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

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Speaker Disclosures

• Dheeraj Mahajan, MD: No relevant financial relationship to disclose
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• 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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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
Side by Side
Core Elements of Antibiotic Stewardship for Nursing Homes

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
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<tbody>
<tr>
<td>Leadership commitment</td>
<td>Demonstrate support and commitment to safe and appropriate antibiotic use in your facility</td>
</tr>
<tr>
<td>Accountability</td>
<td>Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility</td>
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<tr>
<td>Drug expertise</td>
<td>Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility</td>
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<tr>
<td>Action</td>
<td>Implement at least one policy or practice to improve antibiotic use</td>
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<tr>
<td>Tracking</td>
<td>Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility</td>
</tr>
<tr>
<td>Reporting</td>
<td>Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff</td>
</tr>
<tr>
<td>Education</td>
<td>Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use</td>
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</table>
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

• 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

Muhammad S. Ashraf, MBBS

Associate Professor,
Division of Infectious Diseases
Medical Director,
Nebraska Infection Control Assessment and Promotion Program
Co-Medical Director,
Nebraska Antimicrobial Stewardship Assessment and Promotion Program
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
Loeb M et al. BMJ. 2005 Sep 24;331(7518):669
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

Loeb M et al. BMJ. 2005 Sep 24;331(7518):669
Utilizing Algorithms (With Recurrent Educational Sessions)

<table>
<thead>
<tr>
<th></th>
<th>3-Month Pre-Intervention</th>
<th>Initial 6 Months Post-Intervention</th>
<th>7 to 30 Months Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine cultures/ 1000 patient days</td>
<td>3.7</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>ASB treated</td>
<td>67.6%</td>
<td>69.2%</td>
<td>44%</td>
</tr>
<tr>
<td>Antibiotic days/ 1000 patient days</td>
<td>167.7</td>
<td>117.4</td>
<td>109.0</td>
</tr>
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</table>

- 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.

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;
- 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

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.

☐ 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.

Antibiotic use for Asymptomatic bacteriuria

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic use for Asymptomatic bacteriuria</td>
<td>73.15%</td>
<td>69.64%</td>
</tr>
<tr>
<td>Antibiotic use for Asymptomatic bacteriuria</td>
<td>68.78%</td>
<td>49.35%</td>
</tr>
</tbody>
</table>

Nursing Home with over 25% utilization
Nursing Home with less than 25% utilization

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

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

**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%

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
30% decrease in total antibiotic use
64% decline in tetracyclines use
61% decline in clindamycin use
38% decline in fluoroquinolones & 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

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
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
Identifying an Infection (AHRQ)

AIR, Texas A & M University, TMF Health Quality Institute, & David Mehr, M.D., (201).
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.

### Concise Antibiogram Toolkit

**Comprehensive Antibiogram Template**

<table>
<thead>
<tr>
<th>Gram (–)</th>
<th>Aminoglycosides</th>
<th>β-Lactams</th>
<th>Cephalosporins</th>
<th>Quinolones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Residents</td>
<td>Amikacin</td>
<td>Gentamicin</td>
<td>Tobramycin</td>
</tr>
<tr>
<td>Acinetobacter baumannii</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citrobacter freundii</td>
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<tr>
<td>Citrobacter koseri</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Citrobacter sp</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Enterobacter aerogenes</td>
<td></td>
<td></td>
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<tr>
<td>Enterobacter clausae</td>
<td></td>
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<tr>
<td>Enterobacter sp</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escherichia coli</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Klebsiella oxytoca</td>
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Patient and family Education & Engagement (UNC-Residents and families)

Don’t Take Antibiotics for Granted

It’s easy to see why antibiotics are helpful, and now you know why sometimes you or your family member may not need them. We can all help by taking antibiotics only when they’re really needed.

Why Not Antibiotics?

Overusing Antibiotics Can Cause Problems

How can antibiotics hurt you or someone you care about?

- Antibiotics can, in some cases:
  - Cause nausea and vomiting
  - Cause diarrhea, including the kind due to *C. difficile*, an infection that can lead to severe symptoms
  - Cause a rash or other allergic reactions
  - Harm your kidneys or other organs
  - Create bacteria that are resistant to antibiotics

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 | Indicated Diagnostic Tool Used | Long-Term Catheter | Wound | 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 Resistance 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](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

- Leadership commitment
- Assess / Identify
- Monitor
- Implement

Leadership commitment:
- Identify problems
- Process mapping
- Beliefs

Assess / Identify:
- Changes in antibiotic use
- Reporting
- Re-educate

Monitor:
- Identify Team (MD, RNs, infection preventionist, pharmacist, etc.)

Implement:
- Education
  - Communication tools
  - Decision tools

Leadership commitment:
- Changes in antibiotic use
- Reporting
- Re-educate