# Trends in Antibiotic Prescribing for Acute Respiratory Tract Infections and Implementation of a Provider-Directed Intervention Within the Veterans Affairs Healthcare System (VA)

Karl Madaras-Kelly, PharmD MPH[1,2]; Hayli Hruza, MPH[1]; Benjamin Pontefract, PharmD[1]; Barbara Jones, MD, [3,4]; Makoto Jones, MD, MS[3,4]; Yiwen Yao, MStat[3,4]; McKenna Nevers, MS[3,4]; Jian Ying, PhD[3,4]; Ben Haaland, PhD[3,4]; Chad Kay, Pharm. D[5]; Melissa Christopher, PharmD[5]; Matthew Samore, MD, FSHEA[3,4]

Boise VA Medical Center, Boise, ID[1]; Idaho State University College of Pharmacy, Meridian, ID[2]; George E. Wahlen VA Medical Center, Salt Lake City, UT[3]; University of Utah School of Medicine, Salt Lake City, UT[4]; VA San Diego Health Care System, San Diego, CA[5]

Contact Information:
Karl Madaras-Kelly PharmD, MPH
Boise VA Medical Center
Boise, ID 83702
Karl.Madaras-Kelly2@va.gov
Ph: 208-422-1000 ext. 7680

Poster# 208

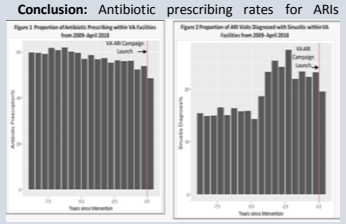
## Abstract

**Background:** We report VA-wide trends over time in acute respiratory infection (ARI) antibiotic prescribing, and early assessment of an intervention to improve ARI management.

**Methods:** We created a retrospective cohort of ARI (sinusitis, pharyngitis, bronchitis, and URI-NOS) visits between 2009 and April 2018. Patients with complicating conditions were excluded. Antibiotic prescribing rates were calculated. A provider-directed VA-wide ARI campaign was initiated in October 2017. The Campaign was implemented locally by antibiotic stewards or regional personnel trained in academic detailing (AD). Campaign components: dashboards for tracking provider and facility prescribing metrics, printable feedback reports, and AD educational materials. Metrics include: ARI antibiotic prescribing rates, bronchitis/URI-NOS antibiotic prescribing rates, guideline-concordant antibiotic selection for sinusitis or pharyngitis, and proportion of ARI visits with a sinusitis diagnosis. A Logistic generalized estimating equation model assessed metrics over time pre/post intervention and chi-squared tests compared guideline concordant antibiotic proportions pre/post intervention.

**Results:** There were 1,580,612 and 137,421 ARI visits pre/post intervention, respectively. Antibiotic prescribing decreased from 2009, annual odds ratio (OR) 0.94 [95% CI 0.93, 0.96; p<0.001]. An additional effect was observed post-intervention [OR 0.88, (0.84, 0.88), p<0.001]. Bronchitis/URI-NOS prescribing rates decreased from 2009 [annual OR 0.94 (CI 0.93, 0.95), p<0.001]. Additional effect was observed post-intervention [OR 0.86, (0.81, 0.91), p<0.001]. Overall, the proportion of ARI visits diagnosed with sinusitis increased [annual OR 1.09 (1.08, 1.10), p<0.01], but the proportion of sinusitis diagnoses decreased [OR 0.72 (0.69, 0.75), p<0.001] post- intervention. Guideline-concordant antibiotic selection was 61.5% vs. 71.2% for sinusitis and 63.3% vs. 67.8% for pharyngitis pre/post intervention, respectively (both p<0.001).

**Conclusion:** Antibiotic prescribing rates for ARIs



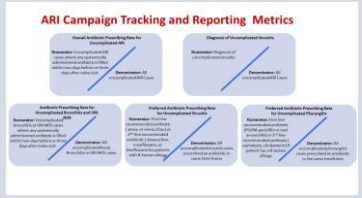
## Introduction

ARIs comprise the largest diagnostic group of conditions for which unnecessary antibiotics are prescribed. Multi-faceted approaches that focus on individual provider behavior show promise compared to provider education alone. Audit and Feedback of individual provider prescribing patterns and AD have independently been demonstrated to reduce unnecessary antibiotic use for treatment of ARIs.[1,2] The VA Antimicrobial Stewardship Taskforce (ASTF) partnered with the VA Office of Academic Detailing to develop and implement a VA-wide Campaign to improve the diagnosis and reduce antibiotic treatment of ARIs utilizing audit-feedback and AD. [3,4]

## Objective

**Objective 1**: To improve the management of uncomplicated ARIs throughout the VA by applying the core elements of outpatient antibiotic stewardship: commitment, action, tracking and reporting, education and expertise.

**Objective 2**: Improve performance of five ARI specific metrics:




## Method

The VA Antimicrobial Stewardship Taskforce and VA Academic Detailing Service Group launched a national ARI Campaign in October, 2017. The ARI Campaign offered guidance **(suggested approach, Figure 1)** and resources to local antimicrobial stewards and academic detailers voluntarily interested in improving ARI management.

**Figure 1. Suggested Approach**
**Protocol Elements**

| Commitment | Action | Tracking and Reporting | Education & Expertise |
|---|---|---|---|
| • Sample letter for Facility & Director Clinic Champions<br>• Strategies for Administration | • AD Materials and AD Training<br>• Provider Level ARI Audit- Feedback report<br>• Sample ARI-Specific Order Menus | • ARI Management Dashboard (Provider & Facility)<br>• ARI Campaign Metrics<br>• AD Workload | • ARI Campaign Slide set<br>• Provider Communication Video<br>• Patient Materials |

## Analysis

ARI diagnoses were identified by ICD-9/ICD-10 codes. Complicated ARI cases were excluded: history of prior ARI ≤ 30 days, chronic sinusitis or pharyngitis, concurrent non-ARI infection, chronic lung disease, end stage renal disease, active neoplasm, and immunocompromising conditions. Antibiotic prescriptions were identified by a combination of VA dispensing data and documented non-VA prescription entries into the medical record.

A logistic generalized estimating equation model adjusted for seasonality and covariates associated with antibiotic prescribing. Chi-squared tests compared guideline concordant antibiotic proportions pre and post intervention.

## Changing Behavior: Provider Feedback

An ARI Dashboard was created to track uncomplicated ARI encounters. The dashboard creates reports that analyze prescribing practices on both the individual provider level and the clinic level. The reports reflect each ARI specific metric, tracks performance over time, and compares providers with the average results of peers working in the same local clinics. **(Figure 2)** Additional resources were created to enable appropriate prescribing practices which are coupled with audit-feedback. **(Figure 3)**

**Figure 2 Provider Panel**

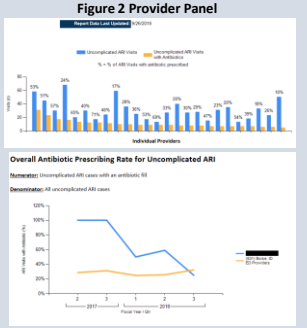
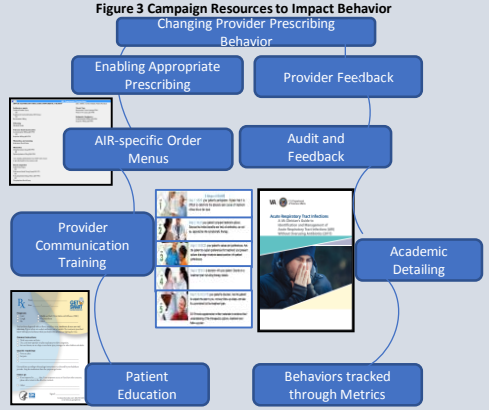



**Figure 3 Campaign Resources to Impact Behavior**




## Results

The cohort consisted of predominantly male patients with a mean age of 56 years. The ARIs evaluated in this analysis included rhinosinusitis (19%), pharyngitis (14%), bronchitis (29%), and URI-NOS (38%). An estimate of the ARI Campaign uptake is provided in **Table 1**.

**Table 1. Estimated ARI Campaign Scope**

| Characteristic | Quantity |
|---|---|
| Steward Attendees on ASTF Kick-off Webinar | 278 |
| Academic Detailing Attendees on AD Kick-off Call | 196 |
| ARI Campaign Materials Ordered by facilities (Clinician Guide, Quick Reference Guide, Clinic Posters) | 21,090 |
| Unique VA Facilities that ordered ARI AD materials | 44 |
| VA Medical Centers that have regularly accessed the ARI dashboard to generate audit and feedback reports* | 54 |
| Estimated number of Providers who received the intervention** | Unique providers = 885 |
| AD visits documented in SaleForce*** | Unique Providers = 496<br>Staff interactions = 558 |

* Facilities that have accessed the ARI dashboards more than 20 times
** Unique providers with > 15 uncomplicated ARI visits based on ED and Primary Care Clinics within facilities that regularly accessed the dashboard
***Documentation of AD visits by VA AD Service personnel. Antibiotic stewards also conducted AD visits which are not captured within Salesforce.

## Results Continued

Antibiotic prescribing decreased from 2009, with additional effect observed post-intervention. **(Figure 4)** Trends in Bronchitis/URI-NOS prescribing rates paralleled the overall decrease in uncomplicated ARI antibiotic prescribing. **(Figure 5)** An overall trend in rhinosinusitis diagnoses was observed, but the intervention was associated with a decrease in rhinosinusitis diagnoses. **(Figure 6)** Slight increases in preferred antibiotic prescribing among rhinosinusitis and pharyngitis were observed. **(Figures 7 and 8)** Note that improvements diminish towards Spring, when ARI Campaign efforts decrease due to limited ARI visits to generate feedback reports.

**Figure 4. Overall Antibiotic Prescribing Rate for Uncomplicated ARI**

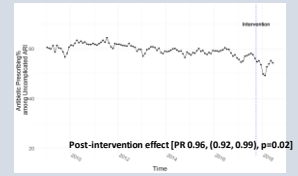



**Figure 5. Antibiotic prescribing rate for Acute Bronchitis/ URI-NOS**


**Figure 6. Proportion of diagnoses of Rhinosinusitis in ARI vists**


**Figure 7. Preferred Antibiotic Prescribing Rate for Rhinosinusitis**

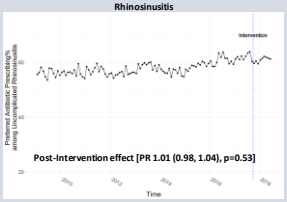
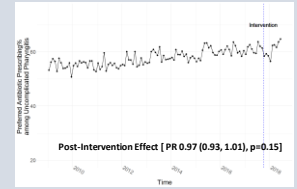



**Figure 8. Preferred Antibiotic Prescribing rate for Pharyngitis**




## Conclusions

**Conclusion:** Antibiotic prescribing rates for ARIs within the VA have steadily declined since 2010. Additional decline in antibiotic prescribing was associated with the launch of a national campaign to improve ARI management. Most ARI Campaign activities correspond with the ARI season (October –March) during which ~ 70% of ARI visits occur. The ARI Campaign minimum number of ARI visits recommended for generated audit-feedback reports is 10 and many providers do not accumulate sufficient visits to justify generating reports outside of the ARI season. However, while the total number of ARI encounters is low, the proportion of visits with antibiotics is warranted.[5] We anticipate eprescribed increases and the intervention effect diminishes. Thus, re-engagement each ARI season xpansion of the intervention to additional VA facilities during the 2018-19 ARI season and re-engagement by participating facilities.

**References**: 1. BMC Infect Dis, 2013. 13: p. 290; 2. Ann Intern Med, 2015. 163(2): p. 73-80;3. VA Academic Detailing Service; 4. Veteran's Affairs Antimicrobial Stewardship Program. 5. Jama, 2013. 309(22): p. 2345-52