



CHRISTUS[®] TRINITY MOTHER FRANCES
Health System

Antimicrobial Stewardship

Background

Why Antimicrobial Stewardship

30-50% of antibiotic use in hospitals are unnecessary or inappropriate

- Appropriate antimicrobial use is a medication-safety and patient-safety issue
- Antimicrobial misuse contributes to antimicrobial resistance
 - The CDC estimates that 2 million illnesses and 23,000 deaths are caused by resistant bacteria annually in the US
- Improving antimicrobial use is a national priority
 - Mandated by the Joint Commission for all hospitals

Background

Inappropriate Antimicrobial Uses

- Given when not needed
- Continued when no longer necessary
- Wrong doses
- Broad spectrum agents used for very susceptible organisms
- Wrong drug

Antibiotics are the only drug where use in one patient can impact the effectiveness in another.
If everyone does not use antibiotics well, we will all suffer the consequences.

Background

Consequences of Inappropriate Use

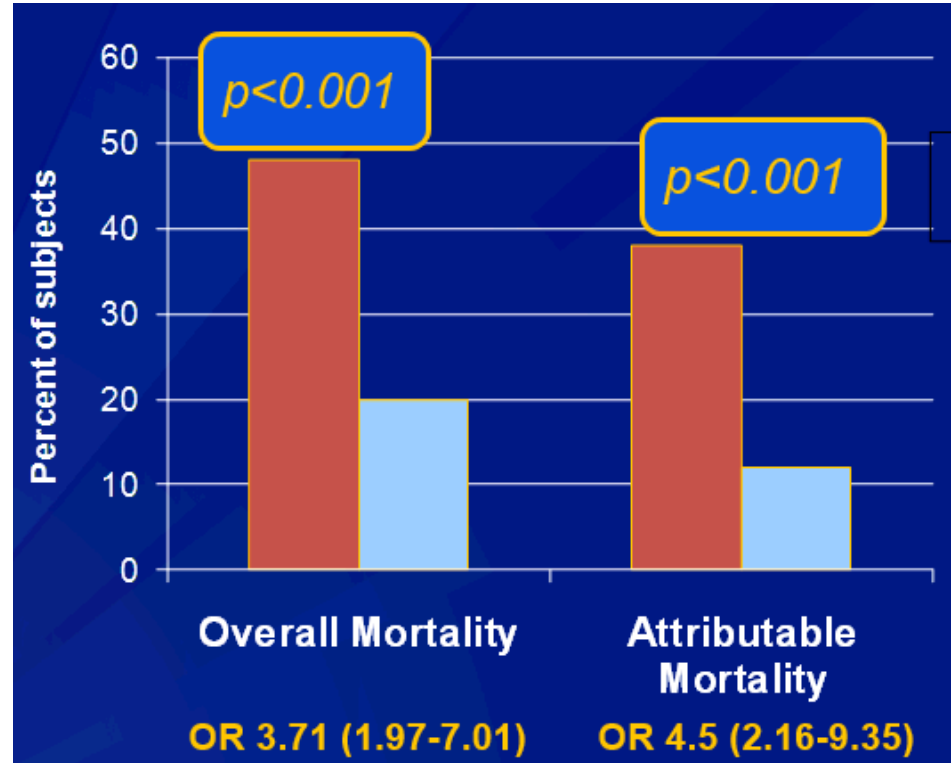
- Adverse effects
 - Disturbance of normal flora
 - Acute kidney injury
 - Drug interactions
- Antibiotic resistance
- *Clostridium difficile* infections (CDI)
- Drug cost

Consequences of Inappropriate Use

Antibiotic Resistance and Mortality

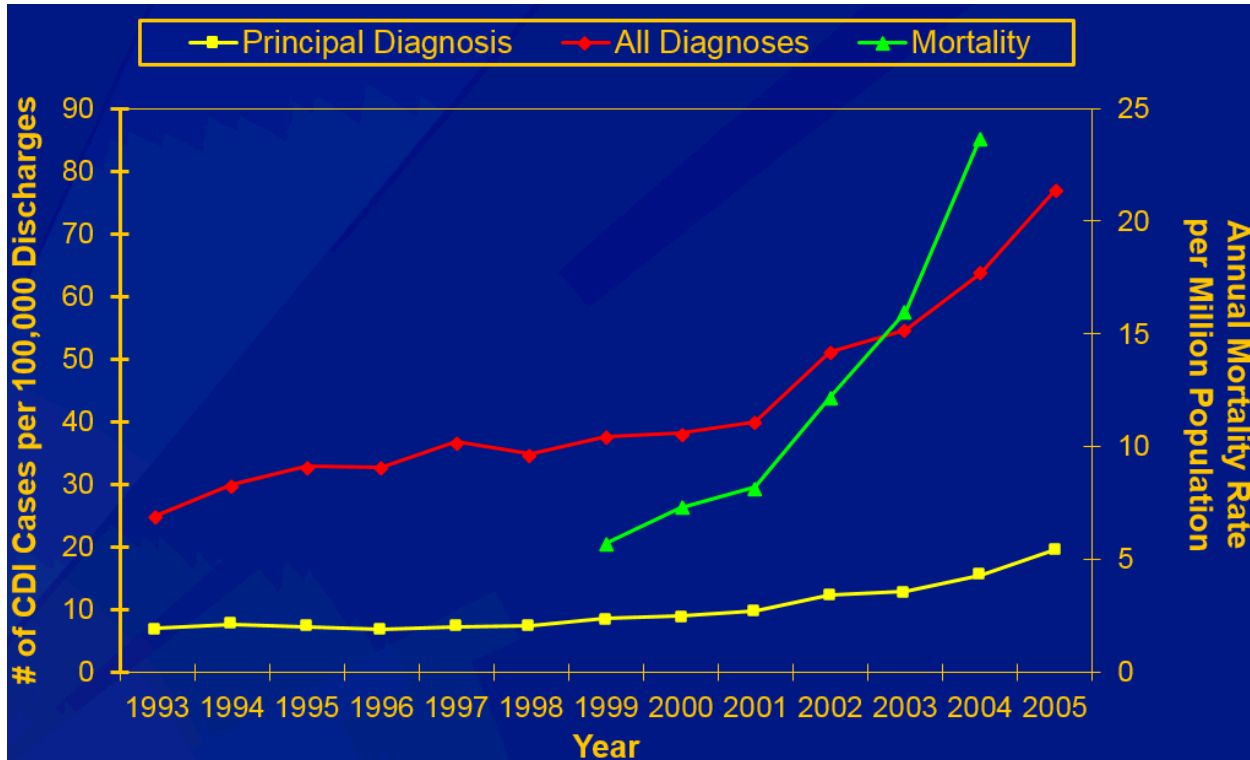
Mortality rate is significantly higher in patients with carbapenem-resistant *K. pneumoniae* (CRKP) compared to carbapenem-susceptible *K. pneumoniae* (CSKP)

■ CRKP ■ CSKP



Consequences of Inappropriate Use

C. difficile – Incidence and Mortality



**Increasing
incidence and
mortality of
CDI**

The Joint Commission Standard

Antimicrobial Stewardship

- Required components
 - Leadership commitment
 - Accountability
 - ID physician and ID pharmacist
 - Education on antimicrobial resistance and ASP practices
 - Prescribers, pharmacy, nursing staff, and patients
 - Development of multidisciplinary protocols as applicable
 - Formulary restriction, IV to PO conversion, order sets
 - Collection, analysis, and reporting
 - Antimicrobial usage, prescribing pattern, resistance rates

**NEW Standard for
Antimicrobial Stewardship**

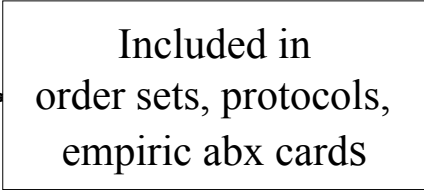
Effective Jan 1, 2017

*Required for all acute care hospitals,
critical access hospitals, and LTAC's*

Antimicrobial Stewardship

Strategies

- DO's
 - Select appropriate empiric regimens
 - National guidelines and recommendations
 - Local susceptibility patterns
 - Patient's medical histories and allergies
 - Use appropriate doses
 - Prolonged infusions of b-lactams → maximize PK/PD
 - Use shorter durations (per guidelines)
 - Ex. 7 days for HAP, 5 days CAP, 3 days for UTI



Included in
order sets, protocols,
empiric abx cards

Antimicrobial Stewardship

Strategies

- DON'T's
 - Don't let antibiotic choice and dose depend on the location of the patient
 - Don't choose antibiotics that have high GI tract concentrations or use doses so high that you achieve high GI concentrations
 - High GI concentrations → selection for resistance
 - Ceftriaxone, fluoroquinolones
 - Don't give antibiotics so long that you create resistance

Empiric Abx Recommendations

Community-acquired Pneumonia (CAP)

Preferred: **Amp/Sulbactam 3Gm q6h + Azithromycin (ICU or non-ICU)**

May be substituted based on availability

Pearls: Add vanco if suspect MRSA, post-flu, IVDA, shock, or necrotizing process; 22% ↓ mortality w/ β-lactam/azith regimen², limit azith tx to 5 days

Alternatives for PCN-allergic pts:

- ⇒ RASH/HIVES: 3rd gen Cephalosporin + Azithromycin
- ⇒ ANAPHYLAXIS: (non-ICU) Levaquin 750mg daily (ICU) Meropenem + Azithromycin

Health care-Associated Pneumonia (HAP, HCAP, VAP)

Preferred: **Piperacillin/Tazobactam + Tobramycin**

Add azith if < 3 days since admit → not needed for late HAP/VAP

Add vanco if suspect MRSA, post-flu, IVDA, shock, or necrotizing Tobra dosing: 5 mg/kg (Adj.BW) unless > 65 yo or SCr > 2, then 3 mg/kg

Alternative for PCN-allergic pts:

- ⇒ RASH/HIVES: Cefepime 1Gm Q8H + Azithromycin
- ⇒ ANAPHYLAXIS: Meropenem 500mg IV q6h + Azithromycin

De-escalate empiric tx early:

- ⇒ Tobramycin: D/C at 3 days
- ⇒ Azithromycin: D/C at 5 days
- ⇒ Vancomycin: D/C if respiratory tract cultures negative

Intra-abdominal Infections (IAIs)

Preferred: **Piperacillin/Tazobactam**

Pearls: Zosyn covers anaerobes → Metronidazole provides NO added benefit

Alternatives for PCN-allergic pts:

- ⇒ RASH/HIVES: Cefepime 1Gm IV q8h + Flagyl 500mg q8h
- ⇒ ANAPHYLAXIS: Meropenem 500mg IV q6h

Cellulitis

Preferred: **Amp/Sulbactam 3Gm IV q6h**

Alternatives for PCN-allergic pts:

- ⇒ RASH/HIVES: Cefepime 1Gm IV q8h
- ⇒ ANAPHYLAXIS: Meropenem 500m IV q6h
- ⇒ Add vanco for risk of MRSA, purulent wound, or complicated infection
- ⇒ Add clindamycin 900 mg IV Q8H for 3-5 days if toxic or necrotizing process present (may d/c earlier if appropriate)
- ⇒ If Fournier's gangrene, refer to DFI treatment

Clostridium difficile

Diagnosis: PCR test for presence of toxigenic *C. diff*.

• Liquid stool ONLY • 1 negative result = rule out • NO test of cure

Treatment: Severe/toxic/elevated SCr: **IV Flagyl + PO vanco 500 mg QID**
WBC < 15,000, SCr stable, non-toxic: PO Flagyl or PO vanco 250 mg QID

- ⇒ Consider PO vanco if > 6 stools/day or recurrence
- ⇒ avoid use of FQs, cholestyramine, clindamycin, and PPIs
- ⇒ IV Flagyl alone is not sufficient therapy

Urinary Tract Infections (UTIs)

Preferred: **Cefazolin 1 gm IV Q8H** (if no *Pseudomonas* risk)

⇒ Use Piperacillin/Tazobactam 1st line if at risk for *Pseudomonas* or *sepsis*

⇒ Use PO Cefitin 250mg BID or Keflex 500mg q12h for uncomplicated UTI

Pearls: > 1/3 of all *E Coli/Klebsiella* at MFH are quinolone-resistant
Ceftriaxone not commended d/t low urine/high GI concentration → ESBL risk

Alternative for PCN-allergic pts:

- ⇒ RASH/HIVES: Cefepime 1Gm Q12H
- ⇒ ANAPHYLAXIS: Meropenem 500mg IV q8h

Diabetic Foot Infection (DFI)

Preferred: **Piperacillin/Tazobactam + IV Vancomycin**

Pearls: Consider MRI to r/o osteomyelitis

- ⇒ 2nd line: Cefepime 1 gm Q8H + IV Flagyl 500mg q8h + IV Vancomycin
- ⇒ 3rd line: Meropenem + IV Vancomycin

Beta-Lactam Allergy

The probability of a Type I (IgE-mediated) allergic rxn to β-lactams is 0.004-0.015%; Cross-sensitivity is unlikely between β-lactam subclasses

Algorithm for PCN allergy (call Clinical Pharmacist for more info)

- Localized rash only → ok to use any cephalosporin
- More severe, generalized rash/hives → cefepime or meropenem only
- Immediate rxn/anaphylaxis → meropenem or aztreonam only

Clinical Pearls of Appropriate Antibiotic Use

- ⇒ Quinolone use associated with:
 - ↑ risk of *C diff* / hypervirulent *C diff* strains
 - ↑ risk of vancomycin-resistant *Enterococcus*
 - ↑ risk of ESBL enterobacteriaceae (*E coli*, *Klebsiella*)
- ⇒ Coagulase negative staph is a common cxs contaminant

Resources

- Centers for Disease Control and Prevention. Get Smart for Healthcare. Available at: <https://www.cdc.gov/getsmart/healthcare/>
- The Joint Commission. APPROVED: New Antimicrobial Stewardship Standard. *Joint Commission Perspectives* 2016;36(7):1-4.
- Infectious Diseases Society of America. IDSA Practice Guidelines. Available at: http://www.idsociety.org/IDSA_Practice_Guidelines/