INFECTIOUS DISEASE & ANTIBIOTIC STEWARDSHIP

THE PROBLEM

Antimicrobial Resistance

• When pathogenic microorganisms including bacteria, fungi, viruses, and parasites become resistant to the drugs used for their treatment
• Antimicrobial resistance is a worldwide problem
• Resistant organisms are difficult and costly to treat
• Can occur inpatient or outpatient – most deaths that result from antimicrobial resistance occur inpatient
• Do you remember with azithromycin was a wonder drug? What are some of the resistance problems have your seen in practice?
US DRUG RESISTANCE THREATS - CDC

• Urgent Threats
  • C. difficile – 15,000 deaths per yr.
  • Carbapenem-Resistant Enterobacteriaceae - resistant to all or nearly all antibiotics
  • Neisseria gonorrhoeae – 246,000 resistant infections per year

• Serious Threats
  • Multidrug-Resistant Acinetobacter
  • Fluconazole-Resistant Candida
  • Extended Spectrum Enterobacteriaceae (ESBL)

• Serious Threats (cont)
  • Vancomycin-Resistant Enterococcus (VRE)
  • Multidrug-Resistant Pseudomonas Aeruginosa
  • Drug-Resistant Non-Typhoidal Salmonella
  • Drug-Resistant Salmonella Serotype Typhi
  • Drug-Resistant Shigella
  • Methicillin-Resistant Staphylococcus Aureus (MRSA)
  • Drug-Resistant Streptococcus Pneumoniae
  • Drug-Resistant Tuberculosis
US DRUG RESISTANCE THREATS - CDC

- Concerning
  - Vancomycin-Resistant Staphylococcus Aureus
    - 13 cases in 4 states since 2002
    - Few or no treatment options
  - Erythromycin-Resistant Group A Streptococcus
    - Strep throat
    - Necrotizing fasciitis
  - Clindamycin-Resistant Group B Streptococcus
    - Group B strep is leading cause of serious bacterial infections in newborns

THE PROBLEM

Do no harm - Medications used to treat infections are not always benign

- Possible harms of antimicrobial medications
  - Allergic reactions
  - Other serious adverse reactions such as prolonged QT interval, Stevens-Johnson syndrome, damage to liver/kidney, serum sickness reaction, etc.
  - Minor but troublesome ADRs – nausea, diarrhea, headache, non-allergic rashes, etc.
  - Other infections (such as yeast infections & C. diff)
  - Interactions with other drugs

- What ADRs have you seen in practice?
APPROACHES TO SOLVE THE PROBLEM

• Prevention
• Antibiotic Stewardship Programs
• Evidence-based Guidelines
• Mobile Apps for Providers
• Patient Education Approaches

PREVENTION OF INFECTION IN HEALTH CARE SETTINGS

• Hand Hygiene
  • Clean your hands: Before eating
  • Before and after having direct contact with a patient's intact skin (taking a pulse or blood pressure, performing physical examinations, lifting the patient in bed)
  • After contact with blood, body fluids or excretions, mucous membranes, non-intact skin, or wound dressings
  • After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient
  • If hands will be moving from a contaminated-body site to a clean-body site during patient care
  • After glove removal – wearing gloves is not a substitute for hand hygiene. Dirty gloves can soil hands
  • After using a restroom
  
https://www.cdc.gov/handhygiene/providers/index.html
• Good hand hygiene
  • Thorough hand-washing for at least 15 seconds
    • When hands are visibly dirty or in contact with
    • After known or suspected exposure to *Clostridium difficile* if your facility is experiencing an outbreak or higher endemic rates
    • After known or suspected exposure to patients with infectious diarrhea during *norovirus* outbreaks
    • If exposure to *Bacillus anthracis* is suspected or proven
    • Before eating
    • After using a restroom

• Alcohol based hand sanitizer for everything else
  https://www.cdc.gov/handhygiene/providers/index.html

• Other Methods of Prevention
  • Appropriate use of protective equipment – gloves, gowns, eye protection
  • Use of appropriate sharps disposal
  • Safe handling and disposing of contaminated materials
  • Does your white coat spread infection?
Vaccines
- Encourage Vaccines for Patients
  - Vaccines are available to help prevent some bacterial and viral diseases
  - While no vaccine is 100%, they help to develop herd immunity and if not fully effective, may make the illness less severe
- Vaccines for Health Care Providers
  - Help to prevent you from diseases such as Hepatitis B and other vaccine preventable disease
  - Protect patients from getting infections from their health care providers
- Don’t buy into vaccine myths – be ready to refute them

ANTIBIOTIC STEWARDSHIP PROGRAMS

- Hospitals – CDC Core Elements
  - Leadership Commitment: Dedicating necessary human, financial and information technology resources.
  - Accountability: Appointing a single leader responsible for program outcomes. Experience with successful programs show that a physician leader is effective.
  - Drug Expertise: Appointing a single pharmacist leader responsible for working to improve antibiotic use.
  - Action: Implementing at least one recommended action, such as systemic evaluation of ongoing treatment need after a set period of initial treatment (i.e. “antibiotic time out” after 48 hours).
  - Tracking: Monitoring antibiotic prescribing and resistance patterns.
  - Reporting: Regular reporting information on antibiotic use and resistance to doctors, nurses and relevant staff.
  - Education: Educating clinicians about resistance and optimal prescribing.

https://www.cdc.gov/getsmart/community/for-hcp/index.html
• **Nursing Homes – CDC Core Elements**

  • **Leadership commitment:** Demonstrate support and commitment to safe and appropriate antibiotic use in your facility
  • **Accountability:** Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility
  • **Drug expertise:** Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility
  • **Action:** Implement at least one policy or practice to improve antibiotic use
  • **Tracking:** Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility
  • **Reporting:** Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff
  • **Education:** Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use

  https://www.cdc.gov/getsmart/community/for-hcp/index.html

• **Core Elements for Outpatient Professionals**

  • **Identify one or more high-priority conditions for intervention.**
    • conditions for which antibiotics are overprescribed, such as conditions for which antibiotics are not indicated – acute bronchitis, viral URIs, viral pharyngitis, mononucleosis
    • conditions for which antibiotics are overprescribed, such as conditions for which antibiotics are not indicated – diagnosing strep throat without use of RST or diagnostic criteria
    • conditions for which antibiotics might be indicated but for which the wrong agent, dose, or duration often is selected, such as selecting an antibiotic that is not recommended – azithromycin for acute sinusitis; treating children under 2 yr. with otitis media for only 5 – 7 days instead of 10
    • conditions for which watchful waiting or delayed prescribing is appropriate but underused – otitis media, acute uncomplicated sinusitis
    • conditions for which antibiotics are underused or the need for timely antibiotics is not recognized – missed diagnoses such as STDs, sepsis

  https://www.cdc.gov/getsmart/community/for-hcp/index.html
• Identify barriers that lead to deviation from best practices.
  • Knowledge gaps
  • Time pressure to diagnose and treat quickly
  • Patient expectations
  • Worries about patient satisfaction ratings or patients moving to another practice

• Establish standards for antibiotic prescribing.
  • Evidence-based national guidelines
  • Clear expectations on use of guidelines, correct diagnostic criteria, use rapid on-site tests, use of cultures when appropriate

https://www.cdc.gov/getsmart/community/for-hcp/index.html

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**FREQUENT CONDITIONS OF ANTIBIOTIC OVERUSE IN PRIMARY CARE**

• Acute rhinosinusitis
  • For symptoms that are not severe, persistent, or worsening

• Acute uncomplicated bronchitis
  • Antibiotics not useful – rule out pneumonia

• Common acute URI

• Pharyngitis – unless Group A strep; treatment on clinical presentation only

• Acute uncomplicated cystitis – overuse of fluoroquinolones

• Acute otitis media – watchful waiting underused for children over 2; high dose amoxicillin still first line unless allergic

• Treatment of asymptomatic bacteriuria
GUIDELINES, WHAT GUIDELINES?

• Infectious Disease Society of America – has numerous treatment guidelines
• CDC – guidelines for STD diagnosis & treatment, tuberculosis diagnosis & treatment, guidelines for vaccine use in children and adults
• National Guideline Clearing House – guideline.gov; a great site for finding evidence-based guidelines
• American Academy of Pediatrics – guidelines for children
• American Thoracic Society – TB guidelines
• Mobile apps

PATIENT EDUCATION

• Appropriate antibiotic use – one to one education, posters, pamphlets, short videos
• Discussion of risks vs. benefits – many patients think that antibiotics and other antimicrobial medications are benign
  • Antimicrobials are great when prescribed for an infection they can effectively treat
  • Take for all days prescribed to avoid developing resistance
  • Possible drug adverse reactions, including allergic
  • Killing off good bacteria – leading to vaginitis, diarrhea, etc.
• Prescribe other medications that help the symptoms when antibiotics are not needed
• What has been successful for you?
QUESTIONS?
INTERESTING CASES OR EXAMPLES?