Antimicrobial Stewardship in the Bureau of Prisons

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USPHS
Target Audience: Pharmacists and Pharmacist Technicians

ACPE#: 0202-0000-19-242-L01-P/T

Activity Type: Knowledge-based
Financial Disclosures

LCDR Deborah Long and LCDR Alisha Edmunds “declare(s) no conflicts of interest, real or apparent, and no financial interests in any company, product, or service mentioned in this program, including grants, employment, gifts, stock holdings, and honoraria.”

The American Pharmacist Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.
Objective 1: Describe basic antimicrobial stewardship principles

Objective 2: Discuss the roles and responsibilities of pharmacists’ involvement in antimicrobial stewardship

Objective 3: Discuss strategies pharmacists can use to optimize treatment of infections and reduce adverse events associated with antibiotic use
Question 1: The development of order sets, guidelines, and algorithms are an example of which antimicrobial stewardship strategy?

a) Diagnostic Stewardship  
b) Formulary management  
c) Syndrome-specific stewardship  
d) De-escalation
Question 2: Performing a urinalysis but only proceeding to urine culture if pyuria is present is an example of what antimicrobial stewardship strategy?

a) Prospective audit and feedback
b) Diagnostic Stewardship
c) Syndrome-specific stewardship
d) Automatic stop orders
Question 3: What is the most recent FDA safety alert regarding fluoroquinolones?

a) Restrict fluoroquinolone antibiotic use for certain uncomplicated infections

b) Increased risk of ruptures or tears in the aorta blood vessels

c) Use is associated with disabling and potentially irreversible serious adverse reactions that may occur together, including tendinitis and tendon rupture, peripheral neuropathy, and CNS effects

d) Use is associated with increased risk of mitral and aortic regurgitation
What is Antimicrobial Stewardship?

► IDSA: “..coordinated interventions designed to improve and measure the appropriate use of antimicrobials..”

► SHEA: “..coordinated strategies to improve the use of antimicrobial medications..”

► CDC: “..the effort to measure and improve how antibiotics are prescribed by clinicians and used by patients”

Right Bug. Right Drug.
Reduce Resistance. Improve Outcomes.
Antibiotic resistance threatens everyone.

Yearly... at least 2 million people are infected with antibiotic-resistant bacteria.

And at least 23,000 people die as a result.

30% deemed unnecessary equates to 47 million antibiotic courses each year.

Antibiotic Stewardship Programs and Activities can:

- Improve patient outcomes
- Decrease *Clostridium difficile* infections
  - ↓ antibiotic prescribing in outpatient settings by 10% ↓ *C. diff* by 17%
- Decrease antibiotic resistance
  - Could save 37,000 lives from antibiotic-resistant infections over 5 years
- Decrease costs
  - Annual savings of $200,000 to $400,000 in hospitals and other facilities
Pharmacists in Antimicrobial Stewardship

- Essential to Antimicrobial Stewardship Programs
  - Ensure each antibiotic has an indication
  - Ensure antibiotics are ordered correctly
  - Optimize dose
  - Follow-up on culture results and de-escalate, escalate, or stop treatment
  - Recommend IV to oral conversion
  - Assist in development of antibiotic use policies and educational documents
Evolution of Antimicrobial Stewardship in the BOP

- National initiatives evolving into the BOPs Antimicrobial Stewardship Program

  - From 2001 throughout 2014 there were several projects/presentations including:
    - Development of Clinical Practice Guidance documents (7)
    - National webinars (5) and presentations (3)
    - National Drug Utilization Evaluations (DUE)
Evolution of Antimicrobial Stewardship in the BOP

- National initiatives evolving into the BOPs Antimicrobial Stewardship Program
  - In 2015:
    - National DUE results were published
    - Stewardship was incorporated into the bureau’s strategic plan
    - Development of Clinical Practice Guidance document (1)
    - National webinars (3)
    - National presentation (1)
    - Antimicrobial Stewardship advisory group was created
Evolution of Antimicrobial Stewardship in the BOP

- Antimicrobial Stewardship Advisory Group
  - Initiated in 2015 with 7 members, expanded to 11 members by 2018
  - Monthly meetings to discuss current and upcoming projects
  - Development of the Clinical Guidance Document
  - Collaborated with infection control nurse to develop antimicrobial stewardship dashboard
### Outcomes of Antimicrobial Stewardship in the BOP

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<tbody>
<tr>
<td>Total antibiotic prescriptions</td>
<td>133,813</td>
<td>130,161</td>
<td>122,493</td>
<td>114,145</td>
<td>104,641</td>
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<td>Antibiotic prescriptions per 1,000 inmates</td>
<td>776</td>
<td>743</td>
<td>700</td>
<td>661</td>
<td>622</td>
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<td>% change of antibiotic prescriptions from previous year</td>
<td>__</td>
<td>-4.2%</td>
<td>-5.8%</td>
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# Outcomes of Antimicrobial Stewardship in the BOP

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<td>Total antibiotic</td>
<td>114,145</td>
<td>104,641</td>
<td>96,383</td>
<td>88,102</td>
<td>82,515</td>
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<td>Antibiotic prescriptions</td>
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<tr>
<td>per 1,000 inmates</td>
<td>661</td>
<td>622</td>
<td>608</td>
<td>575</td>
<td>538</td>
<td>516</td>
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<td>% change of antibiotic</td>
<td>-5.6%</td>
<td>-5.9%</td>
<td>-2.2%</td>
<td>-5.4%</td>
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<td>% change of antibiotic</td>
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<td>prescriptions from</td>
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Antimicrobial Stewardship Clinical Consultants

- Expanded efforts from Advisory Group to Clinical Consultants in 2019
  - Currently 1 Coordinator and 6 Clinical Consultants
  - Current fluoroquinolone prospective audit and feedback
  - Review and edit Clinical Guidance Document
  - Monitor data from dashboard and identify areas of focus
  - Annual partnership with CDC for U.S. Antibiotic Awareness Week
Antimicrobial Stewardship Consultant Goals and Initiatives

► Assist institution, regional, and central office clinicians in appropriate therapy selection and disease state management

► Conduct antimicrobial medication reviews to include appropriate therapy interventions

► Assist in BOP formulary management of antimicrobial medications

► Collect and collate antimicrobial drug utilization evaluation and treatment data
Antimicrobial Stewardship Consultant Goals and Initiatives

- Monitor and present infectious disease cases
- Provide antimicrobial continuing education presentations
- Develop quick guides and educational handouts for providers and patients
- Evaluate, track, and trend antimicrobial usage
- Assist with IV to oral therapy conversions
Future Plans for Antimicrobial Stewardship in the BOP

- Transitions in care
- Prospective audit and feedback expanded to all broad spectrum antibiotics
- Quarterly antibiotic update
- Provider report cards
- Syndrome-specific stewardship
- Broad spectrum antibiotic formulary restrictions
Antimicrobial Stewardship Strategies

► To optimize treatment, reduce resistance rates, and decrease inappropriate prescribing
► Start small, pick an area of weakness, and start building your program

- Local treatment guideline development
- Prospective audit and feedback
- Formulary management
- Education
- CDC partnerships
- Pledge to use antibiotics responsibly
- Provider report cards
- Syndrome-specific stewardship
- Diagnostic stewardship
- Antibiotic dashboards
Clinical Guidance Document
First created in 2014
Condensed BOP specific summary of national guidelines, updates, and publications
Reviewed and updated frequently
Topics
- upper respiratory infections, CAP, otitis media, SSTIs, *Clostridium difficile* infections, UTIs, *H. pylori*, dental infections

Antimicrobial Stewardship
Federal Bureau of Prisons
Clinical Guidance
July 2019

Formulary Management

- Which antibiotics are overprescribed at your site?
- Formulary restriction to decrease use of broad spectrum agents
  - Azithromycin
  - Amoxicillin/clavulanate
- Linked disease states (ICD-10 codes) to antibiotics only if considered a first line agent
  - Example: amoxicillin/clavulanate for treatment of acute sinusitis
- Non-formulary requests required for all other indications
  - Example: azithromycin for acute bronchitis
  - Must provide justification for use
Education

- Presentations and updates
- Toolkit development
- Posters, flyers, and newsletters
- Electronic communications
- Culture and susceptibility document
- Transitions in care
- Quick dosing guides

**Targeted audience**

- Medical directors and providers
- Pharmacists
- Nurses and Infection Control
- Quality Improvement
- Dentists
- Laboratory staff
- Administrators
- Patients
US Antibiotics Awareness Week

- Partner with the CDC to raise awareness about antibiotics
  - 5 daily email messages
  - Antibiotic awareness flyers for inmates and staff
  - Newsletter articles
  - Patient case quizzes for staff
  - Desktop screen savers
  - Informational desk with pamphlets and flyers

CDC: https://www.cdc.gov/antibiotic-use/week/toolkit.html
Commitment Letters

A Commitment to Our Patients About Antibiotics

Antibiotics only fight infections caused by bacteria. Like all drugs, they can be harmful and should only be used when necessary. Taking antibiotics when you have a virus can do more harm than good. You will still feel sick and the antibiotic could give you a skin rash, diarrhea, a yeast infection, or worse.

Antibiotics also give bacteria a chance to become more resistant to them. This can make future infections harder to treat. It means that antibiotics might not work when you really do need them. Because of this, it is important that you only use an antibiotic when it is necessary to treat your illness.

How can you help? When you have a cough, sore throat, or other illness, tell your doctor you only want an antibiotic if it is really necessary. If you are not prescribed an antibiotic, ask what you can do to feel better and get relief from your symptoms.

Your health is important to us. As your healthcare providers, we promise to provide the best possible treatment for your condition. If an antibiotic is not needed, we will explain this to you and offer a treatment plan that will help.

We are dedicated to prescribing antibiotics only when they are needed, and we will avoid giving you antibiotics when they might do more harm than good.

Sincerely,

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.

“Be Antibiotics Aware. Smart Use. Best Care.”

CDC: https://www.cdc.gov/antibiotic-use/week/toolkit.html
Pledge to use antibiotics responsibly

- World Health Organization
- Goal to receive 1 million pledges
- General public, healthcare providers, food producers, animal health, and the government

WHO: https://pledge.antibioticawarenessweek.org/en/#2/-1.0/153.7
Provider report cards

- Reports prescribing rates for antibiotics
- Offers feedback on performance
- Monthly average data for individual provider vs. peers
- May be an easy way to receive modest reductions in prescribing habits
Aims to improve the management of specific disease states

- Standard interventions
- Syndromes
  - CAP, UTI, SSTIs, MRSA, CDI

Strategies:
- Guideline development
- Order sets
- Algorithms
- Diagnostic evaluations
Diagnostic stewardship

- To improve the process of ordering, performing and reporting diagnostic tests
- Addresses inappropriate test ordering → incorrect diagnosis and unnecessary antibiotics
- Great opportunity for laboratory and nursing partnership

Examples:
- Education on test ordering, interpretation, or collection
- Do not order or collect urine cultures in asymptomatic patients
- CDI
  - Only test symptomatic patients with diarrhea and suspicion of CDI
  - Do not repeat testing within 7 days
  - Do not test for cure
  - Avoid testing if on laxative w/in prior 48 hrs
Prospective audit and feedback-Fluoroquinolones

Consultant pharmacists are each assigned a region

Review all newly prescribed orders for fluoroquinolones

Send interventions through email

Document and collect data quarterly
  - Total FQ orders reviewed
  - Total recommendations made and accepted

Intervention types

Indications

DOT

FDA Drug Safety Communication:
- FDA advises restricting fluoroquinolone antibiotic use for certain uncomplicated infections; warns about disabling side effects that can occur together

FDA warns about increased risk of ruptures or tears in the aorta blood vessel with fluoroquinolone antibiotics in certain patients
Let the data talk!
Antibiotic Dashboard

- Antibiotic prescribing use data
- Developed to help sites identify areas for improvement
- Standardized data as #Rx/1000 patients

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
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<tbody>
<tr>
<td>Amoxicillin/Clav</td>
<td>4,295</td>
<td>4,696</td>
<td>5,351</td>
<td>5,301</td>
<td>5,678</td>
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<tr>
<td>Ciprofloxacin</td>
<td>5,929</td>
<td>5,556</td>
<td>5,155</td>
<td>4,554</td>
<td>3,960</td>
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<tr>
<td>cefTRIAxone</td>
<td>3,943</td>
<td>3,523</td>
<td>3,614</td>
<td>3,347</td>
<td>3,132</td>
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<tr>
<td>Azithromycin</td>
<td>3,769</td>
<td>3,480</td>
<td>3,452</td>
<td>3,195</td>
<td>3,003</td>
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<tr>
<td>metroNIDAZOLE</td>
<td>3,231</td>
<td>3,074</td>
<td>3,012</td>
<td>2,752</td>
<td>2,476</td>
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<tr>
<td>Levofloxacin</td>
<td>2,486</td>
<td>2,652</td>
<td>2,541</td>
<td>2,071</td>
<td>2,178</td>
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<tr>
<td>Nitrofurantoin</td>
<td>984</td>
<td>928</td>
<td>1,081</td>
<td>1,053</td>
<td>1,173</td>
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Amoxicillin/clav usage has increased
Levofloxacin use has remained steady

Antibiotic usage and outcomes data in the BOP
Data Collection

Antibiotic use measures
- Days of therapy (DOT)
- Defined daily dose (DDD)
- #Rx/1000 patients

Outcome measures
- Impact of interventions
- Rates of CDI
- Antibiotic resistance rates
- Antibiotic costs
Azithromycin and Amoxicillin/Clavulanate prescribing rates

Prescribing rates for Azithromycin & Amoxicillin/Clavulanate before and after formulary restriction

- Azithromycin: 45%↓
- Amoxicillin/Clavulanate: 22%↓

### Fluoroquinolone data—Prospective audit and feedback

#### July 1, 2019-September 30, 2019 data

<table>
<thead>
<tr>
<th></th>
<th>North East</th>
<th>South East</th>
<th>Mid-Atlantic</th>
<th>North Central</th>
<th>South Central</th>
<th>Western</th>
<th>Totals</th>
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<tbody>
<tr>
<td>Total FQ orders reviewed by consultants</td>
<td>140</td>
<td>151</td>
<td>150</td>
<td>81</td>
<td>259</td>
<td>52</td>
<td>833</td>
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<tr>
<td>Total recommendations</td>
<td>38</td>
<td>50</td>
<td>23</td>
<td>16</td>
<td>36</td>
<td>29</td>
<td>192</td>
</tr>
<tr>
<td>Recommendations accepted (%)</td>
<td>42%</td>
<td>14%</td>
<td>52%</td>
<td>32%</td>
<td>22%</td>
<td>59%</td>
<td>34%</td>
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18% decrease in total Fluoroquinolone rxs from FY18 to FY19
Fluoroquinolone data - Prospective audit and feedback

July 1, 2019 - September 30, 2019 data

**Intervention types**

- Stop Therapy: 79
- Change Antibiotic: 71
- Shorten Therapy: 15
- Adjust Dose: 12
- More Information Needed: 11
- De-escalate: 2
- Prolong Therapy: 2

**STOP THERAPY**

**CHANGE ANTIBIOTIC**

**SHORTEN THERAPY**

**ADJUST DOSE**

**MORE INFORMATION NEEDED**

**DE-ESCALATE**

**PROLONG THERAPY**
Antibiotic Dashboard - raw data

30% decrease in overall prescribing from FY14 to FY19

Antibiotic Dashboard - Rx per/1000

FY 11: 776 Rx/1000 inmates
FY 18: 538 Rx/1000 inmates

30% decrease in # Rx/1000 inmates from FY11 to FY18

What can YOU do as an antimicrobial steward!

► Build partnerships
► Engage healthcare personnel (physicians, nurses, advanced practice providers, lab, quality control personnel)
► Educate
  ► CDC Training on Antibiotic Stewardship: offers up to 8 hours of CE
► Promote a culture of appropriate antibiotic use
► Make the right thing easy to do
► Pledge to use antibiotics responsibly

The point is NOT to implement everything but to choose a specific intervention that’s important to your facility
Self-Assessment

**Question 1:** The development of order sets, guidelines, and algorithms are an example of which antimicrobial stewardship strategy?

a) Diagnostic Stewardship  
b) Formulary management  
c) **Syndrome-specific stewardship**  
d) De-escalation
Question 2: Performing a urinalysis but only proceeding to urine culture if pyuria is present is an example of what antimicrobial stewardship strategy?

a) Prospective audit and feedback
b) Diagnostic Stewardship
c) Syndrome-specific stewardship
d) Automatic stop orders
**Question 3**: What is the most recent FDA safety alert regarding fluoroquinolones?

a) Restrict fluoroquinolone antibiotic use for certain uncomplicated infections

b) **Increased risk of ruptures or tears in the aorta blood vessels**

c) Use is associated with disabling and potentially irreversible serious adverse reactions that may occur together, including tendinitis and tendon rupture, peripheral neuropathy, and CNS effects

d) Use is associated with increased risk of mitral and aortic regurgitation
Key Take-Aways

► Antimicrobial stewardship is essential
► Interdisciplinary participation is crucial for a successful program
► Review your data
► Start with a small targeted intervention
► Expand program as opportunities arise
► Circle back to your data to monitor success and sustainability
“You can’t go back and make a new start, but you can start right now and make a brand new ending.”

~James Sherman


References


Closing Remarks

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