

UTI: A practical approach

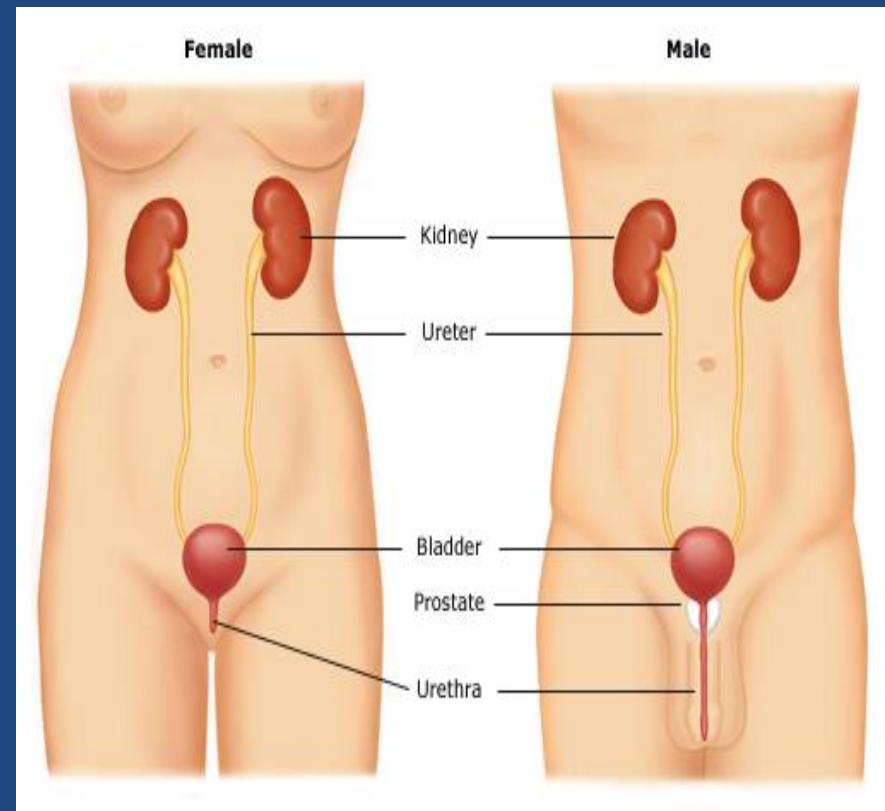
Leonor Echevarria, MD; FACP
Infectious Disease Attending
BUMC-P

Urinary Tract Infections Outline

- Definition
- Diagnosis
- Microbiology
- UTI (syndromes)
- Treatment

Urinary tract infection

- Uncomplicated UTI: infection in a premenopausal, non-pregnant woman with no urological abnormalities
- Complicated UTI: infection in a urinary tract with functional or structural abnormalities.



UTI : Clinical symptoms and presentation in adult

- Lower tract : cystitis
 - Dysuria urinary urgency and frequency lateral fullness discomfort.
 - hemorrhagic cystitis bloody urine (10%)
- Upper tract: pyelonephritis
 - Fever, sweating
 - Nausea, vomiting, flank pain, dysuria
 - Dehydration, hypotension
- Vaginal discharge (ho STD)

Diagnosis of UTI

- Collection of specimens
- Urinalysis microscopic examination
 - WBC upper limit 5-10 leukocytes hpf.
 - presence of bacteria
- Urine dipstick test : rapid screening test
 - Leukocyte esterase test (rapid pyuria screen)
 - Se (detect >10 WBC/mL) 75-96%, Sp 94-98%
 - Nitrate->Nitrite test positive in only 25%
 - Se ~20%, Sp 95%

QUESTION

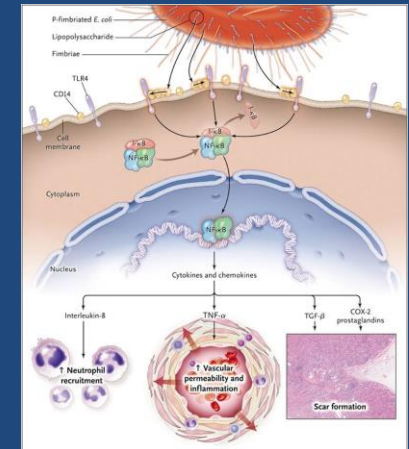
- What are the indications for urine culture?

Diagnosis of UTI

- Indications for urine culture
 - Pyelonephritis
 - complicated UTI
 - Recurrent UTI
 - Patients with multiple allergies
 - Suspect MDRO

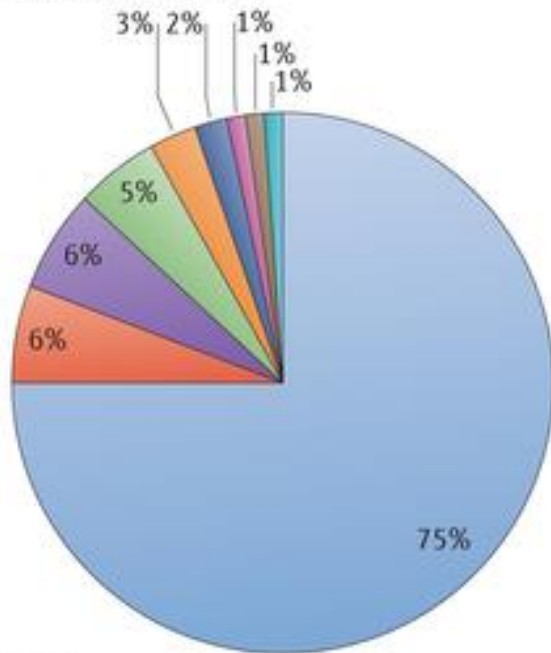
Microbiology of UTI

- *E. coli* 75-90%
- *S. saprophyticus* 5-15%
- Klebsiella, Proteus, Enterococcus, Pseudomonas small percentages
 - Hospital acquired : Enterobacter, Klebsiella, Acinetobacter, Serratia, Citrobacter, Providencia, Pseudomonas, Enterococcus
 - Anaerobes rarely cause UTI
 - Candida increasingly recognized as a cause of UTI



Microbiology of UTI

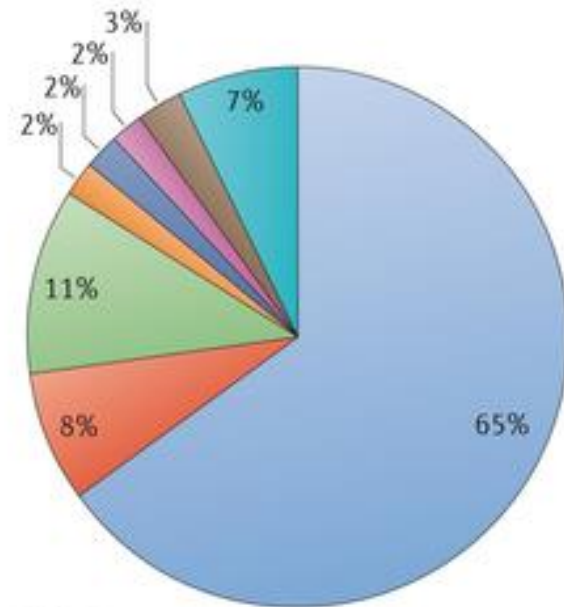
Uncomplicated UTI



Risk factors

- Female gender
- Older age
- Younger age

Complicated UTI



Risk factors

- Indwelling catheters
- Immunosuppression
- Urinary tract abnormalities
- Antibiotic exposure

Nature Reviews | Microbiology

Urinary Tract Infections

- Acute uncomplicated cystitis
- Acute uncomplicated pyelonephritis
- Recurrent UTI
- Complicated UTI- sepsis
- CA UTI
- Candida UTI

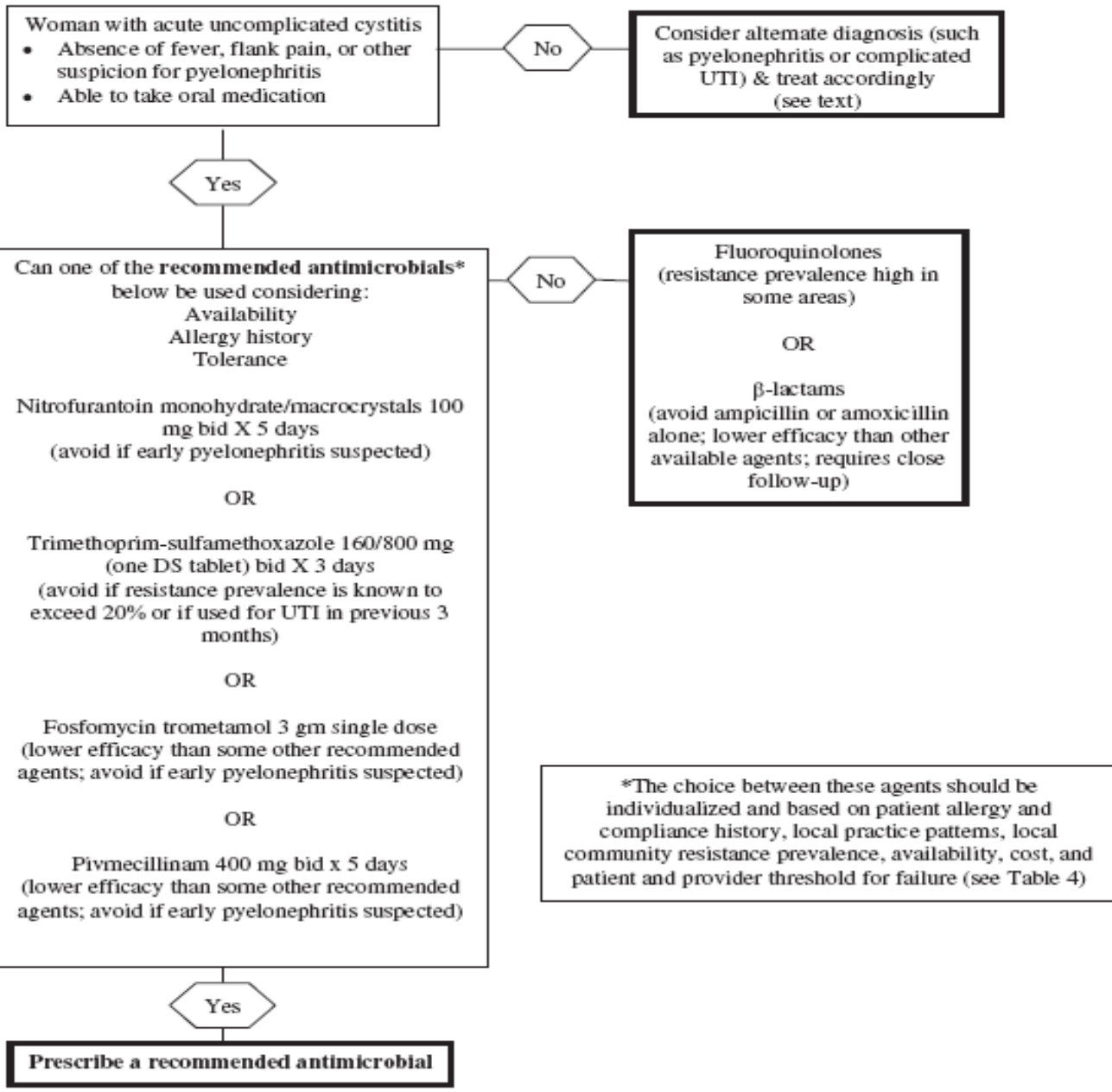
Treatment of UTIs

- Acute uncomplicated cystitis
- Acute uncomplicated pyelonephritis

Treatment of UTIs

For AUC and AUP consider :

- Antimicrobial resistance
- Collateral damage
 - Cephalosporins linked to subsequent infections VRE, ESBL Klebsiella, Beta lactamase R acinetobacter, C Dif
 - Fluoroquinolones linked to infection with MRSA and FQ R in GN




Acute uncomplicated pyelonephritis

- Urine culture and susceptibility testing
- Oral ciprofloxacin 500 BID x 7 days (w or wo initial IV). Resistance < 10%
- Oral TMP/SMX (160/800) if uropathogen known to be susceptible x 14 days. If susc not known initial IV (ceftriaxone or AG)
- Oral B- lactam less effective. If used initial IV (ceftriaxone or AG) 10-14 days

QUESTION

- Which are the FDA warnings for quinolones?

CDC Warning on FQ Antibiotic use: Rolling Back Use for Patient Safety

1. FDA recommendations state that risks of serious side effects with fluoroquinolones generally outweigh benefits for patients with the following:
 -  a. **Acute bacterial sinusitis**
 - b. **Acute exacerbation of chronic bronchitis**
 - c. **Uncomplicated UTI**
2. The FDA has determined that fluoroquinolones should be reserved for the previous three conditions only when there are no alternative treatment options.
3. Fluoroquinolones may be considered in the following scenarios:
 - a. Patient with type 1 hypersensitivity reaction to both penicillin and cephalosporins
 - b. Definitive therapy for multidrug resistant organism in which the isolate is resistant to all beta-lactams and susceptible to fluoroquinolone.
 - c. For bacteremia stepdown therapy in which organism is susceptible
 - d. For serious bacterial infections (i.e. anthrax & plague) where the benefits of fluoroquinolones outweigh the risk.

Fluoroquinolone Boxed Warning	
July 2008	<ul style="list-style-type: none"> • increased risk of tendinitis and tendon rupture
February 2011	<ul style="list-style-type: none"> • increased risk of exacerbating muscle weakness related to Myasthenia gravis
August 2013	<ul style="list-style-type: none"> • increased potential risk for irreversible peripheral neuropathy
July 2016	<ul style="list-style-type: none"> • increased CNS effects ((i.e. anxiety, depression, hallucinations, suicidal thoughts, confusion)
July 2018 (new labeling change)	<ul style="list-style-type: none"> • new mental health side effects updated to include ddisturbances in attention, disorientation, agitation, nervousness, memory impairment and delirium • serious blood sugar disturbances, particularly risk of coma with hyopglycemia

Dec 20,2018 -Warning for aortic rupture and tearing in patients at risk (known aortic or arterial aneurysms,HTN,PVD,elderly,rare genetic conditions affecting collagen)

Pasternak et al ,NEJM JW Gen Med May 1 2018

Daneman et al. BMJ Open 2015;5:e 010077

JAMA Intern Med 2015;175:1839

J AM Coll Cardiol 2018;72:1369

QUESTION

How do you define recurrent UTI ?

Recurrent UTIs

- 2 or > episodes 6M or 3 or > in a year. Non pregnant adult women
- Relapse : If current infection is caused by same pathogen as the initial UTI and occurs within 2 weeks
- Re infection: If current infection is caused by a different strain than initial UTI of Urine culture was sterile

Recurrent UTI : Risk Factors

- Spermicidal products
- Sexually active
- Genetic factors
- Variations in innate immune system (low CXCR1 and CXCR2 expression)

Recurrent uncomplicated Urinary Tract Infections in women
AUA/CUA/SUFU

AUA American Urological Association

CUA Canadian Urological Society

SUFU Society of Urodynamics, Female Pelvic Medicine &
Urogenital Reconstruction

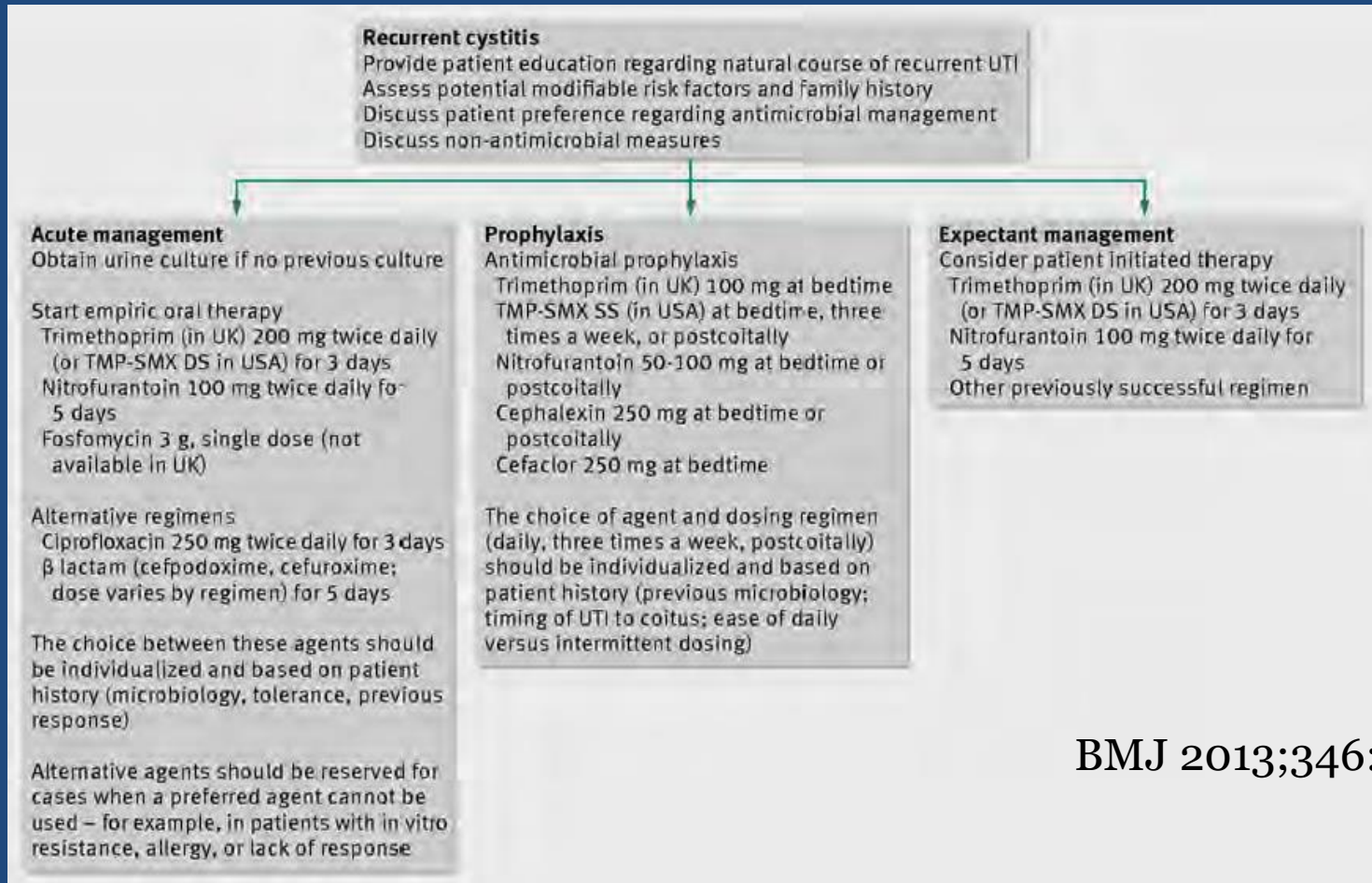
J Urol. 2019 Aug;202 (2): 282-289

Prophylactic daily antibiotics.

- TMP 100mg once daily
- TMP-SMX 40mg/200mg once daily
- TMP-SMX 40mg/200mg thrice weekly
- Nitrofurantoin monohydrate/macrocrystals 50mg daily
- Nitrofurantoin monohydrate/macrocrystals 100mg daily
- Cephalexin 125mg once daily
- Cephalexin 250mg once daily
- Fosfomycin 3g every 10 days

Preventive measures

- Antimicrobial prophylaxis
- Patient centered approach



Non antimicrobial strategies

- Lactobacillus : L crispatus intravaginal suppositories, oral capsules with L rhamnosus GR-1 and L reuteri RC- 14
- Water ingestion >1.5 lt/day
- Estrogens
- Cranberries
- Urination before and after sexual activity
- Diet (alcalinizing agents and siderocalin)

Infect Dis Clin N Am 28 (2014) 135-147

CID 2013 : 57 719-24

Shields-Cutter RR et al. Human urinary composition controls antibacterial activity of siderocalin J Biol Chem 2015;290(26):15949-15960

Drug induced UTI's

- Recent reports of drug induced UTI's related to sodium-glucose coransporter 2 (SGLT2) inhibitors “flozins”
- Oral hypoglycemics that work by increasing the amount of glucose spilled in the urine
- Include canagliflozin (Invokana), empagliflozin (jardiance) and dapagliflozin (Farxiga)
- SGLT2 are likely NOT causing UTI but rather the increased urinary glucose concentration may be linked to infection severity (Doses > 10 mg dapagliflozin) (2)

www.fda.gov/Drugs/DrugSafety/ucm475463.htm

2.Donnan JR et al. CMAJ Open 2018;
doi:10.9778/cmajo.20180111

Complicated UTIs

Initial evaluation:

- Detailed history- Previous UTI, prior ATB use, have you seen a urologist before?
- Physical exam – Sepsis ?
- UA and Urine culture
- Imaging

If obstruction

- Prompt urologic evaluation

Complicated UTIs

- Diabetes Mellitus
- Acute pyelonephritis
- Emphysematous pyelonephritis
- Renal abscess
- Renal papillary necrosis
- UTI in renal transplant recipients
- Nephrolithiasis
- Prostatitis

Diagnosis of CA-UTI

- In patients with indwelling urethral, indwelling supra pubic or intermittent catheterization
- Presence of symptoms or signs cw UTI with no other identified source of infection along with 10^3 CFU/ml of ≥ 1 bacterial species in a single urine specimen.

Diagnosis of CA-UTI

- Signs and symptoms cw UTI include: new onset of worsening fever, rigors, altered mental status, malaise, or lethargy with no other identified cause, flank pain; CVA tenderness; acute hematuria; pelvic discomfort
- When catheter removed : dysuria, urgent or frequent urination, supra pubic pain or tenderness

Diagnosis of CA-UTI

- A urine culture should be obtained prior to initiating antimicrobial treatment
- If an indwelling catheter has been in place for > 2 weeks at the onset of CA-UTI and is still indicated, the catheter should be replaced and a urine sample sent from freshly placed catheter
- If catheter can be discontinued , a culture of voided midstream urine specimen should be obtained

Banner Clinical Practice

- Discuss with patient indication and risk of placing an indwelling urinary catheter and document in chart.
- Select an indication for the catheter when ordering.
 - Urinary retention or obstruction
 - U.O. monitoring in critically ill, incontinent, uncooperative
 - Peri-operatively for selected surgical procedures
 - Fluid challenge in patients with ARF
 - Urinary incontinence posing risk to patient
 - Prolonged immobilization
 - Palliative care in terminally ill
- Continuing the catheter requires daily renewal order.
 - Nursing will contact you on daily basis for indication and order
 - Exceptions include certain urologic/gyn/perineal procedures

CA UTIs

- Cefepime 2 gm IV q 12h, Pip/tazo 3.375 gr q 6h or IMP 500 mg q 6h
- Discontinue or exchange catheter
- Duration 5- 14 days
- Shorter duration in uncomplicated UTI 3d
- Do not use moxifloxacin

Zosyn extended infusion

- Zosyn 4.5 gm IV q 6h will be automatically replaced 3.375 GM IV extended infusion (4hs) q 8h. MIC <16
- ER 30 min infusion will continue

CID 2013; 56(2): 272-282

J Pharm Pract.2011 Dec ;24(6):571-6

J Expert Opin Drug Metab Toxicol.2010 Aug; 6(8): 1017-31

DOB: 04/12/1958
 Weight: 78.80 kg (0) 87/28/2018

Gender: Female

Encounter: Inpatient
 Location: 01 08C; 0821; 01

Allergies: Aloe Vera, Peanuts, Benadryl, opium, penicillin, Sulfacetamide Sodium

+ Add | Rx Plans (1): NMC QMR RETAL +

Reconciliation Status
 ✓ Meds History ✓ Admission ✓ Discharge
 Show Primary...

Orders Prior to Reconciliation

Orders After Reconciliation

Order Name/Details	Status	Order Name/Details	Status
Home Medications		omeprazole (Prilosec 10 mg oral enteric coated capsule) 30 mg, 1 cap, Oral, Daily, for 30 days, 30 cap, 0 Refill(s) < Notes for Patient >	Prescribed
Continued Home Medications		diclofenac (diclofenac sodium extended release) 100 mg, Oral, BID < Notes for Patient >	Documented
diclofenac 100 mg, 2 tab, Oral, BID	Ordered	Ruconazole (Ruconazole 200 mg oral tablet) 400 mg, 2 tab, Oral, Daily, for 34 days, 68 tab, 0 Refill(s) < Notes for Patient >	Prescribed
Ruconazole 400 mg, 2 tab, Oral, Daily	Ordered	The continued order status has changed since it was reconciled or replaced.	
piperacillin-tazobactam (Zosyn (extended interval)) 3.375 gm, IV Piggyback, Q8H	Ordered	piperacillin-tazobactam (piperacillin-tazobactam 3 gm-0.375 gm intravenous injection) See Instructions, IV Piggyback Q8H, 34 unit(s), 0 Refill(s) < Notes for Patient >	Prescribed
prednisONE 15 mg, 3 tab, Oral, Daily	Ordered	The continued order status has changed since it was reconciled or replaced.	
propranolol 20 mg, 2 tab, Oral, BID	Ordered	prednisONE (prednisONE 5 mg oral tablet) 15 mg, 3 tab, Oral, Daily, for 60 days, 180 tab, 0 Refill(s) < Notes for Patient >	Prescribed
VANCOMycin 250 mg, 20 mL, Oral, Q8H	Ordered	propranolol (propranolol 10 mg oral tablet) 20 mg, 2 tab, Oral, BID, for 60 days, 240 tab, 0 Refill(s) < Notes for Patient >	Prescribed
Medications		VANCOMycin (vancomycin 125 mg oral capsule) 125 mg, 1 cap, Oral, Q8H, for 34 days, 136 cap, 0 Refill(s) < Notes for Patient >	Prescribed
chlorhexidine topical (FenDEX) 15 mL, Swish and Spit, BID	Ordered		
famotidine 20 mg, 1 tab, Oral, BID	Ordered		
glucagon 1 mg, 1 mL, SubCutaneous, On Call, PRN: Blood Glucose	Ordered		
glucose 15 gm, Oral, On Call, PRN: Blood Glucose	Ordered		
glucose 30 gm, Oral, On Call, PRN: Blood Glucose	Ordered		
glucose (Dextrose 50%) 25 gm, 50 mL, IV Push, On Call, PRN: Blood Glucose	Ordered		
heparin 5,000 units(s), 1 mL, SubQ, Q8H (n)	Ordered		
multivitamin 1 tab, Oral, Daily	Ordered		

Continue Remaining Home Meds | Do Not Continue Remaining Orders

Details

0 Missing Required Details | All Required Orders Reconciled | On Table

Reconcile And Sign | Cancel

Search Banner:

Everything Go

Advanced Search

Systemwide Links

- Home
- About Us
- Banner Store
- Departments
- Facilities
- Giving Back
- System News
- Strategic Initiatives
- Teams & Projects
- Tools & Services
- Patient Experience

- Banner Injury Prevention
- Bioethics
- Brand Services
- Call Center
- Care Management
- Clinical Education
- Clinical Informatics
- Clinical Innovation and Medical Informatics
- Design Services
- Development & Construction
- Digital Content Services
- e-Discovery and Litigation Support
- Emergency Management
- Employee Wellness Programs (ECHO)
- Ethics and Compliance Home Page
- Finance
- HIMS
- HIPAA
- Human Resources
- Banner iCare
- Infection Prevention and Control
- Information Technology
- Labor and Management Engineering
- Laboratories
- Legal Department
- Occupational Health Services
- Online Solutions
- Policies & Procedures Resource Center
- Public Relations
- Risk Management
- Secure Hire
- Supply Chain Management
- Medical Ethics

ments >> Infection Prevention and Control >> System Antibigrams

Antibigrams

How to request facility antibigrams for the various Banner facilities

Facility Name	Antibigram
Facility Data	Antibigrams Facility Data.pdf
Medical Center	AZ Baywood Antibigram Data July-Dec 2012.pdf
Medical Center	AZ Boswell Antibigram Data July-Dec 2012.pdf
Medical Center	AZ Del Webb Antibigram Data July-Dec 2012.pdf
Cardon Children's	AZ Desert Adult Antibigram Data July-Dec 2012.pdf
Isolation Guidelines	AZ Desert Peds Antibigram Data July-Dec 2012.pdf
Patient and Staff Education	AZ Estrella Antibigram Data July-Dec 2012.pdf
Cleaning and Disinfection Tools	AZ Gateway Antibigram Data July-Dec 2012.pdf
System Antibigrams	Good Samaritan Antibigram Data July-Dec 2012.pdf
Useful Links and Resources	AZ Baywood Heart Antibigram Data Jan-Dec 2012.pdf
Contact Information	
Policies and Procedures Correct	
Medical Center	Ironwood Antibigram Data July-Dec 2012.pdf
Medical Center	AZ Thunderbird Adult Antibigram Data July-Dec 2012.pdf



Intranet Statistics:
76086 hits today

[--]
Feedback

Candida UTI

- Asymptomatic candiduria almost always represents colonization and elimination of underlying RF (catheter can eradicate candiduria..)
- Candida cystitis fluconazole susc org. fluconazole 200 mg Po x 2 weeks + removal of catheter
- Symptomatic ascending candida pyelonephritis fluconazole 400 mg 2 weeks, elimination of obstruction
- Treatment of asymptomatic candiduria: -
Very low birth weight infants
 - Patients undergoing urologic procedures
 - Neutropenic patients

Recommended reading

- Clinical Practice Guidelines CID 2011:52 e 103-120
- Urinary Catheter Guidelines CID 2010:50 625-663
- Infect Dis Clin N Am 28 (2014) 1-159
- Uncomplicated Urinary Tract Infection N Engl J Med 366;11
- In the Clinic. Urinary Tract Infection. Ann Intern Med 2017; 167: ITC 49-63