Antibiotic Stewardship in Long-Term Care Webinar Series
Lake Superior Quality Innovation Network / Minnesota Department of Health
October 25, 2017

Antibiotic Stewardship in Skilled Nursing Facilities: Getting into Compliance with the Mega Rule

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University of Wisconsin School of Medicine and Public Health
Madison, WI
Consultant Activities:

1. **Zurex Pharmaceuticals** (Madison, WI): provide strategic advice on development and testing of the company’s novel anti-septic platform (<$5,000).

2. **Deb Group** (SC Johnson Subsidiary, Charlotte, NC): provide strategic advice on evaluating the company’s automated hand hygiene monitoring technology (<$5,000).
Objectives

• Overview of antibiotic use in SNFs
• Regulatory history & overview
• Reform of CMS Requirements of Participation
• Where to focus your efforts
Why Antibiotic Use in SNFs Matters

- Up to **70%** of skilled nursing facility residents will receive **one or more** courses of systemic antibiotics in a year.

- **~50%** of antibiotics started in skilled nursing facilities are **unnecessary**.

- **50% < 7d > 50%**
  - Half of antibiotic course for treatment of common infections are prescribed for **more than a week**.

- **A majority** of antibiotics prescribed in skilled nursing facilities are **broad-spectrum**.

- 78% **Narrow-Spectrum**
- 22% **FQ, Ceph, BL/BLI, Macrol 78%**
Why Antibiotic Use in SNFs Matters

### HARMS AT INDIVIDUAL LEVEL

- **ADE**
  - 20% of all adverse drug events (ADEs) in nursing homes caused by antibiotics
  - Antibiotic-associated ADEs are one of the most common reasons for transfer to ER

- **CDI**
  - *C. difficile* infection (CDI) is a life-threatening intestinal disease caused by antibiotics
  - 12% of nursing home residents treated inappropriately for UTI develop CDI

- **ARO**
  - ~50% of nursing residents are colonized with antibiotic-resistant organisms (AROs)
  - Antibiotic exposure is the single most important risk factor for ARO colonization

### HARMS AT FACILITY LEVEL

- Residents in nursing homes with higher antibiotic use have a 24% increased risk of antibiotic-related harm
- Antibiotics account for 1/3 of all survey penalties for inappropriate medication use in Wisconsin nursing homes

### HARMS AT POPULATION LEVEL

- Half of the residents transferred to the hospital are colonized with *C. difficile* and/or antibiotic-resistant bacteria which may be spread to others
- Nursing homes have been repeatedly implicated in the regional spread of resistance
- Mathematical models suggest that antibiotic resistance cannot be controlled in hospitals without controlling resistance in nursing homes
Our Government and Public Health Authorities Are Concerned

NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

MARCH 2015

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.
Evolution of Nursing Homes & the Regulatory Environment

1965 – The Older Americans Act (Medicare & Medicaid)

2009 – Infection Control Guidance Updated

Marion Branch National Home for Disabled Volunteer Soldiers, Indiana

Nursing Home Reform Act of 1987
OBRA 87

2016 – CMS Updates “Requirements of Participation”
History of Infection Control Regulations

• **1990-2009**
  - 5 survey tags – *6 pages*
  - F441 – “Infection Control”
  - F442 – “Preventing Spread of Infection”
  - F443 – “Employees with Communicable Disease”
  - F444 – “Handwashing”
  - F445 – “Linens”

• No clear guidance on how to interpret the regulations
• Antimicrobial stewardship???


<table>
<thead>
<tr>
<th>Year</th>
<th>Total Citations</th>
<th>F-441</th>
</tr>
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<tbody>
<tr>
<td>2011</td>
<td>1st</td>
<td></td>
</tr>
<tr>
<td>2012</td>
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</tr>
<tr>
<td>2013</td>
<td>2nd</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>2nd</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>2nd</td>
<td></td>
</tr>
</tbody>
</table>

School of Medicine and Public Health
UNIVERSITY OF WISCONSIN - MADISON
History of Infection Control Regulations

• **2005**
  - F329 – Unnecessary drugs
    - Often interpreted to apply only to antipsychotic medications
    - Actually applies to any high-risk medication

• **2009**
  - *Surveyor Guidance* updated - 34 pages
  - Collapsed tags to F441 – “Infection Control” – Required infection control program
    - Person who oversees, but short of requiring “IP”
    - Oversight not a full FTE
    - Hand hygiene
    - Transmission based precautions
    - Antibiotic review – review data to ensure appropriate use ???
History of Infection Control Regulations

• **2016**
  
  • Sweeping change to regulations
  
  • Moved vaccination regs under IC regs
  
  • Focus expanded to include interrupting transmission in addition to preventing infections
  
  • Must follow national standards (NHSN or McGeer)
  
  • Facilities are required to base their IPCP program based on an annual facility assessment
  
  • Facilities must employ and designate an individual for responsibility the IPCP who has specific training beyond their terminal clinical degree
  
  • §483.80(a): The facility must establish an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

[Interpretive guidance is 696 pages (IC-related sections 49 pages)]


[https://www.ahcancal.org/facility_operations/Documents/SC17-36.03.Appendix%20PP%20with%20Final%20IGs.pdf](https://www.ahcancal.org/facility_operations/Documents/SC17-36.03.Appendix%20PP%20with%20Final%20IGs.pdf)
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  11/2018
    - Facilities must employ and designate an individual for responsibility the IPCP
    who has specific training beyond their terminal clinical degree

• **11/2017**
  - §483.80(a): The facility must establish an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

https://www.ahcancal.org/facility_operations/Documents/SC17-36.03.Appendix%20PP%20with%20Final%20IGs.pdf
Specific Regulatory Language

• Leadership support
  • Involve medical director, consulting pharmacist, nursing, administrative leadership
  • Involve facility ICPO

• Facilities will develop and implement ASP protocols that address:
  • How program will be integrated into facility IPCP
  • Frequency of program review (at least annually)
  • How antibiotic use and resistance outcomes will be tracked & reported
  • Frequency and mode of use/outcome reporting to prescribers
  • Criteria the facility will employ to determine antibiotic appropriateness
  • Frequency and mode of staff/prescriber education

• Required prescribing (indication, drug, dose, duration) and monitoring practices
  (notification of test results that may affect treatment decisions)
READY YOU'RE NOT

INCOMPLETE YOUR TRAINING IS
Regs Modeled on CDC Core Elements

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

Checklist for Core Elements of Antibiotic Stewardship in Nursing Homes
Identify an individual to be responsible for leading the ASP team
ASP is a team effort
ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• Antibiotic utilization tracking & reporting (Core)
• Facility antibiogram (Advanced)
• Facility-specific prescribing guideline (Advanced)
• Provider feedback reports (Advanced)

Post-prescribing
• Audit & feedback (Advanced)

Nursing Practice
• SBAR (Core)
• Reducing unnecessary urine testing (Core)
• Antibiotic timeout (Core)
ASP team tasks

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Antibiotic stewardship policy template

• Eliminate reagent strip testing of urine for the evaluation of resident change-in-condition

• Carefully assess unintended consequences of testing delegation protocols

• Process & tools for assessing and communicating resident change-in-condition

• Eliminate test-of-cure urine cultures

• Discourage use of prophylactic antibiotics

Jump et al. *JAMDA* 2017; epub ahead of print
ASP team tasks

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**Nursing Practice**
- SBAR (Core)
- Reducing unnecessary urine testing (Core)
- Antibiotic timeout (Core)
Effectiveness of multifaceted educational programme to reduce antibiotic dispensing in primary care: practice based randomised controlled trial

Table 3. Random Assignment and Treatment with Parenteral Antibiotics According to Guideline

<table>
<thead>
<tr>
<th></th>
<th>Multi-Disciplinary Training</th>
<th>Physician-Only Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random Assignment of SNFs</td>
<td>(% of episodes with guideline indication)</td>
<td></td>
</tr>
<tr>
<td>Preintervention</td>
<td>50% (10/20)</td>
<td>64.5% (69/107)</td>
</tr>
<tr>
<td>Postintervention</td>
<td>81.8%* (18/22)</td>
<td>69% (29/42)</td>
</tr>
</tbody>
</table>

*p = .06.
SNF = skilled nursing facility.

Resident & Family Engagement - Passive

ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• **Antibiotic utilization tracking & reporting (Core)**
• Facility antibiogram (Advanced)
• Facility-specific prescribing guideline (Advanced)
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Post-prescribing
• Audit & feedback (Advanced)

Nursing Practice
• SBAR (Core)
• Reducing unnecessary urine testing (Core)
• Antibiotic timeout (Core)
Measuring antibiotic utilization

If You Can't Measure It, You Can't Improve It

(William Thomson, Lord Kelvin)
Antibiotic tracking and reporting requirements

• What needs to be tracked?
  • Utilization measure
  • Outcome measure (C. diff rates, MRSA rates, antibiogram)
  • Appropriateness measure

• What type of reporting?
  • QAA meeting
  • Providers
## Antibiotic Measures

<table>
<thead>
<tr>
<th>Utilization</th>
<th>Appropriateness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Antibiotic start (event)</td>
<td>• Necessity</td>
</tr>
<tr>
<td>• Days of therapy (DOT/AUR)</td>
<td>• % of courses exceeding “X” days</td>
</tr>
<tr>
<td>• Length of therapy (LOT)</td>
<td>• Appropriateness of spectrum</td>
</tr>
<tr>
<td>• Defined daily dose (DDD)</td>
<td>• Appropriateness of dose</td>
</tr>
<tr>
<td>• Costs (per a-day/r-day)</td>
<td></td>
</tr>
</tbody>
</table>

Mylotte J. J Am Med Dir Assoc 2016; 17(7): e13-8
Antibiotic Starts

• Pros
  • Many facilities are already doing this (typically counts only)
  • Aligned with current 24-hour report & infection log processes
  • Relatively easy to marry with treatment indication
  • Not influenced by prophylactic therapy
  • Can be easily modified to exclude hospital-initiated antibiotics

• Cons
  • Current data systems dictate reliance on manual data abstraction methods
    • If automated, could be inflated by intermittent therapy (fosfomycin, vancomycin), treatment interruptions and treatment modifications
    • Suboptimal reliability of 24-hour report/infection logs
  • Does not address prophylactic antibiotics
  • Does not address dimensions of appropriateness (necessity, duration, spectrum)
Days of Therapy (DOT)

• Pros
  • Identical to the hospital AU measure
  • Does provide indirect information on length of therapy (not the case in hospitals)
  • More amenable to automation than antibiotic starts

• Cons
  • May be difficult to parse out hospital-initiate antibiotics
  • May be difficult to parse out prophylactic antibiotics
  • May be difficult to parse out relative contribution of different treatment indications
  • Only captures information on one dimension of appropriateness (duration)
Measures of Appropriateness - Necessity

**Revised McGeer (Stone)**

(A) Clinical  
(Must satisfy one of the following scenarios)

1. Either of the following:
   - Acute dysuria or
   - Acute pain, swelling or tenderness of testes, epididymis or prostate

2. If either FEVER* or LEUKOCYTOSIS present need to include ONE or more of the following:
   - Acute costovertebral angle pain or tenderness
   - Suprapubic pain
   - Gross hematuria
   - New or marked increase in incontinence
   - New or marked increase in urgency
   - New or marked increase frequency

3. If neither FEVER or LEUKOCYTOSIS present INCLUDE TWO or more of the ABOVE (Box #2).

(B) Lab (At least one of the following must be met)

1. VOIDED SPECIMEN: POSITIVE URINE CULTURE (≥ 10^5 CFU/ML) NO MORE THAN 2 ORGANISMS

2. STRAIGHT CATH SPECIMEN: POSITIVE URINE CULTURE (≥ 10^2 CFU/ML) ANY NUMBER OF ORGANISMS

**Loeb Minimum Criteria**

(A) Clinical  
(Must satisfy one of the following scenarios)

1. Acute dysuria

2. FEVER** plus ONE or more of the following:
   - New or worsening urgency
   - New or worsening frequency
   - Suprapubic pain
   - Gross hematuria
   - Costovertebral angle tenderness
   - Urinary incontinence

**Crnich et al. SHEA 2014**

Either Criteria Positive = 251/504 (49.8%)  
Agreement = 354/504 (70.2%)

* Fever (Revised McGeer): single temp ≥ 100°F or repeated temp ≥ 99°F or 2°F above baseline

** Fever (LMC)x: single temp ≥ 100°F or 2.4°F above baseline
Measures of Appropriateness - Duration

• 50% of facility-initiated Abx treatment courses exceed 7 days

• 20% of antibiotic utilization can be eliminated by shortening treatment courses to 7 days or less

• Measures
  • DOTs
  • % of facility-initiated treatment courses exceeding 7 days

Crnich et al. APIC Wisconsin 2015
Other Measures of Appropriateness

• % of facility-initiated treatment courses that are guideline concordant

• % of facility-initiated treatment courses in which specific classes of antibiotics utilized (e.g., fluoroquinolones)

• Spectrum Score

• Medication appropriateness index
Suggestions for developing tracking workflows

• Start having conversations with facility pharmacy
  • Most pharmacy services maintain a database that details drug, dispense date and
days of therapy that was dispensed
  • They will not often have data on indication or appropriateness

• Offload primary data collection to frontline staff
  • Every facility uses a 24-hour board that can potentially be adapted to capture
discrete resident information
  • Can get information on antibiotic starts, duration of therapy and indication
  • Will be difficult to incorporate appropriateness (duration being an exception)

• Integrate into infection surveillance activities
  • IP is required to maintain line-list of infections in the facility
  • It is minimal effort to capture data on antibiotic use
  • Can assess appropriateness
ABCs for Diagnosing Urinary Tract Infection in Long Term Care

Resident Name: ___________________________ Date/Time: ___________________________
Note: ___________________________

Diagnosis of Urinary Tract Infection (UTI) in long term care resident requires clinical signs and symptoms of UTI and a positive culture.

Assessment: Clinical Signs and Symptoms of UTI

CHECK HERE IF CRITERIA ARE MET FOR SIGNS OR SYMPTOMS

Resident without indwelling catheter

- Acute dysuria alone OR
- Fever + at least one of the symptoms below (new or increased) OR
- If no fever, at least two of the symptoms below (new or increased)
  - Urgency
  - Frequency
  - Suprapubic pain
  - Gross hematuria
  - Costovertebral angle (CVA) pain or tenderness
  - Urinary incontinence

Resident with indwelling catheter

- At least one of the symptoms below (new or increased)
  - Fever
  - Costovertebral angle (CVA) pain or tenderness
  - Rigors (shaking chills)
  - Diaphoresis
  - Thirsty pain (back, side pain)
  - Pelvic discomfort
  - Acute hematuria
  - Malaise or lethargy with no other cause

Blood Pressure: ___________ Pulse: ___________ Temperature: ___________ Respiratory Rate: ___________

Fever (oral > 100°F or any site ≥ 2°F above baseline or repeated oral > 99°F rectal > 99.5°F)

Bacteria (Order urinalysis and culture & sensitivity if above criteria are met)

Collect clean voided specimen if possible, or catheterized catheter if necessary. For residents with chronic indwelling Foley catheter, change catheter; send urine obtained from new catheter.

Consider CBC, BMP if clinically indicated (e.g., leukocytosis, fever). The presence of an elevated WBC count suggests infection, with or without a fever.

Urinalysis

<table>
<thead>
<tr>
<th>Nitrites</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leukocyte esterase</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Pyuria</td>
<td>≥ 10 WBC/µl</td>
<td>10 WBC/µl</td>
</tr>
</tbody>
</table>

Culture and sensitivity

<table>
<thead>
<tr>
<th>Positive urine culture</th>
<th>Positive urine culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean catch specimen ≥ 10^5 cfu/ml, with ≥ 2 organisms</td>
<td></td>
</tr>
<tr>
<td>Catheterized specimen (straight cath or newly placed indwelling cath ≥ 10^5 cfu/ml, with ≥ 1 organism</td>
<td></td>
</tr>
</tbody>
</table>

Possible causes for mental status changes include:

- Constipation
- Pain
- Dehydration
- Medication or dose change
- Hypoxia
- Infections such as pneumonia
- Hypo/hyperglycemia
- Urinary retention
- Environmental triggers

Care Plan

Criteria met for UTI symptoms AND positive urine culture

- Review for treatment with antibiotics
- Monitor vital signs
- Monitor fluid intake and increase if indicated

Criteria not met for UTI symptoms (with or without a positive urine culture)

- Review for alternate diagnosis
- Monitor vital signs and symptoms
- Monitor fluid intake and increase if indicated
- Re-evaluate if above criteria for symptomatic UTI emerge

At any point, re-evaluate with M/F/N/P/A, if symptoms progress or if the resident has any of the following: Fever > 100.5°F; heart rate > 100 or < 50; RR > 24/min or < 10/min; BP < 90 or > 200 systolic; oxygen saturation < 90%; finger stick glucose > 70 or < 200; unable to eat or drink.

Prior to treatment consider review:

Advance directives for limiting treatment (especially antibiotics):

Medication Allergies:

The resident is on warfarin (Coumadin):

NOTES

Suspected UTI SBAR

Complete this form before contacting the resident's physician. Date/Time ____________________

Nursing Home Name ____________________ Facility Fax ____________________

Resident Name ____________________ Date of Birth ____________________

Physician/NP/PA ____________________ Phone ____________________

Fax ____________________

Name ____________________ Faculty Phone ____________________

Submitted by: ☐ Phone ☐ Fax ☐ In Person ☐ Other ____________________

Situation

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

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

Background

Active diagnoses or other symptoms (especially, bladder, kidney/urinary system 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®

☐ No ☐ Yes Enter UTI antibiotic
Other suggestions

• Use cross-sectional approaches to identify problem areas

• Design prospective tracking efforts with your improvement activities in mind
  • Focus on tracking UTI treatment if your efforts are only focused on UTI
  • Make sure you have some tool for assessing diagnosis shifting (everyone who used to have UTI now has respiratory tract infection)

• Trend your data using incidence densities (e.g., events per 1,000 resident-days) rather than count data

• Be careful when comparing your data to external data
ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• Antibiotic utilization tracking & reporting (Core)
• Facility antibiogram (Advanced)
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Nursing Influences on Prescriber Decision-Making

- Thoroughness of the initial assessment of resident change-in-condition
- Thoroughness of communicating findings of the assessment
- Nurse recommendations for testing and treatment
- Follow-up assessment of the resident
Communication/Decision Aid Tool

• Quasi-experimental study in 12 NHs in Texas

• Intervention focused on operationalizing Loeb study (2005) into a communication tool

• Implementation stratified by intensity
  • Control (n = 4)
  • Low-intensity (n = 4)
  • High-intensity (n = 4)

OR = 0.35
95% CI = 0.16 – 0.76

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Dipstick ➔ UA ➔ Urine culture ➔ Antibiotic Prescription

- Urine testing automated in many NHs.
- Average time from recognition of change to antibiotic = 2-3 days
- 60-90% of antibiotics prescribed for UTI started after culture results are back

Phillips et al., *BMC Geriatrics* 2012; 12: 73
Drinka & Crnich, *Ann Long Term Care* 2014; 22(9)
Active monitoring is doing something

Abnormal Vital Signs? (Any checked in B2)

Localizing Symptoms? (Any checked in B3)

Non-localizing Symptoms? (Any checked in B4)

Other significant findings?

Higher Risk (Go to R1 & R2)

Lower Risk (Go to R2)

Suggested Script for Low-Risk Change-In-Condition

*According to my assessment, this resident is experiencing a low-risk change-in-condition. I would like your permission to initiate our active monitoring care plan. I would not recommend testing the urine or starting antibiotics at this time

R1. Diagnostic and Therapeutic Orders

- Urinalysis
- Urine Culture
- CBC w/Diff
- Chest X-Ray
- Start Antibiotic(s) for this indication:
  - Antibiotic: ________ Dose: _____ Frequency: _____ Days: _____
  - Other: __________
- Oxygen supplementation
- Nebulizer treatment
- Cough suppressants

R2. Monitoring and Supportive Care Orders

- Monitor vital signs every ___ hours
- Oral fluids for hydration: ___ cc ___ hr.
- IV fluids for hydration: ___ cc ___ hr.
- Monitor fluid intake/urine output every ___ hours
- Notify provider if symptoms worsen or if unresolved in ___ hours / days
- Other orders: ____________________

Review McGeer's Criteria
Reduced Testing → Reduced Treatment

- 12 NHs in Massachusetts participated
- Intervention
  - Education (NH staff & providers)
  - Pathway (form)
  - Process and outcome measures trended & regularly reviewed by facility staff

<table>
<thead>
<tr>
<th>Measure</th>
<th>IRR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine Culture Rate</td>
<td>0.47 (0.42 – 0.52)</td>
</tr>
<tr>
<td>UTI Rate</td>
<td>0.42 (0.35 – 0.50)</td>
</tr>
<tr>
<td><em>C. Difficile</em> Rate</td>
<td>0.85 (0.45 – 1.68)</td>
</tr>
</tbody>
</table>

Doron et al., *IDWeek* 2014 [poster abstract]
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Antibiotic Prescribing is a Process with Multiple (Potential) Decisions

- **Q1:** Do I Test?
- **Q2:** Do I Treat?
- **Q3:** How Do I Treat?
- **Q4:** Can I Stop?
- **Q5:** Can I Narrow?
- **Q6:** How Long Should I Treat?
Opportunities to Modify Antibiotic Therapy

Subject is being treated for UTI in a nursing home or emergency department setting.

- Yes: Subject does not meet McGeer or Loeb criteria OR Urine analysis and/or urine culture are negative.
- No: Continue Antibiotics.

Duration of effective antibiotic therapy is > 7 days.

- Yes: Subject receiving a fluoroquinolone AND Urine culture shows susceptibility to a narrow-spectrum alternative.
  - Yes: Shorten treatment duration.
  - No: Treatment duration is appropriate.
- No: Change to appropriate narrow-spectrum antibiotics.

Subject receiving a fluoroquinolone AND Urine culture shows susceptibility to a narrow-spectrum alternative.

- Yes: Shorten and streamline
- No: No change needed.

Hossin et al. IDWeek 2017

No intervention opportunity* 119 (34%)

Stop and shorten 55 (16%)

Streamline 20 (6%)

Shorten 15 (4%)

Stop and streamline 8 (2%)

Stop and shorten 28 (8%)

Stop, shorten, and streamline 8 (2%)

Stop 100 (28%)
Post-Prescribing Process

Antibiotic Started by PCP?

Yes

Schedule Post-Prescribing Review

No

Notify PCP of Antibiotic Start

Assemble Pertinent Data for Review

Resident condition
Microbiology results
Other laboratory test results
Imaging test results

Nurse/PCP Post-Prescribing Review

① Can antibiotics be stopped?
② Can antibiotic spectrum be narrowed?
③ Can antibiotic duration be shortened?

48-72 Hours
ASP team tasks

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Nursing Practice
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Make Consequences more Visible

- 80% of cultures from a urine sample
- 85% of the antibiotic use in the 3 NHs was empiric (before cultures)
  - 54% involved a fluoroquinolone antibiotics
  - 65% of episodes associated with discordant (inappropriate) therapy
- Making antibiogram available reduced inappropriate use to 55%
ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• Antibiotic utilization tracking & reporting (Core)
• Facility antibiogram (Advanced)
• Facility-specific prescribing guideline (Advanced)
• Provider feedback reports (Advanced)

Post-prescribing
• Audit & feedback (Advanced)

Nursing Practice
• SBAR (Core)
• Reducing unnecessary urine testing (Core)
• Antibiotic timeout (Core)
Impact of local prescribing guidelines

An Educational Intervention to Improve Antimicrobial Use in a Hospital-Based Long-Term Care Facility

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Antibiotic-resistant infections (per 1,000-days) ↓ 25%
ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• Antibiotic utilization tracking & reporting (Core)
• Facility antibiogram (Advanced)
• Facility-specific prescribing guideline (Advanced)
• Provider feedback reports (Advanced)

Post-prescribing
• Audit & feedback (Advanced)

Nursing Practice
• SBAR (Core)
• Reducing unnecessary urine testing (Core)
• Antibiotic timeout (Core)
Provider-Led Post-Prescriptive Review

Antibiotic Self-stewardship: Trainee-Led Structured Antibiotic Time-outs to Improve Antimicrobial Use

Background: Antibiotic use is an important quality improvement target. Nearly 50% of antibiotic use is unnecessary or inappropriate. To combat overuse, the Center for Disease Control and Prevention (CDC) proposed “time-outs” to mediate antibiotics.

Objective: To optimize antibiotic use through trainee-led time-outs.

Design: Before-after study.

Setting: Internal medicine (2 units, 46 beds) at a university hospital.

Participants: Inpatients (n = 679).

Intervention: From January 2012 until June 2013, while serving monthly education on antimicrobial stewardship, resident physicians were instructed to perform an antibiotic review at the time of hospital admission.

Measurements: Antibiotic costs were standardized and compared to the year before and after the audit. Use was measured as World Health Organization defined days (DDDs) per 1000 patient-days. Total antibiotic use and the use of macrolides, carbapenems, antipseudomonal penicillins, and vancomycin were compared using interrupted time series. Rates of nosocomial Clostridium difficile infection were compared using incidence rate ratios.

Results: Total costs in the units decreased from $16,018,304 (January 2011 to January 2013) to $13,291,214 (January 2013 to January 2015), for a savings of $2,727,090 (16%) reduction. Of the savings, $5,410,031 (78%) was related to carbapenems and $11,274 (22%) was due to other antibiotic classes. Adherence with the audits process was 80%. In the pre- and post-analysis, the only reliable and statistically significant change was a reduction in the rate of macrolide use, by 1.9 DDDs per 1000 patient-days per month (95% CI, −3.8 to −0.02; P = 0.048). Rates of C. difficile infection decreased from 2.4 to 1.9 per 1000 patient-days (incidence rate ratio, 0.8, CI 0.5 to 1.0).

Limitations: Other temporal factors may confound the findings.

Conclusions: An antibiotic self-stewardship bundle to implement the CDC’s suggested time-outs seems to have reduced overall costs and targeted antibiotic use.

Primary Funding Source: None.

Clin Infect Dis 2015; 60(8): 1252-8
Impact of an ID Consultative Service on Antibiotic Utilization in a NH

Pharmacist Led Post-Prescriptive Review and Feedback

**Figure A**
Rate of antibiotic starts for UTI and fitted values.

**Figure B**
Rate of all antibiotic prescriptions and fitted values.

ASP team tasks

Pre-Prescribing
• Policy/procedure development (Core)
• Education & promotion (Core)
• Antibiotic utilization tracking & reporting (Core)
• Facility antibiogram (Advanced)
• Facility-specific prescribing guideline (Advanced)
• Provider feedback reports (Advanced)

Post-prescribing
• Audit & feedback (Advanced)

Nursing Practice
• SBAR (Core)
• Reducing unnecessary urine testing (Core)
• Antibiotic timeout (Core)
Introducing Normative Influences
A MRSA outbreak in a 147-bed NH in WI led to an intensive review of facility microbiology and antibiotic prescribing data.

- Review of urinary antibiogram identified:
  - 31/100 (27%) all isolates were *Enterococcus* sp.
  - 87% of E. coli resistant to ciprofloxacin

- Facility embarked on several interventions:
  - Provided staff with antibiogram results
  - Guideline-concordant prescribing tracked by facility staff
  - Medical director sent out letters to outlier providers

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**Provider Feedback**

**Figure 2. Standardized Rates of Broad-Spectrum Antibiotic Prescribing at Acute Care Office Visits Over Time**

The Pew Charitable Trusts – A path to better antibiotic stewardship, 2016
NH ASP Resources

- Centers for Disease Control and Prevention

- Wisconsin HAI in Long-Term Care
  - [https://www.dhs.wisconsin.gov/regulations/nh/hai-introduction.htm](https://www.dhs.wisconsin.gov/regulations/nh/hai-introduction.htm)

- UNC Nursing Home Infections
  - [https://nursinghomeinfections.unc.edu](https://nursinghomeinfections.unc.edu)

- Massachusetts Coalition

- Minnesota Department of Health

- Agency for Healthcare Research and Quality ASP Toolkits
  - [https://www.ahrq.gov/nhguide/index.html](https://www.ahrq.gov/nhguide/index.html)
Thank You