Antimicrobial Resistance and Introduction to UAMS Antimicrobial Stewardship

UAMS Antimicrobial Stewardship Program
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The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism.
Antibiotic Usage

- CDC reports 50% of antibiotics prescribed in US are inappropriate

- Increased usage -> antibiotic resistance
  - Local impact: in-hospital resistance is driven by in-hospital usage
  - Multidrug Resistant Organisms: Over 2 million infections and 23 thousand deaths per year
  - Rates of multi-drug resistant organisms are increasing
    - MRSA, VISA, VRE, ESBL, CRE, MDR-pseudomonas

- Antibiotic overuse increases risk of *C. difficile*
  - Fluoroquinolones, Cephalosporins, Clindamycin
  - 250,000 infections and 14,000 deaths per year in the US

- Antimicrobial Associated Adverse Events:
  - Approximately 5% of hospitalized patients on antibiotics have a drug related event
  - Antibiotic associated ER visits: 140,000 per year
Arkansas ranks 46th in number of antibiotic RXs dispensed
1,154 RX per 1,000 persons (>1 per person)
Antibiotic Overuse Leads to Resistance

1. Lots of germs. A few are drug resistant.
2. Antibiotics kill bacteria causing the illness, as well as good bacteria protecting the body from infection.
3. The drug-resistant bacteria are now allowed to grow and take over.
4. Some bacteria give their drug-resistance to other bacteria, causing more problems.

How Antibiotic Resistance Happens
Rise of Antibiotic Resistance

MRSA = methicillin-resistant *Staphylococcus aureus*; VRE = Vancomycin-resistant enterococci; FQRP = Fluoroquinolone-resistant *Pseudomonas aeruginosa*.
Need for New Antimicrobials

The rate of multi-drug resistant organisms is increasing, however, the development of new antibiotics on the market is decreasing.

Multi-drug resistant organisms exist without treatment options.

Adapted from: CL Ventola. P&T 2015; 40:4(277-83)
**Clostridium difficile**

“C diff”

- Life-threatening diarrhea
- Iatrogenic: Due to antibiotic exposure
- More virulent strain emerged in 2000 with 400% increase in deaths
- 90% of deaths occur in patients > 65 years old
- Think twice before starting antibiotics unless needed
- Fluoroquinolones, Cephalosporins, Clindamycin have highest risk
Extended Spectrum Beta-lactamase “ESBL”

- Enzyme produced by some enterobacteriaceae
- Causes resistance to wide variety of penicillins and cephalosporins
- Bloodstream infections due to ESBL producing organisms have a 57% higher risk of death compared to non-ESBL strains
- $40,000 increase in cost per ESBL bloodstream infection
- Typically require broad spectrum carbapenems for treatment
Carbapenem-Resistant Enterobacteriaceae “CRE”

- Typically hospital acquired
- Resistant to nearly all antibiotics available
- 50% of patients with CRE bloodstream infection die
- Rate increasing
UAMS Antimicrobial Handbook

- Produced Annually
- Specific Antibiogram for Wards, ER, ICU
- IV->PO Conversion Recommendations
- Daily Costs of Antibiotics
- Antimicrobial Restrictions and Reservations
- Automatic Stop Dates for Certain Antibiotics
- Antimicrobials in Pregnancy and Lactation
- Vancomycin Dosing
- Pneumonia Treatment Guidelines
- Role of MRSA Nares for Vanc De-escalation
- Navigating antibiotic allergies
- Alternatives to fluoroquinolones
- Use of procalcitonin
Antimicrobial Stewardship

Coordinated interventions to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration
Antimicrobial Stewardship

• Aim is to decrease selective pressure for multidrug-resistant organisms in order to preserve the utility of antibacterial agents.

• Goal is to ensure that there are systems and support to help providers use antibiotics optimally.

• Leads to improved patient outcomes, increased patient safety, decreased risk of *C. diff*, decreased facility costs.

• For this to work, every provider has to play a role in stewardship.
Antibiotics are a limited resource. The more that antibiotics are used today, the less likely they will still be effective in the future.
Does Your Patient Need Antibiotics??

• Signs and symptoms of infection
  – Are you treating colonization?

• Appropriate collection of cultures
  – Collect prior to initiation of antibiotics

• Appropriate Duration
  – Less is more
UAMS Antibiotic Stewardship

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- Call Antibiotic Stewardship anytime
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