Impact of Antimicrobial Stewardship Commitment Posters on Antibiotic Prescribing for Upper Respiratory Tract Infections in a Rural Outpatient Setting

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INTRODUCTION

- At least 30% of antibiotics prescribed in the outpatient setting are unnecessary[1]
- Antibiotics are commonly overprescribed for upper respiratory tract infections (URIs) despite 90-98% being viral in nature[1,2]
- Antibiotic stewardship interventions in the outpatient setting are necessary to reduce inappropriate antibiotic prescribing[2]
- Antibiotic commitment posters represent a potential low-hanging fruit antibiotic stewardship initiative in the outpatient setting, especially for clinic systems with limited available antibiotic stewardship resources
- The Centers for Disease Control and Prevention advocate for display of commitment posters in outpatient clinics to advise providers to only prescribe antibiotics when a bacterial infection is suspected[3]
- The impact of antibiotic commitment posters on antibiotic prescribing in the outpatient setting has largely been part of multi-faceted interventions in academic medical centers or urban cities rather than in rural outpatient settings

OBJECTIVE

- To determine the impact of antibiotic commitment posters as a single-intervention in rural outpatient clinics on antibiotic prescribing for URIs

METHODS

- **Study Design**: Quasi-experimental study
- **Study Location**: A network of outpatient clinics located in rural New York and Pennsylvania within The Guthrie Clinic system
- **Inclusion criteria**: Patients with a URI visit diagnosis code at outpatient clinics that had not yet implemented other antibiotic stewardship interventions
- **Exclusion criteria**: Patients with other outpatient infectious disease state diagnosis codes or at outpatient clinics with other antibiotic stewardship interventions implemented
- **Pre-Intervention Period**: July 1, 2016 – December 31, 2016
- **Intervention Period**: Antibiotic commitment posters were displayed in exam and waiting rooms of outpatient clinics between April–June 2017
- **Post-Intervention Period**: July 1, 2017 – December 31, 2017
- **Data Collection**: Demographic, provider, clinic-specific, and antibiotic prescription data were collected
- **Data Analysis**: Comparison of the number of URI visit diagnosis codes where an antibiotic was prescribed or not prescribed between the pre-intervention and post-intervention period after adjusting for covariates of interest.
- **Statistical Analysis**: All statistical analyses were performed using R Statistical Software (R Foundation For Statistical Computing, Vienna, Austria) and the probability of prescribing antibiotics pre- versus post-intervention was compared using a generalized linear mixed-effects model.
- **Ethics**: This study was approved by the Institutional Review Board at Binghamton University and The Guthrie Clinic.

REFERENCES

1. Centers for Disease Control and Prevention. 1 in 3 Antibiotic Prescriptions Unnecessary. Newsroom release, May 2016. Web. 9 September 2018.
2. Klepser ME, Dobson EL, Pogue JM, et al. A call to action for outpatient antibiotic stewardship. J Am Pharm Assoc (2003). 2017 Jul - Aug;57(4):457-463.
3. Centers for Disease Control and Prevention. Antibiotic Prescribing and Use in Doctor's Offices – Print Materials for Healthcare Professionals. May 2018. Web. 9 September 2018.
4. Meeker D, Knight TK, Friedberg MW, et al. Nudging guideline-concordant antibiotic prescribing—a randomized control trial. JAMA Intern Med. 2014 Mar;174(3):425-31.

IMPLEMENTATION & RESULTS

Figure 1. The Guthrie Clinic Antibiotic Commitment Poster

Table 1. Demographics

Year	2016	2017
Total URI Cases	4420	3827
Antibiotics Prescribed for URI	2415 (54.6%)	1977 (51.6%)*
Age (years)	41 (1 - 98)**	42 (4mo - 98)**
Male	35%	34%
Visit Length (minutes)	20.0 (15.0, 20.0)***	20.0 (20.0, 20.0)***
Congestive Heart Failure	2%	2%
Diabetes Mellitus	10%	10%
Hypertension	27%	29%
*p=0.013	**Range of ages	***Interquartile range

Figure 2. Distribution of Proportions of URI Diagnoses with Prescribed Antibiotics over all Clinics by Year

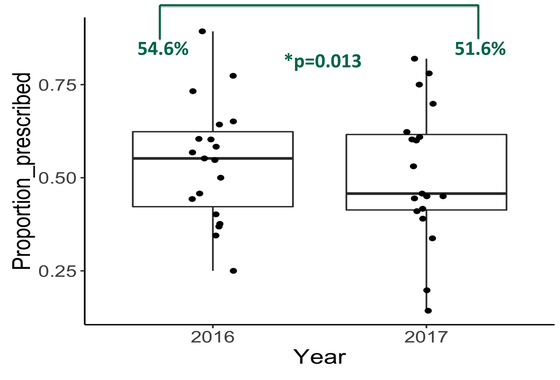

Figure 3. Clinic-Specific Trajectories from 2016 to 2017

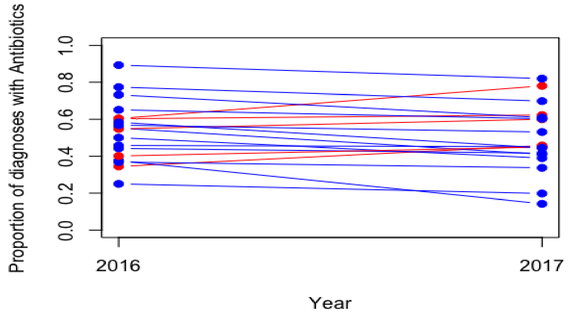

Figure 4. Top ABX Prescribed for URI in 2016 (# Rx's)

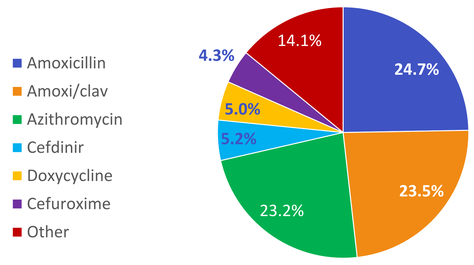

Figure 5. Top ABX Prescribed for URI in 2017 (# Rx's)

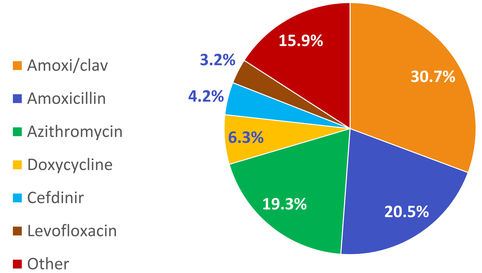

Table 2. Factors Influencing Antibiotic Prescribing for URIs

Factor	P-value*
Older Age (>65 years)	<0.001
Males	0.005
Chronic Obstructive Pulmonary Disease	0.741
Congestive Heart Failure	0.279
Hypertension	0.98
Visit Length	0.218
Visit with their Primary Care Physician	<0.001

*From a generalized linear mixed-effects model

DISCUSSION

- To our knowledge, this is the first study to investigate the impact of antibiotic commitment posters on antibiotic prescribing in rural outpatient clinics
- Fewer antibiotics were prescribed for URI cases in the post-intervention period compared to pre-intervention (51.6% vs. 54.6%, respectively; adjusted odds-ratio for time period = 0.89 for 2017 vs. 2016, p = 0.013)
- The most commonly prescribed antibiotics in both cohorts were amoxicillin, amoxicillin-clavulanate, and azithromycin
- Male gender (p=0.005), older age (p<0.001), and patients being seen by a provider other than their primary care provider (p=0.001) were associated with a higher proportion of antibiotics prescribed per URI diagnosis
- There was no statistically significant difference in antibiotics prescribed for patients with and without certain comorbidities such as diabetes, hypertension, or chronic obstructive pulmonary disease after accounting for other covariates.
- Similar to our findings, Meeker and colleagues demonstrated that display of antibiotic commitment posters in exam rooms resulted in a 19.7 absolute percentage reduction in inappropriate antibiotic prescribing rate compared to the control group (p=0.02) and that this represents a simple, low-cost antibiotic stewardship intervention[4]
- Antibiotic commitment posters are a simple antibiotic stewardship intervention to implement in the outpatient setting

Keys to Success:

- Physician Champion and Senior Director of Quality supported the use of antibiotic commitment posters in exam rooms to minimize inappropriate antibiotic prescribing in the outpatient setting
- All providers in the outpatient clinics signed the poster to demonstrate their commitment to appropriate antibiotic prescribing
- Pragmatic use of a really broad swath of URI diagnoses codes to account for practice variation in a rural setting

Limitations:

- All primary care clinics across the health system received the commitment posters, therefore there is no control
- Without a control clinic, the associated decrease in antibiotic prescribing rates could be due to factors in addition to the poster intervention
- Our results may not be generalizable to other outpatient clinic systems in different geographical locations

CONCLUSION

- Antibiotic stewardship commitment posters were associated with a decrease in the number of antibiotics prescribed for URIs in rural outpatient clinics
- Antibiotic stewardship commitment posters represent a low-hanging fruit intervention for outpatient antibiotic stewardship programs especially in rural areas with limited resources available to improve antibiotic prescribing for URIs

DISCLOSURES

- The following authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation: Karen S. Williams, Caitlin Cushna, Utkarsh J. Dang, and KarenBeth H. Bohan.
- Wesley D. Kufel has served on the advisory board for Theratechnologies and has received funding from Melinta Therapeutics.