Optimal Use of Antibiotics for Urinary Tract Infections in Long-Term Care Facilities: Successful Strategies Prevent Resident Harm

Abstract

Antibiotics are one of the most commonly prescribed medications in long-term care facilities (LTCFs), but up to 75% are incorrectly prescribed. The intensity of antibiotic use to treat urinary tract infections (UTIs) in LTCFs increases the risk for life-threatening adverse effects. Overuse and misuse of these lifesaving medications has contributed to the rapid emergence of antibiotic-resistant bacteria and *Clostridium difficile* infection. The Pennsylvania Patient Safety Authority analyzed UTI events reported from Pennsylvania LTCFs during the 30-month period from April 1, 2014, through September 30, 2016, to study (1) triggers for prescribing antibiotics for UTIs, and (2) the frequency of prescriptions for broad-spectrum antibiotics specifically associated with antibiotic-resistant bacteria and *C. difficile*. The analysis reveals deviance from national practice guidelines for treating UTIs and the suboptimal use of antibiotics for mixed growth and contaminated specimens. This crisis of incorrect antibiotic use and the downstream effects of antibiotic-resistant bacteria and *C. difficile* demonstrate an urgent need for immediate adoption of best practices for accurate identification and optimal treatment of UTIs in the elderly including: (1) integrating strategies to overcome barriers to antibiotic stewardship, and (2) improving communication between nursing, prescribing staff, and healthcare facilities in the continuum of care. A Pennsylvania LTCF shares its success story demonstrating the effectiveness of these strategies in reducing suboptimal antibiotic use.

Introduction

Since the discovery of penicillin in 1928 to treat serious infections, antibiotics have saved millions of lives.\textsuperscript{1,2} However, like all medications, antibiotic use includes the risk for mild to life-threatening adverse reactions. Antibiotic use is generally considered as a possible source when a patient develops a rash, but may not be recognized as the culprit in other adverse effects such as nausea, vomiting, diarrhea, stomach pain, fungal infections, or drug fever. People older than 65 years, who are the most common residents of long-term care facilities (LTCFs), are more susceptible to...
severe adverse effects of antibiotics, including anaphylaxis, central nervous system and kidney toxicity, abnormal liver function, diarrhea from Clostridium difficile, and consequences of antibiotic-resistant bacteria. Adverse effects are often difficult to treat and can lead to hospitalization and death. A recent study by the Centers for Disease Control and Prevention (CDC) demonstrates that antibiotic overuse may predispose individuals to sepsis due to disturbance of the normal gastrointestinal (GI) bacteria microbiome.

Because of escalating bacterial resistance to antibiotics, bacterial infections impact the community at large and are once again a worldwide threat. Overuse and misuse of lifesaving antibiotics has resulted in dwindling or unavailable treatment options and contributed to the rapid emergence of antibiotic-resistant bacteria. In LTCF, up to 75% of antibiotics are misused and incorrectly prescribed. The largest percentage of misused or incorrectly prescribed antibiotics in LTCFs are used to treat misdiagnosed urinary tract infections (UTIs), the most common bacterial infection in LTCFs.

Common misperceptions about UTI diagnosis, testing, and interpretation of laboratory tests may result in inappropriate treatment of asymptomatic bacteriuria, overuse of broad-spectrum antibiotics, and failure to review or change empiric antibiotics based on culture results. Authority analysts queried the Pennsylvania Patient Safety Reporting System (PA-PSRS) database to obtain a snapshot of antibiotic prescribing practices in Pennsylvania LTCFs.

For a UTI to be reportable through PA-PSRS, the event must meet nationally accepted criteria for clinical symptoms and diagnostic tests. The diagnostic gold standard for UTI is qualitative urine culture in the presence of evidence-based symptoms.

The frequent use of antibiotics for UTIs in LTCFs merits adoption of best practices for (1) identifying and treating urinary tract infections in the elderly, and (2) improving communication between nursing, prescribing staff, and facilities in the continuum of care. Transfer of residents between the hospital and LTCF as their level of care changes increases the opportunity for transmission of antibiotic-resistant bacteria and continuation of inappropriate antibiotic prescriptions.

**Methods**

The Pennsylvania Patient Safety Authority examined all UTIs reported by LTCFs through PA-PSRS during the 30-month period reported from April 1, 2014 (when the revised McGeer reporting criteria were implemented), through September 30, 2016. The 2014 revision of PA-PSRS criteria for LTCFs reporting infections includes new data fields to list organisms identified by laboratory tests and antibiotics prescribed. This new information provides valuable information on Pennsylvania LTCFs application of UTI criteria and antibiotic treatment decisions.

Key search terms included the following: symptomatic urinary tract infections (SUTI), catheter-associated urinary tract infection (CAUTI), urine cultures, treatment, antibiotics, organisms, voided urine, and positive culture. UTI events were analyzed by subcategory (e.g., SUTI or CAUTI), information about organisms and antibiotics (e.g., events listing organism and antibiotic ordered, events missing either a qualified organism or antibiotic ordered, events with antibiotics prescribed without culture results, and events with antibiotics ordered for contaminated specimens), and voluntary free-text comments regarding diagnostic and treatment decisions. A drug class was assigned to each antibiotic.
Results

The query of the PA-PSRS database during the 30-month study period from April 1, 2014, through September 30, 2016, resulted in 13,680 UTI events (i.e., 10,949 SUTI and 2,731 CAUTI). A majority of overall UTI reports (89.5%, 12,237 of 13,680) listed both the organism found in the urine culture and the antibiotic prescribed. A less significant number (5%, 678) reported that an antibiotic was ordered but no organism was identified, because there was no culture, the culture was pending, or it was done at a hospital and unavailable. About 1% of reports (119) showed an antibiotic was ordered although the specimen was contaminated or more than 2 bacterial organisms were found. The remaining 5% of reports (646) did not report the use of an antibiotic (Figure 1).

The First-Choice Antibiotic Prescribed for UTI Events

Fluoroquinolones were the most frequently prescribed first-choice antibiotic class (32%), followed by nitrofurantoin (15%), trimethoprim/sulfamethoxazole (TMP-SMX; 14%), and penicillins (12%). The use of cephalosporins was less frequently reported: first-generation cephalosporins were used in 7% of events; second-generation in 3%; and third-generation in 5%. Carbapenems, tetracycline, and aminoglycosides were the least frequently prescribed classes of antibiotics at 1%, 2%, and 2% respectively. The remainder of a variety of infrequently used antibiotics encompasses the "other" category, including vancomycin, clindamycin, diflucan, and azithromycin. Antibiotics were unlisted in 5% of the reports (Figure 2).
Antibiotic Use for SUTI and CAUTI Events

The most commonly prescribed antibiotics in events that list organisms identified by urine culture for SUTI and CAUTI in descending order were fluoroquinolones, followed by nitrofurantoin and TMP-SMX.

The most commonly prescribed antibiotics for events without identifying organisms were as follows:

- For SUTI events: fluoroquinolones, followed by TMP-SMX and nitrofurantoin
- For CAUTI events: fluoroquinolones, followed by third-generation cephalosporins and "other" antibiotics

The most commonly prescribed antibiotics for specimens that did not meet Pennsylvania Patient Safety Authority criteria for an infection (mixed flora or contaminated culture results) were as follows:

- For SUTI events: fluoroquinolones, followed by nitrofurantoin and TMP-SMX
- For CAUTI events: fluoroquinolones, followed by first-generation cephalosporins and penicillins

Details are provided in the Table.

<table>
<thead>
<tr>
<th>Antibiotic Class</th>
<th>SUTI EVENTS</th>
<th>CAUTI EVENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events with Organism Identified</td>
<td>Events with No Organism Identified</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Carbapenems</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>First-generation cephalosporins</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Second-generation cephalosporins</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>
### Discussion

#### Selection of Antibiotics

The high incidence of testing for UTIs, identification of the organism, and reporting of antibiotics used provides valuable information that may help guide antibiotic conservation measures. Interestingly, PA-PSRS data reveals that fluoroquinolones—which have a high tendency for adverse effects—are most often selected as empiric and first-choice antibiotic treatments for both SUTI and CAUTI in Pennsylvania LTCFs, even when the organism is not identified or the specimen is contaminated. As shown in the table, antibiotics were prescribed in some Pennsylvania LTCFs for treating UTIs that failed to meet nationally accepted criteria for a true UTI. Although it is encouraging that these events were not reported in large numbers, it nonetheless is concerning that antibiotics with a high risk of adverse effects and used outside of contemporary treatment guidelines were prescribed for empiric treatment, for suspected UTIs in which no organism had been identified, or for culture results showing contaminated specimens not appropriate for treatment.

Multiple contemporary national guidelines advocate TMP-SMX or nitrofurantoin as the primary empiric and first-line treatment of acute uncomplicated UTI in older adults (see "UTI Treatment Guidelines"). Less effective first-line agents include fosfomycin and pivmecillinam. Second-line agents including beta-lactams and fluoroquinolones are recommended when first line agents fail, or there is a high local resistance pattern (≥20%) to TMP-SMX. Fluoroquinolones and extended-spectrum cephalosporins are not recommended as empiric or first-line therapy because of their significant, negative effect on normal fecal flora, risk of adverse drug effects, and increased prevalence of antibiotic-resistant bacteria and *C. difficile*.

UTI treatment guidelines outline appropriate dosage and short course regimens. From a single dose to five days of treatment is often recommended in uncomplicated cases to achieve symptomatic cure with fewer side effects (see "UTI Management Guidelines"). Clinical factors to take into consideration when selecting an antibiotic dose and duration include the resident's history and allergies, local resistance prevalence, and the percentage of local resistance rates. The higher the percentage of resistance, the lower the threshold for treatment failure.

Appropriate antibiotic use includes: (1) selecting the right drug, dose, and duration for the condition, (2) determining necessity based on national guidelines for site-specific infections, (3) aligning compatibility with the facility susceptibility patterns (antibiogram), and (4) using the narrowest spectrum antibiotic to achieve the adequate level of

<table>
<thead>
<tr>
<th>Antibiotic Class</th>
<th>5%</th>
<th>2%</th>
<th>1%</th>
<th>8%</th>
<th>8%</th>
<th>3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third-generation cephalosporins</td>
<td>5%</td>
<td>2%</td>
<td>1%</td>
<td>8%</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>32%</td>
<td>40%</td>
<td>38%</td>
<td>29%</td>
<td>36%</td>
<td>40%</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>16%</td>
<td>11%</td>
<td>21%</td>
<td>11%</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Penicillins</td>
<td>1%</td>
<td>8%</td>
<td>8%</td>
<td>12%</td>
<td>6%</td>
<td>14%</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>2%</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>15%</td>
<td>11%</td>
<td>14%</td>
<td>13%</td>
<td>9%</td>
<td>17%</td>
</tr>
</tbody>
</table>

**Note:** Data reported through the Pennsylvania Patient Safety Reporting System, April 1, 2014, through September 30, 2016. Of the total 13,680 UTI events, 10,949 were SUTI and 2,731 were CAUTI. Events with no antibiotic listed and antibiotic classes with use of less than 1% across all categories were excluded.

CAUTI, Catheter-associated urinary tract infection; SUTI, Symptomatic urinary tract infection; UTI, Urinary tract infection.
therapy. Exposure to antibiotics and extended duration of therapy can lead to a shift in normal GI microbiota, resulting in increased susceptibility to infection and sepsis. Increasing incidence of *C. difficile* diarrhea has led to a shift away from use of broad-spectrum antibiotics to narrow-spectrum antibiotics. A 16-year study published in *The Lancet Infectious Diseases* in January 2017 described an 80% decline in *C. difficile* driven by a 50% reduction of fluoroquinolone use.

**UTI Management Guidelines**

**Risk Reduction Strategies**

The following strategies synthesized from the current literature demonstrate a streamlined framework to integrate antibiotic stewardship tasks into facility policies, programs, workflows, and quality-improvement projects.

**Before requesting antibiotic orders, validate the resident's symptoms for consistency with a true UTI.**

• Use nationally recognized criteria to identify a potential SUTI or CAUTI. Use surveillance definitions based on current evidence-based literature and expert consensus. This is critical to capture true UTI events.

**Train nursing assistants and staff nurses to understand, record, and report appropriate signs and symptoms associated with UTIs.**

• Institute training programs and documentation tools. This is especially critical for difficult-to-understand criteria, such as recognizing specific symptoms of what constitutes a true change in mental or functional status, determination of fever, and the role of leukocytosis in diagnosing a true UTI.

**Avoid urine testing as the only evaluation for nonspecific signs or symptoms.**

• Do not limit to suspicions about the urinary tract the clinical assessment for falls, foul-smelling or thick dark urine, and unspecified confusion. This practice may result in missed diagnosis of conditions unrelated to the urinary tract or to an infection, such as dehydration.

**Empower clinicians to withhold antibiotic therapy for asymptomatic bacteriuria (ASB).**

• Develop clinical pathways, protocols, and communication tools to clearly define facility-based policies on screening and treatment of ASB.

• Follow current guidelines recommending ASB screening only for pregnant women and patients undergoing elective urologic procedures.

• Define ASB as >100,000 CFU of a bacterial urinary pathogen in the urine of a resident without symptoms directly attributable to the urinary tract.

• Base protocols and education on current research: (1) ASB is a benign and transient condition; (2) high rates of bacteriuria are normal in the elderly; (3) antibiotics used for ASB have major negative consequences, but lack clinical benefit; and (4) untreated ASB has minimal risk of tissue invasions and sepsis.

**Avoid dependence on Dipsticks and urinalysis (UA) without culture to diagnose and treat UTIs.**

• Avoid using rapid urine tests to diagnose and treat a suspected UTI without appropriate indications and collection methods. This practice can result in misdiagnosis and unnecessary use of antibiotics. The diagnostic gold standard for UTI is qualitative urine culture in the presence of evidence-based symptoms.
The presence of white blood cells, nitrites, leukocyte esterase, red blood cells, or protein does not differentiate asymptomatic bacteriuria from symptomatic (true) UTI appropriate for antibiotic treatment. False readings may occur due to urinary seeding by some antibiotics, protein, ascorbic acid, glycosuria, and vaginal contamination.

Educate nursing staff on appropriate specimen collection methods to prevent contamination and limit bacterial growth.

- Replace indwelling urinary catheters if in place more than 2 weeks before aspirating a specimen from the port in the new tubing.

- Avoid common causes of specimen contamination: improper specimen collection, unclean hands, contaminated equipment, and improper storage and transfer to the laboratory.

- Follow acceptable methods of obtaining a urine specimen by clean catch, straight catheter, or indwelling catheter. Poor-quality specimens can result in mixed flora or contaminated specimen and treatment for nonpathogenic organisms.

Educate nursing staff to interpret a urine culture report.

- Learn the meaning of the sensitivity patterns and the minimum inhibitory concentration (MIC), which is the lowest concentration of drug that inhibits the growth of the organism. Reporting the MIC to the prescriber guides selection of the most appropriate, lower-spectrum antibiotic.

- Employ a consultant pharmacist to provide education and tools to differentiate broad-spectrum from narrow-spectrum antibiotics.

- Identify the organism (not just gram-negative or lactose fermenter), determine whether the colony count is appropriate for the method of specimen collection, and review the sensitivity and resistance patterns to identify the narrowest spectrum antibiotic that will kill the organism.

Review facility-specific resistance patterns to guide appropriate antibiotic selection.

- Guide empiric prescribing of antibiotics while awaiting culture results using an antibiogram table. This table demonstrates the percentage of effectiveness of commonly used antibiotics for organisms identified from cultures performed in the facility in the previous year.

- Work with the facility's laboratory contractor to develop an antibiogram. Tools are available online at https://www.ahrq.gov/nhguide/index.html.

- Reevaluate appropriateness of antibiotics ordered in the hospital or emergency department upon readmission.

Employ a watchful waiting technique for residents with nonspecific or mild symptoms.

- Avoid empiric antibiotics for changes in condition such as falls or increased confusion in the absence of UTI-specific symptoms. Observe for 24 to 48 hours for resolution of symptoms, and search for other causes of the condition. Evaluate the residents' hydration status, push fluids, and evaluate medication side effects or worsening of symptoms, such as hypoxia.

- Develop clinical pathways or order sets to guide empiric treatment or watchful waiting. The Infectious Diseases Society of America provides a clear decision-making algorithm to guide antibiotic selection.

Establish a protocol for a 48- to 72-hour antibiotic time out.
• Develop a procedure to consult with the prescribing physician to reevaluate empiric antibiotic appropriateness within 48 to 72 hours or when final culture results are available.26

Engage stakeholders in continuum of care stewardship efforts.

• Establish relationships with hospital antibiotic stewardship teams to improve understanding of the rationale for antibiotics prescribed and to streamline availability of hospital testing results.

• Work with consultants such as behavioral health and dialysis to establish stewardship goals and protocols.

• Educate and engage families and residents in the stewardship plan.18

Measure antibiotic prescribing processes and outcomes.

• Monitor compliance with proper application of UTI criteria, antibiotic prescribing documentation, and facility-specific treatment protocols.26

• Perform a point prevalence survey of antibiotic use and measure monthly rates of new antibiotic starts and cultures ordered.

Antibiotic Stewardship in Action: A LTCF Success Story

The findings below are based on the implementation of a UTI evaluation tool at two 70-plus bed continuing care retirement community nursing facilities in Pennsylvania, providing long-term and skilled nursing care. The UTI evaluation tool was implemented to improve accurate UTI diagnosis and to reduce prescriptions of unnecessary antibiotics. This information has been provided with explicit permission from Living Branches Dock Meadows, Souderton Mennonite Homes, Dock Woods.

While performing monthly surveillance using PA-PSRS definitions, the infection prevention analyst (IP) noted a large number of asymptomatic bacteria (ASB) cases treated with antibiotics. The IP, supported by the Quality Assurance/Process Improvement (QAPI) team, looked at unnecessary treatment of ASB as the first antimicrobial stewardship project for these facilities. The medical director identified that the improper ordering of urinalyses and urine cultures could lead to the inappropriate treatment of ASB. The QAPI team discussed using a tool to guide nursing staff in ordering urine tests only when indicated by the presence of urinary symptoms.

A proprietary UTI evaluation tool, developed in 2014 by the Pennsylvania Medical Directors Association (PMDA) was adapted to meet the facilities' needs. Direct involvement of licensed nurses provided input to create a final tool that could be easily used by all nursing staff and increased their personal investment in implementation. The IP assured that the symptoms listed in the tool were in line with PA-PSRS UTI and CAUTI criteria for infections. Finally, the QAPI committee, including the medical director, approved use of the UTI evaluation tool. Numbers of urinalysis/urine cultures and outcomes were reported monthly at QAPI meetings. The UTI evaluation tool protocol was added to the infection control policy and procedures under the antimicrobial stewardship plan.

Care coordinators and the IP provided the tool to the certified registered nurse practitioners and physicians with an explanation of how it would be used by nursing as a decision-making aid. The staff were educated in May 2015 on PA-PSRS UTI and CAUTI criteria, ASB, and antimicrobial stewardship, and in July and August 2015 on the UTI evaluation guideline. Monitoring the new process, they found that new staff were ordering an increased number of urinalyses and urine cultures, compared with such orders by staff who had previously received antimicrobial stewardship education. One-on-one education was conducted for new staff until the urinary evaluation tool was
added to the monthly clinical orientations in September 2016. The staff now receive a monthly report on the number of urinalysis and urine cultures performed and outcomes at the monthly nurses meeting. The nursing staff are reminded to consistently use the tool for decision-making when they obtain an order for a urine specimen. In addition, it was found that several urinalyses were ordered by the psychiatric consultants as part of their routine evaluation. The IP requested that the consultants eliminate the urinalysis and subsequent culture from the evaluation unless urinary symptoms were present.

The two hospital-based laboratories used by the facilities were contacted to produce a yearly antibiogram and to continue monthly culture reports to make sure all urine cultures were evaluated. The antibiogram was used to educate prescribers about resistance patterns in the facility to guide antibiotic choice. Outcomes were evaluated and measured by analysis of the number of urine cultures performed, the number of treated symptomatic UTIs and treated asymptomatic bacteriuria, and the number of episodes of bacteriuria not treated. Figure 3 depicts the aggregated data from the two facilities under the same management.

Figure 3. Effect of Interventions on the Number of Urine Cultures and Episodes of Treated Asymptomatic Bacteriuria at Two Long-Term Care Facilities

<table>
<thead>
<tr>
<th>MONTH</th>
<th>Number of urine cultures ordered</th>
<th>Number of treated asymptomatic bacteriuria events</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2015</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Jun 2015</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Jul 2015</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Aug 2015</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Sep 2015</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Oct 2015</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Nov 2015</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Jan 2016</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Feb 2016</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mar 2016</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Apr 2016</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>May 2016</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Jun 2016</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Jul 2016</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Aug 2016</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Sep 2016</td>
<td>5</td>
<td>0</td>
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<tr>
<td>Oct 2016</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Nov 2016</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

May 2015—Initial education on UTI criteria /asymptomatic bacteriuria /antimicrobial stewardship
June 2015—UTI evaluation guideline developed
July/August 2015—Guideline initiated, RN/LPN/CNA/MD/CRNP education
September 2015—Discouraged psychiatric consultant ordering as part of their evaluation
April 2016—Obstacle: Family request for antibiotics. Solution: Family education by supervisors, charge nurses, and infection prevention analyst
May 2016—Obstacle: Suboptimal practices by new staff. Solution: UTI evaluation tool added to new employee clinical orientation

Note: Data reported May 2015 through November 2016.

CNA: Certified nursing assistant; CRNP: certified registered nurse practitioner; LPN: licensed practical nurse; MD: medical doctor; RN, registered nurse; UTI: urinary tract infection.

The IP reports that oversight of compliance has been necessary from the start. The tool is posted at each nurses station as a visual reminder and to encourage use. Care coordinators are empowered to look at reasons for urine culture orders and to follow through by evaluating the culture reports to make sure that the organism is susceptible to the empirically prescribed antibiotic. The care coordinators, charge nurses, and IP educate families of residents, who sometimes insist on antimicrobial treatment. Supervisors and charge nurses talk to the families about side effects of antibiotics and provide assurance that when symptoms are mild and nonspecific, the resident will continue to be monitored for the development of more specific symptoms and extra fluids will be provided, if indicated.

http://patientsafety.pa.gov/ADVISORIES/Pages/201709_UTI.aspx
Physicians approved the tool and were grateful to have nurses provide more specific information during phone consultations. The evaluation guideline was particularly well accepted because it provides options without dictating a plan of care. The nursing staff have become better critical thinkers, and nurses and physicians work together to reduce unnecessary antibiotic use. The adaptation of the UTI Evaluation Guideline by the two facilities in combination with staff education has definitely had a positive impact on the antibiotic prescribing practices within the facilities (see Figure 3).

A copy of the tool (/ADVISORIES/Documents/Tool%20PDFs/MS17731.pdf) can be found on the Authority website.

Limitations

The results of this study may not be generalizable because the PA-PSRS reporting mechanism for LTCFs does not collect data on identification or treatment of asymptomatic bacteriuria. Further, the prompts in the PA-PSRS system for reporting the organism found in the culture and the antibiotic used are optional. Finally, event reports do not provide information on empiric versus culture directed antibiotic treatment, the culture sensitivity reports, allergies, or previous adverse effects of antibiotics.

Conclusion

The combination of inappropriate antibiotic prescriptions for UTIs and the growing emergence of antibiotic-resistant organisms create an urgent need for all LTCFs to institute programs to control antibiotic resistance and side effects by requiring judicious use of antibiotics. This snapshot of antibiotic use for UTIs in Pennsylvania LTCFs demonstrates a wakeup call for individual facilities to find the stewardship gaps in their facility. This is best accomplished within the framework of a structured antibiotic stewardship program. The program should be aimed at optimizing antimicrobial use, avoiding unintended consequences of antibiotic use, and improving clinical outcomes. Strategies to overcome stewardship barriers and reduce resident harm from adverse effects of antibiotic use include actions to standardize triggers for UTI surveillance and laboratory testing, as well as accurate laboratory-results interpretation, appropriate treatment, communication, and monitoring.

Reviewer Comments

This is a very helpful article for all nursing home providers, medical directors, and management staff who are interested in reducing inappropriate or misuse of antibiotic for UTIs. The success story at the end of the article helps validate the risk reduction strategies. It is very important that the emergency department and nursing directors are on board with the current PA-PSRS criteria for UTIs. It can be very challenging for providers to practice good medicine when the upper level management undermine the established criteria by requesting a UA for behavioral changes only. Avoid transferring residents to the local hospital emergency rooms, when appropriate, for a change in condition with normal vital signs and “NO” evidence of criteria for ordering a UA. In these situations if all blood work, x-rays, and the exam are normal, it is very likely that resident will return to the nursing home with a diagnosis of a UTI, which is really an ASB. This leads to the importance of working closely with the local hospital ER providers/hospital pharmacists so they understand the updated McGeer criteria for diagnosing a UTI and prescribing the appropriate antibiotics for an uncomplicated UTI. The Antibiogram ideally should be facility-specific, since there is a broad range of levels of quality care given among nursing home residents.

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Corporate Medical Director for Masonic Villages of PA Geriatric Consultant for UPMC Community Provider Services
Acknowledgement

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Notes


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Supplemental Material

**UTI Management Guidelines**

**Infectious Diseases Society of America Guidelines [online].** https://www.idsociety.org/Organ_System/

This web page outlines current evidence-based standards for the diagnosis and treatment of infections by body site, in pdf documents, slides with case studies, pocket cards, and mobile apps.


This article reviews successful antimicrobial stewardship strategies in the diagnosis and treatment of urinary tract infections (UTIs).


This article includes evidence-based guidance for the diagnosis and treatment of UTI in long-term care residents.

http://patientsafety.pa.gov/ADVISORIES/Pages/201709_UTI.aspx 9/21/2017

This evidence-based review describes the problem of over-diagnosis and overtreatment of UTI, presents appropriate clinical findings, and offers guidance for UTI testing and antibiotic prescription.


This article recommends approaches to managing common infections in long-term care residents and proposes minimal standards for reviewing use of antimicrobials.

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