Antibiotic Utilization Reports May Reduce Prescribing Practices For Upper Respiratory Infections

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Abstract

Antibiotics are commonly prescribed for upper respiratory infections (URIs), which are often viral. From January 2019 to December 2019, through provider use comparative monthly reports, we aimed to decrease antibiotic use among 12 full-time Emergency Department providers at the Cincinnati VA Medical Center. A prospective analysis comparing utilization rates before and after the intervention was performed. A statistically significant decrease of 68% was seen post-intervention ($p<0.05$). A proposed target reduction of 50% or more at one year was observed in 6 out of 12 providers . Face-to-face antibiotic use reports may serve as an effective intervention in reducing antibiotic prescriptions in this setting.

Background

- More than 90% of URIs have a viral etiology. Nonetheless, in over 50-70% of visits for these conditions result in antibiotic prescription[1]. Shively et al found that the most common indication for prescriptions of antibiotics in Veterans by Primary care providers was Upper respiratory infections. Of the total of antibiotics prescribed, they found that antibiotics were not indicated in 49.7% of the cases[2]
- Antibiotic prescription in adults with acute respiratory tract infection is the most common reason for prescription in the outpatient physician visits. Antibiotics are prescribed three times more than anticoagulants, antiplatelets, oral hypoglycemics and narrow therapeutic index agents in Emergency Departments (ED)[3].
- Consequently, these overprescribed antibiotics represent a risk for emergence of resistant pathogens, Clostridium difficile-associated disease, antibiotic-associated diarrhea, and allergic reactions[4].

Objectives

Intervention and Surveillance

To reduce of overall and specific antimicrobial use through:

- Utilizing individual prescriber antibiotic use report for URIs
  - URIs include: Common cold, pharyngitis, acute rhinosinusitis and acute bronchitis.
- Pooled utilization rate for comparison.
- Proposed reduction of 50% or more.

Post-intervention Phase

Compare pre and post intervention utilization rates.

Methods

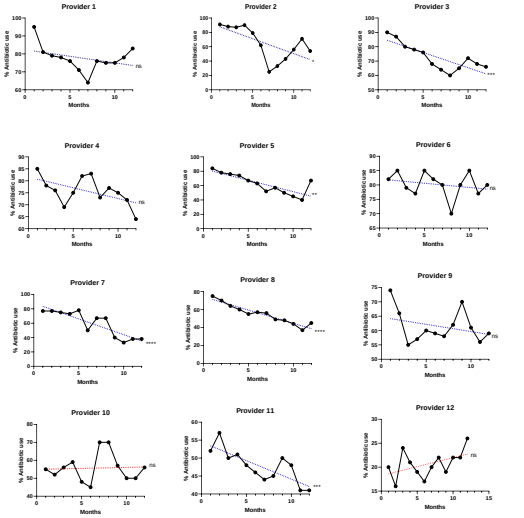
Design

- A prospective single-center single-unit 12-month intervention aimed to survey and provide individual prescriber, face-to-face comparative reports of antibiotic utilization.
- Report of antimicrobial use for any of the 4 diagnostic URI entities: Common cold, Pharyngitis, acute rhinosinusitis and acute bronchitis.
- Cases-utilization extraction performed by ICD-10 codes and Data Capturing from VA Online Dashboard.
- Proposed target of antibiotic utilization of 50%.

Setting

- Emergency Department at Cincinnati VAMC Jan – Dec 2019
- 12 Healthcare providers including physicians and nurse practitioners

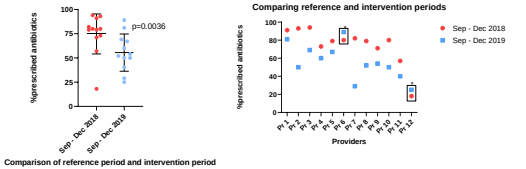
Results: Antibiotic use performance by provider



- Hypothesis: Individual antibiotic use reports would reduce prescribing among providers.
- Finding: Utilization of antibiotics by prescriber demonstrating trend towards decline in use of antibiotic utilization in 10 out of 12 providers, and statistically significant improvement in 6 out of 12 providers.

*Statistical method: Simple linear regression. Legend: ns no statistical difference, * p≤ 0.05, ** p≤ 0.01, *** p≤ 0.001,**** p≤ 0.0001).*

Results: Comparative 2018 and 2019 Antibiotic Use



- The pre-intervention antimicrobial prescription rate from September to December 2018 among all providers averaged 74.75% (SD 20.59, 95% CI 61.6-87.8), with a post-intervention reduction rate of 55.5% from September to December of 2019 (SD 19.20, 95% CI 43.3-67.7) that was statistically significant ($p=0.0036$)*.
- There was an overall 67.7% reduction in antimicrobial utilization rate among all providers that was statistically significant ($p<0.001$)**
- A higher proportion of antibiotic use was observed in physicians when compared to non-physician providers in both pre and post intervention stages, achieving a reduction of 16.6% and 23% after intervention respectively, with no statistical difference between the two groups (CI 95% of -38.82 to 2.395, $p=0.0773$)***.
- A proposed target reduction of 50% or more was observed in 6 out of 12 providers (50%), and 2 out of the total (16.7%) had increase in their antibiotic utilization rate after intervention was initiated.

*Statistical methods: *Pooled and individual paired t-test, **Unpaired t-test, ***Two-way ANOVA*

Conclusions

- Routine face-to-face utilization reports may constitute an effective approach in reducing antibiotic prescription practices in the Emergency Department, and potentially, in other outpatient healthcare settings.
- Physicians, who in our study were less likely to change antimicrobial use practices, represent a potential target of additional measures and education.

References

1. Gonzales R, Steiner JF, Sande MA. Antibiotic Prescribing for Adults With Colds, Upper Respiratory Tract Infections, and Bronchitis by Ambulatory Care Physicians. JAMA. 1997;278:901-904.
2. Shively NR, Buehrle DJ, Clancy CJ, Decker BK. Prevalence of Inappropriate Antibiotic Prescribing in Primary Care Clinics within a Veterans Affairs Health Care System. Antimicrobial agents and chemotherapy. 2018;62
3. Shehab N, Patel PR, Srinivasan A, Budnitz DS. Emergency Department Visits for Antibiotic-Associated Adverse Events. Clinical Infectious Diseases. 2008;47:735-743.
4. Donnelly JP, Baddley JW, Wang HE. Antibiotic Utilization for Acute Respiratory Tract Infections in U.S. Emergency Departments. Antimicrobial Agents and Chemotherapy. 2014;58:1451-1457.