Antibiotic Stewardship in Long Term Care

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IPRO Nursing Home Care C.2
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Atlantic Quality Innovation Network (AQIN)

- The federally funded Medicare Quality Innovation Network – Quality Improvement Organization (QIN-QIO) for New York State, the District of Columbia, and South Carolina.

- Led by IPRO.

- Partners include
  - Delmarva Foundation in the District of Columbia and
  - The Carolinas Center for Medical Excellence in South Carolina.

- One of 14 QIN-QIOs operating across the U.S.
Atlantic Quality Innovation Network (AQIN)

- Works toward better care, healthier people and communities, and smarter spending.

- Catalyzes change through a data-driven approach to improving healthcare quality.

- Collaborates with providers, practitioners and stakeholders at the community level to share knowledge, spread best practices and improve care coordination.

- Promotes a patient-centered model of care, in which healthcare services are tailored to meet the needs of patients.
Why Should a LTC Facility Implement Antibiotic Stewardship?
CMS Regulation F881-483.80

“The facility must establish an infection prevention and control program (IPCP) that must include at a minimum, the following elements”:

a. An antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.- November 28, 2017

b. Infection preventionist- November 28, 2019
483.80 (a)- Antibiotic Stewardship

The intent of the regulation is to ensure that the facility:

• Develops and implements protocols to optimize the treatment of infections by ensuring that residents who require an antibiotic are prescribed the appropriate antibiotic.

• Reduces the risk of adverse events including the development of antibiotic resistant organisms, from unnecessary or inappropriate antibiotic use; and

• Develops, promotes and implements a facility wide system to monitor the use of antibiotics.
483.80 (b) Infection Preventionist

Infection Preventionist (IP): The facility must designate one or more individuals as the IP who is/are responsible for the facility’s IPCP (infection prevention and control program).

- Have primary professional training in nursing, medical technology, microbiology, epidemiology or other related field.
- Be qualified by education, training, experience or certification.
- Work at least part time at the facility.
- Have completed specialized training in infection prevention and control.

IP must be a member of the facility’s quality assessment and assurance committee and report to the committee on the IPCP on a regular basis.
Nursing Home Resident Risks

- Increased adverse drug events and drug interactions (allergic rash, anaphylaxis, or death).
- Serious diarrheal infection from C-Difficile.
- Disruption of normal flora (this can result in overgrowth of candida such as oral thrush).
- Colonization and/or infection with antibiotic resistant organisms such as MRSA, VRE, MDR-GNB.
  - MRSA - methicillin resistant *staph aureus*
  - VRE - vancomycin resistant enterococcus
  - MDR-GNB - multi-drug resistant gram negative bacteria
Oral Antibiotics/ADEs/Indications
# Commonly Used Oral Antibiotics

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>ADE</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trimethoprim/Sulfamethoxazole (Bactrim or Septra)</td>
<td>Rash, Stevens-Johnson, Renal Failure, photosensitivity, Hematologic (neutropenia/anemia), Diarrhea</td>
<td>Urinary Tract Infection Uncomplicated Chronic Bronchitis</td>
</tr>
<tr>
<td>Nitrofurantoin (Macrobid)</td>
<td>GI Intolerance, Neuropathies, Pulmonary Reactions, Diarrhea, Optic Neuritis, Anemia, Hepatitis- BEERS LIST</td>
<td>Urinary Tract Infection Uncomplicated</td>
</tr>
<tr>
<td>Fosfomycin (Monurol)</td>
<td>Diarrhea, Headache, Angioedema, Vaginitis, Nausea, Optic Neuritis, Vaginitis, Cholestatic Jaundice, Anemia</td>
<td>Urinary Tract Infection Uncomplicated (women)</td>
</tr>
<tr>
<td>Quinolones (Ciprofloxacin (Cipro), Levofoxacin (Levoquins), Moxifloxacin (Avelox))</td>
<td>Hypersensitivity, Photosensitivity, GI symptoms, Dizziness, Confusion, Diarrhea, Tendinitis and Tendon Rupture, Stevens-Johnson, QT Prolongation, Leukopenia, Thrombocytopenia, Tremors, Hallucinations, Peripheral Neuropathy, Hepatitis</td>
<td>Urinary Tract Infection Uncomplicated, Pyelonephritis Uncomplicated Chronic Bronchitis Atypical Pneumonia Pneumonia Skin and Soft Tissue</td>
</tr>
<tr>
<td>Tetracycline-Doxycycline (Monodox)-Minocycline(Minocin)</td>
<td>Nausea, Diarrhea, Renal Toxicity, Stevens-Johnson, Anemia, Thrombocytopenia, Neutropenia, Intracranial Hypertension, Hepatotoxicity, Rash, Photosensitivity</td>
<td>Chronic Bronchitis Atypical Pneumonia Rhinosinusitis</td>
</tr>
</tbody>
</table>
## Commonly Used Oral Antibiotics

<table>
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<tr>
<th>Antibiotic</th>
<th>ADE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Cefdinir (Omnicef), Cefpodoxime Proxetil (Vantin)), Cephalexin</td>
<td>Hypersensitivity, Rash, Diarrhea, Seizures, Stevens-Johnson, Vaginitis, Leukopenia, Anemia, Renal Dysfunction, Thrombocytopenia, Interstitial Nephritis</td>
<td>Pyelonephritis Uncomplicated Chronic Bronchitis Pneumonia (with macrolide)</td>
</tr>
<tr>
<td>Ampicillin, Amoxicillin, Augmentin</td>
<td>Hypersensitivity, Diarrhea, Vaginitis, Anemia, Increase in Liver Enzymes, Leukopenia, Thrombocytopenia, Glossitis, Rash, GI symptoms, interstitial nephritis</td>
<td>Chronic Bronchitis Rhinosinusitis Skin and Soft Tissue</td>
</tr>
<tr>
<td>Erythromycin, Clarithromycin (Biaxin), Azithromycin (Zithromax)</td>
<td>Stevens-Johnson, Hepatotoxicity, Drug Reaction with Eosinophilia and Systemic Symptoms, Diarrhea, QT Prolongation, Vomiting, Rash, Vaginitis</td>
<td>Chronic Bronchitis Atypical Pneumonia</td>
</tr>
<tr>
<td>Linezolid (Zyvox)</td>
<td>Anemia, Leukopenia, Pancytopenia, Thrombocytopenia, Lactic Acidosis, Nausea, Vomiting, Diarrhea, Serotonin Syndrome, Optic Neuropathy, Convulsions, Tooth/Tongue Discoloration</td>
<td>Pneumonia Skin and Skin Structure Diabetic Foot Infections</td>
</tr>
</tbody>
</table>
# Antibiotic Classes and *Clostridium-Difficile*

<table>
<thead>
<tr>
<th>Class</th>
<th>Association with C-Difficile Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin, Ampicillin, Amoxicillin, Cephalosporins (second generation and higher), Fluoroquinolones</td>
<td>Very Common</td>
</tr>
<tr>
<td>Other Penicillins, Sulfonamides, Trimethoprim, Macrolides</td>
<td>Somewhat Common</td>
</tr>
<tr>
<td>Aminoglycosides, Bacitracin, Metronidazole, Teicoplanin, Rifampin, Chloramphenicol, Tetracyclines, Carbapenems, Daptomycin, Tigecycline</td>
<td>Uncommon</td>
</tr>
</tbody>
</table>

Longo D.L.  NEJM 2015;372:1539-48
FDA Warning- Quinolone Drugs for Systemic Use- Update Due to Disabling Side Effects

- Warning posted July 26, 2016
- FDA has determined that the quinolone antibiotics should be reserved for use in patients with no other treatment option for sinusitis, chronic bronchitis, uncomplicated urinary tract infection. Risk > Benefit
- Boxed warning for tendinitis, tendon rupture, worsening myasthenia gravis, peripheral neuropathy (may be irreversible), CNS effects.
- Disabling and potentially permanent side effects of the tendons, muscles, joints, nerves and CNS that can occur together in the same patient.
National Action Plan for Combating Antimicrobial Resistance

CDC Drug Resistant Threats -US

Carbapenem-resistant *Enterobacteriaceae* (CRE)- **Urgent**- Reduce by 60% CRE infections acquired during hospitalization compared to estimates

*Clostridium Difficile*- **Urgent** - Reduce by 50% the overall incidence

*Neisseria gonorrhoeae*- **Urgent**- Maintain the prevalence of ceftriaxone-resistant *Neisseria gonorrhoeae* below 2% compared to estimates from 2013

Methicillin resistant *Staphylococcus Aureus* (MRSA)-**Serious**- Reduce by at least 50% overall MRSA bloodstream infections by 2020 as compared to 2011

*Pseudomonas spp*- Reduce by 35% multidrug-resistant *Pseudomonas spp.* infections acquired during hospitalization compared to estimates from 2011

**Serious**- Reduce by at least 25%the rate of antibiotic-resistant invasive pneumococcal disease among >65 year-olds compared to estimates from 2008
New Threats

• Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study. The Lancet November 2015

• “Discovery of first mcr-1 gene in E. coli bacteria found in a human in United States”.

• MCR-1 causes resistance to colistin, a last-resort drug for treating resistant infections- May 2016

• “Superbug gene MCR-1 found in a Connecticut toddler” - Sep 2016 - A new case of the superbug gene MCR-1, which makes E. coli resistant to most antibiotics, was found in a toddler living in Connecticut. This is the fourth time that physicians detect a superbug in the United States.
National Action Plan Strategies- March 2015

1.1. Implement public health programs and reporting policies that advance antibiotic-resistance prevention and foster antibiotic stewardship in healthcare settings and the community. Strengthen antibiotic stewardship in long term care settings by expanding existing programs, developing new ones and monitoring progress and efficacy, slow the spread of resistant organisms, transitions of care.

2.2 Expand and strengthen the national infrastructure for public health surveillance and data reporting, and provide incentives for timely reporting of antibiotic-resistance and antibiotic use in all healthcare settings.

5.4 Promote the generation and dissemination of information needed to effectively address antibiotic-resistance.
## CDC Threat Report – August 2015 (updated)

### Urgent Threats

- *Clostridium Difficile (CDIFF)*
- Carbapenem-Resistant *Enterobacteriaceae* (CRE)
- *Neisseria gonorrhoeae*

### Serious Threats

- Fluconazole-Resistant Candida
- Vancomycin-Resistant Enterococcus (VRE)
- Multi-Drug Resistant *Pseudomonas aeruginosa*
- Methicillin-Resistant *Staphylococcus aureus* (MRSA)
- Drug-Resistant Tuberculosis
- Drug-Resistant *Streptococcus pneumoniae*
- Drug-Resistant Salmonella and Drug Resistant Shigella
- Extended Spectrum *Enterobacteriaceae* (ESBL)
Antibiotic Stewardship- Goals, Components, Monitoring, Outcomes, Literature Review
LTC Antibiotic Stewardship Goals

The primary goal of antibiotic stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use.”- JAMDA 2016

“The establishment and expansion of antibiotic stewardship programs will improve patient outcomes and minimize the development of resistance by ensuring judicious use of antibiotics.” National Action Plan 2015

Antibiotic stewardship addresses the appropriate selection, dosing, route and duration of antimicrobial therapy. CDC

Morrill et al. JAMDA 2016; 183e1-e16
The 4 D’s of Antibiotic Stewardship

1. Diagnosis: Does the patient have a bacterial diagnosis that requires an antibiotic?
2. Drug: Is the order for the right drug and the right dose?
3. Duration: How long do the guidelines recommend treating the infection?
4. Documentation: Is the plan documented clearly?
Need for Antibiotic Stewardship in Long Term Care (2015)

“Antibiotics are among the most frequently prescribed medications in nursing homes, with up to 70% of residents in a nursing home receiving one or more courses of systemic antibiotics when followed over a year.” CDC

“Similar to the findings in hospitals, studies have shown that 40–75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.” CDC

“Harms include risk of serious diarrheal infections from Clostridium difficile, increased adverse drug events and drug interactions, and colonization and/or infection with antibiotic-resistant organisms.” CDC

In a large study of 37,300 residents, the majority of antibiotic treatment durations were > 7 days, with 66% of residents receiving > 10 days of therapy.

Available at: http://www.cdc.gov/longtermcare/index.html
CDC 7 Core Elements of ASP in Long Term Care

1. Facility Leadership Commitment
2. Accountability
3. Drug Expertise
4. Actions to Improve Use
5. Education
6. Tracking
7. Reporting
<table>
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<tr>
<th>CDC CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP</th>
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<tbody>
<tr>
<td><strong>Hospital (2014)</strong></td>
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<tr>
<td>Leadership Commitment</td>
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<tr>
<td>Accountability</td>
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<tr>
<td>Drug Expertise</td>
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<tr>
<td>Action</td>
</tr>
<tr>
<td>Tracking-Monitoring Antibiotic Prescribing and Resistance Patterns</td>
</tr>
<tr>
<td>Reporting-Regular reporting of information on antibiotic use and resistance to doctors, nurses and relevant staff</td>
</tr>
<tr>
<td>Education</td>
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Literature Review- Barriers to ASP in Long Term Care

- Lack of well validated strategies specific to long term care.
- Lack of facility funding for resources such as lack of on-site microbiology laboratories.
- Challenges associated with proper diagnosis and treatment of infections in residents.
- Lack of ASP trained physicians and pharmacists.
- Resident and family expectations.
- Asymptomatic bacteriuria ranges from 23-50% of non-catheterized residents and close to 100% in catheterized residents.
- Many older residents do not mount a fever or present symptoms in response to infection further complicating diagnosis.

Morrill H.J. JAMDA 2016; 183e1-e16
Literature Review
Reported Causes of Antibiotic Misuse in LTC

- Unnecessary use of antibiotics for colonization (asymptomatic bacteriuria)
- Unnecessary treatments for urinary tract infection prophylaxis
- Unnecessary antibiotic treatments for viral infections (influenza)
- Unnecessary use of topical antibiotics
- Empiric prescribing without microbiological investigation
- Lack of re-assessment/review of antibiotic treatment plans at day 3
- Longer than needed durations of therapy- 7 days or less are effective for most infections
- Widespread prescribing of antibiotics for upper respiratory tract infections or chronic bronchitis

Dyar O.J. et al Clinical Microbiology and Infection 2015; 21: 10-19
Lim et al. Clinical Interventions in Aging 2014; 165-177
Published Interventional Studies- Outcomes

Naughton 2001- Antibiotic use at diagnosis compared with guidelines- educational intervention providers and nurses- increase in appropriate use- 10 LTC facilities.

Loeb 2005- Number of antibiotics prescribed for suspected UTIs- educational intervention providers and nurses- fewer courses of antibiotics prescribed but not sustained.

Monette 2007- Antibiotic prescriptions compliant with guidelines- educational intervention and prescribing profile- decrease in non-compliant prescriptions but not sustained.

Pettersson 2011- Proportion of quinolones prescribed for lower UTIs in women, proportion of infections handled by physicians as “wait and see”- educational and physician and nurse feedback- no change in use of quinolones for UTIs, increase in number of infections treated as “wait and see”.

Dyar O.J. et al Clinical Microbiology and Infection 2015; 21: 10-19
Antimicrobial Stewardship in a Long Term Care Acute Care Hospital using Offsite Electronic Medical Record Audit

- Telemedicine antibiotic stewardship program including hospital AS team conducting remote daily audits - Boston
- Total antibiotic usage significantly decreased
- Decrease in CDI rate per month
- 885 Recommendations included
  - Stop antibiotics (21.6%)
  - Infectious disease consult needed (10.5%)
  - Change antibiotics (6.9%)
  - De-escalate (5.5%)
  - Shorten treatment duration (1.5%)
  - Prolong the treatment duration (1.1%)

Beaulac et al. Infection Control and Hospital Epidemiology 2016: 1-7
Telephone Survey of Infection Control and Antibiotic Stewardship Practices in LTC

- Study published in January 2016- JAMDA
- 124 LTC Facilities in Maryland- 14,371 beds (contacted 231)
- 80% of facilities had an antibiotic guide
- 81% Collect data on antibiotic prescribing
- 27% had a restricted formulary
- 25% had an antibiotic approval process mostly done by the medical director
- 35% had training for prescribing antibiotics
- 50% report infections to CDC/NHSN

Yang et al. JAMDA 2016; 1-4
Impact of Antimicrobial Stewardship on Physician Practice in a Geriatric Facility

- 2012 ASP developed at Baycrest Health in Toronto CA.
- ASP Team = 1 part time pharmacist and 2 part time family medicine physicians.
- Focus on 4 major areas - correct diagnosis of UTI, appropriate choice of antibiotic, appropriate duration of therapy, and modification of therapy based on culture and sensitivity data.
- Results - No significant change in the total number of antibiotic prescriptions written for UTI in LTC. Significant reductions in the average days of therapy before and after the ASP.

Impact of a Decision Aid for Suspected Urinary Tract Infections on Antibiotic Overuse in Nursing Homes

- Study goal was to reduce the antibiotic use for asymptomatic bacteriuria (ASB) and to reduce overall antibiotic use with use of a decision making aid (symptom identification criteria).
- An analysis pre and post intervention (6 months before and 6 months after) in 12 Texas nursing homes.
- Retrospective chart review (669 prescriptions for suspected UTI for 547 residents).
- Decision aid decreased the number of prescriptions written for ASB from 78%-65% low intensity and 65%-57% high intensity.
- Odds of a prescription being written for ASB decreased significantly in homes using the decision aid.

McMaughan DK. et al. BMC Geriatrics 2016; 16: 81
Clinical Characteristics, Diagnostic Evaluation and Antibiotic Prescribing Patterns for Skin Infections in Nursing Homes

- Retrospective chart review study in 12 nursing homes in the Denver metropolitan area.
- 100 cases included in the study-identified using the MDS and initiated on systemic antibiotic therapy.
- Most common infections: non-purulent cellulitis (55), wound infection (27), infected ulcer (8), cutaneous abscess (7).
- Loeb criteria for initiating antibiotics not met in 26 cases.
- 41% of patients were not evaluated by a provider within 48 hours of antibiotic start.
- Median duration of therapy was 7 days, 43% of patients received treatment courses > 10 days.
- Antibiotics Prescribed – 73 cases oral B-lactam, 28 cases antibiotic with MRSA activity, 18 cases gram negative activity.

Successfully Reducing Antibiotic Prescribing in Nursing Homes

- 9 month QI study conducted in 12 nursing homes in North Carolina- 6 of these NHs served as the control group.

- Providers and nurses trained by UNC researchers (in-service) on prescribing guidelines (Loeb criteria) and 12 common indications in which antibiotics are not required.

- Nurse use of the medical care referral form to document symptoms and a pocket card.

- Residents and family members and NH staff were educated in multiple ways-brochure related to antibiotic prescribing, presentations at resident council meetings and health fairs.

- Follow up education- nurses and providers received information on adherence to guidelines and overall prescribing rates.

- Measurements included the rate of antibiotic prescribing for presumed urinary tract, skin and soft tissue and respiratory infections- intervention homes vs. control homes

Successfully Reducing Antibiotic Prescribing in Nursing Homes (2)

- Prescriptions for UTIs were most common followed by respiratory and skin and soft tissue.
- During the intervention, few Medical Care Referral forms were completed, NH staff reported that they used the items noted on the form when communicating with medical providers regarding relevant signs and symptoms.
- Significant reduction in antibiotic prescribing rates in the intervention NH group compared to the control NH group.
- Authors question whether this result can be repeated or sustained.
- The study did not evaluate changes in rates of hospitalizations, ER visits or C-Difficile cases.
Assessment, Implementation Strategies, Transitions of Care and Planning and Evaluating an ASP
Antibiotic Stewardship Program Goals

1. Make ASP a quality improvement focus (optimal selection, dose, duration, and route of therapy)
2. Avoidance of adverse events and toxicity
3. Avoidance of antibiotic resistance
CDC Core Elements of NH Antibiotic Stewardship Checklist

ACTIONS TO IMPROVE USE

Does your facility have policies to improve antibiotic prescribing/use?  ❑ Yes  ❑ No

If yes, indicate which policies are in place (select all that apply)  ❑ Requires prescribers to document a dose, duration, and indication for all antibiotic prescriptions  ❑ Developed facility-specific algorithm for assessing residents  ❑ Developed facility-specific algorithms for appropriate diagnostic testing (e.g., obtaining cultures) for specific infections  ❑ Developed facility-specific treatment recommendations for infections  ❑ Reviews antibiotic agents listed on the medication formulary

Has your facility implemented practices to improve antibiotic use?  ❑ Yes  ❑ No

If yes, indicate which practices are in place (select all that apply)  ❑ Utilizes a standard assessment and communication tool for residents suspected of having an infection  ❑ Implemented process for communicating or receiving antibiotic use information when residents are transferred to/from other healthcare facilities  ❑ Developed reports summarizing the antibiotic susceptibility patterns (e.g., facility antibiogram)  ❑ Implemented an antibiotic review process/“antibiotic time out”  ❑ Implemented an infection specific intervention to improve antibiotic use Indicate for which condition(s):______________________________
Assessment of Current Practice

- Greater New York Hospital Association NH Checklist
- Opportunity to get a baseline assessment in preparation for initiation and/or expansion of antibiotic stewardship
- Antibiotic Tracking Form

https://www.uhfnyc.org/assets/1042 (93 page PDF of toolkit) accessed 9/5/17
Baseline assessment of current antibiotic stewardship initiatives and opportunities for expansion and/or initial implementation.

### Antimicrobial Stewardship Toolkit

#### ASSESSMENT OF CURRENT PRACTICES SURVEY

**ASSESSMENT OF CURRENT PRACTICES**

This questionnaire was developed to better understand your current antimicrobial practices and your experience with antimicrobial stewardship.

**FACILITY NAME:** ____________  **DATE:** ____________

**LONG TERM CARE FACILITY**

1. Do you have an in-house pharmacy?  
   - Yes ☐  No ☐
   
   a. If yes, is your pharmacy open 24/7?  
      - Yes ☐  No ☐

   i. If your pharmacy is not open 24/7, what are the pharmacy’s hours?

   ii. Please describe the off-hours coverage plan:

   b. Who is responsible for performing infection surveillance at the facility?  

   c. Do you track antibiotic use data?  
      - Yes ☐  No ☐

   d. If yes, how is antimicrobial use data reported? Please check all that apply:
      - □ Amount used (i.e., grams or milligrams)
      - □ Defined Daily Dose (DDD)
      - □ Dollars spent
      - □ Other (Please specify,___)

2. Do you have an in-house microbiology lab?  
   - Yes ☐  No ☐

   a. If no, where are the microbiology services performed?

   b. Can you obtain antimicrobial resistance data from the in-house or external microbiology lab?  
      - Yes ☐  No ☐

   c. How are you able to access the data?

   d. Are you able to obtain unit-specific data on an as-needed basis?  
      - Yes ☐  No ☐

3. Is an antibiogram developed for your facility? (an aggregation of sensitivity of organisms)  
   - Yes ☐  No ☐

   a. If yes, how often (Monthly, quarterly, annually)?

4. Are you currently utilizing computer based surveillance for antibiotic use or health care–acquired infections?  
   - Yes ☐  No ☐
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| 1. Do you have a system in place to identify and address antibiotic use patterns? | a. Yes  
b. No  
c. Under development |
| 2. Do you have a policy that addresses antibiotic use?                   | a. Yes  
b. No  
c. Under development |
| 3. Is an antibiotic stewardship program in place?                        | a. Yes  
b. No  
c. Under development |
| 4. Are you currently experiencing antibiotic resistance?                 | a. Yes  
b. No  
c. Under development |
| 5. What are the top three common infectious clinical syndromes at your facility that are either known or estimated? | 1.  
2.  
3.  |
| 6. Which staff currently is or will be part of your core antimicrobial stewardship team? Please check all that apply. | Infectious Disease-Train Physician  
Clinical Pharmacist  
Clinical Microbiologist  
Infection Control Practitioner  
Hospital Epidemiologist  
Senior Leadership  
Information System Specialist  
Other (Please specify) |
| 7. Do you have Computer physician/clinician order entry (CPOE)?          | Yes  
No |
| 8. What are the barriers to implementation at your facility? Please check all that apply. | Financial considerations/cost  
Opposition from physicians  
Resistance from administration  
Other clinical initiatives are higher priority  
Personnel shortages  
None of the above  
Other (Please specify) |
| a. How frequently are reports pertaining to infection surveillance reviewed (Monthly, quarterly, annually, on an as-needed basis)? | a.  
b.  
c.  |
| b. How is the information reported by syndrome, overall incidence within the facility? Please list all. | a.  
b.  
c.  |
| c. What are the criteria used to identify resistance or infection trends requiring further intervention? | a.  
b.  
c.  |
Target Areas for Program Implementation

• **Infection Type**: UTI, Pneumonia, SST Infection - common rates in the facility, influence on hospital admissions. Develop guidelines (e.g., care path) for diagnosis, treatment, and duration of antibiotic therapy.

• **Specific Pathogen**: rates of resistance/C. Difficile rates - resistance trends and outbreaks

• **Specific Antimicrobial Agent**: aggregate antibiotic use - units purchased quarterly or monthly. Consultant pharmacist

• **Care Transition**: to and from the Hospital/ER - length of therapy/resistance/colonization
Antibiotic Stewardship Strategies

• Develop guidelines (e.g., care path) for diagnosis, treatment, and duration of antibiotic therapy and other interventions to treat infections.
• Identify dose optimization strategies- dosing per renal function.
• Develop policy/guidelines to streamline/de-escalate therapy.
• Develop antimicrobial order forms with algorithms for common entities including duration of therapy.
• Provide continuous prospective review with feedback to providers.
• Develop or update a site specific antibiogram.
Identifying Infection-Guideline Development

- Loeb Criteria- when to initiate antibiotic treatment
- McGeer Criteria- Surveillance
- IDSA Treatment Guidelines
Loeb Minimum Criteria for Initiation of Antibiotics in LTC - Examples

- **Skin and Soft Tissue Infections**
  - New or increasing purulent drainage and/or ≥ 2 of the following
    - Fever - temperature >37.9 C or increase of 1.5 C from baseline
    - Redness
    - Tenderness
    - Warmth
    - New or increased swelling of the affected site

- **Urinary Tract Infections**
  - Without Indwelling catheters
    - Acute dysuria or fever (>37.9C) and ≥ 1 of the following
      - New or worsening urgency
      - Frequency
      - Suprapubic pain
      - Gross hematuria
      - Costovertebral Angle Tenderness
      - Urinary incontinence
Loeb Minimum Criteria for Initiation of Antibiotics in LTC- Examples

Urinary Tract Infections

• With chronic indwelling urinary catheter
  • > 1 of the following
    • Fever (>37.9 C (100 F))
    • New costovertebral angle tenderness
    • Rigors
    • New onset delirium

• Fever without obvious focus of infection
• Fever (>37.9 C (100 F)) and > 1 of the following
  • New onset of delirium
  • Rigors

Loeb M. et al. Infection Control and Hospital Epidemiology 2001
Suspected UTI -SBAR

• Difficult to differentiate between a UTI that requires an antibiotic prescription and asymptomatic bacteriuria, which does not require antibiotics and should not be treated. As such, the Suspected Urinary Tract Infection (UTI) toolkit helps clinicians make this differentiation.

• A study in 12 nursing homes in Texas found that using the Suspected UTI SBAR form reduced antibiotic prescriptions for asymptomatic bacteriuria by about one-third.
www.ahrq.gov (Suspected UTI SBAR)

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 __________________________ 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/gnethourinary conditions)

Specify __________________________

☐ No ☐ Yes The resident has an indwelling catheter

☐ No ☐ Yes Patient is on dialysis

☐ No ☐ Yes The resident is continent. 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®)
### 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**
  - ☐ Fever of 100°F (38°C) or reported temperatures of 99°F (37°C)²
  - ☐ New back or flank pain
  - ☐ Acute pain
  - ☐ Rigid / shivering chill
  - ☐ New change in mental status
  - ☐ Hypertension (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**
  - ☐ 1. Acute dysuria alone

- **OR**
  - ☐ 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

- **OR**
  - ☐ 3. No fever, but two or more of the following symptoms:
    - ☐ Urgency
    - ☐ Suprapubic pain
    - ☐ Frequency
    - ☐ Incontinence

**Notes:** 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. ††

### R. 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: ________ Dose: ________ Route: ________ Duration: ________
    - ☐ No ☐ Yes Pharmacist to adjust for renal function
  - ☐ Other

**Physician/NP/PA signature ___________________________ Data/Time: ___________________________**

Telephone order received by ___________________________ Data/Time: ___________________________

**Family/POA notified [name] ___________________________ Data/Time: ___________________________**

---

* For residents that require oral or lower temperatures, use temperature of 99°F (37°C) above the baseline as a definition of a fever.

† The evidence supporting our understanding of best practices and our facility protocols. Minimum criteria for a UTI meet ≥ 5 of 10 criteria.

†† This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active UTI infection.
Symptom Free Pee Let It Be

- Created by the Association of Medical Microbiology and Infectious Disease (AMMI)- Canada

- A national initiative to stop inappropriate antibiotic use for asymptomatic bacteriuria in long-term care residents.

- Posters and Resident/Family Letters available
Symptom-Free Pee: LET IT BE

A national initiative to stop inappropriate antibiotic use for asymptomatic bacteriuria in long-term care residents.

STOP treating asymptomatic bacteriuria; it is not an infection
STOP testing foul-smelling, dark, or cloudy urine

WAIT and rehydrate residents who develop changes in mental status, behaviour, or function without typical urinary tract infection symptoms

GO to urinalysis and urine culture if typical signs and symptoms of urinary tract infection are present

For more directions and guidance:
www.ammi.ca
#SymptomFreeLetItBe
McGeer Criteria

- Criteria that define infections for surveillance purposes – this increases the likelihood that events captured are true infections.

- Standardized terminology for definitions for fever, acute changes in mental status, acute functional change- Fever changed to match IDSA guidelines for evaluating fever and infection in older adults in LTC.

- Use of the McGeer Criteria in an ASP program will allow for comparison of data over time with multiple provider/nurse assessments.

- Infection Criteria for: RTI, UTI, SSTI, GI
McGeer Criteria- Pneumonia

- Pneumonia (all 3 criteria must be present)
- Interpretation of a chest radiograph as demonstrating pneumonia or the presence of a new infiltrate
- At least 1 of the following respiratory sub criteria
  - New or increased cough
  - New or increased sputum production
  - O2 saturation <94% on room air or a reduction in O2 saturation of >3% from baseline
  - New or changed lung examination abnormalities
  - Pleuritic chest pain
  - Respiratory rate >25 breaths/min
- At least 1 of the constitutional criteria
Basic Policies and Goals

• Orders for antibiotics must include- drug- dose-duration and indication.

• Policies should be developed that discourage the use of prophylactic antibiotics for the prevention of UTI.

• Evaluation of the use and need for routine dip-stick testing when evaluating a resident for a change in condition.

• Guidelines on the duration of antibiotic therapy and the need to re-evaluate after 3 days of therapy (time out).
ASP Educational Interventions

- Educational sessions for providers and nursing staff - example - recognition of signs and symptoms of pneumonia in the setting of LTC.
- Academic detailing - ideal to have a multi-disciplinary team providing the education to providers.
- Prescribing Feedback - individual report of prescribing patterns over the past 3 months.
- Dissemination of written materials - guidelines, algorithms, pocket cards, posters, toolkits (signs and symptoms).
- Antibiograms - laboratory based or community wide.
- Diagnostic and treatment guidelines on common infections such as Pneumonia, UTI, SSTI - made available to all staff.
Transitions of Care

- Indication for treatment communicated.
- Does home have full contact precautions room?
- Infection Control hand-off
- Is colonization or infection recorded in the medial record and transition of care form?
- Is there a transition of care form on both admission and discharge from the hospital specifically addressing infectious disease?
- Are there formulary issues that may result in interruption of therapy?
Transitions of Care Examples of Potential Inappropriate Antibiotic Use in LTC

• Resident sent to ER for a potentially non-infectious cause and sent back to LTC with an inappropriate antibiotic - transitions of care - antibiotic review - education - process

• Resident is discharged from the hospital with an antibiotic prescription that was not indicated, was the wrong dose or drug or was continued for too long a duration.

• Resident may be prescribed an inappropriate antibiotic at a specialist visit (urology, rheumatology, dermatology) - transitions of care - antibiotic review

• Exposure to systemic antibiotics and C-diff spores may occur in the acute care setting, symptom onset may not develop until after the resident is transferred to the LTC setting
Antibiotic Stewardship Program Evaluation

- **Track Antibiotic Use**-
  - Days of Therapy/1000 patient days (DOT)
  - Defined Daily Dose (DDD)
  - Antibiotic starts - pre and post intervention - trending over time
  - Antibiotic starts specific to infection type
- **Point prevalence measures** - number of UTI events in the months before and after the intervention
Measures of antibiotic use

**Point prevalence of antibiotic use.** Point prevalence surveys of antibiotic use track the proportion of residents receiving antibiotics during a given time period (i.e., a single-day, a week, or a month). Because the data collection is time-limited, point prevalence surveys are an easier way to capture antibiotic use data. In addition to providing a snapshot of the burden of antibiotic use in a facility, point-prevalence surveys can capture specific information about the residents receiving antibiotics and indications for antibiotic therapy. Unlike other antibiotic use measures which focus only on the prescriptions initiated in the nursing home, prevalence surveys could also include data on residents admitted to the facility already receiving an antibiotic to track the total burden of individuals at risk for complications from antibiotic use (e.g., *C. difficile* infection).
### Sample Antibiotic Tracking Sheet

#### Antibiotic Prescribing Across Practice

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>8.3%</td>
</tr>
<tr>
<td>Amoxicillin-Clavulanate</td>
<td>10.1%</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>0.0%</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>20.8%</td>
</tr>
<tr>
<td>Bactrim</td>
<td>9.7%</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>0.0%</td>
</tr>
<tr>
<td>Cefdinir</td>
<td>2.2%</td>
</tr>
<tr>
<td>Cefpodoxime</td>
<td>0.0%</td>
</tr>
<tr>
<td>Cefprozil</td>
<td>0.1%</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>1.9%</td>
</tr>
<tr>
<td>Cephalexin</td>
<td>8.5%</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>10.1%</td>
</tr>
<tr>
<td>Clarithromycin</td>
<td>0.8%</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>1.3%</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>9.6%</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>0.0%</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>5.8%</td>
</tr>
<tr>
<td>Lineszol</td>
<td>0.0%</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>1.7%</td>
</tr>
<tr>
<td>Minocycline</td>
<td>1.2%</td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>0.1%</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>6.3%</td>
</tr>
<tr>
<td>Penicillin</td>
<td>0.3%</td>
</tr>
<tr>
<td>Vancomycin (Oral)</td>
<td>0.7%</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>0.0%</td>
</tr>
<tr>
<td>Dicloxacillin</td>
<td>0.1%</td>
</tr>
<tr>
<td>Cefadroxil</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Quinolone Summary</strong></td>
<td><strong>16.6%</strong></td>
</tr>
</tbody>
</table>

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**IPRO**
Serving New York State

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Quality Improvement Organizations
Sharing Knowledge, Improving Health Care.
CENTERs FOR MEDICARE & MEDICAID SERVICES

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59
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</tbody>
</table>

### Graph

(Site Name)
Outcomes of Antibiotic Stewardship

• Decrease in antimicrobial usage.
• Decrease or change in resistance.
• Reduced incidence of C. difficile infection (CDC-NHSN reporting- IPRO).
• Improved resident treatment outcomes/satisfaction.
• Increase in the number and type of interventions completed by the stewardship program.
• Rate of provider acceptance of interventions.
Future Outcomes for ASP in LTC

• Measurement of reduction in hospitalization, ER visits or specialty visits.
• Impact on antimicrobial resistance- local facility and healthcare community.
• Reductions in mortality.
• Reduction in adverse drug events.
References

References (2)

22. Durham D. P. Quantifying transmission of clostridium difficile within and outside healthcare settings. Emerging Infectious Diseases 2016; 22
This material was prepared by the Atlantic Quality Innovation Network (AQIN), the Medicare Quality Innovation Network - Quality Improvement Organization for New York State, South Carolina, and the District of Columbia, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents do not necessarily reflect CMS policy. 11SOW-AQINNY-TskC.3-17-35
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