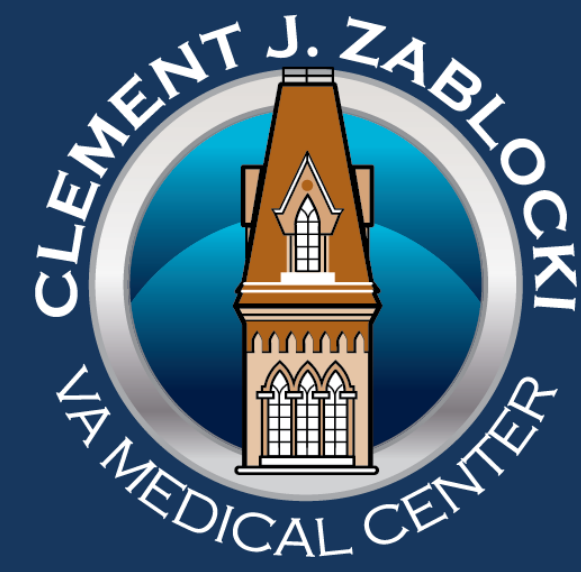




# Implementation of Veterans Affairs outpatient antimicrobial stewardship interventions for asymptomatic bacteriuria and acute respiratory infections, a stepped wedge randomized study

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## BACKGROUND

### Antimicrobial resistance is a growing threat

**60 %** Antibiotic use in the US occurs in the outpatient setting

**50 %** Outpatient antibiotic prescriptions inappropriate

**30 %** Outpatient antibiotics prescriptions unnecessary

Antimicrobial stewardship initiatives are needed for outpatients

Effective methods of outpatient stewardship are not well defined

## OBJECTIVE

To design, implement and evaluate the impact of antimicrobial stewardship interventions focused asymptomatic bacteriuria (ASB) and acute respiratory infections (ARI) in the outpatient setting.

## METHODS

| Inclusion  | Exclusion  |
|--|--|
| <ul style="list-style-type: none"> <li>Adults</li> <li>PCP visit</li> <li>Uncomplicated ARI</li> <li>Positive urinary culture</li> </ul> | <ul style="list-style-type: none"> <li>Complicated infection</li> <li>Immunosuppressed</li> <li>COPD (for ARI)</li> <li>Abnormal urologic anatomy (for ASB)</li> </ul> |

- Data collection was completed by retrospective chart review, utilization of existing VA dashboards, and existing patient satisfaction surveys
- Patients were identified for chart review based on microbiologic data for positive urine culture and utilizing the VA ARI dashboard for ARIs

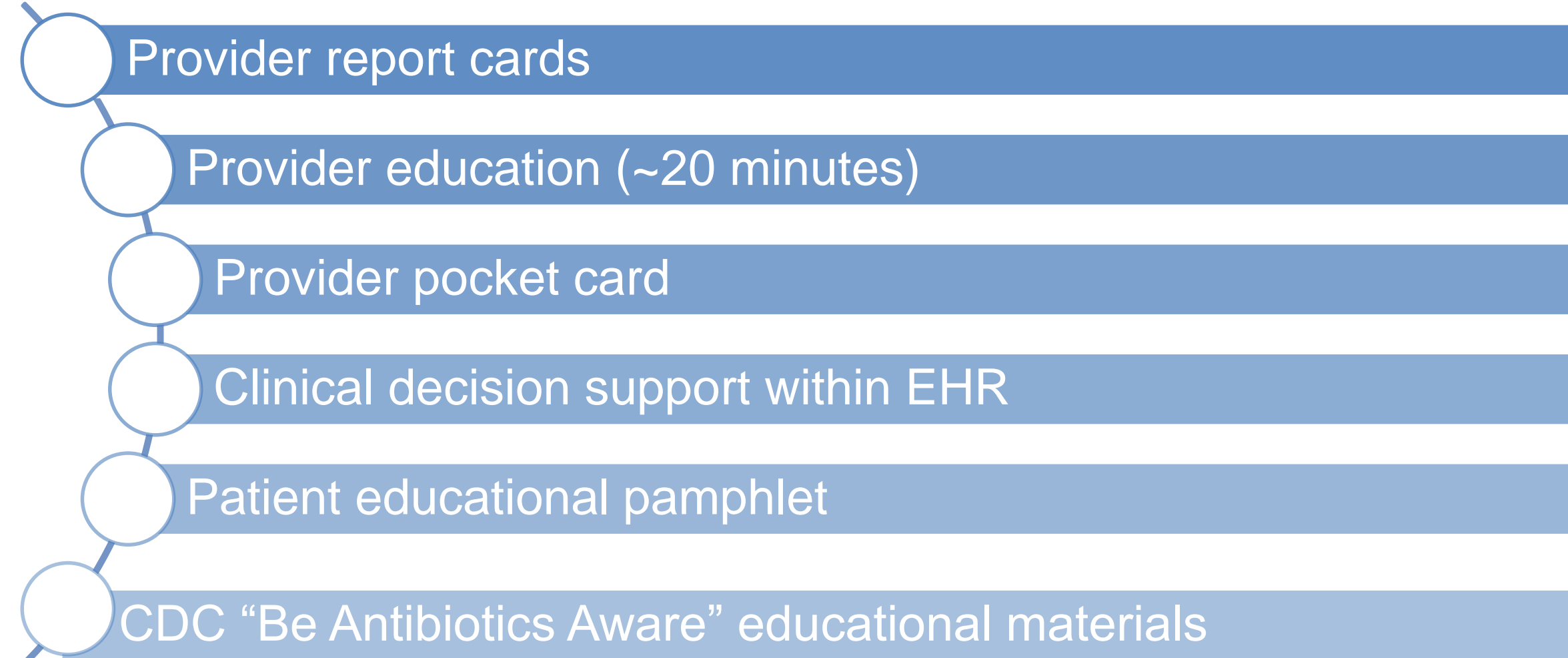
### STEPPED WEDGE STUDY DESIGN

|           | October | November     | December     | January      | February |
|-----------|---------|--------------|--------------|--------------|----------|
| Cluster 1 |         | Intervention |              |              |          |
| Cluster 2 |         |              | Intervention |              |          |
| Cluster 3 |         |              |              | Intervention |          |

Pre-group = light purple, post-group = dark purple

| Primary Outcomes   | Secondary Outcomes  |
|--|---|
| <ul style="list-style-type: none"> <li>Overall antibiotic prescriptions as a composite of antibiotic prescriptions for:               <ul style="list-style-type: none"> <li>ASB</li> <li>acute bronchitis</li> <li>URI-NOS</li> <li>uncomplicated sinusitis</li> <li>uncomplicated pharyngitis</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Individual components of the primary outcome</li> <li>Patient satisfaction surveys</li> <li>Antimicrobial appropriateness</li> <li>Composite safety endpoint within 4 weeks of:               <ul style="list-style-type: none"> <li>Hospital admission</li> <li>Return to clinic visit</li> <li>ED visit</li> </ul> </li> </ul> |

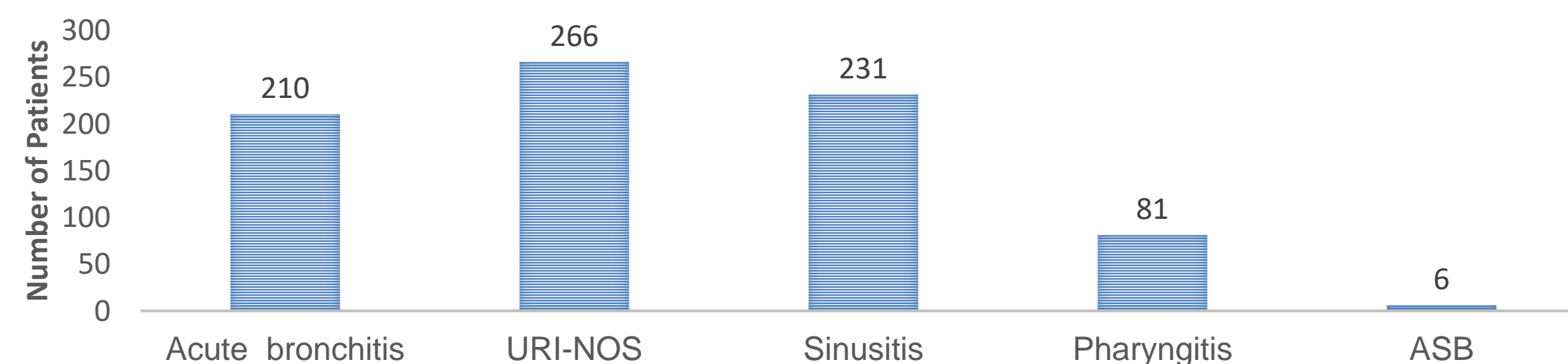
## INTERVENTION



## BASELINE CHARACTERISTICS

| Characteristic           | Pre (n=405) | Post (n=482) | Significance |
|--------------------------|-------------|--------------|--------------|
| Cluster, n (%)           |             |              |              |
| 1                        | 156 (39)    | 248 (51)     |              |
| 2                        | 109 (27)    | 159 (33)     | <0.0001      |
| 3                        | 140 (35)    | 75 (16)      |              |
| Visit Diagnosis, n (%)   |             |              |              |
| Acute bronchitis         | 112 (28)    | 98 (20)      | NS           |
| URI-NOS                  | 112 (28)    | 154 (32)     | NS           |
| Uncomplicated sinusitis  | 89 (22)     | 142 (29)     | NS           |
| Asymptomatic bacteriuria | 2 (1)       | 4 (1)        | NS           |
| Male sex, n (%)          | 355 (88)    | 396 (82)     | 0.0057       |
| Caucasian race, n (%)    | 348 (86)    | 397 (82)     | NS           |
| Age, mean (SD)           | 59 (18)     | 58 (16)      | NS           |
| BMI, mean (SD)           | 31 (7)      | 31 (6)       | NS           |
| CrCl, mean (SD)          | 94 (35)     | 95 (35)      | NS           |

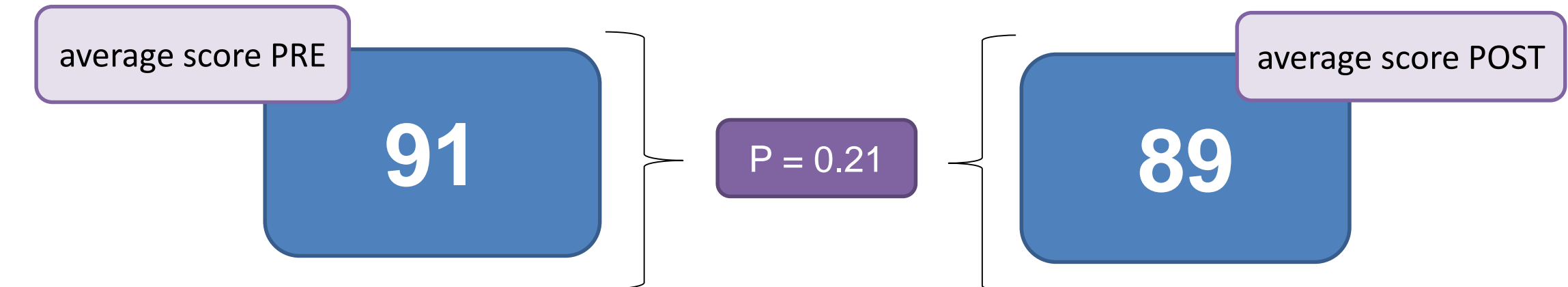
### VISIT DIAGNOSES



## RESULTS

| Outcome  | Pre (n=405)     | Post (n=482)    | P value      |
|--|-----------------|-----------------|--------------|
| Overall antibiotic prescriptions n, %  | 225 (56%)       | 235 (49%)       | NS           |
| ASB antibiotic prescriptions n, %  | 12 (3%)         | 8 (2%)          | .08          |
| <b>Bronchitis antibiotic prescriptions n, %</b>  | <b>85 (19%)</b> | <b>61 (12%)</b> | <b>.0003</b> |
| URI-NOS antibiotic prescriptions n, %  | 35 (9%)         | 27 (6%)         | NS           |
| Sinusitis antibiotic prescriptions n, %  | 69 (17%)        | 105 (22%)       | NS           |
| Pharyngitis antibiotic prescriptions n, %  | 20 (5%)         | 23 (5%)         | NS           |
| Composite safety outcome of related hospitalization, ED visit or primary care visit within 4 weeks | 38 (10%)        | 41 (9%)         | NS           |
| <b>Overall appropriate antibiotic prescriptions</b>  | <b>5 (2%)</b>   | <b>23 (10%)</b> | <b>.0004</b> |

### PATIENT SATISFACTION SURVEYS (100 point score)



| Outcome   | OR    | p-value | 95% CI       |
|---|-------|---------|--------------|
| Appropriate uncomplicated sinusitis prescription (post group)   | 4.961 | 0.0021  | 1.789-13.754 |
| Appropriate uncomplicated pharyngitis prescription (post group) | 5.359 | 0.0013  | 1.927-14.903 |

## CONCLUSIONS

- No significant difference in overall antibiotic prescriptions
  - Significant decrease in bronchitis prescriptions
- No difference in composite safety outcome or patient satisfaction surveys
- Significant increase in appropriate prescribing, however overall numbers were small
- Patients were ~ 5 x more likely to receive an appropriate prescription in the post-group
- Add to evidence supporting antimicrobial stewardship interventions in the outpatient setting
- Highly interactive and continual interventions are likely to be even more impactful based on current published evidence and feedback from providers

## FUTURE DIRECTIONS

- Evaluate risk factors for receipt of inappropriate prescriptions
- Continue active outpatient antimicrobial stewardship provider education
- Expanded education sessions to surgery, nursing and pharmacy services