

# Judicious Antibiotic Use in Developing Countries

Ronald A. Herman, PhD

CPFI Annual Meeting

Flat Rock, NC

June 8, 2013

## Learning Objectives

On completion of this session, the participants will be able to:

1. Identify at least five common clinical syndromes that may be seen in an ambulatory care environment and that may require antibiotic treatment.
2. Understand the evidence that summarizes the rate of resistance for these common infectious diseases.
3. Select an antibiotic regimen, dose and duration, that will likely be successful and uses the least amount of health resources.

## Introduction

1. In the developed world:
  - a. Antimicrobial agents typically account for a large proportion of the pharmacy expenditures in a hospital.
  - b. It has been estimated that 50% of antimicrobial use in hospitals is inappropriate.
2. Inappropriate antibiotic use has been associated with propagation of antimicrobial resistance and other adverse effects.
3. Appropriate use of antimicrobial agents improves patient outcomes AND reduces overall medical costs.

## IDSA Examples of Inappropriate Use of Antimicrobial Agents

1. Use of antibacterial agents for treatment of syndromes that are not caused by bacteria (e.g., “colds,” acute bronchitis, most sore throats, “fever”).
2. Administration of an antibacterial with a broader-than-necessary spectrum of activity.
3. Failure to consider likely pathogens and resistance patterns in selecting empiric antibiotic regimen.
4. Prescribing courses of antibacterial therapy that are longer than necessary
5. Prescribing antibacterial agents at inappropriate doses (either too high or too low) or intervals
6. Treating infectious processes with agents that do not provide activity against the causative agent(s)

## Antimicrobial Resistance

1. The incidence of antimicrobial resistance among health care–associated pathogens has been steadily increasing over the past 2–3 decades.
2. Development of new antimicrobial agents, however, has decreased.

3. Antimicrobial-resistant infections have been associated with increased medical costs (\$18,588–\$29,069), excess hospital stay (6.4–12.7 days), and increased mortality (attributable mortality 6.5%) for infected patients. The excess mortality results in societal costs of \$10.7–\$15 million.<sup>1</sup>

<sup>1</sup> Roberts RR, Hota B, Ahmad I., et al. *Clinical Infectious Diseases* (2009) 49: 1175-84.

## Why is Antimicrobial Resistance Associated with Adverse Outcomes?

1. Delays in initiating effective therapy.
2. Less effective and/or more toxic antimicrobial therapy.
3. Severity of underlying disease.
4. It is probably not due to increased virulence.
5. Resistant strains have generally not been shown to be more virulent than susceptible strains of the same bacteria.
6. Community-associated MRSA may be a notable exception.

## Antimicrobial Stewardship

1. Antimicrobial stewardship is defined as a rational, systematic approach to the use of antimicrobial agents in order to achieve optimal outcomes:
  - a. Achievement of cure
  - b. Avoidance of toxicity and other adverse effects
  - c. Avoidance of emergence or propagation of antimicrobial resistance).
2. Improving antibiotic use is a public health imperative
  - a. Antibiotics are a shared resource, (and becoming a scarce resource).
  - b. Antibiotics are the only drug where use in one patient can impact the effectiveness in another.
  - c. If everyone does not use antibiotics well, we will all suffer the consequences.

## Common Infectious Disease Problems on Short Term Medical Trips

1. Source of Prescribing Information
  - a. Handbook of Medicine in Developing Countries
  - b. Stanford's Guide to Antimicrobial Therapy
  - c. Lexi-Drugs – The Drug Information Handbook
2. Urinary Tract Infections
  - a. Urethritis or cystitis
    - i. Urine dip stick:
      - 5 WBC's or + leukocyte esterase
    - ii. Etiology: often Gram – rods

iii. Treatment:

- Trimethoprim/sulfamethoxazole (TMP/SMX)
  - DS (800/160 mg) po bid x 5 days
- Amoxicillin
  - 500 mg po tid x 5 days
- 1<sup>st</sup> generation cephalosporin
  - Cephalexin 250 mg po tid (or 500 mg po bid) x 5 days
- Oral fluoroquinolone
  - Ciprofloxacin 250 mg po bid (or 500 mg daily) x 3 days

b. Pyelonephritis

i. Urine dip stick:

- 5 WBC's or + leukocyte esterase

ii. Treatment:

- Trimethoprim/sulfamethoxazole (TMP/SMX)
  - DS (800/160 mg) po bid x 10 days
- Amoxicillin
  - 500 mg po tid x 10 days
- 1<sup>st</sup> generation cephalosporin
  - Cephalexin 250 mg po tid (or 500 mg po bid) x 10 days
- Oral fluoroquinolone
  - Ciprofloxacin 250 mg po bid (or 500mg daily) x 3 days

3. Sexually Transmitted Diseases

a. Gonorrhea

i. Treatment

- Often TMP/SMX resistant
- Ceftriaxone
  - 250 mg IM injection – single dose
- Cefixime
  - 400 mg orally – single dose
- Amoxicillin/Clavulanate
  - Single 3 g oral dose
- Oral fluoroquinolone
  - Ciprofloxacin 250-500 mg – single oral dose, however, widespread resistance often makes this ineffective.

b. Syphilis

i. Treatment

- Benzathine Penicillin
- 2.4 million units IM single dose, and

- Penicillin Allergic Patient
  - Doxycycline 100 gm po bid x 14 days, or
  - Erythromycin 500 mg po qid x 15 days
- c. Epididymitis
- i. Treatment
    - TMP/SMX
      - DS (800/160 mg) po bid x 5days
    - Doxycycline
      - 100 mg po bid x 5 days
    - Erythromycin
      - 500 mg po qid x 5 days
    - Azithromycin
      - 1 g po as a single dose
- d. PID – Pelvic Inflammatory Disease
- i. Can be chlamydial, Gram (-) rods or anaerobes
  - ii. Treatment
    - Amoxicillin/Clavulanate + Doxycycline
      - 3 g single dose Amox/Clav, then doxycycline 100 mg po bid x 7 days
    - Ceftriaxone + Doxycycline
      - Ceftriaxone 250 mg IM single dose, then doxycycline 100 mg po bid x 7 days
    - Ofloxacin
      - 300 mg po q12h x 7 days
- e. Vaginitis
- i. Candida
    - Nystatin Vaginal Tablets
      - Insert one tablet daily at bedtime x 14 days
    - Clotrimazole Vaginal Cream
      - Insert 1 applicatorful at bedtime x 7 days
    - Fluconazole
      - 150 mg po as a single dose
  - ii. Trichomonas
    - Metronidazole
      - 250 mg po tid (or 375 mg po bid) x 7 days
    - Tinidazole
      - 4 x 500 mg po daily for 2 days

- iii. Bacterial Vaginosis
  - Metronidazole
    - 500 mg po bid (or 750 mg po qd) x 7 days
- 4. Upper Respiratory Tract Infections
  - a. Otitis Media
    - i. Treatment
      - Amoxicillin
        - 250 mg po tid x 5 days
      - TMP/SMX
        - DS (800/160 mg) po bid x 5days
      - Amoxicillin with Clavulanic Acid
        - 625 mg po bid x 7 days
    - b. External Otitis
      - i. Treatment
        - Antibiotic/Steroid Ear Drop
          - Gentamicin/Hydrocortisone, one drop in affected ear twice a day
        - Acetic Acid Ear Drops
          - One drop in affected ear twice a day
    - c. Purulent Sinusitis
      - i. Treatment
        - Amoxicillin
          - 250 mg po tid x 5 days
        - TMP/SMX
          - DS (800/160 mg) po bid x 5days
        - Amoxicillin with Clavulanic Acid
          - 625 mg po bid x 7 days
    - d. Exudative Pharyngitis
      - i. Treatment
        - Benzathine Penicillin
          - 1.2 million units IM as a single dose
        - Penicillin VK
          - 500 mg po bid x 10 days
        - Erythromycin
          - 500 mg po bid x 10 days
        - Cephalexin
          - 500 mg po bid x 10 days

5. Lower Respiratory Tract Infections

a. Pneumonia

i. Treatment

- Azithromycin
  - 500 mg po, then by 250 mg po bid for 4 doses
- Clarithromycin
  - 500 mg po bid x 5 days
- TMP/SMX
  - DS (800/160 mg) po bid x 5days
- Amoxicillin with Clavulanic Acid
  - 625 mg po bid x 7 days

b. Bronchitis

i. Etiology – most often is viral and antibiotics should not be used.

ii. If bacteria is suspected, treatment:

- Erythromycin
  - 500 mg po tid x 5 days
- Amoxicillin
  - 500 mg po tid x 5 days
- TMP/SMX
  - DS (800/160 mg) po bid x 5days

6. Skin or Soft Tissue Infections

a. Cellulitis or Impetigo

i. Treatment

- Cloxacillin
  - 500 mg po qid x 5 days
- Cephalexin
  - 500 mg po tid x 5 days
- Clindamycin
  - 300 mg po tid x 5 days

## Conclusion

1. Antibiotics are a shared resource, (and becoming a scarce resource).
2. Antibiotics are the only drug where use in one patient can impact the effectiveness in another.
3. If everyone does not use antibiotics well, we will all suffer the consequences.