



Outpatient Prescribing of Fluoroquinolones for Uncomplicated Cystitis in a Community Healthcare System

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No conflicts of interest to disclose

Background



- Urinary tract infections (UTIs) most common outpatient infection in the US
- Uncomplicated cystitis is UTI confined to bladder in healthy non-pregnant females
- 95% monobacterial
- 80% of infections caused by *Escherichia coli*

IDSA Guidelines



- 2010 IDSA Acute Uncomplicated Cystitis Guidelines

Primary Agents

- Nitrofurantoin monohydrate/macrocrystals 100 mg PO BID for 5 days
- Trimethoprim-sulfamethoxazole (TMP-SMX) 160/800 mg PO BID for 3 days*
- Fosfomycin 3g PO once

Alternative Agents

- β -lactams (amoxicillin-clavulanate, cefdinir, cefaclor, cefpodixime) for 3-7 days
- Fluoroquinolones (ofloxacin, ciprofloxacin, levofloxacin) for 3 days

*If resistance is $\leq 20\%$

Fluoroquinolones in Cystitis



- Propensity for collateral damage
- FDA Safety Warnings
 - Tendon rupture (2008)
 - Peripheral neuropathy (2013)
 - **Restriction of use in uncomplicated UTIs (2016)**
 - Hypoglycemia and mental health (2018)
 - Aortic dissection (2018)

Fluoroquinolone Duration in Cystitis



- Double-blind, noninferiority randomized controlled trial
- Compared ciprofloxacin 250 mg BID for 3 days vs. 7 days
- Included women 65 or older with uncomplicated cystitis
- Bacterial eradication at 2 days after treatment was 98% in 3-day group, 93% in 7-day group ($p=0.16$)
- Higher rate of adverse events for 7 day group vs. 3 day group
 - Drowsiness, loss of appetite, and nausea or vomiting reached statistical significance

Fluoroquinolones in Cystitis



Practitioner Education and Feedback to Decrease Ciprofloxacin Prescriptions in Patients with Acute Uncomplicated Cystitis

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- Prior to intervention
 - 31.7% patients prescribed ciprofloxacin for uncomplicated cystitis
 - 92% of ciprofloxacin prescriptions inappropriate
 - 83% prescribed incorrect ciprofloxacin duration (>3 days)

Purpose of Study



- Evaluate the appropriateness of fluoroquinolone prescribing for uncomplicated cystitis in the outpatient clinics of SoutheastHEALTH
- Identify areas of improvement of antimicrobial stewardship in outpatient acute cystitis treatment
- Support the Joint Commission requirements for ambulatory antimicrobial stewardship

Methods



- Approved by the SoutheastHEALTH Institutional Review Board
- Design: Retrospective chart review
- Primary endpoint: Rate of inappropriate fluoroquinolones prescribed for uncomplicated cystitis
- Secondary endpoints: Rate of inappropriate dose and duration of fluoroquinolones that are prescribed

Data Points



- Age
- Prescriber
- Allergies
- Antibiotic prescribed
(including dose, frequency,
and duration)
- Statistical Analysis
 - Mean, median, mode, range

Inclusion and Exclusion Criteria



Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none">• 18 years or older	<ul style="list-style-type: none">• Pregnant
<ul style="list-style-type: none">• SoutheastHEALTH clinic visit between 1/1/2019 and 12/31/2019	<ul style="list-style-type: none">• Male
<ul style="list-style-type: none">• Prescribed antibiotic as empiric therapy (not based off culture)	<ul style="list-style-type: none">• Complicated UTIs*
<ul style="list-style-type: none">• ICD-10-CM Code<ul style="list-style-type: none">• N39.0 Urinary tract infection, site not specified• R82.71 Bacteriuria	<p>*Including symptoms of flank pain, low back pain, fever (subjective or objective), chills, costovertebral angle tenderness, nausea, vomiting, structural abnormalities, catheters</p>

Appropriate Indications for Fluoroquinolones



- Previous urine culture within the past 2 years that showed resistance to first-line agents
- Recurrent or unresolved infection
- Patient allergy to TMP-SMX and nitrofurantoin
- Disclaimer: due to cost of fosfomycin, will consider fluoroquinolone appropriate if both TMP-SMX and nitrofurantoin cannot be used

Results



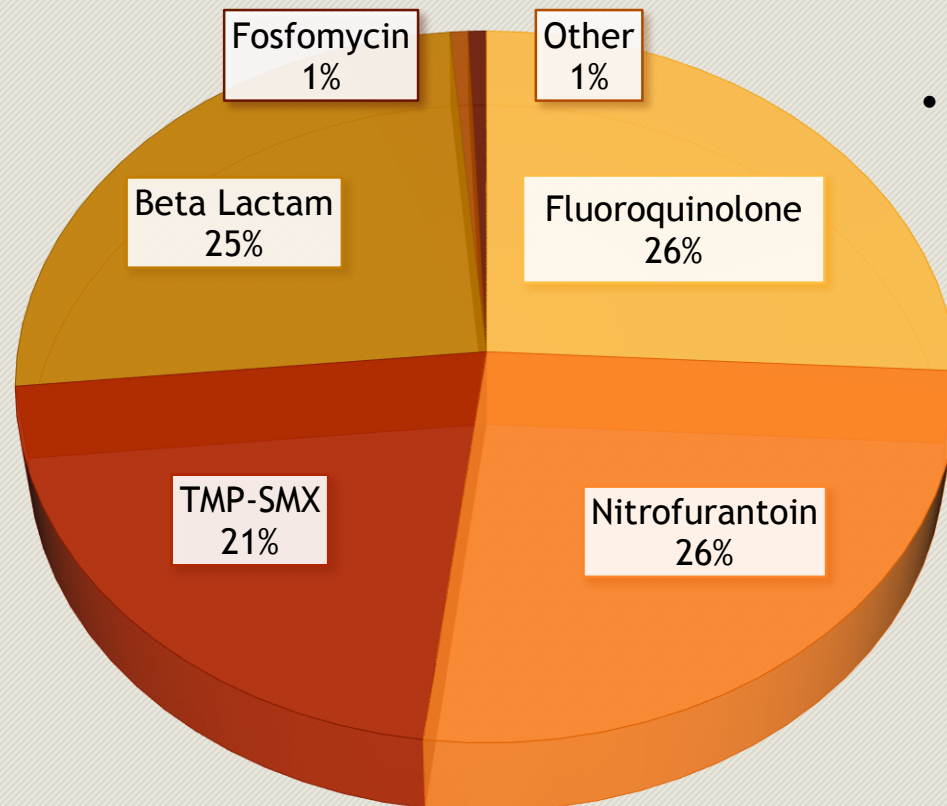
- 996 patients obtained from ICD-10 report
 - Further removed excluded patients
- 32 prescribers
 - 18 physicians, 14 nurse practitioners

Demographics	
Age (years)	56.5
Female (%)	437 (100)

Results



ANTIBIOTIC PRESCRIBED N=437

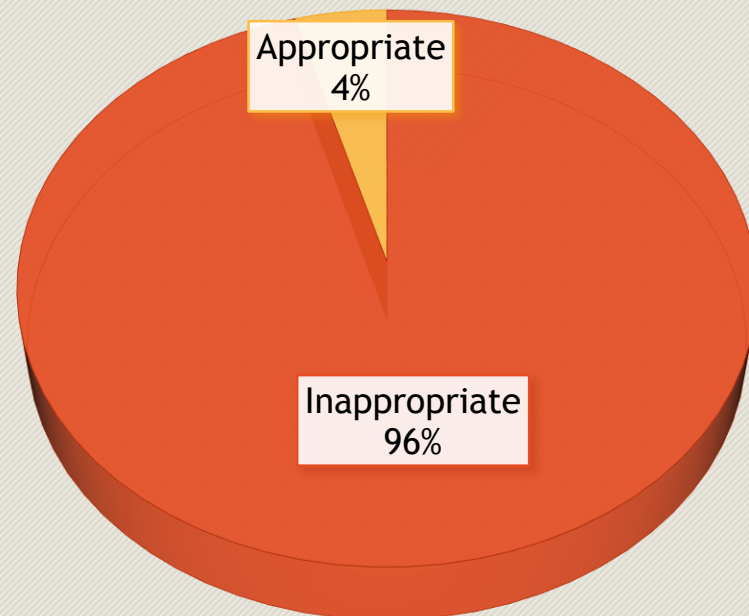


- “Beta Lactam” includes cephalosporins and amoxicillin-clavulanate
- “Other” includes agents not recommended as empiric therapy

Results: Fluoroquinolones



APPROPRIATENESS OF FLUOROQUINOLONE AS CHOICE OF ANTIBIOTIC N=113



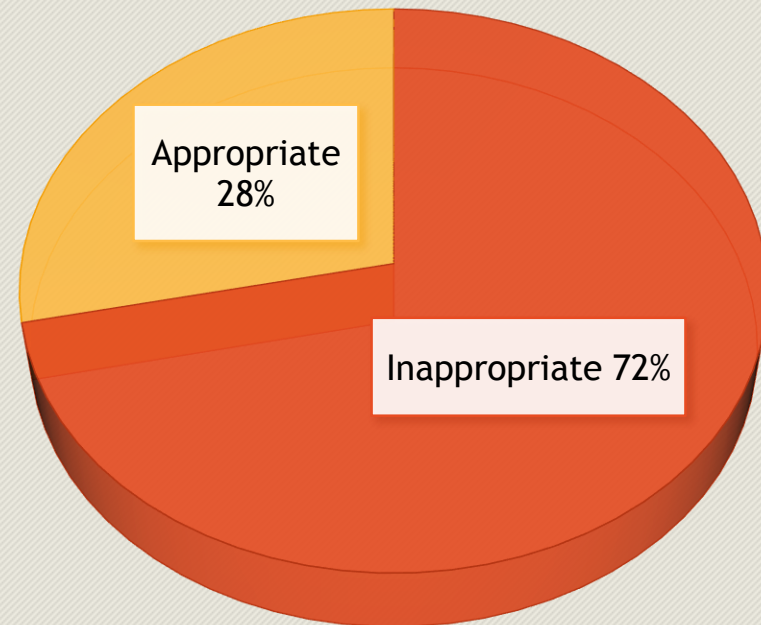
Results: Fluoroquinolones



- Appropriate duration of fluoroquinolone is 3 days

Statistic	Days
Mean	5.46
Mode	7
Range	3-10

APPROPRIATENESS OF DURATION OF FLUOROQUINOLONE N=113

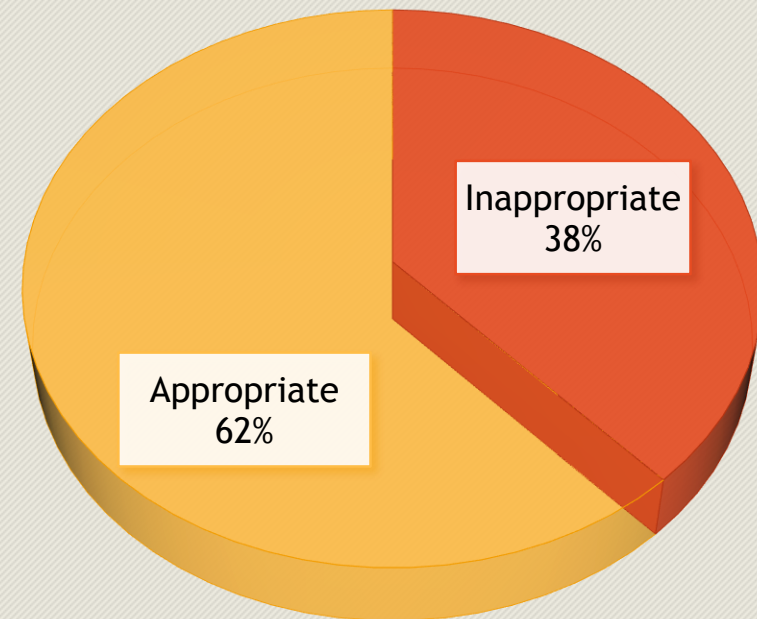


Results: Fluoroquinolones



- Appropriate dose is ciprofloxacin 250 mg BID or levofloxacin 250 mg daily

APPROPRIATENESS OF DOSE OF FLUOROQUINOLONE N=113



Discussion



- May overestimate rate of inappropriate fluoroquinolone use due to lack of documentation
- Provides baseline for future antimicrobial stewardship interventions
 - Prescriber education
 - Electronic health record system modification
 - Antibigram education

Strengths and Limitations



Strengths	Limitations
<ul style="list-style-type: none">• Directly applicable to our institution's patient population	<ul style="list-style-type: none">• Single-center study• Small sample size• May not be applicable to other institutions

Conclusion



- Most fluoroquinolones prescribed for uncomplicated cystitis at SoutheastHEALTH clinics are inappropriate
- Identifies need for antimicrobial stewardship efforts in the ambulatory setting
- Further studies needed to evaluate impact of antimicrobial stewardship efforts



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