

Best Practices: Goals of Antimicrobial Stewardship

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Goal: Optimize Clinical Outcomes of treating infection

– *For current and future patients!*



**No Helmet
No Gloves
No Jacket
No Boots**

No Brains

Goal: Antimicrobial Resistance don't create it, It's Hard to Reverse

Less Resistance: Infection Control and spread MRSA
Less Resistance : Pneumococcal Vaccination (duration
of benefit unclear)

No improvement:

High rates of resistance to TMP in UTI;

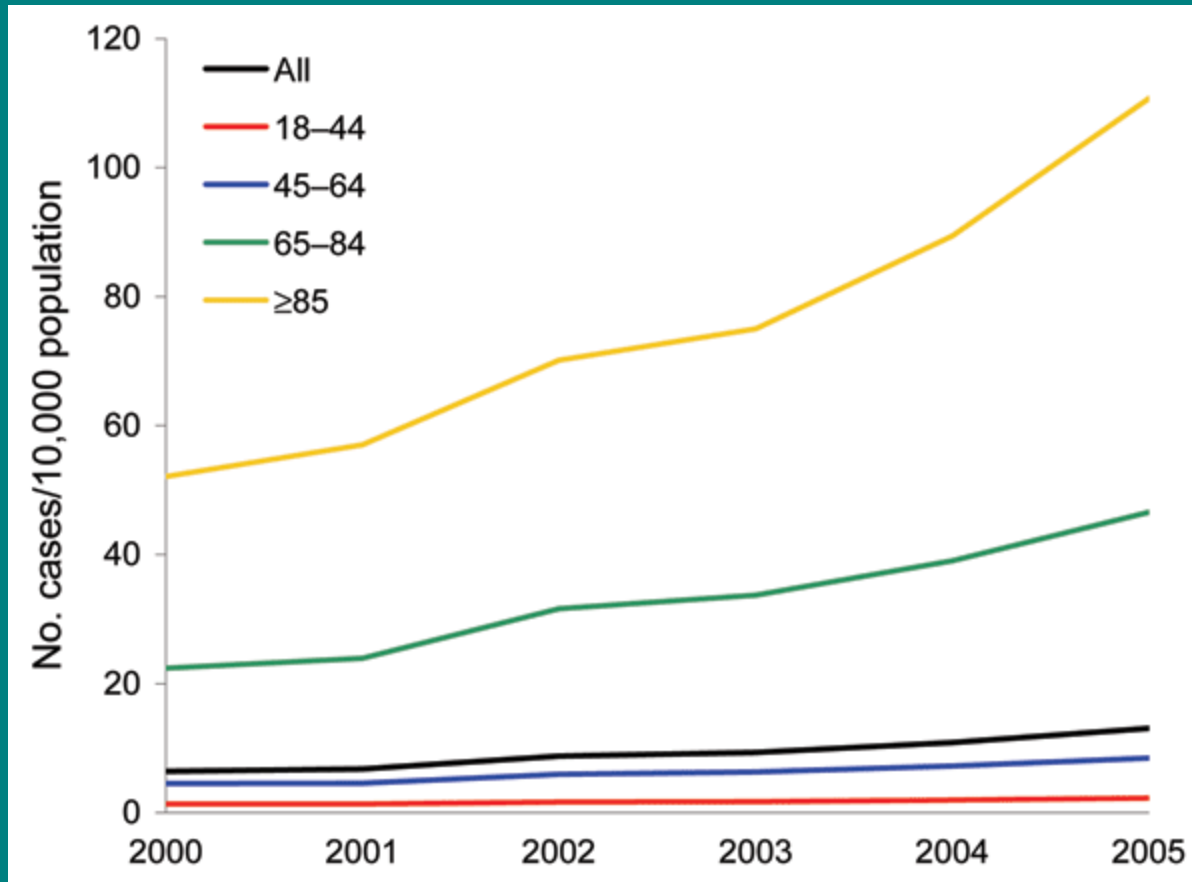
Trimethoprim utilization targeted, decrease use by
85% over 2 years,

no diminution of resistance in E Coli and Klebsiella*

What we do not want: Patient Isolate 3/2011

	1. KPN	2. KPN#2
	REACTION	REACTION
AMIKACIN	R	S
AMPICILLIN	R	R
AMP/SULB	R	R
CEFAZOLIN	R	R
CEFEPIME	R	R
CEFTAZIDIME	R	R
CEFTRIAZONE	R	R
CIPROFLOXACIN	R	R
ERTAPENEM	R	R
GENTAMICIN	R	R
IMIPENEM	R	R
LEVOFLOXACIN	R	R
NITROFURANTOIN	R	R
TRIMETH-SULFA	R	R

Goal: Avoid adverse outcomes from unnecessary antimicrobials



Goal: Cost Control: Clinical and Pharmacologic History can save \$\$

- Aztreonam: Gram negative agent safe in (most) penicillin allergy
 - Penicillin allergy : 10% patients report
 - True penicillin allergy 10-15% of the above
- ↓ Aztreonam use by taking detailed history from patient and pharmacy records:
annual savings \$300,000

UMass Memorial Medical Center

- Academic medical center
 - Level 1 trauma center
 - 2 inpatient campuses: University & Memorial
 - 800+ inpatient beds
 - 7 adult ICUs
- Stewardship team
 - Infectious Disease MD: 24 hrs/wk
 - ID PharmD

Antimicrobial Stewardship Program (ASP)

- Formal ASP started in November 2008
 - Prior: Restricted antimicrobials
- Current program
 - **Antimicrobial Review**
 - Targeted daily antimicrobial review for acute care areas
 - Antimicrobial review with ICU pharmacists twice weekly
 - **Point Prevalence**
 - **Education**

Antimicrobial Review: Our program

- Targeted daily antimicrobial review for acute care areas
- Utilize Theradoc to identify:
 - Piperacillin-tazobactam
 - Quinolones
 - Vancomycin: focus on dosing/adjusting level
 - Aztreonam
 - Any positive blood cultures
- Immediate feedback to primary team
- Focus: Avoid unnecessary antibiotics, use narrow spectrum, de-escalate

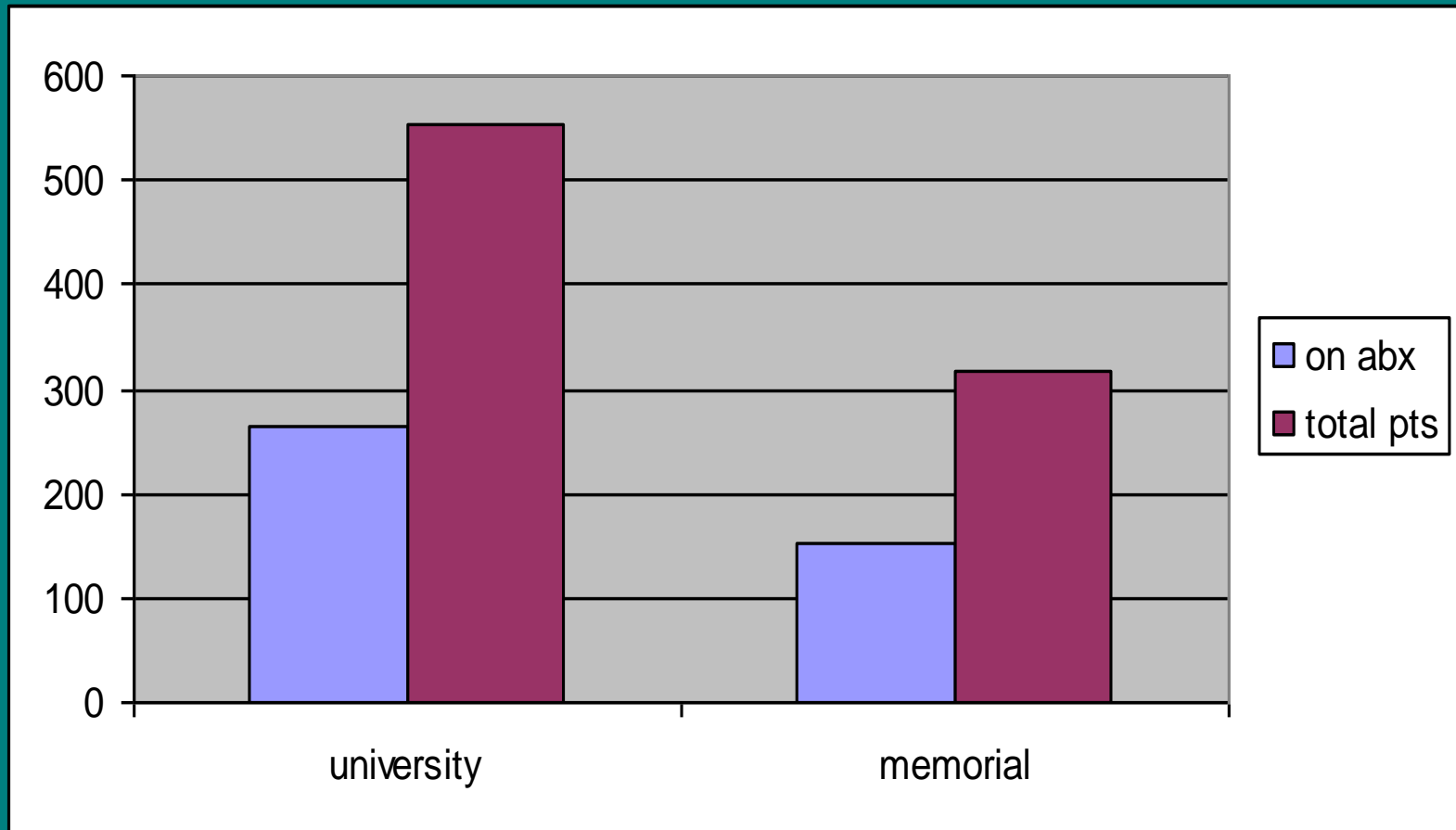
Antimicrobial Review: Data

- Data from over 2000 antimicrobials reviewed (~1500 patients)
- Interventions in 40%, with 65% “acceptance” rate
 - How do you define acceptance?
- Cost savings
 - Piperacillin-tazobactam (extended infusion, antimicrobial review, and generic):
 - Annualized savings for FY2011 \$1,075,000
 - Aztreonam (restriction and antimicrobial review):
 - Annualized savings for FY2011 \$313,000

Point Prevalence

- Review every inpatient to determine percent on antimicrobials
 - Exclude: ER, Pediatrics, BMT
- For those on antimicrobials, further examine use
 - Appropriate
 - Indication
 - Service based opportunities (surgery, medicine, oncology)
 - Identify opportunities and direct future initiatives

Half of Inpatients at UMass Receive Antimicrobial Therapy on Any Given Day



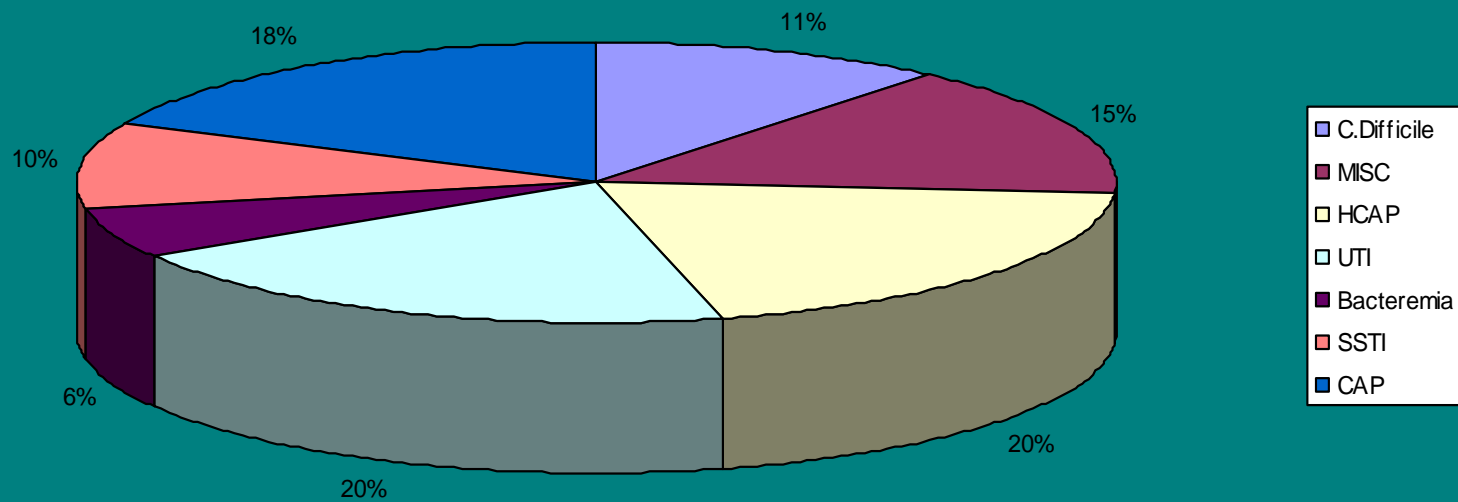
Point Prevalence: Antibiotic Use

- December 2010
 - 204 patients receiving antimicrobials
 - average 1.7 antibiotics/patient
 - 63 of 334 (19%) antibiotics unnecessary

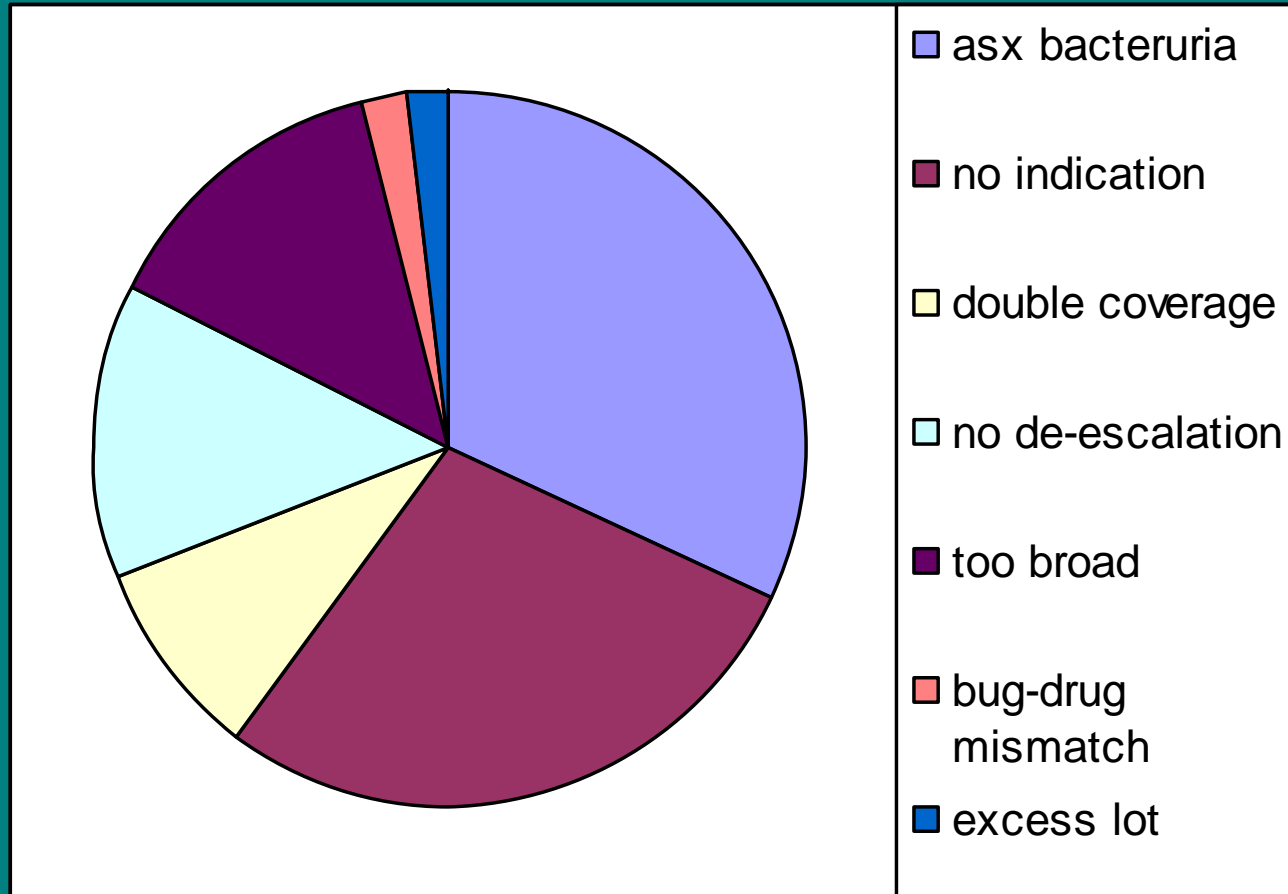
March 2011

- 217 patients receiving antimicrobials
- average 1.7 antibiotics/patient
- 77 of 353 (22%) of antibiotics unnecessary

Indications for Antimicrobial therapy



Reasons for Unnecessary Antibiotics



Education

- Guidelines
 - HAP/HCAP, VAP (emphasis on De-escalating AT) CAP – with an emphasis on CMS core measures
 - C. difficile colitis* diagnosis and therapy, Reduction of catheter-associated UTIs in adult ICU patients
- Lecture pearls
 - Don't treat asymptomatic bacteriuria (except...)
 - Where was the infection acquired?
 - Community vs. healthcare-associated/hospital-acquired
 - FQs not useful for empiric double gram-negative coverage
- Tools
 - Antibigram Card, Common Infectious Disease and Empiric Antibiotic Recommendation Card

Education: HAP/HCAP

- Don't "double cover" gram negatives unless risk for MDR organism
- Use your antibiogram to support recommendations!
 - *Pseudomonas aeruginosa* in HAP, VAP, and HCAP
 - Ciprofloxacin S: 44% (ICU), 65% (non-ICU)
 - piperacillin/tazobactam R isolates, cipro susceptibility ~10%
- Correctly classify CAP vs. HCAP
 - Group homes and assisted living CAP, NOT HCAP
- Get a sputum and de-escalate!

Education: CAP

- CMS Core Measure and reimbursement
- Antibiotic Selection!
 - Must be IV for patients going to the ICU
 - No Need to include coverage for pseudomonas when treating community acquired pneumonia (CAP) (unless a risk factor for pseudomonas is present)

Education: Common Infectious Diseases and Empiric Antibiotic Recommendations Card

- Adult Emergency department and Inpatients
- Multidisciplinary collaboration
- Recommendations based on UMass antibiogram, antimicrobial cost, guidelines and expert opinion

Education: Common Infectious Diseases and Empiric Antibiotic Recommendations Card

UMass Memorial Medical Center: Common Infectious Diseases and Empiric Antibiotic Recommendations for Adult ED and Inpatients[#] - July 2011

SITE/Infection	Preferred*	Alternatives*
URINARY/KIDNEY		
Asymptomatic bacteriuria	No treatment is indicated unless patient is pregnant or will undergo invasive urologic intervention(s) (If pregnant consider amoxicillin, nitrofurantoin, TMP-SMX OK IN 2 ND TRIMESTER PREGNANCY)	
Symptomatic cystitis, Uncomplicated (Women only)	Ciprofloxacin 250 mg PO q12h OR Nitrofurantoin 100 mg PO q6h x 5d (NOT in CrCl < 60 ml/min; For uncomplicated, females only)- Consider macrobid for outpatients	Bactrim 1DS tablet PO q12h (caution in elderly, renal insufficiency) OR Cefpodoxime 200 mg PO BID
Symptomatic cystitis, Complicated (with anatomic abnormality, indwelling foley cath., recent instrumentation, men, diabetes/other immunosuppression)	Ciprofloxacin 500 PO q12h vs. 400mg IV q12h OR Ceftriaxone 1 gm IV q24h	Gentamicin: Maximum of 3-5 mg/kg/day per pharmacy protocol
Acute pyelonephritis	Ceftriaxone 1-2 gm IV q24h (not for Enterococcus)	Gentamicin: Maximum of 3-5 mg/kg/day per pharmacy protocol OR <i>Below agents, only if susceptibility known</i> Bactrim 1DS tablet PO q12h (caution in elderly, renal insufficiency) OR Ciprofloxacin 500mg PO q12h/400mg IVq12h
Nosocomial UTI	Ceftazidime 1 gm IV q8h	Gentamicin: maximum of 3-5 mg/kg/day per pharmacy protocol

LUNG

<p>Community-acquired pneumonia (CAP) **includes patients coming from group homes and assisted living** <u>FOR ICU admits, IV therapy for CAP</u></p>	<p>Azithromycin 500mg PO/IV q24 PLUS Ceftriaxone 1 g IV q24h (step down to PO cefpodoxime) For severe CAP or risk for MRSA: Consider adding Vancomycin 15 mg/kg IV q8-12h to target troughs of 15-20 mcg/ml NOTE: If CAP patient is at risk for pseudomonas[■], consider: Piperacillin-tazobactam PLUS Ciprofloxacin</p>	<p>Only if PCN/Ceph allergy: Levofloxacin 750mg PO/IV q24h x 5 days OR 500 mg PO/IV x 7-10days</p> <p>NOTE: If CAP patient with PCN/CEPH allergy is at risk for pseudomonas[■], consider: Aztreonam[□] 2gm IV q8h PLUS Levofloxacin</p>
<p>Early-onset HAP /VAP (within days 1-3 of admission)</p>	<p>As CAP above</p>	
<p>HCAP[†] and Late-onset HAP (day 4 or later): FLOOR admission</p>	<p>Piperacillin/tazobactam 4.5g IV q8h EI over 4 hrs OR Ceftazidime 2 gm IV q8h (replaces pip/tazo) PLUS Vancomycin with target trough 15-20 mcg/ml +/- Gentamicin if risk for multi-drug resistant (MDR) pathogens (see risk below ▲)</p>	<p>Obtain sputum cultures for gram stain, Culture and Sensitivity If severe PCN/CEPH allergy: Aztreonam[□] 2gm IV q8h (replaces pip/tazo) PLUS Vancomycin with target trough 15-20 mcg/ml</p>
<p>Late-onset VAP/HAP (day 4 or later): ICU admission</p>	<p>Piperacillin/tazobactam 4.5g IV q8h EI over 4 hrs OR Ceftazidime 2 gm IV q8h (replaces pip/tazo) PLUS Vancomycin with target trough 15-20 mcg/ml +/- Amikacin if risk for MDR pathogens (see below ▲)</p>	<p>Note: Amikacin does not require ID approval when used in ICUs</p>

■ Risk for Pseudomonas in CAP: [COPD **or** Interstitial lung disease (eg pulmonary fibrosis) **AND** current **or** recent (within 3 mos): corticosteroid (>10 mg prednisone daily) **or** antibiotic therapy **or** malnutrition] **OR** Structural lung disease (eg bronchiectasis)

† HCAP : Hospitalized for 2+ days in the past 90 days **OR** Resided in a nursing home or long term (acute) care facility (LTCH/LTAC) **OR** Attended hemodialysis/Received recurrent IV antibiotic therapy, chemotherapy or wound care in the past 30 days

▲ Risk factors for MDR organisms: Previous *Pseudomonas* pneumonia **OR** History of MDR organism only sensitive to aminoglycosides **OR** Received piperacillin-tazobactam/3rd or 4th gen. cephalosporin/carbapenem in past 45 days **OR** Mechanical ventilation in past 30 days **OR** structural lung disease

Additional points and Future Plans

- Always look for new opportunities
- Learn and use your internal data
- Collaborate with other disciplines
- Be available to help, not just to request
- Future plans
 - Campaign to Decrease treatment of asymptomatic bacteriuria
 - Repeat Point prevalence
 - Re-assess current strategies