Antimicrobial Stewardship 101: Fighting Fatal Infection
Target Audience: Pharmacists
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Activity Type: Knowledge-based
Disclosures

I have no actual or potential conflicts of interest in relation to this presentation.

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Opinions expressed today are those of the presenter and do not represent positions or views of the Department of Veterans Affairs or the U.S. Government.

The American Pharmacists Association is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.
Learning Objectives

1. Describe current patterns of antibiotic resistance in the United States, including pathogens identified by the Centers for Disease Control and Prevention as urgent or serious threats.

2. Define antimicrobial stewardship and the rationale behind extending antimicrobial stewardship into the ambulatory setting.

3. Summarize the core elements of community antimicrobial stewardship.

4. Identify novel approaches to implement antimicrobial stewardship in the community.
1. Assessment Question

Infections caused by resistant organisms are most frequent in which health care setting:
A. Hospitals
B. Nursing homes
C. Community
D. There is no difference
1. Assessment Question

Infections caused by resistant organisms are most frequent in which health care setting:
A. Hospitals
B. Nursing homes
C. **Community**
D. There is no difference
2. Assessment Question

Unnecessary and incorrect antibiotic prescribing in primary care clinics is approximately:

A. 20%
B. 50%
C. 70%
D. 90%
2. Assessment Question

Unnecessary and incorrect antibiotic prescribing in primary care clinics is approximately:

A. 20%
B. 50%
C. 70%
D. 90%
3. Assessment Question

Why is antibiotic stewardship needed?
A. Resistance is increasing
B. Limited antibacterial drug development
C. Serious adverse drug events
D. All of the above
3. Assessment Question

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C. Serious adverse drug events
D. All of the above
4. Assessment Question

What are the CDC Core Elements to Outpatient Antibiotic Stewardship?

A. Commitment; Action for policy and practice; Tracking and reporting; Education and expertise
B. Plan; Do; Study; Act
C. Right drug; Right dose; Right time; Right route; Right patient
D. Formulary restrictions; Education; Pharmacist champion
4. Assessment Question

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ANTIMICROBIAL STEWARDSHIP 101: FIGHTING FATAL INFECTION
WHAT’S THE PROBLEM?

C. difficile

Resistance

ADEs
ADVERSE DRUG EVENTS

ANTIBIOTICS ARE RESPONSIBLE FOR ALMOST 1 OUT OF 5 EMERGENCY DEPARTMENT VISITS FOR ADVERSE DRUG EVENTS

ANTIBIOTICS ARE THE MOST COMMON CAUSE OF EMERGENCY DEPARTMENT VISITS FOR ADVERSE DRUG EVENTS IN CHILDREN UNDER 18 YEARS OF AGE.

RESISTANCE

Estimated minimum number of illnesses and deaths caused annually by antibiotic resistance*:

At least 2,049,442 illnesses,
23,000 deaths

*bacteria and fungus included in this report

“Antibiotic resistant infections can happen anywhere. Data show that most happen in the general community.”

RESISTANCE

Resistance of *Streptococcus pneumoniae* to Penicillins

Resistance of *Streptococcus pneumoniae* to Macrolides

Resistance of *Staphylococcus aureus* to Oxacillin (MRSA)

Resistance of *Escherichia coli* to Aminopenicillins

Resistance of *Escherichia coli* to Fluoroquinolones

RESISTANCE

URGENT Threat

- *C. difficile*
- CRE
- *Neisseria gonorrhoeae*

SERIOUS Threat

- MRSA
- VRE
- *Streptococcus pneumoniae*
- ESBL
- *Candida sp.*

CONCERNING Threat

- Group A & B *Streptococcus*

C. difficile


**C. difficile**

- Increasingly reported in the community in young, healthy persons
- In CA-CDI cases:
  - 13.5% recurrence
  - 1.3% death
  - 35.9% no antibiotic exposure!
- 30% of community-associated *C. difficile* cases had a health care exposure of ‘dental office visit’

**Figure 1.** Estimated U.S. Burden of *Clostridium difficile* Infection (CDI), According to the Location of Stool Collection and Inpatient Health Care Exposure, 2011. Of the estimated cases of community-associated CDI, 82% were estimated to be associated with outpatient health care exposure. CO-HCA denotes community-onset health care–associated infection, HO hospital onset, and NHO nursing home onset.

C. difficile

- Drivers of CDI = Antibiotic use and poor infection control
- Every antibiotic has been associated with CDI:
  - Clindamycin > penicillins > cephalosporins

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio (OR)</th>
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<tbody>
<tr>
<td>Quinolones</td>
<td>2.3-12.7</td>
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<tr>
<td>Clindamycin</td>
<td>1.8-4.8</td>
</tr>
<tr>
<td>B-lactams</td>
<td>1.9</td>
</tr>
<tr>
<td>1st gen cephalosporins</td>
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<tr>
<td>3rd gen cephalosporins</td>
<td>1.6-5.4</td>
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<td>Proton pump inhibitors</td>
<td>2.4-5.0</td>
</tr>
<tr>
<td>Histamine H2 blockers</td>
<td>2.0</td>
</tr>
</tbody>
</table>

WHAT CAUSED THE PROBLEM?

- Antibiotic use
- Poor communication
- Time delay of dx tools
- Lack of drug development
DRUG DEVELOPMENT

- End of the antibiotic era?
- Limited antibacterial drug development
- Older, more toxic antibiotics being used
- Bad bugs, need drugs 10 x ‘20 initiative
  - FDA-approved agents= ceftaroline

NEW ANTIBIOTICS WON’T SAVE US...

How are antibiotics being prescribed?
Antibiotic Expenditures by Health Care Setting

Antibiotics = $10.7 billion

- Community: 61.5%
- Hospital: 33.6%
- NH/LTFC: 4.9%

Source: NSP

Antibiotic Prescriptions (Rx) in the Community

258 million dispensed RX for oral antibiotics

833 oral antibiotic Rx / 1000 population

Antibiotic RX Trends, 2006-2014

Antibiotic Class by Provider Group

- At least **1 in 3** antibiotics prescribed in primary care visits are unnecessary

- Primary indication for antibiotics in the community are for upper respiratory tract infections (URTI)

- **52%** of antibiotics for URTI were inappropriate

WHAT CAN WE DO?

Infection Prevention  Surveillance

Antibiotic Stewardship  Development

& improving diagnostic tools (rapid diagnostic testing)

Slide credit: Dr. Lauri Hicks, CDC.
ANTIBIOTIC STEWARDSHIP

Activity that promotes appropriate use of antibiotics:
- Selection – Is an antibiotic needed? Best agent?
- Dosing – Is the appropriate dose prescribed?
- Route – Can an oral formulation be used (vs IV)?
- Duration – Is the duration excessive? Is short-course therapy appropriate?

Goals:
- Improve patient outcomes
- Reduce preventable antibiotic-related events
- Improve antibiotic susceptibilities
- Optimize resource utilization

ANTIBIOTIC STEWARDSHIP

- Why is stewardship needed?
  - Antibiotics are overprescribed
  - Antibiotics are not ‘safe’ drugs
  - Antibiotic use increases the prevalence of resistance
  - Antibiotic use increases the likelihood of colonization/infection with resistant organisms
    - Associated with poor outcomes and mortality
  - Antibiotic armamentarium is dwindling
ANTIBIOTIC STEWARDSHIP STRATEGIES

- Education and educational resources
- Guidelines and disease management pathways
- Clinical decision support systems
- Delayed prescribing (“Watchful Waiting”)
- Point-of-care testing
- Public pledges to prescribe antibiotics appropriately
- Prospective audit with intervention and feedback
- Academic detailing
- Formulary restriction and preauthorization
- Communication strategies


DOES STEWARDSHIP WORK?

- Increase good patient outcomes
- Decrease antibiotic resistance
- Decrease *C. difficile* infections
- Decrease costs

CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP

- CDC guidance on the most effective stewardship strategies
  - Core Elements of Hospital Antibiotic Stewardship Programs
  - Core Elements of Antibiotic Stewardship for Nursing Homes
  - Core Elements of Outpatient Antibiotic Stewardship
- Many resources available:
  - Print materials
  - Continuing education
  - Treatment recommendation summaries

CORE ELEMENTS - TARGET AUDIENCE

- Prescribers
- Pharmacists
- Health leaders
- Outpatient health care settings
  - Medical clinics
  - Urgent care
  - Retail clinics
  - Emergency departments
  - Dental practices
  - Ambulatory surgery

CORE ELEMENTS OF OUTPATIENT ANTIBIOTIC STEWARDSHIP

Commitment
Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.

Action for policy and practice
Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.

Tracking and reporting
Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or have clinicians assess their own antibiotic prescribing practices themselves.

Education and expertise
Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.

CORE ELEMENTS

- Public commitments to support antibiotic stewardship
- Identify a stewardship leader
- Include stewardship duties as part of job responsibilities
- Use consistent patient messaging by all clinic staff

CORE ELEMENTS

**CLINIC ACTION**
- Communication skills training
- Require written explanation for nonrecommended antibiotics
- Provide clinician decision support for the management of common infections
- Use resources to prevent unnecessary visits
  - Includes pharmacist consultations

**CLINICIAN ACTION**
- Use evidence-based diagnosis and treatment recommendations
- Delayed prescribing (or “watchful waiting”)

CORE ELEMENTS

**CLINIC ACTION**
- Implement a system to track antibiotic prescribing
- Assess and share progress towards appropriate antibiotic prescribing goals

**CLINICIAN ACTION**
- Evaluate antibiotic prescribing
- Participate in continuing education and quality improvement initiatives

CORE ELEMENTS

- CLINIC ACTION
  - Academic detailing
    - Include pharmacists!
  - Provide continuing education opportunities
  - Timely access to persons with expertise
    - Include pharmacists!

- CLINICIAN ACTION
  - Education patients
  - Provide patient education materials

CORE ELEMENTS - ASSESSMENT

Figure 1. Clinician Checklist for Core Elements of Outpatient Antibiotic Stewardship

CDC recommends that outpatient clinicians take steps to implement antibiotic stewardship activities. Use this checklist as a baseline assessment of policies and practices that are in place. Then use the checklist to review progress in expanding stewardship activities on a regular basis (e.g., annually).

**COMMITMENT**

1. Can you demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety related to antibiotics? [ ] Yes [ ] No
   - Indicate which of the following are in place (select all that apply):
     - Write and display public commitments in support of antibiotic stewardship.

**ACTION**

2. Have you implemented at least one practice to improve antibiotic prescribing? [ ] Yes [ ] No
   - Indicate which practices you use. (Select all that apply):
     - Use evidence-based diagnostic criteria and treatment recommendations.
     - Use delayed prescribing practices or watchful waiting, when appropriate.

**TRACKING AND REPORTING**

3. Do you monitor at least one aspect of antibiotic prescribing? [ ] Yes [ ] No
   - Indicate which of the following are being tracked. (Select all that apply):
     - Self-evaluate antibiotic prescribing practices.
     - Participate in continuing medical education and quality improvement activities to track and improve antibiotic prescribing.

**EDUCATION AND EXPERTISE**

4. Do you provide education to patients and seek out continuing education on antibiotic prescribing? [ ] Yes [ ] No
   - Indicate how you provide antibiotic stewardship education. (Select all that apply):
     - Use effective communications strategies to educate patients about when antibiotics are and are not needed.
     - Educate about the potential harms of antibiotic treatment.
     - Provide patient education materials

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NOVEL APPROACHES TO IMPLEMENT STEWARDSHIP IN THE COMMUNITY
OUTPATIENT STEWARDSHIP EXPERIENCE #1

- Stewardship strategy: Local treatment recommendations

- Stakeholders:
  - Academician
  - Community pharmacist
  - Community pharmacy
  - Medical clinic (FQHC)
  - Medical clinic system

OUTPATIENT STEWARDSHIP EXPERIENCE #2

- **Stewardship strategy:** Public pledge combined with education

- **Stakeholders:**
  - Academicians
  - Department of Health
  - Health plan
  - Acute care ID pharmacist
  - Health care professional societies
  - CDC Office of Antibiotic Stewardship
  - Medical clinic
  - Medical clinic system

OUTPATIENT STEWARDSHIP EXPERIENCE #3

- **Stewardship strategy:** Data-driven focus on unnecessary prescribing in dentistry

- **Stakeholders:**
  - Academicians
  - Acute care ID pharmacist
  - Dentist leaders
  - Dental clinic
  - Dental clinic system

KEYS TO SUCCESS

- Leadership support and buy-in from stakeholders
- Don’t do it alone: find partners!
- Focus on conditions where antibiotics are unnecessary, but are frequently prescribed
  - Respiratory tract infections
  - Pharyngitis
- What is feasible for your practice?
- Start low, go slow...
What is the impact of free antibiotic programs on population health?

CONCLUSIONS

- We are in the midst of a public health crisis and stewardship is urgently needed in the community
  - The majority of antibiotic prescribing occurs in the community
  - Other countries have lower prescribing rates
- Stewardship has been shown to improve antibiotic prescribing in outpatient health care settings
- While outpatient stewardship models are scarce, guidance and evidence-based interventions are ready for real-world implementation
- Continued tracking of antibiotic prescribing/use is imperative to national stewardship efforts. Providing these results in an actionable format to antimicrobial stewards will contribute to an effective learning health care system
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READING LIST


