



CDC Antibiotic Stewardship Updates

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NHSN Annual Training

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OBJECTIVES

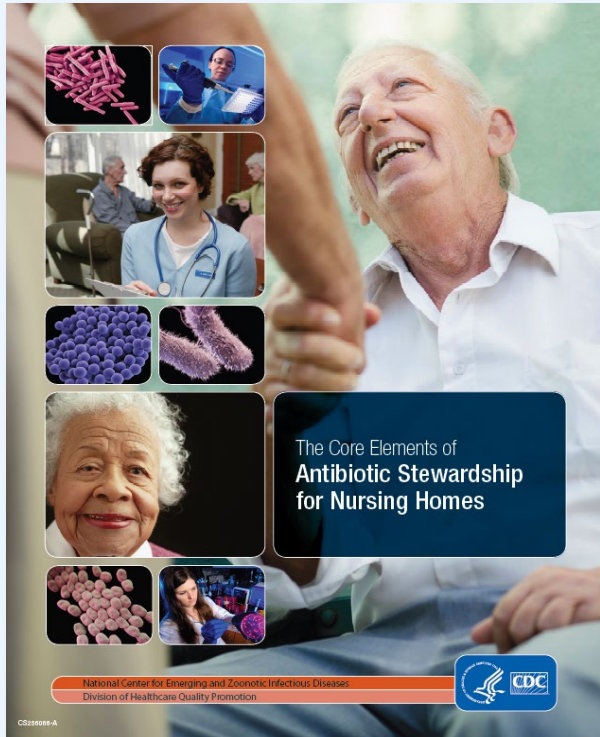
- Describe CDC's Core Elements of Hospital Antibiotic Stewardship Programs, the Priorities for Hospital Core Element Implementation, and national uptake of these frameworks.
- Highlight the role of health systems in ambulatory care delivery and improving outpatient antibiotic use.
- Outline updates to CDC's core elements of outpatient antibiotic stewardship guidance.

CDC's Core Elements of Antibiotic Stewardship

- The Core Elements outline **structural** and **procedural** components that are associated with successful stewardship programs.
- The Core Elements summarize best practices and evidence from successful antibiotic stewardship programs, implemented under a quality improvement framework.
 - Complement existing guidelines/position statements from [IDSA](#), SHEA, ASHP, SIDP
 - Supported by published reviews
- CDC's **Core Elements of Hospital Antibiotic Stewardship Programs** plays an important role in regulatory and accreditation stewardship standards.

Chat and Q & A features are limited to only 1000 participants

CDC's Core Elements of Antibiotic Stewardship



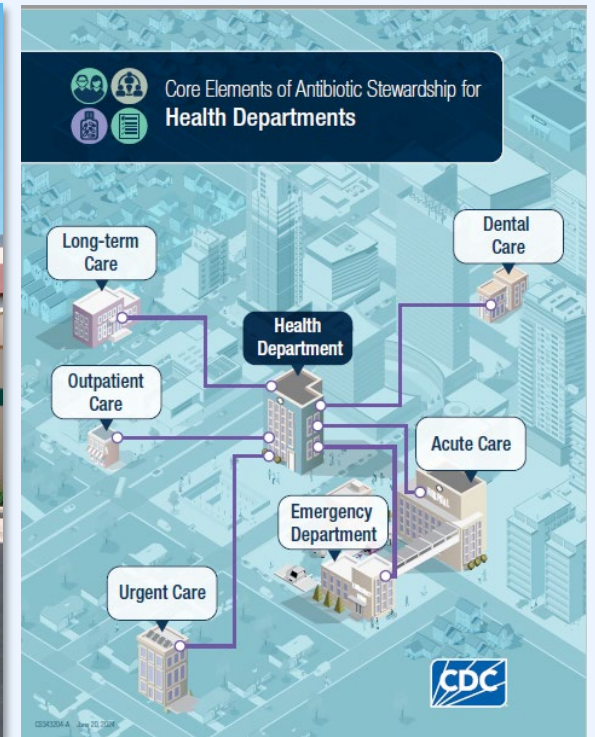
Nursing Homes



Outpatient Settings

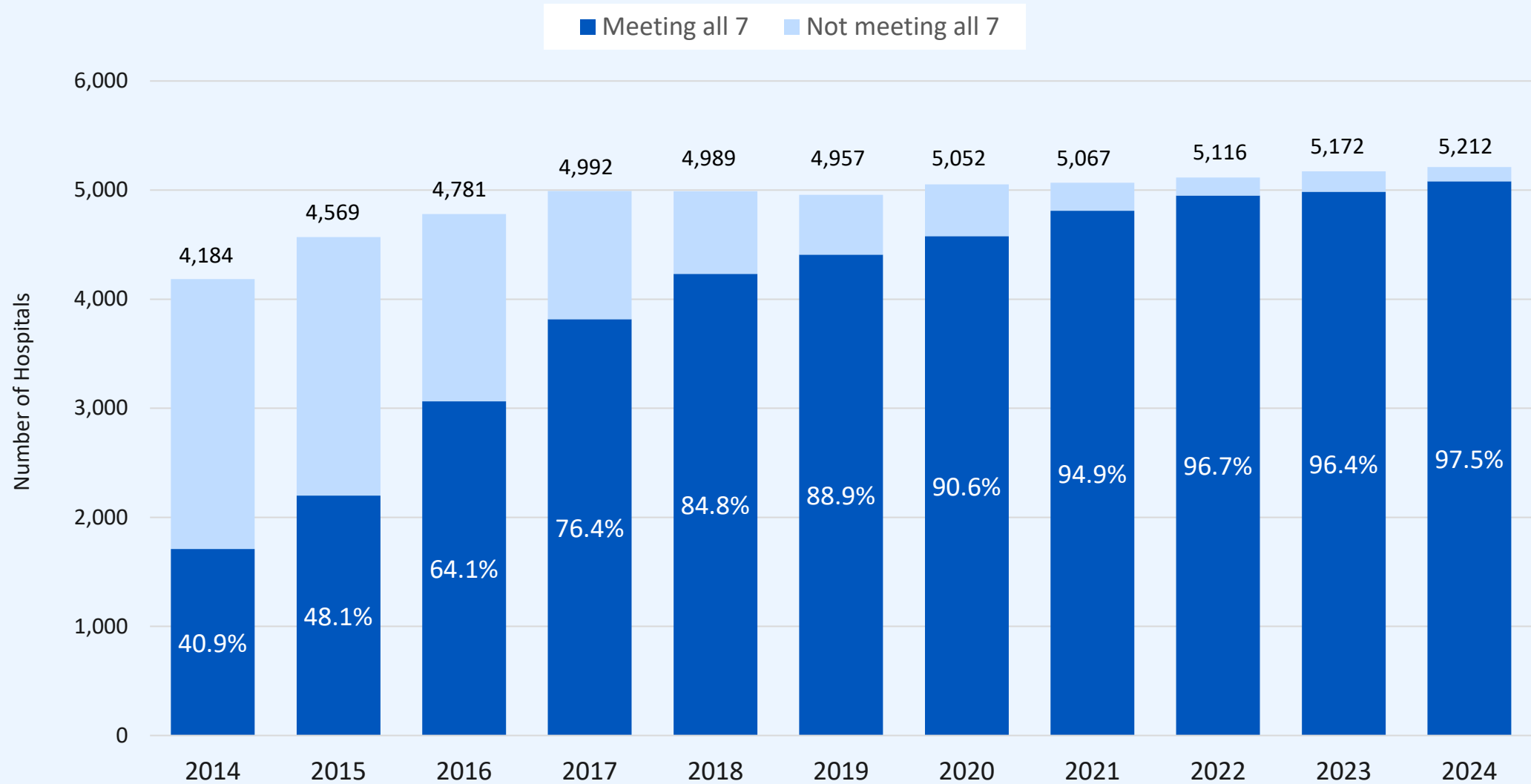


Small and Critical Access Hospitals

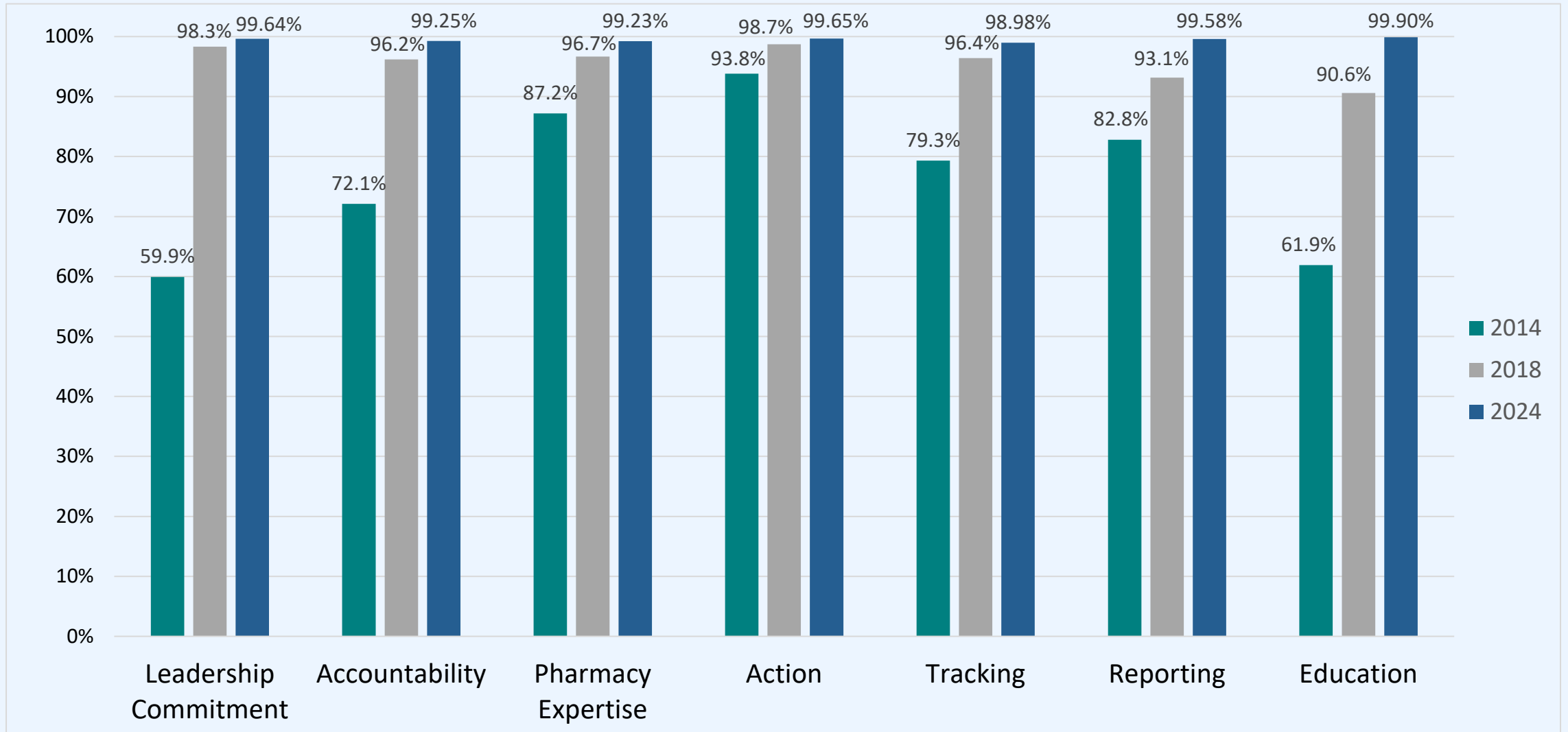


Health Departments

Number and percentage of hospitals meeting all 7 Core Elements

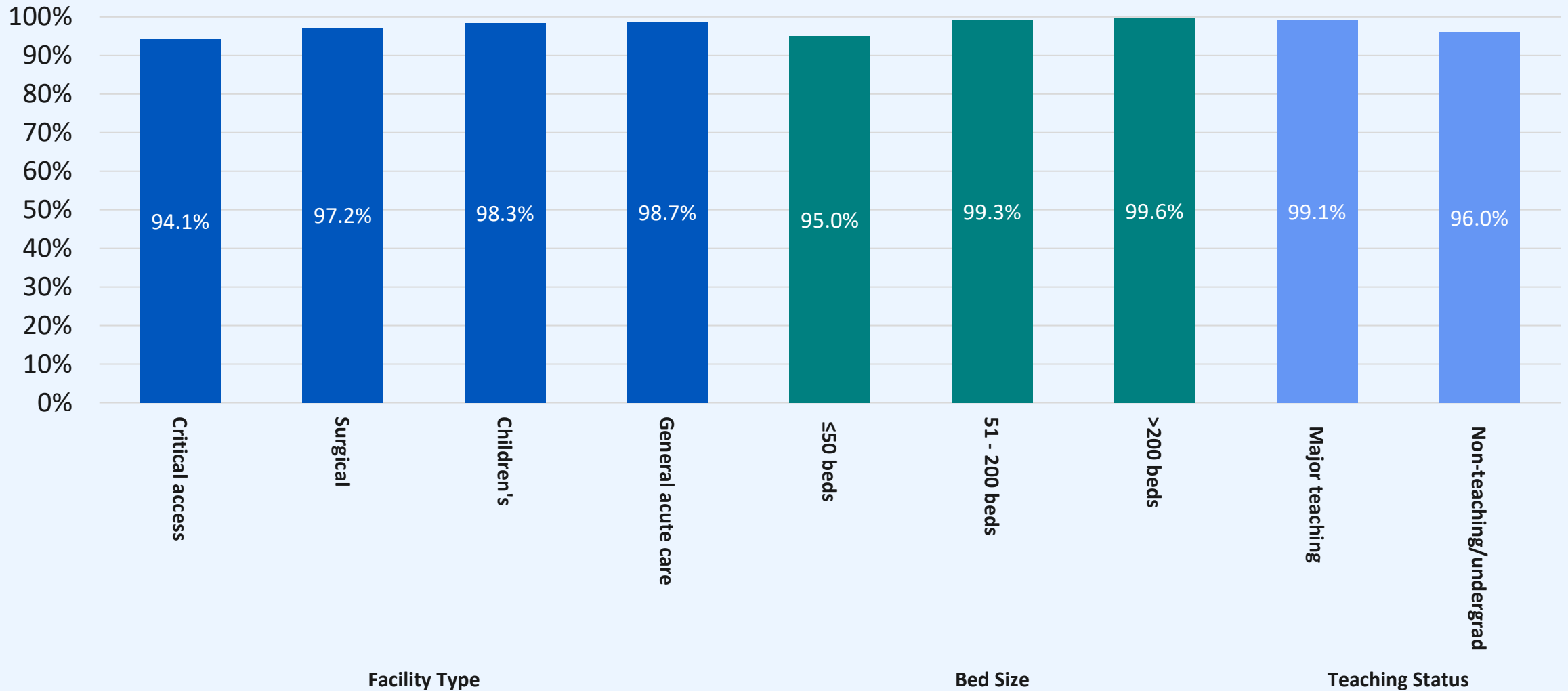


Percentage of hospitals meeting each Core Element



Chat and Q & A features are limited to only 1000 participants

Percentage of hospitals meeting all 7 Core Elements, by hospital characteristic



Chat and Q & A features are limited to only 1000 participants



The Core Elements of Hospital Antibiotic Stewardship Programs: 2019



Centers for Disease
Control and Prevention
National Center for Emerging and
Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Core Elements of Hospital Antibiotic Stewardship Programs



Hospital Leadership Commitment

Dedicate necessary human, financial, and information technology resources.



Accountability

Appoint a leader or co-leaders, such as a physician and pharmacist, responsible for program management and outcomes.



Pharmacy Expertise (previously “Drug Expertise”):

Appoint a pharmacist, ideally as the co-leader of the stewardship program, to help lead implementation efforts to improve antibiotic use.



Action

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



Tracking

Monitor antibiotic prescribing, impact of interventions, and other important outcomes, like *C. difficile* infections and resistance patterns.



Reporting

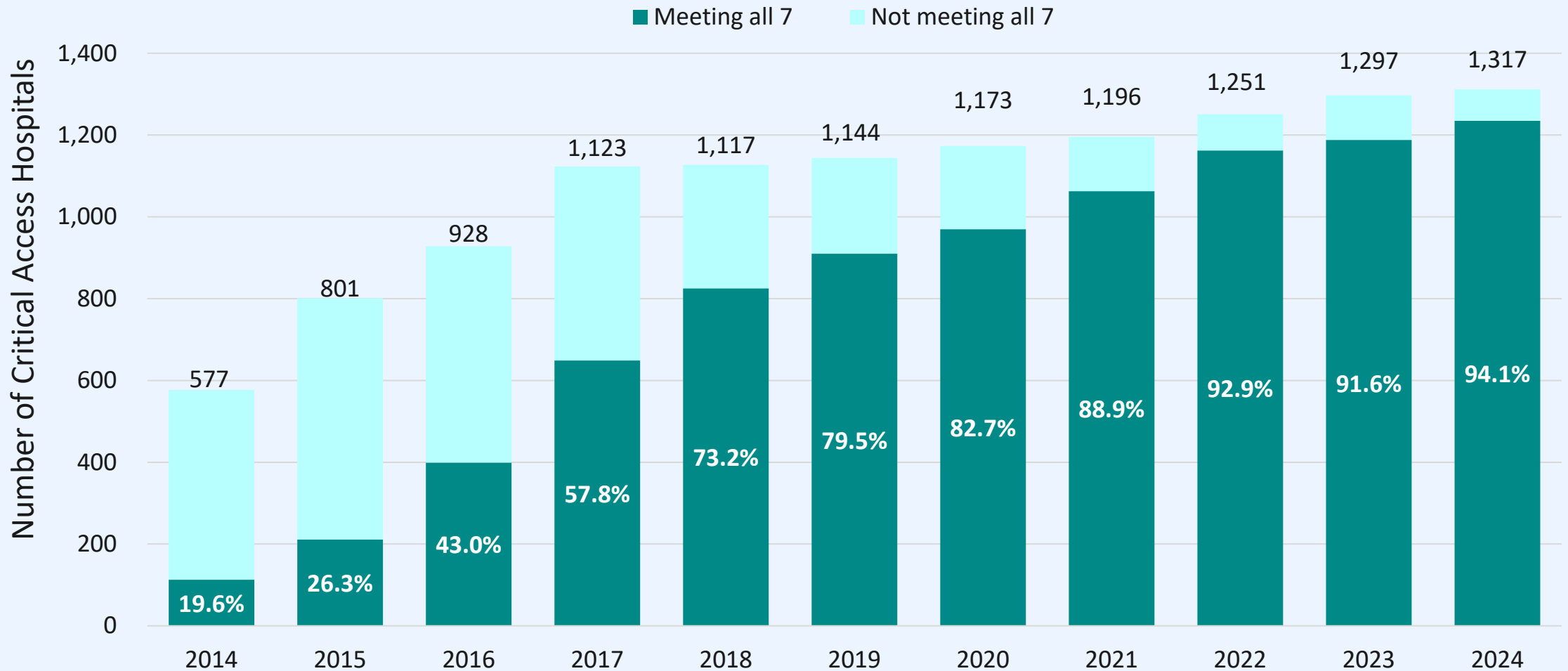
Regularly report information on antibiotic use and resistance to prescribers, pharmacists, nurses, and hospital leadership.



Education

Educate prescribers, pharmacists, nurses, and patients about adverse reactions from antibiotics, antibiotic resistance, and optimal prescribing.

Number and percentage of critical access hospitals meeting all 7 Core Elements



CDC released Priorities to enhance the quality and impact of hospital antibiotic stewardship programs

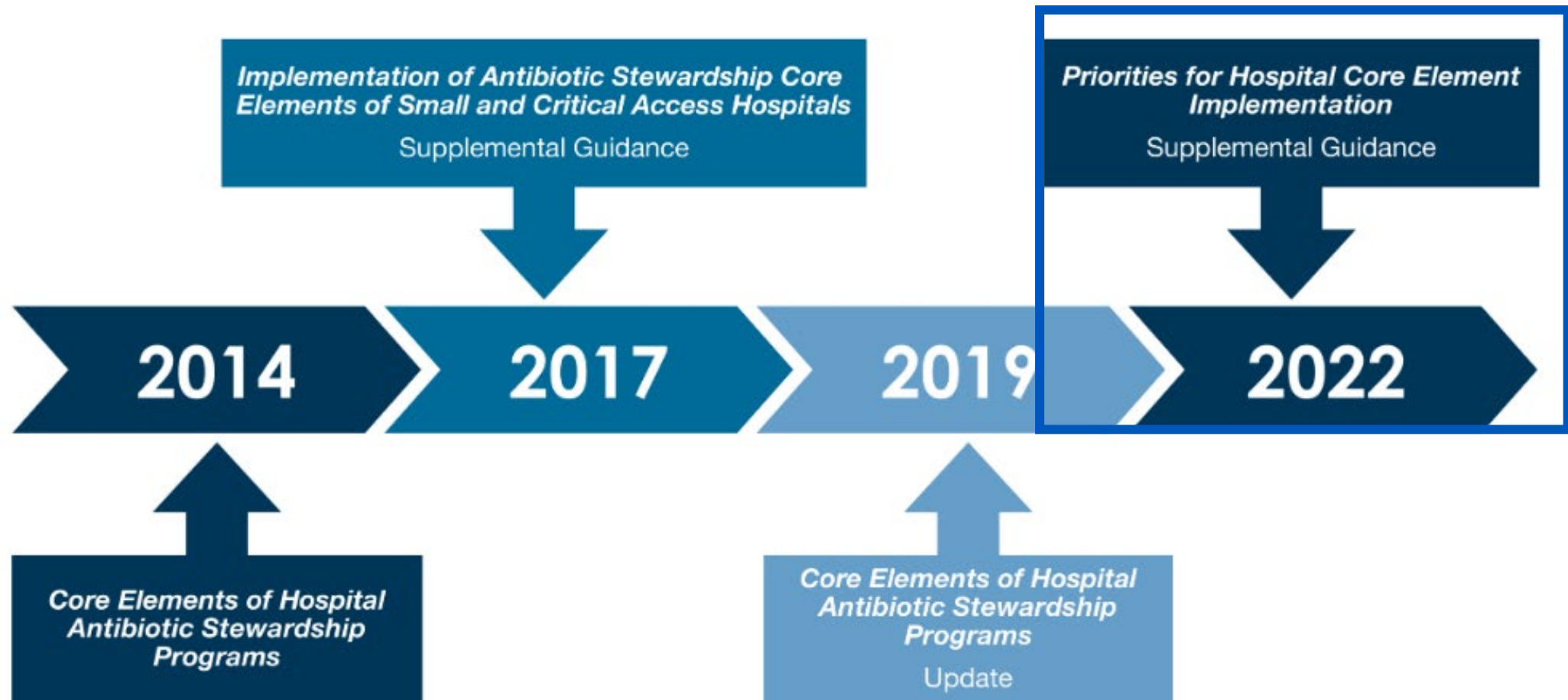









Figure. Timeline of Core Elements of Hospital Antibiotic Stewardship Programs

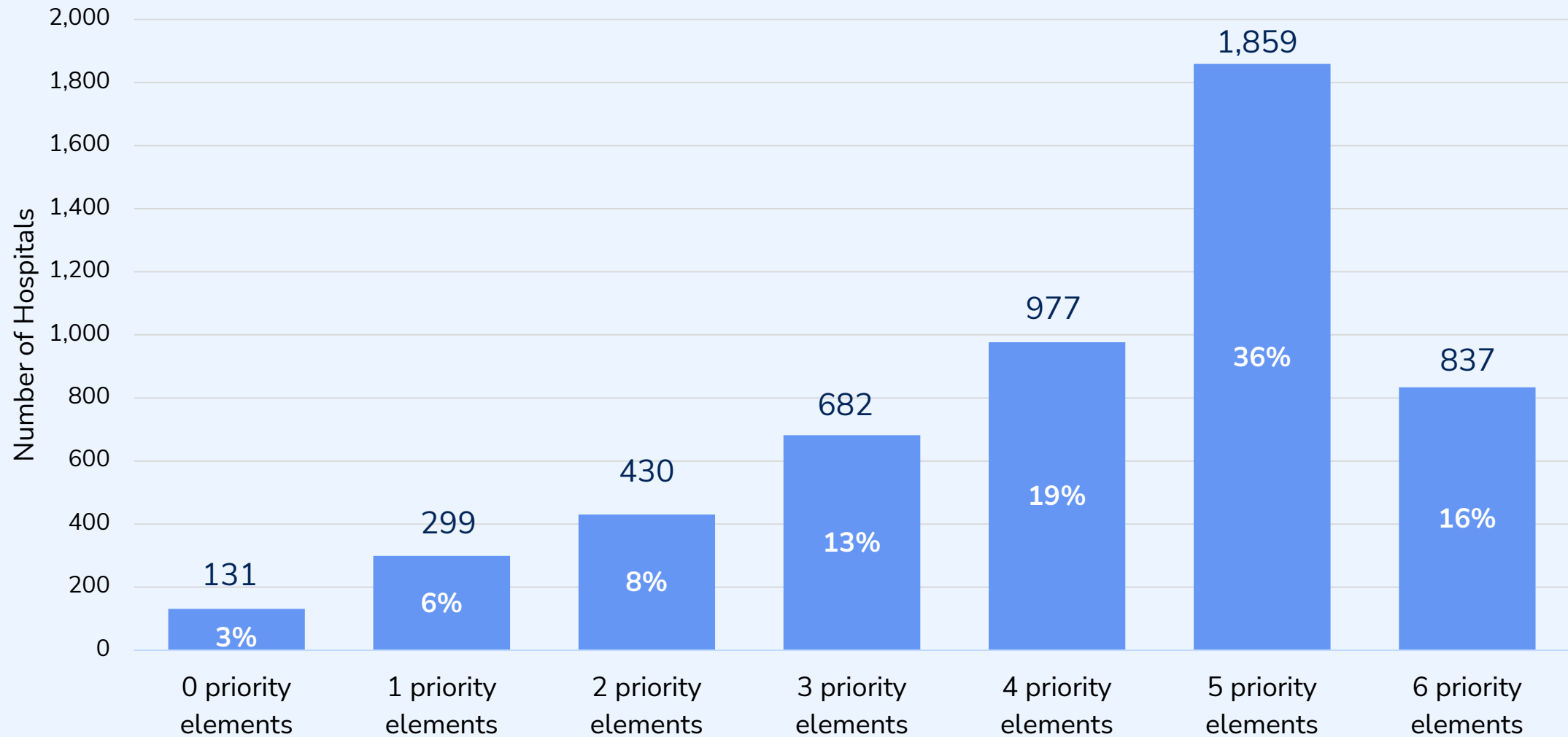
Priorities are derived from the Hospital Core Elements

- Highlight a subset of effective stewardship implementation approaches that are supported by evidence and/or recommended by stewardship experts.
- Provide hospital leadership and antibiotic stewards opportunities to **expand** their antibiotic stewardship programs.

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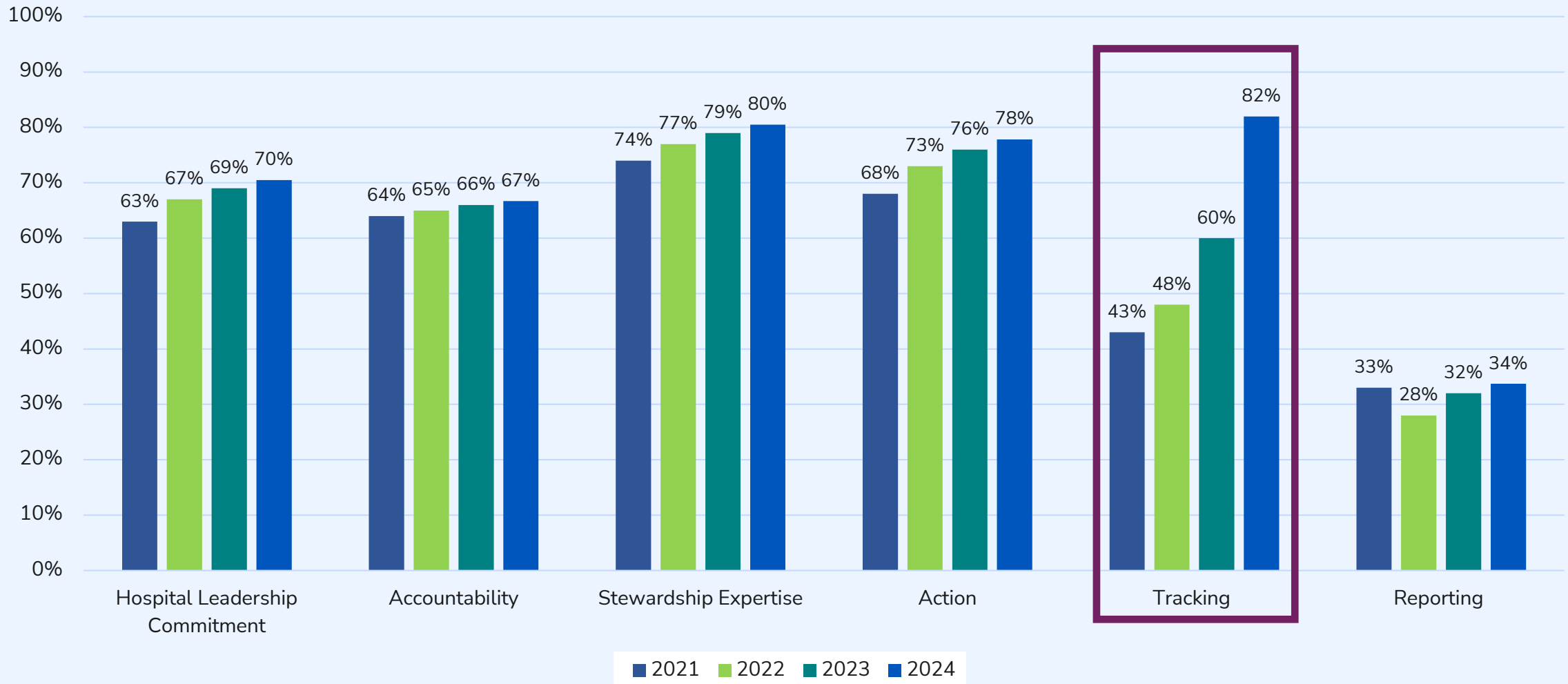
Hospital Core Elements	Priorities for Hospital Core Element Implementation
Hospital Leadership Commitment	
 <p>Dedicate necessary human, financial, and information technology resources.</p>	Antibiotic stewardship physician and/or pharmacist leader(s) have antibiotic stewardship responsibilities in their contract, job description, or performance review.
Accountability	
 <p>Appoint a leader or co-leaders, such as a physician and pharmacist, responsible for program management and outcomes.</p>	Antibiotic stewardship program is co-led by a physician and pharmacist.*
Pharmacy/Stewardship Expertise	
 <p>Appoint a pharmacist, ideally as the co-leader of the stewardship program, to help lead implementation efforts to improve antibiotic use.</p>	Antibiotic stewardship physician and/or pharmacist leader(s) have completed infectious diseases specialty training, a certificate program, or other training on antibiotic stewardship.
Action	
 <p>Implement interventions, such as prospective audit and feedback or preauthorization, to improve antibiotic use.</p>	Antibiotic stewardship program has facility-specific treatment recommendations for common clinical condition(s) and performs prospective audit/feedback or preauthorization.
Tracking	
 <p>Monitor antibiotic prescribing, impact of interventions, and other important outcomes, like <i>C. difficile</i> infections and resistance patterns.</p>	Hospital submits antibiotic use data to the NHSN Antimicrobial Use Option.
Reporting	
 <p>Regularly report information on antibiotic use and resistance to prescribers, pharmacists, nurses, and hospital leadership.</p>	Antibiotic use reports are provided at least annually to target feedback to prescribers. In addition, the antibiotic stewardship program monitors adherence to facility-specific treatment recommendations for at least one common clinical condition.
Education	
 <p>Educate prescribers, pharmacists, nurses, and patients about adverse reactions from antibiotics, antibiotic resistance, and optimal prescribing.</p>	No implementation priority identified.

Number and percentage of facilities meeting 0-6 Priority Elements



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Percentage of facilities meeting each Priority Core Element (n=5,212)



Tracking Uptake of Core Elements in LTAC Hospitals



Form Approved
OMB No. 0920-0666
Exp. Date: 12/31/27
www.cdc.gov/nhsn

Patient Safety Component—Annual Facility Survey for LTAC

Instructions for this form are available at: <http://www.cdc.gov/nhsn/forms/instr/TOI-57.150-LTAC.pdf>

*required for saving

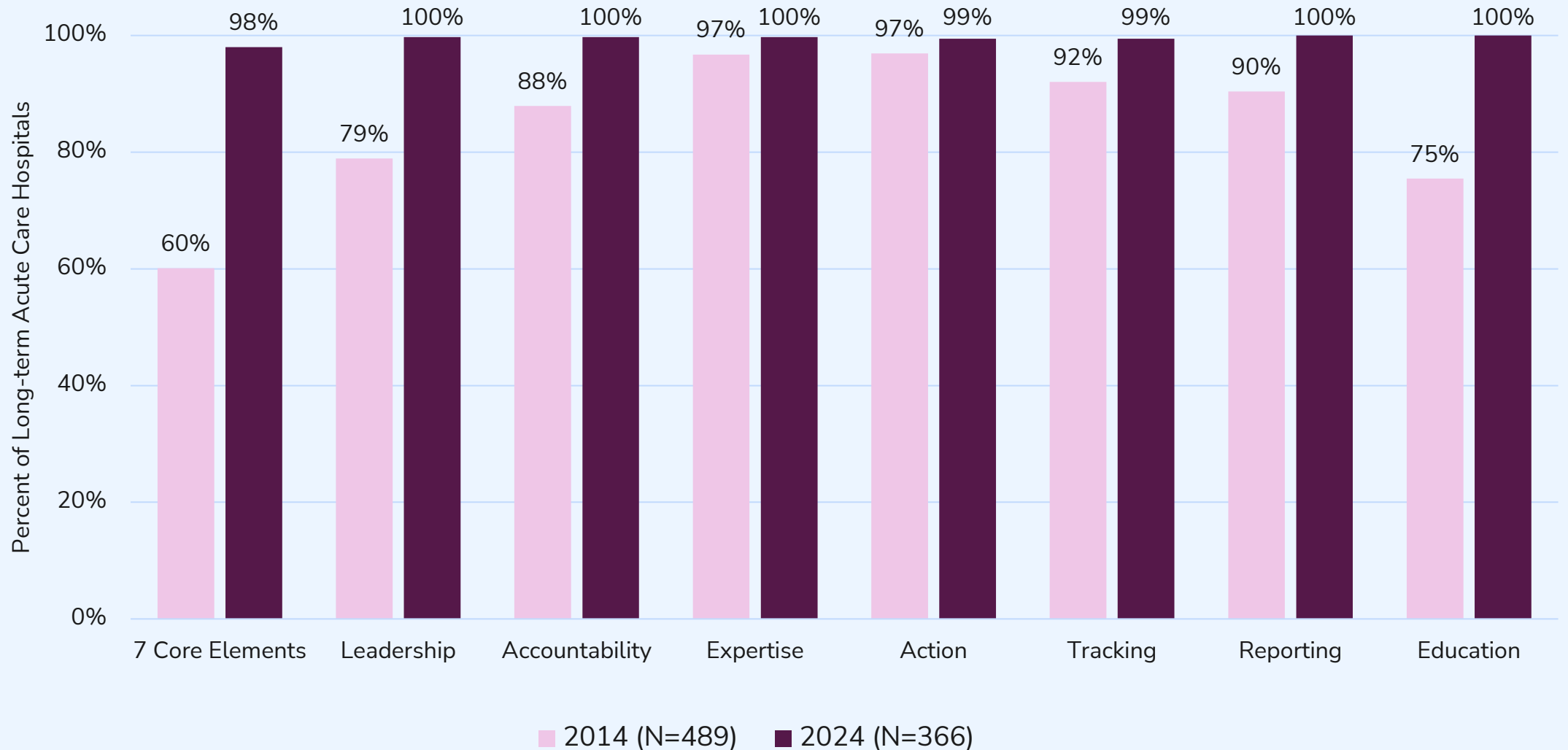
Facility ID:

Facility Characteristics (completed by Infection Preventionist)

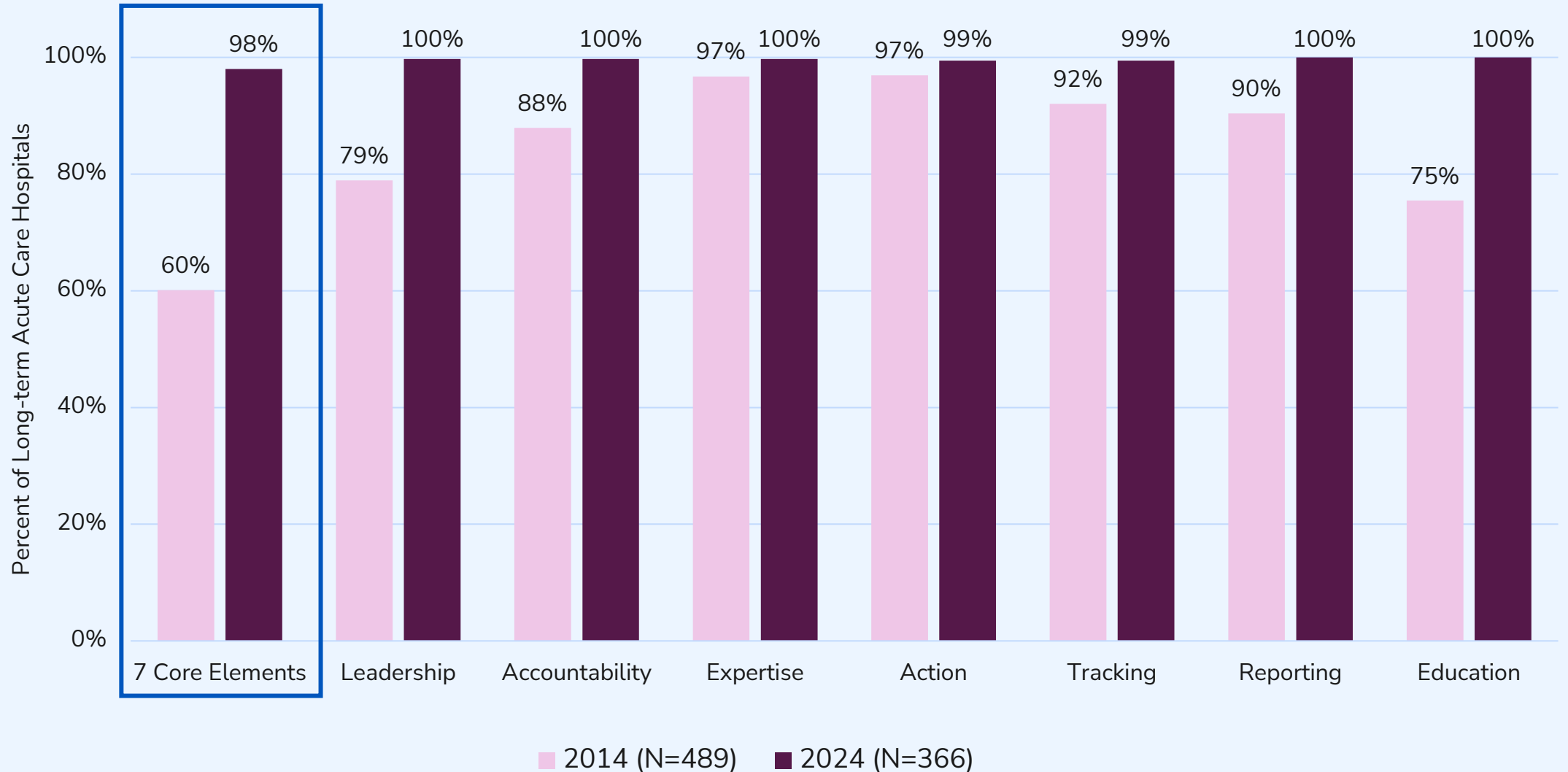
Antibiotic Stewardship Practices (completed with input from Physician and Pharmacist Stewardship Leaders)

- *34. 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).

Percentage of LTAC hospitals meeting each Core Element

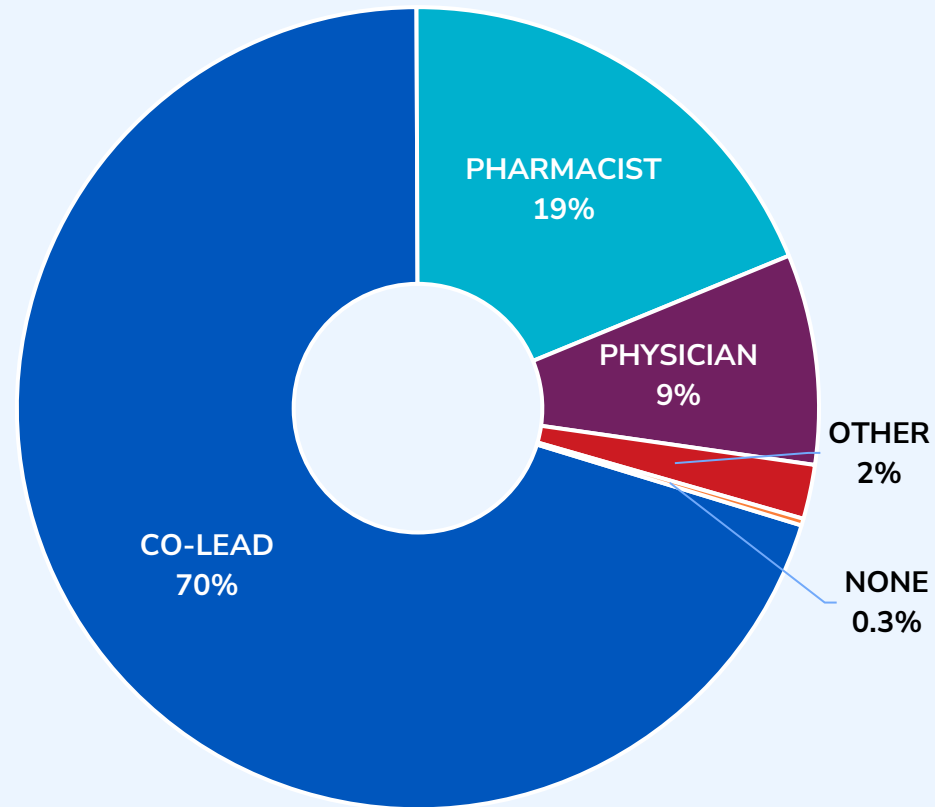


Percentage of LTAC hospitals meeting each Core Element



STEWARDSHIP PROGRAM LEADERSHIP IN LTAC HOSPITALS, 2024

Co-lead antibiotic stewardship programs were present in 70% of LTAC hospitals in 2024.

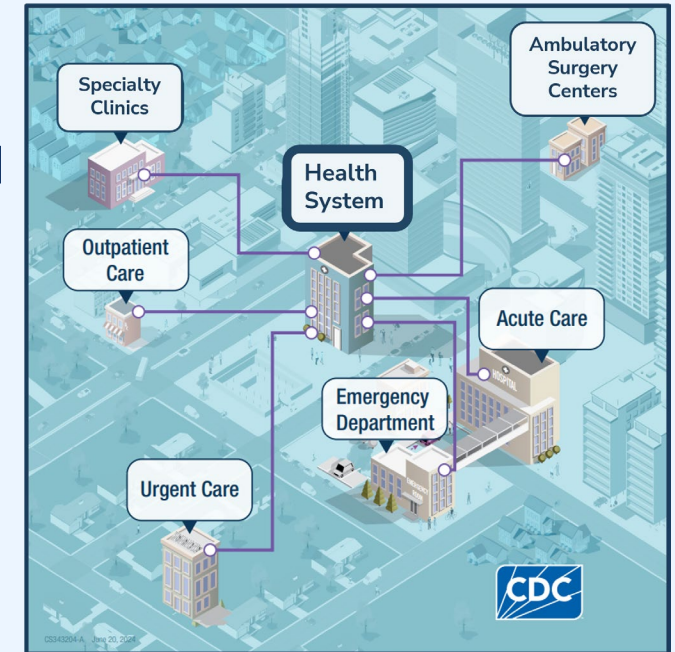


■ CO-LEAD ■ PHARMACIST ■ PHYSICIAN ■ OTHER ■ NONE

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Updated Outpatient Core Elements

- Healthcare delivery increasingly **consolidated** within networks or systems
 - **72% of hospitals** and **49% of primary care physicians** affiliated with health systems
- **Health systems** well-positioned to support development or expansion of stewardship into outpatient settings within their networks
 - Expanded role of hospital stewards to support outpatient stewardship within their health system/hospital outpatient clinics
- Published evidence and experience implementing outpatient stewardship has grown



The Core Elements of Outpatient Antibiotic Stewardship

- Published in 2016, addressed **role of clinics and clinicians** in improving antibiotic prescribing
 - Health systems were one of the intended audiences, but less prominent role
- Included review of evidence
 - 5 systematic reviews, expert opinion
- Focused on **stewardship activities**
 - Accounted for lack of “outpatient stewardship program” in most ambulatory settings



UPDATED OUTPATIENT CORE ELEMENTS



Commitment

Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.



Action for policy and practice

Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.



Tracking and reporting

Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or have clinicians assess their own antibiotic prescribing practices themselves.



Education and expertise

Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.



Leadership Commitment

Dedicate necessary human, financial, and information technology resources.



Accountability

Designate a leader or co-leaders responsible for outpatient antibiotic stewardship program development, management and outcomes.



Expertise

Pair antibiotic stewardship expertise with outpatient setting-specific expertise.



Action

Implement interventions, such as clinical decision support or audit and feedback, to improve antibiotic use.



Tracking

Monitor antibiotic prescribing, the impact of stewardship interventions and other important outcomes.



Reporting

Regularly report data on antibiotic prescribing and outcomes to healthcare professionals and leadership.



Education

Educate healthcare professionals, patients and caregivers on optimal antibiotic prescribing, adverse events, and antimicrobial resistance.

The Core Elements of Outpatient Antibiotic Stewardship Programs

- Stewardship strategies outlined in the guidance can be tailored to best meet the needs of health systems and their different outpatient settings.

Box 1. Outpatient settings for The Core Elements of Outpatient Antibiotic Stewardship Programs

- **Primary care:** Such as family practice, pediatrics, internal medicine.
- **Urgent care:** Facilities offering immediate, non-emergency care for a wide range of conditions.
- **Telemedicine:** Virtual encounters delivered through telecommunication technology, either by traditional clinics (e.g., primary care, urgent care) or direct-to-consumer companies.
- **Emergency care:** Facilities providing immediate evaluation and treatment for acute illness and injuries, including free-standing and independent facilities that are not hospital based.
- **Specialty and subspecialty care:** Clinics serving patients with specialized medical conditions such as gastroenterology, dermatology, urology, oncology, obstetrics, and otolaryngology.
- **Retail health:** Clinics in retail stores or pharmacies that provide preventive health services and treatment for routine conditions.
- **Community pharmacies:** Retail, independent, clinic-based or hospital-affiliated pharmacies.
- **Dental care:** General and specialty dental clinics.
- **Other:** Such as ambulatory surgical centers, outpatient hemodialysis centers, and outpatient parenteral antibiotic therapy (OPAT) services.

The Core Elements of Outpatient Antibiotic Stewardship Programs

- In hospital Core Elements, **priority examples** outlined in 2019 update helped make the case for enhancing stewardship programs.
- In updated outpatient Core Elements, similar structure was adapted for each Core Element to identify:
 - **Priority activities** – high impact activities that require organizational-level support for standardized, system-wide implementation
 - **Additional key activities** – strategies that can be implemented at the health system level and/or tailored to individual practice settings



Leadership Commitment

- **Definition:** Dedicate necessary human, financial, and information technology resources.
- **Health System Priority:**
 - Allocate dedicated **time** and **resources** for outpatient stewardship leads to manage and advance the program independent of inpatient activities, and with adequate IT and analytic staff support to ensure effective and sustainable implementation.



Accountability

- **Definition:** Designate a leader or co-leaders responsible for outpatient stewardship program development, management, and outcomes.
- **Health System Priority:**
 - Allocate dedicated **time** and **resources** for outpatient stewardship leads to manage and advance the program independent of inpatient activities, and with adequate IT and analytic staff support to ensure effective and sustainable implementation.

Expertise



BOX 2. Key support staff and partners for successful antibiotic stewardship implementation

Clinical

- **Physicians and advanced practice providers:** Provide input on stewardship interventions focusing on feasibility and workflow impact.
- **Pharmacists:** Deliver patient education and conduct medication reviews during hospital discharge and outpatient visits.
- **Hospital antibiotic stewardship leadership:** Contribute expertise and support outpatient efforts in hospital-associated clinics.
- **Infection prevention programs:** Integrate stewardship efforts with infection control priorities.
- **Laboratory services:** Ensure appropriate use and reporting of outpatient diagnostic tests.
- **Nursing services:** Reinforce stewardship activities and provide patient education.

Administrative and Operational

- **Administrative staff:** Coordinate logistics and provide support for stewardship activities across clinics.
- **Clinic management teams:** Implement and oversee planned stewardship interventions.
- **Communications and marketing services:** Develop patient education materials and resources to promote appropriate antibiotic use.
- **Information technology teams:** Extract and validate prescribing and outcomes data, develop stewardship and prescriber dashboards, and integrate clinical decision support into workflows.
- **Payer relations services:** Provide performance measure data related to antibiotic use by health plan.
- **Quality improvement, patient safety, and regulatory teams:** Support implementation of interventions including those focused on providing feedback to clinicians.

Patient and Family Partners

- **Patients and families:** Provide feedback on patient-centered resources to ensure stewardship efforts align with patient priorities.
- **Community representatives or patient advisory councils:** Provide structured patient input, especially around educational materials, messaging, and satisfaction concerns.

- **Additional key activity:** Engage key staff with the skills and expertise needed to ensure the success of stewardship interventions.



Tracking

- **Definition:** Monitor antibiotic prescribing, the impact of stewardship interventions, and other important outcomes.
- **Health System Priority:**
 - Measure antibiotic use, including both the **quantity** and **quality** of prescribing, using electronic data at the clinician, practice, and health system levels to evaluate adherence to treatment recommendations.



Tracking

Table 2. Measures tracking the quality of antibiotic prescribing

Approach	Pros	Cons	Example Measures
Antibiotic Prescribing for Antibiotic-Inappropriate Conditions	-Evaluates conditions where antibiotics are not indicated -More actionable than volume measures -Can target unnecessary prescribing for a single or multiple conditions	-Requires linkage of prescribing to diagnosis -Vulnerable to diagnosis shifting -Multiple diagnoses in one visit may complicate attribution	-HEDIS® Avoidance of Antibiotics for Bronchitis (AAB) -HEDIS® Appropriate Treatment for Upper Respiratory Infections (URI)
Antibiotic Prescribing for Antibiotic-Sometimes Appropriate Conditions	-Includes conditions where antibiotics are often overprescribed -High prevalence and high potential for impact -Can highlight opportunities for targeted improvement	- Requires linkage of prescribing to diagnosis -Standards for appropriateness less clear than antibiotic-inappropriate conditions	% of acute sinusitis visits with an antibiotic prescribed % of otitis media visits in children over age 2 with an antibiotic prescribed
Optimal Selection for Antibiotic Prescriptions	-Evaluates concordance with treatment guidelines -Identifies overuse of broad-spectrum agents -Can target high-risk or high-cost antibiotics	-May underestimate appropriateness in special cases (e.g., drug allergy, complicated infections) -Does not address unnecessary prescribing	-% of acute sinusitis visits treated with azithromycin -Amoxicillin index (amoxicillin prescriptions/total antibiotic prescriptions) -% of acute cystitis visits in women treated with fluoroquinolones
Excess Duration of Antibiotic Prescriptions	-Diagnosis information may not be needed -Duration may be easier to benchmark -Optimizing antibiotic duration is generally well-accepted by clinicians -Reducing excess duration can reduce patient harms	-May not reflect initiation or selection appropriateness -Specific to diagnoses with shorter recommended durations -Standards may vary by age group and condition -May be influenced by electronic health record defaults	-% of prescriptions with duration >7 days -Median duration of antibiotics by condition -% of sinusitis visits with >10 days of antibiotics prescribed
Use of Diagnostic Testing	-Ensures appropriate testing to improve diagnosis for common infections -Broader impact on patient safety, quality of care, and cost beyond antibiotic use	-Requires complex data and analysis compared to other metrics -Asymptomatic colonization (e.g., throat or urinary tract) can complicate interpretation	-HEDIS® Appropriate Testing for Pharyngitis (CWP) -Rate of urinalysis or culture orders overall or for patients without urinary tract infection symptoms

Table 1. Measures tracking the quantity of antibiotic prescribing

Approach	Pros	Cons	Example Measures
Total Antibiotic Prescribing	-Includes antibiotics not linked to a visit -Simple to calculate and analyze -Not vulnerable to diagnosis shifting	-Does not assess appropriateness of prescribing -Cannot adjust for visit volume or patient acuity	-Total number of antibiotics prescribed/total number of active patients
Antibiotic Prescribing Across All Visits	-Adjusts for visit volume -Simple to calculate and analyze -Not vulnerable to diagnosis shifting	-Does not assess appropriateness of prescribing -Cannot adjust for patient acuity -Excludes antibiotics prescribed outside a visit	-% of visits with an antibiotic prescription
Antibiotic Prescribing Across Multiple Conditions	-Allows grouping of common or high-priority conditions -Less vulnerable to diagnosis shifting	-Does not assess appropriateness of prescribing	-HEDIS® measure: Antibiotic Utilization for Respiratory Conditions (AXR) -% of visits for upper respiratory infections with an antibiotic prescribed



Expertise

- **Definition:** Pair antibiotic stewardship expertise with outpatient setting-specific clinical expertise.
- **Health System Priority:**
 - Identify **service line leads** to support stewardship program lead(s), champion antibiotic stewardship activities, and engage clinicians within their outpatient practice.



Reporting

- **Definition:** Regularly report data on antibiotic prescribing and outcomes to healthcare professionals and leadership.
- **Health System Priority:**
 - Report antibiotic use metrics electronically through a **stewardship dashboard** to evaluate antibiotic prescribing patterns and support effective audit-and-feedback for clinicians and practices.



Action

- **Definition:** Implement interventions, such as clinical decision support or audit and feedback, to improve antibiotic use.
- **Health System Priority:**
 - Implement **clinical decision support** and perform **audit-and-feedback** guided by health system-specific treatment recommendations.



Action

Table 1. Evidence-based interventions to improve antibiotic prescribing

Intervention	Description	Considerations	Examples
Communication skills training	<ul style="list-style-type: none"> Train clinicians to effectively communicate about the appropriate use of antibiotics and discuss risks and benefits of antibiotic treatment with patients and caregivers 	<ul style="list-style-type: none"> Can be effective in improving antibiotic prescribing while maintaining patient satisfaction Impact contingent on participation, but can have sustained benefits Time constraints may still be a barrier after training 	<ul style="list-style-type: none"> Use communication skills training strategies to reduce unnecessary antibiotic use for acute respiratory illnesses
Delayed prescribing	<ul style="list-style-type: none"> Provide patients with an antibiotic prescription that can be filled if symptoms worsen or fail to improve in a specified timeframe Approach can be used for illnesses that often resolve without antibiotic treatment 	<ul style="list-style-type: none"> Can reduce the use of antibiotics, but applies to a limited number of conditions Included in clinical guidelines for certain conditions Should not be used for conditions where antibiotics are not indicated or are immediately indicated 	<ul style="list-style-type: none"> Rates of delayed antibiotic prescriptions for acute otitis media in children Rates of delayed antibiotic prescriptions for acute sinusitis
Accountable justification	<ul style="list-style-type: none"> Practice of requiring clinicians to document the rationale or indication for providing an antibiotic prescription that is not in accordance with established treatment recommendations 	<ul style="list-style-type: none"> Creates social and reputational pressure that can improve clinician prescribing behavior Can improve congruence between visit documentation and coded diagnosis Additional administrative burden may detract from direct patient care time 	<ul style="list-style-type: none"> Prescribing a non-first-line agent (e.g. azithromycin for sinusitis) Prescribing an antibiotic when relevant diagnostic testing was not performed (e.g. pharyngitis without a rapid strep test)

Public commitment	<ul style="list-style-type: none"> Visual commitment to patient safety through appropriate antibiotic prescribing placed in patient care <u>environment</u>. 	<ul style="list-style-type: none"> Can improve clinician prescribing behavior by providing a visual reminder of accountability to provide high-quality patient care Low cost/resource intervention, but may require administrative approval 	<ul style="list-style-type: none"> Signed commitment posters, screensavers, and educational materials displayed during patient encounters
Clinical decision support	<ul style="list-style-type: none"> Tools and systems that provide clinicians with knowledge and patient-specific information to support decision-making in clinical care 	<ul style="list-style-type: none"> Integration into existing clinical workflow using electronic health record system can improve uptake Tools can be clinician-initiated or system-initiated Should be easy to use and add value to clinical decision-making 	<ul style="list-style-type: none"> EHR alerts or reminders for non-indicated antibiotic use Condition-specific order sets for guideline concordant antibiotic selection and duration of therapy
Audit and feedback	<ul style="list-style-type: none"> Process of systematically reviewing prescribing practices and providing clinicians with information about their prescribing performance 	<ul style="list-style-type: none"> Most effective when compared to peer prescribing Benchmarking needs to be setting-specific Measures of appropriate prescribing should be based on established treatment recommendations 	<ul style="list-style-type: none"> Identify high volume/rate prescribers Evaluate clinician antibiotic prescribing for respiratory condition visits
Performance incentives	<ul style="list-style-type: none"> Financial or non-financial rewards <u>designed</u> to encourage clinicians to reduce unnecessary antibiotic use and adhere to established treatment recommendations when prescribing antibiotics. 	<ul style="list-style-type: none"> Can motivate clinicians to improve guideline-concordant antibiotic prescribing Can be integrated into broader quality improvement initiatives to improve value-based care 	<ul style="list-style-type: none"> Quality improvement goals or quality measure benchmarks (e.g., HEDIS antibiotic use measures) Limit the impact of patient satisfaction scores on clinician reimbursement for upper respiratory infection visits

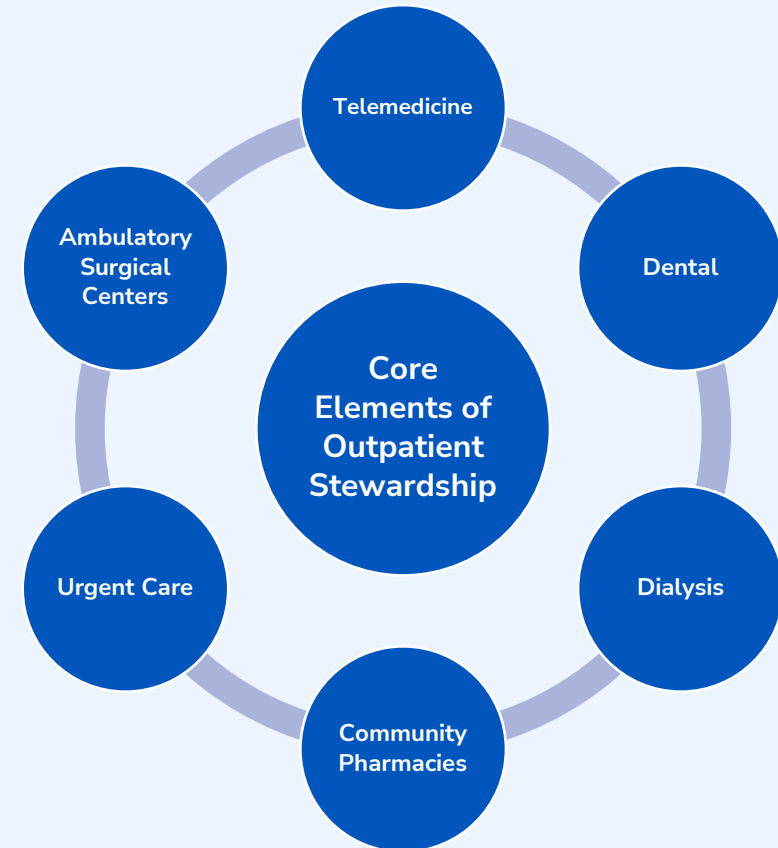


Education

- **Definition:** Educate healthcare professionals, patients, and caregivers on optimal antibiotic prescribing, adverse events, and antimicrobial resistance.
- **Health System Priority:**
 - Provide training on **academic detailing** for service line leads or stewardship champions to support effective delivery of evidence-based antibiotic prescribing education tailored to clinicians' practice needs.

The Core Elements of Outpatient Antibiotic Stewardship Programs

- Updated Core Elements includes appendices with outpatient **setting-specific considerations**
 - 2-page factsheet for different outpatient settings



The Core Elements of Outpatient Antibiotic Stewardship Programs

- Includes updated **Outpatient Antibiotic Stewardship Assessment Tool**
 - Aligns with 7 Core Elements framework
 - Incorporates health system priority activity for each Core Element

Health Systems Checklist for Core Elements of Outpatient Antibiotic Stewardship

CDC recommends that health systems take steps to implement the Core Elements of Outpatient Antibiotic Stewardship to improve patient safety and slow the spread of antimicrobial resistance. Use this checklist to identify and monitor outpatient stewardship activities within your health system.

COMMITMENT

1. Does your health system have dedicated resources and established accountability to improve antibiotic prescribing in outpatient settings? Yes No

If yes, indicate which of the following are in place in your health system. (Select all that apply.)

- Appoint a designated leader, or co-leaders, who are accountable for antibiotic stewardship activities in outpatient facilities within your health system.
- Outline outpatient antibiotic stewardship-related duties in job descriptions and annual performance reviews for stewardship program leads and key support staff.
- Create and promote clinician or organizational leadership commitments to antibiotic stewardship and display during patient encounters (e.g., commitment posters, screensavers, marketing materials).
- Create a formal, written outpatient antibiotic stewardship policy or other formal statements supporting efforts to improve and monitor antibiotic use in outpatient settings.
- Provide resources to support outpatient antibiotic stewardship efforts, ensuring that staff from key support departments and groups (e.g., information technology) are contributing to stewardship activities.
- Communicate with outpatient facilities' clinicians and staff members about antibiotic stewardship activities to set patient expectations regarding appropriate antibiotic use.

ACTION FOR POLICY AND PRACTICE

2. Has your health system implemented at least one practice to improve antibiotic prescribing in outpatient settings? Yes No

If yes, indicate which practices which you use. (Select all that apply.)

- Establish health system-wide treatment recommendations for common clinical conditions which may result in an antibiotic prescription.
- Support electronic health record interventions promoting appropriate antibiotic use (e.g., clinical decision support systems integrated into clinician workflows to assist in diagnostic and therapeutic choices).
- Provide health system-wide guidance on active monitoring and delayed antibiotic prescribing practices for conditions which usually resolve without treatment (e.g., acute otitis media in children and acute uncomplicated sinusitis).
- Support performance incentives for clinicians related to improving antibiotic prescribing.
- Use call centers or phone triage to prevent unnecessary visits (e.g., for common cold) that may result in an unnecessary antibiotic prescription.
- Support programs which systematically de-label inaccurate antibiotic allergies among patients through a review of allergy history, penicillin allergy testing, and/or a referral to an allergist.
- Provide communications skills training to clinicians to promote strategies to improve antibiotic use.

TRACKING AND REPORTING

3. Does your health system track and report at least one aspect of antibiotic prescribing? Yes No

If yes, indicate which tracking and reporting activities are performed. (Select all that apply.)

- Track and report specific antibiotic use metrics describing prescribing practices for high priority conditions or assessing quality of prescribing (antibiotic selection, duration, or other quality indicators).
- Use audit and feedback reports (with or without peer comparisons) to improve clinician antibiotic prescribing.
- Share antibiotic prescribing reports summarizing antibiotic use and stewardship activities with health system leadership, antibiotic stewardship staff, individual clinicians, infection prevention staff, quality improvement staff, or other relevant local partners and stakeholders.
- Explore or identify potential health disparities in antibiotic use, clinical diagnoses, and/or access to care across patient populations.

EDUCATION AND EXPERTISE

4. Does your health system provide education and resources to clinicians and patients on evidence-based antibiotic prescribing in outpatient settings? Yes No

If yes, indicate which tracking and reporting activities are performed. (Select all that apply.)

- Provide clinicians continuing education or maintenance of certification training on appropriate antibiotic use.
- Provide academic detailing (e.g., peer-to-peer education) on antibiotic prescribing to clinicians to promote appropriate antibiotic use.
- Provide patient educational resources on appropriate antibiotic use and antibiotic-related adverse events during patient encounters and communication.
- Ensure clinicians have timely access to persons with antibiotic prescribing expertise.

Core Elements of Outpatient Antibiotic Stewardship 4

Knowledge Check

Which of the following represent key changes in the updated Outpatient Core Elements compared to the 2016 version? (Select ALL that apply)

- A. Introduction of health system–level *priority activities* for each Core Element
- B. Emphasis on system-wide infrastructure (e.g., IT, analytics, dashboards) to support stewardship
- C. Shift away from clinician-level interventions toward exclusively centralized approaches
- D. Greater integration of outpatient stewardship within health system networks and leadership structures

Knowledge Check Answer

Which of the following represent key changes in the updated Outpatient Core Elements compared to the 2016 version? (Select ALL that apply)

- A. Introduction of health system–level *priority activities* for each Core Element
- B. Emphasis on system-wide infrastructure (e.g., IT, analytics, dashboards) to support stewardship
- ~~C. Shift away from clinician-level interventions toward exclusively centralized approaches~~
- D. Greater integration of outpatient stewardship within health system networks and leadership structures

Antibiotic Use and Stewardship in the United States, 2025 Update: Progress and Opportunities

- Introduction
- Antibiotic stewardship guidance and resources
- **Antibiotic use and stewardship data**
- Findings from CDC studies
- *Be Antibiotics Aware* campaign updates
- The path forward

Antimicrobial Resistance & Patient Safety Portal

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

Explore and Visualize Data on Antibiotic Use and Stewardship

Learn more at cdc.gov/antibiotic-use

CDC

CS354543-A

ELC Stewardship Program Fact Sheets

Improving Antibiotic Use Protecting Patients and Combating Antimicrobial Resistance



Antimicrobial resistance – when germs like bacteria and fungi develop the ability to defeat the drugs designed to kill them – is an urgent public health threat. In the United States, more than three million antimicrobial-resistant infections and *Clostridioides difficile* infections (often associated with antibiotic use) occur each year, leading to nearly 50,000 deaths.¹

Improving the use of antibiotics, also known as **antibiotic stewardship**, is a core strategy to ensure patient safety and slow the development and spread of antimicrobial resistance in hospitals and communities.

The Centers for Disease Control and Prevention (CDC) leads U.S. Government public health efforts to protect the health of Americans by improving antibiotic use and strengthening antibiotic stewardship programs. **These investments have resulted in:**

96% of U.S. hospitals and 82% of long-term care facilities have antibiotic stewardship programs that meet all seven CDC Core Elements of Antibiotic Stewardship as of 2023.^{2,3}

14% reduction in how often antibiotics were dispensed by community pharmacies from 2011 to 2023.^{3,4}

7% reduction in the percent of residents who received antibiotics in long-term care facilities between 2013 to 2021.⁴

For nearly two decades, CDC has invested in a strong national infrastructure that empowers every state and more than a dozen territorial and local health departments to combat antimicrobial resistance. Health departments work every day to detect, respond to, and control outbreaks and improve antibiotic use. CDC provides millions of dollars annually to health departments which allow expanded antibiotic stewardship expertise and public engagement on the importance of improving antibiotic use.

From August 2023 to July 2024, public health antibiotic stewardship experts in 57 health departments collaborated with:

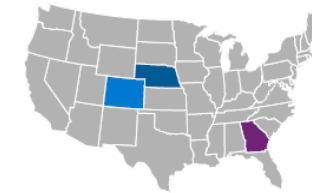
77,737
Healthcare Professionals
(e.g., doctors, pharmacists, advanced practice providers, and nurses)

11,320
Healthcare Facilities
(e.g., hospitals, nursing homes, and outpatient facilities)

1,240
Partners
(e.g., healthcare systems, academic institutions, and professional organizations)

Antibiotic Stewardship in Action State Health Departments Advancing Antibiotic Stewardship

Public health antibiotic stewardship experts improve antibiotic use, protect patients, and combat antimicrobial resistance. These are examples of state health departments improving antibiotic prescribing for patients in their communities.



Improving Antibiotic Use in Nebraska

The Nebraska Department of Health and Human Services antibiotic stewardship experts and the Nebraska Hospital Association increased the number of hospitals reporting to the National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance (AUR) Module.⁵ Reporting to the NHSN AUR Module helps hospitals monitor and improve their antibiotic use. Experts facilitated educational webinars and provided 48 hospitals with technical assistance to support reporting. This led to an increase in the percentage of facilities in Nebraska tracking antibiotic use as part of a national effort using the NHSN AUR module from 24% in 2022 to 51% in 2024. Statewide public health collaboration in Nebraska helped to strengthen hospital antibiotic stewardship programs.

Improving Antibiotic Use in Colorado

In 2021, the Colorado Department of Public Health and Environment partnered with Children's Hospital Colorado to launch the Colorado Antimicrobial Stewardship Endeavor (CASE). CASE brings together physicians, pharmacists, and epidemiologists to support Colorado hospitals implement antibiotic stewardship. CASE assists hospitals in implementing evidence-based actions, tracking antibiotic use, and meeting state and national standards. CASE increased its outreach from 17 hospitals in 2021 to 42 hospitals in 2024. CASE drove optimal antimicrobial use by increasing uptake of the Core Elements of Antibiotic Stewardship from 88% in 2018 to 100% in 2022 among acute care hospitals and from 69% to 83% among critical access hospitals.

Improving Antibiotic Use in Georgia

The Georgia Department of Public Health, in partnership with a Federally Qualified Health Center (FQHC), improved appropriate antibiotic use in rural areas where there are few infectious disease doctors to lead stewardship efforts. Experts provided treatment guidelines for pharyngitis (infections that cause sore throat, such as strep throat), educational webinars, and feedback data for individual clinicians. The FQHC network implemented an alert in the electronic medical record system to remind clinicians that bronchitis (chest colds) should not be treated with antibiotics. This resulted in fewer unnecessary antibiotic prescriptions for pharyngitis and bronchitis and increased prescribing of the right antibiotics for strep throat across the network. The health department is expanding the initiative to dental clinics and planning more collaborations.

Learn more about:

1. Antimicrobial resistance threats in the United States: bit.ly/45mOzu1
2. Core Elements of Antibiotic Stewardship: bit.ly/3GNnuXL
3. Data on antibiotic stewardship and antibiotic use in the United States: bit.ly/4mjd3tX
4. Antibiotic prescribing in the United States: bit.ly/41i08QP
5. National Healthcare Safety Network Antimicrobial Use and Resistance Module: bit.ly/3H6ZYVB



Learn more about the Core Elements of Antibiotic Stewardship:
bit.ly/3GNnuXL



Revised August 2025



Penicillin Allergy Management - Removing Barriers to Optimal Antibiotic Prescribing

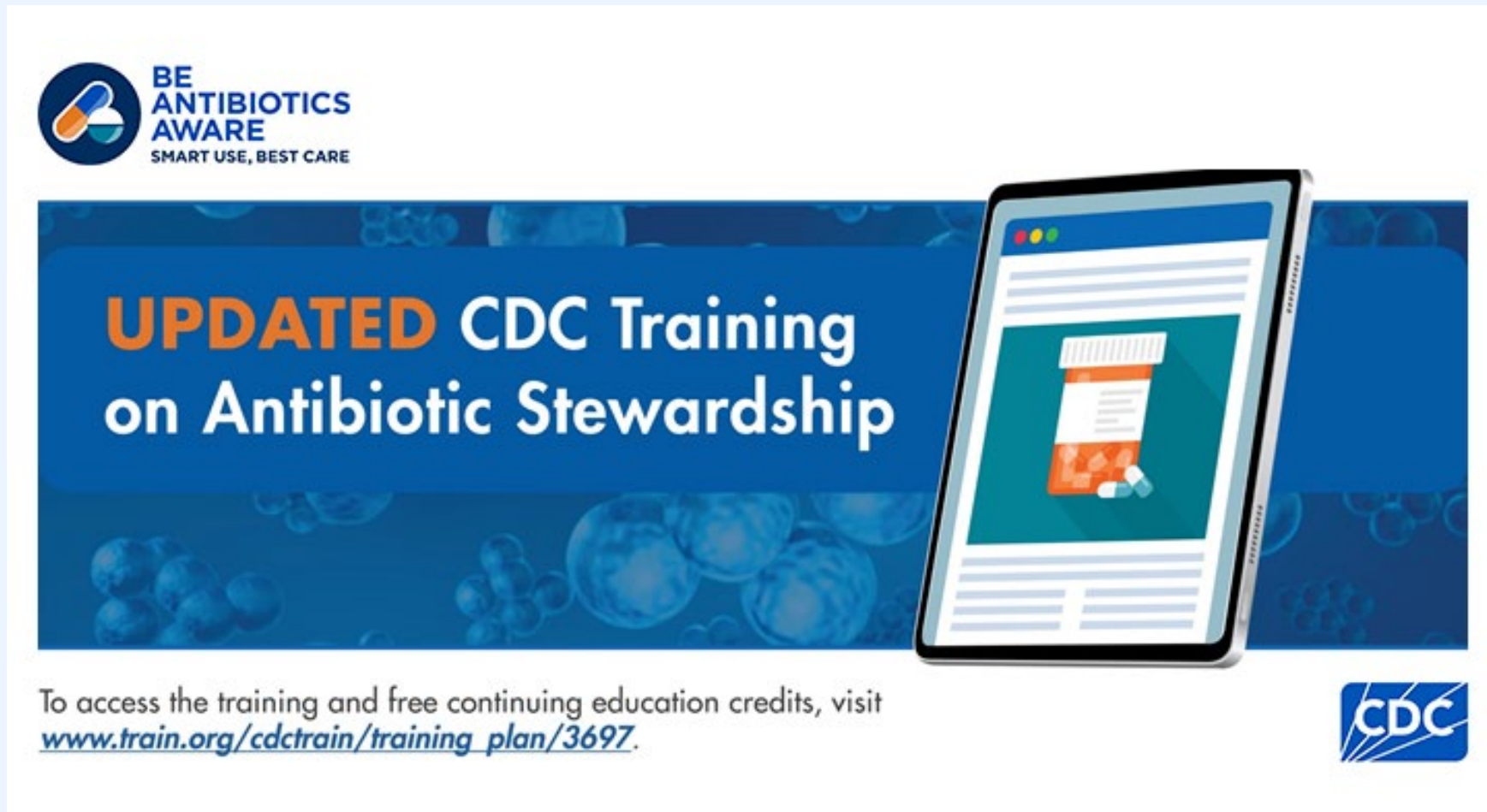
Topics Covered:

- Module 1: Learn about penicillin allergies: What are the adverse effects, how to take a history and perform a risk assessment
- Module 2: Learn about penicillin allergy testing: When to test, how to test, and how to delabel
- Module 3: Learn about penicillin allergy teamwork: How to engage patients, how to document penicillin allergy testing, and how to function as a team

Available credit:	
2.00 ABIM MOC	
2.00 ACPE Pharmacy	
2.00 AMA PRA Category 1 Credit™	
2.00 Participation	
Course opens:	11/21/2024
Course expires:	12/06/2027
Cost:	\$0.00

Funding for these online educational program was made possible (in part) by the Centers for Disease Control and Prevention.

CDC training with over 8 hours of free CE credits on antibiotic stewardship



The advertisement features the 'BE ANTIBIOTICS AWARE' logo in the top left corner, which includes a stylized pill icon and the tagline 'SMART USE, BEST CARE'. The central text reads 'UPDATED CDC Training on Antibiotic Stewardship' in a large, bold font. To the right of the text is a graphic of a tablet displaying a webpage with a pill bottle icon. At the bottom left, there is a call to action: 'To access the training and free continuing education credits, visit www.train.org/cdctrain/training_plan/3697.' The CDC logo is positioned in the bottom right corner. The background of the central graphic is blue with a pattern of white and light blue circles.

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

UPDATED CDC Training
on Antibiotic Stewardship

To access the training and free continuing education credits, visit
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CDC

Questions?



Thank You!

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antibioticuse@cdc.gov

For more information, contact CDC
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TTY: 1-888-232-6348 <https://www.cdc.gov/>
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U. S. Centers for Disease Control and Prevention.

