Antibiotic Stewardship in the LTC Setting

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Objectives

- Describe the Antibiotic Stewardship Care Elements of tracking and the specific interventions and outcomes that can be monitored.

- Understand how the pharmacy (consultant and provider pharmacy) can be included in antibiotic stewardship policies.
Antibiotic Stewardship

“...a set of commitments and actions designed to optimize the treatment of infections while reducing the adverse events associated with antibiotic use.”

-Centers for Disease Control and Prevention

Goals:

- Prevent antibiotic overuse
- Decrease the incidence of multi-drug resistant organism (MDRO) infections
Action for Improvement: Infection-Specific Management Plans

• Most common types of infections
  o UTI
  o Respiratory infections
  o Skin and soft tissue infections
  o Gastroenteritis
Why is it important?

Up to 70% of nursing home residents received antibiotics during a year.

Up to 75% of antibiotics are prescribed incorrectly.

Why is it important?

Reduce Risk

- Prevent drug-resistant infections
- *C. difficile* related diarrhea
- Drug interactions
- Medication side effects
Antimicrobial Resistance

Prevent drug-resistant infections

- Microbes are constantly evolving, which enables them to adapt to new environments. Antimicrobial resistance is the microbe’s ability to grow in the presence of a chemical (Antibiotic) that would usually kill them, or limit their growth.
  - Leading Causative Factors:
    - Antibiotic overuse
    - Antibiotic misuse

Antimicrobial Resistance Statistics

Prevent drug-resistant infections

- Each year, 2 million people in the United States become infected with antibiotic-resistant bacteria.
  - Of those, 23,000 people die each year due to these infections.
- An estimated $20 billion in healthcare costs goes towards treating these infections.
  - Due to prolonged and costlier treatments
  - Extended hospital stays
  - Additional doctor visits
- 50% of the antibiotics prescribed are either not necessary, or are not optimally effective as prescribed

Antimicrobial Resistance: Strains of Concern

Prevent drug-resistant infections

- Methicillin-resistant Staphylococcus aureus (MRSA)
- Vancomycin-resistant Enterococci (VRE)
- Fluoroquinolone-resistant Pseudomonas aeruginosa (FQRP)
- Drug-resistant Mycobacterium tuberculosis (TB)
- Multidrug-resistant Neisseria gonorrhoeae (Gonorrhea)
Antibiotic-resistant infections

% incidence

1980  1990  2000

Source: Centers for Disease Control and Prevention
Antibiotic induced *C. difficile* agents

*C. difficile* related diarrhea

- clindamycin
- fluoroquinolones (for example, levofloxacin, ciprofloxacin)
- Penicillins (Augmentin)
- Cephalosporins (Keflex, Rocephin)
Drug Interactions Examples

Drug interactions

- Calcium/Magnesium/Iron interactions
  - Tetracyclines
  - Fluroquinolones

- Zyvox and SSRIs- increased risk for serotonin syndrome
  - Agitation/Restlessness/Confusion
  - Tachycardia/Hypertension
  - Fever/HA/Shivering/Sweating
  - Seizures/Irregular heartbeat/unconsciousness

- Warfarin
  - Fluroquinolones/Bactrim
Side effect examples

Medication side effects

- Levaquin- dose too high... risk for spontaneous tendon rupture

- Nitrofurantoin with reduced kidney function- risk for pulmonary fibrosis and confusion
Antibiotic Stewardship Core Elements

1. Leadership commitment
2. Accountability
3. Drug expertise
4. Action
5. Tracking
6. Reporting
7. Education

1. Leadership Commitment
   - Facility dedicating support and commitment to safe and appropriate antibiotic use
   - Providing resources:
     - Staffing
     - Financial
     - Technological

2. Accountability
   - Designating leaders among the health care team
     - Physician
     - Nurse
     - Pharmacist
   - Promote and oversee stewardship throughout the facility
Antibiotic Stewardship Core Elements

3. Drug Expertise
- Utilization of pharmacists or other individuals trained in antibiotic stewardship
  - Consultant Pharmacist
  - Provider Pharmacy/Pharmacist

4. Action
- Implement at least one policy to improve abx use within the facility
- Do not initiate too many interventions at the same time
- Start with broad interventions:
  - Document dose, duration, and indication
  - Develop treatment recommendations that are facility specific
Antibiotic Stewardship Core Elements

5. Tracking
- Monitor at least:
  - One process measure
  - One outcome measure

6. Reporting
- Share information on antibiotic use and resistance with prescribers, nursing, and pharmacists

7. Education
- Provide resources for prescribers and nurses
- Don’t forget to educate families and residents (especially upon admission)
  - General information about antibiotic resistance
  - Facility guidelines on antibiotic prescribing
- Use data gathered to develop further opportunities to improve antibiotic use
Tracking Interventions and Outcomes

- **Process Measures- How and why antibiotics are prescribed**
  - Determine if facility is following prescribing policies
    - Clinical assessment
    - Prescription Documentation
    - Antibiotic selection, dose, duration of therapy

- **Antibiotic Use Measures: How often and how many antibiotics are prescribed**
  - Facility started antibiotics
  - Days of therapy
  - Antibiotic time outs.

- **Antibiotic Outcome Measures:**
  - Adverse outcomes
    - C. difficile infections; MDRO; other side effects
  - Costs from antibiotics
The “Mega Rule”

- Regulation will be implemented in three phases
  - Phase 1: November 2016
  - Phase 2: November 2017
    - An ABX stewardship program that includes ABX use protocols and a system to monitor antibiotic use.
  - Phase 3: November 2019
    - Facility must designate one or more individual(s) as the IP who is responsible for the facility’s IPCP – with specialized training.
Infection Prevention and Control Program (IPCP)

- Phase 2:
  - Antibiotic Stewardship (F881)

- Phase 3:
  - Infection Preventionist (IP) (F882)
    - Facility designates one or more individuals as the IP who is responsible for the facility’s infection control (with specialized training)
“The Antibiotic Stewardship Program in Relation to Pharmacy Services

The assessment, monitoring, and communication of antibiotic use shall occur by a licensed pharmacist in accordance with §483.45(c), F756, Drug Regimen Review. A pharmacist must perform a medication regimen review (MRR) at least monthly, including review of the medical record and identify any irregularities, including unnecessary drugs.”
Consultant Pharmacist Involvement

- **Education**
  - Assist facility in forming standardized assessment and communication tools
    - SBARs (Situation, Background, Assessment, Recommendation)
    - Loeb Minimum Criteria for Initiation of Antibiotics
- **Review of antibiotic prescriptions**
- **Establish standards on laboratory testing**
- **Review of microbiology culture results**
- **Vaccination Protocols**
  - CDC ACIP guidelines
Consultant Pharmacist Involvement

- **Documentation – “The 5 D’s”**
  - Diagnosis
  - Drug
  - Dose
  - Duration (specific start/end date)
  - De-Escalation

- **Assist facilities in choosing best empiric treatment options for various conditions**
  - IDSA Guidelines
  - Antibiograms
### Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents

#### Suspected Urinary Tract Infection
- **NO indwelling catheter:**
  - Acute dysuria
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature) and at least one of the following:
    - Urgency
    - Frequency
    - Suprapubic pain
    - Gross hematuria
    - Costovertebral angle tenderness
    - Urinary incontinence

#### WITH indwelling catheter (Foley or suprapubic):
- At least one of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - New costovertebral tenderness
  - Rigors
  - New onset of delirium

Note: Foul smelling or cloudy urine is not a valid indication for initiating antibiotics. Asymptomatic bacteriuria should not be treated with antibiotics.

#### Suspected Lower Respiratory Tract Infection
- Fever >38.9°C [102°F] and at least one of the following:
  - Respiratory rate >25
  - Productive cough

- Fever >37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature, but ≤38.9°C [101.4°F]
  - Cough
  - At least one of the following:
    - Pulse >100
    - Rigors
    - Delirium
    - Respiratory rate >25

- Asymptomatic resident with COPD and >65 years
  - New or increased cough with purulent sputum production

- Asymptomatic resident without COPD and new cough with purulent sputum production
  - Respiratory rate >25
  - Productive cough

- New infiltrate on chest X-ray thought to represent pneumonia and at least one of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - Respiratory rate >25

#### Suspected Skin and Soft-tissue Infection
- New or increasing purulent drainage at a wound, skin, or soft-tissue site
- At least 2 of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - Redness
  - Tenderness
  - Warmth
  - New or increasing swelling

#### Fever with Unknown Focus of Infection
- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature) and at least one of the following:
  - New onset delirium
  - Rigors

Note: fever or mental status changes that do not meet delirium criteria (e.g., reduced functional activities, withdrawal, loss of appetite) need to be investigated but empiric antibiotics are not needed.

Source: Loeb et al. Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term Care Facilities: Results of a Consensus Conference. Inf Control Hosp Epi. 2001

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Suspected UTI SBAR Form

Complete this form before contacting the resident's physician.

Nursing Home Name ____________________________ Facility Fax ____________________________
Resident Name ____________________________ Date of Birth ____________________________
Physician/NP/PA ____________________________ Phone ____________________________
Fax ____________________________
Nurse ____________________________ Facility 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/gastrointestinal conditions)

Specify ☐ No ☐ Yes The resident has an indwelling catheter
☐ No ☐ Yes Patient is on dialysis
☐ No ☐ Yes The resident is incontinent; if yes, now/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®)

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 or dramatic change in mental status
☐ Hypertension (significant change from baseline BP or a systolic BP <80)

Resident WITHOUT indwelling catheter
Criteria are met if one of the three situations are met

☐ No ☐ Yes Acute dysuria alone

☐ OR ☐ Yes 2. Single temperature of 100°F (38°C) and at least one new or worsening of the following:
☐ Urgency
☐ Suprapubic pain
☐ Frequency
☐ Back or flank pain
☐ Urinary incontinence
☐ Gross hematuria

☐ No ☐ Yes 3. No fever, but two or more of the following symptoms:
☐ Urgency
☐ Suprapubic pain
☐ Frequency
☐ Gross hematuria
☐ Incontinence

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‡.

Request for Physician/NP/PA Orders
Orders were provided by clinician through ☐ Phone ☐ Fax ☐ In Person ☐ Other ____________________________
☐ Order UA
☐ Urine culture
☐ Encourage _______ ounces of liquid intake _______ times daily until urine is light yellow in color.
☐ Record fluid intake.
☐ Assess vital signs for _______ days, including temp. every _______ hours for _______ hours.
☐ Notify Physician/NP/PA if symptoms worsen or if unresolved in _______ hours.
☐ Initiate the following antibiotic
☐ Antibiotic: ____________________________ Dosage: ____________________________ Route: ____________________________ Duration: ____________________________
☐ No ☐ Yes Pharmacist to adjust for renal function
☐ Other ____________________________

Physician/NP/PA signature ____________________________ Date/Time ____________________________
Telephone order received by ____________________________ Date/Time ____________________________
Family/POA notified (name) ____________________________ Date/Time ____________________________

* For residents that regularly run a fever temperature, use a temperature of 2°F (1°C) above the baseline as a definition of a fever.
† This is according to our understanding of best practices and our facility protocols. Minimum criteria for a UTI must meet 1 of 3 criteria listed in box.
‡ This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active UTI infection.
## Sample Antibiogram

### Gram-Positive Aerobes (% susceptibility)

<table>
<thead>
<tr>
<th>Organism</th>
<th>Penicillins/Cephalosporins</th>
<th>Fluoroquinolones/Aminoglycosides (synergy)</th>
<th>Other Antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ampicillin</td>
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<tr>
<td></td>
<td>Ampicillin/sulbactam</td>
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<td></td>
<td>Cefadroxil</td>
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<td>Cefaclor</td>
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<td>Cefazolin</td>
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<td>Cefuroxime</td>
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<td>Nafcillin</td>
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<td>Gentamicin</td>
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<td>Spectinomycin</td>
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<td>Tetracycline</td>
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<td>Trimethoprim/Sulfamethoxazole</td>
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<td>Vancomycin</td>
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<thead>
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<th>Penicillins/Cephalosporins</th>
<th>Aminoglycosides</th>
<th>Fluoroquinolones/Other Antibiotics</th>
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### Gram-Negative Aerobes (% susceptibility)

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<th>Organism</th>
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<th>Aminoglycosides</th>
<th>Fluoroquinolones/Other Antibiotics</th>
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<tr>
<th>Organism</th>
<th>Penicillins/Cephalosporins</th>
<th>Aminoglycosides</th>
<th>Fluoroquinolones/Other Antibiotics</th>
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Stanford School of Medicine. Palo Alto VA Antibiogram.  
http://errolozdalga.com/medicine/pages/OtherPages/PAVAAntibiogram.html
<table>
<thead>
<tr>
<th></th>
<th>Patient</th>
<th>Age/BD</th>
<th>Unit/room</th>
<th>Antibiotic start date</th>
<th>Indication / Type of infection</th>
<th>Antibiotic</th>
<th>Dose / frequency</th>
<th>Duration</th>
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<td></td>
<td>Minimum Tx guidelines Met? (Y/N) (LOAB or McGreer’s Criteria)</td>
<td>Culture/ sensitivity results</td>
<td>Resolved (Y/N)</td>
<td>Other/ notes</td>
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<td>Other/ notes</td>
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Appendix C: Antibiotic Tracking Log
Transitions of Care

The coordination and continuity of health care as patients move from one care setting to another

http://healthy-transitions-colorado.org
Accessed 8/14/16
Transitions Example: Hospital to Skilled Nursing Facility

- Patient’s orders include antibiotics
- Generally, the pharmacy has no information other than:
  - Name of drug
  - Dose
  - Directions
  - Length of therapy
- Missing:
  - Indication!
  - Cultures
  - Patient history
Prospective Review of Antibiotic Prescriptions

- Ensure antibiotic is prescribed correctly
- Evaluate renal function
- Recommend Dose Adjustments
- Screen for Drug Interactions

Information given to pharmacy every time an antibiotic is prescribed:

- Drug / Dose / Duration (specific start/end date)
- Specific indication (prophylaxis or therapy)
- Specific organism (if known)

Allows pharmacist to clinically interpret antibiotic appropriateness

Consistent documentation allows for tracking trends within facility
### Provider Pharmacy

<table>
<thead>
<tr>
<th>Patient/Resident Last Name</th>
<th>First Name</th>
<th>Date of Birth</th>
<th>Medical Record Number</th>
<th>M/F</th>
</tr>
</thead>
<tbody>
<tr>
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<td><em><strong>/</strong></em>/_____</td>
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</tbody>
</table>

**Allergies:**__________________________________________________________

<table>
<thead>
<tr>
<th>Weight</th>
<th>Height</th>
<th>Most Recent Serum Creatinine or GFR</th>
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</table>

**Antibiotic information** (* = Required information)

<table>
<thead>
<tr>
<th>*Antibiotic</th>
<th></th>
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<tbody>
<tr>
<td>*Route of Admin.</td>
<td></td>
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<tr>
<td>*Dose and Duration</td>
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<tr>
<td>*Specific Indication for use</td>
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</tr>
</tbody>
</table>

**Optional:**
Additional information: (e.g. culture and sensitivity results, etc.)

**Site of Culture:**

- □ Blood
- □ Skin/Wound
- □ Sputum
- □ Urine
- □ Other: ___________________________

**Culture Results / Pathogen(s):** ______________________________________

**Sensitivity Results:** ________________________________________________

**Other:**
Guiding Principles and Results of Stewardship

- Prompt initiation of therapy
- Better empiric coverage of pathogen; streamlined coverage of known pathogen
- Optimally dosed and timed antibiotics
- Reduced adverse events and complications
Resources for Action

- Lake Superior Quality Innovation Network
- CDC Core Elements of Antibiotic Stewardship
- MN Department of Health

  - Additional information and fact sheets
  - Toolkits for implementation
References


