Outpatient Antimicrobial Stewardship

Michael J. Smith, MD, MSCE
Julianne V. Green, MD, PhD
Bethany A. Wattles, PharmD

Objectives

At the end of the presentation, attendees will be able to:

1. Summarize antimicrobial stewardship concepts and their application in the outpatient setting
2. Summarize current antibiotic prescribing trends across Kentucky
3. Apply principles of outpatient diagnostic stewardship to their own clinical practice
4. Apply outpatient antimicrobial stewardship interventions in their own clinical practice

Kentucky Antibiotic Awareness is a state-wide campaign to encourage appropriate antibiotic use throughout Kentucky.

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Antibiotic Adverse Effects (AE)

• CDC, 2011-2015: US adults
  • 145,490 ED visits for antibiotic AEs each year
  • 13.7% of all ED visits for adverse drug events
  • Most frequent classes: sulfonamides (23.2%), penicillins (20.8%), quinolones (15.7%)

• CDC, 2011-2015: US children
  • 69,464 ED visits for antibiotic AEs each year
  • 46.2% of all ED visits for adverse drug events
  • 40.7% involved a child ≤ 2 yo
  • 86.1% involved an allergic reaction
  • Amoxicillin was most frequent

A Call to Action

Antimicrobial Stewardship

• Definition
  • Coordinated interventions designed to improve and measure the appropriate use of agents by promoting the selection of the optimal drug regimen including dosing, duration of therapy, and route of administration

• Goals
  • To optimize clinical outcomes while minimizing unintended outcomes of antimicrobial use
  • To reduce healthcare costs without adversely impacting quality of care

Outpatient Antibiotic Prescribing

• An estimated 80-90% of antibiotic use occurs in the outpatient setting
• At least 30% of antibiotics prescribed in the outpatient setting are unnecessary
• Total inappropriate use, including inappropriate drug selection, dosing, and duration, may approach 50% of all outpatient use
Kentucky Antibiotic Prescribing

- Kentucky has the highest antibiotic prescribing rate in the US for all ages and children

Antibiotic prescribing in KY children

Antibiotic prescribing by provider type
Sinusitis

- 98% of cases are viral and antibiotics are not guaranteed to help even if the causative agent is bacterial

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Management</th>
</tr>
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<tbody>
<tr>
<td>Bacterial diagnosis is based on symptoms that are: • Severe (&gt;3 - 4 days) • Persistent (10d) without improvement • Worsening (3 - 4 days)</td>
<td>If bacterial infection is established: • Watchful waiting is encouraged • First line: amoxicillin or amoxicillin-clavulanate • Macrolides are NOT recommended due to high levels of Strep pneumo resistance (40%)</td>
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Acute Otitis Media (AOM)

- Most common childhood indication for antibiotics
- 4-10% of children treated experience adverse effects

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<td>Requires either: • Moderate or severe bulging of TM or new onset otitis media (not due to otitis externa) • Mild bulging of TM AND recent (&lt;48h) onset of otalgia or intense erythema</td>
<td>Consider watchful waiting • First line: amoxicillin • Amoxicillin-clavulanate is recommended in certain situations</td>
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Bronchitis

- Cough is most common symptom for adults visiting their PCP
- Acute bronchitis is the most common diagnosis in these patients

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<td>Evaluation should focus on ruling out pneumonia, which is rare in otherwise healthy adults. • Colored sputum does NOT indicate bacterial infection • Chest radiography generally not indicated</td>
<td>Antibiotics are not recommended in uncomplicated acute bronchitis • Symptomatic therapy: • Cough suppressants • First-generation antihistamines • Decongestants</td>
</tr>
</tbody>
</table>

Common Cold or Non-Specific URI

- Can be caused by over 200 viruses
- Usually lasts around 5-10 days

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<td>Often characterized by nasal discharge, congestion, cough Fever, if present, occurs early in illness</td>
<td>Symptomatic relief • Adults: decongestants with first-generation antihistamine • Potential harm and no benefit from OTC medications in children &lt;6 yo</td>
</tr>
</tbody>
</table>
Communication Training

- Avoid inappropriate prescribing
- Increase patient satisfaction
- Decrease visit length

Dialogue Around Respiratory Illness Treatment (DART)
- Communication training in Module 6 of CDC Training on Antibiotic Stewardship

Key Communication Practices:
1. Review your Physical Exam findings
2. Deliver a clear diagnosis
3. Use a 2-part negative/positive treatment recommendation
   - Negative treatment recommendations to “rule out” the need for antibiotics:
     - “This is a cold, which antibiotics won’t work against”
   - Positive treatment recommendations for symptom relief:
     - “Raising the head of her bed will help with the drainage from her nose so she won’t cough so much”
4. Provide a contingency plan
Communication Training

Note: Patients/parents tend to question the treatment plan after a negative recommendation. Avoid this by using the following structure:

- "On the one hand, antibiotics won’t help…” [negative recommendation]
- "On the other hand, there are things you can do…” [positive recommendation]

Guideline Review

Infectious Diseases Society of America (IDSA)
- Sinusitis
- Group A Strep Pharyngitis
- Community-Acquired Pneumonia
- Uncomplicated Cystitis and Pyelonephritis
- Skin and Soft Tissue Infections
- Influenza

American Academy of Pediatrics (AAP)
- Sinusitis
- Acute Otitis Media (AOM)
- Urinary Tract Infection (UTI)

Other Conditions
- Common Cold/Upper Respiratory Infection (URI)
- Bronchitis

When Diagnosis Requires Testing: Roles of Diagnostic and Antimicrobial Stewardship

- Clinical evaluation
  - Laboratory
  - Antimicrobial stewardship
  - Diagnostics & treatment
- Patient
- Problem list
- Differential diagnosis
- History & physical exam

Example: A Really Good Test

- The test will correctly identify 99% of the people who have the disease
- And only incorrectly 1% of the people who don’t have the disease
- If a patient has the disease the probability they test positive is 99% (true positive)
- If a patient does not have the disease the probability they nevertheless test positive is 1% (false positive)
- You test a child at random for a disease that has a prevalence of 0.1% (1/1000)
- The test is positive- what do you tell mom?
So even though the test is positive, you only have a 9% chance of being right when you tell mom the child has the disease.
General Concepts

A Good Test:
Will seldom miss a diagnosis (high sensitivity)
Will seldom sound a “false alarm” (high specificity)
Few tests are perfectly accurate
Sensitivity and specificity are often opposite
For a test to be useful it is not necessary for both to be high
It IS necessary for the provider to understand where the strength of each test lies

Diagnoses That Involve a Testing Step

Pharyngitis

• In children, accounts for >7 million annual visits to primary care providers
• Viruses are the most common cause

Why Test for Group A strep Pharyngitis?

• Treatment prevents progression to acute rheumatic fever and other suppurative complications
• More immediate improvement of symptoms
• Decreases person-to-person transmission
• Safely avoid use of antibiotics in those who do not have Group A strep pharyngitis
• Decrease development of resistance

When to Test

• Sudden onset
• Sore throat, high fever
• Age 5-15 years
• Tender anterior LAN
• Tonsilopharyngeal exudates, palatal petechiae
• HA, N/V, abdominal pain
When to Test

• EBV infection is usually clinically indistinguishable from Group A strep

Age Ranges in Children with Compatible Clinical Scenario

• 5-15 years, down to 3 years
• IDSA guidelines:
  • Not indicated for children <3 years old
  • Strep pharyngitis rare in this age group
  • Acute rheumatic fever is rare

When NOT to Test

• Obvious viral symptoms:
  • Cough
  • Rhinorrhea
  • Oral ulcers
  • Hoarseness
  • Conjunctivitis
  • Diarrhea
  • Viral exanthem

Many Things Can Cause Pharyngitis

• Viral URIs
• Irritation from:
  • Allergies
  • Post-nasal drip
  • Persistent cough
  • Smoke exposure
• Herpetic etiology
• Aphthous ulcers
• Others
• Reasons children have been strep tested inappropriately:
  • Irritability
  • Foul breath odor
  • Longstanding sore throat in absence of fever
  • FUO in children <2yo (even infants)
  • “Test of cure”
  • Asymptomatic contact of sibling

Why is the test positive if my patient doesn’t have Group A strep pharyngitis?

• Asymptomatic carriage of Group A strep can be as high as 25%
• Can persist for many months
• Risk of transmission to others is low

Testing
**Group A strep Rapid Antigen Test**
- High Specificity
- Lower Sensitivity
- If negative => do backup culture
- Do not need backup culture if positive

If positive, makes condition more likely
If negative, does not rule out condition

**Take Home Points- Strep Testing in Children**
- Testing in right clinical scenario
- Do not test if: cough, rhinorrhea, oral ulcers or hoarseness
- No “test of cure”
- Treatment: Amoxicillin
  - To date: no penicillin-resistant Group A strep has ever been isolated
- Guidelines: idsociety.org

**Pharyngitis - Adults**
- Group A Streptococcal (GAS) infection is the only common indication for antibiotic therapy for sore throat
- Only 5-10% of adult sore throat cases are caused by GAS

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<tr>
<td>Those who meet 2 or more criteria should receive RADT</td>
<td>Antibiotic therapy is NOT recommended for negative RADT</td>
</tr>
<tr>
<td>Fever</td>
<td>First line therapy: amoxicillin and penicillin V</td>
</tr>
<tr>
<td>Tonsillar exudates</td>
<td>Duration: 10 days</td>
</tr>
<tr>
<td>Tender cervical lymphadenopathy</td>
<td>Resistance to azithromycin and clindamycin are increasing</td>
</tr>
<tr>
<td>Absence of cough</td>
<td></td>
</tr>
<tr>
<td>Throat cultures are not routinely recommended</td>
<td></td>
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</table>

RADT: Rapid antigen detection test

**Urilalysis and Urine Culture**

**When to Suspect UTI**
- Infants/young children: fever, irritability, lethargy, poor feeding, vomiting, dehydration
- Children/adolescents/adults: flank pain, fever, chills, nausea/vomiting
  - Dysuria, frequency, incontinence, urgency
  - Pain in suprapubic/flank region
- Malodorous urine has NOT been correlated with UTI
Urinalysis

• Can be performed on any specimen, including bag specimen

• BUT the specimen must be fresh (<1 hr at RT or <4 hrs refrigerated) to ensure the sensitivity and specificity of the urinalysis

• MUST be used in conjunction with properly obtained urine culture to confirm UTI

Roberts et al., 2011 (AAP UTI Guidelines)

Components of the Urinalysis

- "Dipstick"
  - pH Line
  - Glucose Line
  - Specific Gravity Line
  - Nitrite Line
  - protein Line

- "Microscopy"
  - White Blood Cells: "pyuria" defined as at least 5 WBCs/hpf
  - In microscopic analysis
  - Leukocyte esterase: enzyme produced by WBC's
  - In urine dipstick, surrogate for WBC's
  - High sensitivity, but low specificity
  - Finding of pyuria "by no means" confirms UTI
  - Nitrite
  - Dietary nitrates => nitrite
  - Highly specific, but not sensitive
  - Most gram-positive cocci will not produce nitrates.
  - (Staph saprophyticus and Enterococcus)
  - Pseudomonas does not
  - Forms in about 4 hours (infants may not hold urine that long)

Roberts et al., 2011 (AAP UTI Guidelines)

Presence of Any Requires Urine Culture:

- WBC: "pyuria" defined as at least 5 WBCs/hpf
  - In microscopic analysis
- Leukocyte esterase: enzyme produced by WBC's
  - In urine dipstick, surrogate for WBC's
  - High sensitivity, but low specificity
  - Finding of pyuria "by no means" confirms UTI
- Nitrite
  - Dietary nitrates => nitrite
  - Highly specific, but not sensitive
  - Most gram-positive cocci will not produce nitrates.
  - (Staph saprophyticus and Enterococcus)
  - Pseudomonas does not
  - Forms in about 4 hours (infants may not hold urine that long)
- Bacteria

Roberts et al., 2011 (AAP UTI Guidelines)

Urine Culture- Appropriate Source

- Catheterized specimen
  - The only time a urine culture from a bag is worth something is if it is negative
  - Use of a bagged specimen can cause harm
    - 4-12 times more likely to be unnecessarily:
      - Recalled back to the ED
      - Treated with antibiotics
      - Subjected to radiologic procedures
      - Hospitalized

Roberts et al., 2011 (AAP UTI Guidelines)
**Diagnosis of UTI**

- Clinical suspicion
- Properly collected sample
- Urinalysis: presence of WBC, LE, Nitrite or Bacteria
- Catheterized urine
- Culture Results

**Growth that Constitutes UTI**

- Catheterized urine
- Properly collected sample
- Urinalysis: presence of WBC, LE, Nitrite or Bacteria
- Culture Results

**Appropriate Empiric Oral Therapy for UTI**

- Amoxicillin-Clavulanate
- Trimethoprim-Sulfamethoxazole
- Cephalosporins
  - Cefixime
  - Cefpodoxime
  - Cefprozil
  - Cefuroxime axetil
  - Cephalexin
- Duration: 7-14 days

**Urinary Tract Infection (UTI) – Adolescents/Adults**

- Among the most common infections in women
- Usually caused by *E. coli*

**Diagnosis Management**

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<td>Urinalysis: nitrites and leukocyte esterase are most accurate indicators</td>
<td>Treatment of asymptomatic bacteruria is not recommended</td>
</tr>
<tr>
<td>Urine Culture</td>
<td>First line: nitrofurantoin, trimethoprim/sulfamethoxazole, fosfomycin</td>
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<tr>
<td></td>
<td>Fluoroquinolones should be reserved for situations in which other agents are not appropriate</td>
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**CDC Treatment Recommendations:**

[www.cdc.gov/antibiotic-use/community/for-hcp/outpatient-hcp/index.html](http://www.cdc.gov/antibiotic-use/community/for-hcp/outpatient-hcp/index.html)
Barriers to Outpatient Stewardship

- Patient expectations and satisfaction
- Time constraints
- Diagnostic uncertainty
- Externalized responsibility

Eastern Kentucky Interviews

- 25 provider interviews completed
- Parent phone interviews in progress
- Issues discussed:
  - Antimicrobial resistance
  - Patient expectations
  - Strategies for change

Commitment

- Identify leadership
- Join the Listserv
- Add stewardship to job descriptions/evaluations
- Display office posters
**Provider Education**

CDC Training on Antibiotic Stewardship

[https://www.train.org/cdctrain/training_plan/3697](https://www.train.org/cdctrain/training_plan/3697)

- Section 1: Antibiotic Resistance and the benefits of antibiotic stewardship
- Section 2: Antibiotic stewardship in outpatient settings
- Section 3: Antibiotic stewardship considerations for the management of common outpatient conditions and dentistry
- Section 4: Antibiotic stewardship in emergency departments, hospitals, and nursing homes.

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**Patient Education**

- In office education
  - Patient handouts
- TV and computer screens
- Community education
  - Schools, churches, libraries, TV, radio, newspaper, health fairs, social media

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**Children’s Activities**

- [Image of children’s activities]

**Action**

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Protocol Development</th>
<th>Clinical Decision Support</th>
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<tbody>
<tr>
<td>Provider Feedback</td>
<td>Indications or Written Justification</td>
<td></td>
</tr>
<tr>
<td>Delayed Fill or Watchful Waiting</td>
<td>Triage Visits</td>
<td></td>
</tr>
<tr>
<td>UTI Treatment De-Escalation</td>
<td>Cefdinir Use</td>
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**Tracking and Reporting**

1. Track and report...
   - Antibiotic prescribing for one or more high-priority conditions
   - The percentage of all visits leading to antibiotic prescriptions
   - Complications of antibiotic use and antibiotic resistance trends among common outpatient bacterial pathogens
2. Assess and share performance on quality measures and established reduction goals addressing appropriate antibiotic prescribing from health care plans and payers
   - HEDIS
   - CMS Quality Payment Program

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**Incentives**

**CMS Quality Payment Program (QPP)**
- Quality: antibiotic-related measures
- Improvement activities: CDC training, ASP implementation
- Promoting interoperability: decision support, protocols, patient education

**Medicaid EHR Incentive Program**
- Quality measures
- Patient Centered Medical Home (PCMH)
  - QI and KM measures related to clinical decision support and performance results

For more information: KY Regional Extension Center
[http://www.kentuckytece.com](http://www.kentuckytece.com)
We want to hear from you!

- How can we continue to help?
- Address barriers
- Develop specific education materials
- Assist in implementation of stewardship initiatives in your practice
- Future educational events
- Tell us about your stewardship initiatives and successes
- Provide feedback/ideas

Email Us!
KYantibx@louisville.edu

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