EDUCATIONAL SERIES: Navigating Infection Control and Antimicrobial Stewardship in Long-Term Care

Webinar #3: Antimicrobial Stewardship: Strategies for Implementation

New England Nursing Home Quality Care Collaborative
Webinar Will Begin Shortly.

Call-In Number: (888) 895-6448
Access Code: 1228904

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Antimicrobial Stewardship: Strategies for Implementation

Shira Doron MD  Kirthana Beaulac PharmD  Gabriela Andujar MD
Objectives

- Review the landscape of antimicrobial use and resistance in long term care and the regulatory requirements surrounding stewardship
- Define the elements of a successful stewardship program
- Outline the role of each member of the care team in carrying out the goals of stewardship
- Explore resources for policy and protocol development
- Describe examples of stewardship interventions that have been successful at other Long Term Care Facilities
Polling Question

How confident are you that the antimicrobial stewardship policy and practices in your facility are adequate to reduce unnecessary antibiotic use?

A. I am completely confident that the antimicrobial stewardship policy and practices in my facility are adequate

B. I am somewhat confident that the antimicrobial stewardship policy and practices in my facility are adequate

C. I have no confidence that the antimicrobial stewardship policy and practices in my facility are adequate
# Antibiotic Prevalence in Long Term Care

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Range of Published Rates per 1,000 Resident-Care Days*</th>
<th>Estimated Range for Total Annual Number of Cases in US†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower respiratory tract infection</td>
<td>0.3-4.7</td>
<td>0.16-2.57 million</td>
</tr>
<tr>
<td>Symptomatic urinary tract infection</td>
<td>0.19-2.2</td>
<td>0.10-1.20 million</td>
</tr>
<tr>
<td>Skin and soft-tissue infection‡</td>
<td>0.1-2.1</td>
<td>0.05-1.15 million</td>
</tr>
<tr>
<td>Acute gastroenteritis</td>
<td>0.1-2.5</td>
<td>0.05-1.37 million</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>0.2-0.36</td>
<td>0.11-0.20 million</td>
</tr>
<tr>
<td>All infections</td>
<td>1.8-13.5</td>
<td>0.98-7.38 million</td>
</tr>
</tbody>
</table>

* From 12 studies cited in reference 1.
† Based on the assumption that 1.5 million Americans reside in long-term-care facilities 365 days per year (547,000,000 resident-care-days in United States).
‡ Including cellulitis, abscesses, infected pressure ulcers, etc.

Antibiotic Appropriateness

- 50-75% of Long Term Care (LTC) Residents in the US get at least 1 antibiotic prescription each year
- It has been estimated 25-75% of all systemic antibiotic prescriptions and 60% of topical antibiotic prescriptions in LTC are inappropriate or unnecessary

Why are we doing so poorly?

• Workflow Related
  • Physicians have limited time to evaluate multiple patients without readily available night/weekend access
  • Many LTCFs lack institutional prescribing guidelines, access to contemporary references, or prescribing oversight
  • Limited access to ID specialists or specialized diagnostics

• Culture Related
  • Patient who seems frail- no room for error
  • Family who is demanding
  • Institutional fear of litigation

## Consequences

Table 3. Factors Associated with Acquisition of Multidrug-Resistant Gram-Negative Bacteria among Case Patients and Control Patients Matched According to Duration of Follow-up

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case patients (n = 29)</th>
<th>Control patients (n = 29)</th>
<th>Unadjusted OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, &gt;85 years</td>
<td>24 (83)</td>
<td>22 (76)</td>
<td>1.7 (0.4–6.97)</td>
<td>.48</td>
</tr>
<tr>
<td>Female sex</td>
<td>24 (83)</td>
<td>27 (93)</td>
<td>0.4 (0.08–2.06)</td>
<td>.27</td>
</tr>
<tr>
<td>White race</td>
<td>28 (97)</td>
<td>27 (93)</td>
<td>2 (0.42–5.31)</td>
<td>.53</td>
</tr>
<tr>
<td>ADL score, ≥1</td>
<td>14 (48)</td>
<td>12 (41)</td>
<td>1.5 (0.08–2.06)</td>
<td>.27</td>
</tr>
<tr>
<td>GDS score, ≥6</td>
<td>19 (66)</td>
<td>19 (66)</td>
<td>1 (0.29–3.45)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Presence of pressure sore</td>
<td>4 (14)</td>
<td>2 (7)</td>
<td>3.1 (0.51–19.5)</td>
<td>.22</td>
</tr>
<tr>
<td>Fecal incontinence</td>
<td>25 (86)</td>
<td>20 (69)</td>
<td>3.5 (0.72–16.85)</td>
<td>.12</td>
</tr>
<tr>
<td>Urinary incontinence</td>
<td>28 (97)</td>
<td>22 (76)</td>
<td>7 (0.86–56.9)</td>
<td>.07</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>8 (28)</td>
<td>6 (21)</td>
<td>1.7 (0.39–6.97)</td>
<td>.48</td>
</tr>
<tr>
<td>Charlson comorbidity index score, &gt;2</td>
<td>14 (48)</td>
<td>14 (48)</td>
<td>1 (0.29–3.45)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Interval hospitalization*</td>
<td>2 (7)</td>
<td>1 (3)</td>
<td>2.0 (0.2–22.1)</td>
<td>.50</td>
</tr>
<tr>
<td>Interval antibiotic exposure*</td>
<td>13 (45)</td>
<td>9 (31)</td>
<td>5.5 (1.2–24.8)</td>
<td>.03</td>
</tr>
</tbody>
</table>

**NOTE.** Data are no. (%) of residents, unless otherwise indicated. ADL, activities of daily living; CI, confidence interval; GDS, global deterioration scale; OR, odds ratio.

* Interval antibiotic and hospital exposure were assessed during the interval between baseline and follow-up culture sampling.

OFallon E; Kandel R; Schreiber R; DAGata EM. Infection Control & Hospital Epidemiology. 31(11):1148-53, 2010 Nov. DOI: 10.1086/656590
The Core Elements of Antibiotic Stewardship for Nursing Homes
Leadership commitment
Demonstrate support and commitment to safe and appropriate antibiotic use in your facility

Accountability
Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility

Drug expertise
Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility

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

Tracking
Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility

Reporting
Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff

Education
Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use
What are the ingredients for a successful program?

• Culture change
• Provider education
• Use of metrics/benchmarking
• Use of the microbiology laboratory
  • Antibiograms
• Use of technology and informatics
Culture change

• Be cognizant of physicians’ reluctance to give up autonomy
• Create a multidisciplinary team (“champions”)
• Provide a helpful (“teaching”) service
• Use concepts of behavior change theory
• Solicit feedback often
Provider education

• Every interaction is an opportunity for education
• Keep in mind - medical school education is lacking in concepts of stewardship
• Focus on:
  • Colonization versus infection
  • Community-acquired versus hospital-acquired
  • De-escalation (“but s/he is getting better on that”)
  • Early discontinuation
  • “That’s what s/he was transferred here on”
Carbapenem-resistant Enterobacteriaceae knowledge scores

Proportion of Healthcare Practitioners with Knowledge Score >50%, by Years of Experience

- All years (n=419) - 53.5%
- <3 (n=129) - 64.3%
- 3-10 (n=106) - 56.6%
- >10 (n=184) - 44.02%

What Can You Do?

ONLY YOU CAN PREVENT Antibiotic Resistance

SMOKEYB...
Long term care facility administrators can

• Establish multidisciplinary teams to address antibiotic stewardship and optimal drug use
• Have protocols that outline the appropriate circumstances for use of antibiotics
• Review antibiotic culture data for trends suggesting a worsening resistance problem
• Have protocols ensuring that cultures are checked and antibiotics adjusted according to culture results
• Establish programs for periodic review of antibiotic utilization
Long term care facility nurses can

- Be familiar with current protocols for testing and treatment of presumed bacterial infections
- Educate families and residents that many respiratory infections are caused by viruses and do not require antibiotics
- Educate families and residents about the appropriate indications for testing for and treating suspected UTIs
- Identify advanced directives for limited treatment
- Follow up with referring facility regarding pending lab results
Long term care facility prescribers can

- Encourage use of screening tools and protocols to decrease the use of unnecessary antibiotics.
- Educate fellow clinicians, staff and family members on appropriate use of antibiotics.
- Implement measures to reduce the need for treating with antibiotics (avoidance of indwelling urinary catheters, maximizing immunization levels, decubitus ulcer prevention, etc.)
Long term care facility pharmacists can

• Review antibiotic utilization and, where possible, appropriateness; identify opportunities for improved prescribing and discuss at QI meetings.

• Educate physicians and nursing staff about targeted antibiotic use, using a narrow spectrum antibiotic based on culture results.

• Prepare updated and easily accessible protocols

• Apply pharmacokinetic principles to vancomycin dosing and monitoring
  • avoid administration of divalent cations (Fe, Mg, Ca, Zn) within 6 hours before or 2 hours after fluoroquinolones

• Ensure prescriptions are compatible with allergy history

• Encourage use of oral route for highly orally bioavailable drugs
What facilities can do together

• Develop communication tools to share critical information between acute and long term facilities when patients are transferred
  • Culture results
  • Pending results
  • Treatments initiated (what, when, indication, stop date)
  • Precautions
  • Immunizations
  • History of *C. difficile*

• Ensure contact information is provided for follow up on patient history and pending test results

• Establish cross-facility teams to address infection prevention and antibiotic stewardship.
Polling Question

Which would you rank as the largest barrier to implementation of a successful antimicrobial stewardship program at your facility?

- Provider attitude
- Provider training
- Patient/ family demands
- Access to technology and diagnostics
- Access to clinical expertise
- Dedicated time
- Other
Turning Theory into Action
Policy Development- Antibiotic Stewardship Committee

• Outline membership
  • Medical director or designee (another clinician)
  • Infection preventions
  • Consultant pharmacist
  • Other optional members:
    o Director or Assistant Director of Nursing
    o Frontline staff (ie, nurses, nursing assistants),
    o Administrative staff
    o A board member or designee
    o Representative from the resident and family council

Key pieces of AS Policy

• Outline dedicated time and effort to carry out antibiotic stewardship activities (separate from infection control)
• Outline roles and responsibilities
  • Consultant pharmacist: support assessment, monitoring, and communication about antibiotic use as part of the medication regimen review
  • Medical Director or designated prescriber: be accountable for antimicrobial usage, assist in policy development, and serve as an educational resource
• Develop a system for monitoring antibiotic use
• Review both antibiotic stewardship policy and antibiotic use policies at least annually
Policy Scope

• Subcommittee Responsibilities
  • Antibiotic Use Protocols
  • Develop and maintain system for antibiotic use
  • Maintain annual antibiogram
  • Provide education on antibiotic stewardship
  • Meet at least quarterly

• Medical director or designated clinician
  • Serve as the primary medial point of contact for AS Committee
  • Assist in development of antibiotic use guidelines
  • Play an active role in stewardship-related educational activities
  • Provide individualized feedback to other prescribers

• Consultant Pharmacist
  • Review antibiotics during their monthly medication review, considering both ongoing and completed courses
  • Make recommendations to the Antibiotic Stewardship Committee based on findings
Antibiotic Use Policies

• Separate from the Antibiotic Stewardship Policy, should also have Antibiotic Use Policies
  • Clinical conditions
  • Durations of therapy
  • Certain high-risk antibiotics

• Provide guidance in diagnostics and treatment choices, including duration
Low Hanging Fruit

• IV to PO conversion
  • Several antibiotics have good bioavailability
    - Fluoroquinolones, linezolid, metronidazole, clindamycin, SMX/TMP, fluconazole
  • Decreased length of stay, cost of care, and risk for line-related infections

• Dose Optimization
  • Patient Characteristics: age, renal function, weight
  • Causative Organism
  • Site of Infection
  • Extended infusions
Impact of implementation of a novel antimicrobial stewardship tool on antibiotic use in nursing homes: a prospective cluster randomized control pilot study

Elizabeth Fleet¹, G. Gopal Rao¹*, Bharat Patel², Barry Cookson³, Andre Charlett⁴, Clive Bowman⁵ and Peter Davey⁶

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Resident antimicrobial management plan (RAMP)

- 30 nursing homes with 1832 beds.
- Two-part tool: initiation of treatment and review of treatment
- 1628 residents pre-intervention and 1610 post-intervention
RAMP tool

• Good practice points at initiation of antibiotics
  • Clinical signs and symptoms present
  • Resident examined by a physician
  • Diagnosis/site of infection documented
  • Clinical specimens sent
  • Antibiotic appropriate for indication, allergies and comorbidities
  • Antibiotic initiated promptly
RAMP tool

• Good practice points on review of antibiotic treatment
  • Documentation of review after 48-72 hours
  • Stop date or planned review date documented
  • Resident re-examined by physician
  • Results of cultures noted
  • Outcome of treatment assessed
Total antibiotic consumption

Significant decrease p=0.02

Significant increase p=0.04

pre-intervention

post-intervention
Effective Antimicrobial Stewardship in a Long-Term Care Facility through an Infectious Disease Consultation Service: Keeping a LID on Antibiotic Use

Robin L. P. Jump, MD, PhD; Danielle M. Olds, RN, PhD; Nasim Seifi, MS; Georgios Kypriotakis, MS; Lucy A. Jury, RN, CNP; Emily P. Peron, PharmD; Amy A. Hirsch, PharmD; Paul E. Drawz, MD; Brook Watts, MD; Robert A. Bonomo, MD; Curtis J. Donskey, MD
LID Service

- ID service for a 4-ward, 160-bed LTCF at urban VA
- LID team= ID physician and NP, examined residents once a week and were available for remote consult the rest of the week via electronic medical record and telephone
  - The LID service saw an average of 7 patients and fielded 5-10 phone calls each week
  - Nearly 1/3 of the consults required only 1 visit; the remaining patients required an average of 3.6 visits (range 2 – 20).
Effective antimicrobial stewardship in a long-term care facility through an infectious disease consultation service: keeping a LID on antibiotic use.

Jump RL; Olds DM; Seifi N; Kypriotakis G; Jury LA; Peron EP; Hirsch AA; Drawz PE; Watts B; Bonomo RA; Donskey CJ

DOI: 10.1086/668429

FIGURE 1. Observed rates of antibiotic use before and after initiation of the long-term care facility (LTCF) infectious diseases consultation service (LID), shown as filled and open symbols, respectively, in the LTCF (A) and the hospital (B). The corresponding lines and their slopes (indicated on the graph) represent the estimated rates of change in antimicrobial use for total antimicrobials (squares), oral agents (diamonds), and intravenous agents (circles), determined using segmented regression analysis of an interrupted time series. An asterisk indicates P<=.05.
Effective antimicrobial stewardship in a long-term care facility through an infectious disease consultation service: keeping a LID on antibiotic use.

Jump RL; Olds DM; Seifi N; Kypriotakis G; Jury LA; Peron EP; Hirsch AA; Drawz PE; Watts B; Bonomo RA; Donskey CJ

DOI: 10.1086/668429

FIGURE 3. Observed rates of positive Clostridium difficile tests at the long-term care facility (LTCF; squares) and the hospital (triangles) before (filled symbols) and after (open symbols) initiation of the LTCF infectious diseases consultation service (LID). The corresponding lines and their slopes (noted on graph) represent the estimated rates of change for positive C. difficile tests at the LTCF (solid lines) and the hospital (dashed lines), determined using segmented regression analysis of an interrupted time series. An asterisk indicates $P<=.05$. 
New England Sinai Hospital: a successful ASP at a LTACH
The program

- Worked with leadership, ID consultant, IP, Pharmacy director
- End date and indication required by pharmacy for all antimicrobials
- List of the “great eight” antimicrobials
- Tufts MC ID physician or ID PharmD, off-site, M-F
- Log on and generate report: patients on antimicrobials at least 7 days
- Review electronic medical records
- Recommendations made by email
- Clinical pathways
Analysis

- From April 2011 through March 2014
- 885 recommendations on 734 patients
- AS staff spent approximately 1-2 hours per week reviewing cases and providing recommendations remotely

Residents:
- Mean age of 68 years (SD ±34)
- Median length of stay of 56 days
Type of Infection

- Colitis: 20.9%
- Bacteremia: 15.4%
- UTI: 11.6%
- Cellulitis: 3.2%
- Wound infections: 5.1%
- Osteo: 8.5%
- Other: 15.1%
Recommendations

Not agree 55%
Agree with management 45%

Recs not agree
Recs not followed 52.15%
Recs followed 47.85%
Types of Recommendations

- Stop: 21.6%
- More info: 16.1%
- ID Cons: 10.5%
- Change Ab: 6.9%
- De Escalate: 5.5%
- Shorten tx: 1.5%
- Prolong tx: 1.1%
- Increase dosage: 0.9%
Following the intervention there was a significant decrease in monthly HA-CDI rates that was maintained throughout the post intervention period.

**IRR 0.57; 95% CI 0.35-0.92; p=0.02**
General Themes

• Antimicrobial Stewardship does require resources
  • Consider contracting for help if needed

• The cost of the additional resource input is consistently offset by the cost savings of using less antibiotics with additional benefits
  • Lower rates of *C. difficile*
  • Resistance mitigation
  • Improved patient safety

• Small interventions can have a big impact
Questions
<table>
<thead>
<tr>
<th>Date</th>
<th>Webinar Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 3rd</td>
<td>WEBINAR: Infection Control: Prevention</td>
</tr>
<tr>
<td>May 8th</td>
<td>WEBINAR: Approach to the Patient with Suspected UTI</td>
</tr>
<tr>
<td>Jun 12th</td>
<td>WEBINAR: Infection Control: Management (Case Scenarios)</td>
</tr>
<tr>
<td>Jul 10th</td>
<td>WEBINAR: Antibiotic Selection, De-Escalation, and Duration</td>
</tr>
<tr>
<td>Aug 14th</td>
<td>WEBINAR: How to Get an A on Your Report Card: Prevention and Management of <em>C. difficile</em> and Other Healthcare Associated Infections</td>
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<tr>
<td>Sep 11th</td>
<td>WEBINAR: Measure Your Success: Monitoring and Tracking Data</td>
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</table>
Connect with the New England QIN-QIO on Social Media!
Captures valuable data such as:
- Pre and post tests
- Knowledge checks
- Surveys

Learners’ course specific reports:
- Test responses
- Activity completions
- Feedback
- Number of Attempts

Access at Learning4Quality.org

Questions, comments, or concerns, email: learning@healthcentricadvisors.org
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For Massachusetts Facilities

- Facility recognition for full program completion **REQUIRES that you submit monthly antibiotic start data and participate in all webinars**
  - For your viewing to be recorded, missed webinars can be accessed through the following links:

- **Calculating Resident Days:**
  - Add the daily census for every day in the month of interest to get resident days for the month.

- **Calculating Percent Occupancy:**
  - Calculate the percent occupancy for the facility on the last day of the month:
    - (Number of beds occupied/ Total number of beds) x 100
• An “Infection Control and Antibiotic Stewardship Toolkit” is being assembled for distribution

• Submission of monthly antibiotic starts can occur beginning on the first day of each month (for prior month) at this link: https://www.surveymonkey.com/r/9Y2TQ7C

• Contact for any questions:
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