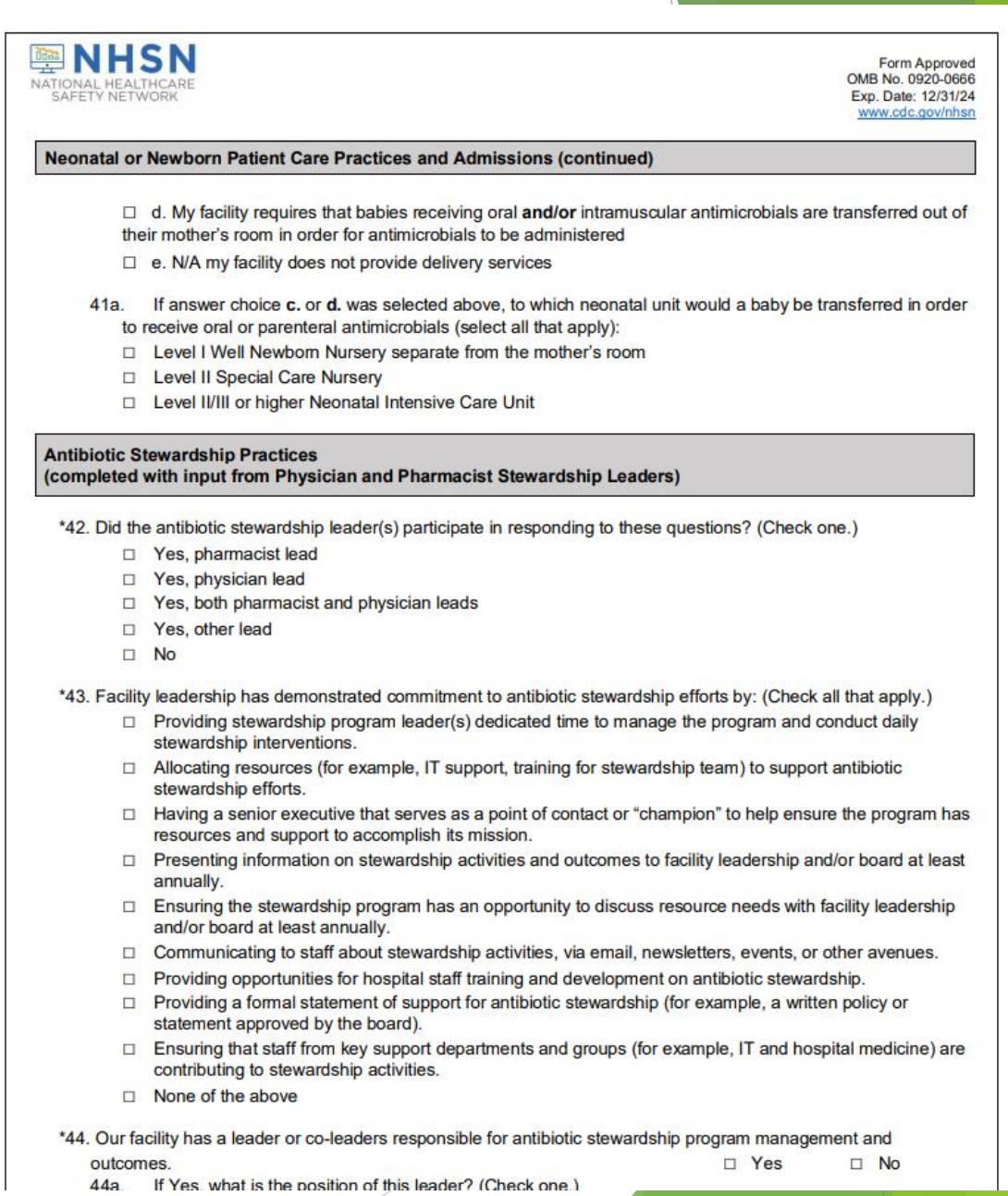


Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

National Healthcare Safety Network (NHSN)

[2023 Patient Safety Annual Hospital Survey Form (cdc.gov)]

Antibiotic Stewardship
Questions on pages 13-19



NHSN
NATIONAL HEALTHCARE SAFETY NETWORK

Form Approved
OMB No. 0920-0666
Exp. Date: 12/31/24
www.cdc.gov/nhsn

Neonatal or Newborn Patient Care Practices and Admissions (continued)

☐ d. My facility requires that babies receiving oral **and/or** intramuscular antimicrobials are transferred out of their mother's room in order for antimicrobials to be administered

☐ e. N/A my facility does not provide delivery services

41a. If answer choice **c.** or **d.** was selected above, to which neonatal unit would a baby be transferred in order to receive oral or parenteral antimicrobials (select all that apply):

☐ Level I Well Newborn Nursery separate from the mother's room
☐ Level II Special Care Nursery
☐ Level II/III or higher Neonatal Intensive Care Unit

Antibiotic Stewardship Practices
(completed with input from Physician and Pharmacist Stewardship Leaders)

*42. Did the antibiotic stewardship leader(s) participate in responding to these questions? (Check one.)

☐ Yes, pharmacist lead
☐ Yes, physician lead
☐ Yes, both pharmacist and physician leads
☐ Yes, other lead
☐ No

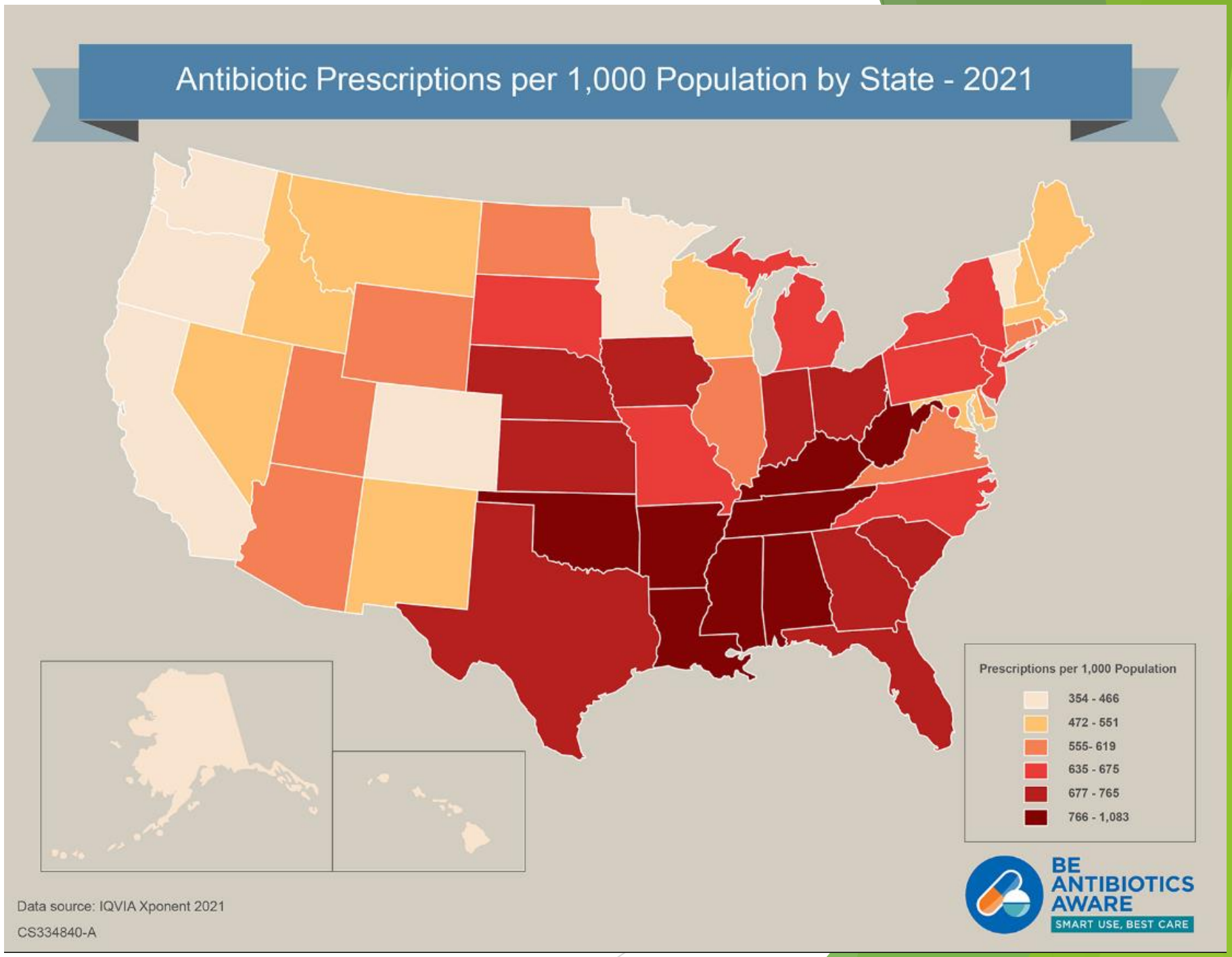
*43. Facility leadership has demonstrated commitment to antibiotic stewardship efforts by: (Check all that apply.)

☐ Providing stewardship program leader(s) dedicated time to manage the program and conduct daily stewardship interventions.
☐ Allocating resources (for example, IT support, training for stewardship team) to support antibiotic stewardship efforts.
☐ Having a senior executive that serves as a point of contact or "champion" to help ensure the program has resources and support to accomplish its mission.
☐ Presenting information on stewardship activities and outcomes to facility leadership and/or board at least annually.
☐ Ensuring the stewardship program has an opportunity to discuss resource needs with facility leadership and/or board at least annually.
☐ Communicating to staff about stewardship activities, via email, newsletters, events, or other avenues.
☐ Providing opportunities for hospital staff training and development on antibiotic stewardship.
☐ Providing a formal statement of support for antibiotic stewardship (for example, a written policy or statement approved by the board).
☐ Ensuring that staff from key support departments and groups (for example, IT and hospital medicine) are contributing to stewardship activities.
☐ None of the above

*44. Our facility has a leader or co-leaders responsible for antibiotic stewardship program management and outcomes. ☐ Yes ☐ No

44a. If Yes, what is the position of this leader? (Check one.)

[2022 Report | Antibiotic Use | CDC]



COVID-19 Impacts on Antimicrobial Resistance

- **Tracking Data:** Detection & Reporting of AR data slowed because of changes in patient care, testing, treatment, and capacity of HCFs
- **Preventing Infections:** pandemic related challenges hindered many infection prevention practices (e.g., challenges with hand hygiene, PPE, etc.)
- **Antimicrobial Use and Access:** Antibiotics were commonly prescribed to patients with COVID-19
- **Environment & Sanitation:** Wastewater surveillance used to improve detection and response for AR.
- **Vaccines, Therapeutics & Diagnosis:** Focused on need to prevent infections, the need for more prevention products, and not just antimicrobials and vaccines.

Implementation Strategies for Small and Critical Access Hospitals for Antibiotic Stewardship

- Antibiotic Stewardship Core Elements (cdc.gov)

Leadership Commitment & Accountability

- Dedicate necessary human, financial & information technology resources
- Appoint a leader or co-leaders, such as a physician and pharmacist, responsible for program management and outcomes.
  - Examples of Strategies:
    - Designate a physician leader
    - Antibiotic Stewardship Policy & Multi-disciplinary Team
    - Integrate AS activities into ongoing quality improvement
    - Reporting structure for ASP with facility leadership up to the board.
    - Statement on importance of the ASP approved by the Board.
    - Statement from hospital leadership to all providers and patients on hospital's commitment to improving antibiotic use
    - Support training for hospital stewardship leaders on AS

Pharmacy Expertise

- Appoint a pharmacist, ideally as the co-leader of the stewardship program, to lead implementation efforts to improve antibiotic use.
  - Examples of Strategies:
    - Appoint a pharmacist leader (include AS in job description or service contract)
    - Appoint a physician leader to support AS program
    - Offer training courses on AS to develop their expertise
    - Seek additional help by joining multi-hospital collaborates or through remote consults

Action

- Implement interventions, such as prospective audit and feedback or preauthorization, to improve antibiotic use.

Examples of Key Opportunities to Improve Antibiotic Use	
CAP	Review cases at 48 hours to determine pneumonia diagnosis vs. non-infectious
	Avoid empiric use of antipseudomonal beta-lactams and/or methicillin-resistant Staphylococcus aureus (MRSA) agents unless clinically indicated.
	Assess duration of therapy (usually treated for 5-7 days)
UTI	Implement criteria for ordering urine cultures
	Establish criteria to distinguish asymptomatic vs. symptomatic bacteriuria
	Use shortest duration of antibiotics as clinically appropriate
SSTI	Develop diagnostic criteria to distinguish purulent & non-purulent infections/severity of illness
	Avoid empiric use of antipseudomonal beta-lactams and/or anti-anaerobic agents unless clinically indicated.
	Guidelines suggest most uncomplicated bacterial cellulitis may be treated for 5 days.

Action (Cont.)

Examples of Other Strategies	
Pharmacist	Review antibiotics for unnecessary duplicative antibiotic therapy.
	Review for opportunities for intravenous to oral conversion
	Monitor for medication safety (e.g., renal dose adjustments)
Nurses	Review culture techniques to ensure cultures are collected properly
	Review culture results with treating clinician and pharmacist
	Monitor response to antibiotic therapy w/feedback to clinician and pharmacist
	Assess oral intake and clinical status to alert providers and pharmacist for opportunities to convert from IV antibiotics to PO.
	Educate patients about potential adverse events associated with antibiotics, especially C. difficile infection.
	Initiate “antibiotic time-outs” with the treating clinician and pharmacist and review antibiotic therapy after 48 hours of treatment.

Tracking

- Monitor antibiotic prescribing, impact of interventions, and other important outcomes like C. difficile infection and resistance patterns.
  - Examples of Strategies:
    - Submit antibiotic use data to the National Healthcare Safety Network (NHSN) Antimicrobial Use (AU) Option for monitoring/benchmarking inpatient AU
    - Monitor adherence to facility-specific treatment for CAP, UTI and SSTI
    - Monitor the performance of antibiotic time-outs
    - Perform a medication use evaluation to assess courses of therapy for selected antibiotics
    - Monitor how often patients are converted from intravenous to oral therapy.
    - Assess how often patients are prescribed unnecessary duplicate therapy

Reporting

- Regularly report information on antibiotic use and resistance to prescribers, pharmacists, nurses, and hospital leadership.
  - Examples of Strategies:
    - Prepare regular reports on the measures being tracked related to antibiotic use and provide to key stakeholders (e.g., pharmacy, patient safety, medical staff, committees, board.)
    - Share provider-specific reports with individual clinicians confidentially.
    - Distribute data and key messaging through staff newsletters and emails.

Education

- Educate prescribers, pharmacists, and nurses about adverse reactions from antibiotics, antibiotic resistance and optimal prescribing.
- Examples of Strategies:
  - Integrate regular updates on AS & R into employee newsletters, intranet, website, etc.
  - Provide educational presentations to key providers, pharmacy and nursing at least annually (e.g., staff meetings)
  - One-on-one education/coaching
  - AS education in orientation & annually for medical staff, pharmacist & nursing.
  - Incorporate AS education into credentialing
  - Patient/family education (e.g., fact sheet on AU for patients)

BE ANTIBIOTICS AWARE

GET AHEAD OF SEPSIS

All Healthcare Professionals can *Be Antibiotics Aware*

BE ANTIBIOTICS AWARE

SMART USE, BEST CARE

For more information, visit www.cdc.gov/antibiotic-use.

CS335343-A

FOR HEALTHCARE PROFESSIONALS

GET AHEAD OF SEPSIS

KNOW THE RISKS. SPOT THE SIGNS. ACT FAST.

PROTECT YOUR PATIENTS FROM SEPSIS.

Your patients are counting on you.
Educate them about:

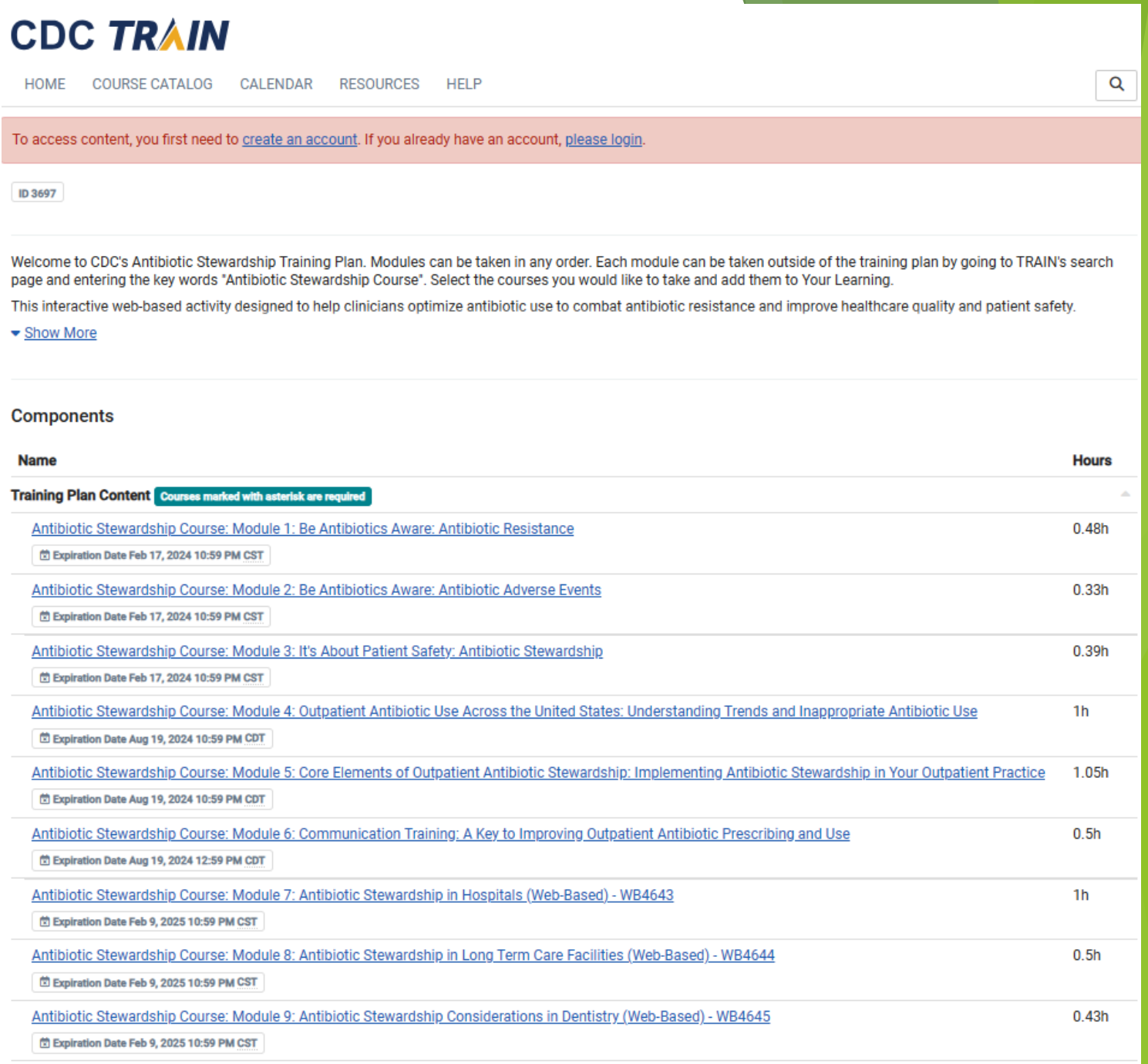
- How to prevent infections
- What signs to look for
- When to seek medical care for possible sepsis

To learn more about sepsis and how to prevent infections, visit **www.cdc.gov/sepsis**.

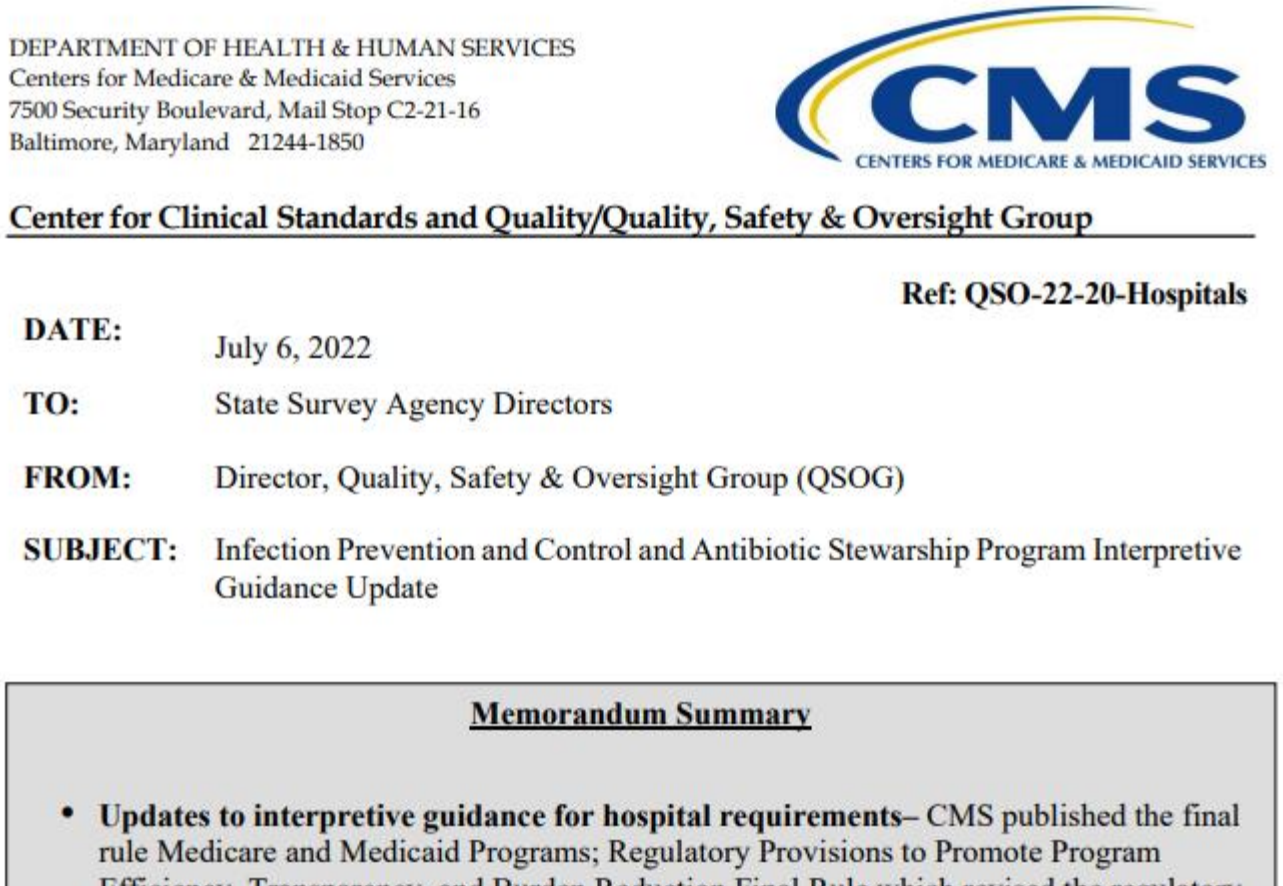
CDC

Pub No. 300424

[CDC's Antibiotic Stewardship Course - CDC TRAIN - an affiliate of the TRAIN Learning Network powered by the Public Health Foundation]



CMS Infection Prevention and Control and Antibiotic Stewardship Program Interpretive Guidance Update



DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland 21244-1850

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

Center for Clinical Standards and Quality/Quality, Safety & Oversight Group

Ref: QSO-22-20-Hospitals

DATE: July 6, 2022

TO: State Survey Agency Directors

FROM: Director, Quality, Safety & Oversight Group (QSOG)

SUBJECT: Infection Prevention and Control and Antibiotic Stewardship Program Interpretive Guidance Update

Memorandum Summary

- **Updates to interpretive guidance for hospital requirements**– CMS published the final rule Medicare and Medicaid Programs; Regulatory Provisions to Promote Program Efficiency, Transparency, and Burden Reduction Final Rule which revised the regulatory requirements for hospitals related to infection prevention and control and antibiotic stewardship programs. We made conforming revisions to the interpretive guidelines.

Background:

On September 30, 2019The Centers for Medicare & Medicaid Services (CMS) published the final rule *Medicare and Medicaid Programs; Regulatory Provisions to Promote Program Efficiency, Transparency, and Burden Reduction Final Rule*, which included revisions for the hospital Conditions of Participation (CoP) for 42 CFR §482.42 Infection preventions and control and antibiotic stewardship programs.

QSO-22-20-Hospitals (cms.gov)

The Joint Commission New and Revised Antibiotic Stewardship Requirements for Hospitals

Effective 1/1/2023

The Joint Commission

New and Revised Antibiotic Stewardship Requirements
Hospital (HAP) Accreditation Program

Medication Management (MM) Chapter

MM.09.01.01

Current Requirement Text: **Revision Type:** Revised

The hospital has an antimicrobial stewardship program based on current scientific literature.

MM.09.01.01

New Requirement Text:

The hospital establishes antibiotic stewardship as an organizational priority through support of its antibiotic stewardship program.

MM.09.01.01 **EP:** 1

Current EP Text: **Revision Type:** Moved and Revised

Leaders establish antimicrobial stewardship as an organizational priority.
Note: Examples of leadership commitment to an antimicrobial stewardship program are as follows:
- Accountability documents
- Budget plans
- Infection prevention plans
- Performance improvement plans
- Strategic plans
- Using the electronic health record to collect antimicrobial stewardship data

(See also LD.01.03.01, EP 5)

MM.09.01.01 **EP:** 10

New EP Text:

The hospital allocates financial resources for staffing and information technology to support the antibiotic stewardship program.
(See also LD.01.03.01, EP 5)

MM.09.01.01 **EP:** 2

Current EP Text: **Revision Type:** Deleted

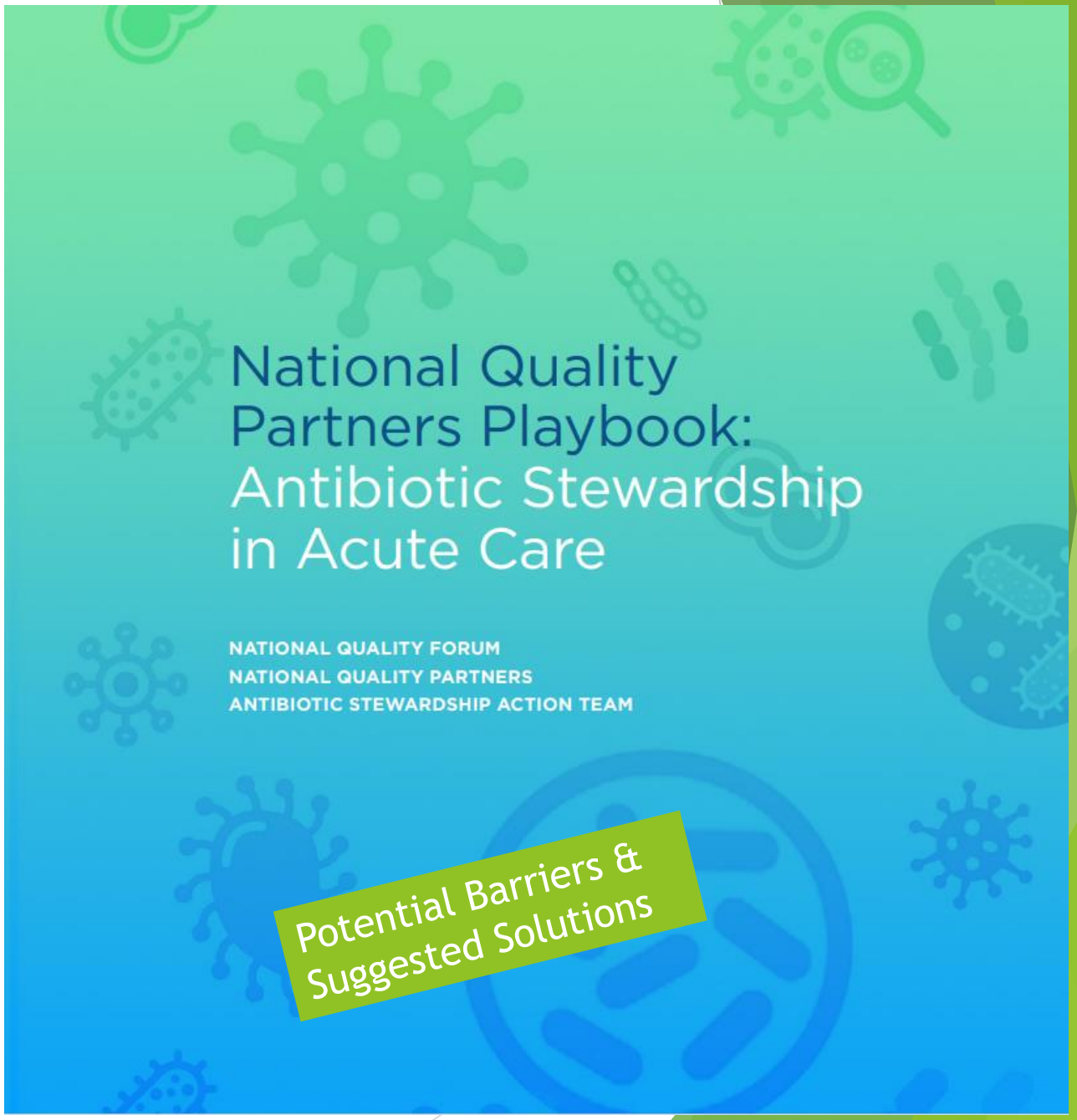
The hospital educates staff and licensed independent practitioners involved in antimicrobial ordering, dispensing, administration, and monitoring about antimicrobial resistance and antimicrobial stewardship practices. Education occurs upon hire or granting of initial privileges and periodically thereafter, based on organizational need.

The Joint Commission New & Revised Antibiotic Stewardship Requirements

Antibiotic Stewardship – Understanding the Updated Requirements | The Joint Commission

Enhancing Antibiotic Stewardship Programs in CAHs Video

Antibiotic Stewardship Resource



http://www.qualityforum.org/NQP/Antibiotic_Stewardship_Playbook.aspx

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- 26. Antimicrobials and Resistance | Microbiology and Risk Factors for Transmission | Table of Contents | APIC

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- Antibiotic Stewardship Core Elements (cdc.gov)
- Building Public Health Capacity for Antimicrobial Resistance (cdc.gov)
- Antibiotic Stewardship – Understanding the Updated Requirements - Effective January 1, 2023 | Hospital and Hospital Clinics | Medication Management MM | The Joint Commission

Questions