The Role of Antimicrobial Stewardship Champions

Antimicrobial Stewardship [AS] Team Development

Antimicrobial Stewardship Education and Training

Antimicrobial Stewardship Communication

Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

Infection Surveillance

Resident Change Communication & Documentation

The Role of the Laboratory in Antimicrobial Stewardship

Antimicrobial Use Measurement
This toolkit is designed to be used by any senior living community; all recommendations can be tailored to accommodate individual community’s needs and resources. There is no “one-size-fits-all” approach for promoting antimicrobial stewardship in post-acute care. Many of the action steps and strategies below may already be in place at the community. Therefore, assessing existing processes for opportunities to incorporate antimicrobial stewardship is recommended.

The term “providers” includes all licensed providers in the senior living community (e.g., MD, DO, NP, PA) regardless of employment status (e.g. full-time, part-time or casual status; on-call; external consultant; etc.).
Identify antimicrobial stewardship champions
Identify antimicrobial stewardship champions

• A physician serves as an antimicrobial stewardship champion to promote adherence to clinical practice guidelines for antimicrobial prescribing
Identify antimicrobial stewardship champions

- Nursing leadership serves as an antimicrobial stewardship champion to promote nursing assessment, documentation, and communication in antimicrobial stewardship activities

- **Job Descriptions**
  - Senior Living Attending Prescriber
  - Senior Living Consultant Pharmacist
  - Senior Living Medical Director
  - Senior Living Nurse Executive
Identify antimicrobial stewardship champions

- A coordinator is assigned to oversee antimicrobial stewardship activities
Identify antimicrobial stewardship champions

- Senior leadership is supportive of antimicrobial stewardship activities
Senior Living Leadership Commitment to Antimicrobial Stewardship

Leaders in health are invited to submit a description (or letter of commitment) of their organization’s commitment to actively promote and implement principles of good antibiotic stewardship, and specific actions the organization plans to take to advance antibiotic stewardship objectives in the National Strategy for Combating Antibiotic-Resistant Bacteria[PDF - 37 pages] and the five-year National Action Plan for Combating Antibiotic-Resistant Bacteria[PDF - 63 pages].

Commitment letters should be drafted on your organization’s letterhead and emailed to HIP@cdc.gov. Commitment letters should include the following information:

1. Name of organization and point of contact’s information (i.e., name, title, phone number, email address).
2. A description of your organization’s commitment to promote and implement principles of good antibiotic stewardship. The description should include the type of activities for implementation by your organization (i.e., antimicrobial use and resistance reporting, implementing stewardship programs and evidence-based guidelines, diagnostics development, implementation, Get Smart education) and specific actions your organization will take over the next five years to advance specific antibiotic stewardship objectives under Goal 1 of the National Strategy for Combating Antibiotic-Resistant Bacteria[PDF - 37 pages]. Descriptions should also include targets, milestones, or accomplishments to benchmark your stewardship success.
3. Language indicating if CDC can summarize your organization’s commitments, share the summaries online, and make your commitment letter available on request. See the List of Commitment Letters below for summaries of stewardship commitments already received. After your organization’s commitment letter is received, you will be contacted for additional information about antibiotic stewardship implementation activities.

Sample:
The Evangelical Lutheran Good Samaritan Society will partner with CDC to explore development of robust reporting mechanisms for infections and antibiotic prescribing in post-acute and residential senior care centers, provide educational support for residents, families, staff and provider partners highlighting quality and safety measures key to understanding and supporting prescribing of antibiotics and care practices to minimize harm from medication adverse events, overuse of antibiotics and preventable infections, and create and implement a comprehensive clinical guideline spanning all of the Society’s service lines.
Antimicrobial Stewardship Committee Charter

Responsibilities
This committee will describe the relationship between inappropriate antimicrobial use and the emergence of antimicrobial-resistant pathogens. It will also outline the goals of antimicrobial stewardship programs in the senior living community, and new evidence-based guidelines from the Infectious Diseases Society of America (IDSA). These evidence-based guidelines will be used for developing programs to enhance antimicrobial stewardship in the senior living community.

The three proactive core strategies that provide the foundation for an antimicrobial stewardship program will be emphasized:

1. Prospective auditing of antimicrobial utilization with direct interaction and feedback to the prescriber, and
2. Formulary restriction and pre-authorization requirements to immediately reduce antimicrobial use and cost, and
3. Effective general infection control processes to reduce the generation and spread of infection throughout the senior living community.

Various additional elements (e.g., education, antimicrobial cycling, antimicrobial order forms, parenteral-to-oral conversion plans) will be considered as part of the stewardship program.

Purpose
Inappropriate antimicrobial use is strongly associated with the emergence of antimicrobial resistant pathogens. An effective antimicrobial stewardship program, with appropriate drug product selection, dosing, route of administration, and duration of antimicrobial therapy, in conjunction with a comprehensive infection control program has been shown to limit the emergence and transmission of antimicrobial-resistant microorganisms. The goals of antimicrobial stewardship are to optimize safe and appropriate use of antibiotics, enhance clinical outcomes while minimizing unintended consequences of antimicrobial use (e.g., toxicity, resistance), and reduce healthcare costs without adversely affecting quality of care.

Committee Members
Chairperson: Infection Control Program Coordinator
Committee Coordinators: Nurse Executive/Director of Nursing, Consultant Pharmacist
Members:
- Medical Director
- At least 1 attending prescriber
- Housekeeping/Laundry Supervisor
- Charge Nurse
- Certified Nursing Assistant
- Dietary Services Manager
- Laboratory – (1) Lab practitioner
- Executive Sponsor – Executive Director, CEO and/or Administrator

Frequency: once a month for operations and quarterly for physicians or ad hoc as needed
Communication: Monthly summaries via email distribution to all prescribers. Monthly in person operations updates at committee meetings
Reports to: Executive Director, CEO and/or Administrator and Medical Director
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- Identify a committee/workgroup to incorporate antimicrobial stewardship issues (AS Team). Members may include: antimicrobial stewardship champion(s), nursing leadership, antimicrobial stewardship coordinator, senior leadership, consulting/in-house pharmacist, quality improvement, infection preventionist, information technologist, etc.
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- AS Team develops and communicates roles and responsibilities about antimicrobial stewardship for community stakeholders
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- AS Team members have dedicated time for antimicrobial stewardship activities
  - Explore quality improvement-and resident safety-related grant funding opportunities that could incorporate antimicrobial stewardship activities
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- AS Team regularly reviews antimicrobial use summaries/reports
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- Engage the consulting or in-house pharmacist in antimicrobial stewardship activities, particularly antimicrobial measurement
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- Nursing leadership/nursing champion regularly communicates antimicrobial stewardship progress to nursing assistants and nurses. Progress may include improved shift change hand-offs, compliance with use of Situation – Background – Assessment – Request (SBAR) form, infection rates, communication and documentation of nursing assessments, etc.
Suspected UTI SBAR

[Nursing Home Name]
[Street]
[City, State, Zip]
Facility Phone/Fax

Resident Name
Date of Birth
Physician/NP/PA
Physician/NP/PA Phone/Fax
Nurse
Date/Time

How was information provided to clinician? ☐ Phone ☐ Fax ☐ In Person ☐ Other

5 – Situation (use this information to complete Section A&R)

☐ I am contacting you about a suspected UTI for above resident.

Current Assessment (check all that apply):
☒ Increased urgency
☒ Increased frequency
☒ Hematuria
☒ Rigors (shaking, chills)
☒ Delirium (sudden onset of confusion, disorientation, dramatic change in mental status)

Vital Signs: BP _______ Pulse _______ Resp. rate _______ Temp. _______

Resident Complaints (check all that apply):
☒ Dysuria (painful, burning, difficult urination)
☒ Suprapubic pain
☒ Costovertebral tenderness (flank pain/tenderness)

Recent Urinalysis Results (within the last 10 days) if Available:
UA results that were obtained on _______ (date) due to ______ (reason).

The results accompanying this communication are as follows:

☐ No
☐ Yes

B – Background

Indwelling catheter: ☐ No ☐ Yes

Incontinence: ☐ No ☐ Yes

If yes, is this new/worsening? ☐ No ☐ Yes

Active diagnoses (especially bladder, kidney/gastrointestinal conditions):
Specify:

Advance directives for limiting treatment (especially antibiotics): ☐ No ☐ Yes

Specify:

Medication allergies: ☐ No ☐ Yes

Specify:

The resident is on Warfarin (Coumadin™): ☐ No ☐ Yes

The resident is diabetic: ☐ No ☐ Yes

A – Assessment (check boxes and determine recommendation)

Resident with indwelling catheter:
☒ Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C) or higher
☒ New costovertebral tenderness
☒ Rigors
☒ New delirium
☒ Hypotension

Any one of the above present

Resident without indwelling catheter:
☒ Acute dysuria alone

Or:
☒ Single temperature of 100°F (38°C) or repeated temperatures of 99°F (37°C) or higher
☒ OR at least one new or worsening of the following:
☒ Urgency
☒ Suprapubic pain
☒ Frequency
☒ Gross hematuria
☒ Costovertebral angle tenderness
☒ New/worsening urinary incontinence

R – Recommendation

Protocol criteria ARE met.
According to our understanding of best practices and our facility protocols the resident may have a urinary tract infection and need a prescription for an antibiotic agent.

Staff: Please Check Box for Course of Action Recommended

☐ Yes
☐ No

Protocol criteria are NOT met.
According to our understanding of best practices and our facility protocols, the information is insufficient to indicate an active urinary tract infection. The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.

*For residents who regularly run a lower temperature, use a temperature of 2°F (1°C) above the baseline as a definition of a fever.

Physician/NP/PA Orders

How were orders provided by clinician? ☐ Phone ☐ Fax ☐ In Person ☐ Other

☐ Ordered UA (with C&S if indicated)

Would you like to initiate any of the following?
☒ Encourage 4 ounces of cranberry juice TID.
☒ Record fluid intake
☒ Assess vital signs, including temp, every _____ hours for _____ hours
☒ Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours

Other:

Initiate the following antibiotics:

Specify:

Other, specify:

Physician/NP/PA signature: ___________________________ date/time:

Telephone order received by: ___________________________ date/time:

Family/PCA notified (name): ___________________________ date/time:
Comprehensive Antibiogram Toolkit: Phase 4
Sample Antibiotic Use Tracking Sheet

<table>
<thead>
<tr>
<th>Last name</th>
<th>Room no.</th>
<th>Onset date</th>
<th>Signs and symptoms</th>
<th>Site of infection</th>
<th>Culture site</th>
<th>Infection type</th>
<th>Treatment start date</th>
<th>Antibiotic name</th>
<th>Broad or narrow spectrum</th>
<th>UTI/pneumonia: adherent to antibiogram?</th>
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</table>
Incorporate antimicrobial stewardship issues into a committee/workgroup (Antimicrobial Stewardship [AS] Team)

- Medical director/physician champion regularly communicates antimicrobial stewardship progress to licensed providers in the community
  - Consider communicating aggregate and/or individual antimicrobial use results to providers

Published clinical practice guidelines that support antimicrobial stewardship are reviewed by key antimicrobial stewardship stakeholders – at a minimum the medical director/antimicrobial stewardship physician champion, nursing leadership/director of nursing, infection preventionist, consulting/ in-house pharmacist.
Provide regular antimicrobial stewardship education and training to all healthcare personnel, including providers
Provide regular antimicrobial stewardship education and training to all healthcare personnel, including providers

- Provide education and training about antimicrobial stewardship to resident care staff, including providers
**Nursing Home Infection Control Guidelines for C. Difficile**

**When to Perform Toxin Assay on Stool:**
- Resident symptomatic with diarrhea (>3 loose/watery stools a day).
- Especially consider in residents who received antibiotics in previous 60 days and have one or more of the following: fever, elevated WBC, fecal leukocytes, abdominal pain/tenderness.
- Do not perform toxin assay on formed stool.
- Do not culture stool; only perform toxin assay.
- After treatment, do not retest for cure (toxin may stay positive even when resident is improved).

**When to Treat:**
- Symptomatic resident with toxin-positive stool.

**How to Isolate Culture-positive Residents:**
- Limit time outside of room for *C. difficile* positive resident while symptomatic; limit time especially if resident is unable to contain stool.
- Use gloves for contact with resident or resident’s environment while on therapy.
- Perform hand hygiene with soap and water (alcohol does not kill *C. difficile* spores).
- Consider daily use of diluted hypochlorites (household bleach diluted 1:10 with water) to disinfect resident’s environment.

**When to Decolonize a Resident:**
- Do not attempt; no proven successful regimen exists.

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**Nursing Home Infection Control Guidelines for VRE**

**When to Culture:**
- When *enterococcus* is cultured, check sensitivities or ask lab if it is vancomycin resistant.

**When to treat:**
- Symptomatic infection, not colonization.

**How to Isolate Culture-positive Residents:**
- Do not use contact precautions in the absence of a draining wound, profuse respiratory secretions, or evidence implicating the specific patient in ongoing transmission of the MDRO within the facility.
- Use appropriate hand hygiene before and after all resident contacts (soap and water, or waterless alcohol product).
- Avoid placing resident in same room with person with indwelling medical device or open wound.
- Use sterile bandages to contain secretions from VRE-infected wound.
- Clean contaminated surfaces with EPA-registered hospital disinfectant.

**When to Decolonize a Resident:**
- Do not attempt; no proven successful regimen exists.
Nursing Home Infection Control Guidelines for MRSA

When To Culture:
- Resident with abscess >5 cm (via needle aspirate).
- Tracheostomy resident with evidence of pneumonia.
- Expectorated sputum of resident with acute bacterial bronchitis or pneumonia.

When To Treat:
- Symptomatic infection, not colonization.
- Use anti-MRSA antibiotic empirically for abscess or chronic ulcer meeting criteria for deep infection.

How To Isolate Culture-positive Residents:
- Do not use contact precautions in the absence of a draining wound, profuse respiratory secretions, or evidence implicating the specific patient in ongoing transmission of the MDRO within the facility.
- Use appropriate hand hygiene before and after all resident contacts (soap and water, or waterless alcohol product).
- Avoid placing resident in same room with person with indwelling medical device or open wound.
- Use sterile bandages to contain secretions from MRSA-infected wound.
- Clean contaminated surfaces with EPA-registered hospital disinfectant.

When to Decolonize a Resident:
- Do not attempt; no proven successful regimen exists.

12 Common Nursing Home Situations in Which Systemic Antibiotics are Generally Not Indicated

1. Positive urine culture in an asymptomatic resident.
2. Urine culture ordered solely because of change in urine appearance.
3. Nonspecific symptoms or signs not referable to the urinary tract, such as falls or mental status change (with or without a positive urine culture).
4. Upper respiratory infection (common cold).
5. Bronchitis or asthma in a resident who does not have COPD.
6. “Infiltrate” on chest x-ray in the absence of clinically significant symptoms.
7. Suspected or proven influenza in the absence of a secondary infection (but DO treat influenza with antivirals).
8. Respiratory symptoms in a resident with advanced dementia, on palliative care, or at the end of life.
9. Skin wound without cellulitis, sepsis, or osteomyelitis (regardless of culture result).
10. Small (<5cm) localized abscess without significant surrounding cellulitis (drainage is required of all abscesses).
11. Decubitus ulcer in a resident at the end of life.
12. Acute vomiting and/or diarrhea in the absence of a positive culture for shigella or salmonella, or a positive toxin assay for Clostridium difficile.
Urinalysis and UTIs: Improving Care

[Name]
[Organization]

May 2014


AHRQ Pub. No. 14-0010-4-EF
The ABC’s of Antibiotics

Did you know?
Antibiotics are drugs used to treat bacterial infections. Using antibiotics the wrong way can lead to antibiotic-resistant infections. Each year in the United States, at least 2 million people get serious infections with bacteria that are resistant to one or more of the antibiotics designed to treat those infections. At least 23,000 people die each year as a direct result of these antibiotic-resistant infections. And this is why healthcare providers are being more careful when prescribing antibiotics.

What is antibiotic resistance?
Antibiotic resistance happens when bacteria change in a way that reduces or eliminates the ability of antibiotics to kill the bacteria.

How can I help prevent antibiotic resistance?
✓ Take antibiotics exactly as your healthcare provider instructs.
✓ Only take antibiotics prescribed for you.
✗ Do not save antibiotics for the next illness or share them with others.
✗ Do not pressure your healthcare provider for antibiotics.

Top 5 questions you can ask your healthcare provider about antibiotics:
1. “Do I really need an antibiotic?”
2. “Can I get better without this antibiotic?”
3. “What side effects or drug interactions can I expect?”
4. “What side effects should I report to you?”
5. “How do you know what kind of infection I have? I understand that antibiotics won’t work for viral infections.”

Infection Prevention and You
Learn more about antibiotic resistance at apic.org/infectionpreventionandyou and cdc.gov/getsmart.
Provide education and training to nursing staff at all levels within the community to promote the timely and accurate recognition, assessment, communication, and documentation of change in a resident’s condition.
Provide education and training to nursing staff at all levels within the community to promote the timely and accurate recognition, assessment, communication, and documentation of change in a resident’s condition.

- Utilize tools to educate and train nursing staff at all levels within the community to promote the timely and accurate recognition, assessment, communication, and documentation of change in a resident’s condition.
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors.

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing.
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

Develop and communicate expectations to all healthcare personnel, including all licensed providers in the community regardless of employment status (e.g. full-time, part-time or casual status; on-call; external consultant; etc.), regarding their roles in antimicrobial stewardship
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Communicate antimicrobial stewardship messages to all community staff (e.g. via staff meetings, newsletters, etc.)
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Communicate antimicrobial stewardship messages to family/visitors (e.g. via brochures, newsletters, family council meetings)
Be Smart About Antibiotics

PREVENT
HAI
Healthcare-Associated Infections

Taking antibiotics when you don’t need them is like leaving the lights on all the time.

- The lights may burn out, leaving you in the dark when you most need them.
- If you use antibiotics when you don’t need them, they may not work when you get sick.

Antibiotics can help the body fight infections caused by germs called bacteria, but they are not miracle drugs for everything.

When antibiotics are NOT needed:

- You have an infection caused by a virus (such as a cold, bronchitis, the flu, or most types of diarrhea).
- You don’t have an infection but instead have some other medical problem (such as anemia).
- You are not actually sick (except in rare cases where antibiotics have been shown to prevent infection).
- You have decided against them (such as near the end of life).

Why doctors may give antibiotics when they are NOT needed:

- Doctors are not always sure what is causing an illness and may feel they have to provide treatment right away.
- Some patients and families think they are not getting good care unless they get an antibiotic and insist that they want one.

What you can do:

- Talk with the doctor about the benefits and harms of antibiotics.
- Take medicine exactly the way the doctor says. Don’t skip doses.
- Take care of yourself: get rest, eat and drink enough, and take over-the-counter medicines as needed.
- If you are on hospice or thinking about hospice, talk with your doctor about whether you need antibiotics anymore.

What not to do:

- Don’t ask for an antibiotic when the doctor says it isn’t needed.
- Don’t take an antibiotic for a virus (cold, cough, or flu).

How antibiotics can hurt you:

- Antibiotics normally work by killing bacteria. Sometimes not all of the germs are killed, and the strongest ones can grow and spread. A person can get sick again, and this time the germs are harder to kill because the antibiotics no longer work. This is called resistance and makes some infections very hard to control. Resistance can make you sick longer, requiring more doctor visits and drugs that are even stronger. The more often you use an antibiotic, the greater the chance that the germs will become resistant.
- Antibiotics can save lives, but they can cause problems, too. Older people have more side effects, which can cause problems all over the body. In addition to resistance, antibiotics can cause nausea, dizziness, diarrhea, rash, kidney damage, and allergic reactions.

Don’t Take Antibiotics for Granted
Antibiotics are helpful, but now you know why sometimes you or a family member may not need them. You can help yourself and others by taking antibiotics only when they are needed.

Resources for you:

CDC: www.cdc.gov/getsmart/
FDA: http://www.fda.gov/Drugs/ResourcesForYou/UCM078484
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Develop policies based on clinical practice standards for antimicrobial stewardship (e.g. the 5 Ds: right diagnosis, drug, dose, duration, and de-escalation)
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Develop policies based on clinical practice guidelines for infection management including prescribing algorithms and clinical pathways (e.g., Loeb et al. (2001), SHEA/IDSA guidelines)
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Develop standardized policies and protocols for ordering diagnostic tests (e.g., microbiology, imaging) based on clinical guidelines (e.g., High et al., 2008). For example, if UTI is suspected, ensure that clinical criteria (High et al., 2008) are met prior to ordering microbiology tests
Communicate antimicrobial stewardship messages to healthcare community staff and resident family and visitors

Develop and communicate policies and protocols based on clinical guidelines for antimicrobial stewardship, infection management, and diagnostic testing

- Communicate policies and protocols for antimicrobial stewardship, infection management, and diagnostic testing to all licensed providers in the LTCF
Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents

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

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

**Suspected Lower Respiratory Tract Infection**
- Fever >38.9°C [102°F] and at least one of the following:
  - Respiratory rate >25
  - Productive cough
- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature, but ≤38.9°C [101.2°F]) and cough and at least one of the following:
  - Pulse >100
  - Rigors
  - Delirium
  - Respiratory rate >25
- Afebrile resident with COPD and ≥65 years and new or increased cough with purulent sputum production
- Afebrile resident without COPD and new cough with purulent sputum production and at least one of the following:
  - Respiratory rate >25
  - Delirium
- New infiltrate on chest X-ray thought to represent pneumonia and at least one of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - Respiratory rate >25
  - Productive cough

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

**Fever with Unknown Focus of Infection**
- Chest X-ray and complete cell count with differential is reasonable for residents with fever, cough, and at least one of the following: pulse >100, worsening mental status, rigors.
A1. Early Recognition and Testing

Resident experiencing new onset of diarrhea

Has the resident had ≥3 unformed stools in a 24 hour period?

Yes →
- Contact provider, order lab test for CDI. Do not start empiric treatment before collecting sample
- Consider creating a standing order for nursing staff to initiate CDI testing

No →
- Do not test asymptomatic residents for CDI

Collect and submit fresh stool sample
- Only unformed stools should be collected
- Collect specimen in clean, watertight container
- Refrigerate (2-8°C; 36-48°F) until testing can be done

While test results are pending:
- Discontinue all non-essential antibiotics
- Discontinue all anti-peristaltic medications
- Initiate fluid replacement if not contraindicated
- Initiate pre-emptive Contact Precautions (gowns, gloves)

Test results →

Positive →
- Contact provider regarding treatment (see IDSA Guidelines)
- Place resident in appropriate room
- Do not perform a "test of cure" or re-test if resident is responding to treatment

Negative →
- Consider other causes of diarrhea, perform testing for other enteric pathogens
- If all testing is negative and symptoms continue
- Clinically reassess resident. If PCR was initial testing method, do not re-test for C. diff. If initial C. diff testing method was relatively insensitive (e.g., EIA) and no other cause of diarrhea is found, consider performing additional diagnostic testing for C. diff as clinically indicated
### Therapeutic Antimicrobial Order Form

**Indication/Site of Infection (Required)**
- [ ] Septic (source unknown)
- [ ] Blood
- [ ] CNS
- [ ] Heart
- [ ] Respiratory Tract
- [ ] Intraperitoneal/GI
- [ ] Urinary Tract
- [ ] Skin/Soft Tissue
- [ ] Bone/Joint
- [ ] Other

**Organism (Required)**
- [ ] Unknown
- [ ] Known

**Clinical Status (Optional)**
- [ ] Septic-like Syndrome
- [ ] Hospital-Acquired (>72 hours in house)
- [ ] Neutropenic (ANC < 1000 cells/mm³)
- [ ] Healthcare Associated, Nursing home patient, hospitalized ≥ 2 of past 60 days, neutropenia within 48 hours, 3rd or 4th course of chemotherapy
- [ ] Risk Factor for Resistant Organism (Antimicrobial therapy in last 60 days, Immunosuppressive therapy/disease, Contact with resistant organism)

### Parenteral Antimicrobials

Standard doses recommended below assume normal renal and hepatic function.

<table>
<thead>
<tr>
<th>Unrestricted Parenteral Agents</th>
<th>Dose Interval</th>
<th>Alternative Dosing</th>
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<tbody>
<tr>
<td>Ampicillin</td>
<td>2 gm IVP BID</td>
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<tr>
<td>Ampicillin/Bicillin</td>
<td>3 gm IVP BID</td>
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<td>Azithromycin</td>
<td>500 mg IVP BID</td>
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<tr>
<td>Cefazolin</td>
<td>1 gm IVP BID</td>
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<tr>
<td>Ceftriaxone</td>
<td>1 gm IVP BID</td>
<td></td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>200 mg IVP BID</td>
<td></td>
</tr>
<tr>
<td>Metronidazole</td>
<td>500 mg IVP BID</td>
<td></td>
</tr>
<tr>
<td>Nafcillin</td>
<td>2 gm IVP BID</td>
<td></td>
</tr>
<tr>
<td>Penicillin</td>
<td>2 MU IVP BID</td>
<td></td>
</tr>
</tbody>
</table>

**Duration Restriction Parenteral Agents**
Please reassess need for continued therapy with these agents within 5 days.

<table>
<thead>
<tr>
<th>Dose Interval</th>
<th>Alternative Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cephalosporins</td>
<td></td>
</tr>
<tr>
<td>Cefazolin</td>
<td>1 gm IVP BID</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>1 gm IVP BID</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>400 mg IVP Q12H</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>600 mg IVP BID</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>750 mg IVP BID</td>
</tr>
<tr>
<td>Piperacillin/</td>
<td>3.375 gm IVP BID</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>15 mg/kg IVP Q12H</td>
</tr>
</tbody>
</table>

### Oral Antimicrobials

Standard doses recommended below assume normal renal and hepatic function.

<table>
<thead>
<tr>
<th>Unrestricted Oral Agents</th>
<th>Dose Interval</th>
<th>Alternative Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>500 mg po TID</td>
<td></td>
</tr>
<tr>
<td>Amoxicillin/Clavulanate</td>
<td>875 mg po BID</td>
<td></td>
</tr>
<tr>
<td>Azithromycin</td>
<td>500 mg IVP BID</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxime</td>
<td>500 mg po QID</td>
<td></td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>500 mg po BID</td>
<td></td>
</tr>
<tr>
<td>Dicloxacillin</td>
<td>500 mg po QID</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>100 mg po BID</td>
<td></td>
</tr>
<tr>
<td>Fluoroquinolone</td>
<td>200 mg po QID</td>
<td></td>
</tr>
<tr>
<td>Metronidazole</td>
<td>500 mg po TID</td>
<td></td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>100 mg po BID</td>
<td></td>
</tr>
<tr>
<td>Trimethoprim/Trimethoprim</td>
<td>1 DS po BID</td>
<td></td>
</tr>
<tr>
<td>Sulamethoxazole</td>
<td>125 mg po QID</td>
<td></td>
</tr>
</tbody>
</table>

**Duration Restriction Oral Agents**
Please reassess need for continued therapy with these agents within 5 days.

<table>
<thead>
<tr>
<th>Dose Interval</th>
<th>Alternative Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>500 mg po Q12H</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>300 mg po QID</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>750 mg po Q12H</td>
</tr>
</tbody>
</table>

### THERAPEUTIC ANTIMICROBIAL ORDER FORM

**St. Luke’s Hospital**
232 S. Wood Street
Chesterfield, MO 63017

Form No. SL-1051
Physician Orders Tab
Rev. 05/01

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Rhonda Eldridge
Center for Healthy Aging
UTI Communication Toolkit
Clinician Letter

[MONTH] 20XX

Prescribing Clinician Name
Recipient Address
City, State, Zip

Re: Change in protocol regarding urinalyses to improve care and antibiotic stewardship

Dear XXXXX,

Based on clinical practice guidelines developed by nursing home, infectious diseases, and geriatric experts, our facility has decided to modify its protocol around urinalysis to optimize antibiotic use for urinary tract infections (UTIs). We will use a Suspected Urinary Tract Infection (UTI) Situation, Background, Assessment, and Recommendation Form (UTI SBAR) to facilitate gathering critical information by nurses to communicate to prescribing clinicians. The UTI SBAR form is intended to enhance communication and provide guidance regarding managing potential urinary tract infections and indications for ordering urinalyses and cultures. The UTI SBAR form is based on the SBAR form of communication, or Situation, Background, Assessment, and Recommendation. The SBAR communication style has been shown to promote better communication by addressing the specific types of information that clinicians are likely to need for decision making.

As you know, UTIs are the most commonly treated infection among nursing home residents, but proper diagnosis and treatment pose significant and distinctive challenges. While residents with specific UTI symptoms, such as dysuria, usually need treatment, urinalyses and cultures may be obtained for a variety of reasons and their results may lead to a prescription for an antibiotic.

However, research provides no evidence that treating asymptomatic bacteriuria in older adults is of benefit. Antimicrobial treatments do not affect the prevalence of bacteriuria, the frequency of symptomatic urinary infections, morbidity, or mortality.1-3 Asymptomatic bacteriuria applies to a positive result from any routinely collected culture, such as one obtained after a course of antibiotics used to treat an infection.

Moreover, research has shown that such treatments are potentially harmful. Nursing homes serve as one of our most fertile breeding grounds for antibiotic-resistant strains of bacteria—a very high rate of antibiotic use gives rise to Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant Enterococcus (VRE), fluoroquinolone-resistant strains of a variety of bacteria, and multi-drug resistant organisms (MDROs).1-4 In addition, residents with asymptomatic bacteriuria who were treated with an antibiotic have been found to be 8.5 times more likely to develop Clostridium difficile infection (CDI) within the three months following their course of antibiotics.1-5

Embedded in the UTI SBAR form is our new protocol for initiating antibiotics for urinary tract infections. In addition to providing standardized information to help with decision-making, a clinician will be provided with recommendations from the nursing home’s protocol for initiating antibiotics. This recommendation will be based on current best practices and clinical guidelines.
Evaluate the community’s process to assess, communicate, and document a resident’s change in condition.
Evaluate the community’s process to assess, communicate, and document a resident’s change in condition

- Perform process mapping to examine key opportunities to communicate clinical information pertinent to infections and antimicrobial stewardship. This method will demonstrate how antimicrobial stewardship components fit into existing care processes
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing assistants and nursing through the use of a standardized process.
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing assistants and nursing through the use of a standardized process.

- Implement a standardized process to communicate a change in a resident’s condition between nursing assistants and nurses; use findings from process mapping to develop or revise processes.
  - Standardized tools provide consistency when communicating a change in a resident’s condition.
  - Provide education and training to staff on the standardized communication process.
**MEDICAL CARE REFERRAL FORM**

*Use in all situations when a resident has a new problem and infection may be suspected, and is being referred to a medical care provider, including transfer to an emergency department or hospital.*

**To:**

**Phone:**

**Fax:**

**Resident Name:**

**DOB:**

**Room #:**

**From:**

**Phone:**

**Date:**

**Time:**

**Family Contacted:** Yes No
**If YES, Name and relationship:**

**Contact Date:**

**Time:**

**DESCRIPTION OF CURRENT PROBLEM** including recent fever pattern and change in recent/current health status:

### CURRENT VITAL SIGNS

- **Blood pressure:**
- **Pulse:**
- **Respiratory rate:**
- **Highest temperature in last 24 hours:**
- **Heart rate:**
- **3 most recent routine temperatures and new taken:**
  - Temp:
    - New taken:
  - Shaking chills in last 24 hours: Yes No?

### USUAL COGNITIVE FUNCTION

- **Good**
- **Questionable**
- **Impaired**

### MEDICAL HISTORY

- **Diabetes:** Yes No?
- **If yes, most recent blood sugar:**
- **COPD:** Yes No?
- **Indwelling catheter:** Yes No?
- **On hospice care:** Yes No?
- **Advanced directive**
- **MST Form:**
- **DNR:**
- **No antibiotics:**
- **Meds:**
- **Allergies:**

### SUSPECTED URINARY TRACT INFECTION

- **Y** New or increased urgency of urination
- **N**
- **Y** New or increased frequency of urination
- **N**
- **Y** Costovertebral angle (CVA) tenderness
  - If yes, new onset: **Y**
  - If yes, increasing: **Y**
  - **N**
- **Y** Painful or difficult urination
- **N**
- **Y** Obvious blood in urine
- **N**
- **Y** Change in urine appearance or odor
- **N**
- **Y** New or worse urinary incontinence
- **N**
- **Y** Positive culture

### SUSPECTED SKIN OR SOFT TISSUE INFECTION

- **Y** New or increasing pus draining from wound
- **N**
- **Y** New breakdown
- **N**
- **Y** New or expanding redness around wound
- **N**
- **Y** Pain / tenderness
- **N**
- **Y** warmth
- **N**
- **Y** New or increased swelling at the site
- **N**
- **Y** Increased odor
- **N**
- **Y** Ulcer for 3 or more weeks

### SUSPECTED RESPIRATORY INFECTION

- **Y** New cough
- **N**
- **Y** Increasing cough
- **N**
- **Y** Productive cough
  - If yes, with purulent sputum: **Y**
  - **N**
- **Y** Sore throat
- **N**
- **Y** Chest X-ray
  - If yes, pneumonia infiltrate: **Y**
- **N**
- **Y** Body aches
- **N**
- **Y** Headache
- **N**
- **Y** Runny nose and/or sneezing
- **N**
- **Y** Shortness of breath
- **N**
- **Y** Pleuritic chest pain (painful to take deep breath)

### SUSPECTED GASTROINTESTINAL INFECTION

- **Y** Vomiting: Number of times in past 24 hours:
- **N**
- **Y** Diarrhea: Number of times in past 24 hours:
- **N**
- **Y** Other vomiting or diarrhea in the community
- **N**
- **Y** Positive culture
  - If yes, positive for:

---

*Rhonda Eldridge Center for Healthy Aging*
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process.
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process

- Implement a standardized process to communicate a change in a resident’s condition in a consistent manner between nursing and providers; use findings from process mapping to develop or revise processes

- The standardized process should include review of all sources of resident information (e.g., electronic health record, 24-hour/daily report, shift change report/communication, stand-up meetings, wall boards, etc.) to ensure that clinically-relevant resident information is accessible to the end user (e.g., nurses, providers, etc.) for clinical decision-making
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process

- Provide education and training to staff on the standardized communication process
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process.

- Audit the implementation of the standardized communication process (e.g., are nursing staff using standardized communication tools?)
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process.
The community sets the expectation that a change in a resident’s condition is consistently communicated between nursing and providers through the use of a standardized process.

- Audit the completeness and accuracy of the information included on the standardized communication tool (e.g., SBAR). For example, are nurses thoroughly and appropriately communicating the information required according to the standardized communication tool?
The community sets the expectation that a change in a resident’s condition is consistently documented
The community sets the expectation that a change in a resident’s condition is consistently documented

- Integrate tools for information gathering into the electronic health record when possible to provide consistency, care continuity and centrally documented information (e.g., a UTI monitor)
The community sets the expectation that a change in a resident’s condition is consistently documented

- Information Technology support for antimicrobial stewardship activities is available in the community to facilitate accessibility of clinical documentation; activities may include report generation, optimizing electronic health record for clinical documentation, etc.
The community sets the expectation that a change in a resident’s condition is consistently documented

- Explore ways your electronic health record vendor can support antimicrobial stewardship activities
Diagnostic testing results, including microbiology, are accessible in a timely manner for clinical decision-making and infection surveillance.
Diagnostic testing results, including microbiology, are accessible in a timely manner for clinical decision-making and infection surveillance

- Implement a process to ensure that diagnostic testing, including microbiology results, are accessible in a timely manner for clinical decision-making.
Diagnostic testing results, including microbiology, are accessible in a timely manner for clinical decision-making and infection surveillance

- Implement a process to ensure that diagnostic testing, including microbiology results, are accessible in a timely manner for infection surveillance
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

- Policies/protocols based on clinical practice guidelines for the initiation of antimicrobials (Loeb et al., 2001) are followed by all licensed providers in the community regardless of employment status (e.g. full-time, part-time or casual status; on-call; external consultant; etc.)

- Consider conducting antibiotic use assessment to monitor guideline adherence
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

- All licensed providers follow basic antimicrobial stewardship practices including the 5 Ds: right diagnosis, drug, dose, duration, de-escalation
  - Consider engaging consulting or in-house pharmacist
  - Specifically ensure that all antimicrobial orders have the following elements documented:
    - Diagnosis
    - Treatment indication/ rationale (e.g., specific resident symptoms warranting antibiotics)
    - Treatment site (e.g., urinary tract, lower respiratory tract etc.)
    - Drug
    - Dose
    - Duration
    - Antibiotic start date
    - Antibiotic end date
    - Route/ de-escalation
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

**Criteria for Conversion of Medications from Intravenous to Oral/Enteral (IV/PO)**

**Policy:**
A number of commonly used medications are known to have virtually equivalent bioavailability when given by either the PO or IV routes. The advantages of oral administration of medications (as opposed to intravenous) include: decreased complications of intravenous therapy (e.g., IV infiltration, line infection), decreased nursing and pharmacy workload, and decreased medication costs. In addition, similar institutions have already implemented IV to PO programs with successful results.

**Table 1: Conversion, Rounding and Costs**

<table>
<thead>
<tr>
<th>Conversion</th>
<th>Adult Rounding Oral Doses</th>
<th>Pediatric Rounding Oral Doses</th>
<th>Cost PO (per dose)</th>
<th>Cost IV (per dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetazolamide</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$1</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$0.10</td>
</tr>
<tr>
<td>Chlorothiazide</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$0.23</td>
</tr>
<tr>
<td>Esomeprazole</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$0.15</td>
</tr>
<tr>
<td>Famotidine</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$1</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$1</td>
</tr>
<tr>
<td>Lacosamide</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$35</td>
</tr>
<tr>
<td>Levetiracetam</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$1</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$3</td>
</tr>
<tr>
<td>Levomethadone</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$0.10</td>
</tr>
<tr>
<td>Linezolid</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$168</td>
</tr>
<tr>
<td>Mycophenolate mofetil (Cellcept)*</td>
<td>1</td>
<td>1</td>
<td>--</td>
<td>$2</td>
</tr>
<tr>
<td>Mycophenolate sodium (Myfortic)*</td>
<td>1000</td>
<td>720</td>
<td>180 mg</td>
<td>$5</td>
</tr>
<tr>
<td>Sildenafil</td>
<td>1</td>
<td>1</td>
<td>Nearest 50 mg or use suspension</td>
<td>$17</td>
</tr>
<tr>
<td>Voriconazole</td>
<td>1</td>
<td>1</td>
<td>Nearest 50 mg or use suspension</td>
<td>$90</td>
</tr>
</tbody>
</table>

**Table 2: Available Oral Dosage Forms and Administration Directions**

<table>
<thead>
<tr>
<th>Tablet / Capsule</th>
<th>Crush</th>
<th>Suspension / Powder</th>
<th>Administration Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetazolamide</td>
<td>No</td>
<td>--</td>
<td>May sprinkle capsule contents.</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>Yes</td>
<td>200 mg/5mL</td>
<td>--</td>
</tr>
<tr>
<td>Chlorothiazide</td>
<td>--</td>
<td>250 mg/5mL</td>
<td>--</td>
</tr>
<tr>
<td>Esomeprazole</td>
<td>No</td>
<td>20, 40 mg granules for suspension</td>
<td>Administer 1 hour before meal. Mix granules with 1 tablespoon of water and wait 2-3 minutes for mixture to thicken.</td>
</tr>
<tr>
<td>Famotidine</td>
<td>No</td>
<td>40 mg/5mL</td>
<td>--</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>Yes</td>
<td>40 mg/mL</td>
<td>--</td>
</tr>
<tr>
<td>Lacosamide</td>
<td>--</td>
<td>40 mg/mL</td>
<td>--</td>
</tr>
<tr>
<td>Levetiracetam</td>
<td>No</td>
<td>100 mg/mL</td>
<td>--</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>Yes</td>
<td>25 mg/mL</td>
<td>Administer 2 hours before or 2 hours after multiple vitamins, antacids, or other products containing magnesium, aluminum, iron, or zinc. Tube feeds must be held for 2 hours before and after oral administration. Suspension: Administer on an empty stomach.</td>
</tr>
<tr>
<td>Levothyroxine</td>
<td>Yes</td>
<td>25 mg/mL</td>
<td>Administer 4 hours before or after antacids or products containing iron. Administer in the morning 30 minutes before breakfast.</td>
</tr>
<tr>
<td>Linezolid</td>
<td>Yes</td>
<td>20 mg/mL</td>
<td>--</td>
</tr>
<tr>
<td>Mycophenolate mofetil (Cellcept)*</td>
<td>500 mg tablet or 250 mg capsule</td>
<td>No</td>
<td>200 mg/mL</td>
</tr>
<tr>
<td>Mycophenolate sodium (Myfortic)*</td>
<td>180 mg, 360 mg delayed release tablet</td>
<td>No</td>
<td>--</td>
</tr>
<tr>
<td>Silodenafil</td>
<td>Yes</td>
<td>2.5 mg/mL</td>
<td>--</td>
</tr>
<tr>
<td>Voriconazole</td>
<td>Yes</td>
<td>200 mg/5mL</td>
<td>--</td>
</tr>
</tbody>
</table>

*Materials may be consumed in a predispensed medication form until further notice. Specific directions or prescribed dosage: Instruct with provider when agent will be utilized based upon service or patient's need and history prior to making a dosage recommendation.
MEDICATION MONITORING:
INTRAVENTOUS TO ORAL THERAPEUTIC INTERCHANGE PROGRAM

I. BACKGROUND

The oral route of administration may be ideal so long as the medication achieves the desired concentrations in blood and/or the targeted site(s) of action. Patients often start on parenteral therapy, but as their condition improves, they are often candidates for continuation with oral therapy. Available oral formulations have high oral bioavailability and equivalent potency. The conversion from intravenous (IV) to oral (PO) formulations of the same medication while maintaining equivalent potency is known as "sequential therapy".

Much of the beneficial data on IV to PO therapy interchanges stems from the conversion of antimicrobial medications. Studies have shown that appropriate conversion from IV to PO antimicrobial therapy can decrease the length of hospitalization without adversely affecting patient outcome and may improve patient care by reducing the risk of intravascular catheter infection because of shorter line dwell times and less endoluminal contamination. Additional benefits of IV to PO conversion include reduced hospital cost, greater patient comfort and easier ambulation. Furthermore, the use of oral medications may decrease nursing personnel time.

II. POLICY

This policy outlines IV to PO conversion considerations and specific criteria for the substitution and therapeutic interchange of medications as set forth by the SHC Pharmacy and Therapeutics Committees, the Antimicrobial Subcommittee, and the Antimicrobial Stewardship Team.

III. PROCEDURES

A. If the patient is being considered for an IV to PO conversion, the clinical pharmacist (and/or Antimicrobial Stewardship Team in the case of antimicrobials) can examine the route of therapy and determine if it is clinically appropriate to perform a sequential, parenteral to oral therapy switch.

B. If the patient meets the approved criteria for transition to oral therapy (Section F), the clinical pharmacist will enter the new order using "per Protocol" order mode and enter a standardized i- Vent in the patient's medical record detailing the conversion.

C. The covering provider will be notified when the sequential switch occurs. The provider has the option to switch back to the intravenous route if parenteral therapy is preferred.

D. The Antimicrobial Stewardship Team will report findings and feedback to the Antimicrobial Subcommittee approximately every year.

E. The Pharmacy Department will review and report findings and feedback for non-antimicrobial medications at departmental meetings every quarter for the first year (2013), then every year thereafter.

F. Criteria for patient eligibility:

Inclusion Criteria:
- Patients improving clinically
- Tolerating food or enteral feeding
- Able to adequately absorb oral medications via the oral, gastric tube, or nasogastric tube route
- Not displaying signs of shock, not on vasopressor blood pressure support
- Taking other medications orally

Additional requirements for antimicrobials:
- Afebrile for at least 24 hours (temperature ≤100°F or ≤37.8°C)
- Heart rate ≤90 beats per minute
- Respiratory rate ≤20 breaths per minute
- Systolic blood pressure ≥90 mm Hg (without vasopressor drugs)
- Signs and symptoms of infection improvement according to assessment:
  - • Improving WBC and differential counts
  - • Improving signs and symptoms
  - • Hemodynamically stable
  - • Patient is not septic

Exclusion Criteria:
- Persistent nausea and vomiting, diarrhea
- Patient with the following GI conditions:
  - Leaks or suspected leaks with no active bowel sounds
  - Patient is known to have a malabsorption syndrome
  - Proximal resection of small intestines
  - High nasogastric (NG) tube output or requiring continious GI suction (>500mL/day)
  - Active GI bleed
  - Cystic fibrosis
  - Patients with Grade III or IV mucositis
  - Wernicke's encephalopathy (for thiamine interchange)
  - Acute pain (for IV acetaminophen interchange)
  - Myxedema coma or if endocrine consulting (for IV levothyroxine)

Additional exclusions for antimicrobials:
- Patient has a serious or life threatening infection:
  - Meningitis, endocarditis, intracranial abscesses, osteomyelitis, septicemia, Legionella pneumonia
  - Inadequately drained abscesses and empyema
  - Severely immunocompromised (solid organ transplant, bone marrow transplant)

G. Intravenous to Oral Dose Conversion, Pricing, and Bioavailability

<table>
<thead>
<tr>
<th>Medication</th>
<th>Intravenous Dose</th>
<th>Oral Equivalent</th>
<th>Oral Bioavailability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Famotidine</td>
<td>20mg q12h (0.87mg/dose)</td>
<td>20mg q12h (0.08/dose)</td>
<td>45%</td>
</tr>
<tr>
<td>Pantoprazole</td>
<td>40mg daily ($3.49)</td>
<td>40mg daily ($0.22/dose)</td>
<td>77%</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>1000mg q6h pm ($16.94/1gm)</td>
<td>1000mg q6h pm ($0.08/dose)</td>
<td>85-99%</td>
</tr>
</tbody>
</table>

1 Serum levels do not consistently correspond to the FAMOTIDINE dose or the degree of gastric acid inhibition.
### Multivitamins

<table>
<thead>
<tr>
<th>Multivitamins</th>
<th>10 mL daily ($5.70)</th>
<th>1 tablet daily ($0.04)</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine</td>
<td>100mg daily ($9.63)</td>
<td>100mg daily ($0.02)</td>
<td>5%</td>
</tr>
<tr>
<td>Do not interchange if for Wernicke’s Encephalitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>folate</td>
<td>1mg daily ($0.04/dose)</td>
<td>1mg daily ($0.02)</td>
<td>75-90%</td>
</tr>
<tr>
<td>Potassium Chloride</td>
<td>20mEq daily ($1.26)</td>
<td>20mEq daily ($0.35)</td>
<td>-</td>
</tr>
<tr>
<td>Levothyroxine</td>
<td>0.05mg daily (51.85/dose)</td>
<td>0.1mg daily ($0.15/dose)</td>
<td>40-80%</td>
</tr>
<tr>
<td>Do not interchange if for myxedema coma or if endemic consultation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>10mg q6h pm ($0.40/dose)</td>
<td>10mg q6h pm ($0.11/dose)</td>
<td>80%</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>4mg q6h pm ($0.63)</td>
<td>Tablet ($0.18)</td>
<td>56%</td>
</tr>
</tbody>
</table>

#### H. Antimicrobial IV to Oral Dose Conversion

<table>
<thead>
<tr>
<th>Medication</th>
<th>Intravenous Dose</th>
<th>Oral Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin</td>
<td>250 mg IV daily ($7.03/dose)</td>
<td>250 mg PO daily ($2.25/dose)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>200 mg IV every 12 hours ($1.64/dose)</td>
<td>260 mg PO every 12 hours ($0.10/dose)</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>400 mg IV every 8 hours ($2.52/dose)</td>
<td>700mg PO every 12 hours ($0.41/dose)</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>100 mg IV every 6 hours ($12.66/dose)</td>
<td>300mg PO every 6 hours ($0.18/dose)</td>
</tr>
<tr>
<td>Fluconazole</td>
<td>100 mg IV every 12 hours ($10.76/dose)</td>
<td>100mg PO every 12 hours ($0.79/dose)</td>
</tr>
<tr>
<td>Levoloxacin</td>
<td>200 mg IV every 8 hours ($4.84/dose)</td>
<td>200 mg PO daily ($0.15/dose)</td>
</tr>
<tr>
<td>Linezolid</td>
<td>100 mg IV every 12 hours ($10.84/dose)</td>
<td>600 mg PO every 12 hours ($0.87/dose)</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>500 mg IV every 8 hours ($1.11/dose)</td>
<td>500 mg PO every 8 hours ($0.19/dose)</td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>400 mg IV daily ($8.40/dose)</td>
<td>400 mg PO daily ($14.23/dose)</td>
</tr>
<tr>
<td>Rifampin</td>
<td>600 mg IV daily ($32.66/dose)</td>
<td>600 mg PO daily ($1.94/dose)</td>
</tr>
<tr>
<td>Trimethoprim / Sulfamethoxazole (TMP/SMX)</td>
<td>5-15mg TMP/kg/day in 3-4 divided doses ($5.16/tablet)</td>
<td>1 double strength = 160 mg TMP ($0.14/tablet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 single strength = 80 mg TMP ($0.06/tablet)</td>
</tr>
</tbody>
</table>

#### IV. REFERENCES


#### V. DOCUMENT INFORMATION

- Original Author/Date: Emily Mul, Pharm.D. BCPS; 5/2012
- Gatekeeper: Pharmacy Department
- Distribution: This procedure is kept in the Pharmacy Policies and Procedure Manual
- Review/Revision History: Denise Gin, Pharm.D, BCPS; Lina Meng, Pharm.D, BCPS; Craig Sterling, Pharm.D.; Paul Mohabir, M.D.; Thomas Weiser, MD MPH; 12/2012
- Approvals: Pharmacy and Therapeutics Committee; 05/2012, 02/2013

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Stanford Hospital Clinics
Stanford, CA 94305
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

- Empirically prescribed antibiotics are reviewed by the provider in a timely manner and adjusted or discontinued based on microbiology results
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

- All licensed providers in the community follow clinical guidelines/recommendations for asymptomatic bacteriuria management (e.g., Infectious Diseases Society of America (IDSA) Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults 2005.)
  
  - Consider conducting antibiotic use assessment to monitor guideline adherence
All licensed providers have access to a local antibiogram; consider whether the data are compiled from the community, local hospital, healthcare system, region, etc.; as well as how often the data are updated (e.g., annually, quarterly, monthly, etc.)
Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

Clinical Protocols for Antimicrobial Stewardship, Infection Management, and Diagnostic Testing

- Infection prevention expertise is available in the community
Concise Antibiogram Toolkit
Background

This toolkit is designed to guide nursing homes in creating their own antibiograms, an important tool for guiding empiric antimicrobial therapy. Information about antibiograms and instructions on how to create them is included.

What is an antibiogram?

- Antibiograms are important tools for health care professionals involved in prescribing empiric antibiotics for suspected bacterial infections. These tools utilize microbiologic data from patient specimens from a nursing facility to estimate the ward- or facility-wide prevalence of antibiotic susceptibilities for common bacterial pathogens. They are also an important component of monitoring trends in antimicrobial resistance within different areas of a facility.
- Hospitals use antibiograms as part of their infection control measures to classify types of bacteria found in cultures, to identify patterns of antibiotic susceptibility in those bacteria, and to track changes in antibiotic susceptibility over time. Hospitals use these cumulative antimicrobial susceptibility test data reports to determine the most appropriate agents for initial empiric antimicrobial therapy and to target efforts to reduce inappropriate antibiotic use.

Why should you develop and use an antibiogram at your nursing facility?

- Antibiograms encourage responsible use of antibiotics throughout facilities. Prescribing clinicians—physicians, nurse practitioners, and physician assistants—can consult these tools before initiating empiric antibiotic therapy, which may improve outcomes among patients with infections.
- Antibiograms are a good way to detect changes in resistance patterns for an entire facility or for locations within a facility.
- Antibiograms can be inexpensive to develop and maintain. The results are easily accessible to health care providers.

What should you know before you decide to use an antibiogram?

- Antibiograms are not generalizable to different nursing facilities; they can be useful tools for guiding empiric therapy and monitoring antibiotic susceptibility trends within a specific facility.
- Selection of empiric therapy in a particular patient should not be based solely on an antibiogram. A patient’s particular infection history, including past antimicrobial use, must also be considered.
- Antibiograms only capture the aggregate proportion of susceptible isolates for a given organism-antibiotic combination. They do not provide the prevalence resistance to multiple antibiotics.
- Antibiograms provide guidance for empiric antibiotic use in patients, but other factors including patient characteristics and prevalence of other risk factors should be incorporated when making therapeutic decisions.
Concise Antibiogram Toolkit
Getting Started—Sources of Data

Once you decide that an antibiogram will be a useful tool for your facility, there are a few things to consider.

1. What will you need to create the antibiogram?
2. What data are needed to create an antibiogram?
3. How do you interpret your antibiogram?
4. How will the tool be implemented in your facility?
5. How often will the antibiogram be updated?

What will you need to create the antibiogram?
To create your facility's antibiogram, you will need some working knowledge of computers and a good understanding of culturing practices and infection control.

The resources included in this toolkit can be used with the 2007 (or later) Microsoft Office suite. The software recommended to create the antibiogram (WHONET) can be downloaded for free from the Internet at http://www.who.int/drugresistance/whonetsoftware/en/. It is important that you be able to use Microsoft Office and feel comfortable learning new software.

You will also need some knowledge of how the tool will be used in your facility. One factor to consider is whether the antibiogram will be used by physicians and health care workers in the entire facility or only by those on a certain floor or ward. This information may result in the decision to create separate antibiograms instead of one facility-wide tool. An infection control professional could be ideal for creating and maintaining your antibiogram as well as for teaching other personnel how to interpret the results.

What data are needed to create an antibiogram?
An antibiogram cannot be developed without specific information about your facility's microbiological cultures. You will need to access the results of the cultures, including those concerning antibiotic susceptibilities. You can potentially obtain these data from several different sources.

Potential Data Sources

Laboratory—electronic or paper based
The most convenient way to obtain data for your facility’s antibiogram may be to contact the primary laboratory from which you obtain culture results. This laboratory may be independent or affiliated with another health care facility, such as a hospital. The laboratory that processes your cultures will have a record of the antibiotic susceptibility tests performed for each culture. You may be able to ask the laboratory for this information. Whether you receive this information in electronic or paper format will affect how you process the data further.

If at all possible, try to obtain your data electronically, either in a spreadsheet or text file. Paper-based results will require that the data be manually entered into a spreadsheet before using WHONET (See Tool “How to...” for more information.)
Concise Antibiogram Toolkit
Using WHONET to Create Your Antibiogram

WHONET is a free Windows-based database software developed in 1989 by the World Health Organization (WHO). The software is used in laboratories worldwide for the management and analysis of microbiology laboratory data with a special focus on the analysis of antimicrobial susceptibility test results. This software will analyze the culture results of your nursing home facility and supply you with the susceptibility results for your antibiogram.

Completing the tutorials available on the WHONET website is recommended. You will need to register, which is free, to begin viewing the tutorials. Please use this document to supplement the tutorials. This document is specific to creating an antibiogram.

A troubleshooting section to address some of the issues you may find is included. WHONET also provides technical support, available once you have registered and logged in.

Downloading WHONET Software Program

2. Click on the “Click here to download the software and manuals” link. A new window should open titled “WHONET Login Page.”
3. Click on “Create a New Account” (if you haven’t already registered with WHONET). Registration is free.
4. Click on the “DOWNLOAD WHONET” button in the upper left corner of the page.

5. In the “Software” box, click on the version of “WHONET 5.6” which fits the version of Microsoft Windows currently running on your facility’s computers. If you have Windows 98 through Windows Vista, click the top “WHONET 5.6.” If you have Windows 2000 through Windows 7, click the bottom one. If unsure, right click on your “My Computer” icon on your desktop and choose “Properties:” Your version of Microsoft Windows will appear under “System.”
6. If a dialog box opens up asking if you would like to run or save the file, click “Run.” If it only asks if you want to save the file or cancel, click “Save.” You can choose to save to a location that will be permanent on your computer. This may even be your desktop. Otherwise, the files may save to your “Downloads” folder. The necessary files will begin downloading.
7. If you were able to select “Run,” the InstallShield Wizard should open automatically. If you clicked “Save,” you may need to look in your recent downloads and double-click on “whonet56setup” to launch the installer. Recent downloads can be found either in a dialog box that opened when the download started, or in the “Downloads” folder under “My Documents.”
Concise Antibiogram Toolkit  
How to Enter Data Manually Into an Antibiogram Template

Once you’ve printed your results from WHONET, you’re ready to enter the percent (%) susceptibilities into the antibiogram template. This should be fairly straightforward, but there are a few things to note before you begin:

1. **Only include an organism in your antibiogram if it has been isolated from at least four patients:**

   On the WHONET printout, note the “Number of patients” column (see red arrow in Figure 1). This column contains the number of patients who had cultures from which each organism was isolated at least once. The percent (%) susceptibilities for each organism are based on susceptibility results from the number of isolates noted in the “Number of patients” column. Some of these numbers may be quite low, which could give unreliable percent (%) susceptibilities. For example, in Figure 1 you can see there is a “2” in the “Number of patients” column next to “Enterobacter cloacae” (see blue arrow). This means the percent (%) susceptibilities for *E. cloacae* are only based on two isolates and, as you can see, will all be 0 percent, 50 percent, or 100 percent. These numbers are clearly not very helpful, as even one more isolate with a different susceptibility pattern could change the percent (%) susceptibilities significantly. We therefore recommend that you only include an organism in your antibiogram if it has been isolated from at least four patients (i.e., a “4” in the “Number of patients” column).

   In general, including organisms with four isolates will increase the number of organisms in your antibiogram. However, this is still a fairly low number of isolates and should be interpreted with caution. Percent (%) susceptibilities based on four isolates should give you a general idea of how effective various antibiotics are against those organisms, but organisms with more isolates will likely produce more accurate results in which you can have greater confidence.

   Additionally, a higher number of isolates implies that that organism is infecting more people in your facility. Therefore, you may decide to give more weight to the percent (%) susceptibilities for organisms with more isolates when selecting empiric antibiotics (while still taking into account factors like likelihood of an organism given infection site, individual infection history, etc.).
<table>
<thead>
<tr>
<th>Gram (-)</th>
<th>Aminoglycosides</th>
<th>β-Lactams</th>
<th>Cephalosporins</th>
<th>Quinolones</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of</td>
<td>Amoxicillin</td>
<td>Meropenem</td>
<td>Piperacillin</td>
<td>Polymyxin</td>
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<tr>
<td>Achromobacter baumannii</td>
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<td>Citrobacter freundii</td>
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<td>Citrobacter koseri</td>
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<tr>
<td>Citrobacter sp</td>
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<tr>
<td>Enterobacter aerogenes</td>
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<td>Enterobacter cloacae</td>
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<tr>
<td>Escherichia coli</td>
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<tr>
<td>Klebsiella oxytoca</td>
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<tr>
<td>Klebsiella pneumoniae</td>
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<tr>
<td>Klebsiella sp</td>
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<tr>
<td>Morganella morganii</td>
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<td>Proteus sp</td>
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<tr>
<td>Providencia sp</td>
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<tr>
<td>Pseudomonas aeruginosa</td>
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<tr>
<td>Salmonella sp</td>
<td></td>
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<tr>
<td>Serratia marcescens</td>
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<tr>
<td>Shigella sp</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Gram (+)</th>
<th>Aminoglycosides</th>
<th>Penicillins</th>
<th>Cephalosporins</th>
<th>Macrolides</th>
<th>Quinolones</th>
<th>Others</th>
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<tbody>
<tr>
<td></td>
<td># of</td>
<td>Amoxicillin</td>
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<td>Methicillin Resistant (MRSA)</td>
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<td>Methicillin Susceptible (MSSA)</td>
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<td>Staphylococcus coag neg</td>
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<tr>
<td>Enterococcus faecalis</td>
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<tr>
<td>Enterococcus faecium</td>
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<tr>
<td>Enterococcus sp</td>
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<td></td>
</tr>
<tr>
<td>Streptococcus pneumoniae</td>
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</tr>
<tr>
<td>Streptococcus agalactiae</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Streptococcus sp</td>
<td></td>
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</tr>
</tbody>
</table>
Measure antimicrobial use
Identify antimicrobial stewardship champions

- Establish an antimicrobial utilization baseline
  - Antimicrobial Use Assessment (Appendix E)
Identify antimicrobial stewardship champions

- Assess antimicrobial use on a regular basis (e.g., monthly, quarterly, etc.)
Communication and Decision-making Toolkit for Four Infections
QAPI Meetings Tip Sheet

Having a Quality Assurance and Process Improvement (QAPI) Team and QAPI team meetings is important to successfully implement and oversee progress being made in relation to antibiotic use, infection control, and care practices related to communication with medical care providers (the Medical Care Referral Form or MCRF) and residents and their families (the Be Smart About Antibiotics handout).

Based on successful models of QAPI, it is recommended that:

- Team meetings be held monthly to review progress.
- All individuals responsible for the QI program attend the meetings.
- A team leader be identified who is responsible to:
  - Provide an update on progress:
    - how often the MCRF has been used.
    - reviewing changes based on the infection log.
  - Convene the meetings and review information from the last month.
  - Follow-up on matters identified during the meeting.
  - Train or delegate training new staff in the Common Suspected Infections: Tools to Improve Communication and Decisionmaking toolkit.
  - Work with staff to assure that all current residents and families, new residents, and those considering hospice receive the Be Smart About Antibiotics handout.

Points for the team to address:

Who will complete the MCRF: ______________________________

Where blank copies of the MCRF will be kept: ____________________

Where completed copies of the MCRF will be kept: __________________

When monthly meetings will be held: ____________________________

Other: ____________________________

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May 2014

Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov
Identify antimicrobial stewardship champions

- Assess antimicrobial appropriateness on a regular basis (e.g., monthly, quarterly, etc.); this activity is most suitable for the consulting or in-house pharmacist. Assess prescribing trends by provider and community-wide
Identify antimicrobial stewardship champions

- Monitor compliance with prescribing expectations and clinical practice guidelines relevant to antimicrobial stewardship (e.g., monitor compliance with Loeb minimum criteria for initiation of antibiotics in LTC residents)
  - Antimicrobial Use Assessment (Appendix E)
Identify antimicrobial stewardship champions

- Develop antimicrobial use summaries/reports on a regular basis
References


References


References


References


