No action today, no cure tomorrow

Combating Antimicrobial Resistance through Antimicrobial Stewardship

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Disclosures

Dr. Polisetty declares 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.
Learning Objectives

1. Describe how antibiotic use and misuse promote antimicrobial resistance
2. Identify techniques pharmacists, pharmacy students and technicians can use to optimize antimicrobial use through policies, education, and active interventions.
3. Recall where to find more information about wise use of antibiotics
What is the process by which resistant bacteria grow after a bacterial population is exposed to an antibiotic?

A. Selection Pressure
B. Antibiotic Spectrum
C. Infection Prevention
D. Antibiotic De-escalation
What are the goals of an Antimicrobial Stewardship Program?

A. Optimize clinical outcomes-through appropriate antimicrobial selection and dosing
B. Improve Patient outcomes
C. Reduce unintended consequences of antimicrobial overuse such as C. difficile
D. All the above
A clinician wishes to give a patient some printed information about coughs/colds and not treating viral infections with antibiotics. Where can a patient handout on this topic be easily obtained?

A. CDC Get Smart Website
B. Hospital’s Antibiotic Resources empiric use guideline
C. Hospital’s Antibiotic Resources dosing guideline
D. Azithromycin Package Insert
WHAT IS ANTIMICROBIAL RESISTANCE?
Antimicrobial Resistance

• Relative or complete lack of effect of an antibiotic on a previously susceptible microorganism
• An organism is able to grow in readily achievable serum concentrations of the antibiotic in question

OR

• Increase in MIC (minimum inhibitory concentration)- “MIC creep”
• Decrease in disk diffusion
Problems caused by resistance

- Poor outcomes
  - Increased treatment failures – inpatient and outpatient
  - Increased mortality in VAP, sepsis from inadequate initial therapy
  - Increase in *Clostridium difficile* rates and other antibiotic-resistant bacteria (MDR pathogens) in many hospitals
- Increased Costs
- Utilization of more toxic regimens
- Adverse events
- Long term consequences through disruption of microbiota and microbiome
Antibiotic Resistance
RISING THREAT OF ANTIBIOTIC RESISTANCE

Antibiotic Resistance – A National and Local Threat

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

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

* bacteria and fungus included in this report
Scary Statistics

- Estimated 2,000,000 infections with antibiotic resistant bacteria in the US each year.¹
  - Estimated 23,000 deaths per year related to antibiotic resistant bacteria.¹
- Estimated 50% of outpatient antibiotic prescribing might be inappropriate: drug prescribed; dose; duration; was antibiotic needed.²⁻⁴
  - Estimated 30% of outpatient antibiotic prescriptions are not needed.⁵

Relationship Between Antibiotics and Development Of Resistance
Drivers of Resistance - Antimicrobial Overuse and Misuse

- 60% of antibiotic expenditures occur in the ambulatory setting.  
- In 2013, approximately 269,000,000 antibiotic prescriptions were dispensed.
- Approximately 20% of pediatric visits and 10% of adult visits resulted in an antibiotic prescription.
- Complications include rashes and diarrhea to severe allergic reactions.
- The adverse drug reactions (ADRs) resulted in an estimated 143,000 ER visits.

Worse Yet...

- **Clostridium difficile** (C. diff.) infection – antibiotic use is the most important risk factor\(^\text{14}\)
- 2011 – estimated 453,000 cases – 1/3 were community acquired\(^\text{15}\)
- 35% adult and 70% of pediatric cases are community associated\(^\text{15,16}\)
- One study estimated a 10% reduction in outpatient antibiotic prescribing would result in a 17% reduction in community acquired C. *diff*\(^\text{17}\)
- Antibiotic stewardship can prevent avoidable adverse events resulting from antibiotics by reducing unnecessary antibiotic prescribing\(^\text{18-20}\)


## Antibiotic Use: Ambulatory Settings

### Acute Respiratory Tract Infections: Antibiotic Prescription Rates* (5 Years and Older)

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>1995-1996</th>
<th>2005-2006</th>
<th>Rate Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>64</td>
<td>33</td>
<td>0.51 (0.42 to 0.63)</td>
</tr>
<tr>
<td>Amoxicillin/clavulanic acid</td>
<td>8</td>
<td>11</td>
<td>1.44 (1.08 to 1.93)</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>38</td>
<td>22</td>
<td>0.59 (0.47 to 0.74)</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>6</td>
<td>37</td>
<td>6.2 (4.63 to 8.30)</td>
</tr>
<tr>
<td>Sulfonamides/tetracyclines</td>
<td>15</td>
<td>8</td>
<td>0.53 (0.35 to 0.81)</td>
</tr>
<tr>
<td>Quinolones</td>
<td>4</td>
<td>21</td>
<td>5.39 (3.95 to 7.36)</td>
</tr>
</tbody>
</table>

* Average annual rates for each period (per 1000 population)

Antibiotic Use: Emergency Department

- Antibiotics for asthma exacerbations
  - National asthma treatment guidelines suggest that asthma exacerbations are largely unresponsive to antibiotics.
  - Vanderweil et al.
    - Antibiotic prescription for acute asthma from 1993 to 2004: 22%
      - No significant change in prescribing frequency over the 12-year period.
    - Acute asthma cases receiving antibiotics decreased to 18% from 2003 to 2006.

Antibiotic Use: Emergency Department

• Fluoroquinolones

Community Antibiotic Prescribing Rates by State (2013/2014)*

50% of all antibiotics prescribed in U.S. health provider offices are either unnecessary or inappropriate

*Antibiotic prescriptions per 1000 persons
Prescribing data from 2014; population data from 2013
Source: IMS Health
Timeline of antibiotic resistance
Drivers of Antibiotic Resistance

**Antibiotic Use**
- Any antibiotic use causes selection pressure

_Prescribers_ are primarily responsible for 5 of 6 modifiable drivers of antibiotic resistance.

6 _Modifiable_ Drivers of Antibiotic Resistance

- **Unnecessary antibiotic use** causes selection pressure and harm
- **Unnecessary testing** and then treating + cultures
- **Unnecessarily broad** antibiotics
- **Wrong dosing**
- **Unnecessarily long antibiotic duration**
- **Hospital transmissions** (i.e. poor hand hygiene)
Selection Pressure – Happening in Patients near You

- **Selection pressure** is the process that favors survival of resistant strains through exposure of antimicrobials.

- **Decreasing unnecessary antibiotic use** is key to reducing selection pressure and thus reducing antibiotic resistance.
What is the process by which resistant bacteria grow after a bacterial population is exposed to an antibiotic?

A. Selection Pressure
B. Antibiotic Spectrum
C. Infection Prevention
D. Antibiotic De-escalation
SO WHAT ARE WE GOING TO DO ABOUT IT?
GOAL FOR COMBATING ANTIBIOTIC RESISTANCE

CARB Goal
- Reduction of inappropriate outpatient antibiotic use by 50% by 2020
- 30% of outpatient antibiotic use is unnecessary
- Goal: Reduction of overall outpatient antibiotic use by 15% by 2020

NATIONAL ACTION PLAN FOR COMBATING ANTIBIOTIC-RESISTANT BACTERIA

By 2020, significant outcomes of Goal 1 will include:

- Establishment of antibiotic stewardship programs in all acute care hospitals and improved antibiotic stewardship across all healthcare settings.
- Reduction of inappropriate antibiotic use by 50% in outpatient settings and by 20% in inpatient settings.
Timeline of Releases by CDC

• 2014 - CDC issues *Core Elements of Hospital Antibiotic Stewardship Programs*

• 2015 – CDC issues *Core Elements of Antibiotic Stewardship for Nursing Homes*

• November 2016 – CDC issues *Core Elements of Outpatient Antibiotic Stewardship*
Intended Audiences for Core Elements of Outpatient Antibiotic Stewardship

• Primary care clinics and clinicians
• Outpatient specialty and subspecialty clinics and clinicians
• Emergency departments and emergency medicine clinicians
• Retail health clinics and clinicians
• Urgent care clinics and clinicians
• Dental clinics and dentists
• Nurse practitioners and physician assistants
• Health care systems

Framework and Evidence-Based Literature


Core Elements of Antimicrobial Stewardship

- Commitment

- Action for Policy and Practice

- Tracking and Reporting

- Education and Expertise
What is “Antimicrobial Stewardship”? 

Cooperative behaviors that reduce patient harm by using antibiotics appropriately.

**Increased**
- Patient Safety
- Efficacy
- Patient Satisfaction

**Decreased**
- Adverse Events
- Antibiotic Resistance
- Length of Stay
- Costs
Goals and Objectives of ASP

• Optimize clinical outcomes
  • Through appropriate antimicrobial selection and dosing

• Improve Patient outcomes

• Reduce unintended consequences of antimicrobial overuse
  • Drug toxicity- adverse drug reactions
  • Emergence of resistance (MDR pathogens)
  • *C.Difficile* rates
  • Increased healthcare costs

[Clin Infect Dis 2007;44;159-177]
Learning Assessment Question

What are the goals of an Antimicrobial Stewardship Program?

A. Optimize clinical outcomes-through appropriate antimicrobial selection and dosing
B. Improve Patient outcomes
C. Reduce unintended consequences of antimicrobial overuse such as C. difficile
D. All the above
Antimicrobial stewardship refers to:

• Coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen
  • Dosing, duration of therapy, and route of administration
  • Achieving best clinical outcomes related to antimicrobial use while minimizing toxicity and other adverse events
  • Limiting the selective pressure on bacterial populations that drives the emergence of antimicrobial-resistant strains
  • Reducing excessive costs attributable to suboptimal antimicrobial use

SHEA, IDSA, PIDS. Infect Control Hosp Epidemiol 2012;33:322-327
Minimum Requirements of an Antimicrobial Stewardship Program

- A multidisciplinary interprofessional antimicrobial stewardship team
- A formulary limited to nonduplicative antibiotics with clinical need
- Institutional guidelines for the management of common infections
- Processes to measure and monitor antimicrobial use at the institutional level for internal benchmarking
- Periodic distribution of a facility-specific antibiogram
  - Rates of relevant antibiotic susceptibilities to key pathogens
Types of Antibiotic Stewardship Programs

- Prospective audits and feedback
  - More labor intensive
  - Can be restricted to certain hours
  - Involves continuous monitoring and intervention
  - Requires a good computer system to collate relevant data
  - More physician control

- Formulary restriction and Preauthorization
  - Less labor intensive
  - Requires an on-call program or pager system almost 24/7
  - More restrictive process
  - Physicians need preauthorizations to use certain antimicrobials
Supplemental Strategies

- Education
- Guidelines and Clinical Pathways
- Antimicrobial cycling
- Antibiotic Order Forms
- Combination Therapy
- Streamlining and de-escalation of therapy
- IV to PO conversion
- Dose Optimization
- Computer based surveillance
- Information technology for outcome measurement
Antibiotic Stewardship Works When Everyone Contributes and Communicates!

- **Clinicians**
  - Communicate with nurses and pharmacists
  - Order tests only when indicated
  - Use syndrome-specific guidelines
  - Perform daily antibiotic time-outs
  - Discontinue vancomycin when no longer necessary

- **Nurses**
  - Communicate with physician and pharmacist
  - Assess diarrhea and recommend not sending *C. difficile* test if not needed
  - Ask if antibiotic, PICC line, or foley-catheter is necessary
  - Chart number and consistency of bowel movements if there is concern about diarrhea

- **Pharmacists**
  - Communicate with physician and nurses
  - Ensure optimal antibiotic choice and dosing
  - Recommend antibiotic changes based on culture results
  - Address duration of therapy
  - Discontinue vancomycin when no longer necessary
  - Recommend converting patients to oral route when possible
  - Counsel patients on safe and effective use of antibiotics
Nurses, central to patient care and trust, will have a growing role in Antimicrobial Stewardship.

2017 American Nurses Association/Center for Disease Control and Prevention White Paper, “Redefining the Antimicrobial Stewardship Team.”
TOP 5 NM Antibiotic Stewardship Behaviors

1. **Document allergy histories clearly, including reaction type and severity.** Reported antibiotic allergies result in the use of second-line antibiotics and inferior outcomes.

2. **Perform Antibiotic Time Out** as a daily practice. Stop iv vancomycin at 48-72 hours, for instance, when no MRSA has been isolated from appropriate clinical samples. Avoid unnecessarily prolonged antibiotic durations.

3. **Avoid sending urinalysis/urine culture or treating positive urine cultures** if the patient does not have symptoms consistent with UTI (asymptomatic bacteriuria).

4. **Avoid prescribing fluoroquinolones (ciprofloxacin, levofloxacin) empirically for cystitis.** Alternative antibiotics have fewer chronic side effects and appears to be associated with increased risk of *C. difficile* diarrhea.

5. **Reduce** hospital-acquired *Clostridium difficile* infection by only testing stool samples from patients that meet clinical criteria (C Diff Test-worthy diarrhea).
NM CDH Antimicrobial Stewardship Program (ASP) Supports Appropriate Antibiotic Decision-making -- before & during hospitalization and at discharge

- Diagnosis-directed guidelines
- Antibiograms
- Order set development
- Pre-authorization

- Duration guidance
- Patient education
- Establish follow-up

- Formulary decisions
- Restriction criteria
- Education

- Audit and feedback
- IV to PO switches
- Drug-bug mismatch
ASP at NMH West Region

• ASP program inpatient setting since 2012 at NM CDH
• Part of the Antimicrobial Stewardship Collaborative with other NMH hospitals
• Developing guidelines, protocols and educational materials for staff and patient use
• ED Smart sets and outpatient order sets for quick references and antibiotic prescribing (Bronchitis, UTI, Pediatric CAP/UTI, Otitis Media, Pharyngitis, Sinusitis, SSTI)
Reducing Use of Resistant antibiotics

• “Once an antibiotic is proven to be effective and enters widespread human therapeutic use, its days are numbered” – Walsh C. Nature

• Best to reserve the broad spectrum antibiotics
  • ID consults
  • Automatic stop time
  • Adherence to order sets and pre-specified indications
Ambulatory Antimicrobial Stewardship Program at NM Ambulatory clinics

• Initial focus:
  • fluoroquinolone prescribing(?)
  • *C. difficile* prevention(?)

• Leverage physician champions
  • Work with Antimicrobial Stewardship Pharmacists at CDH and Delnor

• Leverage EPIC “Smart Sets”

• Increased educational focus and communication
  • 2017 NMPP Clinical Integration Measure
  • Patient Education
    • “Choosing Wisely” program
  • Provider Education
    • Physician CME

• Reporting and Tracking to Monitor Program Response
Treatment recommendations for common infectious indications
Treatment of Community Acquired Pneumonia

• Diagnosis
  • S/Sx- fever, chills, purulent cough
  • Positive chest X-Ray
  • Procalcitonin level >0.05
  • Respiratory pathogen panel (eliminate viral sources)
  • At least 1 blood samples drawn for culture
  • Urinary antigen tests for *Legionella pneumophila* and *Streptococcus pneumoniae*
  • Expectorated sputum samples collected for culture (endotracheal aspirate sample in intubated patients).

• Antibiotic Option in hospitalized patients-

<table>
<thead>
<tr>
<th>Antibiotic Option (Oral)</th>
<th>Antibiotic Options (Intravenous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefdinir plus azithromycin</td>
<td>Ceftriaxone 1-2 g IV Q 24 h + azithromycin 500 mg for 5 days</td>
</tr>
<tr>
<td>Augmentin plus azithromycin</td>
<td></td>
</tr>
<tr>
<td>Levofloxacin 750 mg PO x 5 days (for severe PCN allergy)</td>
<td>Levofloxacin 750 mg IV or PO Q24 h x 5 days</td>
</tr>
</tbody>
</table>

Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults, *Clinical Infectious Diseases*, Volume 44, Issue Supplement_2, 1 March 2007, Pages S27–S72, [https://doi.org/10.1086/511159](https://doi.org/10.1086/511159)
A 55-year-old female with no PMH is admitted with community-acquired pneumonia (CAP) and has completed 4 days of IV ceftriaxone and azithromycin. Her last fever was over 48 hours ago. She is hemodynamically stable, no longer needs supplementary oxygen, has baseline mentation, and is ready for discharge. The prescriber plans to send her home on an additional 10 days of azithromycin.

What is concerning about this plan’s potential to increase bacterial resistance? *Select the best answer.*

A. Unnecessarily long duration  
B. Keeping antibiotics unnecessarily broad  
C. Switching the patient to oral therapy
Adult Bronchitis
– Recommended Treatment Options

No antibiotics are recommended per guidelines for acute bronchitis lasting less than 3 weeks. For symptomatic therapies, please refer to the Guideline Summary:

Antitussive Treatment Options (Non-OTC)

- Guaifenesin plus Codeine syrup (100mg guaifenesin/10mg codeine per 5 mL) 5-10mL PO Q4-6 hours prn cough/congestion, #180mL, no refills

- Benzonatate (Tessalon Perles) 100mg caps #1-2 PO TID prn cough/congestion, do not exceed 600mg per day, #18, no refills

- Albuterol HFA 8g (90mcg/actuation) 1-2 puffs inhaled Q4-6 hours prn bronchospasm (#8g, no refills)
Adult Sinusitis
– Recommended Treatment Options

No antibiotics are recommended per guidelines for acute sinusitis lasting less than 10 days. For symptomatic OTC therapies, please refer to the Guideline Summary

**Symptomatic Treatment Options (Non-OTC)**
- Fluticasone propionate (Rx Flonase or Flonase OTC) 50mcg/spray 2 sprays per nostril once daily; may reduce to 1 spray per nostril once daily after 2-3 days as symptoms improve; #16g, no refills
- Triamcinolone acetonide (Nasacort Allergy 24 HR OTC) 55mcg/spray 2 sprays per nostril once daily; may reduce to 1 spray per nostril once daily after 2-3 days; #16.5g, no refills

**Antibiotics (if bacterial source highly likely; > 10 days of persistant symptoms consistent with bacterial disease [See Guideline])**
- Amoxicillin 875mg tab #1 PO BID, #14, no refills
- Amoxicillin/clavulanate (Augmentin 875mg) tab #1 PO BID, #14, no refills
- Doxycycline hyclate 100mg cap or tab #1 PO BID, #14, no refills

Source: CDH/Delnor ED Smart Set Adult Recommendations
Diagnosis and Treatment of Urinary Tract Infections - Updated UA/Urine cx orders
Treatment of Urinary Tract Infections

- Important to differentiate between asymptomatic bacteriuria and real infection
- Check pt s/sx, UA, urine culture
- Do NOT treat asymptomatic bacteriuria

Treatment duration
- Uncomplicated UTI (absence of fever and flank pain)- 3-5 days
- Complicated UTI/Pyelonephritis (fever, CVA tenderness, flank pain)– 7-14 days

<table>
<thead>
<tr>
<th>Antibiotic Options (Oral)</th>
<th>Antibiotic Options (Intravenous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin 100 mg BID x 5 days</td>
<td>Cefazolin 1-2 g IV Q 8h</td>
</tr>
<tr>
<td>Bactrim DS 1 BID x 3 days</td>
<td>Ceftriaxone 1g IV Q24h</td>
</tr>
<tr>
<td>amoxicillin-clavulanate, cefdinir, cefaclor, and cefpodoxime-proxetil, cephalexin x 3–7</td>
<td>Cipro 400 IV Q12 h (For severe PCN all)</td>
</tr>
</tbody>
</table>

International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: A 2010 Update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases
Adult Cystitis
– Recommended Treatment Options

Antibiotic selection listed below is based on local susceptibility rates for E.coli. Agents are listed in order of preference. Use of cephalosporins is considered safe in patients who report penicillin allergy that is only manifested as a rash.

1\textsuperscript{st} Line/Preferred Agents:
- Nitrofurantoin macrocrystal 100mg cap #1 PO BID x 5 days (do not use if CrCl < 60mL/min)
- Sulfamethoxazole/trimethoprim DS tab #1 PO BID x 3 days
- Cephalexin 500mg caps #1 PO BID x 7 days

2\textsuperscript{nd} Line Agents:
- Cefuroxime 250mg tab #1 PO BID x 7 days
- Ciprofloxacin 250mg tab #1 PO BID x 3 days (not preferred due to high rates of \textit{E.coli} resistance)
A 55-year-old male admitted with an acute closed wrist fracture is noted to have a 2-day-old urine culture + for *P. aeruginosa*. He is scheduled for his wrist surgery today. You confirm the patient has no new dysuria, suprapubic pain, urgency or hesitancy. He has no fevers. What is the best antibiotic management today? *Select the best answer.*

A. Cancel surgery. Await sensitivities and prescribe an appropriate antibiotic.
B. Prescribe piperacillin-tazobactam empirically as you wait for sensitivities.
C. He has asymptomatic bacteriuria. Within 30-60 minutes prior to the orthopedic surgery, administer routine prophylaxis, cefazolin, an antibiotic that does not have anti-Pseudomonal activity.
Treatment of skin and soft tissue infections

Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America
Acute or Subacute Diarrhea?

Yes

≥3 watery stools within 24 hours

No

Alternate explanation (i.e., laxative, PO contrast)?

Yes

C diff PCR previously sent within 7 days

No

Was the test positive?

Yes

No

Do not order C diff PCR. If diarrhea-causing medication present, stop medication and re-evaluate in 48 hours.

Order C diff PCR* (If <3 BMs after 24 hours and clinically stable, cancel order)

Do not send C diff PCR for test-of-cure. If diarrhea improving, continue current management. If diarrhea is worsening:
• Escalate therapy
• Consider ID consultation

Key Point: Avoid Unnecessary Testing
• The high sensitivity of C diff PCR results in high false positive rate
• Confirm clinical diagnosis of CDI (≥3 watery stools/24 hours)
• Confirm no presence of medication that can cause diarrhea
• Confirm no recent C diff PCR sent

*If concern for severe infection, start empiric treatment pending PCR result. If concern for megacolon, start empiric treatment and consider urgent surgical consultation.

NEW C. DIFF GUIDELINES PUBLISHED FEBRUARY 2018!

Clinical Practice Guidelines for Clostridium difficile Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA), Clinical Infectious Diseases, , cix1085, https://doi.org/10.1093/cid/cix1085
A patient admitted for suspected endocarditis was admitted 3 days ago and is receiving IV vancomycin and IV ceftriaxone. On rounds this morning he reports he had 3 watery stools two days ago but none since. A C diff PCR was ordered yesterday but no sample has been sent yet. Upon review of the medication profile, it is notable that the patient received an enema on the day of admission. What is the best action on the part of the attending physician? 

Select the best answer.

A. Tell the nurse to send the next stool for C diff PCR.
B. Cancel the test.
Quinolone Update

Adult Cystitis, Adult Bronchitis, Adult Sinusitis
Summary

- Quinolones (ciprofloxacin, etc.) are no longer indicated for most cases of uncomplicated UTIs, acute bronchitis, or acute sinusitis.
- This is due to the risks of tendon, joint, and muscle problems; arrhythmias; neuropathy; or CNS effects (confusion, etc.).
- Some of these may occur after one dose... and in rare cases are disabling and persistent.
- As a result, in July 2016, FDA revised the Boxed Warning, FDA’s strongest warning, to address these serious safety issues. FDA also added a new warning and updated other parts of the drug label, including the patient Medication Guide.
- Increasing quinolone resistance continues to be a major concern.

https://www.fda.gov/Drugs/DrugSafety/ucm511530.htm
Prescriber/Pharmacist’s Letter: July 2016; Vol: 32, No. 7
Information for Healthcare Professionals to Provide When Counseling Patients: Tendon Rupture Risk

- Pain, swelling, inflammation, and tears of tendons including the Achilles, shoulder, hand, or other tendons can happen in patients taking fluoroquinolone antibiotics. Tendons are the areas that connect your muscles to your joints. The Achilles tendon is at the back of the ankle. The chance of getting tendon problems is higher if you are:
  - over 60 years of age
  - taking steroids (corticosteroids)
  - a kidney, heart, or lung transplant recipient

- Other reasons for tendon ruptures include:
  - physical activity or exercise
  - kidney failure
  - tendon problems in the past, such as with rheumatoid arthritis

- Call your healthcare provider right away at the first signs or symptoms of pain, swelling or inflammation in a tendon area. These could be symptoms of tendinitis or tendon rupture. Stop taking your fluoroquinolone until a healthcare provider has determined that you do not have tendinitis or a tendon rupture. Signs or symptoms of tendon rupture include:
  - a snap or pop in a tendon area
  - bruising right after an injury in a tendon area
  - inability to move the affected area or bear weight

- At the first sign of pain, swelling, or inflammation in a tendon area, avoid exercise and use of the affected area.

- Talk to your healthcare provider about the risk of tendon rupture with continued use of a fluoroquinolone and whether you should be prescribed a different type of antibiotic to treat your infection.

New Requirements for Antimicrobial Stewardship by Regulatory Agencies
### NEW Antibiotic stewardship requirements

<table>
<thead>
<tr>
<th>CMS Issues Proposed Rule that Prohibits Discrimination, Reduces Hospital-Acquired Conditions, and Promotes Antibiotic Stewardship in Hospitals</th>
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<td>Date 2016-06-13</td>
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**Prepublication Requirements**

The Joint Commission has approved the following revisions for prepublication. While revised requirements are published in the semiannual updates to the print manuals (as well as in the online E-dition®), accredited organizations and paid subscribers can also view them in the monthly periodical The Joint Commission Perspectives®. To begin your subscription, call 877-223-6886 or visit http://www.jcrinc.com.

**New Antimicrobial Stewardship Standard**

<table>
<thead>
<tr>
<th>Applicable to Hospitals and Critical Access Hospitals</th>
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<td>Effective January 1, 2017</td>
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**Prepublication Requirements**

<table>
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<th>Improve Quality of care by</th>
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<tr>
<td>• Reducing readmissions</td>
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<tr>
<td>• Reducing barriers to care</td>
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<tr>
<td>• Reducing the incidence of hospital-acquired conditions (including healthcare-associated infections)</td>
</tr>
<tr>
<td>• Improving the use of antibiotics (including the potential for reduced antibiotic resistance)</td>
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<tr>
<td>• Addressing workforce shortage issues; and</td>
</tr>
<tr>
<td>• Improving patient protections</td>
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[https://www.jointcommission.org/topics/hai_antimicrobial_stewardship.aspx](https://www.jointcommission.org/topics/hai_antimicrobial_stewardship.aspx)
Antibiotic Stewardship in Primary Care and Specialty Practices

- In-services
- Formal education
- Antibiogram
- Stewardship booklet
When NOT To give Antibiotics

Antibiotics are not necessary based on national guidelines
• Viral upper respiratory infection (i.e. common cold)
• Bronchitis, bronchiolitis
• Influenza
• Non-suppurative otitis media (fluid in the middle ear)
• Viral pneumonia
• Asthma, allergy

If prescribed for appropriate indications (PNA, UTI)
• Correct dosing based on pt weight
• Correct Duration
How to get patients interested

• Takes time
• Best advice is to sit down and talk with the patient while being careful about terminology
  • CDC has good resources to help
  • Infection Prevention has some strategies to speak with patients and families
• Informational Brochures regarding impact of inappropriate use. (ex C. Diff)
• Discuss alternative options such as cough suppressants or inhalers to alleviate symptoms
CDC: Get Smart Campaign

What To Do
✓ Talk with your healthcare provider about antibiotic resistance.
✓ When you are prescribed an antibiotic,
  • Take it exactly as the doctor tells you. Complete the prescribed course even if you are feeling better.
  • If treatment stops too soon, some bacteria may survive and re-infect you.
  • This goes for children, too. Make sure your children take all medication as prescribed, even if they feel better.
  • Throw away any leftover medication once you have completed your prescription

What Not To Do
✓ Antibiotics cure bacteria, not viruses such as:
  • Colds or flu;
  • Most coughs and bronchitis;
  • Sore throats not caused by strep; or
  • Runny noses.
Choosing Wisely® is an educational program intended to assist physicians and patients with making appropriate choices regarding topics including medical tests and antibiotic use. “You don’t really need that <<insert>>.”

The Choosing Wisely modules were developed in collaboration with national medical specialty societies and are designed to help providers and patients talk about necessary tests and procedures.

Printed materials support physician communication.

Sample Choosing Wisely® Resource
Choosing Wisely Sample Resources
www.choosingwisely.org

Colds, flu, and other respiratory illnesses in adults:
When you need antibiotics—and when you don’t

If you have a sore throat, cough, or sinus pain, you might expect to take antibiotics. After all, you feel bad, and you want to get better fast. But antibiotics don’t help most respiratory infections, and they can even be harmful. Here’s why.

**Antibiotics kill bacteria, not viruses.** Antibiotics fight infections caused by bacteria. But most respiratory infections are caused by viruses. Antibiotics can’t cure a virus.

**Virus causes:**
- All colds and flu
- Almost all sinus infections
- Most bronchitis (short colds)
- Most sore throats, especially with a cough
- Runny nose, hoarse voice, or mouth soreness

**Antibiotics have risks.** Antibiotics can upset the body’s natural balance of good and bad bacteria. Antibiotic causes:
- Nausea, vomiting, and severe diarrhea
- Vaginal infections
- Neural damage
- Tiredness
- Life-threatening allergic reactions

Many adults go to emergency rooms because of antibiotic side effects.

**Overuse of antibiotics is a serious problem.** Wide use of antibiotics leads to a “superbug” threat. These are bacteria that become resistant to antibiotics. They can cause drug-resistant infections, even disability or death. The resistant bacteria—the superbugs—can also spread to family members and others.


Cómo Elegir Sabiamente™
Una iniciativa de la Fundación ABIM

Antibióticos para infecciones del oído en niños
Cuándo se necesitan y cuándo no

Mejor niños contra infecciones del oído. Por lo general, son el oído medio, cerca del timpano. Es posible que las causen una bacteria o virus. A menudo, los doctores tratan las infecciones bacterianas con antibióticos. Los antibióticos son medicamentos posteriores que matan las bacterias.

Los recién nacidos y niños bebés y niños menores antroantibioticos. (Ver la siguiente página). Sin embargo, usar antibióticos con demasiada frecuencia puede ser nocivo. A continuación se da la razón:

En la mayoría de los casos, no se necesitan antibióticos.
- No funcionan para infecciones causadas por virus.
- No pueden aliviar el dolor.
- Por lo general, las infecciones virales y muchas infecciones bacterianas desaparecen solo en los oídos, especialmente en los niños mayores de dos años.

Primero, llama al doctor y trata el dolor. Si sospecha que su hijo tiene una infección del oído, debe llamar al consultorio del doctor y describir los síntomas. Por lo general, el doctor debe poderle decir cuántos días necesita de infección o en los niñas.

El primer signo de una infección del oído es dolor, especialmente el primer día, y el oído podría tener fuentes.

Consejo: Diagnóstico de un análisis de venta libre como:
- Anticoncepción (gema) para infecciones y genitales.
- Despiertos (dolor) para niños y genitales. Los antibióticos no deben el dolor después de eso. Por lo tanto, los antibióticos son un tratamiento importante, y por lo general, son el único tratamiento que se necesita.

Northwestern Medicine®
Choosing Wisely - Resource
www.choosingwisely.org

Choosing Wisely
An initiative of the ABIM Foundation

Antibiotics for a sore throat, cough, or runny nose
When children need them—and when they don’t

If your child has a sore throat, cough, or runny nose, you might expect the doctor to prescribe antibiotics. But most of the time, children don’t need antibiotics to treat a respiratory illness. In fact, antibiotics can do more harm than good. Here’s why:

Antibiotics work best in treating bacterial infections. If your child has a bacterial infection, antibiotics may help. But if your child has a virus, antibiotics will not help your child feel better or keep others from getting sick.

- Most colds and flu are viruses.
- Chest colds, such as bronchitis, are also usually caused by viruses. Bronchiolitis is a cough with a lot of thick, sticky phlegm or mucus. Cigarette smoke and particles in the air can also cause bronchiolitis. But bacteria are not usually the cause.
- Most sinus infections (sinusitis) are also from viruses. The symptoms are a lot of mucus in the nose and post-nasal drip. Mucus that is colored does not necessarily mean your child has a bacterial infection.

In most cases, antibiotics will not help your child. Usually, antibiotics do not work against colds, flu, bronchitis, or sinus infections because these are viruses. Sometimes bacteria cause sinus infections, but even then the infection usually clears up on its own in a week or so. Many common ear infections also clear up on their own without antibiotics.

Some sore throats, like strep throat, are bacterial infections. Symptoms include fever, redness, and trouble swallowing. However, most children who have these symptoms do not have strep throat. Your child should have a test to confirm that it’s strep, and then, if it’s needed, the doctor will prescribe antibiotics.

Antibiotics have risks
Side effects from antibiotics are a common reason that children dislike taking them. The drugs can cause diarrhea or vomiting, and about 5 in 100 children have allergic reactions. Some of these allergic reactions can be serious and life-threatening.

Oxacillin antibiotics also cause strong stomach pain. The stomach pain can be hard to handle, and some children will not eat until the pain goes away. This is sometimes called “antibiotic aversion.” The stronger bacteria often spread from your child’s other family members at home and schools, causing infections that are more difficult to cure and more costly to treat.

Antibiotics are a waste of money if used incorrectly.
Most antibiotics do not cure colds, that many school endings that are not needed in newborns. Also, in newer cases, treatment of infections that are antibiotic-resistant costs much more costs $23,000.

When does your child need antibiotics?
Your child may need antibiotics if:
- a cough does not get better in 3 to 4 days.
- a bacterial form of pneumonia or sinusitis is diagnosed.
- symptoms of pneumonia do not get better in 4 days, or they get better and worsen again.
- your child has a yellow or green nasal discharge and a fever of at least 100 F for several days in a row.
- your child’s strep throat, based on a rapid test or an throat culture. Antibiotics should not be prescribed unless one of the tests shows strep. The test cannot be diagnosted just by looking at the throat.

Advice from Consumer Reports
How to manage colds and flu
Make sure your child gets enough rest and fluids.
Ask your doctor about antibiotic treatment.

Stuffy nose:
- Use saline nasal rinse or drops or spray. For infants, use a rubber bulb to suction out the extra phlegm or snot.
- Put a cool mist humidifier or vaporizer in your child’s room. Close the doors.

Cough:
- For children ages 6 to 12 years, half the tablespoon of honey does not help cough in children under 6 years old.
- For those ages 6 to 12 years, over-the-counter cough suppressant for children 6 to 12 years old.
- Consider cough drops for children 6 and older.

Fever:
- Don’t give your child aspirin, which has been linked to a rare but serious illness called Reye’s syndrome.
- If your child has a fever, give ibuprofen or acetaminophen.
- Ask the doctor about the right medicine and dose for your child’s age and size.

Flu vaccine:
- Children 6 months or older should get the vaccine each year.
- For young children, make sure the nurse asked them if they have the flu vaccine.

Over-the-counter cough and cold medicines:
- Do not give these products to children under age 6.
- Many cold medicines already have acetaminophen in them, so be aware of double-drugging.
- If antibiotics are prescribed, be sure your child takes them for the full course of treatment, even if they feel better.

Consumer Reports Healthy Children
Consumer Health Watch
Health Watch

02/2012
Viruses or Bacteria
What's got you sick?

Antibiotics only treat bacterial infections. Viral illnesses cannot be treated with antibiotics. When an antibiotic is not prescribed, ask your healthcare professional for tips on how to relieve symptoms and feel better.

<table>
<thead>
<tr>
<th>Illness</th>
<th>Usual Cause</th>
<th>Antibiotic Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold/Ruiny Nose</td>
<td>✓</td>
<td>NO</td>
</tr>
<tr>
<td>Bronchitis/Chest Cold (in otherwise healthy children and adults)</td>
<td>✓</td>
<td>NO</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td>Flu</td>
<td>✓</td>
<td>NO</td>
</tr>
<tr>
<td>Strep Throat</td>
<td>✓</td>
<td>Yes</td>
</tr>
<tr>
<td>Sore Throat (except strep)</td>
<td>✓</td>
<td>NO</td>
</tr>
<tr>
<td>Fluid in the Middle Ear (otitis media with eardrum)</td>
<td>✓</td>
<td>NO</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>✓</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Antibiotics Aren’t Always the Answer

www.cdc.gov/getsmart

http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html
Impact of Wellness Bags on Antibiotics for Bronchitis

• Dr. Dennis, Chair of Infection Control and Outpatient Medical Director for Mayo Regional Hospital in Maine, created Wellness Bags for clinicians to give patients to alleviate a persistent cough or runny nose – instead of antibiotics

• The bags included tissues, cough drops, hand sanitizer and *Choosing Wisely* materials from Consumer Reports about why antibiotics are not recommended for treating bronchitis and other respiratory illnesses

• Comparing chart data from January–March 2016 to the same period in 2017
  • Antibiotic prescriptions fell from 84 percent in primary care practices before the intervention to 8 percent after the intervention.
  • Antibiotic prescriptions fell from 67 percent to 54 percent in the ER during the same period

http://www.choosingwisely.org/resources/updates-from-the-field/bagging-antibiotics-in-maine/
A clinician wishes to give a patient some printed information about coughs/colds and not treating viral infections with antibiotics. Where can a patient handout on this topic be easily obtained?

A. CDC Get Smart Website  
B. Hospital’s Antibiotic Resources empiric use guideline  
C. Hospital’s Antibiotic Resources dosing guideline  
D. Azithromycin Package Insert
Summary

Antimicrobial resistance is a major threat to the health of our patients

• There are several steps we as healthcare professionals can take in order to prevent the rise of antimicrobials resistance
• We should ensure antibiotics are only being used when needed!

What can you do-

• Get baseline data and indication specific data on antibiotic prescribing rates at your practice or community
• Identify problems- inappropriate prescribing, incorrect doses, prolonged durations
• Bring in key stakeholders- primary care physicians, nurses, emergency rooms prescribers
• Provide guideline based education and feedback
• Order sets can be helpful for common illnesses like UTI, SSTI, CAP
• No antibiotics for viral causes
• Help patients with symptomatic relief with cough and cold remedies, and inhalers instead of antibiotics

Communicating with Patients and their family is key!
KEEP CALM AND DO Antimicrobial Stewardship
No action today, no cure tomorrow

Combating Antimicrobial Resistance through Antimicrobial Stewardship

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