Implementing Outpatient Antimicrobial Stewardship in a Primary Care Office through Pharmacist-led Audit and Feedback

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Abstract

Background: More than 30% of antibiotics prescribed in the outpatient setting are unnecessary. This study aimed to determine the impact of pharmacist-led audit and feedback on outpatient antibiotic prescribing for upper respiratory tract infections (URIs) and urinary tract infections (UTIs).

Methods: A retrospective, observational study was conducted at an outpatient primary care office to evaluate implementation of a pharmacist-led audit and feedback process. The office includes 0.6 FTE ambulatory care pharmacist (ACP) who completed antimicrobial stewardship training, and is part of a health system supported by a pharmacist and physician co-led antimicrobial stewardship program (ASP). Education, including pocket cards with URI and UTI guidelines was provided by the ASP leads in July 2017 prior to the study period (August 2017 – March 2018). The ACP was responsible for weekly audit of all prescribed antibiotics for URI and UTI and provided feedback to prescribers. Appropriateness of therapy was determined via the guidelines presented by the ASP team. Feedback included recommendations regarding watch-and-wait, antimicrobial selection, dose, and duration of therapy. The primary outcome was to compare antibiotic use over time following the implementation of the audit and feedback program.

Results: Over the study period 1107 prescriptions were audited by the ACP: 825 URI and 282 UTI. Feedback was provided for all cases, positive feedback for 580 (52.4%), negative feedback for 380, (34.3%) and mixed feedback for 147 (13.3%). The most common reasons for feedback were inappropriate agent (26.3%) and too long of duration of therapy (24.3%). Fluoroquinolone prescribing rates for UTIs decreased from 85% at baseline to 40% in Month 1 and to 11.7% of UTI prescriptions over the next 6 months. Nitrofurantoin prescribing increased from 0.4% in Month 1 to 38.6% of UTI prescriptions over the next 6 months to become the most commonly prescribed agent. Beta-lactams were the most commonly prescribed antibiotics for URIs (66.7%). The median URI duration of therapy decreased from 10 days at baseline to 7 days across all 7 study months.

Conclusion: Pharmacist-led audit and feedback significantly reduced fluoroquinolone prescribing for UTIs and shortened median duration of therapy for URIs in the outpatient setting.

Background

- Inappropriate antibiotic prescribing contributes to increasing rates of antimicrobial resistance and an estimated 30% of antibiotics prescribed in the outpatient setting are unnecessary
- Antimicrobial stewardship programs (ASPs) have been shown to reduce unnecessary antibiotic prescribing in the inpatient setting and are mandated by The Joint Commission; however, ASP resources are scarce in the outpatient setting
- The Centers for Disease Control and Prevention (CDC) identifies four core elements of outpatient antimicrobial stewardship: commitment, action for policy and practice, tracking and reporting, and education and expertise

Methods & Program Description

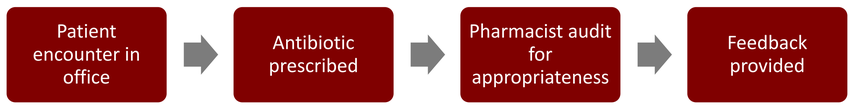
Study Design
- Retrospective, observational

Primary Objective
- To describe a pharmacist-led audit and feedback of outpatient antibiotics prescribed at a primary care office

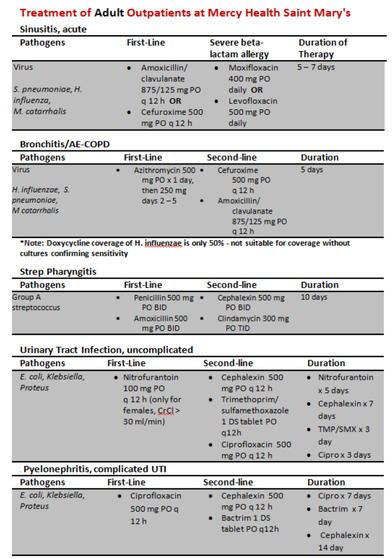
Methods
- Audit and feedback initiated by 0.6 FTE ambulatory care pharmacist (ACP) with support from a health-system wide antimicrobial stewardship program (ASP) co-led by an infectious disease (ID) pharmacist and physician

Timeline

Process



Pocket cards with Local Guideline Recommendations



Treatment of **Adult** Outpatients at Mercy Health Saint Mary's

Sinusitis, acute

Pathogens	First-Line	Severe beta-lactam allergy	Duration of Therapy
Virus *S. pneumoniae, H. influenza, M. catarrhalis*	• Amoxicillin/ clavulanate 875/125 mg PO q 12 h **OR** • Cefuroxime 500 mg PO q 12 h	• Moxifloxacin 400 mg PO daily **OR** • Levofloxacin 500 mg PO daily	5 – 7 days

Bronchitis/AE-COPD

Pathogens	First-Line	Second-line	Duration
Virus *H. influenzae, S. pneumoniae, M catarrhalis*	• Azithromycin 500 mg PO x 1 day, then 250 mg days 2 – 5	• Cefuroxime 500 mg PO q 12 h • Amoxicillin/ clavulanate 875/125 mg PO q 12 h	5 days

*Note: Doxycycline coverage of H. influenzae is only 50% - not suitable for coverage without cultures confirming sensitivity

Strep Pharyngitis

Pathogens	First-Line	Second-line	Duration
Group A streptococcus	• Penicillin 500 mg PO BID • Amoxicillin 500 mg PO BID	• Cephalexin 500 mg PO BID • Clindamycin 300 mg PO TID	10 days

Urinary Tract Infection, uncomplicated

Pathogens	First-Line	Second-line	Duration
E. coli, Klebsiella, Proteus	• Nitrofurantoin 100 mg PO q 12 h (only for females, CrCl > 30 ml/min)	• Cephalexin 500 mg PO q 12 h • Trimethoprim/ sulfamethoxazole 1 DS tablet PO q12h • Ciprofloxacin 500 mg PO q 12 h	• Nitrofurantoin x 5 days • Cephalexin x 7 days • TMP/SMX x 3 day • Cipro x 3 days

Pyelonephritis, complicated UTI

Pathogens	First-Line	Second-line	Duration
E. coli, Klebsiella, Proteus	• Ciprofloxacin 500 mg PO q 12 h	• Cephalexin 500 mg PO q 12 h • Bactrim 1 DS tablet PO q12h	• Cipro x 7 days • Bactrim x 7 day • Cephalexin x 14 day

Treatment of **Pediatric** Outpatients at Mercy Health Saint Mary's

Sinusitis, acute

Pathogens	First-Line	Severe beta-lactam allergy	Duration of Therapy
Virus *S. pneumoniae, H. influenza, M. catarrhalis* **NOTE: Bacterial etiology should only be considered if: • Persistent symptoms without improvement of nasal discharge or daytime cough >10 days • Severe symptoms: fever ≥39°C, purulent nasal discharge for at least 3 consecutive days	• Amoxicillin suspension 80-90 mg/kg per day PO divided in 2 doses (Maximum 500 mg/dose) **OR** • Amoxicillin/clavulanate 80–90 mg/kg per day PO divided in 2 doses (Max: 875 mg per dose)	• Cefdinir 14 mg/kg/day PO in 1 or 2 divided doses (Maximum 300 mg/dose or 600mg/day) **OR** • Trimethoprim/ sulfamethoxazole 8 mg TMP/kg/day PO divided in 2 doses	10 days

Otitis Media

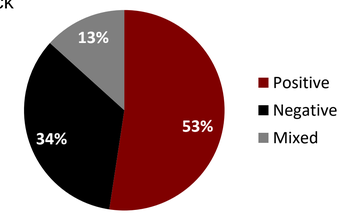
Pathogens	First-Line	Second-line	Duration
S. pneumoniae, H. influenza, M. catarrhalis, virus ** Watch and wait x 48-72 hr is recommended for children ≥ 2 years of age with unilateral or bilateral AOM without otalgia and children greater than 6 months with unilateral AOM without otalgia	• Amoxicillin suspension 80-90 mg/kg per day PO divided in 2 doses (Maximum 500mg/dose) **OR** • Amoxicillin/clavulanate 80–90 mg/kg per day PO divided in 2 doses (Max: 875 mg per dose)	• Cefdinir 14 mg/kg/day PO in 1 or 2 divided doses (Maximum 300 mg/dose or 600mg/day) **OR** • Bactrim (TMP-SMX) 8 mg TMP/kg/day PO divided in 2 doses	10 days

Urinary Tract Infection

Pathogens	First-Line	Severe beta-lactam allergy	Duration
E. coli, Klebsiella, Proteus	• Cephalexin 25 mg/kg/day PO divided in 2 doses (Maximum 500 mg/dose q 12 h)	• Bactrim (TMP-SMX) (age>2 months) 8 mg TMP/kg/day PO divided in 2 doses	• UTI: 7 days • Pyelonephritis: 10 – 14 days

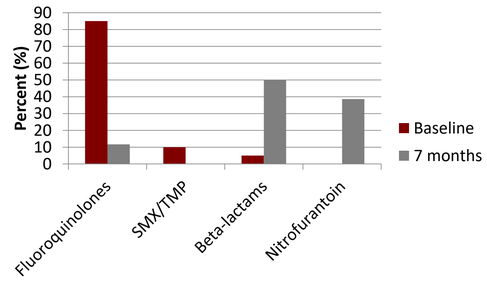
Results

- 1107 prescriptions reviewed and feedback provided
  - 825 Upper respiratory infection (URI)
  - 282 Urinary tract infection (UTI)
- Feedback

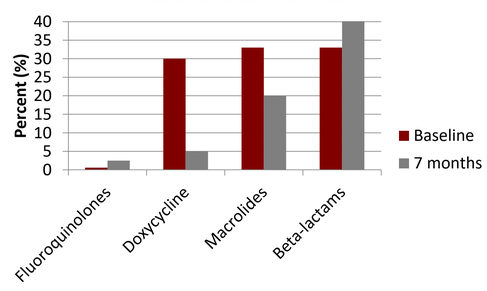


Duration of Therapy for URIs (days)		
	Median	Range
Baseline	10	5 –14
August	7	7 –10
September	7	5 –14
October	7	5 –14
November	7	5 –14
December	7	5 –14
January	7	5 –14
February	7	5 –10

Antibiotic Use for UTIs



Antibiotic Use for URIs



Conclusion & Future Directions

- Pharmacist-led audit and feedback improved the appropriateness of antibiotic prescribing for URIs and UTIs
- Establishing effective antimicrobial stewardship programs in primary care offices is important in improving antibiotic prescribing in the outpatient setting
- Additional resources, including staff with antimicrobial stewardship training, may be required to scale-up outpatient efforts to improve global antimicrobial prescribing and meet CDC recommendations

References

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