UTI: An Opportunity for Antimicrobial Stewardship

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Project to Implementing Antimicrobial Stewardship in Nursing Homes-Funded by NYSDOH

Primary Objectives:
1. Implement antimicrobial stewardship programs in LTCF
2. Reduce the use of quinolones for the treatment of UTI and pneumonia
3. Reduce the overall incidence of CDI

Secondary Objective:
1. Monitor and report CDI through implementation and use of NHSN
Project Implementation

• Recruited 7 LTCF:
  ▫ 4 large facilities
  ▫ 3 hospital affiliated facilities

• Implementation of the antimicrobial stewardship intervention occurred successively at each of these LTCF

• Intervention was tailored to each LTCF context and needs
# I. Stewardship Teams

<table>
<thead>
<tr>
<th>Hospital Team</th>
<th>LTCF Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hospital infectious diseases physician</td>
<td>• Medical Director</td>
</tr>
<tr>
<td>• Hospital antimicrobial stewardship pharmacist</td>
<td>• Nursing Director</td>
</tr>
<tr>
<td>• Project coordinator</td>
<td>• Infection Preventionist</td>
</tr>
<tr>
<td>• Project infection preventionist</td>
<td>• Nursing Educator</td>
</tr>
<tr>
<td></td>
<td>• In house dispensing Pharmacist</td>
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<tr>
<td></td>
<td>• NP/PA</td>
</tr>
<tr>
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<td>• Director of Quality</td>
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<tr>
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<td>• Nursing Home Administrator</td>
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</table>
Antimicrobial Stewardship Collaboration

**Medical Director Advisory Team**
- Directors of other NH in the community
- Hospital Team members
- Treatment guidelines for UTI and Pneumonia

**LTCF Team**
- Implementation of guidelines
- Antibiotic Reviews and feedback
- Urine culture testing and treatment review
- CDI NHSN reporting

**Microbiology lab**
- Antibiogram and list of urine cultures

**Dispensing pharmacy**
- In-house and a large dispensing pharmacy

**EIP CDI data**

**Hospital Team**
- Diagnosis and Treatment guidelines
- Data summaries
- Education, pocket cards, posters
- Assistance with NHSN reporting

**Advisory Group**

**Data**

**Implementation**

**Education**
II. Measuring Antimicrobial Use

<table>
<thead>
<tr>
<th>DRUG NAME</th>
<th>SIG</th>
<th>Dose/Route</th>
<th>Duration</th>
<th>Indication</th>
<th>Date Written</th>
<th>Auth</th>
<th>Disp</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOXYCYCLINE 100 MG CAPSULE</td>
<td>TAKE ONE CAPSULE PO TWICE</td>
<td>DAILY X 7 DAYS</td>
<td>(BRONCHITIS/COPD)</td>
<td>27-Jan-16</td>
<td>14</td>
<td>14</td>
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<tr>
<td>CIPROFLOXACIN 500MG TABS(*)</td>
<td>ONE TABLET PO TWICE</td>
<td>DAILY. (OSTEOMYELITIS)</td>
<td>(DC 2/8/16)</td>
<td>4-Jan-16</td>
<td>70</td>
<td>55</td>
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<tr>
<td>VANCOMYCIN 1 GM ADD-VAN VIA</td>
<td>INFUSE 1GM I.V. EVERY 12 HOURS OVER 60-90 MINUTES</td>
<td>(<em>Activate before use</em>)</td>
<td>12-Jan-16</td>
<td>60</td>
<td>8</td>
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</tr>
<tr>
<td>VANCOMYCIN 1 GM ADD-VAN VIA</td>
<td>INFUSE 1GM I.V. EVERY 12 HOURS OVER 60-90 MINUTES</td>
<td>(<em>Activate before use</em>)</td>
<td>25-Jan-16</td>
<td>28</td>
<td>8</td>
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<tr>
<td>SULFAMETHOXAZOLE/TMP DS TAB</td>
<td>TAKE 1 TABLET BY MOUTH</td>
<td>TWICE DAILY X 14 DAYS.</td>
<td>(PYELONEPHRITIS)</td>
<td>11-Jan-16</td>
<td>28</td>
<td>2</td>
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<tr>
<td>STEFODOXIME 200 MG TABLET</td>
<td>TAKE ONE TABLET PO EVERY 12 HOURS FOR 10 DAYS</td>
<td>(PYELONEPHRITIS)</td>
<td>12-Jan-16</td>
<td>20</td>
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LTCF1-Top 12 Indications

- OTHER GI INFECTION
- BLOODSTREAM INFECTION
- DENTAL/SURGICAL PROPHYLAXIS
- BRONCHITIS
- HEENT INFECTION
- BONE/JOINT INFECTION
- C. DIFF
- PNEUMONIA
- SKIN/SOFT TISSUE INFECTION
- PEMPHIGOID
- UTI PROPHYLAXIS
- UTI

Days of Therapy
LTCF1-12 Top Indications by Number of Residents

UTI/PNEUMONIA
PEMPHIGOID
OTHER GI INFECTION
UNSPECIFIED ABSCESS
UTI PROPHYLAXIS
HEENT INFECTION
C. DIFF
BRONCHITIS
DENTAL/SURGICAL PROPHYLAXIS
PNEUMONIA
SKIN/SOFT TISSUE INFECTION
UTI

Number of Residents
Most Common Agents Used for UTI

- Ciprofloxacin: 85
- Levofloxacin: 15
- Nitrofurantoin: 10
- Cephalexin: 5
- SMZ-TMP: 5
- Amoxicillin: 5
- Ampicillin: 5
- Cefpodoxime: 5
- Doxycycline: 5
- Fluconazole: 5
- Linezolid: 5
- Amox/K Clav: 5

Number of Patients
### UTI Antibiogram

**Nursing home A- 2013**

**Urine Isolates: % Susceptible**

<table>
<thead>
<tr>
<th>Organism</th>
<th># of isolates</th>
<th>Ampicillin</th>
<th>Ampicillin-Sulbactam</th>
<th>Aztreonam</th>
<th>Cefazolin</th>
<th>Cefepime</th>
<th>Ciprofloxacin</th>
<th>Gentamicin</th>
<th>Imipenem</th>
<th>Levofoxacin</th>
<th>Piperacillin-Tazobactam</th>
<th>Tobramycin</th>
<th>Trimethprim-Sulfamethoxazole</th>
<th>Nitrofurantoin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GRAM-NEGATIVE ORGANISMS</strong></td>
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<tr>
<td><em>Escherichia coli</em></td>
<td>50</td>
<td>50</td>
<td>54</td>
<td>94</td>
<td>76</td>
<td>96</td>
<td>62</td>
<td>82</td>
<td>100</td>
<td>50</td>
<td>90</td>
<td>80</td>
<td>76</td>
<td>94</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td>11</td>
<td>0</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>82</td>
<td>100</td>
<td>45</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>18</td>
<td>88</td>
<td>*</td>
<td>100</td>
<td>89</td>
<td>100</td>
<td>67</td>
<td>94</td>
<td>*</td>
<td>78</td>
<td>94</td>
<td>94</td>
<td>83</td>
<td>0</td>
</tr>
</tbody>
</table>

*Limitations prevent the testing and reporting of ampicillin-sulbactam and imipenem for *P. mirabilis*.

&Differences in the % susceptibility for an organism represented by <30 isolates may not be statistically significant from year to year.
III. Action
Improve Antibiotic use for Urinary Tract Infections

Modified CDC assessment of appropriateness of antibiotics for UTI form: http://www.cdc.gov/getsmart/healthcare/implementation.html
Applying Criteria to Define UTI
Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term—Care Facilities: Results of a Consensus Conference

Author(s): Mark Loeb, MD, MSc; David W. Bentley, MD; Suzanne Bradley, MD; Kent Crossley, MD; Richard Garibaldi, MD; Nelson Gantz, MD; Allison McGeer, MD; Robert R. Muder, MD; Joseph Mylotte, MD; Lindsay E. Nicolle, MD; Brenda Nurse, MD; Shirley Paton, RN; Andrew E. Simor, MD; Philip Smith, MD; Larry Strausbaugh, MD

Source: Infection Control and Hospital Epidemiology, Vol. 22, No. 2 (February 2001), pp. 120-124

Published by: The University of Chicago Press on behalf of The Society for Healthcare Epidemiology of America

Stable URL: http://www.jstor.org/stable/10.1086/501875

Accessed: 07/07/2014 15:39
Revised Surveillance Definitions of Infections for Nursing Homes

Surveillance definitions are not the same as the clinical criteria to start treatment
Surveillance definitions are a tool to assess the percentage of antibiotics used that fit the criteria
understand the gaps in knowledge, processes and guide improvement
Suprapubic Pain
None
Flank Pain
Elevated WBC
Hematuria
Incontinence & Bladder Spasm
New Onset Retention
Urgency
Fever
Other
New onset confusion
Nausea/Vomitting/Diarrhea
Frequency
Dysuria

*12 patients, confusion delirium was the only symptom that triggered a urine culture.
Revised McGeer Criteria for UTI

1. Need a positive urine culture
   and
2. Localizing signs and symptoms to the genitourinary tract
**For Patients without an indwelling catheter**

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>Urine Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 1 of the following sign or symptom subcriteria</td>
<td>1. At least $10^5$ cfu/mL of no more than 2 species of microorganisms in a voided urine sample</td>
</tr>
<tr>
<td>1. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate</td>
<td>2. At least $10^2$ cfu/mL of any number of organisms in a specimen collected by in-and-out catheter</td>
</tr>
<tr>
<td>2. Fever or leukocytosis and at least 1 of the following localizing urinary tract subcriteria</td>
<td></td>
</tr>
<tr>
<td>If no fever: 2 of the localizing urinary tract subcriteria</td>
<td></td>
</tr>
<tr>
<td>1. Acute costovertebral angle pain or tenderness</td>
<td></td>
</tr>
<tr>
<td>2. Suprapubic pain</td>
<td></td>
</tr>
<tr>
<td>3. Gross hematuria</td>
<td></td>
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<tr>
<td>4. New or marked increase in incontinence</td>
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<tr>
<td>5. New or marked increase in urgency</td>
<td></td>
</tr>
<tr>
<td>6. New or marked increase in frequency</td>
<td></td>
</tr>
</tbody>
</table>
For Patients with an Indwelling Catheter

**Signs and Symptoms**

At least 1 of the following sign or symptom subcriteria:

1. Fever, rigors, or new-onset hypotension, with **no alternate site of infection**

2. Either acute change in mental status or acute functional decline*, with **no alternate diagnosis and leukocytosis**

3. New-onset suprapubic pain or costovertebral angle pain or tenderness

4. Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

**Culture**

- Urinary catheter specimen culture with at least 105 cfu/mL of any organism(s)

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*The definition of acute functional decline is also based on changes in ADLs according to the scoring system in MDS*
**Confusion Assessment Method (CAM) Criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute onset</td>
<td>Evidence of acute change in resident’s mental status from baseline</td>
</tr>
<tr>
<td>Fluctuating</td>
<td>Behavior fluctuating (eg, coming and going or changing in severity during the assessment)</td>
</tr>
<tr>
<td>Inattention</td>
<td>Resident has difficulty focusing attention (eg, unable to keep track of discussion or easily distracted)</td>
</tr>
<tr>
<td>Disorganized thinking</td>
<td>Resident's thinking is incoherent (eg, rambling conversation, unclear flow of ideas, unpredictable switches in subject)</td>
</tr>
<tr>
<td>Altered level of consciousness</td>
<td>Resident’s level of consciousness is described as different from baseline (eg, hyperalert, sleepy, drowsy, difficult to arouse, nonresponsive)</td>
</tr>
</tbody>
</table>
A patient with advanced dementia may be unable to report urinary symptoms, in this situation, it is reasonable to obtain a urine culture if there are signs of systemic infection such as

- **Fever**, (increase in temperature ≥ 2°F (1.1°C) from baseline)
- **Elevated WBC**
- **Chills**

in the absence of additional symptoms (e.g. new cough) to suggest an alternative source of infection.
Revised McGeer Surveillance Criteria*

D
B
A

Findings of Medical Record Review

Most of the residents are tested and treated for asymptomatic bacteriuria.

Treatment

- 47% were treated empirically
  - 30% organisms non susceptible
- 53% were treated after culture results
  - Evaluation and follow up at 48-72 hours minimal
  - A positive culture drives the decision to treat

Duration of treatment

- Mean 5 days (range 3-14 days)
Asymptomatic Bacteriuria

If you obtain a urine specimen from all female residents in your nursing home, how many would be positive?

a. 10%

b. 80%

c. Up to 50%

➢ Elderly LTCF Women 25-50%
➢ Elderly LTCF Men 15-40%
➢ Short term catheterization 9-23%
➢ Long term catheterization 100%
A Positive Urine Test, What Does it Mean?

Bacteria in Urine

Urinary Tract Symptoms

- Asymptomatic Bacteriuria (ASB)
- Urinary Tract Infection (UTI)
Asymptomatic Bacteriuria Is Common

<table>
<thead>
<tr>
<th></th>
<th>Asymptomatic bacteriuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women less than 60 years</td>
<td>3-5%</td>
</tr>
<tr>
<td>Elderly in Community</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>11-16%</td>
</tr>
<tr>
<td>men</td>
<td>15-40%</td>
</tr>
<tr>
<td>Elderly in Nursing Homes</td>
<td></td>
</tr>
<tr>
<td>women</td>
<td>25-50%</td>
</tr>
<tr>
<td>men</td>
<td>15-40%</td>
</tr>
<tr>
<td>Patient with indwelling catheter</td>
<td>100%</td>
</tr>
</tbody>
</table>

Nicolle LE, Clinical Infectious Diseases 2005;40(5): 643–54
IV. Education- Medical Providers

Small group sessions

- Presentation of facility antibiotic use, CDI and UTI review data
- Review appropriate testing and treatment of UTI
- Review antibiogram
- Review locally created treatment guidelines
- Provided pocket treatment cards
- Recommended
  - Improvement of the documentation of signs and symptoms
  - Clinical evaluation for every antibiotic prescription and at 48 hours, i.e. antibiotic “time out”
Education- Nursing Staff

Small group sessions

- Review CDI and UTI review data
- Review appropriateness of urine testing and treatment
- Recommended the use of an on-line education program
- Recommended the use of the SBAR
- Emphasized the importance of documentation of signs and symptoms
- Created posters
Education- Family

• Created a brochure on appropriate treatment of UTI
• Created a newsletter for distribution to residents and families
• Recommended coaching of nursing staff on best method to deliver the brochure information to families
V. Feedback of Data
LTCF1. Rate of Antibiotic Starts for UTI and Urine Culture Rate

Education

Posters
Pocket cards

Education
LTCF1. Change in Ciprofloxacin DOT for UTI
Example How Data Was Used for Action

• Goal to capture all urine cultures and UTI treatment
  ▫ Worked with micro lab to get list of tested residents
  ▫ Worked with pharmacy to get new antibiotic starts for UTI

• Uncovered the limitation of the 24 hour report

• Performed monthly assessments of tested and treated residents for signs and symptoms of UTI

• Feedback to nurses and in house medical providers on the appropriateness of testing and treatment

“We used to work in silos, now we talk to each other”
Action: Improve Documentation of Antibiotic Indication

I make sure all the antibiotic orders have an indication.
Dispensing Pharmacist Antibiotic Review and Feedback

Assessment of Appropriateness of Antibiotics for Urinary Tract Infection (UTI)

Resident Name: ____________________________ Date: ____________________________

Unit: ____________________________ MDN/P#: ____________________________

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

1. Was urinalysis/urine culture ordered based on appropriate symptoms? (See below) __Yes __No __Unknown
2. Fever (oral > 100°F or any site > 2°F above baseline or repeated oral > 99°F/rectal > 99.5°F) __Yes __No __Unknown
3. Clinically unstable: fever > 102°F, heart rate > 100, RR > 30, BP < 90 systolic, finger stick glucose < 60 or > 400 __Yes __No __Unknown

Suggestions:

Thank You, ____________________________

Signature of Pharmacist

Please contact me in the Pharmacy (ext 6108) if additional information is required on the matter.

RESPONSE: The above comments or suggestions were reviewed by me and my response is:

Agree and have taken follow-up action. Don’t Agree Will Review and Respond. See following comments:

Signature of Physician/NP/PA

PLEASE RETURN TO THE PHARMACY WHEN COMPLETED

• If NO, was the antibiotic changed? __Yes __No __Unknown __N/A
Name of antibiotic ____________________________

• Was empiric antibiotic stopped if no organism was isolated by culture?  ____________________________

OR

• Was the antibiotic used a quinolone? __Yes __No
If yes, were there other options on the sensitivities rpt? __Yes __No
• Was resident evaluated for continued symptoms prior to discharge?  ____________________________
Acknowledgments

- Elizabeth Dodds Ashley, PharmD
- Christina Felsen, MPH
- Gail Quinlan, RN, CIC
- Grant Barney

- All the LTCF Medical Directors, Medical and Nursing staff
- LTCF Pharmacists
- Vince Galetta, Buffalo Pharmacies
# Nursing Documentation

<table>
<thead>
<tr>
<th>Rm</th>
<th>Resident Name</th>
<th>Type of Specimen</th>
<th>Date Ordered</th>
<th>Date, Time Sent</th>
<th>Date, Initials, Time Results Received</th>
<th>Symptoms at Time of Results Received</th>
<th>Date, Initials, Time Provider Notified</th>
<th>New Order Y/N</th>
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