Antimicrobial Stewardship in Post-Acute and Long-Term Care Facilities: Strategies and Resources for Implementation

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3. American Institutes for Research 4. Centers for Disease Control and Prevention (CDC)

Speaker Disclosures

- Dheeraj Mahajan, MD: No relevant financial relationship to disclose
- Muhammad S. Ashraf, MBBS : No relevant financial relationship to disclose
- Elizabeth Frentzel, MPH: No relevant financial relationship to disclose
- Nimalie Stone, MD: No relevant financial relationship to disclose

Learning Objectives

- Recognize practical approaches towards developing a formal antimicrobial stewardship program in post-acute and long-term-care setting using CDC core elements
- Identify different stewardship strategies and tools relevant to the Core Elements
- Learn about the effectiveness and limitations of various post acute and long-term care facilities antimicrobial stewardship programs.

USING CDC CORE ELEMENT FOR ANTIMICROBIAL STEWARDSHIP PROGRAM DEVELOPMENT

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President and CEO

Chicago Internal Medicine Practice and Research (CIMPAR, SC)

DEFINITION

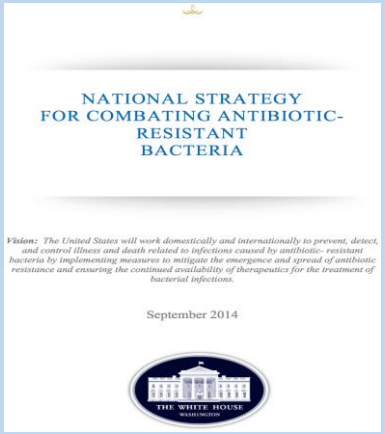
Antibiotic stewardship refers to a set of commitments and activities designed to **“optimize the treatment of infections while reducing the adverse events associated with antibiotic use.”**

Background

- **70%** of NH residents **receive** one or more courses of antibiotics in a year
- **40%-75%** of antibiotics prescribed in NH may be **unnecessary or inappropriate**
- **Cost** of antibiotic use in NHs is **$ 38 to 137 million** per year
- Residents with higher antibiotic use are at **24 % higher** risk of antibiotic related **harm**
- **20 %** of **providers prescribe 80 %** of antibiotics
- **40-75%** of antibiotics in NH are prescribed **incorrectly**
- **50 %** of antibiotics in NH are prescribed for **longer duration than necessary**

Calls for Action

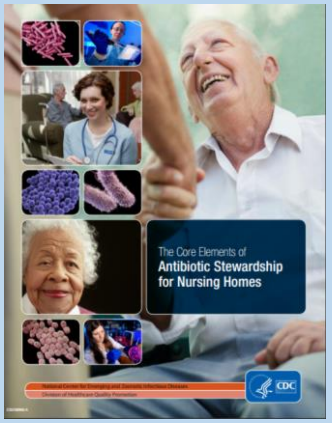
- White House call for combating antibiotic resistant bacteria (2014)
- CDC's Core Elements of Antibiotic Stewardship for Nursing Homes (2015)
- CMS regulations on LTC antimicrobial stewardship (2016)
- Joint Commission's 2017 standard on antimicrobial stewardship


NATIONAL STRATEGY FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

Vision: The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic- resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.

September 2014

THE WHITE HOUSE



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Medicare & Medicaid Services

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489

[CMS–3260–F]

RIN 0938–AR61

Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities

AGENCY: Centers for Medicare & Medicaid Services (CMS), HHS.

ACTION: Final rule.

Side by Side

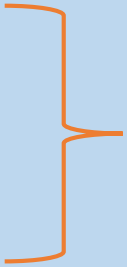
Core Elements of Antibiotic Stewardship for Nursing Homes

Leadership Commitment

- **Written statements** of Leadership support
- **Define Duties** of leaders and champions
- Notify and **communicate**
- Create and promote a **culture**

Accountability

- The medical director
- The director of nursing
- The pharmacist



LEADERS

- The Infection prevention program coordinator
- The laboratory
- State and local health departments

Drug Expertise

- Work with consultant **pharmacists with additional training**
- Network with area hospital with similar AMS philosophy and **engage with Infection prevention personnel**
- Develop relationships with **infectious disease consultants**

Policy and Practice Change

- Policies that support optimal antibiotic use
- Broad interventions
  - Algorithms for resident assessments
  - Communication tools
  - Antibiograms
  - Antibiotic-time outs
  - Program to prescribe antibiotic for shortest duration needed to treat infection
- Pharmacy interventions (monitoring for adverse reactions and review of labs, cultures etc.)
- Infection and syndrome specific interventions (reduce antibiotic use for asymptomatic bacteriuria and antibiotic prophylaxis for UTI; optimize management of pneumonia and the use of chronic wound cultures)

Tracking and Reporting

- Tracking **how and why** antibiotics are prescribed (process measure)
- Tracking **how often and how many** antibiotics are prescribed (antibiotic use measure)
- Tracking the **adverse outcomes** and costs from antibiotics (outcome measure)

Education

- WHO

Physicians, NPPs, Nursing, residents and families

- HOW

Flyers, Newsletters, Emails/listserves and In-person sessions

….FEEDBACK goes a long way

CONCLUSION

- Antimicrobial stewardship core elements are similar for hospitals and nursing homes
- Start with 1 or 2 activities/interventions and build on success
- Celebrate your achievements and recognize the staff

ANTIMICROBIAL STEWARDSHIP IN POST-ACUTE AND LONG-TERM CARE SETTINGS:

Evidence-Based Interventions

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Medical Director,
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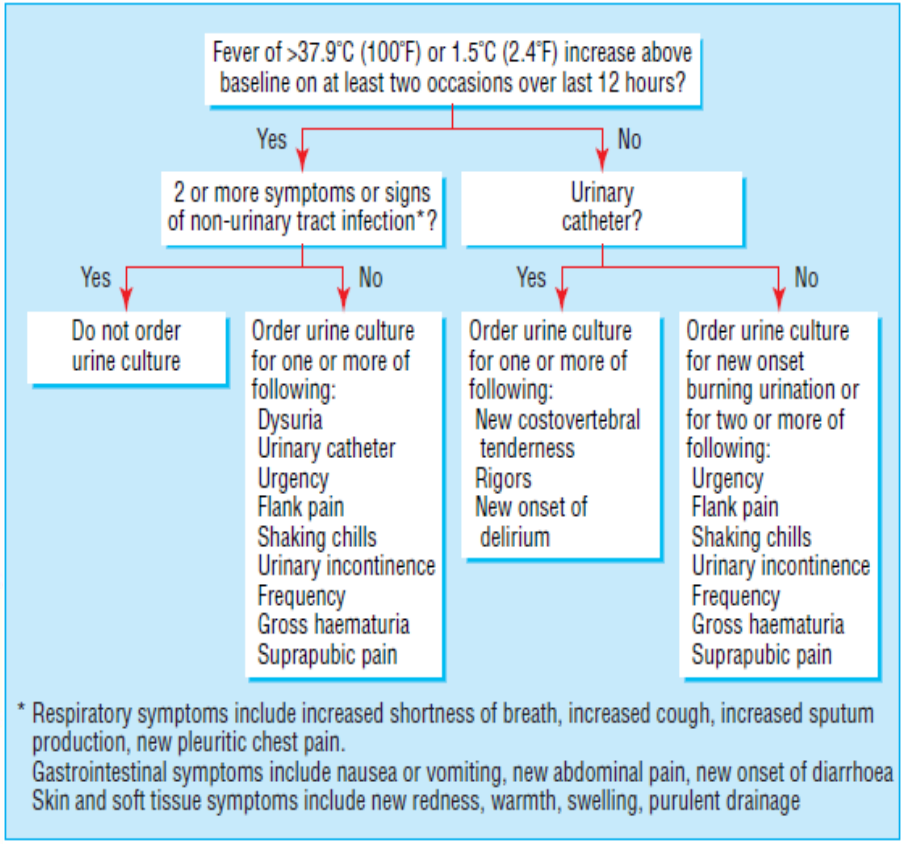
Co-Medical Director,
Nebraska Antimicrobial Stewardship Assessment and Promotion Program
University of Nebraska Medical Center

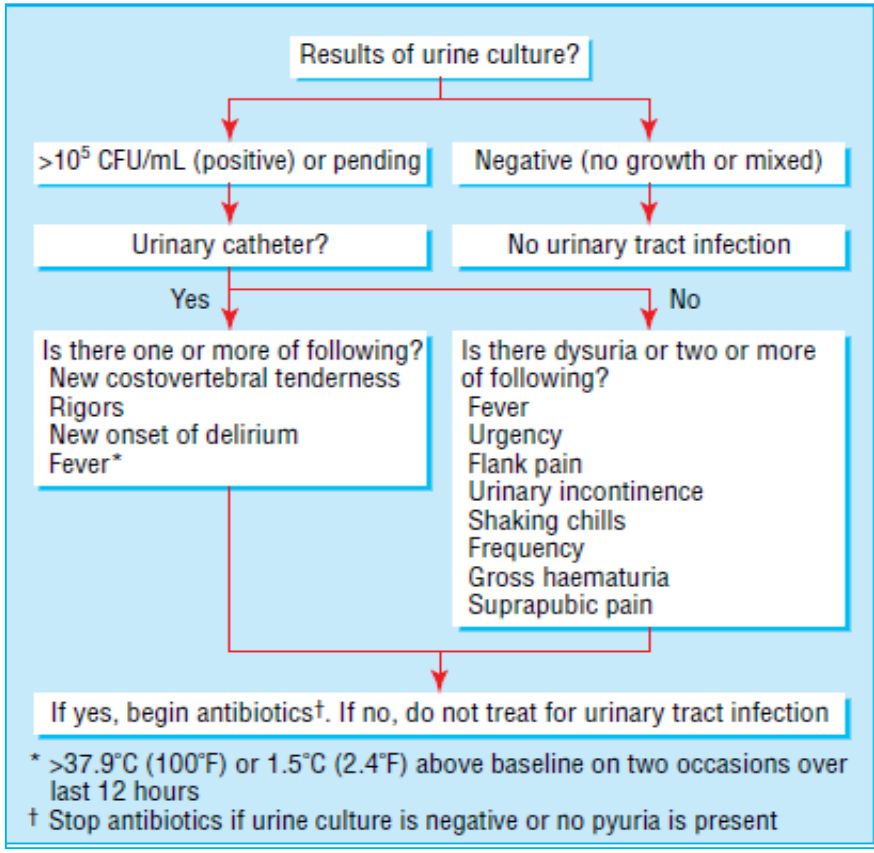
University of Nebraska Medical Center

Evidence Based Interventions To Improve Antibiotic Use

- Pre-prescription Interventions:
  - Use of diagnostic and treatment algorithms
  - Use of communication/decision aid tools
  - Education of nursing staff and providers about guidelines
  - Use of nursing home Antibiograms
- Post-prescription interventions:
  - Post–prescribing review of antibiotics (antibiotic time out)
  - Prospective audit and feedback
- Interventions targeting pre and post-prescription periods:
  - LTCF ID consultation service

Utilizing Algorithms to Decrease Inappropriate Urine Cultures and Treatment of Asymptomatic Bacteriuria





Loeb M et al. BMJ. 2005 Sep 24;331(7518):669

Utilizing Algorithms (Intervention Impact)

Clinical algorithms targeted to physicians and nurses caused 31% decline in antibiotic use for UTI

Antibiotic use for other indications, along with total antibiotic use, did not change

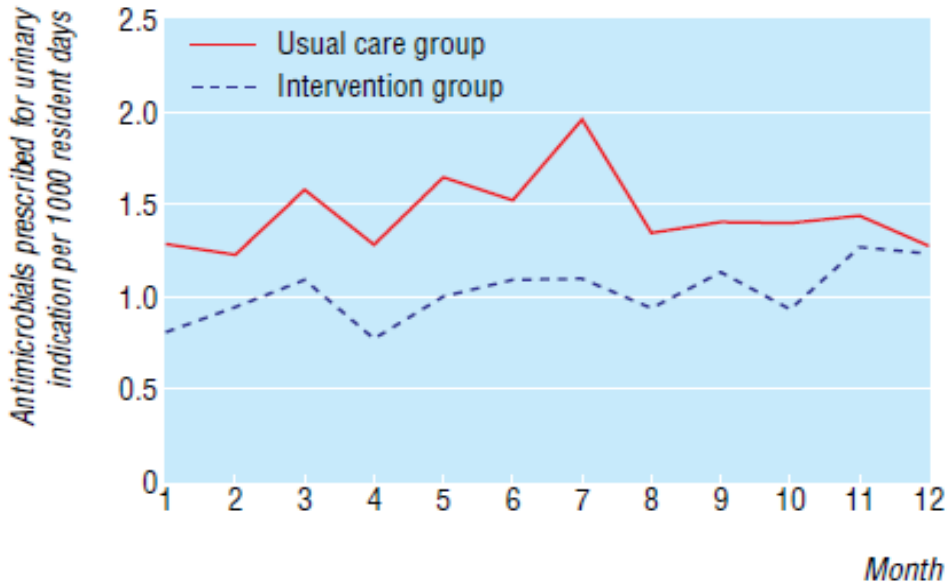


Fig 4 Monthly rates of antimicrobial prescriptions for urinary indications in intervention and usual care nursing homes

Loeb M et al. BMJ. 2005 Sep 24;331(7518):669

Utilizing Algorithms (With Recurrent Educational Sessions)

	3-Month Pre-Intervention	Initial 6 Months Post-Intervention	7 to 30 Months Post-Intervention
Urine cultures/ 1000 patient days	3.7	1.5	1.3
ASB treated	67.6%	69.2%	44%
Antibiotic days/ 1000 patient days	167.7	117.4	109.0

- Inappropriate urine cultures and total antibiotic days went down after setting up criteria for sending urine cultures and for the diagnosis of UTI.
- Required semi-annual follow-up educational sessions and individualized direct feedback in certain instances.

Zabarsky TF, et al. Am J Infect Control 2008 Sep;36(7):476-80.

Use of Communication/Decision Aid Tool

A – Assessment (check boxes and determine recommendation prior to call)

Resident with indwelling catheter:

- □ fever of 100◦F (38◦C)or 2◦F (1◦C) greater than baseline
- □ new costovertebral tenderness
- □ rigors
- □ new delirium
- □ hypotension

Any one of the above present

Resident without indwelling catheter:

- □ Acute dysuria alone;

OR

- □ Single temperature of 100◦F (38◦C), multiple at 99◦F (37◦C) or above, or 2◦F (1◦C) degrees greater than baseline AND at least one new or worsening of the following:
  - □ urgency
  - □ suprapubic pain
  - □ frequency
  - □ gross hematuria
  - □ costovertebral angle tenderness
  - □ new/worsening urinary incontinence

Yes | No | Yes | No

R - Recommendation

□ **Protocol criteria ARE met.**

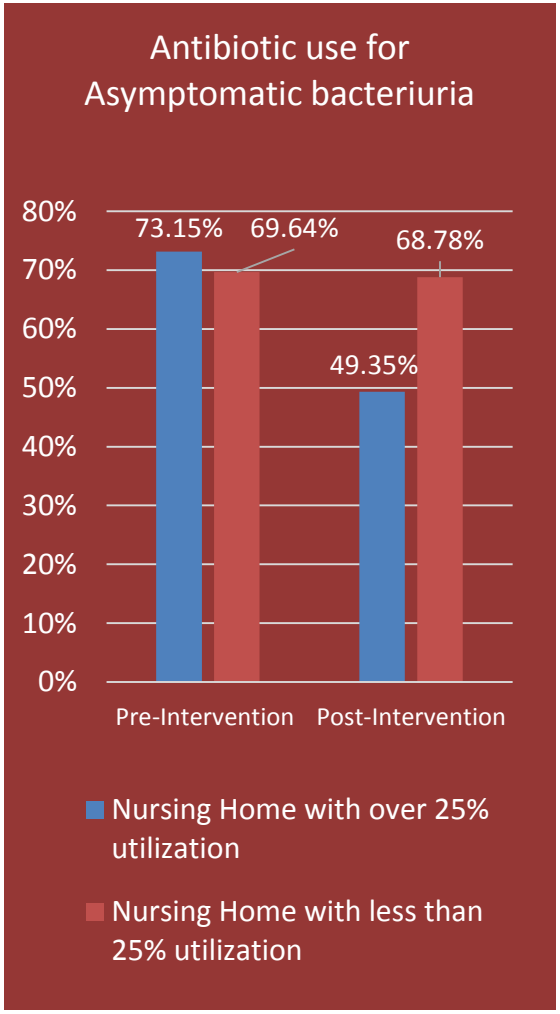
According to our understanding of best practices and our facility protocols the resident may have a urinary tract infection and need a prescription for an antibiotic agent.

Staff:

Please Check Box for Course of Action Recommended

□ **Protocol criteria are NOT met.**

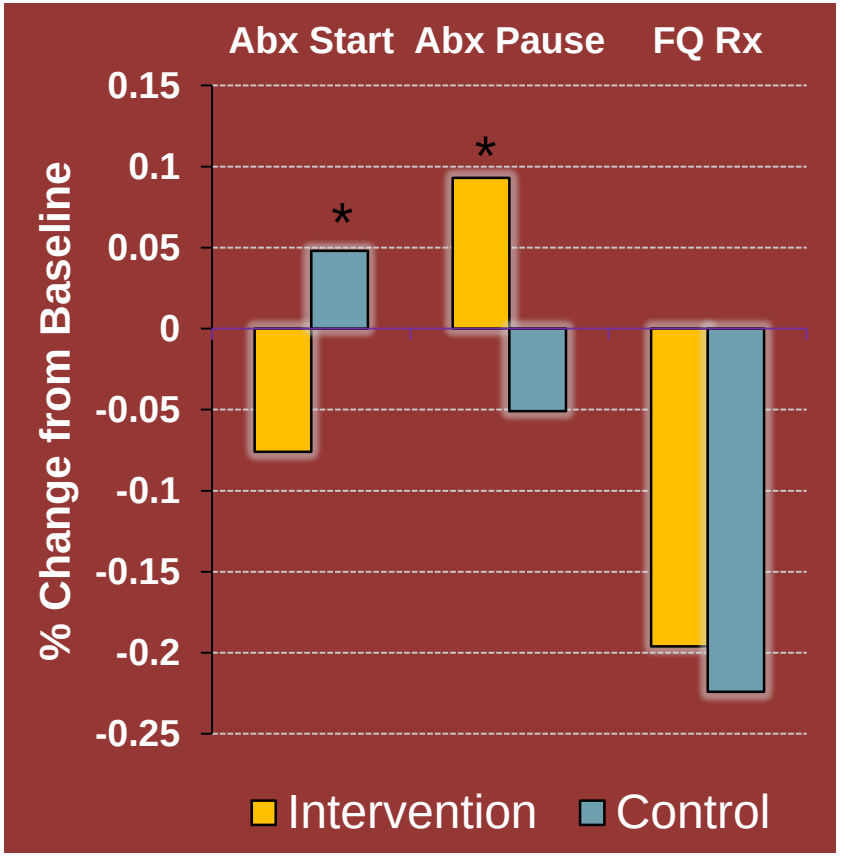
According to our understanding of best practices and our facility protocols, the information is insufficient to indicate an active urinary tract infection. The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.



McMaughan DK et al. BMC Geriatr. 2016 Apr 15;16:81

Education of Nursing Staff and Providers About Guidelines

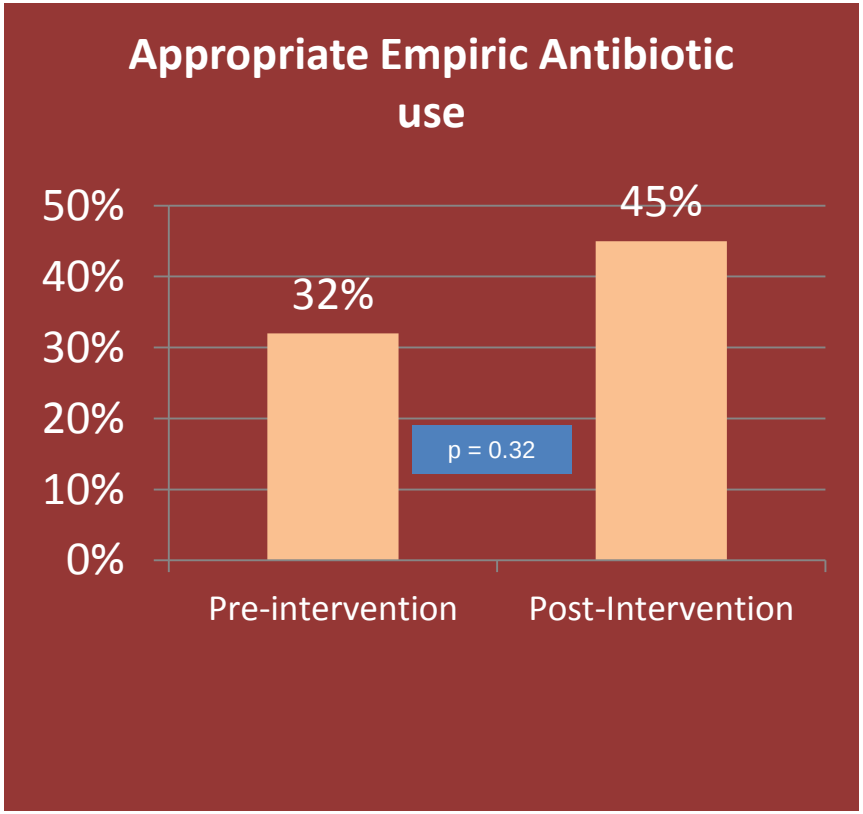
- Cluster RCT in 58 NHs in Sweden
- Prescribing guideline disseminated through interactive case-based sessions w/ nurses & providers
- Total antibiotic prescriptions decreased and wait and see approach by physicians increased



Pettersson E et al. J Antimicrob Chemother. 2011 Nov;66(11):2659-66

Use of Nursing Home Antibiogram

- Up to 85% of treatment started empirically
- Where cultures available
  - only 32% of empiric antibiotic appropriate
- Antibiogram was distributed to Nursing Staff, Administrators and Physicians in a meeting.
- 6 months later there was a modest increase in appropriateness; however, the difference was not statistically significant



Furuno JP et al. Infect Control Hosp Epidemiol. 2014 Oct;35 Suppl 3:S56-61

The North West London Hospitals NHS

RAMP* Form Part B: Review of treatment

*Resident Antimicrobial Management Plan (part of StAUNCH Project)

Part B: Start to fill in 48-72 hours after commencing treatment
All sections should be completed by end of treatment period

Plan no.	Resident Name	Room no.

Good Practice Points		Nurse Records	Sign & Date
B 1	*Review clinical progress after 48-72 hours of treatment*	**Review of progress: due 48-72h after commencing treatment (See section A6)** **Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... / ..... **The resident:** [tick all applicable] ☐ now has no signs or symptoms of infection ☐ was in hospital ☐ has improved ☐ remains the same ☐ has new signs / symptoms [state details] ..... **Is resident worse? YES / NO If YES: State action taken**	
B 2	*Stop date of treatment confirmed or review date planned*	**Total number of days treatment prescribed:** ..... (days) **Treatment STOPPED: Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... / ..... OR **REVIEW of treatment planned for: Date:** ..... / ..... /	
B 3	*Resident re-examined by a doctor*	**Resident re-examined by a doctor for the same condition?** **YES / NO If YES was this:** ☐ Scheduled GP visit ☐ Extra GP visit ☐ Out of Hours Service visit ☐ Hospital A&E visit ☐ Hospital Admission ☐ Hospital Out-Patient visit **Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... /	
B 4	*Results of samples / swabs recorded*	**Sample results:** [tick all applicable] **See section A4 overleaf** ☐ No new samples or swabs sent before this treatment started ☐ Results not available yet ☐ Negative result (no growth) ☐ Positive result (micro-organisms grown) [state details if known] ..... **If positive result:** **Is this micro-organism sensitive to the antimicrobial prescribed?** [tick one option] ☐ Yes ☐ No ☐ Don't know ☐ Not tested by laboratory	
B 5	*Outcome of antimicrobial treatment documented*	**Treatment outcome (at end of course)** ☐ Symptoms completely resolved ☐ Symptoms partly resolved ☐ No improvement **Additional antimicrobial treatment prescribed? YES / NO** ***If YES: Commence new RAMP form***	

For Study Use Only	Ref. No.	B1	B2	B3	B4	B5

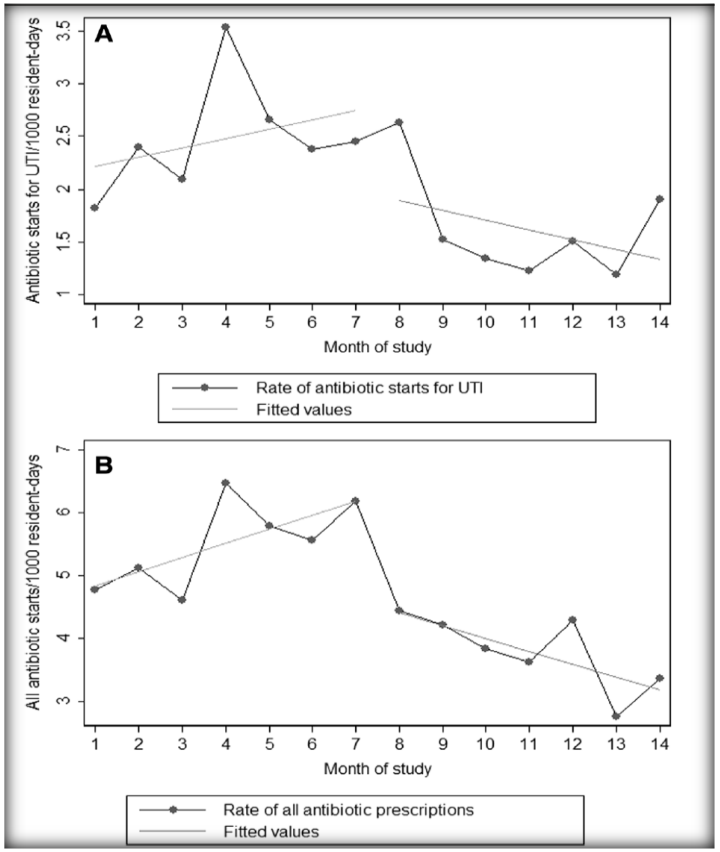
Post – Prescribing Review of Antibiotics

- Cluster RCT in 30 NHs in United Kingdom
- Introduced a form with Part A to be filled out at the start of antibiotic and Part B after 48 hour of treatment
- No additional intervention
- Part A was filled 86% of time and Part B 57% of time
- Antibiotic starts unchanged
- Antibiotic utilization decreased by 10%

Fleet E et al. J Antimicrob Chemother 2014; 69: 2265–73

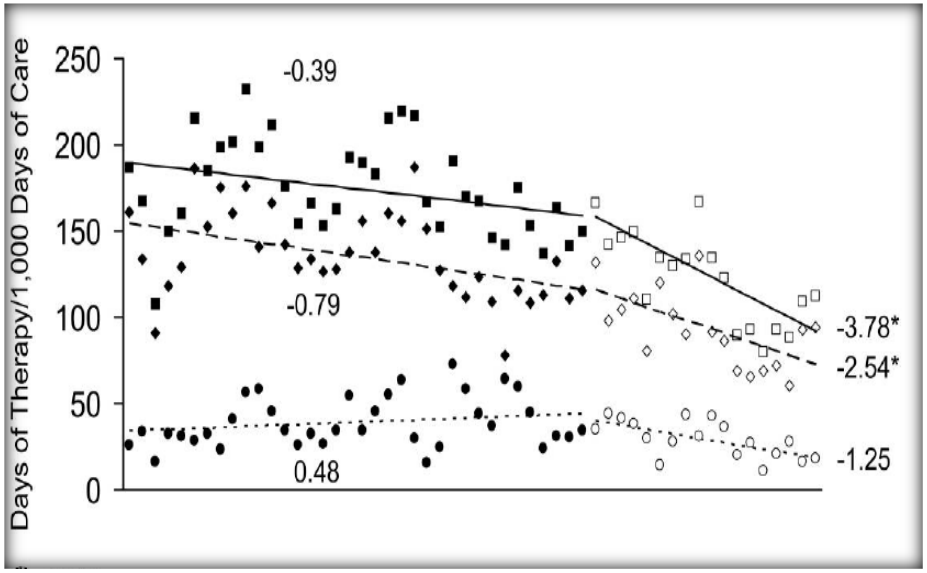
Prospective Audit and Feedback Targeting UTI

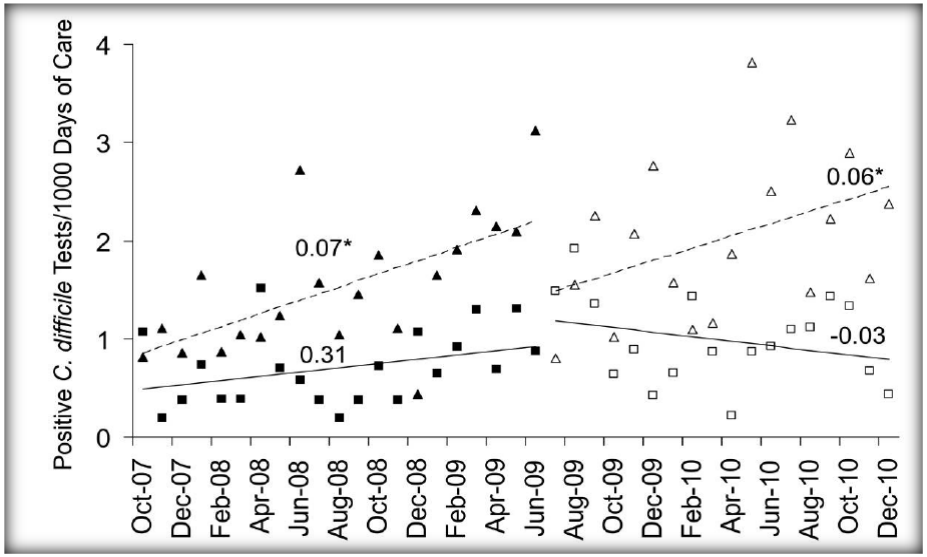
- Immediate 26% decrease in antibiotic prescription for UTI with 6% reduction continuing through the intervention period
- Immediate 25% decrease in all antibiotic prescription with 5% reduction continuing throughout the intervention period
- 25% recommendations were accepted



Doernberg SB et al. Antimicrob Resist Infect Control. 2015 Dec 1;4:54

LTCF ID Consultation Service





- 30% decrease in total antibiotic use
- 64% decline in tetracyclines use
- 61% decline in clindamycin use
- 38% decline in fluroquinolones & sulfamethoxazole/trimethoprim
- 28% decline in beta lactam/ beta lactamase inhibitor use
- Rate of positive *C. difficile* tests at LTCF also declined while rate were the same in the hospital

Jump RL et al. Infect Control Hosp Epidemiol. 2012 Dec;33(12):1185-92

In Summary …….

- There are pros and cons for each of the interventions that have been studied.
- Facilities will have to decide which approach works best for them.
- Free resources and tools are available to help facilities implement various components of core elements.

Stewardship: Resources and Tools

Elizabeth Frentzel, MPH

Principal Research Scientist

AIR®
American Institutes for Research®

Current Strategies and Tools

- AHRQ: Nursing Home Antimicrobial Stewardship Guide
- CDC: Core Elements of Antibiotic Stewardship for Nursing Homes
- Robin Jump: Improving the Care of Long-term Care Facility Residents with Infections
- Minnesota: Antimicrobial Stewardship Program Toolkit for Long-term Care Facilities
- UNC: Promoting Wise Antibiotic Use in Nursing Homes

Overview of the AHRQ Guide

- **Toolkits to Implement, Monitor, and Sustain**
  - Start an Antimicrobial Stewardship Program Toolkit
  - Monitor and Sustain Stewardship Toolkit
- **Toolkits to Determine Whether It Is Necessary to Treat a Potential Infection With Antibiotics**
  - Suspected UTI SBAR Toolkit
  - Common Suspected Infections: Communicating and Decision Making for Four Infections Toolkit
  - Minimum Criteria for Common Infections Toolkit
- **Toolkits to Help Prescribing Clinicians Choose the Right Antibiotic for Treating an Infection**
  - Working with a Laboratory to obtain an antibiogram
  - Concise Antibiogram Toolkit
  - Comprehensive Antibiogram Toolkit
- **Toolkit to Educate and Engage Residents/Family Members**

Overview of the CDC Core Elements

- Principals of nursing home antibiotic stewardship
- Checklist prior to initiating a stewardship program
- Policy and practice descriptions to improve antibiotic use
- Measures of antibiotic prescribing, use and outcomes

Process measures for tracking antibiotic stewardship activities

Completeness of clinical assessment documentation at the time of the antibiotic prescription. Incomplete assessment and documentation of a resident's clinical status, physical exam or laboratory findings at the time a resident is evaluated for infection can lead to uncertainty about the rationale and/or appropriateness of an antibiotic. If a facility has developed algorithms or protocols for evaluating a resident suspected of having an infection, then perform audits of the quality of the assessment to ensure that algorithm was followed.

Improving the Care of Long-Term Care Facility Residents with Infections (Jump)

- Signs and symptoms of infection in older adults
- Urinary tract infections vs. Asymptomatic bacteriuria
- Upper respiratory tract infections, bronchitis and pneumonia
- Isolation precautions
- Collecting samples for microbiological culture
- Communication with providers

MN ASP Toolkit for Long-term Care Facilities

- The core tools include:
  - Action steps and strategies for implementing an ASP and an accompanying audit tool
  - Nursing staff and provider antibiotic use attitudes and beliefs surveys
  - An antimicrobial use assessment tool
  - A nursing process evaluation tool
- Supplemental tools include:
  - Communication tools
  - Infection surveillance tips
  - C. difficile infection prevention and management algorithms
  - Antibiotic initiation criteria
- Additional resources include:
  - Educational modules
  - Fact sheets
  - Helpful references

Types of Strategies and Tools

- Developing a team and starting a program
- Identifying an infection
- Treating the infection appropriately
- Patient and family education & engagement
- Training/CEUs
- Monitoring

Starting a program (CDC)

LEADERSHIP SUPPORT	ESTABLISHED AT FACILITY
1. Can your facility demonstrate leadership support for antibiotic stewardship through one or more of the following actions?	❑ Yes ❑ No

If yes, indicate which of the following are in place (select all that apply)

- ❑ Written statement of leadership support to improve antibiotic use
- ❑ Antibiotic stewardship duties included in medical director position description
- ❑ Antibiotic stewardship duties included in director of nursing position description
- ❑ Leadership monitors whether antibiotic stewardship policies are followed
- ❑ Antibiotic use and resistance data is reviewed in quality assurance meetings

ACCOUNTABILITY	
2. Has your facility identified a lead(s) for antibiotic stewardship activities?	❑ Yes

If yes, indicate who is accountable for stewardship activities (select all that apply)

- ❑ Medical director
- ❑ Director or assistant director of nursing services
- ❑ Consultant pharmacist
- ❑ Other:_____

Checklist for Core Elements of Antibiotic Stewardship in Nursing Homes

CDC. (2015). Checklist for Core Elements of Antibiotic Stewardship in Nursing Homes. https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship.pdf

Identifying an Infection (AHRQ)

A Assessment Input (check all boxes that apply)

Resident WITH indwelling catheter

The criteria are met to initiate antibiotics if one of the below are selected

No	Yes	
☐	☐	Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*
☐	☐	New back or flank pain
☐	☐	Acute pain
☐	☐	Rigors /shaking chills
☐	☐	New dramatic change in mental status
☐	☐	Hypotension (significant change from baseline BP or a systolic BP <90)

Resident WITHOUT indwelling catheter

Criteria are met if one of the three situations are met

No Yes

☐ ☐ 1. Acute dysuria alone

OR

☐ ☐ 2. Single temperature of 100°F (38°C) **and** at least one new or worsening of the following:

- ☐ urgency
- ☐ frequency
- ☐ back or flank pain
- ☐ suprapubic pain
- ☐ gross hematuria
- ☐ urinary incontinence

OR

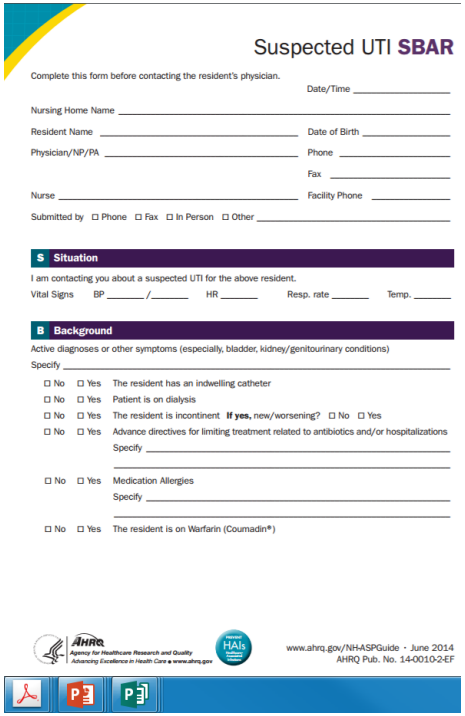
☐ ☐ 3. No fever, but two or more of the following symptoms:

- ☐ urgency
- ☐ frequency
- ☐ incontinence
- ☐ suprapubic pain
- ☐ gross hematuria

Nurses: Please check box to indicate whether or not criteria are met

☐ **Nursing home protocol criteria are met.** Resident may require UA with C&S or an antibiotic.†

☐ **Nursing home protocol criteria are NOT met.** The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.††



Suspected UTI **SBAR**

Complete this form before contacting the resident's physician.

Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

Submitted by ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

S Situation

I am contacting you about a suspected UTI for the above resident.

Vital Signs BP _____/_____ HR _____ Resp. rate _____ Temp. _____

B Background

Active diagnoses or other symptoms (especially, bladder, kidney/genitourinary conditions)

Specify _____

☐ No ☐ Yes The resident has an indwelling catheter

☐ No ☐ Yes Patient is on dialysis

☐ No ☐ Yes The resident is incontinent **If yes,** new/worsening? ☐ No ☐ Yes

☐ No ☐ Yes Advance directives for limiting treatment related to antibiotics and/or hospitalizations

Specify _____

☐ No ☐ Yes Medication Allergies

Specify _____

☐ No ☐ Yes The resident is on Warfarin (Coumadin®)

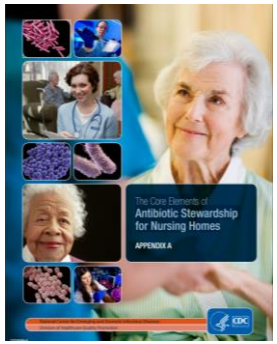
AHRQ Agency for Healthcare Research and Quality Advancing Excellence in Health Care ● www.ahrq.gov

www.ahrq.gov/NHASPGuide · June 2014

AHRQ Pub. No. 14-0010-2-EF

AIR, Texas A & M University, TMF Health Quality Institute, & David Mehr, M.D., (201). Suspected UTI SBAR. Toolkit for AHRQ under Contract No. 290-2006-000-191-8. https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf

Treating the Infection Appropriately (CDC)



- **Perform antibiotic "time outs."** Review antibiotics 2 to 3 days after antibiotics are initiated to answer:
  - Does this resident have a bacterial infection that will respond to antibiotics?
  - Resident on the most appropriate antibiotic(s), dose, and route of admin?
  - Can the spectrum of the antibiotic be narrowed or the duration of therapy shortened (i.e., de-escalation)?
  - Resident benefit from additional infectious disease / antibiotic expertise to ensure optimal treatment of the suspected or confirmed infection?
- **Reduce prolonged antibiotic treatment courses for common infections**
  - Beyond a week has not been found helpful/ short courses are effective
  - Decrease antibiotic duration among nursing home residents may reduce the complications and adverse events associated with antibiotic exposure.

CDC. (2015). The Core Elements of Antibiotic Stewardship for Nursing Homes. Appendix A. https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship-appendix-a.pdf

Treating the Infection Appropriately (AHRQ)

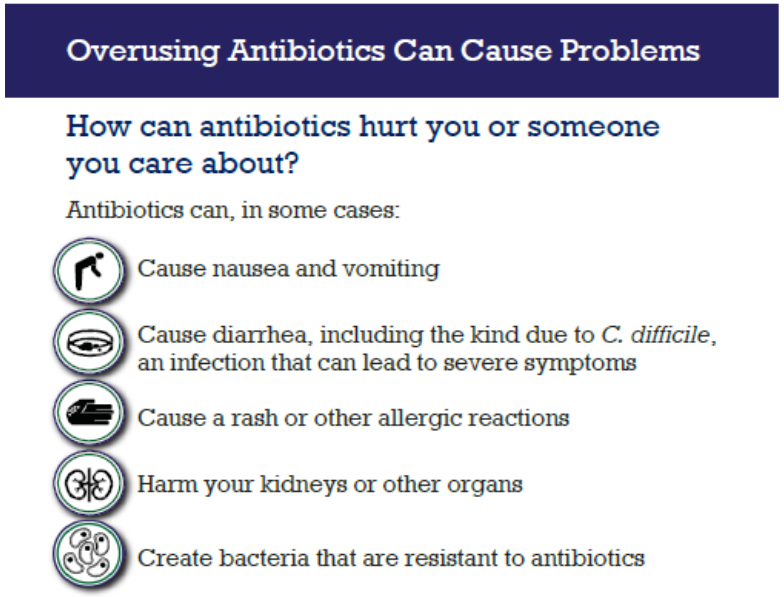
Concise Antibiogram Toolkit

Comprehensive Antibiogram Template

		Aminoglycosides			B-Lactams						Cephalosporins					Quinolones			
Gram (-)	Number of Residents	Amikacin	Gentamicin	Tobramycin	Ampicillin	Amoxacillin-Clavulanate	Ampicillin-Sulbactam	Imipenem	Meropenem (tested by MIC)	Pipercillin-Tazobactam	Cefazolin	Cefepime	Cefoxitin	Ceftazidime	Ceftriaxone	Ciprofloxacin	Gatifloxacin	Levofloxacin	Moxifloxacin
Acinetobacter baumanni																			
Citrobacter freundii																			
Citrobacter koseri																			
Citrobacter sp																			
Enterobacter aerogenes																			
Enterobacter cloacae																			
Enterobacter sp																			
Escherichia coli																			
Klebsiella oxytoca																			

Denver Health, University of Maryland School of Medicine (2012). Concise Antibiogram Toolkit. Toolkit for AHRQ under Contract No. 290-2006-00-20, Task Order No. 9. https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/5_TK2_T5-Concise_Antibiogram_Toolkit_Comprehensive_Antibiogram_Template.pdf

Patient and family Education & Engagement (UNC-Residents and families)



University of North Carolina. 2016. Patient antibiotic use brochure. https://nursinghomeinfections.unc.edu/files/2016/03/Infection-Project-brochure.pdf

Training/CEUs

- Almost all websites provide training
  - Powerpoint presentations
  - Audiofiles
  - Self-paced
- CEUs and self-paced
  - Robin Jump
  - UNC

Monitoring

- Minnesota: Antimicrobial Use Assessment for Long-term Care Facilities
- AHRQ: Antibiotic Use Tracking Sheet, Sample Monthly Summary Reports, Quarterly or Monthly Prescribing Profile

Nursing Home Antimicrobial Stewardship Guide

Toolkit 2. Monitor and Sustain Stewardship

Onset Date	Urinary Tract Infection	Respiratory	Skin/Soft Tissue	Gastrointestinal	Other Infection (Specify)	Signs & Symptoms	Indicate Diagnostic Tool Used and Whether Criteria Were Met	HAI/CAI/NHAI/Other Nosocomial*	Lab Results (organism identified)	X ray	Other Contributing Factors	Prescribing Clinician (PC)	Prescription Date	Prescription Duration	Antibiotic Name	Dose	Change of Antibiotic (if needed)	Followup With PC	Followup With Resident/Family	Comments/Notes

AIR,Texas A & M U, U Wisconsin, TMF Health Quality Institute, Trivedi Consults, LLC, U Pittsburgh, and David Mehr, M.D., Monitor and Sustain Stewardship. Toolkit for AHRQ under contract number HHSA290201000018I #2. https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/3_TK2_T2-Antibiotic_Use_Tracking_Sheet_Final.pdf

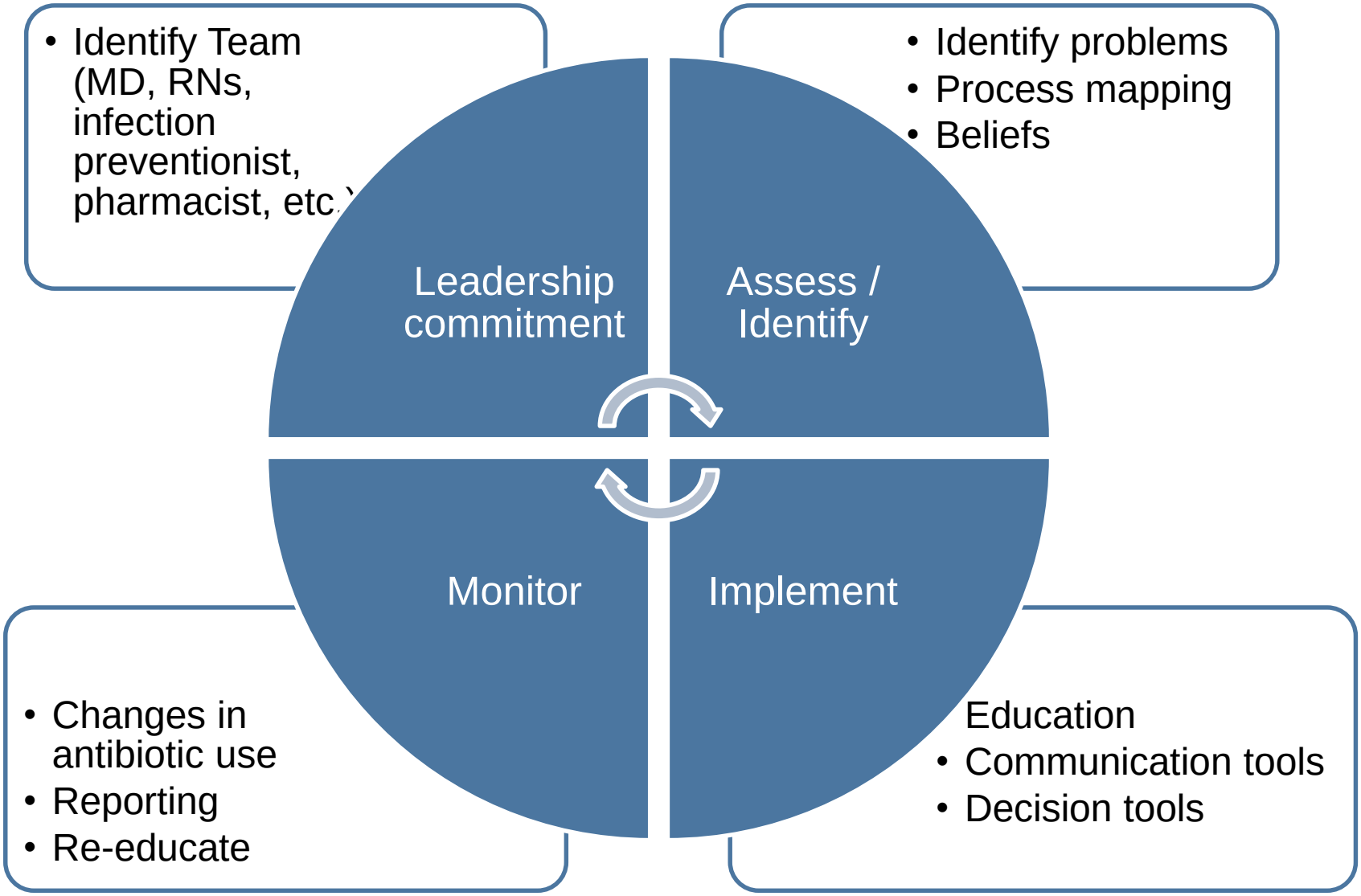
Strengths

- Multiple tools and guidance for facilities
- Based on latest information
- Much of it turn-key solutions
- Multiple training materials that support antibiotic stewardship

Weaknesses

- The wealth of tools can be daunting
- Nursing homes may find it difficult to figure out a place to start
- Nursing homes typically are resource-scarce and implementation can be difficult
- If UTIs are the focus, often significant resistance

Keys to Effective Antibiotic Stewardship



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