Antimicrobial Stewardship Implementation in Post-Acute and Long-Term Care Facilities

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DISCLOSURES

• Received grant funding for investigator initiated study from Merck & Co., Inc.,
OBJECTIVES

- To describe the need of antimicrobial stewardship in post-acute and long-term care facilities

- To recognize practical approaches towards starting and sustaining a successful antimicrobial stewardship program in post-acute and long-term care facilities

- To locate available resources needed for implementation of antimicrobial stewardship program
LTCF Providing More Post-Acute Care Services

Post-acute care (Medicare) admissions are increasing in nursing homes
- Growing medical complexity
- Increasing exposure to devices, wounds and antibiotics
- High prevalence of multidrug-resistant organisms

AHCA Quality Report 2013
Reservoirs of MDROs

Crnich et al. Infect Control Hospital Epidemiol 2012; 33(11):1172-4
Role in Regional Dissemination of MDROs

- Outbreak of KPC-producing Enterobacteriaceae studied over a period of one year
  - 42 cases were identified
  - 24 cases were linked to 1 LTACH
  - 75% of rest of the cases were linked to 3 NH
  - Successful control requires extensive coordination between acute and long term care facilities

C. difficile Infections on the rise

- 25% to 75% of residents receive at least one course of antibiotics.

- 8% to 33% of those treated with an antibiotic in a LTCF acquire CDI.

- Prevalence has been reported to be as high as 14.7%.

- Incidence has ranged from 0.2 to 2.6/1000 resident days in some older studies.

- C. difficile estimated to have caused 112,800 infections with onset in nursing homes in 2012 representing quarter of all cases in the US.

How big is the antibiotic problem in LTCF?
Inappropriate Antibiotic Use in Nursing Homes

25 – 80% of use deemed inappropriate:

## Antibiotic Use in Nebraska LTCF

![Graph showing antibiotic use and days of therapy across different LTCFs.]

<table>
<thead>
<tr>
<th>Study</th>
<th>Antibiotic Starts/1000 resident days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crnich CJ et al. ID Week 2012 Abstract 1789</td>
<td>5.22 to 7.56</td>
</tr>
<tr>
<td>Doernberg SB. et al. Antimicrob Resist Infect Control. 2015 Dec 1;4:54</td>
<td>4.8 to 6.5 (pre-intervention) to 2.8 to 4.4 (post-intervention)</td>
</tr>
</tbody>
</table>
Reasons for Antibiotic Prescriptions in LTCF

- Point Prevalence Survey of 9 LTCF in 4 different states demonstrated that 1 of 3 antibiotic prescription being written in LTCF is for UTI treatment or prophylaxis.
- Urinary tract, Respiratory Tract and Skin are the treatment sites documented for three quarters of all the antibiotic being prescribed.

Thompson ND et al. J Am Med Dir Assoc. 2016 Dec 1;17(12):1151-1153
Inappropriately Treating Asymptomatic Bacteriuria

Up to one-third of prescriptions for suspected urinary tract infection in NH residents are for asymptomatic bacteriuria.

Box 1: Summary of issues and themes identified in the focus group discussions

- Nurses’ and physicians’ interpretation of bacteriuria as “symptomatic” in the presence of nonspecific symptoms
- The ordering of urine cultures for nonspecific changes in a resident’s status
- The central role of the nurse in communicating nonspecific changes in the health status of a resident to physicians and family members
- The difficulty in eliciting information about symptoms from frail elderly residents
- Uncertainty of physicians about the significance and management of a positive urine culture result
- Concern over liability of nurses and physicians

Walker S et al. CMAJ. 2000 Aug 8;163(3):273-7
How to deal with this problem?
New CMS Regulation

Facility must establish an Infection Prevention and Control Program (IPCP) that includes:

- System for preventing, identifying, reporting, investigating and controlling infections
- Written standards, policies and procedures
- Antibiotic stewardship program
- System for recording incidents identified under IPCP and corrective actions taken

[DEPARTMENT OF HEALTH AND HUMAN SERVICES]

Centers for Medicare & Medicaid Services

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489

[CMS–3260–F]

RIN 0938–AR61

Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities

AGENCY: Centers for Medicare & Medicaid Services (CMS), HHS.

ACTION: Final rule.

Establishing ASP in Nursing Home

Summary of Core Elements for Antibiotic Stewardship in Nursing Homes

- **Leadership commitment**
  Demonstrate support and commitment to safe and appropriate antibiotic use in your facility

- **Accountability**
  Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility

- **Drug expertise**
  Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility

- **Action**
  Implement at least one policy or practice to improve antibiotic use

- **Tracking**
  Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility

- **Reporting**
  Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff

- **Education**
  Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use

www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
Obtain Leadership Statement of Support

• Written statement of support for antimicrobial stewardship program (ASP)

• Outline duties of the ASP team members

• Communicate expectations with the nursing staff and prescribing providers

• Create culture that promote appropriate antibiotic use
FROM: [Executive Director, Medical Director, Director of Nursing, etc.]

DATE: [Date]

RE: Antimicrobial Stewardship Program

Antibiotics are among the most commonly prescribed medications within long-term care facilities. However, misuse of antibiotics can lead to undesirable outcomes including emergence of multidrug resistant pathogens, development of *Clostridium difficile* infections, adverse drug reactions, increased mortality, and higher costs.

As part of the continuing commitment to provide high quality care to all our residents, the leadership team of [facility name] has created an Antibiotic Stewardship Program (ASP). This program will promote appropriate use of antibiotics in our facility. The overall goal of ASP is to prevent undesirable outcomes related to antibiotic misuse by optimizing the selection of drug, dose, route, and duration of therapy. Antibiotic use protocols and systems to monitor antibiotic use will be implemented to achieve ASP goals.

The ASP will be a part of the facility’s Infection Prevention and Control Program. Infection preventionist will play a central role and the key leaders accountable for the program include [Medical Director, Director of Nursing, Consultant Pharmacist, etc.]. This multidisciplinary team will regularly review appropriateness of antibiotic courses and make recommendations for adjustment in practice where necessary, establish new or revise existing protocols relevant to appropriate antibiotic prescribing, monitor and report patterns of antibiotic use and resistance; and provide education on responsible use of antibiotics.

The success of this initiative requires the full participation and support of those who prescribe, prepare, administer, and receive antimicrobial therapy. The facility will provide adequate staffing and resources to support the functions and goals of the ASP. ASP team will engage prescribing providers, staff, residents, and residents’ families to ensure that antibiotic use protocols can be implemented smoothly. Facility leadership is confident that with the help of frontline staff, support of prescribing providers, understanding of resident and families, and guidance of ASP team, we will improve quality of care and minimize untoward consequences of antibiotic therapy.

https://asap.nebraskamed.com
Establish Accountability

- Empower leaders of the program
  - Medical Director
  - Director of Nursing
  - Consultant Pharmacist

- Provide dedicated time for ASP activities to:
  - Program leaders
  - Infection Preventionists (who will support day to day activities of ASP)
  - Infection Advisory Committee of AMDA has recommended Infection Preventionists should get 10 hours/week dedicated towards ASP activities
Partner With Local Experts or Develop Expertise Within The Facility

• Establish access to individuals with antibiotic expertise to implement antibiotic stewardship activities

• Examples of experts include:
  
  • Consultant pharmacists who have received specialized infectious diseases or antibiotic stewardship training
    
    • Many Consultant Pharmacists are being trained by their companies on Antimicrobial Stewardship concepts and activities
    
    • Training is also being made available to consultant pharmacists by national societies.

  • Antibiotic stewardship program leads at the hospitals within your referral network.

  • Develop relationships with infectious disease consultants in your community

  • Medical Directors and Lead Physicians can also take courses that can help them prepare for ASP activities including CDC/SHEA/AMDA course.
Impact of Partnership with ID Specialists

- 30% decrease in total antibiotic use
- 64% decline in tetracyclines use
- 61% decline in clindamycin use
- 38% decline in fluoroquinolones & sulfamethoxazole/trimethoprim
- 28% decline in beta lactam/ beta lactamase inhibitor use
- Rate of positive *C. difficile* tests at LTCF also declined while rate were the same in the hospital

Outline the goals of the Antibiotic Stewardship program, structure and procedures of the antimicrobial stewardship committee along with responsibilities of its members.
SUBJECT: Antimicrobial Stewardship Program
POLICY NO.: [Policy number]
EFFECTIVE DATE: [Policy effective date]
LAST REVISION DATE: [Date of last policy revision]
RELEVANT REGULATION: CFR § 483.80(a)(1)-(4)
APPROVED BY: [Approving individual or committee]

Policy Statement:
The goal of the Antimicrobial Stewardship Program (ASP) is to promote the appropriate use of antimicrobials in order to maximize treatment outcome and minimize unintended consequences of antimicrobial therapy. The ASP aims to improve antibiotic prescribing practices through the development and implementation of antibiotic use protocols and a system to monitor antibiotic use.

Structure:
The Antimicrobial Stewardship Committee has been established to provide support and oversee activities of the ASP. This committee and the ASP will be part of the Infection Prevention and Control Program (IPCP). The IPCP will directly report all ASP-related activities and outcomes to the Quality Assurance and Performance Improvement (QAPI) Committee. QAPI Committee will in turn report all ASP activities and outcomes to nursing staff, prescribing clinicians, and other relevant staff.

Procedure:
1. Membership of the Antimicrobial Stewardship Committee
   a. Medical Director (required)
   b. Director of Nursing (required)
   c. Infection Preventionist (required)
   d. Consultant Pharmacist (required)
   e. Additional members as deemed appropriate by the Antimicrobial Stewardship Committee which may include Nurse representative, Nursing Aide representative, QAPI Director, Administrator or other healthcare workers

2. Meetings
   Antimicrobial Stewardship Committee will meet at least quarterly to review ASP-related activities and outcomes. The committee will also report its activities along with antibiotic use and resistance data to QAPI Committee at least on an annual basis.

3. Responsibilities
   a. Ensure appropriate use of antimicrobials through development and implementation of institutional policies, procedures, treatment algorithms, or other relevant initiatives

Some facilities prefer a brief policy version. A summarized modifiable version was developed by Nebraska ASAP and template is available at: https://asap.nebraskamed.com/institutional-policy-template-for-ltcf-asp/
Form an Antibiotic Stewardship Committee/Team

Required

• Infection Preventionist
• Medical Director or a designated lead physician
• Director of Nursing or Assistant Director of Nursing
• Consultant Pharmacist

Optional

• Administrator
• Prescribing Provider (Attending Physician, Nurse Practitioner or Physician Assistant)
• Nurse representative
• Nurse Aid representative
• Allied Health Professional
• Representative from the Resident and Family Council

Committee should meet at least quarterly and review policy/program annually and as needed
Task Antibiotic Stewardship Committee with Specific Responsibilities

Antibiotic Stewardship Committee should:

• Support and promote antibiotic use protocols

• Develop and maintain a system to monitor antibiotic use

• Develop and maintain a system to monitor resistance data

• Report antibiotic use and resistance data regularly to frontline staff and prescribing providers along with goals of antibiotic stewardship programs

• Provide education on antibiotic stewardship to prescribing providers and nursing staff in addition to residents and families
Antibiotic Use Protocols

Antibiotic use protocols include:

• Requirement of specific dose, duration and indication with all antibiotic orders

• Introduction of standardized tools and criteria for assessment and communication of infections (tools may also include decision support algorithms)

• Guidance on prescribing based on national recommendations and facility specific data which also highlights choosing narrow-spectrum antibiotics whenever possible

• Emphasis on reassessment of empiric antibiotics after 2 to 3 days for appropriateness and necessity (Post-Prescribing Review or Antibiotic time out)
Effectiveness of Assessment/ Communication Tool

A – Assessment (check boxes and determine recommendation prior to call)

Resident with indwelling catheter:
- fever of 100°F (38°C) or 2°F (1°C) greater than baseline
- 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), multiple at 99°F (37°C) or above, or 2°F (1°C) degrees greater than baseline AND 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.

☐ 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.

Antibiotic use for Asymptomatic bacteriuria

Nursing Home with over 25% utilization

Pre-Intervention: 73.15%
Post-Intervention: 69.64%

Nursing Home with less than 25% utilization

Pre-Intervention: 49.35%
Post-Intervention: 68.78%

McMaughan DK et al. BMC Geriatr. 2016 Apr 15;16:81
Available Assessment/Communication Tools

Suspected SST **SBAR**

Complete this form before contacting the resident's physician.

Date/Time __________________

Nursing Home Name ____________________________

Resident Name ______________________ Date of Birth ____________

Physician/NP/PA ______________________ Phone ___________

Fax __________

Nurse ______________________ Facility Phone ___________

Submitted by □ Phone □ Fax □ In Person □ Other ___________

**S Situation**

I am contacting you about a suspected skin and soft tissue infection for the above resident.

Suspected LRI **SBAR**

Complete this form before contacting the resident's physician.

Date/Time __________________

Nursing Home Name ____________________________

Resident Name ______________________ Date of Birth ____________

Physician/NP/PA ______________________ Phone ___________

Fax __________

Nurse ______________________ Facility Phone ___________

Submitted by □ Phone □ Fax □ In Person □ Other ___________

**S Situation**

I am contacting you about a suspected lower respiratory tract infection for the above resident.

Suspected UTI **SBAR**

Complete this form before contacting the resident’s physician.

Date/Time __________________

Nursing Home Name ____________________________

Resident Name ______________________ Date of Birth ____________

Physician/NP/PA ______________________ Phone ___________

Fax __________

Nurse ______________________ Facility Phone ___________

Submitted by □ Phone □ Fax □ In Person □ Other ___________

**S Situation**

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

https://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/toolkit3-minimum-criteria.html
Some facilities prefer to send a single page fax to the provider instead of a two page form.

Modified single page versions of communication tools for suspected UTI and lower respiratory tract infections are available at Nebraska ASAP Website.

https://asap.nebraskamed.com/sbar-communication-tool-template-for-suspected-urinary-tract-infection/
Post – Prescribing Review of Antibiotics

- Cluster RCT in 30 NHs in United Kingdom
- Introduced a form with Part A to be filled out at the start of antibiotic and Part B after 48 hour of treatment
- No additional intervention
- Part A was filled 86% of time and Part B 57% of time
- Antibiotic starts unchanged
- Antibiotic utilization decreased by 10%

SBAR Communication Tool Template for Antibiotic Time-Out

**[Facility Logo]**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td><strong>Situation:</strong> I am calling to follow-up on [resident's name: ] who was started on antibiotics recently.</td>
</tr>
</tbody>
</table>
| B | **Background:** This patient was started on:  
  |   | Antibiotic #1: ___________________________ Start date: ____________ |
  |   | Antibiotic #2: ___________________________ Start date: ____________ |
  |   | For:  
  |   | □ UTI  □ Pneumonia  □ Bronchitis  □ Skin infection  □ GI infection  
  |   | □ Fever of unknown source  □ Other, specify: ___________________________ |
  |   | Vital signs at initial presentation were as follows: BP _____ / _____  HR _____  Resp. rate _____  Temp. _____  O2 Sats. _____  
  |   | Symptoms and positive exam findings at that time were: ____________________________________________________________________________________ |
  |   | The diagnosis fits:  
  |   | □ McGee criteria  □ Loeb criteria  □ Neither  □ Assessment tool not used |
| A | **Assessment:**  
  |   | Current vital signs: BP _____ / _____  HR _____  Resp. rate _____  Temp. _____  O2 Sats. _____  
  |   | Since starting antibiotic(s), the resident:  
  |   | □ now has no signs or symptoms of infection  □ has remained the same  
  |   | □ has improved but continues to have signs and symptoms of: ____________________________________________________________________________ |
  |   | □ has new or worsening signs/symptoms of: ____________________________________________________________________________________ |
  |   | Microbiology culture results (fax microbiology report if available):  
  |   | □ has not returned yet  □ has no growth  □ was not obtained  
  |   | □ has positive Gram stain/growth of [specify Gram stain/microorganism: ___________________________]  
  |   | Is susceptible to the antibiotic(s) prescribed:  
  |   | □ Yes  □ No  □ Don’t know  □ Not tested by lab  □ Not yet performed by lab  
  |   | Other antibiotics the organism is sensitive to: ____________________________________________________________________________________ |
| R | **Recommendation:**  
  |   | □ Patient is not improving and needs further evaluation.  
  |   | □ Patient has improved and needs final antibiotic therapy plan.  
  |   | Nurse’s Signature: ___________________________ Date/Time: ___________________________  
  |   | Faxed or Called to: ___________________________ By: ___________________________ Date/Time: ___________________________  
  |   | **Physician Orders/Response (Please check all that apply)**  
  |   | □ I have reviewed the above SBAR.  
  |   | □ Continue current antibiotic to complete a total antibiotic course of _____ days. Specify Antibiotic End date: ___________________________  
  |   | □ Change antibiotic therapy to:  
  |   | □ Drug: ___________________________ Dose: ____________ Route: ____________ Frequency: ____________ Duration: ___________________________  
  |   | □ Stop antibiotic now  
  |   | □ Other (Please specify): ____________________________________________________________________________________  
  |   | Physician Signature: ___________________________ Date/Time: ___________________________  
  |   | Please Fax Back To: ___________________________ or □ Telephone Order  
  |   | *File Under Physician Order/Progress Notes*
Education of Nursing Staff and Providers About Guidelines

- Cluster RCT in 58 NHs in Sweden
- Prescribing guideline disseminated through interactive case-based sessions w/ nurses & providers
- Total antibiotic prescriptions decreased and wait and see approach by physicians increased

Tracking Antibiotic Use

• Require review of antibiotics:
  • On admission to and transfer out of the facility.
  • When it is prescribed by a provider not on facility’s staff (like ED provider)
  • Of all ongoing and completed courses of antibiotics by consultant and/or dispensing pharmacists during monthly medication review

• Periodic (quarterly) Tracking of adherence to antibiotic use protocols

• Conduct at least an annual review of antibiotic use data in the facility to identify:
  • Specific antibiotic that is being excessively used or
  • Providers who are using excessive antibiotics as compared to their peers.

• Reach out to pharmacy to provide antibiotic use data and/or use infection/ antibiotic start log to obtain antibiotic use measurements like:
  • Antibiotic starts/ 1000 resident days
  • Days of therapy/ 1000 resident days
### January Infection and Antibiotic Start Log

<table>
<thead>
<tr>
<th>Resident</th>
<th>Room</th>
<th>Diagnosis</th>
<th>Antibiotic</th>
<th>Start Date</th>
<th>Stop Date</th>
<th>Days of Therapy</th>
<th>Prescriber</th>
<th>Lab Sent</th>
<th>Test Date</th>
<th>Culture f/u at 48-72h?</th>
<th>Pathogen</th>
<th>Result Date</th>
<th>Community vs. Facility</th>
<th>Assessment / SBAR Tool Completed?</th>
<th>Criteria Met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>135B</td>
<td>UTI</td>
<td>nitrofurantoin</td>
<td>1/2/16</td>
<td>1/4/16</td>
<td>3</td>
<td>Dr. Lexin</td>
<td>UA, reflex C&amp;S</td>
<td>1/30/16</td>
<td>Yes</td>
<td>Proteus mirabilis</td>
<td>1/2/16</td>
<td>Facility</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>B</td>
<td>156A</td>
<td>SSTI</td>
<td>cephalixin</td>
<td>1/15/16</td>
<td>1/21/16</td>
<td>7</td>
<td>PA Cillin</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Facility</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>251B</td>
<td>UTI</td>
<td>ciprofloxacin</td>
<td>1/1/16</td>
<td>1/14/16</td>
<td>14</td>
<td>PA Cillin</td>
<td>UA, reflex C&amp;S</td>
<td>1/30/16</td>
<td>Yes</td>
<td>E coli</td>
<td>2/1/16</td>
<td>Community</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>D</td>
<td>551A</td>
<td>Pneumonia</td>
<td>azithromycin</td>
<td>1/20/16</td>
<td>1/26/16</td>
<td>7</td>
<td>Dr. Lexin</td>
<td>None</td>
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<td>NA</td>
<td>NA</td>
<td>Community</td>
<td>Yes</td>
<td>No</td>
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</tr>
<tr>
<td>E</td>
<td>431B</td>
<td>Pneumonia</td>
<td>amoxicillin-clavulanate</td>
<td>1/20/16</td>
<td>1/24/16</td>
<td>5</td>
<td>Dr. Peni</td>
<td>None</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>F</td>
<td>251B</td>
<td>C. difficile</td>
<td>vancomycin</td>
<td>1/14/16</td>
<td>1/23/16</td>
<td>10</td>
<td>PA Cillin</td>
<td>C. difficile PCR</td>
<td>1/13/16</td>
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<tr>
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<td>301A</td>
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<td>oseltamivir</td>
<td>1/1/16</td>
<td>1/5/16</td>
<td>5</td>
<td>Dr. Gripe</td>
<td>Flu swab</td>
<td>1/1/16</td>
<td>Yes</td>
<td>Influenza A</td>
<td>1/1/16</td>
<td>Facility</td>
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<td>302A</td>
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<td>oseltamivir</td>
<td>1/1/16</td>
<td>1/5/16</td>
<td>5</td>
<td>Dr. Gripe</td>
<td>Flu swab</td>
<td>1/1/16</td>
<td>Yes</td>
<td>Influenza A</td>
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<td>Facility</td>
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<td>Yes</td>
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<td>5</td>
<td>Dr. Gripe</td>
<td>Flu swab</td>
<td>1/1/16</td>
<td>Yes</td>
<td>Negative</td>
<td>1/1/16</td>
<td>Facility</td>
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<tr>
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<td>Facility</td>
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<td>levofloxacin</td>
<td>1/2/16</td>
<td>1/3/16</td>
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<td>Dr. Gripe</td>
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<td>NA</td>
<td>NA</td>
<td>Facility</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Type additional antibiotic start in the next row. Summary 1 & 2 data to the right of column “R” will automatically update in this tab and in the Summary tab.

Above template is available at Nebraska ASAP website: [https://asap.nebraskamed.com/infection-and-antibiotic-start-log-template-2/](https://asap.nebraskamed.com/infection-and-antibiotic-start-log-template-2/)

Different Antibiotic Tracking Template along with some other tools can also be found at: [http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes](http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes) Accessed 2/2/18
## Infection and Antibiotic Start Log Template

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days of Therapy / 1000 RD</td>
<td>69.35</td>
<td>38.73</td>
<td>41.87</td>
<td>29.91</td>
<td>56.47</td>
<td>80.43</td>
<td>54.29</td>
<td>58.95</td>
<td>37.80</td>
<td>65.73</td>
<td>53.33</td>
<td>58.33</td>
<td>620.25</td>
<td></td>
</tr>
<tr>
<td>Used Assessment Tool</td>
<td>86%</td>
<td>86%</td>
<td>75%</td>
<td>75%</td>
<td>100%</td>
<td>78%</td>
<td>85%</td>
<td>75%</td>
<td>100%</td>
<td>75%</td>
<td>80%</td>
<td>80%</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Met Criteria to Start ABX</td>
<td>67%</td>
<td>50%</td>
<td>50%</td>
<td>33%</td>
<td>100%</td>
<td>71%</td>
<td>50%</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>UA, reflex C&amp;S / 1000 RD</td>
<td>2.42</td>
<td>3.06</td>
<td>2.99</td>
<td>2.99</td>
<td>3.53</td>
<td>3.26</td>
<td>2.86</td>
<td>3.16</td>
<td>0.00</td>
<td>0.94</td>
<td>3.33</td>
<td>2.22</td>
<td>30.76</td>
<td></td>
</tr>
</tbody>
</table>

## Antibiotic Use and Infection Assessment Trends

![Graph showing trends for various parameters related to infection and antibiotic use.](image-url)
Tracking Resistance Data

- Perform at least annual review of surveillance data pertaining to microorganisms related to antibiotic use like:
  - Methicillin-resistant *Staphylococcus aureus*
  - Carbapenemase-resistant *Enterobacteriaceae*
  - *Clostridium difficile*
  - Any other drug resistant organism that a facility seems to be struggling with

- Make sure that the facility’s contract with laboratory includes provision of facility specific antibiogram

- Resistance data/ antibiogram should also be considered when developing facility specific antibiotic use guidance
Reporting/Feedback Process

• Antibiotic Stewardship Committee/team will be part of Infection Control and Prevention Program (IPCP).

• It will report progress to the Quality Assessment and Assurance (QAA) Committee at least annually.

• New CMS rules mandate IPCP to be reviewed at least annually.

• In addition to QAA committee, annual written feedback on facility’s antibiotic use and resistance data should be shared with:
  • Prescribing providers
  • Nursing Staff
  • Administration
  • Resident and Family Council

• Provide written feedback on antibiotic use for each provider on an annual basis.

• Also share facility specific antibiograms with all the prescribing providers.
Use of Nursing Home Antibiogram

- Up to 85% of treatment started empirically
- Where cultures available
  - only 32% of empiric antibiotic appropriate
- Antibiogram was distributed to Nursing Staff, Administrators and Physicians in a meeting.
- 6 months later there was a modest increase in appropriateness; however, the difference was not statistically significant

## Antibiotic Susceptibility Report for Most Frequently Isolated Gram-Negative Organisms (January 2015 to December 2016)

| Pathogen                  | Isolate Tested | Ampicillin | Amoxicillin/Sulbactam | Piperacillin/Tazobactam | Cefazolin | Cefepime | Cefotaxim | Ceftriaxone | Cefuroxime | Aztreonam |Errapenem | Meropenem | Amikacin | Gentamicin | Tobramycin | Ciprofloxacin | Levofloxacin | Trimethoprim/Sulfamethoxazole | Nitrofurantoin | Tetracycline |
|---------------------------|----------------|------------|------------------------|-------------------------|-----------|----------|-----------|-------------|------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|----------------|----------------|-----------------|----------------|-----------|
| **Escherichia coli**      | 111            | 53         | 59                     | 99                      | 86        | 98       | 92        | 97          | 91         | 98        | 100      | 100       | 91        | 91        | 58        | 59         | 76         | 99                    | 77              |                |
| **Klebsiella pneumoniae** | 41             | --         | 78                     | 98                      | 93        | 98       | 95        | 98          | 93         | 98        | 100      | 100       | 100       | 98        | 98        | 95        | 95         | 93                    | 63              | 83              |
| **Proteus mirabilis**     | 41             | 98         | 98                     | 100                     | 100       | 100      | 100       | 100         | 100        | 100       | 100      | 100       | 100       | 100       | 75        | 75         | 75         | 75                    | 50              | 75              |
| **Pseudomonas aeruginosa**| 31             | --         | --                     | 97                      | --        | 97       | --        | 97          | --         | 84        | --       | --        | 90        | 100       | 74        | 77         | 71         | 71                    | --              | --              |

-- Denotes organism has intrinsic resistance to this antimicrobial
1. Nitrofurantoin is reported for urine sources only

### Summary for Gram-Negative Organisms

During the 2-year period between January 2015 and December 2016, a total of 111 *E. coli* were identified, making it the most commonly identified Gram-negative pathogen. Antibiotic susceptibility of these *E. coli* can be summarized as follows:

1. Oral antibiotics with the **highest** susceptibilities (in descending order) were:
   a. Nitrofurantoin (99%)
   b. Cefuroxime (91%)
   c. Cephalexin (86%, as indicated by cefazolin susceptibility)
   d. Trimethoprim/sulfamethoxazole (76%)

2. Susceptibilities of antibiotics available only in intravenous formulation (e.g., ceftriaxone) exceed 90%, except:
   a. Ampicillin/sulbactam (59%)
   b. Cefazolin (86%)

*Antibiotic susceptibility data can be useful for guiding selection of empiric antibiotic therapy for residents in whom culture and susceptibility data from the past few months are not available.*
Quarterly Antimicrobial Use Summary Report

This report summarizes all systemic antibiotics (IV, IM, PO) prescribed between [month/year] to [month/year]. A total number of [aa] antibiotic courses in [bb] patients were reviewed. During this three-month period, a total of [cc] antibiotic starts / 1000 resident-days (RD) and [dd] days of therapy (DOT) / 1000 RD were observed. The most common reasons for starting antibiotic therapy were [top 3 infectious syndromes]. The three most frequently prescribed antibiotics were [antibiotic names]. Of all the antibiotic courses initiated during this period, [ee]% of courses of therapy were appropriate based on [McGeer, Loeb] criteria. The table below further details antibiotic prescribing patterns and appropriateness during this period.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>New Antibiotic Start / 1000 RD</th>
<th>DOT / 1000 RD</th>
<th>Top 3 Antibiotics with highest DOT / 1000 RD</th>
<th>Top 3 Indications for Starting Antibiotic Therapy</th>
<th>Mer Criteria for Initiating Antibiotic Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Quarter: January to March</td>
<td>[cc]</td>
<td>[dd]</td>
<td>Ciprofloxacin (FF DOT/1000 RD)</td>
<td>UTI (ii %)</td>
<td>UTI (ii %)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cephalexin (SS DOT/1000 RD)</td>
<td>SSTI (jj %)</td>
<td>SSTI (mm %)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Amoxicillin (hh DOT/1000 RD)</td>
<td>ARI (kk %)</td>
<td>ARI (nn %)</td>
</tr>
</tbody>
</table>

Second Quarter: April to June

Third Quarter: July to September

Fourth Quarter: October to December

Abbreviations: RD = resident-day; DOT = days of therapy; UTI = urinary tract infection; SSTI = skin and soft tissue infection; ARI = acute respiratory infection

Sample Antibiotic Use Summary Report is available at Nebraska ASAP website.

https://asap.nebraskamed.com/antibiotic-use-summary-report-template/
This facility was highlighted in a report for successfully implementing ASP.

Multiple interventions were implemented including communication tools, vigorous review of antibiotic orders and introducing antibiograms.

However, one of the main interventions were to provide Antibiotic Report Card to the providers in addition to one on one discussions by medical director.

http://www.pewtrusts.org/~/media/assets/2016/04/apathtobetterantibioticstewardshipininpaitentsettings.pdf, Accessed January 27, 2018
Providing Education

- Educational programs should address:
  - Nursing staff
  - Prescribing providers
  - Families
  - Residents
  - Resident and Family Council

- Need of antibiotic stewardship program and its goals
- Understanding of antibiotic use protocols
- Responsibility of each healthcare worker for ensuring its implementation
- Dangers of antibiotic misuse
- Role of antibiotic stewardship program in promoting appropriate antibiotic use
After the course, nurses’ agreement that their role influences whether residents receive antimicrobials also increased significantly.

https://www.coursesites.com/webapps/Bb-sites-course-creation-BBLEARN/handleSelfEnrollment.htmlx?course_id=_348931_1 Accessed January 27, 2018
ANTIMICROBIAL STEWARDSHIP PROGRAM

What is an Antimicrobial Stewardship Program?
An Antimicrobial Stewardship Program is a set of systematic activities aimed to promote the appropriate use of antimicrobials.

- Improve quality of patient care and patient outcomes
- Minimize side effects from antimicrobials
- Limit the development of antimicrobial resistance
- Educate providers on when to prescribe antimicrobials, and the right drug, dose and duration to use

Why is Antimicrobial Stewardship Program needed?
- Up to 75% of antimicrobial use is considered inappropriate
- Inappropriate use will increase antimicrobial resistance and lead to unwanted side effects (Clostridium difficile infection)
- An Antimicrobial Stewardship Program can improve patient outcomes and reduce inappropriate antimicrobial use

Estimated minimum number of illnesses and deaths caused by antibiotic resistance:
- At least 2,049,442 illnesses, 23,000 deaths
- At least 250,000 illnesses, 14,000 deaths

Who should be part of the program?
Ideally everyone who is involved in the antibiotic use process:
- Medical Directors: set standards for antibiotic prescribing practices
- Directors of Nursing: set standards for nursing practices
- Infection Preventionists: be responsible for the Infection Prevention and Control Program and support Antimicrobial Stewardship Program activities
- Consultant Pharmacists: perform drug use review, provide antibiotic use data and assist with developing treatment guidelines
- Prescribers: prescribe antimicrobials only when clearly indicated
- Nursing staff: evaluate patient using standardized assessment tools and communicate patients’ symptoms to prescribers

How can Antimicrobial Stewardship Program be implemented?
Practical steps of implementation include:
1. Obtain program support from facility leadership
2. Partner with regional physicians or pharmacists with infectious diseases or antimicrobial stewardship expertise
3. Form an Antimicrobial Stewardship Committee
4. Review data on infection assessment practices, and antimicrobial use and resistance patterns
5. Determine program goals such as the types and extent of interventions (e.g., use assessment tools for all suspected infections, eliminate treatment of asymptomatic bacteriuria)
6. Educate prescribers and staff on the types, reasons and goals of the selected interventions
7. Track outcomes after implementation of interventions
8. Report and educate program activities and outcomes to prescribers, staff and residents/families

Antibiotics are responsible for almost 1 out of 5 emergency department visits for adverse drug events

This educational poster and other educational materials can be found at Nebraska ASAP website at following link:
https://asap.nebraskamed.com/antibiotic-stewardship-display-for-healthcare-personnel/
**Additional Resources for Educational Materials**

This pocket card is available at:


Other Educational resources for physicians, nurses and families/ residents can be found at:

http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/ltc/

https://nursinghomeinfections.unc.edu/

https://www.cdc.gov/longtermcare/index.html

www.ahrq.gov/NH-ASPGuide

http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes

Accessed February 1, 2018
Resources for ASP

https://asap.nebraskamed.com Accessed February 1, 2018

http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html Accessed February 1, 2018


https://nursinghomeinfections.unc.edu/ Accessed February 1, 2018

http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes Accessed February 1, 2018

http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/index.html Accessed February 1, 2018

www.ahrq.gov/NH-ASPGuide Accessed February 1, 2018
Summary of the Steps

1. Obtain leadership statement of support
2. Establish accountability
3. Partner with local experts or develop expertise within the facility
4. Develop Antibiotic Stewardship Protocol
5. Form an Antibiotic Stewardship Committee/Team
6. Task Antibiotic Stewardship Committee with Specific Responsibilities
   a) Support and promote antibiotic use protocols
   b) Develop and maintain a system to monitor antibiotic use
   c) Develop and maintain a system to monitor resistance data
   d) Report antibiotic use and resistance data regularly to frontline staff and prescribing providers along with goals of antibiotic stewardship programs
   e) Provide education on antibiotic stewardship to prescribing providers and nursing staff in addition to residents and families
Conclusions

• Implementing Antimicrobial Stewardship in long-term care facilities is a team effort.

• There are pros and cons for each of the interventions that have been studied.

• Facilities will have to decide which approach works best for them.

• CDC Core Elements for ASP in Nursing Homes need to be followed for establishing a successful program.

• Free resources and tools are available to help facilities implement various components of core elements.
Thank You

Questions?

https://asap.nebraskamed.com

Providing you with the resources to promote appropriate antibiotic use, improve patient outcomes and prevent antibiotic resistance.