

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

**Karl Madaras-Kelly, Pharm D, MPH, Professor, Idaho State University**

**Clinical Pharmacist, Boise VAMC**

# Objectives

- **Acute Upper Respiratory Tract infections (ARIs) account for the largest component of unnecessary antibiotic treatment in the outpatient setting.**
- **Variance in provider practice explains a significant component of inappropriate use, and provider-directed interventions are promising strategies for improving performance.**
- **This presentation will describe and outline preliminary findings of a VA-wide provider-directed intervention designed to improve the antibiotic management of ARIs.**

# Defining Antimicrobial Stewardship

## Promoting Antimicrobial Stewardship in Human Medicine

- “Antimicrobial stewardship program: **coordinated interventions** designed to improve and measure the appropriate use of antimicrobials by promoting selection of optimal antimicrobial regimen, dose, duration of therapy, and route of administration.” [www.IDSA.org](http://www.IDSA.org)

Clinical Infectious Diseases  
IDSA GUIDELINE



Implementing an Antibiotic Stewardship Program:  
Guidelines by the Infectious Diseases Society of America  
and the Society for Healthcare Epidemiology of America

Tamar F. Barlam,<sup>1\*</sup> Sam E. Cosgrove,<sup>2\*</sup> Lillian M. Abbo,<sup>3</sup> Conan MacDougall,<sup>4</sup> Audrey N. Schuetz,<sup>5</sup> Edward J. Sepkowitz,<sup>6</sup> Arjun Srinivasan,<sup>7</sup> Timothy H. Dellit,<sup>8</sup> Yngue T. Fatik-Yazar,<sup>9</sup> Neil D. Fishman,<sup>10</sup> Cindy W. Hamilton,<sup>11</sup> Timothy C. Jenkins,<sup>12</sup> Pamela A. Lipsitt,<sup>13</sup> Freeda N. Malani,<sup>14</sup> Larissa S. May,<sup>15</sup> Gregory J. Moran,<sup>16</sup> Melinda M. Neuhauser,<sup>17</sup> Jason G. Newland,<sup>18</sup> Christopher A. Ohl,<sup>19</sup> Matthew H. Samore,<sup>20</sup> Susan K. Seo,<sup>21</sup> and Kavita K. Trivedi<sup>22</sup>

Joint Commission  
Requirement

### New Antimicrobial Stewardship Standard

APPLICABLE TO HOSPITALS AND CRITICAL ACCESS HOSPITALS

Effective January 1, 2017

**CMS Manual System**  
Pub. 100-07 State Operations  
Provider Certification  
Transmittal 169- Advanced  
Copy

Department of Health & Human  
Services (DHHS)  
Centers for Medicare & Medicaid  
Services (CMS)

Date:

**SUBJECT:** Revision to State Operations Manual (SOM) Appendix PP for Phase 2, F-Tag Revisions, and Related Issues

**I. SUMMARY OF CHANGES:** The revisions to the Centers for Medicare & Medicaid Services (CMS) Requirements for Participation under the Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities Final Rule caused many of the prior regulatory citations to be re-designated. As such, CMS was required to re-number the F-Tags used to identify each regulatory part. Those new F-Tags are described here

Implement an antimicrobial stewardship program in conjunction with an Infection Prevention and Control Program in Nursing Homes.

Centers for Disease Control and Prevention

# MMWR

Morbidity and Mortality Weekly Report

Recommendations and Reports / Vol. 65 / No. 6

November 11, 2016

Core Elements for Outpatient Antimicrobial Stewardship... Preliminary information suggests its coming...**Stay tuned**

# VA Antimicrobial Stewardship Task Force

- Chartered in May, 2011 (IDPO/PBM)
- 25-member multi-disciplinary team based on expertise-voluntary
- Limited authority

## Activities and resources

- ASTF SharePoint
- ASTF List-serv
- Monthly webinars (150-300 participants/month)
- Funding for ID Pharmacist training

## Activities and Resources (continued)

- VHA Directive 1031 defining *minimal* requirements for ASPs
- ASTF endorsed MedSafe MUEs
- Model policies and intervention tools
- Healthcare Analytics Information Group (HAIG) surveys 2012, 2015, 2018?
- CDC NHSN Antimicrobial Use Reporting
- Development and dissemination of rudimentary IT stewardship tools

# VA Antimicrobial Stewardship Task Force

## Increased activities

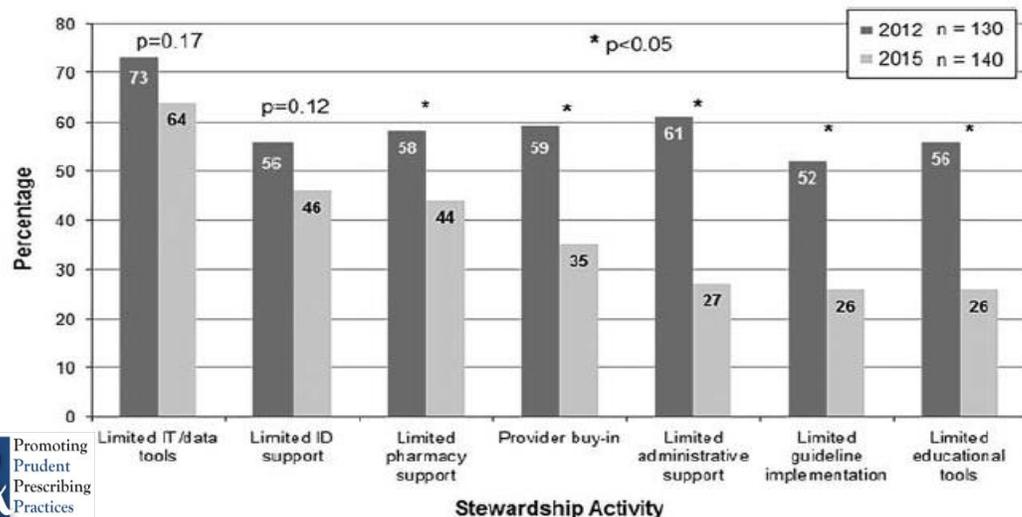
TABLE 1. Antimicrobial Stewardship Task Force (ATSF) Example Policies and Interventions

| Example Policies   | Launch Date | Facilities, No. (%) <sup>a</sup><br>(n = 140) | Facilities that Utilized ASTF Examples, % <sup>b</sup> |
|--|-------------|---|--|
| Intravenous to oral conversion tool  | May 2012    | 116 (83)                                      | 51   |
| Avoidance of double anaerobic coverage   | Jun 2012    | 99 (71)                                       | 42   |
| Intervention to improve outcomes for patients with <i>C. difficile</i> infection | Aug 2012    | 90 (64)                                       | 21   |
| Stewardship monitoring of outpatient parenteral antimicrobial therapy            | Nov 2012    | 85 (61)                                       | 22   |
| Vancomycin de-escalation   | Jan 2013    | 97 (69)                                       | 32   |
| Workload documentation guidance  | May 2013    | 64 (46)                                       | 27   |
| Broad-spectrum Gram-negative de-escalation                                       | Oct 2013    | 98 (70)                                       | 24   |
| Pneumonia duration of therapy  | Sep 2014    | 63 (45)                                       | 21   |
| <i>S. aureus</i> bacteremia intervention   | Jul 2015    | 83 (59)                                       | 20   |

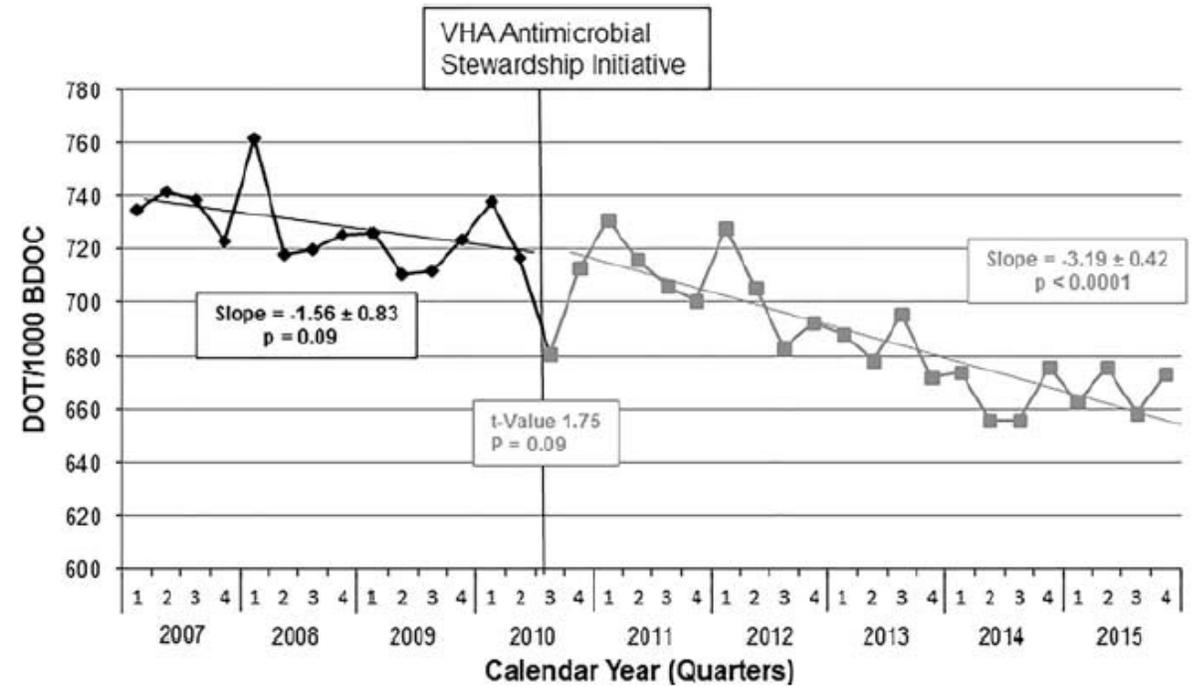
<sup>a</sup>Facilities that reported performing the specified interventions on the 2015 Stewardship Survey.

<sup>b</sup>Percentage of facilities performing the specified intervention that reported utilizing the ASTF example policies to develop the intervention.

## Decreased barriers



## VA-Wide 12% reduction of inpatient antibiotic use



# Outpatient Antimicrobial Use

- Ambulatory care visits in the United States resulted in 258.0 million courses of antibiotics in 2010, or 833 prescriptions per 1000 persons
- 75-80% of antibiotics prescribed to humans are prescribed in the outpatient setting
- Acute respiratory infections (ARIs) consist of sinusitis, pharyngitis, bronchitis, colds, and other upper respiratory tract infection
  - These diagnoses generally do not require antibiotics
- Respiratory tract infections accounted for 44% of all antibiotic prescribing in PCP offices and EDs
  - At least 30% of outpatient antibiotics are estimated to be unnecessary



JAMA, 2016;317(17):4840-52

# Outpatient Antimicrobial Use

## Percent of patients who receive antibiotics by diagnosis:

- Sinusitis: 72.2%
  - 51% unnecessary
- Pharyngitis: 62.2%
  - 75% unnecessary
- Bronchitis: 64.5%
  - 100% unnecessary
- URI NOS: 29.6%
  - 100% unnecessary
- All Acute Respiratory Tract Infections: ~ 50% unnecessary

Table 4. Mean Annual Antibiotic Prescribing Rates in 2010-2011 US NAMCS/NHAMCS vs Estimated Appropriate Antibiotic Prescribing Annual Rates per 1000 Population by Age Group and Diagnosis

|   | Rates per 1000 Population  |  | Potential Reduction in Annual Antibiotic Prescription Rates, % |
|---|--|--|--|
|   | 2010-2011 Weighted Mean Annual Rate of Antibiotic Prescriptions (95% CI) | Estimated Appropriate Annual Rate of Antibiotic Prescriptions <sup>a</sup> |  |
| <b>0-19 y</b>   |  |  |  |
| All acute respiratory conditions <sup>b</sup>   | 421 (369 to 473)   | 278 <sup>c</sup>   | -34  |
| Sinusitis   | 65 (51 to 79)  | 59   | -9   |
| Suppurative otitis media  | 154 (131 to 177)   | 138  | -10  |
| Pharyngitis   | 91 (76 to 105)   | 60   | -34  |
| Asthma or allergy; bronchitis or bronchiolitis; influenza; nonsuppurative otitis media; viral URI; and viral pneumonia <sup>e</sup> | 90 (71 to 108)   | 0  | -100   |
| Pneumonia   | 22 (16 to 27)  | 22   | 0  |
| Other conditions <sup>d</sup>   | 225 (197 to 252)   | 180 <sup>f</sup>   | -20  |
| Urinary tract infection   | 23 (17 to 28)  | 23   | 0  |
| Miscellaneous bacterial infections  | 20 (13 to 26)  | 20   | 0  |
| Remaining other conditions <sup>g</sup>   | 182 (160 to 205)   | 137  | -25  |
| Total <sup>h</sup>  | 646 (571 to 721)   | 458  | -29  |
| <b>20-64 y</b>  |  |  |  |
| All acute respiratory conditions <sup>b</sup>   | 150 (129 to 170)   | 45 <sup>c</sup>  | -70  |
| Sinusitis   | 55 (45 to 64)  | 27   | -51  |
| Suppurative otitis media  | 9 (7 to 11)  | 6  | -33  |
| Pharyngitis   | 29 (23 to 35)  | 7  | -75  |
| Asthma or allergy; bronchitis or bronchiolitis; influenza; nonsuppurative otitis media; viral URI; and viral pneumonia <sup>e</sup> | 52 (43 to 60)  | 0  | -100   |
| Pneumonia   | 5 (4 to 7)   | 5  | 0  |
| Other conditions <sup>d</sup>   | 269 (239 to 298)   | 227 <sup>f</sup>   | -16  |
| Urinary tract infection   | 35 (30 to 41)  | 35   | 0  |
| Miscellaneous bacterial infections  | 11 (9 to 13)   | 11   | 0  |
| Remaining other conditions <sup>g</sup>   | 222 (197 to 248)   | 180  | -19  |
| Total <sup>h</sup>  | 418 (372 to 464)   | 272  | -35  |
| <b>≥65 y</b>  |  |  |  |
| All acute respiratory conditions <sup>b</sup>   | 136 (111 to 162)   | 63 <sup>c</sup>  | -54  |
| Sinusitis   | 44 (32 to 57)  | 37   | -16  |
| Asthma or allergy; bronchitis or bronchiolitis; influenza; nonsuppurative otitis media; viral URI; and viral pneumonia <sup>e</sup> | 66 (48 to 84)  | 0  | -100   |
| Pneumonia   | 12 (7 to 17)   | 12   | 0  |
| Other conditions <sup>d</sup>   | 480 (418 to 543)   | 441 <sup>f</sup>   | -8   |
| Urinary tract infection   | 64 (51 to 77)  | 64   | 0  |
| Remaining other conditions <sup>g</sup>   | 401 (346 to 456)   | 362  | -10  |
| Total <sup>h</sup>  | 617 (544 to 689)   | 504  | -18  |
| <b>All Ages</b>   |  |  |  |
| All acute respiratory conditions <sup>b</sup>   | 221 (198 to 245)   | 111  | -50  |
| Other conditions <sup>d</sup>   | 284 (256 to 313)   | 242  | -15  |
| Total <sup>h</sup>  | 506 (458 to 554)   | 353  | -30  |

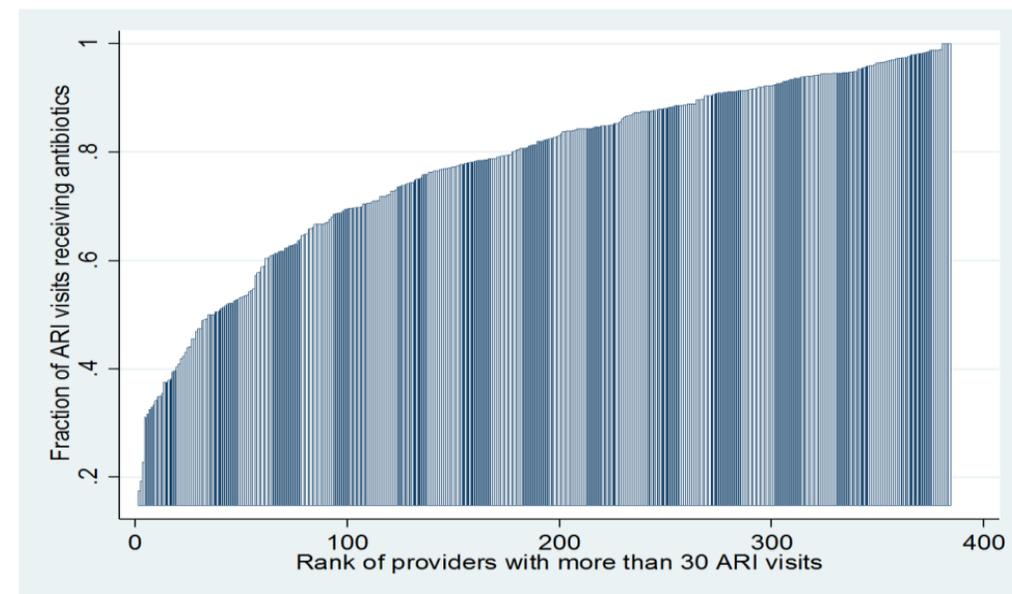
# Outpatient Antimicrobial Use Within the VA

## VA-Wide Analysis of *Uncomplicated* ARI Encounters from 2005-2012

- Analysis of over 1 million encounters; 45,000 providers across the VA
- Excluded “complicated” ARI encounters
- Proportion receiving antibiotics increased from 67.5% in 2005 to 69.2% in 2012 ( $p < 0.001$ )
- Sinusitis 86%, Bronchitis 85%, Pharyngitis 63%, URI-NOS 54%
- Macrolide use increased from 36.8% to 47.0% ( $p < 0.001$ )  
(Macrolides are not recommended as first-line treatment for any ARI)

- After adjustment for other factors, providers explained 59% of the variance in prescribing
- Top 10% of providers prescribed antibiotics in 95% of visits; bottom 10% prescribed antibiotics in 40% of ARI visits

### Fraction of ARI Visits Receiving Antibiotics by Provider



Ann Int Med, 2015;163(2):73-80.

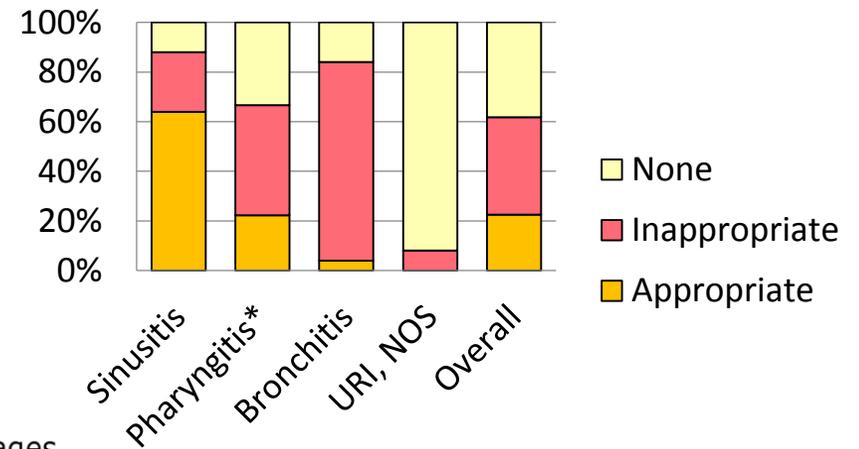
# Role of Medical Utilization Evaluation/Quality Improvement in Antimicrobial Stewardship

- IDSA guidelines recommend regularly evaluating areas for targeted interventions and adapting ASP activities accordingly
- Clinicians more likely to identify with and respond to local data
- Robust use of MUEs within VAs and MUE conductor's frequently work to mitigate findings
- VAMedSAFE and ASTF partnership
- **Gives ASP a different view:** Systematic identification of specific ASP problem areas



**LOCAL DATA: EVALUATION OF MANAGEMENT OF ACUTE UPPER RESPIRATORY INFECTIONS IN HEALTHY VETERANS AT THE BOISE VA MEDICAL CENTER**

Medication Utilization Evaluation (MUE) Sub-Committee



**MUE Goal:** Determine baseline management of ARIs and areas of improvement to focus with ARI bundle

**Findings:** Using similar definitions of Jones et. al. identified a 70% ARI prescribing rate

**Mitigation**

**Standard:** CPRS menus, patient education campaign, nurse education and triage

**Intensive:** Monthly feedback to clinics and one-on-one education of highest antibiotic prescribers

Abx Visit Percentages By Physician and Location

Station: Boise, ID/BOISE  
ARI Dx: Pharyngitis  
10/01/2014 - 09/30/2015  
Antibiotic = <All>

| Division | Physician Name | Emergency |           |        | Primary Care |           |         | Total     |           |         |
|----------|----------------|-----------|-----------|--------|--------------|-----------|---------|-----------|-----------|---------|
|          |                | Abx Count | Vis Count | Abx %  | Abx Count    | Vis Count | Abx %   | Abx Count | Vis Count | Abx %   |
| TOTAL    | TOTAL          | 20        | 40        | 50.00% | 26           | 40        | 65.00%  | 46        | 80        | 57.50%  |
|          | Physician 1    | 2         | 5         | 40.00% |              |           |         | 2         | 5         | 40.00%  |
|          | Physician 2    |           |           |        | 6            | 6         | 100.00% | 6         | 6         | 100.00% |
|          | Physician 3    | 6         | 12        | 50.00% |              |           |         | 6         | 12        | 50.00%  |
| BOISE    | TOTAL          | 20        | 40        | 50.00% | 26           | 40        | 65.00%  | 46        | 80        | 57.50%  |
|          | Physician 1    | 2         | 5         | 40.00% |              |           |         | 2         | 5         | 40.00%  |
|          | Physician 2    |           |           |        | 6            | 6         | 100.00% | 6         | 6         | 100.00% |
|          | Physician 3    | 6         | 12        | 50.00% |              |           |         | 6         | 12        | 50.00%  |

**Antibiotic Prescribing Report**  
Time Period: Fiscal Year 2015  
Prescriber: De-identified Group: Episodic Care Providers

| Diagnosis            | Total Uncomplicated Cases - Prescriber | % Cases Prescribed Abx - Prescriber | Total Uncomplicated Cases - Group | % Cases Prescribed Antibiotics - Group | % Cases Prescribed Antibiotics - Goal |
|----------------------|--|-------------------------------------|-----------------------------------|--|---------------------------------------|
| Acute Pharyngitis    | 17                                     | 76.5%                               | 46                                | 58.7%                                  | 18%                                   |
| Acute Rhinosinusitis | 69                                     | 95.7%                               | 240                               | 92.9%                                  | Unknown                               |
| Acute Bronchitis     | 1                                      | 100.0%                              | 26                                | 80.8%                                  | 20%                                   |
| URI-NOS              | 14                                     | 92.9%                               | 110                               | 28.2%                                  | 0%                                    |
| All Diagnoses        | 101                                    | 92.1%                               | 422                               | 73.6%                                  | Unknown                               |

| Acute Pharyngitis (Prescriber n=9)    |    |             |            |       |
|---------------------------------------|----|-------------|------------|-------|
| Numerator                             | n  | Denominator | Prescriber | Group |
| Cases w/ RADT performed               | 2  | All Cases   | 11.8%      | 43.5% |
| Cases w/ no or neg RADT and abx given | 13 | All Cases   | 76.5%      | 58.7% |
| Cases w/ positive RADT and abx given  | 0  | All Cases   | -          | -     |

| Recommended Antibiotic Prescribing * |   |   |   |  |   |
|--------------------------------------|---|---|---|--|---|
| Diagnosis                            | Total Uncomplicated Cases w/ Abx - Prescriber | % Cases Prescribed Recommended Abx - Prescriber | Total Uncomplicated Cases w/ Abx - Prescriber | % Cases Prescribed Recommended Abx - Group | % Cases Prescribed Recommended Abx - Goal |
| Acute Pharyngitis                    | 13  | 0.0%  | 27  | 37.0%                                      | 90%                                       |
| Acute Rhinosinusitis                 | 66  | 43.9%   | 223   | 68.2%                                      | 90%                                       |
| Acute Bronchitis                     | 1   | N/A   | 21  | N/A  | N/A                                       |
| URI-NOS                              | 13  | N/A   | 81  | N/A  | N/A                                       |

\* This does NOT assess if patient is appropriate candidate for antibiotics, only assessment is if 1st or 2nd line (Recommended) antibiotic was chosen for the selected indication

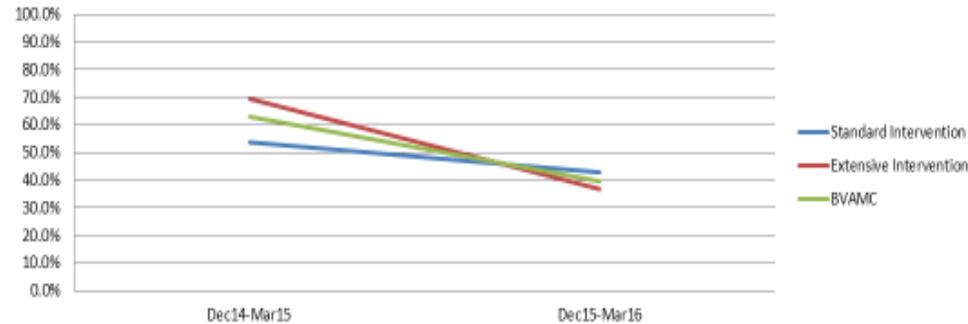
**% Cases w/ Rx's Ordered Using Menu**

# Local MUE ARI Campaign Findings

## ARI Antibiotic Prescribing

| Diagnosis      | Extensive Intervention<br>Absolute Change<br>(N=709) | Standard Intervention<br>Absolute Change<br>(N=538) | Overall Absolute<br>Change (N=1247) |
|----------------|--|---|-------------------------------------|
| Pharyngitis    | -27.8%   | -20.8%  | -23.4%                              |
| Rhinosinusitis | -0.3%  | -0.1%   | -2.2%                               |
| Bronchitis     | -48.7%   | -9.4%   | -30.4%                              |
| URI-NOS        | -10.8%   | 1.5%  | -6.1%                               |
| <b>Total</b>   | <b>-31.9%</b>  | <b>-11.1%</b>                                       | <b>-23.4%</b>                       |

Total Antibiotic Prescribing



## Other MUE Measures

| Metric  | BVAMC<br>(Dec14-Mar15) | BVAMC<br>(Dec14-Mar15) | P value |
|---|------------------------|------------------------|---------|
| Patients treated appropriately <sup>1,2</sup> | 63.2%                  | 75.9%                  | <0.01   |

| Metric  | Intensive Intervention<br>(Dec15-Mar16) | Standard Intervention<br>(Dec15-Mar16) | P value |
|---|---|--|---------|
| Patients treated appropriately <sup>1</sup>           | 80.6%                                   | 70.8%                                  | <0.01   |
| Delayed Rx use  | 1.4%                                    | 2.6%                                   | 0.37    |
| Order menu use  | 18.7%                                   | 10.3%                                  | <0.01   |
| 30-day Respiratory-related return visits <sup>2</sup> | 12.3%                                   | 12.0%                                  | 0.47    |

<sup>1</sup> Appropriate treatment defined as pharyngitis and rhinosinusitis patients who were treated with 1<sup>st</sup> or 2<sup>nd</sup> line antibiotics or no antibiotics and bronchitis and URI-NOS patients

<sup>2</sup> Data collected from electronic data capture, manual chart review of 250 records used to confirm revisit rate.



# So Why Did This Work?



## Clinicians' Perceptions of the Problem of Antimicrobial Resistance (AR)

**Methods:** Assess clinicians' perceptions of AR, barriers to preventing AR, and how best to reach clinicians, a questionnaire and 4 focus groups were conducted after presentation of the CDC 12- steps Campaign

**Results:** One hundred seventeen clinicians completed the questionnaire; 28 participated in the focus groups

Table 2. Clinicians' Perceptions of the Problem of Antimicrobial Resistance, Campaign to Prevent Antimicrobial Resistance, 12-Step Program for Hospitalized Adults: Questionnaire of 4 Hospitals (Pittsburgh Regional Healthcare Initiative, 2002)\*

| Response                   | Antimicrobial Resistance Is a Problem |                   |                |
|----------------------------|---------------------------------------|-------------------|----------------|
|                            | Nationally                            | In My Institution | In My Practice |
| Strongly agree             | 68.1                                  | 40.7              | 40.0           |
| Agree                      | 26.7                                  | 36.3              | 25.3           |
| Neither agree nor disagree | 1.7                                   | 17.7              | 22.1           |
| Disagree                   | 0.9                                   | 4.4               | 10.5           |
| Strongly disagree          | 2.6                                   | 0.9               | 2.1            |

Clinicians more likely to perceive that AR was a problem nationally vs. in their own facility (P=0.001) and in their institution vs. in their practice (P=0.001).

## Self-determination theory:

**Competence:** Know how to apply data in local environment

**Relatedness:** Familiar with people/processes

**Autonomy:** Measured items under clinicians control

## Intervention:

**Audit-Feedback:** Individual feedback, regular feedback, compared to reference group

**Academic detailing:** Delivered by local clinicians/stewards  
Explained data, provided enablers and suggested alternatives

# Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices A Randomized Clinical Trial

Daniella Meeker, PhD; Jeffrey A. Linder, MD, MPH; Craig R. Fox, PhD; Mark W. Friedberg, MD, MPP;  
Stephen D. Persell, MD, MPH; Noah J. Goldstein, PhD; Tara K. Knight, PhD; Joel W. Hay, PhD; Jason N. Doctor, PhD

**Background:** Most antibiotics prescribed in the US are for ARI; half of these prescriptions may be inappropriate with no benefit

**Objective:** Test the ability of three interventions to reduce the rate of inappropriate antibiotic prescribing for ARIs

**Methods:** Multisite, cluster-randomized trial

**Intervention:** 1) **Accountable Justification:** clinicians prompted for explicit justification ordering antimicrobials; 2) **Suggested Alternatives:** CDSS-based non-antibiotic treatment alternative suggested; 3) **Peer Comparison:** each provider's rate of inappropriate antibiotic prescribing will be reported to the provider relative to top-performing peers

**Control:** No intervention

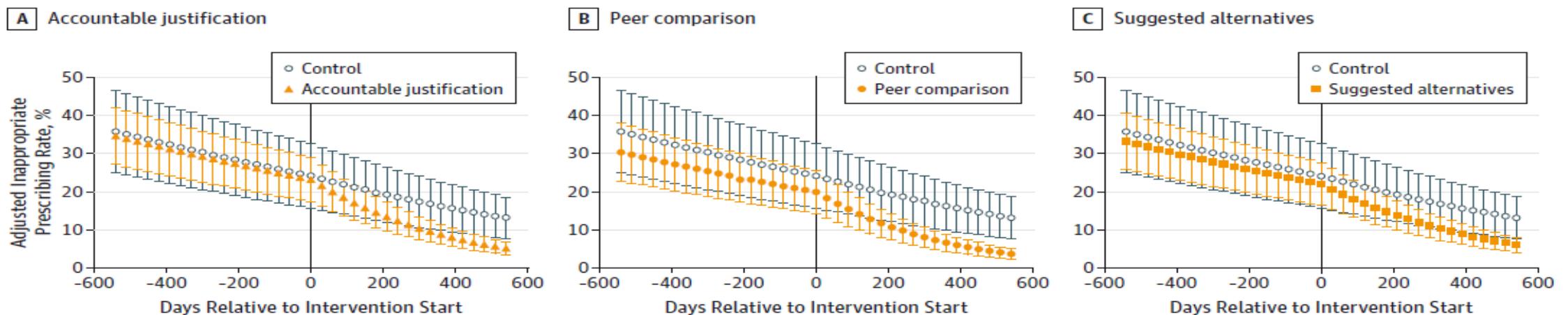
**Measures:** Antibiotic prescribing rate for office visits with non-antibiotic-appropriate diagnoses

# Effect of Behavioral Interventions on Inappropriate Antibiotic Prescribing Among Primary Care Practices A Randomized Clinical Trial

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**Results:** 248 physicians enrolled from 47 clinics; clinics were randomized to the following groups: control, a single intervention, combination of interventions, or all interventions

Figure 2. Adjusted Rates of Antibiotic Prescribing at Primary Care Office Visits for Antibiotic-Inappropriate Acute Respiratory Tract Infections Over Time

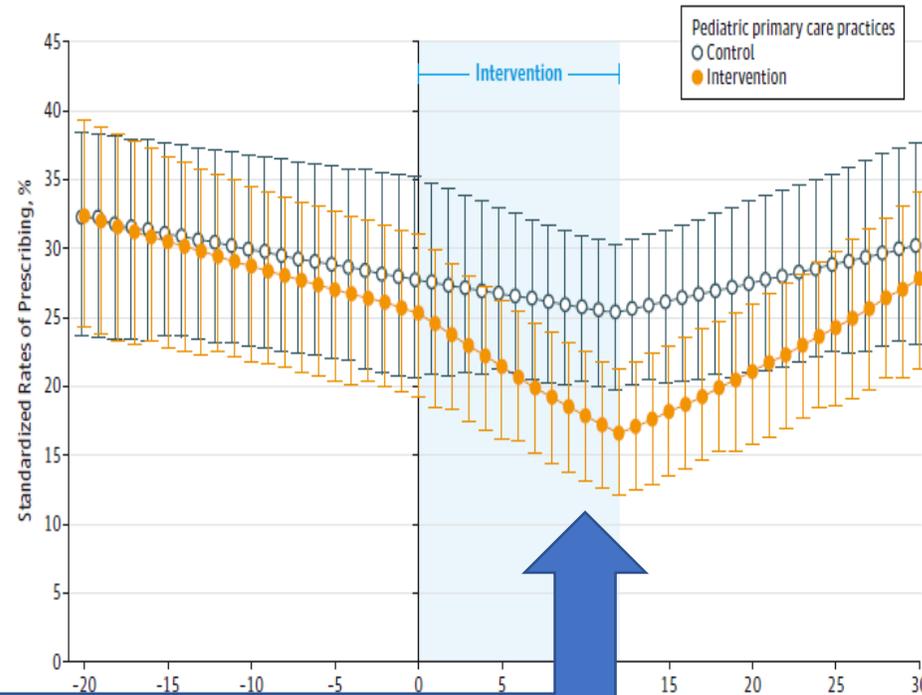


Prescribing rates for each intervention are marginal predictions from hierarchical regression models of intervention effects, adjusted for concurrent exposure to other interventions and clinician and practice random effects. Error bars indicate 95% CIs. Model coefficients are available in eTable 3 in Supplement 2.

# Durability of An Outpatient Stewardship Intervention After Discontinuation of Audit and Feedback: JAMA, October 10<sup>th</sup>, E1-2

- Cluster randomize trial in 18 pediatric clinics reduced broad spectrum antibiotic use by ~ 50%
- Provider education on URI/pneumonia
- Order sets
- Monthly audit and feedback to clinicians
- **Feedback stopped!**

Figure. Standardized Rates of Broad-Spectrum Antibiotic Prescribing Before, During, and After Audit and Feedback



The estimate of interest is the treatment  $\times$  time interaction term, representing the relative changes in trajectories before and during the intervention. Error bars indicate 95% CIs.

# Initial Dissemination

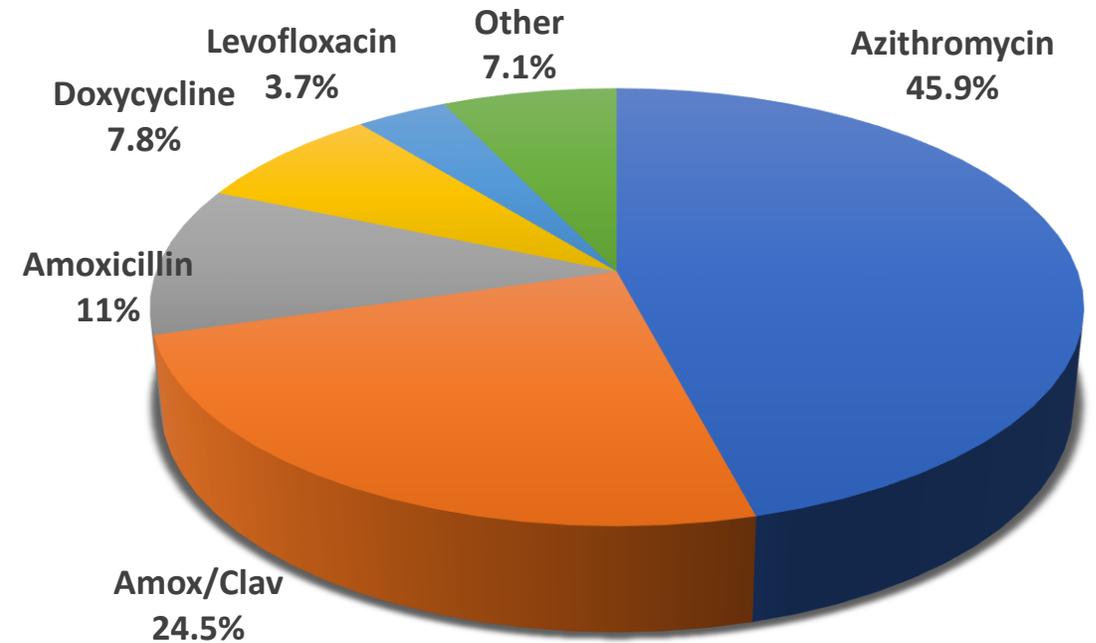
- Shared findings with learning collaborative stewards group
- Replicated ARI intervention within SLC VA same ARI season> several other VAs began planning future interventions
- Initial steps with VA Academic Detailing Service to explore ARI campaign
- Designed and implemented ASTF/VA MedSAFE ARI MUE
- Applied for CDC SHEPheRD grant
- **Subsequent goal:** disseminate results of ARI MUE, then launch ASTF / National Academic Detailing Service ARI Campaign in October 2017
- CDC SHEPheRD funded >>> subsequent goal to launch ARI intervention in different populations, 16 VA clinics + 6 University pediatrics clinics in Fall 2017

# ARI Management Within the VA: Recent Data

## ASTF/ VAMEDSafe MUE Analysis of Uncomplicated ARI Encounters, FY2016

4300 patients in 28 VAMCs

| Diagnoses      | Percent of Total Diagnoses (%) | Percent Received Antibiotics (%) |
|----------------|--------------------------------|----------------------------------|
| Pharyngitis    | 12.9                           | 68.8                             |
| Rhinosinusitis | 16.6                           | 88.5                             |
| Bronchitis     | 26.8                           | 86.2                             |
| URI-NOS        | 34.2                           | 37.3                             |
| Mixed          | 9.3                            | 85.8                             |
| <b>Total</b>   | -                              | <b>67.2</b>                      |



- >50% of upper respiratory tract infections get antibiotics
- Macrolides are not recommended as first-line treatment for ANY ARIs

ICHE, 2018, In Review

# ASTF and AD ARI Campaign Strategy

## Lack of Knowledge?

Many providers are aware that antibiotics are not indicated, but specific recommendations for diagnosis and treatment change over time

**Strategy:** One on one education is important and should be used with additional strategies

## Diagnostic Uncertainty & Fear of Complications?

Uncertainty creates fear of complications from bacterial illness

**Strategy:** Increase awareness among providers and patients of the uncertainty and risk for complications of inappropriate antibiotic use relative to bacterial illness risk

## Patient Pressure & Satisfaction?

The perceived demand for antibiotics and satisfaction influences prescribing behavior

**Strategy:** Communication training can help clinicians assess patient demand, prescribe antibiotics appropriately, & keep patients satisfied

## Habit, Workload, Time Constraints, Decision Fatigue?

Antibiotic prescribing is a behavior rather than a decision

**Strategy:** Behavioral interventions: Academic detailing, tracking and reporting, ARI-specific CPRS menus

**The ARI Campaign Addresses Many Common Problems Common to ARI Management**

# VA Academic Detailing Service

- National dissemination

## Academic detailing

- An educational service for clinicians, by clinicians, that provides individualized, face-to-face outreach, to encourage EBM evidence-based decision making to improve health

- Various campaigns

- Shown success in campaigns targeting of problematic prescribing areas such as opioids and benzodiazepines

**VA Academic Detailing Service Campaigns**

COMING SOON  
Suicide Prevention

General Tools Antipsychotics ARI  
Benzodiazepines Chronic Insomnia Depression Dementia  
Headaches HIV PrEP OEND OUD  
Pain/OSI PTSD Schizophrenia Stimulants

Visit our Repository to view additional VISN-designed materials

# ASTF and AD ARI Campaign

## Partnering for Success

All of the ARI Campaign materials and resources can be accessed from: VA Academic Detailing Service SharePoint  
<https://vaww.portal2.va.gov/sites/ad/SitePages/Home.aspx>

Additional materials and resources can be accessed from: Antimicrobial Stewardship Task Force SharePoint  
<https://vaww.cmopnational.va.gov/cmop/PBM/pre/default/AntimicrobialMainPage/default.aspx>

### Antimicrobial Stewards

- Provide insight into local fit and nuances
- Provide clinical expertise
- Serve as a connecting point to priority providers

### Academic Detailers

- Versed in providing academic detailing
- Understand communication techniques with providers
- Delegated time and work-flow for AD activities

# ASTF and AD ARI Campaign

## Suggested Approach and Checklist

Outpatient Antimicrobial Stewardship Campaign to Improve the Management of Acute Respiratory Tract Infections (ARI) Through Academic Detailing (ARI Campaign): Implementation Strategy and Toolkit

Antimicrobial Stewardship Taskforce/VA Academic Detailing Service

Electronic Access to Appendices Content & Additional ARI Campaign Related Resources available at:

VA PBM Academic Detailing Service SharePoint Site  
<https://vawww.portal2.va.gov/sites/ad>

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- Addresses all CDC Core Elements for implementation (Commitment, Action, Tracking and Reporting, Education and Expertise)
- Step-by-step explanation of resources and considerations to tailor the intervention to local fit to maximize impact
- **Action:** Academic detailing with secondary supportive tools including: dashboards and metrics, detailing materials, provider communications training, patient materials, and CPRS menu examples
- **Enablers:** Dashboards and metrics, provider communications training, patient materials, and CPRS menu examples
- **Checklist:** Facilitates planning by documenting: which activities and who will complete.

# ARI Campaign: *Commitment & Preparation*

Identify the structure of the academic detailing support for the ARI Campaign that best fits local needs

## Option 1: Local, Clinic Personnel Conduct Academic detailing

- **Who:** AS Providers, pharmacy champions, or other local campaign personnel
- **What:** 1. Complete TMS training and study academic detailing materials
- 2. Practice academic detailing skills and begin detailing providers who are supportive of the campaign

## Option 2: Partner with local or VISN Academic Detailing Personnel to Conduct Academic Detailing

- **Who:** Local and VISN AD Person, VISN AD program managers ± stewards
- **What:** 1. Coordinate local oversight of the campaign with AD Personnel/detailers
- 2. Discuss ongoing approaches to outpatient stewardship activities and define roles and expectations

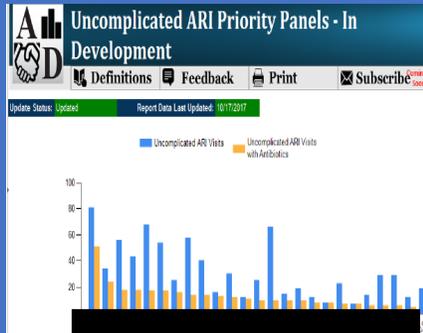
## Option 3: Local, Clinic Personnel Conduct Academic Detailing after additional training

- **Who:** AS Providers, pharmacy champions, or other local campaign personnel
- **What:** 1. Attend two-day face to face intensive academic detailing course
- 2. Potential for ongoing support through national AD service or VISN detailers on bi-monthly AD calls

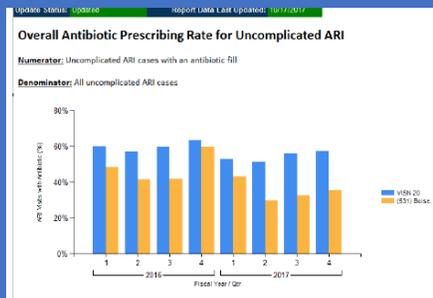
# ASTF and AD ARI Campaign

## Data Sources: Audit-Feedback

ARI Campaign Dashboard tracks prescribing and creates personal provider reports



ARI Campaign Dashboard provides facility specific reports with VSN comparator

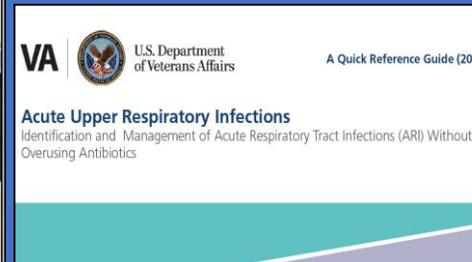
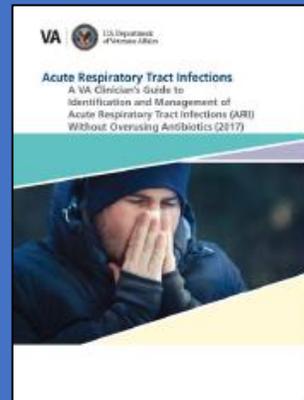


Salesforce is utilized to track ARI Campaign Activities



## Academic Detailing Resources

ARI Campaign website provides AD training videos and evidence based ARI related resources for use during academic detailing encounters.

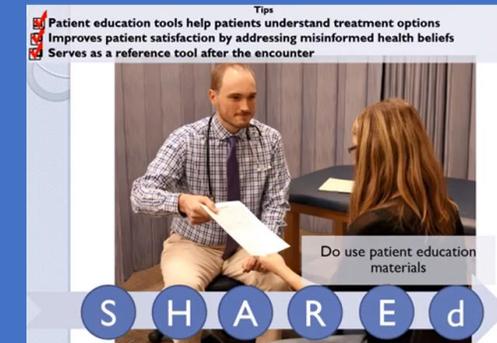


## ARI Campaign Enablers

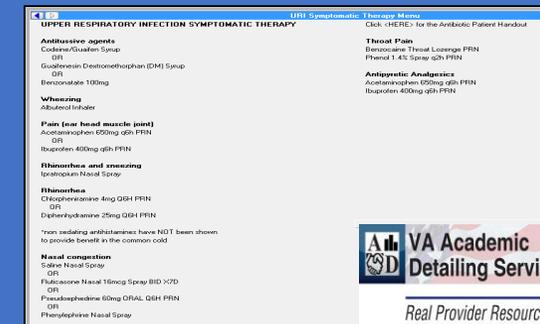
ARI Campaign website provides patient education materials to be used during patient encounter



Provider communication training video available to address perceived patient demand



Example order set menus available



# ARI Campaign: Tracking and Reporting Metrics

## Overall Antibiotic Prescribing Rate for Uncomplicated ARI

**Numerator:** Uncomplicated ARI cases where any systemically administered antibiotic is filled within two days before or three days after index visit.

**Denominator:** All uncomplicated ARI Cases

## Diagnosis of Uncomplicated Sinusitis

**Numerator:** Diagnosis of uncomplicated sinusitis

**Denominator:** All uncomplicated ARI Cases

## Antibiotic Prescribing Rate for Uncomplicated Bronchitis and URI-NOS

**Numerator:** Uncomplicated bronchitis or URI-NOS cases where any systemically administered antibiotic is filled within two days before or three days after index visit.

**Denominator:** All uncomplicated Acute Bronchitis or URI-NOS cases

## Preferred Antibiotic Prescribing Rate for Uncomplicated Sinusitis

**Numerator:** First line recommended antibiotic ( amox. or amox./clav.) or 2<sup>nd</sup> line recommended antibiotic ( doxycycline, moxifloxacin, or levofloxacin for patients with B-lactam allergy

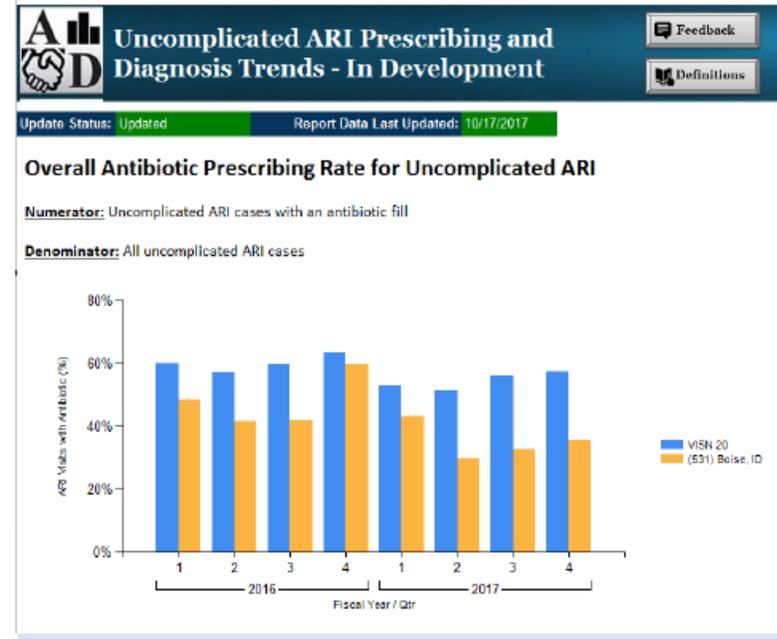
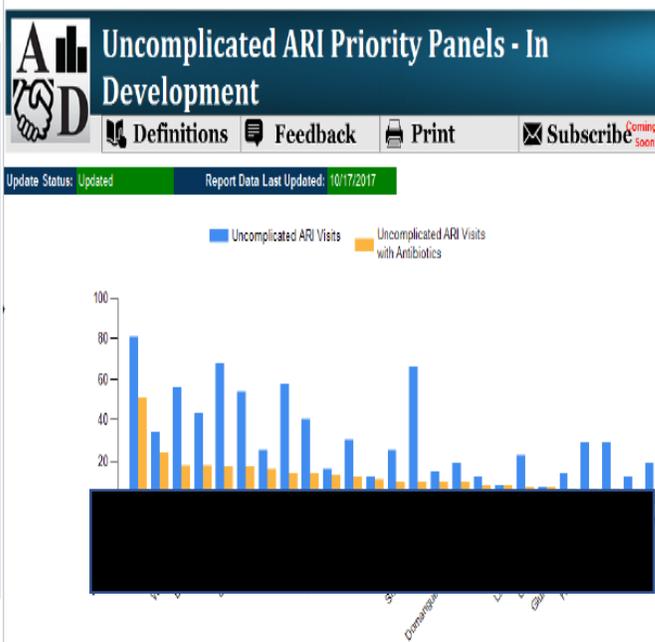
**Denominator:** All uncomplicated sinusitis cases prescribed an antibiotic in same time-frame

## Preferred Antibiotic Prescribing Rate for Uncomplicated Pharyngitis

**Numerator:** First line recommended antibiotic (PO/IM penicillin or oral amoxicillin) or 2<sup>nd</sup> line recommended antibiotic ( cephalexin, clindamycin) if patient has a B-lactam allergy

**Denominator:** All uncomplicated pharyngitis cases prescribed an antibiotic in the same timeframe

# ARI Campaign: *Tracking and Reporting*



## ARI Priority Panel Report

- Identify and track individual provider performance on campaign metrics compared to facility peer group averages
- Graphs, numerical values, numerator/denominator criteria

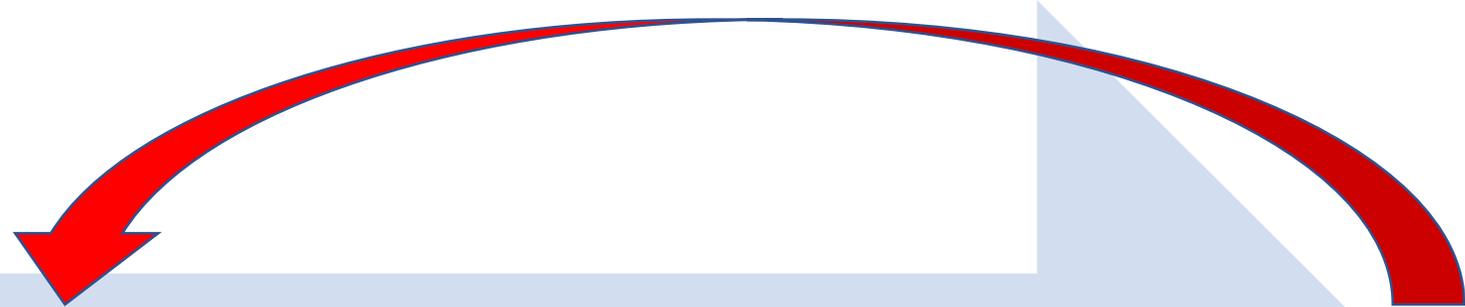
## ARI Prescribing Trend Reports

- Display current performance of ARI Campaign Metrics for VISN(s); facilities; and clinics compared to VISN averages
- Graphs, numerical values, numerator/denominator criteria

## SalesForce

- Platform to track academic detailing related workload
- Track time spent on preparation AND academic detailing activities
- Requires a license distributed through AD service

# ARI Campaign: *Action - Academic Detailing*



Utilize ARI Campaign Dashboard to identify priority providers

- High ARI prescribing frequency
- Low performance on ARI Metrics

Schedule Academic Detailing appointment with provider

- Engage local personnel to facilitate meeting with provider
- Meet at convenient location for the provider

Study priority provider behavior concerning the ARI metrics and baseline report data

- Identify Key Messages that relate with prescribing behavior
- Study Supporting materials that support targeted Key Messages

Provide Academic Detailing

- Detail provider based key messages consistent with low performance on key messages
- Create a clear plan for follow-up

Track Prescribing Practice

- Use ARI Campaign Metrics & Provider Follow-Up Reports to monitor performance
- Document AD activities in Salesforce

# ARI Campaign: *Tracking and Reporting*

## Target Clinics

- Feedback data on ARI Campaign metrics to clinics at periodic intervals during ARI season

## ASP Metrics

- Consider tracking and reporting ARI metrics as ASP program outcomes

## Academic Detailing Activities

- Consider documenting non-detailing and detailing workload within Salesforce to capture non-patient workload related to ARI Campaign

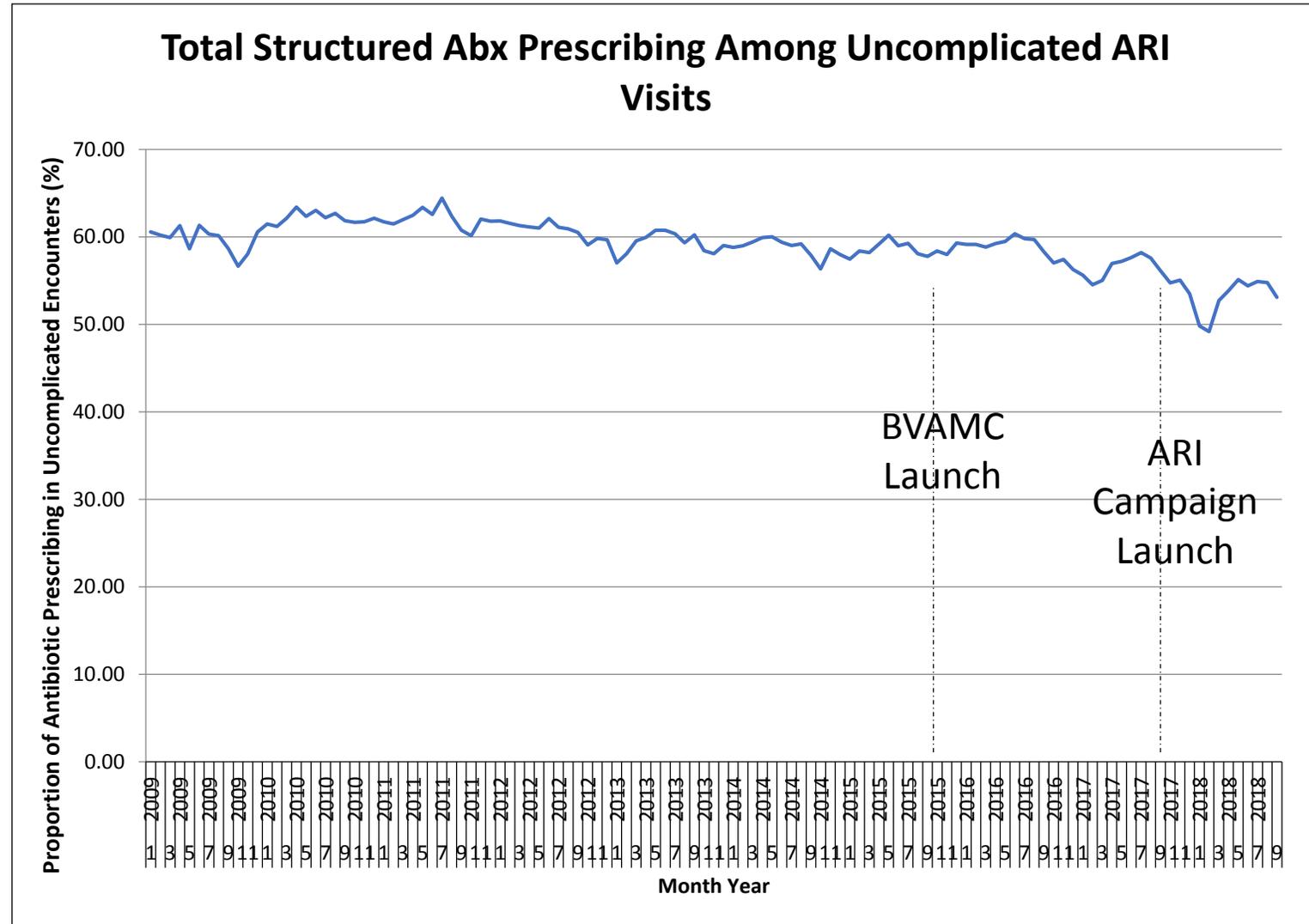
## Overall Activities/Data

- Consider reporting to clinical leadership, clinical staff, and facility administration as appropriate

# Preliminary AD/ASTF ARI Campaign Findings

## Penetration (Through 6/31/18)

| Characteristic   | Quantity                     |
|--|------------------------------|
| Attendees on ASTF Kick-off Webinar   | 278                          |
| Attendees on AD Kick-off Call  | 196                          |
| ARI Campaign Materials Ordered by facilities   | 21,090                       |
| VA Facilities that ordered ARI AD materials  | 44                           |
| VA Medical Centers that have regularly accessed the ARI dashboard to generate reports <sup>1</sup> | 54                           |
| Estimated number of Providers who received the intervention <sup>2</sup>                           | 885                          |
| AD visits documented in Salesforce <sup>3</sup>  | Providers =496<br>Staff =558 |



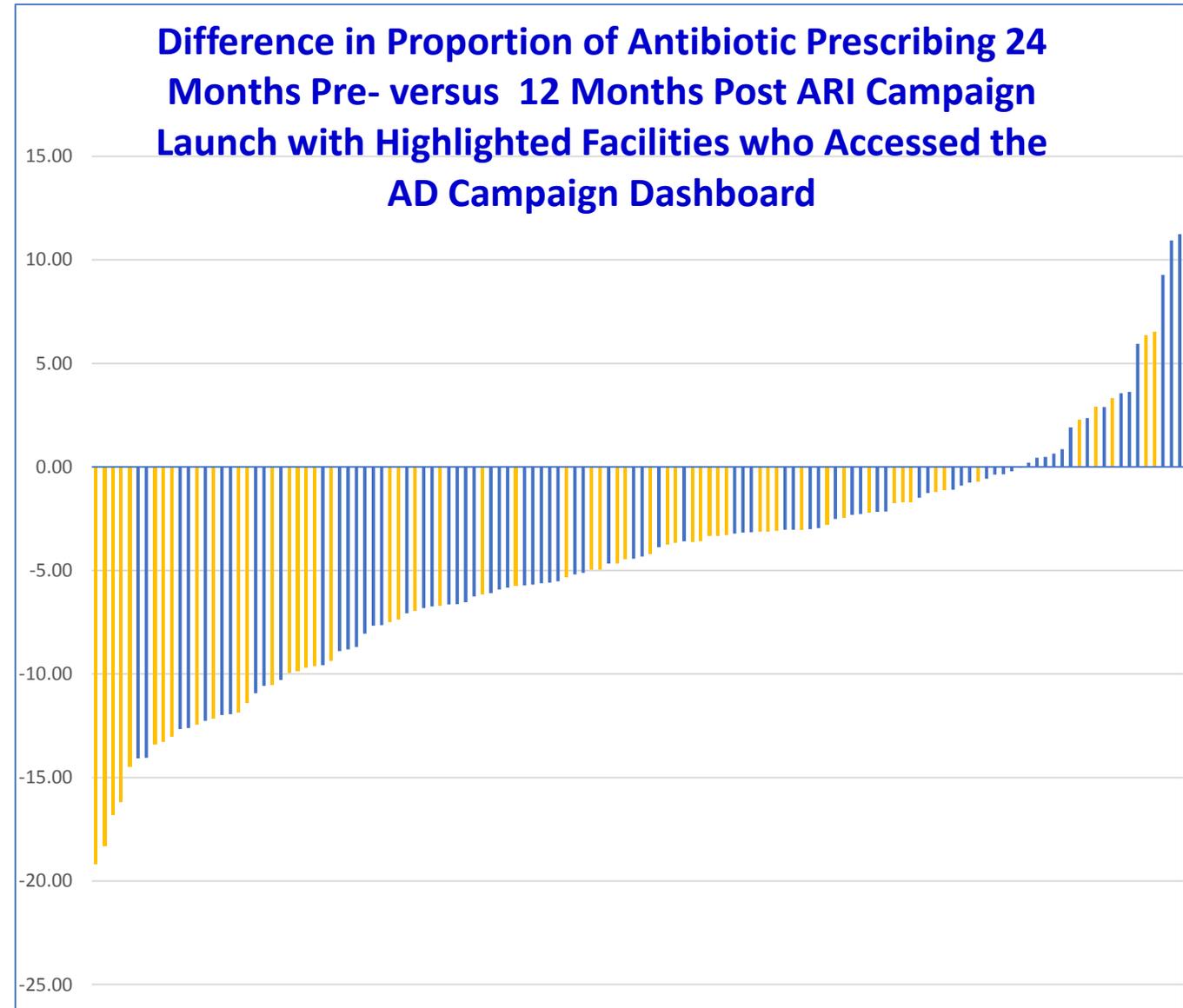
<sup>1</sup> Facilities that have accessed the ARI dashboards more than 20 times

<sup>2</sup> Unique providers with > 15 uncomplicated ARI visits based on ED and Primary Care Clinics within facilities that regularly accessed the dashboard

<sup>3</sup> Documentation of AD visits by VA AD Service personnel. Antibiotic stewards also conducted AD visits which are not captured within Salesforce.

# Preliminary AD/ASTF ARI Campaign Findings (through 6/30/18)

- **Since 2009:** 1,580,612 and 137,421 uncomplicated 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 observed post-intervention [OR 0.88, (0.84, 0.88),  $p < 0.001$ ].
- **Bronchitis/URI-NOS prescribing:** 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),  $p < 0.001$ ].
- **Diagnosis of sinusitis:** 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  $p < 0.001$ ).



Yellow bars indicated facilities accessed AD Campaign Dashboard >20 Times as of 6/30/18

# Suggested Seasonal Kick-Off

- ✓ Review Priority Provider Summary Report for Facility
- ✓ Identify all providers with  $\geq 15$  uncomplicated encounters in prior 12 months
- ✓ Identify new providers to system (w  $\geq 15$  encounters) that did not receive initial academic detailing visit/ audit-feedback report orientation last year
- ✓ AD/Antibiotic steward review reports, identify providers that need initial or follow-up academic detailing to improve performance.
- ✓ Consider group educational venue where ARI campaign can be re-introduced and/ or data on improvement can be shared
- ✓ Check clinics to determine need for Clinician Guides, Quick Reference Guides, or restocking ARI posters /patient materials
- ✓ Disseminate yearly reports ( or progress reports) and initiate academic detailing visits as needed over ARI season

# Improving Outpatient Antibiotic Use Through Implementation And Evaluation Of Core Elements Of Outpatient Antibiotic Stewardship (200-2011-42039-0009)

Safety And Healthcare Epidemiology Prevention  
Research Development (Shepherd)

CENTERS FOR DISEASE CONTROL AND PREVENTION

**Principal Investigator:** Matthew Samore, Salt Lake City  
VA/University Of Utah

**Project Lead:** Karl Madaras-Kelly, Boise VAMC

**Local Investigators:** Antimicrobial Stewards in  
Durham, Kansas City, Eastern Kansas, Salt Lake City,  
Boise, Greater Los Angeles

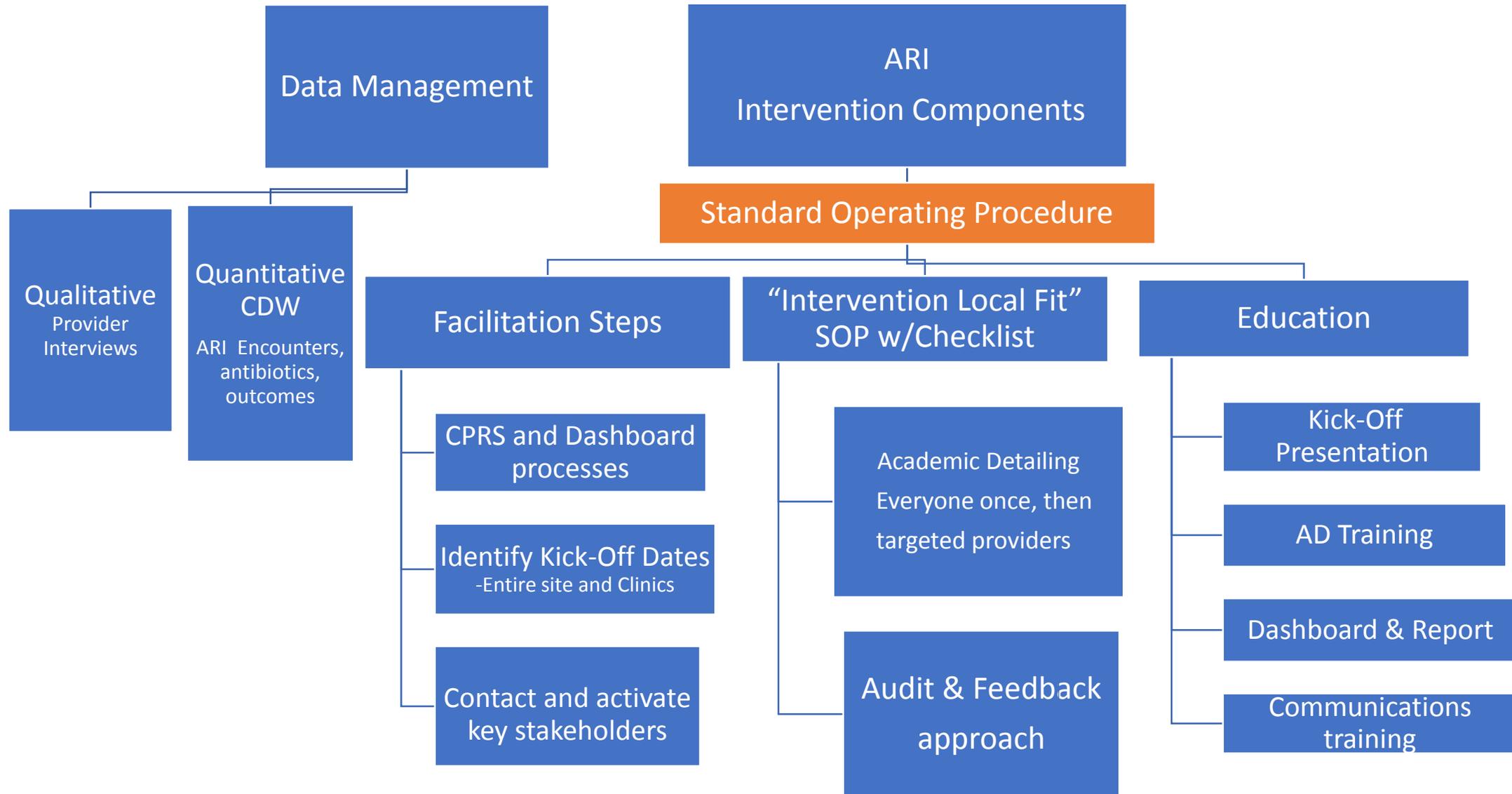
## Method & Setting

- Quasi-experimental, 42-month study
- 6 VA systems and 1 non-VA system comprising of 24 clinics
- Setting: primary care, urgent/episodic care, emergency departments, community-based outreach clinics, pediatrics (University of Utah)

## Intervention Components

- Intervention includes all recommended Core Elements of Outpatient Stewardship: Commitment, Action, Tracking, Reporting, Education
- *Individual provider audit and feedback reports at baseline and every 2 months to high encounter providers*
- Initial academic detailing exercise conducted by Clinic Champions or Key Clinic Personnel. Follow-up as needed
- Enablers: CPRS menus, patient education, communications training

# Outpatient SHEPheRD: ARI Intervention Overview



# Key Similarities and Differences

## Similarities

- Both focused on improving uncomplicated ARI prescribing
- **Key Interventions:** Audit-Feedback, Academic Detailing
- **Secondary Interventions:** (same), order menus, communications training videos, patient materials
- Included tracking of similar antibiotic use metrics



## Differences

- Enhanced focus on audit-feedback. Introductory AD visit with periodic follow-up
- Intervention delivered by clinic champions w/ support from antibiotic stewards
- 10 VA clinics w/ traditional VA RX , 6 clinics wo/traditional VA RX, 6 U of U pediatrics clinics
- NLP augmentation, Top Performer comparator
- **Outcomes:** Revisits, Infectious complications, ADR/Allergies, CDI

# VA: Audit\_Feedback

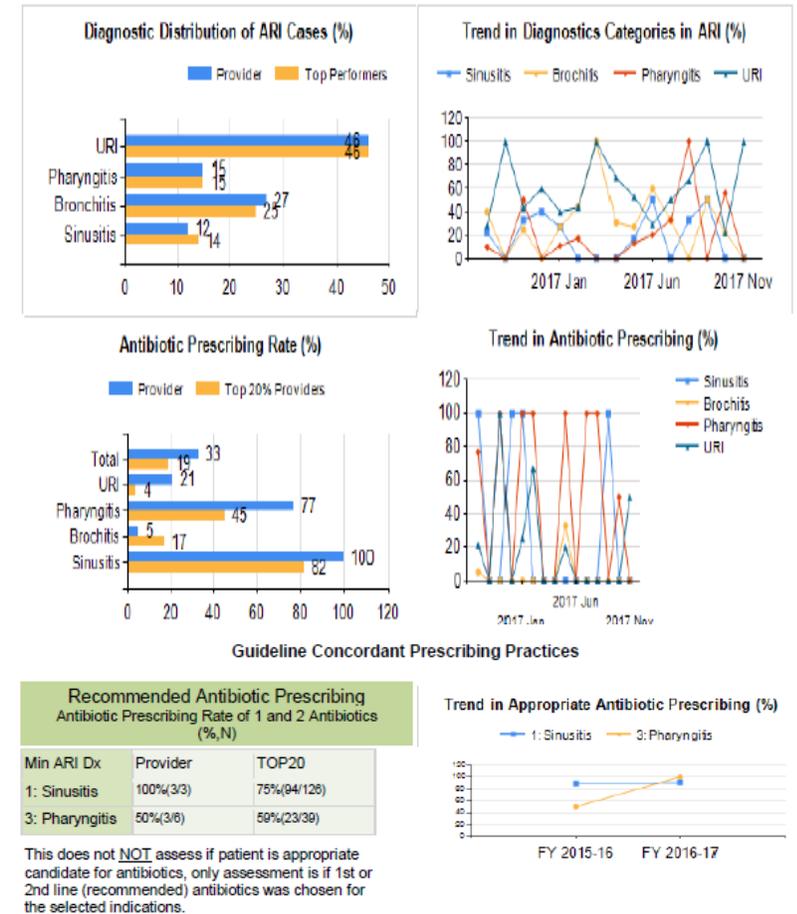
- Reports generated from a priority provider summary report
- Follow-up reports trend same information over time
- Follow-up reports disseminated every 2 months during study to providers who received baseline report

**Provider Summary Report**

Facility name (Sta3n): (531) Boise, ID      Division Name: BOISE  
 Location name: Emergency Department      Report Period: 10/1/2016 to 9/30/2017

| Provider Name | Number of Total ARI Visits | Overall Antibiotics Prescribing Rate | Baseline Provider Report (FY2015-FY2016) | Follow-up Provider Report |
|---------------|----------------------------|--------------------------------------|--|---------------------------|
| [REDACTED]    | 1                          | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 2                          | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 1                          | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 13                         | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 1                          | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 7                          | 100.00%                              | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 4                          | 75.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 6                          | 67.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 6                          | 67.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 5                          | 60.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 35                         | 60.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 5                          | 60.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 33                         | 52.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 12                         | 50.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |
| [REDACTED]    | 4                          | 50.00%                               | <a href="#">Link</a>                     | <a href="#">Link</a>      |

ARI Antibiotic Prescribing Report: [REDACTED]  
 Follow up Report: 10/1/2016 to 11/30/2017



**Antibiotic Prescriber Report Details**

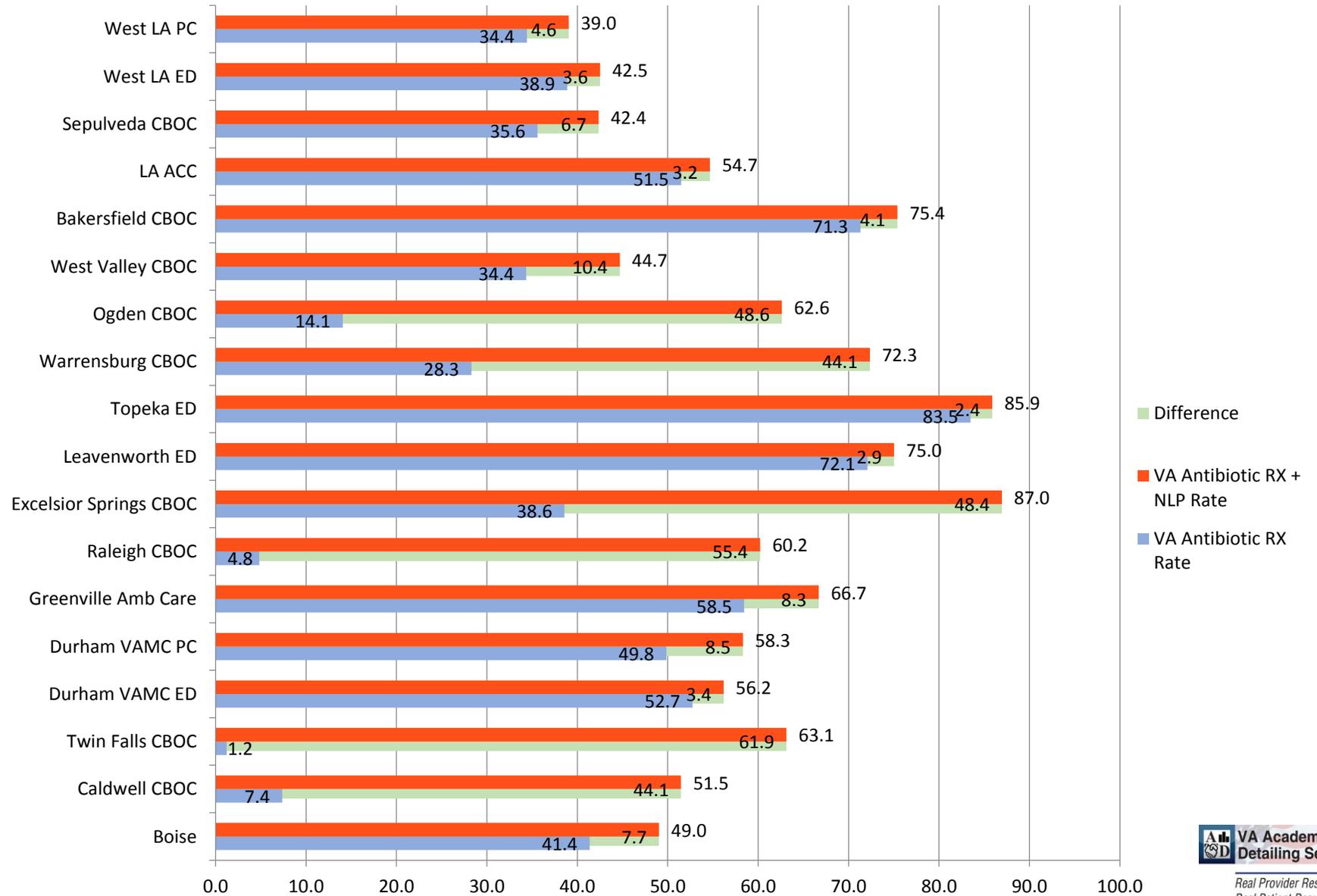
Uncomplicated encounters exclude patients with a diagnosis of COPD, HIV, hemodialysis, organ or marrow transplantation, hematological malignancies, neutropenia, as well as all patients with a diagnosis of chronic sinusitis or pharyngitis and any concurrent diagnoses of infection on the date of visit. Patients who receive inhaled tiotropium, received chemotherapy within the past 30 days, or other systemic immunosuppressive agents are also excluded.

Encounters are assigned to the provider who wrote the antibiotic prescription if an antibiotic was prescribed or the primary provider listed on the encounter if no antibiotic was prescribed. In the case where a nurse is listed as the primary provider, the next provider who has prescriptive authority is assigned the encounter.

Top provider measures are calculated based upon the lowest 20% of provider's aggregate ARI prescription rate for the facility.

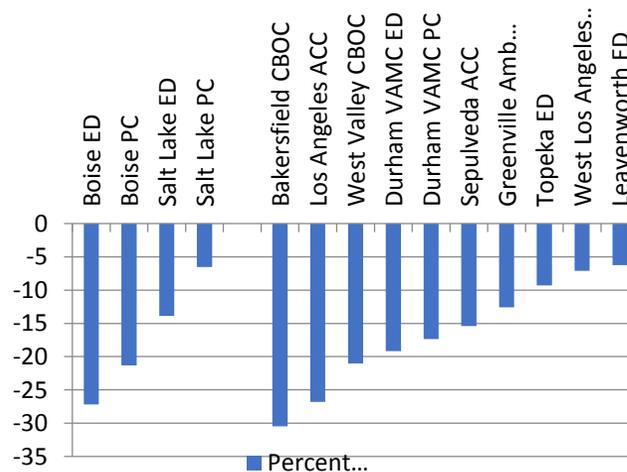
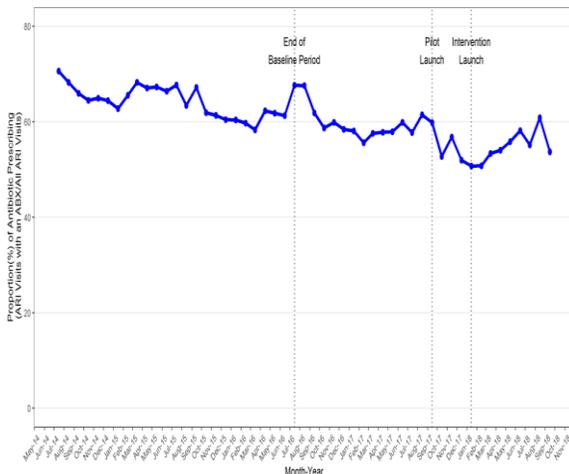
# NLP to Identify Antibiotics Prescribed for ARIs

- **Current efforts relatively good sensitivity (~ 92%) and specificity (~ 83%) based on CPRS review**
- **Overall, identifies ~ 10% additional prescriptions**
- **For select rural clinics, dashboard reports dependent upon NLP data integration**
- **Delays with development resulting in late initiation for 6 clinics**



# Preliminary analysis of VA Clinics (n=10) Intervention

- 14, 527 uncomplicated ARI visits pre-intervention and 3,093 post-intervention (1.9 and 2.2% of total visits)
- **Diagnostic distribution:** Seasonal trends in specific ARI diagnosis are apparent
- **Antibiotic prescribing:** Significant reduction in aggregate prescribing, non-significant reductions by diagnosis
- **Preferred therapy:** Bronchitis/URI-NOS and Pharyngitis increased. Sinusitis remains unchanged



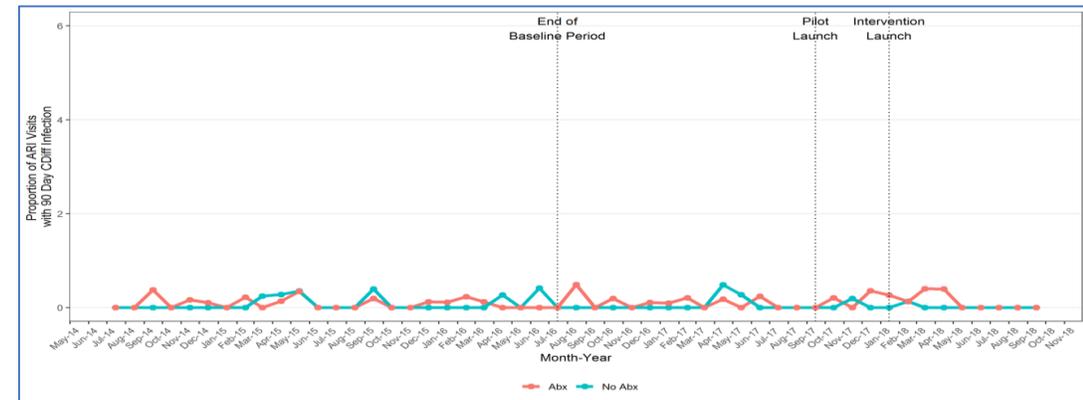
| VA Clinics: Trend Analysis (Rate Ratio; CI; P-Value) |            |                     |         |
|--|------------|---------------------|---------|
| Metric/ ARI Diagnosis                                | Rate Ratio | Confidence Interval | P-Value |
| Uncomplicated ARI Encounters                         | 1.06       | 1.04, 1.08          | <0.01   |
| <b>Diagnostic Distribution</b>                       |            |                     |         |
| Bronchitis/URI-NOS                                   | 0.91       | 0.85, 0.96          | < 0.01  |
| Pharyngitis  | 0.93       | 0.82, 1.04          | 0.21    |
| Sinusitis  | 1.29       | 1.08, 1.54          | <0.01   |
| <b>Prescribing Rate</b>                              |            |                     |         |
| Aggregate  | 0.68       | 0.56, 0.83          | <0.01   |
| Bronchitis/ URI-NOS                                  | 0.88       | 0.76, 1.01          | 0.07    |
| Pharyngitis  | 0.92       | 0.79, 1.08          | 0.31    |
| Sinusitis  | 0.97       | 0.91, 1.04          | 0.44    |
| <b>Preferred Therapy</b>                             |            |                     |         |
| Bronchitis/URI-NOS                                   | 1.13       | 1.01, 1.26          | 0.04    |
| Pharyngitis  | 1.18       | 1.04, 1.35          | 0.01    |
| Sinusitis  | 0.95       | 0.89, 1.01          | 0.11    |

# Preliminary analysis of VA Clinics (n=10) Intervention

- No change in ARI related return visits to date
- Fewer adverse events for post intervention
- No change to date in hospitalizations
- C. Diff, ID complications models did not converge ( CDI rare)
- CPRS validation underway

## Aggregate Patient Outcomes Pre and Post Intervention

|                             | Absolute Difference (%) | Risk Ratio* | 95% CI       | P Value |
|-----------------------------|-------------------------|-------------|--------------|---------|
| 30 Day ARI Related Revisits | 0.07                    | 1.03        | (0.95, 1.13) | 0.44    |
| 30 Day ADR/Allergies        | -0.39                   | 0.84        | (0.76, 0.94) | 0.002   |
| 30-Day Hospitalizations***  | 0.01                    | 1.15        | (0.57, 2.34) | 0.69    |
| 30 Day Inf. Complications   | 0.23                    | **          | **           | **      |
| 90-Day CDI***               | 0.04                    | **          | **           | **      |



# Diagnostic Shifting

- **Current diagnostic audit-feedback interventions are dependent on administrative codes assigned during visit**
- **Potential exists that diagnostic coding practices are changed either intentionally or subconsciously in response to intervention**
- **Diagnostic shifting could result in improved coding practices as result of education or deliberate alteration of documentation to avoid antibiotic prescribing detection**
- **Published studies have not identified substantial diagnostic shifting although more data is needed**
- **Within the CDC SHEPherd study to date, the proportion of aggregate uncomplicated ARIs increased and proportion of aggregate ARIs (total) of all diagnoses has not decreased**
- **We are developing processes to further evaluate diagnostic shifting**

# Summary

- **A significant proportion of antibiotic prescribing for ARIs is unnecessary**
- **Provider variation in prescribing for these conditions is large, reasons for overprescribing are multi-faceted and include social interactions with patients, providers, and stewards**
- **Provider-directed behavioral interventions appear promising to improve antibiotic management for ARIs**
- **Intervention design and implementation challenging across a wide continuum of antimicrobial stewardship programs and academic detailing practices ( a.k.a. herding cats) and direct cause and effect difficult to measure**
- **Antibiotic use for these conditions appears to be improving, especially in the past 2 Winter seasons**
- **Many unanswered questions remain and further work is ongoing**

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# QUESTIONS/COMMENTS?

**Karl Madaras-Kelly**

**[Karl.Madaras-Kelly2@va.gov](mailto:Karl.Madaras-Kelly2@va.gov)**