



Antibiotic Stewardship in Long-Term Care Facilities

NHSN LTC Training 2019

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Centers for Disease Control and Prevention

Speaker Disclosures

The speaker have no financial relationship(s) or disclosures.

The conclusions in this talk are the speaker's and do not necessarily represent the Centers for Disease Control and Prevention.

Learning Objectives

- By the end of the session, participants will be able to:
 1. Discuss ways to track the core elements of antibiotic stewardship implementation using the annual survey
 2. Identify opportunities to improve antibiotic use in UTI using the UTI module
 3. Monitor outcomes of antibiotic stewardship using LabID event reporting

Antibiotics are frequently prescribed inappropriately in nursing homes.

- An estimated 50% of NH residents will be prescribed one or more courses of systemic antibiotics in a year.¹
 - Facility-level interquartile range 44-58%
- In nursing homes, small studies have shown an estimated 40-75% of antibiotic prescribing is inappropriate.^{2,3}

1. Kabbani et al, preliminary data presented at SHEA 2019, do not reproduce without permission.
2. Lim et al. Clin Interv Aging. 2014 Jan 13;9:165-77.
3. Nicolle et al. Infect Control Hosp Epidemiol. 2000 Aug;21(8):537-45.

Antibiotic use (both necessary and unnecessary) can cause harm and adverse drug events.

- Antibiotic use can lead to adverse events and allergic reactions.

1. Gurwitz et al. Am J Med. 2005 Mar;118(3):251-8.

2. Tamura et al, Clin Geriatr Med. 2012 May;28(2):217-36.

3. Field et al, Arch Intern Med. 2001 Jul 9;161(13):1629-34.

4. Corsonello et al, Clin Microbiol Infect. 2015 Jan;21(1):20-6.

Antibiotic use (both necessary and unnecessary) can cause harm and adverse drug events.

- Antibiotic use can lead to adverse events and allergic reactions.
- **Polypharmacy** is associated with an increased risk of adverse drug events in older adults.^{1,2}
 - Antibiotics contribute to clinically significant drug interactions.^{3,4}
 - In a cohort study at two nursing homes, **13%** of adverse drug events were secondary to antibiotic use.¹

1. Gurwitz et al. Am J Med. 2005 Mar;118(3):251-8.

2. Tamura et al, Clin Geriatr Med. 2012 May;28(2):217-36.

3. Field et al, Arch Intern Med. 2001 Jul 9;161(13):1629-34.

4. Corsonello et al, Clin Microbiol Infect. 2015 Jan;21(1):20-6.

Antibiotic use and microbiome disruption lead to *Clostridioides difficile* infection.

- Risk of *C. difficile* infection, morbidity and mortality is **highest** in older adults.
 - Cohort study of nursing homes in Canada showed that diarrhea, gastroenteritis and *C. difficile* infection were the most common antibiotic-related adverse events.¹

1. Daneman et al. JAMA Intern Med. 2015 Aug;175(8):1331-1339.

2. Baggs et al, Clin Infect Dis. 2018 Mar 19;66(7):1004-1012.

Antibiotic use and microbiome disruption lead to *Clostridioides difficile* infection.

- Risk of *C. difficile* infection, morbidity and mortality is highest in older adults.
 - Cohort study of nursing homes in Canada showed that diarrhea, gastroenteritis and *C. difficile* infection were the most common antibiotic-related adverse events.¹
- Some evidence suggests higher rates of **sepsis** in people who have received antibiotics.²
 - Could be secondary to microbiome disruption.

1. Daneman et al. JAMA Intern Med. 2015 Aug;175(8):1331-1339.

2. Baggs et al, Clin Infect Dis. 2018 Mar 19;66(7):1004-1012.

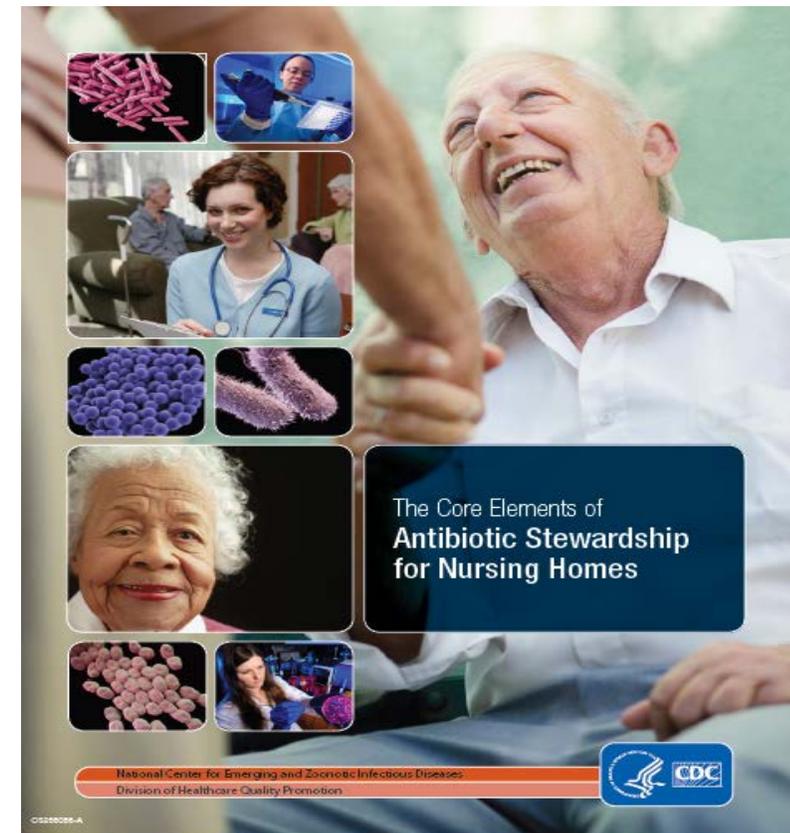
What is Antibiotic Stewardship?

- Antibiotic stewardship is a set of commitments and actions designed to **optimize** the treatment of infections while **reducing** the adverse events associated with antibiotic use.
- Antibiotic stewardship is fundamentally about resident **safety** and **high-quality** healthcare.

The Core Elements of Antibiotic Stewardship for Nursing Homes.

Questions about the framework for assessing current and new antibiotic stewardship activities are included in the yearly facility survey.

- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education



Leadership Commitment: Demonstrate support and commitment to safe and appropriate antibiotic use.

- *19. Does your facility have a written statement of support from leadership that supports efforts to improve antibiotic use? Yes No
- *20. Are antibiotic use and resistance data reviewed by leadership in quality assurance/performance improvement committee meetings? Yes No

Leadership Commitment: Essential First Step for Antibiotic Stewardship Implementation.

- NH leaders commit to improving antibiotic use.
 - Owners, facility administrators, regional and national leaders.



Our Commitment to Antibiotic Stewardship

Antibiotics save lives, but are frequently prescribed unnecessarily. Harms from antibiotic overuse can be significant, especially for frail older adults. Potential harms include adverse drug events, drug interactions, and antibiotic-resistant and *Clostridioides difficile* infections.

As part of our continuing commitment to provide the best quality care to our residents, we are dedicated to improving antibiotic use through antibiotic stewardship implementation. **Antibiotic stewardship** refers to a set of commitments and activities designed to “optimize the treatment of infections while reducing the adverse events associated with antibiotic use.”

We are committed to improving antibiotic prescribing practices. We will provide staff and resources to support antibiotic stewardship implementation. We are confident that with the support of front-line staff, prescribing clinicians, and residents and families, we will continue to provide residents with the best quality care by improving antibiotic use, and protecting them from the unintended harms of inappropriate antibiotic use.

Sincerely,

To learn more about appropriate antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.



Accountability: Identifying Individuals Who Will Lead Antibiotic Stewardship Implementation.

- It is critical to identify a local “champion” who will lead the implementation of antibiotic stewardship actions.¹
 - Medical Director, peer comparison and feedback
 - Nursing Director
 - Consultant Pharmacist
 - Other: IPC coordinator have key expertise and data to improve antibiotic use. Training, dedicated time, and resources can help IPC program coordinators support stewardship activities.

*12. Are there one or more individuals responsible for the impact of activities to improve use of antibiotics at your facility? Yes No

If Yes, what is the position of the individual(s)? (select all that apply)

- Medical director
- Director of Nursing
- Consultant Pharmacist
- Other (please specify): _____

Drug Expertise: Support for Antibiotic Stewardship Implementation.

- Establishing access to individuals with antibiotic expertise:
 - Engage consultant pharmacists
 - Review AU data and can support tracking of AU
 - Ensure documentation of prescribing elements
 - Limit antibiotic duration
 - Improve prescribing practices (protocol development/review, education, ASB treatment, prophylaxis, fluoroquinolones)

 - Develop partnerships with antibiotic stewardship leads in referring hospitals or infectious disease consultants in the community

*21. Does your facility have access to individual(s) with antibiotic stewardship expertise (e.g., consultant pharmacist trained in antibiotic stewardship, stewardship team at referral hospital, external infectious disease/stewardship consultant)? Yes No

Action: Implement at least one policy or practice to improve antibiotic use.

*13. Does your facility have a policy that requires prescribers to document an indication for all antibiotics in the medical record or during order entry? Yes No

If Yes, has adherence to the policy to document an indication been monitored? Yes No

*14. Does your facility provide facility-specific treatment recommendations, based on national guidelines and local susceptibility, to assist with antibiotic decision making for common clinical conditions? Yes No

If Yes, has adherence to facility-specific treatment recommendations been monitored? Yes No

*15. Is there a formal procedure for performing a follow-up assessment 2-3 days after a new antibiotic start to determine whether the antibiotic is still indicated and appropriate (e.g. antibiotic time out)? Yes No

*16. Does a physician, nurse, or pharmacist review courses of therapy for specified antibiotic agents and communicate results with prescribers (i.e., audit with feedback) at your facility? Yes No

If Yes, What type of feedback is provided to prescribers? (check all that apply)

Feedback on antimicrobial route and/or dosing

Feedback on the selection of antimicrobial therapy and/or duration of therapy

Other (please specify): _____

Action: Implementing Antibiotic Prescribing Policies to Improve Antibiotic Use.

- Antibiotic prescribing and use policies:
 - Documentation of indication, dose and duration for every antibiotic course.
 - Adherence to the documentation policy

*13. Does your facility have a policy that requires prescribers to document an indication for all antibiotics in the medical record or during order entry?

Yes No

If Yes, has adherence to the policy to document an indication been monitored?

Yes No

Action: Implementing Antibiotic Prescribing Policies to Improve Antibiotic Use.

- Antibiotic prescribing and use policies:
 - Develop facility-specific treatment guidance for common infections based on practice guidelines.

*14. Does your facility provide facility-specific treatment recommendations, based on national guidelines and local susceptibility, to assist with antibiotic decision making for common clinical conditions? Yes No

If Yes, has adherence to facility-specific treatment recommendations been monitored? Yes No

Action: Implementing Antibiotic Prescribing Policies to Improve Antibiotic Use.

- Antibiotic prescribing and use policies:
 - “Antibiotic review”, reassessing treatment after antibiotic start

*15. Is there a formal procedure for performing a follow-up assessment 2-3 days after a new antibiotic start to determine whether the antibiotic is still indicated and appropriate (e.g. antibiotic time out)?

Yes No

Tracking and Reporting of process and measures of antibiotic use

*4. Does your laboratory provide a report summarizing the percent of antibiotic resistance seen in common organisms identified in cultures sent from your facility (often called an antibiogram)?

Yes No

If Yes, how often is this summary report or antibiogram provided to your facility? (check one)

Once a year Every 2 years Other (specify): _____

*17. Does the pharmacy service provide a monthly report tracking antibiotic use (e.g., new orders, number of days of antibiotic treatment) for the facility? Yes No

*16. Does a physician, nurse, or pharmacist review courses of therapy for specified antibiotic agents and communicate results with prescribers (i.e., audit with feedback) at your facility? Yes No

If Yes, What type of feedback is provided to prescribers? (check all that apply)

- Feedback on antimicrobial route and/or dosing
- Feedback on the selection of antimicrobial therapy and/or duration of therapy
- Other (please specify): _____

Tracking Antibiotic Use

- Monitoring **antibiotic use** can help guide practice changes
- Antibiotic use can be tracked using:
 - Long-term Care (LTC) Pharmacies: dispense and deliver medications, provide drug regimen reviews and clinical consulting, can provide antibiotic use reports.
 - Electronic Health Record Systems (EHR): interface and capability of different EHR systems can vary by facility, can provide accurate antibiotic use reports.
 - Manual Chart Review: may be only the possible way to collect antibiotic use data in some facilities.

*17. Does the pharmacy service provide a monthly report tracking antibiotic use (e.g., new orders, number of days of antibiotic treatment) for the facility?

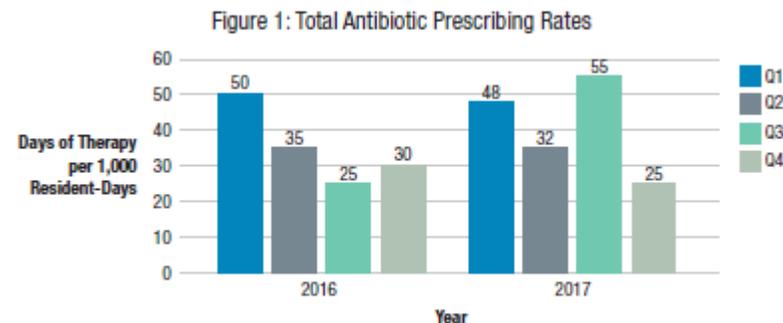
Yes No

Tracking: Antibiotic Use Measures

- Antibiotic starts: Many nursing home IPC programs track new antibiotic starts as part of their infection surveillance activity.
- Antibiotic days of therapy (DOT): Multiple antibiotic orders can be found in the LTC pharmacy or EHR systems for every antibiotic course, tracking DOT may be easier and more accurate when using those data sources.

Name	Date of Antibiotic Order or Transaction	Antibiotic Name	Calendar Days Antibiotic was Administered or Dispensed
Resident A	January 7	Nitrofurantoin	3
Resident B	January 7	Cephalexin	3
Resident A	January 10	Nitrofurantoin	2
Resident C	January 18	Ceftriaxone	7
Resident D	February 5	Vancomycin	10
Resident B	February 24	Ciprofloxacin	5
Resident B	February 24	Metronidazole	5

Month	Antibiotic DOT	Monthly Resident-Days	Rate of DOT/1,000 Resident-Days
January	$(3+3+2+7)=15$	200	$(15/200) \times 1,000=75$
February	$(10+5+5)=20$	250	$(20/250) \times 1,000=80$



Tracking and Reporting

- Antibiotic use rates can be also calculated by antibiotic class, specific resident type (short-stay vs. long-stay), indication or type of infection, location within the nursing home, or prescriber.
- Reporting can motivate staff and sustain practice changes.
 - Providing feedback on prescribing practices and compliance with facility antibiotic use protocols
 - Provider-specific feedback and peer comparison may be an effective way to change prescribing behavior as demonstrated in the outpatient setting.¹

Opportunity for Improvement: Testing and Treatment for Suspected Urinary Tract Infections in Nursing Homes.

- Asymptomatic bacteriuria is common in NH residents.^{1,2}
- **Overtesting** leads to **overdiagnosis** of UTI, treatment of asymptomatic bacteriuria, risk for adverse drug events (ADE) and delays in diagnosis.³
 - Foul-smelling or cloudy urine frequently leads to unnecessary urine testing and treatment.⁴
 - Up to 1/2 of antibiotics prescribed to treat UTI in older adults are unnecessary or inappropriate.⁴⁻⁸

1. Nicolle et al. Int J Antimicrob Agents. 2006 Aug;28 Suppl 1:S42-8.
2. Nicolle et al. Infect Control Hosp Epidemiol. 2001 Mar;22(3):167-75.
3. Wald. JAMA Intern Med. 2016 May 1;176(5):587-8.
4. Nicolle et al, Infect Dis Clin North Am. 1997; 11(3):647-662.
5. Nicolle et al, Clin Infect Dis. 2005;40(5):643-654.
6. Crnich et al, J Am Geriatr Soc. 2017 Aug;65(8):1661-1663.
7. Trautner. Nat Rev Urol. 2012;9(2):85-93.
8. Eure et al, Infect Control Hosp Epidemiol 2017 Aug;38(8):998-1001.

Using the Urinary Tract Infection Module

- Tracking the number of urine cultures, antibiotic starts for UTI and UTI events that meet surveillance definitions can help with tracking of testing and treatment practices for UTI
 - Tracking testing practices
 - Tracking antibiotic use for UTI through the number of antibiotic starts



Event Details	
*Specify Criteria Used: (check all that apply)	
<u>Signs & Symptoms</u>	
<input type="checkbox"/> Fever: Single temperature $\geq 37.8^{\circ}\text{C}$ ($>100^{\circ}\text{F}$), or $> 37.2^{\circ}\text{C}$ ($>99^{\circ}\text{F}$) on repeated occasions, or an increase of $>1.1^{\circ}\text{C}$ ($>2^{\circ}\text{F}$) over baseline	<input type="checkbox"/> Specimen collected from clean catch voided urine and a positive culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml
<input type="checkbox"/> Rigors	<input type="checkbox"/> New onset hypotension
<input type="checkbox"/> New onset confusion/functional decline	<input type="checkbox"/> Specimen collected from in/out straight catheter and a positive culture with any number of microorganisms, at least one of which is a bacterium of $\geq 10^2$ CFU/ml
<input type="checkbox"/> Acute pain, swelling, or tenderness of the testes, epididymis, or prostate	<input type="checkbox"/> Specimen collected from indwelling catheter and a positive culture with any number of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml
<input type="checkbox"/> Acute dysuria	<input type="checkbox"/> Purulent drainage at catheter insertion site
<u>New and/or marked increase in (check all that apply):</u>	
<input type="checkbox"/> Urgency	<input type="checkbox"/> Costovertebral angle pain or tenderness
<input type="checkbox"/> Frequency	<input type="checkbox"/> Suprapubic tenderness
<input type="checkbox"/> Incontinence	<input type="checkbox"/> Visible (gross) hematuria
*Specific Event (Check one):	
<input type="checkbox"/> Symptomatic UTI (SUTI)	<input type="checkbox"/> Symptomatic CA-UTI (CA-SUTI)
<input type="checkbox"/> Asymptomatic Bacteremic UTI (ABUTI)	
Secondary Bloodstream Infection: Yes No	Died within 7 days of date of event: Yes No
*Transfer to acute care facility within 7 days: Yes No	
*Pathogens identified: Yes No *If Yes, specify on page 2	

Facility ID:	*Location Code:	*Month:	*Year:			
Date	*Number of residents	*Number of residents with a urinary catheter	*New antibiotic starts for UTI indication	*Number of urine cultures ordered	*Number of admissions	Number of admissions on <i>C. diff</i> treatment
1						
2						

WHAT REPORTS ARE AVAILABLE TO VIEW MY UTI EVENT DATA?

- **Line list** allow resident-level review of data
- **Rate tables** display an overall facility calculated rates

Available reports may be modified and saved to Custom Reports folder!!

The screenshot shows a navigation interface with the following elements:

- Buttons: "Expand All" and "Collapse All" (both in blue boxes).
- Search: A search input field with the placeholder text "Search".
- Folder Structure:
 - MDRO/CDI Module - LABID Event Reporting
 - HAI Module
 - All UTI Events (highlighted with a green arrow)
- Report Options (under "All UTI Events"):
 - Line Listing - All UTI Events (highlighted with a green box)
 - Rate Table - Total UTI Rate (highlighted with a green box)
 - Line Listing - All UTI Events with Catheter
 - Rate Table - CA-SUTI Incidence Rate
 - Line Listing - All UTI Events without Catheter
 - Rate Table - SUTI Incidence Rate
 - Rate Table - Total Urine Culture Rate

STANDARD LINE LIST – ALL UTI EVENTS

Table headings have:

- Title
- Date of dataset generation
- Date range for the data

Footnotes tell us how the data was sorted and the last date of data generation.

National Healthcare Safety Network

Line Listing - All UTI Events

As of: July 3, 2019 at 12:14 PM

Date Range: All LTCUTI_EVENTS

Specifies if table list ALL UTI, SUTI or CASUTI

1	2	3	4	5	6	7	8
Facility Org ID	Resident ID	Date of Current Admission	Event ID	Event Date	Specific Event	Urinary Catheter Status	Location
11106	24689	01/01/2017	1916	09/11/2018	ABUTI	NEITHER	GEN
11106	123456	03/07/2018	1967	02/05/2019	ABUTI	NEITHER	DEMENTIA
11106	64684641	03/11/2015	1250	05/11/2015	CA-SUTI	INPLACE	GEN
11106	4563543	03/10/2015	1251	05/11/2015	CA-SUTI	INPLACE	GEN
11106	10001	12/18/2017	2042	01/10/2018	CA-SUTI	INPLACE	100 EAST
11106	10003	01/03/2018	2044	02/07/2018	CA-SUTI	REMOVE	GEN
11106	10004	01/22/2018	2045	02/19/2018	CA-SUTI	INPLACE	GEN
11106	10006	09/22/2017	2052	03/29/2018	CA-SUTI	INPLACE	100 EAST
11106	008987	04/04/2018	2000	04/24/2018	CA-SUTI	INPLACE	DEM
11106	10008	03/07/2018	2054	05/15/2018	CA-SUTI	REMOVE	GEN
11106	123456	03/07/2018	1950	06/19/2018	CA-SUTI	INPLACE	GEN
11106	10010	01/11/2018	2056	07/04/2018	CA-SUTI	INPLACE	GEN
		03/05/2013	1975			INPLACE	

11106	111111			04/02/2019	SUTI		GEN
11106	1234	03/01/2019	2026	04/16/2019	SUTI	NEITHER	SKN
11106	2222	04/02/2019	2050	04/18/2019	SUTI	NEITHER	SKN
11106	123456	03/07/2018	2028	05/15/2019	SUTI	NEITHER	100 EAST
11106	56789	04/01/2019	2048	05/22/2019	SUTI	NEITHER	GEN
11106	111111	01/01/2015	2030	06/06/2019	SUTI	NEITHER	GEN
11106	999999	06/01/2019	2033	06/19/2019	SUTI	NEITHER	SKN
11106	1234	03/01/2019	2027	06/21/2019	SUTI	NEITHER	GEN

Sorted by ltcSpcEvent eventDate cathStatus

Data contained in this report were last generated on July 3, 2019 at 12:00 PM.

RATE TABLES – TOTAL UTI RATE

National Healthcare Safety Network

Total UTI Incidence Rate

As of: July 3, 2019 at 2:29 PM
Date Range: All LTCUTI_RATES

Facility Org ID=11106

1	2	3	4	5	6	7	8	9
Location	Summary Year/Month	UTI Count	Number of Antibiotic Starts	UTI Treatment Ratio	Number of Resident Days	Total UTI Rate	Urinary Catheter Days	Cath Util Ratio
FACWIDEIN	2015M01	0	70	70	500	0.000	260	0.520
FACWIDEIN	2015M02	0	85	85	500	0.000	150	0.300
FACWIDEIN	2015M05	2	50	25	100	20.000	0	0.000
FACWIDEIN	2015M11	0	25	25	300	0.000	50	0.167
FACWIDEIN	2016M10	1	16	16	300	3.333	25	0.083
FACWIDEIN	2018M01	2	0	0	3,000	0.667	200	0.067
FACWIDEIN	2018M02	2	1	0.5	3,256	0.614	35	0.011
FACWIDEIN	2018M03	2	2	1	3,069	0.652	65	0.021

UTI treatment ratio
(column 5) =
(column 4/ column 3)

UTI rate
(column 7)
=
(column 3/
column 6)
x 1,000

Catheter
utilization
ratio
(column 9) =
(column 8/
column 6)

FACWIDEIN		2		1		0.633		
FACWIDEIN	2019M04	3	4	1.333	3,269	0.918	10	0.003
FACWIDEIN	2019M05	2	5	2.5	3,185	0.628	25	0.008
FACWIDEIN	2019M06	3	1	0.333	3,288	0.912	0	0.000

Source of aggregate data: Not available

Data contained in this report were last generated on July 3, 2019 at 12:00 PM.

Active Monitoring of Health Outcomes.

- Monitor antibiotic use and **health outcomes** to guide practice changes
 - Health outcomes:
 - Rates of *C. difficile* infection
 - Antibiotic susceptibility profiles

*4. Does your laboratory provide a report summarizing the percent of antibiotic resistance seen in common organisms identified in cultures sent from your facility (often called an antibiogram)?

Yes No

If Yes, how often is this summary report or antibiogram provided to your facility? (check one)

Once a year Every 2 years Other (specify): _____

Integrating Quality Improvement Initiatives

- Implementing infection control practices, antibiotic stewardship and vaccination policies can prevent infections in nursing home residents.
- Education is key for infection prevention, antibiotic stewardship implementation and early sepsis detection.
 - Front line nursing staff are critical in building a team working to improve communication and implementing any quality improvement initiative.

1. <https://www.cdc.gov/sepsis/education/hcp-resources.html>

2. Reyes et al, J Am Med Dir Assoc. 2018 Jun;19(6):465-471.

Education and Improving Communication with Residents and Families.

- Provide ongoing education to residents and families to set expectations and address concerns about antibiotic prescribing.
 - Start the conversation early with residents and families.

*18. Has your facility provided education to clinicians and other relevant staff on improving antibiotic use in the past 12 months?

Yes No

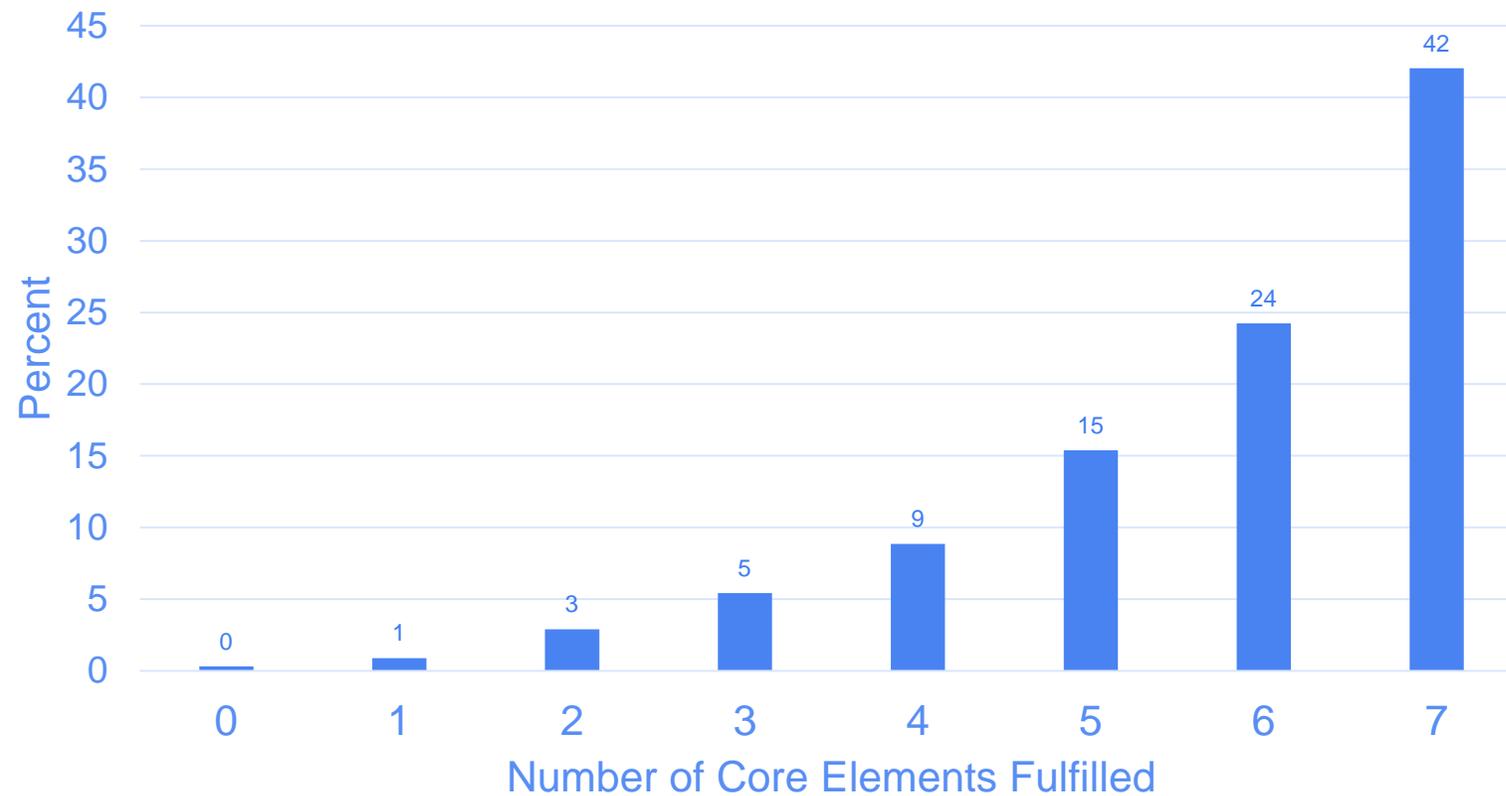
Education and Improving Communication with Residents and Families.

- Provide ongoing education to residents and families to set expectations and address concerns about antibiotic prescribing.
 - Start the conversation early with residents and families.
- Elements that should be included in effective communication:
 - Making the case for the diagnosis (reviewing findings).
 - Explaining why an antibiotic is not needed, combined with a positive treatment recommendation followed by a negative one.
 - Providing a contingency plan.

Training Resources

- Training Resources:
 - CDC Training on Antibiotic Stewardship, includes a module on the treatment of urinary tract infections and stewardship in nursing homes
 - <https://www.train.org/cdctrain/course/1075730>
 - Infection Prevention and Control training course: included a module on antibiotic stewardship
 - https://www.train.org/cdctrain/training_plan/3814

Percent of U.S. Nursing Homes Reporting Implementation of All CDC Core Elements on 2016 Annual NHSN Survey*



Summary

- Antibiotic stewardship is a set of commitments and actions designed to optimize the treatment of infections while reducing the adverse events associated with antibiotic use.
- The annual facility survey can help you identify opportunities to implement the core elements of antibiotic stewardship at your facility.
- Using the urinary tract infection module you can track testing and treatment practices for urinary tract infections and improve antibiotic use.



**U.S. ANTIBIOTIC
AWARENESS WEEK**
November 18-24, 2019
www.cdc.gov/antibiotic-use

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

AntibioticUse@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.