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, stick 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

Learning Assessment Question
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
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

Learning Assessment Question

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?

- 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

CDC – Antibiotic Resistance Threats in the United States-2013
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.\(^6\)
- In 2013, approximately 269,000,000 antibiotic prescriptions were dispensed\(^11\)
- Approximately 20% of pediatric visits\(^12\) and 10% of adult visits resulted in an antibiotic prescription.\(^3\)
- Complications include rashes and diarrhea to severe allergic reactions.\(^13\)
- The adverse drug reactions (ADRs) resulted in an estimated 143,000 ER visits.\(^13\)

Worse Yet...

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


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>Cefalosporins</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/lentacyclines</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

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.

  - 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 (e.g. 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
Learning Assessment Question 1

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

Discussion: A is the best answer. Selection pressure is the process that favors survival of resistant strains through exposure of antimicrobials.

GOAL FOR COMBATING ANTIBIOTIC RESISTANCE

SO WHAT ARE WE GOING TO DO ABOUT IT?

By 2030, 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 inpatient settings, and by 30% in outpatient settings.

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
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

Patient Safety
Efficacy
Patient Satisfaction

Adverse Events
Antibiotic Resistance
Length of Stay
Costs

INCREASED

DECREASED

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

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

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

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!

- 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

- 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

- 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

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).

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.”

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>Levofloxacin 750 mg IV or PO Q24 h x 5 days.</td>
</tr>
<tr>
<td>Levofoxacin 750 mg PO x 5 days (for severe PCN allergy)</td>
<td></td>
</tr>
</tbody>
</table>


Learning Assessment Question 2

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

Discussion: A is the best answer. The IDSA CAP Guideline 2007 recommends a duration of 5 days if the patient has been afebrile for 48-72 hours and shows significant clinical improvement. Most patients become clinically stable within 3-7 days. Thus, in this case, 14 total days of antibiotics is unnecessarily long.

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) 5-10 mL PO Q4-6 hours prn cough/congestion, #180mL, no refills
- Benzonatate (Tessaion 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)

Clinical Infectious Diseases 2007;44:527-72

Source: CDI/Delnor ED Smart Set Adult Recommendations
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 persistent 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

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 (fever, CVA tenderness, flank pain) - 7-14 days

Antibiotic Options (Oral)

<table>
<thead>
<tr>
<th>Nitrofurantoin 100mg BID x 5 days</th>
<th>Cefazolin 1-2 g IV Q 8h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacitracin 1 BID x 3 days</td>
<td>Ceftriaxone 1g IV Q24h</td>
</tr>
<tr>
<td>Amoxicillin-clavulanate, cefdinir, cefadroxil, and cefpodoxime-proxetil, cephalaxin 3-7</td>
<td>Cipro 400 IV Q12 h (For severe PCN all)</td>
</tr>
</tbody>
</table>

Antibiotic Options (Intravenous)

1st 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

2nd 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 E. coli resistance)

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.

1st 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

2nd Line Agents:
- Ciprofloxacin 250mg tab #1 PO BID x 7 days
- Cephalexin 500mg caps #1 PO BID x 7 days
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.

Discussion: C is the best answer.

Treating a urine isolate in an asymptomatic patient prior to a non-urologic surgery is inappropriate. This patient has no symptoms consistent with cystitis and no signs or symptoms of pyelonephritis (no flank pain, fever, chills). Also, his surgery is orthopedic, not urologic. Thus no antibiotic treatment for a UTI is indicated. Only routine surgical antibiotic prophylaxis (SAP) is indicated. There are two indications for antibiotics for asymptomatic bacteriuria: pregnancy and imminent urologic procedure in which mucosal bleeding is anticipated.

Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America


Treatment of skin and soft tissue infections

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

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

**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, 2018. doi:10.1093/cid/cix1085.
Learning Assessment Question 4

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.

Discussion:
The best answer is B. A large portion of hospitalized patients are colonized with toxigenic C. difficile yet have no diarrhea. Many tests may be positive but don’t represent a disease that warrants antibiotics. Thus, the CDC’s clinical criteria of C. Diff PCR-worthy diarrhea has 5 components:

- number – at least 3
- size – high volume
- consistency – liquid stools
- timing – in the past 24 hours
- explanation – no other reasonable explanation for watery stool

This patient’s diarrhea has resolved and is easily explained by a normal response to his recent enema.

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](https://www.fda.gov/Drugs/DrugSafety/ucm511530.htm)
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 Antibiotic stewardship requirements

CMS Issues Proposed Rule that Prohibits Discrimination, Reduces Hospital-Acquired Conditions, and Promotes Antibiotic Stewardship in Hospitals

Date 2016-06-13

- Improve Quality of care by
  - Reducing readmissions
  - Reducing barriers to care
  - Reducing the incidence of hospital-acquired conditions (including healthcare-associated infections)
  - Improving the use of antibiotics (including the potential for reduced antibiotic resistance)
  - Addressing workforce shortage issues; and
  - Improving patient protections.

Antibiotic Stewardship in Primary Care and Specialty Practices

- In-services
- Formal education
- Antibiogram
- Stewardship booklet

New Requirements for Antimicrobial Stewardship by Regulatory Agencies

- United States Outpatient Antibiotic Prescribing and Goal Setting
- National Center for Emerging and Zoonotic Infectious Diseases
- Addressing healthcare-associated infections
- Reducing antibiotic resistance
- Improving patient outcomes
**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® - www.choosingwisely.org**

- 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**
  
  - [Link to resource page]
Choosing Wisely Sample Resources

www.choosingwisely.org

Choosing Wisely - Resource

www.choosingwisely.org

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’s Get Smart about Antibiotics Website
B. Hospital’s Antibiotic Resources empiric use guideline
C. Hospital’s Antibiotic Resources dosing guideline
D. Azithromycin Package Insert

Discussion: The best answer is A. The CDC’s Get Smart about Antibiotics Website provides national guidelines for the use of antibiotics and patient-friendly education handouts and posters.

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!
No action today, no cure tomorrow

Combating Antimicrobial Resistance through Antimicrobial Stewardship

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