PRINCIPLES OF ANTIMICROBIAL STEWARDSHIP FOR ASSISTED LIVING

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Riddle Medical LLC
CASE STUDY OF A URI

Infection Control Issues in Assisted Living Facilities
THE CASE OF FLORENCE ELLIS

• An 86 year old female is found to have a non-productive cough.

• Her vitals are normal with exception of a temp of 99.7 (her normal reading is 97.2)

• She has no other symptoms.
FLORENCE ELLIS CASE STUDY

- On physical exam her chest is clear.
- She has a chronic leg wound, but the wound does not look any different and there is no evidence of infection.
- There are no urinary tract symptoms.
FLORENCE ELLIS CASE STUDY

- After examination it is decided that she needs a fever work-up that includes:
  - CXR
  - Urinalysis and culture
  - Sputum culture
  - Blood cultures X2
  - The ulcer on the leg is swabbed for culture
FLORENCE ELLIS CASE STUDY

- The chest x-ray shows no active disease.
- Urinalysis shows 7 white blood cells.
- Urine culture grew 100,000 e.coli.
- Sputum culture was negative.
- Wound culture grew MRSA.
FLORENCE ELLIS CASE STUDY

• Treatment Plan
  • Levaquin 250 mg QD X 7 days for UTI
  • Linezolid 600 mg Q12H X 14 days for MRSA of the wound

• Outcome
  • 5 weeks later the resident was found to have diarrhea.
  • Stool tested positive for c. difficile.
What would have been a more reasonable approach to take with this case?
LIFE BEFORE ANTIBIOTICS
# HISTORY OF ANTIMICROBIAL DEVELOPMENT

## The 1920’s through the 1940’s

<table>
<thead>
<tr>
<th>Year</th>
<th>Positive Developments</th>
<th>Negative Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>Discovery of Penicillin by Alexander Fleming</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>Discovery of the sulpha drugs</td>
<td></td>
</tr>
<tr>
<td>1942</td>
<td>Penicillin (B-lactam) use begins</td>
<td></td>
</tr>
<tr>
<td>1944</td>
<td>Streptomycin (aminoglycoside) is marketed as a cure for TB.</td>
<td></td>
</tr>
<tr>
<td>1945</td>
<td>Tetrocyclines developed</td>
<td></td>
</tr>
<tr>
<td>1947</td>
<td></td>
<td>Staphylococcus Aureus shows resistance to Penicillin</td>
</tr>
<tr>
<td>1949</td>
<td>Chloramphenical, Neomycin, and Gentamycin introduced</td>
<td></td>
</tr>
</tbody>
</table>
**HISTORY OF ANTIMICROBIAL DEVELOPMENT**

The 1950's

<table>
<thead>
<tr>
<th>Year</th>
<th>Positive Developments</th>
<th>Negative Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>Macrolides such as erythromycin are introduced</td>
<td>Isolates of erythromycin resistant staphylococci are reported in Japan, England, France and the US</td>
</tr>
<tr>
<td>1955</td>
<td>Vancomycin, the first glycopeptide, is introduced</td>
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</tr>
<tr>
<td>1957</td>
<td>The rifamycin family of antibiotics is discovered</td>
<td></td>
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</tbody>
</table>
### HISTORY OF ANTIMICROBIAL DEVELOPMENT

#### The 1960's

<table>
<thead>
<tr>
<th>Year</th>
<th>Positive Developments</th>
<th>Negative Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>Trimethoprim is launched</td>
<td>MRSA detected in the UK</td>
</tr>
<tr>
<td>1962</td>
<td>Quinolones and streptogamins discovered</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td></td>
<td>Penicillin-resistant Neisseria Gonorrhoeae and Streptococcus Pneumoniae reported</td>
</tr>
</tbody>
</table>
The 1970’s

The only antimicrobial development during the decade of the 1970’s was the launch of Cefalexin, a first-generation cephalosporin, in 1970.
The 1980's

<table>
<thead>
<tr>
<th>Year</th>
<th>Positive Developments</th>
<th>Negative Developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td></td>
<td>MRSA develops resistance to Cephalosporins</td>
</tr>
<tr>
<td>1983</td>
<td></td>
<td>Penicillin-resistant Enterococcus faecum is detected</td>
</tr>
<tr>
<td>1986</td>
<td><strong>The first Fluoroquinolone, Norfloxacin, is approved for use</strong></td>
<td>VRE is detected</td>
</tr>
<tr>
<td>1987</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## History of Antimicrobial Development

### Positive Developments

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Linezolid (Zyvox) is approved</td>
</tr>
<tr>
<td>1999</td>
<td>Isolation of Linezolid-resistant enterococci</td>
</tr>
<tr>
<td>2000</td>
<td>Community Acquired MRSA is recognized as an emerging pathogen</td>
</tr>
</tbody>
</table>

### Negative Developments

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Multi-drug-resistant Pseudomonas is reported</td>
</tr>
</tbody>
</table>
| 1999 | - Multi-drug resistant TB is isolated.  
- Most MRSA strains are now resistant to fluoroquinolones.  
- In the US 50% of S. Aureus are MRSA |
| 2000 | |
ASSISTED LIVING POPULATION

• 70% Female
• 54% Age 85 and older
  • Diminished immune response in the elderly
  • Blunted febrile response to infections
• 42% Have Alzheimer’s Disease or Dementia
  • Decreased ability to perform hygiene functions, either from physical or mental limitations
  • Urinary incontinence
  • Diminished cough reflex
• 37% Need Assistance with Three or More Activities of Daily Living
COMMON DISEASES & DISORDERS

- Alzheimer's or other Dementia
- Arthritis
- Depression
- Diabetes
- High Blood Pressure
- Osteoporosis

Percent

![Chart showing the percentage distribution of common diseases and disorders.](chart.png)
COMMON RESPIRATORY INFECTIONS IN AL

• Pertussis (whooping cough) – vaccine recommended for children (Dtap), adolescents and adults (Tdap)

• Respiratory syncytial virus (RSV)

• Cold viruses

• Strep pneumonia – causes bacterial pneumonia and blood infection. Vaccine recommended for persons 50 years of age and older, or younger persons at high risk for pneumococcal disease
CLOSTRIDIUM DIFFICILE

• Patients who are at high risk for C. Diff
  • Currently taking antibiotics or have recently taken them
  • Have had gastrointestinal surgery or manipulation
  • Have had a long length of stay in a healthcare setting
  • Have a serious underlying illness
  • Are immunocompromised
  • Are of advanced age
MANAGEMENT OF C DIFF

- Private room is recommended, especially for residents who have fecal incontinent or who cannot practice good hand washing.
- Contact precautions must be maintained while the resident has diarrhea.
- Hands should be washed frequently with soap and water. Alcohol-based hand gels and lotions are not effective.
- An EPA-approved disinfectant detergent should be used for all environmental cleaning (10:24 rule).
OUTCOMES OF C. DIFF INFECTIONS IN THE ELDERLY

• For those hospitalized the average LOS was 5 days
• 50% of patients hospitalized received oral antibiotics prior to infection; 50% were not exposed to any antibiotic
  • 39% received antibiotics 31 days of infection
  • 8% within 31 – 60 days & 3.7% within 61 – 90 days
• 13% required ICU admission
• 1.3% underwent colectomy
• Hospital mortality was 10.8%
• 20% of survivors were re-admitted with C. Difficile within one year of discharge

Antimicrobial Stewardship
CHALLENGES IN ASSISTED LIVING

- Kistler et al J AM Geriatric Soc. 2013 Apr;61(4):565-570
  - Objective: To better understand antibiotic prescribing in Assisted Living Communities
  - Focus: 4 AL communities in North Carolina
  - 30 AL residents evaluated who received antibiotics between 10/20/10 & 3/31/11
  - Results:
    - Antibiotics were prescribed by providers who had limited information about the case and had limited familiarity with the residents, the families of the residents, and the staff.
    - Prescribers also felt that cases were less severe and less likely to require an antibiotic than did residents, families, and staff.
CONCLUSION

“In a small sample of AL communities, providers faced an array of challenges in making antibiotic prescribing decisions. This study confirms the complex nature of antibiotic prescribing in AL communities and indicates that further work is needed to determine how to improve the appropriateness of antibiotic prescribing”
Decision-Making Model

Antimicrobial Stewardship
INAPPROPRIATE ANTIBIOTIC USE
ISSUE OF BEING COLONIZED OR INFECTED

• Colonized
  • Testing positive for bacteria or fungi without evidence of infection.
  • Infections can develop from the bacteria or fungi the has colonized the person.
  • Bacteria or fungi that colonize patients can be transmitted from one person to another by the hands of healthcare workers.
  • There is no need to treat for colonization.
INFECTION VS. COLONIZATION
HOW TO TELL THE DIFFERENCE

• Clinical Pearls
  • No (or few) WBC’s in a UA = No UTI
  • In the absence of dyspnea, hypoxia, and chest x-ray changes, pneumonia is unlikely
  • Wounds will grow organisms when cultured. Infections can only be determined clinically.
HAND WASHING

Infection Control Challenges in Assisted Living
POLL QUESTION

The amount of time that should be used to scrub hands under water while washing them is?

1. 5 seconds
2. 10 seconds
3. 20 seconds
4. 30 seconds
5. 45 seconds
POLL QUESTION

The amount of time that should be used to scrub hands under water while washing them is?

1. 5 seconds  
2. 10 seconds  
3. **20 seconds**  
4. 30 seconds  
5. 45 seconds
POLL QUESTION

The amount of time that should be used to clean hands when using a hand sanitizer is?

1. 5 seconds
2. 10 seconds
3. 20 seconds
4. 30 seconds
5. 45 seconds
6. Can stop when the hands are dry
POLL QUESTION

The amount of time that should be used to clean hands when using a hand sanitizer is?

1. 5 seconds
2. 10 seconds
3. 20 seconds
4. 30 seconds
5. 45 seconds
6. Can stop when the hands are dry
HAND WASHING

• Compliance ranges from 30% - 80%.

• Using electronic technology, certain areas of the hand have been found to be missed, in some cases frequently missed, even when there is compliance with hand washing procedures.
Multiple research studies of hand washing have shown that most people only wash their hands under water for about 5 seconds, if they wash at all.
WHICH IS BEST?: SANITIZING VS. WASHING

• Questions
  • What should we wash with?
  • Is antibacterial soap better than regular soap?
  • Do hand sanitizers work?
WHICH IS BEST?: SANITIZING VS. WASHING

- Scientific Testing – University of Maryland
  - Clean hands were contaminated with a harmless stain of e.coli bacteria.
  - The infected hands were cleansed with either of the following:
    - A hand sanitizer listing alcohol as the active ingredient
    - An alcohol-free hand sanitizer
    - Regular bar soap with water
    - Antibacterial bar soap with water
    - Regular liquid soap with water
    - Antibacterial liquid soap with water
WHICH IS BEST?: SANITIZING VS. WASHING

• Scientific Testing: Technique
  • The key with hand sanitizers is to use at least one half teaspoon or enough that it takes 15 to 20 seconds to dry.
  • When washing hands a full 20 seconds should be counted out.
    • As an alternative you can sing happy birthday to yourself while scrubbing.
    • Rinse hands after 20 seconds of scrubbing.
    • Dry hands.
  • Once dry, hands were swabbed.
WHICH IS BEST?: SANITIZING VS. WASHING

• Scientific Testing: Results
  • Each swab sample was incubated for three days.
  • The antibacterial soap worked slightly better than the regular soap (the difference was insignificant).
  • Alcohol based sanitizers clearly showed the lowest rate of e.coli growth for all samples.

• CDC Recommendations
  • It is recommended to use a hand sanitizer that contains at least 60% alcohol.
  • When using soap, regular soap is preferred due to worries that germs will develop resistance.
WHICH TO USE?: SANITIZING VS. WASHING

• Washing with soap and water is the first choice, especially if your hands are visibly soiled.

• Hand sanitizers will kill the germs of a soiled hand but will not be effective in removing the dirt and grime from the hands.

• Hand sanitizers are more effective at eliminating germs because they kill them rather than just removing them, but they should only be used when it is not practical for you to get to soap and water.
ANTIMICROBIAL STEWARDSHIP

Establishing the Foundation
The prompt use of antibiotics to treat infections saves lives. However, up to 50% of antibiotics prescribed in U.S. acute care hospitals are inappropriate. The C.D.C. estimates that more than 2 million people are infected with antibiotic-resistant organisms resulting in approximately 23,000 deaths annually.
## A DECADE OF CDC INITIATIVES

<table>
<thead>
<tr>
<th>Year</th>
<th>Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>CDC Publishes the guideline: “Management of Multidrug Resistant Organisms in Healthcare Settings”</td>
</tr>
<tr>
<td>2009</td>
<td>CDC launches the “Get Smart for Healthcare Campaign” to promote improved use of antibiotics in hospitals.</td>
</tr>
<tr>
<td>2013</td>
<td>CDC highlights the need to improve antibiotic use as one of four key strategies required to address the problem of antibiotic resistance in the United States.</td>
</tr>
</tbody>
</table>
A.S. - CORE ELEMENTS

- Leadership Commitment
- Accountability
- Drug Expertise
- Tracking: Monitoring antibiotic prescribing and resistance patterns
- Reporting Antibiotic Use and Outcomes
- Education
LEADERSHIP COMMITMENT

1. Leadership commits to improving antibiotic use
2. Facility leadership, both owners and administrators, demonstrate their support by writing statements of support, by including stewardship related duties in position descriptions for the medical director, director of nursing, and consultant pharmacist in the facility.
3. Communicates with nursing staff and prescribing clinicians about the use of antibiotics and the monitoring and enforcement of stewardship policies
4. Creates a culture through messaging, education, and celebrating improvement, which promotes antibiotic stewardship.
The importance of prudent use of antibiotics is on the rise and we are exhausting our ability to develop new antibiotic agents to combat these dangerous bugs.

The prevalence of resistant organisms is on the rise and we are exhausting our ability to develop new antibiotic agents to combat these dangerous bugs.
ACCOUNTABILITY

1. Empower the medical director to set standards for antibiotic prescribing practices for all clinical providers credentialed to deliver care in the facility.
   1. Medical director will oversee adherence.
   2. The medical director will review antibiotic use data and ensure best practices are followed in caring for the residents at the facility.

2. The director of nursing will set standards for assessing, monitoring, and communicating changes in a resident condition by front-line nursing staff.
   1. The director of nursing will take responsibility for knowledge, perceptions and attitudes among nursing staff of the role of antibiotics in the care of residence at the facility.

3. The consultant pharmacist will provide oversight through quality assurance activities such as medication regimen review and reporting of antibiotic used data.
This is what we know about positive urine cultures:

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community &gt;70 yrs</td>
<td>10-18</td>
<td>4-7</td>
</tr>
<tr>
<td>Long-Term Care</td>
<td>25-55</td>
<td>15-37</td>
</tr>
<tr>
<td>Chronic Catheter</td>
<td>&gt;90%</td>
<td>&gt;90%</td>
</tr>
</tbody>
</table>

If we standardize criteria, look at what happens

1-2.4 / 1000 resident days LTC
0.6 / 1000 with standardized criteria

Nicolle LE. UTI in Hazzard’s Geriatric Medicine 6th ed. 2009
Consider checking:
1. Urine Culture
2. Urinalysis
3. CBC
4. Monitor fluid intake and provide as much fluids as possible
5. Wait until all results return until you make a final decision about treating.

Common Clinical Features

- Lower urinary tract symptoms
  - Dysuria
  - Urgency
  - Frequency
  - Suprapubic pain/tenderness
  - Hematuria
  - Cloudy urine

- Systemic symptoms
  - Nausea/vomiting
  - Fever/chills
  - Flank pain
  - Delirium
  - Functional decline
ACCOUNTABILITY

4. The infection control coordinator will assist in organizing and reviewing data that will be needed to improve strategies related to antibiotic use.
   1. Track antibiotic starts
   2. monitoring adherence to evidence-based published criteria during the evaluation and management of treated infections
   3. reviewing antibiotic resistance patterns in the facility to understand which infections are caused by resistant organisms

5. Laboratory Services
   1. will alert the facility if certain antibiotic resistant organisms are identified
   2. will assist in educating the nursing home staff on the differences in diagnostic test available for detecting various infectious pathogens (for example, EIA toxin testing verses nucleic amplification tests for C. difficile)
   3. Periodically prepare antibiograms (a summary report of antibiotic susceptibility patterns from organisms isolated in cultures)

6. Department of Health
   1. Collaboration as indicated
DRUG EXPERTISE

1. The facility will have access to individuals with antibiotic expertise to implement antibiotic stewardship activities. We will utilize primarily our consultant pharmacist and if possible obtain access to an infectious disease consultant.

2. We will make attempts to partner with any stewardship programs that are taking place at local hospitals.
TAKING ACTION THROUGH POLICY & PRACTICE CHANGE

1. We will promote the establishment of policies that support optimal antibiotic use.
2. We will put broad interventions into place designed to improve antibiotic use.
3. We will incorporate our pharmacy into efforts to improve and somatic use.
4. Through quality assurance, we will attempt to identify clinical situations which may be driving inappropriate courses of antibiotics such as asymptomatic bacteria or urinary tract infection prophylaxis and implement specific interventions to improve use in these areas.
INAPPROPRIATE USE

• Urinary Tract Conditions
  • Positive urine cultures in an asymptomatic resident
  • Urinalysis or culture obtained for cloudy or malodorous urine
  • Non-specific symptoms or signs not referable to the urinary tract
INAPPROPRIATE USE

• Respiratory Tract Conditions
  • Upper respiratory tract conditions
  • Bronchitis absent of COPD
  • Suspected or proven influenza without a secondary infection
  • Respiratory symptoms in a terminal patient with dementia
INAPPROPRIATE USE

• Skin Wounds
  • Skin wounds without cellulitis, sepsis, or osteomyelitis
  • Small localized abscess without significant cellulitis
  • Decubitus ulcer in a terminally ill patient
TRACKING ANTIBIOTIC USE & OUTCOMES

1. How and why antibiotics are prescribed.
2. How often and how many antibiotics are prescribed.
   1. A review of 10 medical records (representing 10 episodes of antibiotic use) at this was completed during the 4th quarter of 2015. The results were reported at the January 2016 committee meeting. 80% of antibiotics prescribed were judged to be appropriate based on documented symptoms of the resident.
3. Adverse outcomes such as C. difficile infections.
4. Antibiotic cost data.
1. Programs that teach the nursing staff and clinical providers the goal of an antibiotic stewardship intervention, and the responsibility of each group for ensuring its implementation

2. We will consider the use of a variety of education tools;
   1. in services
   2. flyers
   3. pocket guides
   4. newsletters
   5. electronic communications
MISSION STATEMENT

the mission of the antimicrobial stewardship program is to optimize clinical outcomes of antimicrobial use at __________________________. The antimicrobial stewardship program works to ensure the optimal selection, dose, and duration of antimicrobials that lead to the best clinical outcome for the treatment or prevention of infection while producing the fewest possible side effects and the lowest risk for subsequent resistance.
# 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: ____________

<table>
<thead>
<tr>
<th>LONG TERM CARE FACILITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you have an in-house pharmacy?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>a. <em>If yes</em>, is your pharmacy open 24/7?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>i. <em>If your pharmacy is not open 24/7</em>, what are the pharmacy’s hours:</td>
<td></td>
</tr>
<tr>
<td>ii. Please describe the off-hours coverage plan:</td>
<td></td>
</tr>
<tr>
<td>b. Who is responsible for performing infection surveillance at the facility?</td>
<td></td>
</tr>
<tr>
<td>c. Do you track antibiotic use data?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>d. <em>If yes</em>, how is antimicrobial use data reported? <em>Please check all that apply.</em></td>
<td></td>
</tr>
<tr>
<td>□ Amount used (i.e., grams or milligrams)</td>
<td></td>
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<tr>
<td>□ Defined Daily Dose (DDD)</td>
<td></td>
</tr>
<tr>
<td>□ Dollars spent</td>
<td></td>
</tr>
<tr>
<td>□ Other <em>(Please specify)</em></td>
<td></td>
</tr>
<tr>
<td>2. Do you have an in-house microbiology lab?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>a. <em>If no</em>, where are the microbiology services performed?</td>
<td></td>
</tr>
<tr>
<td>b. Can you obtain antimicrobial resistance data from the in-house or external microbiology lab?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>c. How are you able to access the data?</td>
<td></td>
</tr>
<tr>
<td>d. Are you able to obtain unit-specific data on an as-needed basis?</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>3. Is an antibiogram developed for your facility? (an aggregation of sensitivity of organisms)</td>
<td>Yes □ No □</td>
</tr>
<tr>
<td>a. <em>If yes</em>, how often (Monthly, quarterly, annually)?</td>
<td></td>
</tr>
<tr>
<td>4. Are you currently utilizing computer based surveillance for antibiotic use or health care–acquired infections?</td>
<td>Yes □ No □</td>
</tr>
</tbody>
</table>
## ASSESSMENT OF CURRENT PRACTICES SURVEY (continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. What are the top three common infectious clinical syndromes at your facility that are either known or estimated?</td>
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</tr>
<tr>
<td>6. Which staff currently is or will be part of your core antimicrobial stewardship team? Please check all that apply.</td>
<td>☐ Infectious Disease-Trained Physician  ☐ Clinical Pharmacist  ☐ Clinical Microbiologist  ☐ Infection Control Practitioner  ☐ Hospital Epidemiologist  ☐ Senior Leadership  ☐ Information System Specialist  ☐ Other (Please specify)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Do you have Computer physician/clinician order entry (CPOE)?</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>a. If yes, does this include medications, such as antibiotics?</td>
<td>Yes ☐ No ☐</td>
<td></td>
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</tr>
<tr>
<td>8. What are/were the barriers to implementation at your facility? Please check all that apply.</td>
<td>☐ Financial considerations/cost  ☐ Opposition from prescribers  ☐ Resistance from administration  ☐ Other clinical initiatives are higher priority  ☐ Personnel shortages  ☐ None of the above  ☐ Other (Please specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. How frequently are reports pertaining to infection surveillance created (Monthly, quarterly, annually, on an as-needed basis)?</td>
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</tr>
<tr>
<td>b. How is the information reported (by syndrome, overall incidence within the facility)? Please list all.</td>
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</tr>
<tr>
<td>c. What are the criteria used to identify resistance or infection trends requiring further intervention?</td>
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</tbody>
</table>
**ANTIMICROBIAL STEWARDSHIP SURVEY**

Please indicate your agreement or disagreement with the following statements about your institution.

## ANTIMICROBIAL RESISTANCE: SCOPE OF THE PROBLEM AND KEY CONTRIBUTORS

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Antibiotic resistance is a significant problem in this institution.</td>
<td></td>
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<tr>
<td>2. Patient rooms are cleaned according to hospital cleaning protocol once a multidrug resistant organism (MDRO) patient has been discharged.</td>
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<tr>
<td>3. Adherence to hand-hygiene protocols is excellent at this institution.</td>
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<tr>
<td>4. This institution does NOT do enough to control the development of resistant organisms through surveillance.</td>
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<tr>
<td>5. This institution does NOT provide adequate staff education regarding MDROs.</td>
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<tr>
<td>6. A patient is likely to develop a MDRO infection during their stay at this institution.</td>
<td></td>
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</tr>
</tbody>
</table>

## ANTIBIOTIC PRESCRIBING PRACTICES

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Microbiology lab results are efficiently communicated to the treating physician.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8. I regularly refer to/consider the antibiotic susceptibility patterns at this institution (e.g., the institutional antibiogram) when empirically prescribing antibiotics.</td>
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<tr>
<td>9. If medically appropriate, intravenous antibiotics should be stepped down to an oral alternative after three days.</td>
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<tr>
<td>10. Restrictions on antibiotics impair my ability to provide good patient care.</td>
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<tr>
<td>11. Antibiotics are overused at this institution.</td>
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</tr>
<tr>
<td>12. More judicious use of antibiotics would decrease antimicrobial resistance.</td>
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</tr>
</tbody>
</table>

## ANTIMICROBIAL STEWARDSHIP PROGRAMS

(A formal program that monitors and manages the appropriate use of antibiotics.)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Antimicrobial stewardship programs reduce the problem of antimicrobial resistance.</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

1. Antimicrobial Stewardship Survey based on the AHRQ Hospital Survey on Patient Safety Culture.  
   http://www.ahrq.gov/qual/patientafetyculture/hospindex.htm
**ANTIMICROBIAL STEWARDSHIP SURVEY (continued)**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Antimicrobial stewardship programs impact this institution’s infection rates.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. This institution has an effective antimicrobial stewardship program.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>17. My individual efforts at antimicrobial stewardship minimally impact this institution’s resistance problem.</td>
<td></td>
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</tr>
<tr>
<td>18. This institution does NOT provide adequate training on antimicrobial prescribing and use.</td>
<td></td>
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</tr>
<tr>
<td>19. Additional staff education on antimicrobial prescribing is needed.</td>
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</tr>
<tr>
<td>20. Prescribing physicians are the only disciplines who need to understand antimicrobial stewardship.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**PREVALENCE OF ANTIMICROBIAL RESISTANCE (OPTIONAL)**

Please indicate the proportion of isolates of each organism listed below that is resistant to the antibiotic indicated at your institution.

<table>
<thead>
<tr>
<th>Organism</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em> resistant to methicillin or oxacillin (i.e., MRSA)</td>
<td></td>
</tr>
<tr>
<td><em>Enterococcus faecium</em> resistant to vancomycin (i.e., VRE)</td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em> resistant to ciprofloxacin</td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em> resistant to cefepime</td>
<td></td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em> resistant to imipenem</td>
<td></td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em> resistant to ceftriaxone</td>
<td></td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em> resistant to imipenem</td>
<td></td>
</tr>
<tr>
<td><em>E. coli</em> resistant to ceftriaxone</td>
<td></td>
</tr>
<tr>
<td><em>Acinetobacter baumannii</em> resistant to imipenem</td>
<td></td>
</tr>
</tbody>
</table>

**BACKGROUND INFORMATION**

1. What is your primary work area or unit in this institution? (Please check ONE answer)
   - □ Many different units/No specific unit
   - □ Medicine (non-surgical)
   - □ Intensive care unit (any type)
   - □ Radiology
   - □ Surgery
   - □ Psychiatry/mental health
   - □ Obstetrics
   - □ Rehabilitation
   - □ Anesthesiology
   - □ Pediatrics
   - □ Pharmacy
   - □ Emergency department
   - □ Laboratory
   - □ Other (please specify)

2. How long have you worked in this institution?
   - □ Less than 1 year
   - □ 1 to 5 years
   - □ 6 to 10 years
   - □ 11 to 15 years
   - □ 16 to 20 years
   - □ 21 years or more

3. What is your staff position in this institution?
   - □ Attending/Staff physician
   - □ Fellow
   - □ Physician assistant
   - □ Infection control practitioner
   - □ Resident physician/Intern
   - □ Pharmacist
   - □ Nurse practitioner
   - □ Other (please specify____)
# ANTIBIOTIC TRACKING SHEET

Instructions: Please use this form to track all antibiotics that have been prescribed to a resident. Please note that this sheet represents all antibiotics that have been prescribed to ONE specific resident.

<table>
<thead>
<tr>
<th>RESIDENT ID:</th>
<th>PRESCRIBING MD:</th>
<th>ADMISSION DATE:</th>
<th></th>
</tr>
</thead>
</table>

## ANTIBIOTIC #1:

<table>
<thead>
<tr>
<th>DATE: (MM/DD/YY)</th>
<th>INDICATIONS FOR USE</th>
<th>DIAGNOSTIC TESTS</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>START</td>
<td>STOP</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>FEVER</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>URINARY TRACT SYMPTOMS</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>RESPIRATORY SYMPTOMS</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>DIARRHEA</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>SKIN/WOUND INFECTION</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>OTHER (PLEASE Specify)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

## LTC FACILITY ONLY: DID THIS PATIENT REQUIRE TRANSFER TO HOSPITAL? YES | NO

## ANTIBIOTIC #2:

<table>
<thead>
<tr>
<th>DATE: (MM/DD/YY)</th>
<th>INDICATIONS FOR USE</th>
<th>DIAGNOSTIC TESTS</th>
<th>RESULTS</th>
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<tbody>
<tr>
<td></td>
<td>START</td>
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<td>YES</td>
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<tr>
<td></td>
<td>FEVER</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td></td>
<td>URINARY TRACT SYMPTOMS</td>
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<td>NO</td>
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<td></td>
<td>SKIN/WOUND INFECTION</td>
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<td>NO</td>
</tr>
<tr>
<td></td>
<td>OTHER (PLEASE Specify)</td>
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<td>NO</td>
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<tr>
<td></td>
<td></td>
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## ANTIBIOTIC #3:

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<td>FEVER</td>
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<tr>
<td></td>
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## ANTIBIOTIC #4:

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<td>URINARY TRACT SYMPTOMS</td>
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<td></td>
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<td>YES</td>
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</tr>
</tbody>
</table>
CASE STUDY

An 81-year old female with NYHA Class IV heart failure (ejection fraction 20%), macular degeneration, and mild Alzheimer’s dementia lives in an assisted living facility and is enrolled in hospice because of her heart failure. Her symptoms are controlled with stable weight and only mild dyspnea at rest. She and her family agree that she never wants to be sent to the hospital again.
CASE STUDY

The staff notes that her mentation is changed one day. She is unable to remain awake and converse with anyone. She was awake and very talkative a few days ago. For the last 24 hours she has been agitated and has had new onset urinary incontinence. Today, she has been asleep all morning.
CASE STUDY

What would be the best medication to consider

A. Donepezil
B. Haloperidol
C. Nitrofurantion
D. Furosemide
E. Citalopram
CASE STUDY

What would be the best medication to consider

A. Donepezil
B. Haloperidol
C. Nitrofurantion
D. Furosemide
E. Citalopram

Rationale
1. The patient is exhibiting symptoms of acute delirium.
2. Most likely underlying cause is a UTI.
3. Risks for acute delirium
   1. > 80 years of age
   2. Hearing and vision problems
   3. Acute illness
   4. Surgery