Antibiotic Over Prescription for Upper Respiratory Tract Infections

Amina Boudaia
ANTIBIOTIC OVER PRESCRIPTION FOR UPPER RESPIRATORY TRACT INFECTIONS

by

AMINA BOUDAIA

EVIDENCE-BASED PRACTICE PROJECT REPORT

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Student Date Advisor Date
DEDICATION

I dedicate this to my supporting, loving, caring, and patient husband. Thank you for constantly pushing me to succeed. You believed in me when I didn’t believe in myself. I could not have done this without you.

To my darling mother and father, thank you for always having a warm meal ready for me when I was too busy to cook for myself. Thank you for teaching me to always follow my dreams and pursue my passion. The sacrifices you have made through the years to get me to where I am today, will never be forgotten. I am forever indebted to you.

To my sweet siblings, thank you for your everlasting support and love.
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To Drs. Strickler and Cavinder, I thank you deeply for your guidance and expertise through this project. Without you, this project would not have been possible.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>IV</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>V</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>VI</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>VIII</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>IX</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>X</td>
</tr>
<tr>
<td>CHAPTERS</td>
<td></td>
</tr>
<tr>
<td>CHAPTER 1 – Introduction</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 2 – EBP Model and Review of Literature</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER 3 – Implementation of Practice Change</td>
<td>18</td>
</tr>
<tr>
<td>CHAPTER 4 – Findings</td>
<td>24</td>
</tr>
<tr>
<td>CHAPTER 5 – Discussion</td>
<td>32</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>44</td>
</tr>
<tr>
<td>BIOGRAPHICAL STATEMENT</td>
<td>48</td>
</tr>
<tr>
<td>ACRONYM LIST</td>
<td>49</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>APPENDIX A – AGREE II Instrument</td>
<td>52</td>
</tr>
<tr>
<td>APPENDIX B- CASP for Systematic Reviews</td>
<td>53</td>
</tr>
<tr>
<td>APPENDIX C- CASP for Qualitative Studies</td>
<td>57</td>
</tr>
<tr>
<td>APPENDIX D- JBI Appraisal Checklist</td>
<td>63</td>
</tr>
<tr>
<td>APPENDIX E-Literature Search Table</td>
<td>64</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2.1 Summary of Evidence</td>
<td>12</td>
</tr>
<tr>
<td>Table 4.1 Descriptive Demographic Data Fall 2021 and Fall 2022 Participants</td>
<td>25</td>
</tr>
<tr>
<td>Table 4.2 Descriptive demographic Data of Providers 2022</td>
<td>26</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1 PRISMA Flowchart</td>
<td>9</td>
</tr>
<tr>
<td>Figure 4.1 AbxUse 2021* AbxUse2022 Crosstabulation</td>
<td>28</td>
</tr>
<tr>
<td>Chi-Square Tests</td>
<td>28</td>
</tr>
<tr>
<td>Figure 4.2 2021 Antibiotic Prescription</td>
<td>28</td>
</tr>
<tr>
<td>Figure 4.3 2022 Antibiotic Prescription</td>
<td>29</td>
</tr>
<tr>
<td>Figure 4.4 Participant Age Chi-Square Tests</td>
<td>29</td>
</tr>
<tr>
<td>Figure 4.5 Participant Sex Chi-Square Tests</td>
<td>30</td>
</tr>
<tr>
<td>Figure 4.6 Participant Race Chi-Square Tests</td>
<td>31</td>
</tr>
<tr>
<td>Figure 4.7 Participant ICD-10 Code Chi-Square Tests</td>
<td>31</td>
</tr>
</tbody>
</table>
ABSTRACT

Antibiotic overuse is a major contributor to antibiotic resistance that is estimated to be responsible for 23,000 deaths annually in the United States (Durante et al., 2017; Garcia et al., 2016). Upper respiratory tract infections (URTIs) are speculated to be a leading contributor to the overprescribing of antibiotics (Aplin-Snider et al., 2020). The purpose of this project was to address the PICOT question: Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30 patient charts (T) help to decrease antibiotic overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)? A multimodal approach targeting both providers and patients demonstrated the best results. Provider targeted interventions included a Centers for Disease Control and Prevention (CDC) protocol outlining treatment recommendations for URTIs and two free continuing medical education (CME) online courses. Patient targeted interventions included education posters that were hung in the waiting and exam rooms. A chart review was conducted over an eight-week period with ICD-10 codes: viral URI/ common cold, pharyngitis, acute rhinitis, acute sinusitis, acute rhinosinusitis, and acute uncomplicated bronchitis/cough. A retrospective chart review was conducted over the same eight-week period in 2021. A chi square analysis was utilized to determine statistical significance and similarities of the two groups. Statistically significant findings were found between the two groups in terms of their age, sex, race, and ICD 10 codes used (p>0.05). The primary outcome was not statistically significant (p>0.05); however, it was found to be clinically significant. The clinical preintervention rate of antibiotic prescription rate was 6/30 cases or 20%, whereas the postintervention rate of antibiotic prescription rate was 2/30 or 6%. These findings highlight the need for more research on implementing strategies to help further decrease antibiotic overprescription.

Keywords: Upper respiratory tract infection; antibiotic use; overprescription
CHAPTER 1
INTRODUCTION

Background

In the United States (US), antibiotic resistance is a major public health concern. Antibiotic resistance is speculated to cause 2 million infections and roughly 23,000 deaths in the US annually (Durante et al., 2017; Garcia et al., 2016; Harris et al., 2016). Just as humans evolve, so do bacteria, as they are living organisms. Continuing to overprescribe antibiotics more prevalently creates more resistant bacterial infections which become harder to treat (Durante et al., 2017). It has been shown that a patient who is prescribed an antibiotic can develop resistance to that antibiotic for up to 12 months (Hansen et al., 2015). Resistance of antibiotics causes significant health concerns and puts a burden on the healthcare system. Evolution of bacteria has shown an increase in patient morbidity and mortality, increased length of hospital stays, and a significant increase in healthcare costs (Durante et al., 2017; McNicholas & Hooper, 2022). Being aware of prescription practices and its correlation with antibiotic resistance is important. Current antibiotic prescribing practices are a direct major contributor to antibiotic resistance nationally and globally (Durante et al., 2017; O’Sullivan et al., 2016).

In the US, acute upper respiratory tract infections (URTIs) are the most common reason for primary care and urgent care visits. URTIs primary and urgent care visits account for over 120 million visits annually (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et al., 2015; Kenealy & Arroll, 2013; McNicholas & Hooper, 2022). URTIs are responsible for billions of dollars in healthcare costs, and hundreds of millions of missed workdays and productivity loss (Aplin-Snider et al., 2020; McNicholas & Hooper, 2022). Additionally, unnecessary prescriptions increase patient out of pocket costs, totaling to more than $3 billion in wasted expenditure (Harris et al., 2016).
URTIs are defined as several conditions of viral etiology which can include the common cold, acute rhinitis (not hay fever or allergic rhinitis), acute sinusitis, acute otitis media, acute bronchitis acute cough, acute pharyngitis (not streptococcal pharyngitis), and influenza (Aplin-Snider et al., 2020; Garcia et al., 2022; Kenealy & Arroll, 2013; McNicholas & Hooper, 2022; NICE, 2015; O’ Sullivan et al., 2016). Most of these infections are self-limiting and will resolve on their own with only supportive care at home. Despite the self-resolution of these illnesses, millions of patients continue to seek care at their health care provider’s (HCP) office with the expectation of having antibiotics prescribed despite a lack of evidence of effectiveness and against current treatment guidelines (Aplin-Snider et al., 2020; Sivapuram, 2021).

This unnecessary overprescription of antibiotics for URTIs serves no clinical benefit and results in harm for the patient (Aplin-Snider et al., 2020; Harris et al., 2016; Kenealy & Arroll, 2013; NICE, 2015). Adverse side effects of antibiotics include but are not limited to mild symptoms such as upset stomach, nausea, vomiting, diarrhea, headache, skin rash, or thrush. However, rare, more serious, and even fatal side effects can occur such as liver or bone marrow failure, pseudomembranous colitis, or potentially fatal allergic reactions (Aplin-Snider et al., 2020; Harris et al., 2016; NICE, 2015). Antibiotics are not effective against URTIs and should not be given to patients due to their increased adverse effects (Kenealy & Arroll, 2013; NICE, 2015).

Data Supporting Need for the Project

Global and National Data

It is predicted by the World Health Organization (WHO) that antibiotic resistance will be responsible for the deaths of 10 million people annually and cost 100 trillion dollars by the year 2050 if no action is taken to combat this global health crisis (Aplin-Snider et al., 2020; McNicholas & Hooper, 2022; O’Sullivan et al., 2016). Working to reduce inappropriate prescriptions can help to reduce costs, improve care, and help with stopping resistance to antibiotics. Among the millions of antibiotic prescriptions written annually for URTIs, half are prescribed inappropriately, contributing to antibiotic resistance (Aplin-Snider et al, 2020; Harris et
Antibiotic prescription for URTIs is ineffective, unproductive, and poses a severe threat to public health both nationally and globally in our generation and future generations since many organisms are becoming resistant to antibiotics (Aplin-Snider et al., 2020; NICE, 2015). The WHO and the Center for Disease Control (CDC), both predict there will come a day when antibiotics will no longer be effective or useful for treatment of commonly cured and treated infections (Aplin-Snider et al., 2020; McNicholas & Hooper, 2022). Therefore, unless there is a clear indication of benefit, it is crucial that antibiotics must be prescribed judiciously (NICE, 2015).

**State and City Data**

As far as state and city data on viral upper respiratory infection cases go, there is very limited statistical data available to the public. There is some data from the CDC website that relates to tracking COVID cases, that uses a tool called the Covid Data Tracker, but no statistical data on URTIs in general.

**Clinical Agency Data**

Personal communication with key stakeholders determined the need for this quality improvement (QI) project at the urgent care facility where this project was implemented. With it being an urgent care center, many patients sought care for illnesses such as URTIs when they were unable to obtain an appointment at their primary care provider’s (PCP) office. The number of patients who did not have a PCP and used the urgent care as one was a majority of the patients. The key stakeholders involved in these conversations included: physicians, nurse practitioners (NP), physician assistants (PA), and the unit manager.

The key stakeholders determined a QI project on antibiotic overprescription in URTIs was needed. Urgent care centers are notorious, after primary care offices, to overprescribe antibiotics for viral illnesses (Garcia et al., 2022). Additionally, the key stakeholders at the office did not have a formal protocol to guide clinical decision making.

**Purpose of the Evidence-Based Practice Project**
Purpose Statement and PICOT Question

The prevalence of antibiotic resistance and the detrimental effects it has on patients and healthcare systems sparked the interest to conduct this project. The purpose of this evidence-based practice (EBP) project was to decrease antibiotic overprescription for URTIs at an urgent care setting. This was performed through implementation of provider focused and patient focused interventions. The provider focused intervention included implementation of a protocol to guide providers in clinical decision making and having providers complete two online training modules. The patient focused intervention included providing education through educational posters hung in the waiting room and each exam room. Specifically, this project addressed the following PICOT question: Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30 patient charts (T) help to decrease antibiotic overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)?

EBP Project Description

This evidence-based practice (EBP) project was implemented at an urgent care center in central Indiana. The project manager collected data in two separate years, fall of 2021 over eight weeks and during the eight-week project implementation Fall 2022. Data collection of a retrospective chart review of patients seen at the clinic with ICD 10 codes: viral URI/ common cold, pharyngitis, acute rhinosinusitis, and acute uncomplicated bronchitis/cough attached to their charts was utilized. Of these patients, data was then collected on whether antibiotics were prescribed.

In the Fall of 2022, the project manager utilized two continuing medical education (CME) online modules for providers to complete regarding antibiotic stewardship and antimicrobial resistance. This, in addition to the protocol to guide antibiotic treatment was delivered to the providers with a brief teaching session at the beginning of each morning. Additionally, educational posters were hung in the waiting room and each exam room for patients to look at
and read. These posters also served as a visual cue to remind providers to take the extra time to educate patients on why an antibiotic for a URTI was not always necessary for their symptoms. At the end of the implementation, the same data was collected over the same months in 2021 for comparison to determine if there was a decrease in antibiotic prescription for URTIs.

This project has the possibility to be a future sustainable project. Having posters regarding antibiotic prescription and URTI’s in the waiting room is simple education for patients. This education teaches patients about the criteria for antibiotics in URTIs and can help to decrease their expectation for obtaining a prescription. Also, having the providers complete a CME online training course will be beneficial for this QI project by giving them education and CME credit. Lastly, the cost to implement this project would be low with the education provided to both providers and patients.
CHAPTER 2

EBP MODEL AND REVIEW OF LITERATURE

Evidence-based Practice Model

Included below are an overview of the EBP model that was used to guide this evidence-based project, details of the extensive literature search that was conducted, a ranking of the levels of evidence of the literature, an analysis and appraisal of the relevant evidence including the appraisal tools used for the appraisal, a synthesis of the critically appraised literature, and recommendations for best practice.

Overview of EBP Model

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model was chosen to guide this evidence-based project (see Appendix P for permission to use JHNEBP model). The JHNEBP model takes a problem-solving approach to guide clinical decision making within a healthcare organization that translates the best evidence available into practice, while accounting for internal and external influences (Melynk & Fineout-Overholt, 2019). The model begins with an inquiry initiated by either an individual or a team about practice related to a specific problem. This inquiry initiates the Practice Question, Evidence, and Translation process, also known as PET (Melynk & Fineout-Overholt, 2019). The PET process allows for a systematic approach to be taken by nurses to cultivate and refine a question regarding current practice, seek out best evidence, and finally, translate this evidence into practice (Melynk & Fineout-Overholt, 2019).

This PET process is then further broken down into a total of 19 steps. The Practice Question phase is comprised of six steps from recruiting an interprofessional team, to developing an EBP question, identifying stakeholders, identifying leadership roles, and scheduling team meetings. The Evidence phase is comprised of five steps which involve conducting search of evidence, appraising the level and quality of evidence, synthesizing the evidence, and developing best practice recommendations. The Translation phase, comprised of eight steps,
involves creating an action plan, implementing the plan, evaluating the outcomes, and disseminating the findings (Melynk & Fineout-Overholt, 2019).

This model was elected for this project because it was developed by nurses, for nurses. Although the 19-step process may initially seem daunting, each step is necessary and crucial to the success of the practice change. The process is designed as a mentored, linear but iterative, process that is user friendly (Melynk & Fineout-Overholt, 2019). The steps are developed in a linear fashion, but through the process of searching for evidence, the process evolves, requiring refinement of the search strategies or practice question (Melynk & Fineout-Overholt, 2019). The model helps to simplify an often, complex process of integrating evidence into practice. The JHNEBP model fits with the project because it stresses to get stakeholders involved early in the process, as stakeholder buy-ins are critical for the success of the practice change implementation (Upstate Medical University, 2022). The stakeholders for this project include the providers: physicians, NPs, and PAs at the urgent care clinic. The participation of the providers in this practice change is pertinent as they will ultimately determine prescription of antibiotics for patients.

**Literature Search**

**Sources Examined for Relevant Evidence**

Assistant from a research librarian was used to conduct an extensive review on the most relevant, up to date information regarding antibiotic overprescription in URTIs. Databases searched included the Joanna Briggs Institute (JBI), Cochrane Library, Turning Research Into Practice (TRIP), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Medline with Full Text via EBSCO. Refer to Figure 2.1 for the PRISMA flowchart for a comprehensive breakdown of the searches. Exclusion criteria for all the search engines included a year limiter of 2012 to current.

*JBI*
Keywords used in the JBI database include antibiotic* AND “upper respiratory tract infection” OR “upper respiratory infection” OR URTI OR URI. Limiters included the year limiter from 2012- current. This search yielded 9 results, one of which was utilized for this project (Sivapuram, 2020).

**Cochrane Library**

Keywords searched in the Cochrane Library include antibiotic AND respiratory OR viral AND infection. Search limiters included the year limiter of 2012- 7/2022. This search yielded 121 results, two of which were kept for use in this project (O’Sullivan et al., 2016; Kenealy & Arroll, 2013). One article, Hansen et al. (2015), was citation chased from the O’Sullivan et al. (2016) article and found through the PubMed database.

**TRIP**

For TRIP, the PICOT format question was utilized with respiratory under population and antibiotic under outcome. Limiters included clinical practice guidelines (CPGs) and the year limiter of 1/2012- current. This search yielded two results, and both were utilized (Harris et al., 2016; NICE, 2015).

**CINAHL**

The keywords utilized in CINAHL included the mesh heading MM “Respiratory Tract Infections” AND prescrib* OR “prescrip* AND antibiotic* AND “upper respiratory.” The limiters used included scholarly peer reviewed, English language, research articles, and the year limiter of 2012-2022. This search yielded a total search result of 94, two of which were utilized in the project (Aplin-Snider et al., 2020; Garcia et al., 2022).

**Medline with Full Text via EBSCO**

Keywords searched in Medline included the mesh heading MM “respiratory tract infections” AND prescrib* OR prescript* AND antibiotic* AND “upper respiratory.” Limiters included the year limiter from 2012-2022, English language, and scholarly peer reviewed. This
search yielded a total of 232 articles, three of which were ultimately selected for this project (Durante et al., 2017; Kim & Marikar, 2020; McNicholas & Hooper, 2022).

**Figure 2.1**

*PRISMA Flowchart*

![PRISMA Flowchart](image)

**Levels of Evidence**

The levels of evidence hierarchy table from Melnyk and Fineout-Overholt (2019) was used to level the evidence obtained from the literature review. This hierarchy of evidence consists of a total of VII levels which is depicted on a pyramid, with level I being the highest and
level VII being the lowest. Level I consists of meta-analysis, systematic reviews (SR) of randomized controlled trials, and current practice guidelines. Level II consists of randomized controlled trials. Level III includes controlled trials without randomization, or quasi-experimental studies. Level IV consists of cohort studies and case-controlled studies. Level V includes SRs of descriptive or qualitative (meta-synthesis) studies and correlational studies. Level VI includes single descriptive or qualitative studies, case series studies, case reports, and concept analysis. Finally, level VII consists of opinions of authorities, reports of expert committees, manufacturer’s recommendations, and traditional literature reviews.

According to Melnyk and Fineout-Overholt (2019), six articles obtained from the literature review fell under level I, as they were either SRs, CPGs, or an evidence summary. Four were under level three, as they were quasi-experimental studies. And lastly, one was under a level six category which was a qualitative study. Refer to Table 2.1 for a complete breakdown of the evidence.

**Analysis and Appraisal of Relevant Evidence**

Three appraisal tools were used to critically appraise the evidence obtained from the search. The first tool included the Appraisal of Guidelines for Research and Evaluation II (AGREE II) which was used to appraise the CPGs. Next, the Critical Appraisal Skills Programme (CASP) checklist was used to appraise SRs, the evidence summary, and the qualitative study (QS). Lastly, the JBI checklist was used for the quasi-experimental studies. Refer to Appendices A, B, C, and D for the AGREE II Instrument, CASP for SRs, CASP for qualitative studies, and JBI checklists respectively. Refer to Table 2.1 for an overview of the summary evidence table.

**AGREE II**

The AGREE II instrument was utilized to appraise the three CPGs included in the study. This instrument consists of a total of 23 statements, with each answer ranging from a scale of 1 (strongly disagree) to 7 (strongly agree). The user is asked to rate each statement on this Likert scale. There is also a further breakdown of “where to look,” “how to rate,” and “additional
considerations” included in the questionnaire to aid the user in rating each statement. In the end there is an overall guideline assessment with two questions rating the overall quality of the guideline and if the user recommends the guideline for use in future practice. This tool has been commonly used in appraising CPG because of its reliability (Brouwers et al., 2010). The three CPGs appraised using this instrument all ranked high on the quality of evidence.

**CASP**

Two different CASP checklists were used in appraising the literature, one was for the SRs, while the other was used for the qualitative study. The two CASP checklists used to appraise the literature both consisted of ten questions with the answer choices: yes, can’t tell, or no. The questions also included a “hints” section to help the appraiser in answering the questions by giving more detail as to what to search for prior to answering. This tool is widely used for these types of studies based on its reliability (CASP, 2018). Two SRs ranked high quality, while one was ranked moderate. The qualitative study was also ranked moderate quality using the CASP checklist.

**JBI**

The JBI Appraisal Checklist was used to appraise the four quasi-experimental studies found in the literature. This checklist consists of nine questions, with the answer choices of: yes, no, unclear, and not applicable. There is a portion at the bottom asking the appraiser to include, exclude, or seek further info on determining the overall appraisal. Additionally, there is information regarding further detail on the subsequent pages of the review to aid the appraiser in what to look for. This tool is widely used for its reliability and validity (Tufanaru et al., 2017). The four quasi-experimental studies all appraised at a level of high quality using this tool.
Table 2.1

*Summary of Evidence*

<table>
<thead>
<tr>
<th>Author/yr</th>
<th>Database(s)</th>
<th>Level of Evidence/Type</th>
<th>Quality/Tool</th>
</tr>
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<tbody>
<tr>
<td>Aplin-Snider et al. (2020)</td>
<td>CINAHL</td>
<td>III/QE</td>
<td>High /JBI</td>
</tr>
<tr>
<td>Durante et al. (2017)</td>
<td>Medline</td>
<td>III/QE</td>
<td>High/JBI</td>
</tr>
<tr>
<td>Garcia et al. (2022)</td>
<td>CINAHL</td>
<td>III/QE</td>
<td>High/JBI</td>
</tr>
<tr>
<td>Hansen et al. (2015)</td>
<td>CC</td>
<td>VI/QS</td>
<td>Moderate/ CASP</td>
</tr>
<tr>
<td>Harris et al. (2016)</td>
<td>TRIP</td>
<td>I/CPG</td>
<td>High/AGREE II</td>
</tr>
<tr>
<td>Kenealy &amp; Arroll (2013)</td>
<td>Cochrane</td>
<td>I/SR</td>
<td>High/CASP</td>
</tr>
<tr>
<td>Kim &amp; Marikar (2020)</td>
<td>Medline</td>
<td>I/CPG</td>
<td>High/AGREE II</td>
</tr>
<tr>
<td>McNicholas &amp; Hooper (2022)</td>
<td>Medline</td>
<td>III/QE</td>
<td>High/JBI</td>
</tr>
<tr>
<td>NICE (2015)</td>
<td>TRIP</td>
<td>I/CPG</td>
<td>High/AGREE II</td>
</tr>
<tr>
<td>Sivapuram (2021)</td>
<td>JBI</td>
<td>I/Summary</td>
<td>Moderate/CASP</td>
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*Note.* CC = citation chased; CPG = clinical practice guideline; QE = quasi-experimental; QS= qualitative study; SR = systematic review

**Construction of Evidence-based Practice**

**Synthesis of Critically Appraised Literature**

Evidence showed different reasons for inappropriate antibiotic prescribing for URTIs. Inappropriate URTIs prescribing was largely due to provider perception of patient expectations (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et al., 2015), patient satisfaction scores (Durante et al., 2017), time constraints (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et
al., 2015; McNicholas & Hooper, 2022), and diagnostic uncertainty (Durante et al., 2017; Garcia et al., 2022; Hansen et al., 2015). These different causes of antibiotic overprescription can be resolved through improving provider and patient education.

**Provider Perception of Patient Expectations and Satisfaction**

There were several important driving factors among providers that was consistently seen with overprescribing antibiotics. Deviation from standard of care was largely attributed to the perception of many providers that patients expected to have an antibiotic prescribed during their encounter (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et al., 2015) or it would lead to a decrease in patient satisfaction scores (Durante et al., 2017; Hansen et al., 2015).

**Time Constraints**

Some providers stated patients pressured providers into prescribing antibiotics for URTIs and due to the time constraints and lack of time to properly educate the patients, they give in and prescribe them anyway (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et al., 2015; McNicholas & Hooper, 2022).

**Diagnostic Uncertainty**

The correlation between diagnostic uncertainty and antibiotic overprescription has been reviewed across different studies. Also due to time constraints, providers are in a rush to move on to the next patient that they may prescribe antibiotics to prevent potential complications (Durante et al., 2017; Garcia et al., 2022; Hansen et al., 2015). This process is known as safety netting or delayed prescribing and is a strategy many providers opt to use (Hansen et al., 2015). Other studies demonstrated that antibiotics may be prescribed due to knowledge gaps and an inability to distinguish between viral and bacterial infections (Durante et al., 2017).

**Provider Education**

Increasing provider education through different multifaceted approaches was reviewed in the literature. By increasing provider education, it demonstrated to increase adherence to clinical guidelines regarding antibiotic prescription, thus reducing the overall number of
inappropriately prescribed antibiotics (Aplin-Snider et al., 2020; Garcia et al., 2022). Effective provider education often involves reviewing best practice guidelines for appropriate prescribing practice (Aplin-Snider et al., 2020). Education can also be delivered through multiple avenues to the providers. These include education training sessions, reflecting on providers’ attitudes towards antibiotic prescription, understanding providers’ perception of the change in practice, and reflecting on how their own personal prescribing practice compares to standard guidelines was shown to be effective (Aplin-Snider et al., 2020). Other means such as video tutorials, online training modules, handouts, and protocols have been shown to be beneficial (Aplin-Snider et al., 2020; Garcia et al., 2022). Protocols were also seen as important in changing provider practice. The implementation of protocols to reinforce and guide antibiotic stewardships showed to be the most effective (Aplin-Snider et al., 2020; Garcia et al., 2022). It is low cost and has been shown to decrease inappropriately prescribed antibiotics (Aplin-Snider et al., 2020; Garcia et al., 2022).

Duration of Symptoms. Understanding the duration of symptoms with URTIs is critical in improving provider prescribing practice (Sivapuram, 2021). Once a provider has accurate information regarding the appropriate course of URTI, the knowledge can later be taught to patients and their family members to provide reassurance and inform them when to seek medical attention, while also contributing to decreasing inappropriate antibiotic overprescription (Sivapuram, 2021).

Improving Provider-Patient Communication. Improved communication skills through communication skills training is essential and has been shown to decrease antibiotic prescription (McNicholas & Hooper, 2022; NICE, 2015). This is largely due to providers being able to educate patients on antibiotic resistance and the inappropriateness of antibiotic prescription. Treatment and care, as well as any information provided to the patient should be individualized to that patient and should be culturally appropriate (NICE, 2015). Patient care can further be individualized by including the patient in the decision-making process (Hansen et al., 2015).
Questions, concerns, thoughts, and ideas are explicitly sought and a joint decision on patient care is then made. Shared decision making plays a crucial role in addressing patient expectations, improving patient satisfaction rates, and even decreasing antibiotic overprescription (Durante et al., 2017; Hansen et al., 2015). It is pivotal that providers understand patient satisfaction scores are associated with reassurance and information, and not misperceptions that a patient is only after an antibiotic prescription (Hansen et al., 2015).

Patient Education

Many patients overestimate the power and effectiveness of antibiotics. Patients believe that these medications are effective against viral illnesses (Hansen et al., 2015). Researchers have demonstrated that taking time to educate patients on URTIs and antibiotic use while applying multiple strategies will change their opinions on antibiotics (McNicholas & Hooper, 2022). It’s been demonstrated that providing written information (McNicholas & Hooper, 2022; O’Sullivan et al., 2016) and providing patient information and reassurance (Hansen et al., 2015) have been effective ways of decreasing antibiotic expectation and thus antibiotic prescriptions.

Written Information. Written information, whether in the form of a booklet, handout, poster, meme, or gif, is a cheap and practical way to increase patient knowledge and significantly reduce antibiotic expectation. Patients found the information on antibiotic usage and management for viral symptoms extremely useful (McNicholas & Hooper, 2022; O’Sullivan et al., 2016). It was found from a SR by O’Sullivan (2016) that clinicians who provide written information on URTIs to patients demonstrated a 20% reduction of patient antibiotic use.

Patient Reassurance. Various reports have shown that patients with URTI seeking care are mainly seeking information and reassurance from the HCP that they are doing okay (Hansen et al., 2015). Additionally, teaching a patient ways to promote healthy lifestyles such as staying up to date on vaccinations, exercising, eating healthy, utilizing physical barriers such as masks, hand hygiene, and using over the counter medications for symptom relief are all effective ways in
maintaining and promoting healthy lifestyles (Hansen et al., 2015). Refer to Appendix E for the evidence table that summarizes the literature search for more details.

**Recommendation for Best Practice**

The recommendations for best practice include helping the provider and patient to understand symptom duration and teaching patients about symptoms management at home for viral illnesses. Also, best practice recommends providers and even patients understanding the different clinical guidelines offered by credible bodies and groups such as the CDC, National Institute for Health and Care Excellence (NICE), or American College of Physicians (ACP). The literature review demonstrated a lot of overprescription that occurs stems from a lack of knowledge on how viruses work in patient education. This in turn leads to patients pressuring providers into prescribing antibiotics, and providers giving in for fear of negative patient satisfaction scores.

**Understand Symptom Duration**

In an evidence summary obtained by Sivapuram (2021) and a CPG by NICE (2015), it was determined that in 90% of children, symptoms of bronchiolitis resolved by about 21 days, acute cough by about 21-25 days, common cold by about 10-15 days, acute rhinosinusitis by 17-18 days, sore throat by 1 week, and non-specific URTIs by about 16 days. It is important to teach parents and patients that symptoms will likely improve within one week, regardless of bacterial or viral etiology while stressing that withholding antibiotics during this duration will rarely lead to complications in low-risk groups (Kim & Marikar, 2020).

**Clinical Guidelines**

The CDC and American College of Physicians have released strict clinical guidelines on antibiotic stewardship regarding who should and who should not receive antibiotic therapy in adults with URTIs (Aplin-Snider et al., 2020). The CDC promotes the correct use of these guidelines in order to decrease antibiotic resistance (McNicholas & Hooper, 2022). The NICE (2015) guidelines also have a protocol aimed at slowing progression of antimicrobial resistance.
**No Antibiotic Prescribing Strategy.** The no antibiotic prescribing strategy was made for those who do not meet requirements to receive an antibiotic. Clinical assessment is extremely important for individualizing care when it comes to the no antibiotic prescribing strategy (Harris et al., 2016; NICE, 2015). This strategy stresses certain patients should not be prescribed antibiotics, such as those with bronchitis. The only time it is okay for antibiotics to be prescribed for bronchitis is if the patient also has pneumonia (Harris et al., 2016; NICE, 2015). The only patients who should receive antibiotics with sore throat are those who test positive for strep (Harris et al., 2016; NICE, 2015). Providers should not prescribe antibiotics for patients with sinus infections unless the symptoms last longer than 10 days or has severe symptoms (Harris et al., 2016; NICE, 2015). Lastly, no patients with a common cold should receive antibiotics.

**Delayed Antibiotic Prescribing Strategy.** Another approach in place for overprescribing antibiotics is the delayed antibiotic prescribing strategy, also known as safety netting. It is useful for when diagnostic uncertainty is involved (Durante et al., 2017; Garcia et al., 2022; Hansen et al., 2015). With this strategy, it is crucial to highlight patients must be reassured that antibiotics are not needed immediately and are taught to wait a certain period of time prior to filling the script or taking the medication (Kim & Marikar, 2020; NICE, 2015).

**Identification of At-Risk Patients.** Depending on patient presentation, comorbidities, and individual patient factors, immediate antibiotic prescription may be warranted. The different situations for patients who are at risk for complications are outlined in the guidelines by NICE (2015) and Kim and Marikar (2020).

**Symptomatic Therapy**

Patient’s lack an understanding that many URTIs are treated by symptom management. Symptomatic therapy continues to be the mainstay treatment for viral URIs (Aplin-Snider et al., 2020) and therefore is one of the most important things providers need to pass on to patients. Teaching about adequate fluid intake, rest, and over the counter analgesics and antipyretics are what is needed for viral illnesses (Kim & Marikar, 2020).
CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

In summary, the implementation of the practice change included a protocol on antibiotic prescription from the CDC, two free online CMEs from the CDC, and educational posters from the CDC’s Be Antibiotics Aware Initiative. These interventions were implemented over eight weeks in the Fall of 2022. A chart review was conducted during these eight weeks or 30 patient charts, whichever came first, to pull prescribing information data. A retrospective chart review was also conducted during the same eight-week period, or 30 charts, whichever came first in 2021 to compare data.

Participants and Setting

This project was implemented in an urgent care clinic in central Indiana. The clinic consisted of eight exam rooms and was open from 9am to 9pm, seven days a week. It averages about 100 visits daily (Nurse Practitioner, personal communication, Aug 25th, 2022). There are roughly about 40 providers who rotate between this clinic and its six sister locations. In the clinic there is a total of four front-office staff, ten back-office staff, many registered nurses and medical assistants, and the clinic manager. The stakeholders included in this project include the providers (physicians, PA’s, and NP’s), the clinic manager, and the medical director.

Patients in the time frame as noted above included in the study were those with the following ICD-10 codes attached to their visit: viral URI/ common cold, pharyngitis, acute rhinosinusitis, and acute uncomplicated bronchitis/cough. The patients also had to be 18 or older. Exclusion criteria included any other ICD-10 code than listed above, those under the age of 18, anyone with an extensive list of comorbidities, and any patient who had a bacterial infection.

Pre-Intervention Group Characteristics
During the Fall of 2021, a retrospective chart review was conducted, and 30 charts were reviewed, 9 of which were males (30%) and 21 were females (70%). Of these 30 charts, 1 participant was Asian (3.3%), 7 were Black or African American (23.3%), 1 was Latino (3.3%), and 21 were White or Caucasian (70%). The ages of these 30 participants averaged 43.8 years old, with a range of 23-70. Six of the charts had the ICD 10 code for viral URI/ common cold (20%), 7 charts were pharyngitis (23.3%), 2 charts were acute rhinosinusitis (6.7%), and 15 were acute uncomplicated bronchitis/ cough (50%). Of these 30 charts, 6 participants (20%) were prescribed antibiotics. No data was collected on which antibiotic was prescribed or who the prescriber was (see Table 4.1).

Of the 40 total providers who rotate between this clinic and its six sister locations, demographic data was only collected on 22 providers. This was due to difficulty obtaining contact information for the remainder of the providers since they were under a different manager than the clinic manager where this project took place. The providers during the year 2021 eight-week time period were the same providers for the 2022 time period, with the exception of a few who no longer worked for the network or had retired. Providers who participated in the project included a mix of 9 physicians (40.9%), 10 NPs (45.5%), and 3 PAs (13.6%). Their experience in years ranged anywhere from 1 year to 41 years, with an average of 11.6 years (see Table 4.2).

**Intervention**

Data from the literature review showed that implementation targeting both patients and providers had the best results in reducing overprescribing of antibiotics. Therefore, the project manager implemented both provider-targeted and patient-targeted interventions simultaneously. A ‘provider handout’ (see Appendix F) was sent to the providers that contained a brief outline of the EBP project details, a link to a survey and the CDC protocol, and directions on accessing the free CME’s. Prior to initiation of data collection, the providers were sent a survey using Survey Monkey to fill out four questions regarding their role and experience. The survey was a quick four questions to help with data collection that asked for the provider’s role: whether they were a
The provider-targeted interventions included a protocol from the CDC (see Appendix H) outlining the treatment recommendations for acute rhinosinusitis, acute uncomplicated bronchitis/cough, common cold or non-specific upper respiratory tract infection, and pharyngitis. The protocol also included treatment recommendations on acute uncomplicated cystitis, however for the purposes and focus of the project, the portion on cystitis was excluded. In addition to the conditions listed and management, the protocol also included information on epidemiology and diagnosis for each condition listed. This protocol was posted near each computer where the providers sat for easy access to refer to when necessary. In addition to this protocol, information on two free CMEs offered through the CDC was sent to the providers via email to serve as an educational refresher course on antibiotic prescription.

The patient-targeted interventions included two educational posters (see Appendices I and J) retrieved from the CDC’s Be Antibiotics Aware Initiative. These educational posters included information on patient symptoms requiring antibiotics, side effects of antibiotics, antibiotic-resistant bacteria, and preventative measures to take.

The implementation of the project was over the span of eight weeks or 30 patient charts, whichever came first, during the Fall of 2022. During these eight weeks, charts were reviewed, and data were collected on patient visits who had the associated ICD-10 codes attached to their charts. Data were collected and then recorded on the data collection tool (see Appendix K). Data on patient’s age, race, sex, diagnosis, ICD-10 code, and whether or not antibiotics were prescribed was all included during data collection. Due to the large amount of daily patient visits and the lack of support from research assistants, it was decided by the project manager that data for this project was only collected on Fridays, Saturdays, and Sundays for a duration of eight weeks from September to October. Most primary care offices are only open Mondays through Thursdays with limited hours, whereas most urgent cares are open seven days a week. It was
decided that the data be focused only on said days as most primary offices were closed and people were seeking care at urgent care clinics for their URTIs. This information was not disclosed to the providers to eliminate any bias.

A retrospective chart review was conducted during the same eight weeks from the Fall of 2021. Data from these eight weeks served as baseline and comparison data. The data from the two years were then compared against each other to determine if there truly was a decrease in antibiotic prescribing for URTI's after the implementation of the protocol, online training modules, and patient education posters.

**Comparison**

During the Fall of 2022, thirty charts were reviewed, 20 of which were female (66.7%) and 10 (33.3%) male. The participants’ ages ranged from 21-66 years, with the mean being 45 years old. Of the 30 participants 2 were Asians (6.7%), 4 were Black or African American (13.3%), 1 was Latino (3/3%), and 23 were White or Caucasian (76.7%). Six (20%) of the charts had the ICD 10 code viral URI/ common cold, 9 (30%) had pharyngitis, 3 (10%) had acute rhinosinusitis, and 12 (40%) had acute uncomplicated bronchitis cough (see Table 4.1). Of these 30 charts, only 2 (6.7%) were prescribed antibiotics. No data was collected on which antibiotic was prescribed or who the prescriber was.

**Outcomes**

The primary outcome of this project that was evaluated was to demonstrate a decrease of unnecessary antibiotic prescriptions for URTIs. There were no secondary outcomes that were evaluated during the course of this project.

Statistical data analysis was measured using a chi square analysis. This was determined to be the test of choice since the data collected were nominal. This test determines whether the implementation is statistically significant. Additionally, a Chi square was also used to determine similarities of the two groups of participants. Due to the nature of this project, there was no tool
needed to measure the outcomes. The data on the patient charts were collected by hand by the project manager, and a chi square was then used to analyze this data.

**Time**

The timeline of this project is outlined in Appendix L titled Implementation Calendar. The project officially launched September 1st, but data collection began September 4th because it was the first Sunday of the month. This project was completed over a period of eight weeks, with the last day being October 29th or until 30 charts were obtained, whichever came first. Data collection from the previous year was from September 5th to October 30th or until 30 charts obtained, whichever came first. The project concluded by the end of October in time for the project site facilitator’s projected retirement.

Tasks that were completed prior to initiation of data collection included sending out the survey from Survey Monkey, printing the correct number of protocols to go next to the provider’s computers and the correct number of CDC posters to be hung in the waiting room and exam rooms. The protocols and the patient education posters were then laminated. The protocols were placed next to each provider computer. The patient education posters were placed in each exam room where they could be easily seen by both the patients, as they waited for the provider to come into the room, and for the provider to see while they were in the exam room to serve as a visual cue for them to spend a few minutes educating the patients on antibiotic use.

**Protection of Human Subjects**

Protection of human subjects was a priority during the entire project. Education and training on protection of human subjects was completed by the project manager as part of the Doctorate of Nursing Practice (DNP) curriculum on date by the Collaborative Institutional Training Initiative (CITI) on 4/16/22 (see Appendix M). The project was deemed to be exempt from requiring Institutional Review Board (IRB) approval per the IRB questionnaire on 8/3/22 (see Appendix N). The manager of the urgent care clinic confirmed that no IRB approval was needed at their site (see Appendix O). Confidentiality and anonymity of participant identifying
information as well as provider names was protected and upheld by the project manager by having a secure two password laptop. Only the project manager had access to this laptop and knew the passwords.
CHAPTER 4

FINDINGS

Evidence from the literature showed an increased need to develop strategies to decrease antibiotic prescription rates for URTIs which was heavily impacting antibiotic resistance. Evidence from the literature showed taking a multimodal approach targeting both providers and patients had the best results in reducing antibiotic prescriptions for URTIs. These findings were used to support the need of this EBP project. The purpose of this EBP project was developed and designed to determine whether initiating an organized protocol that targeted both providers and patients would help to decrease the rate of antibiotic prescription for viral URTIs in the urgent care setting. More specifically, this project helped to answer the question: Does the implementation of patient education posters and protocol plus online training modules for providers, over an 8-week period, help to decrease antibiotic overprescription in URTIs in the urgent care setting compared to no intervention? The findings from this EBP project do not support the use of a multimodal approach to targeting both providers and patients to decrease antibiotic prescription rates for URTIs.

Participants

Demographic information collected from the charts of the participants included age, sex, and race, with the following ICD 10 codes attached to their visit during the Falls of 2021 and Fall of 2022: viral URI/ common cold, acute rhinosinusitis, acute uncomplicated bronchitis/cough (shown in Table 4.1). In the Fall of 2022, thirty charts were reviewed, 20 of which were female (66.7%) and 10 (33.3%) male. The participants’ ages ranged from 21-66 years, with the mean being 45 years old. Of the 30 participants 2 were Asians (6.7%), 4 were Black or African American (13.3%), 1 was Latino (3/3%), and 23 were White or Caucasian (76.7%). It is difficult to determine whether this sample size was a good representation of the population as a whole,
however it is demonstrated in the below table that the two groups that were compared are relatively similar.

**Table 4.1**

*Descriptive Demographic Data for Fall 2021 and Fall 2022 Participants*

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Fall 2021</th>
<th>Fall 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Participants</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>43.8</td>
<td>45.1</td>
</tr>
<tr>
<td>Range</td>
<td>23-70</td>
<td>21-66</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>21 (70%)</td>
<td>20 (66.7%)</td>
</tr>
<tr>
<td>Male</td>
<td>9 (30%)</td>
<td>10 (33.3%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1 (3.3%)</td>
<td>2 (6.7%)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>7 (23.3%)</td>
<td>4 (13.3%)</td>
</tr>
<tr>
<td>Latino</td>
<td>1 (3.3%)</td>
<td>1 (3.3%)</td>
</tr>
<tr>
<td>White or Caucasian</td>
<td>21 (70%)</td>
<td>23 (76.7%)</td>
</tr>
<tr>
<td>ICD 10 code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral URI/common cold</td>
<td>6 (20%)</td>
<td>6 (20%)</td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>7 (23.3%)</td>
<td>9 (30%)</td>
</tr>
<tr>
<td>Acute Rhinosinusitis</td>
<td>2 (6.7%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>AUB/cough</td>
<td>15 (50%)</td>
<td>12 (40%)</td>
</tr>
<tr>
<td>Were antibiotics prescribed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6 (20%)</td>
<td>2 (6.7%)</td>
</tr>
</tbody>
</table>
The demographic information of all the providers who rotate between this clinic and its six sister locations was similar in 2022 to that of the preceding year (see Table 4.2). As previously mentioned, of the 40 providers who rotate between this clinic and its six sister locations, only 22 providers were included in the study due to difficulties obtaining contact information of the remaining providers who were under different management. There was one provider who elected to not participate in this EBP project for reasons unknown. This provider was removed from all emails and contacts of the project manager and was not included in any of the data.

Table 4.2

Descriptive Demographic Data of Providers 2022

<table>
<thead>
<tr>
<th>Number of Providers</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profession</td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>9 (40.9%)</td>
</tr>
<tr>
<td>NP</td>
<td>10 (45.5%)</td>
</tr>
<tr>
<td>PA</td>
<td>3 (13.6%)</td>
</tr>
<tr>
<td>Experience (in years)</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>11.6</td>
</tr>
<tr>
<td>Range</td>
<td>1-41</td>
</tr>
</tbody>
</table>

Note. NP = Nurse Practitioner; PA = Physician’s Assistant.

Changes in Outcomes

The PICOT question of this project was: Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30
patient charts (T) help to decrease antibiotic overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)? The primary outcome of this project includes the use of antibiotics. There were no secondary outcomes that were measured. Findings from this EBP project do not support the use of a multimodal approach to targeting both providers and patients to decrease antibiotic prescription rates for URTIs.

**Statistical Testing and Significance**

The Statistical Package for Social Sciences Version 25 (SPSS25) was the program used to analyze the statistical data of this EBP project. Primary outcome data were analyzed using a chi square test of independence. A chi square test of independence was selected since most of the data that were collected were nominal.

**Findings**

The primary outcome of antibiotic use is described down below with the statistical results of the intervention. A chi square test of independence was also conducted comparing the age, sex, race, the ICD 10 codes from the two groups of participants from 2021 and 2022 to determine whether the two groups were similar to each other.

**Primary Outcome**

**Antibiotic Use.** A chi square test of independence was calculated comparing whether the intervention helped decrease antibiotic prescription. No significant relationship was found ($\chi^2(1) = 1.205, p>0.05$). The intervention and antibiotic prescription rate appear to be independent events (see Figure 4.1). A chi square test of independence was elected for analysis because the data were nominal. Although the findings of the EBP project demonstrated that the primary outcome of antibiotic use was not statistically significant ($p>0.05$), the outcome was clinically significant (see Figures 4.2 and 4.3). There was a decrease found to be in antibiotic prescription from 6 (20%) in 2021 to 2 (93.3%) in 2022.
**Figure 4.1**

*AbxUse2021* *AbxUse2022* Crosstabulation *Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.205a</td>
<td>1</td>
<td>.272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>.033</td>
<td>1</td>
<td>.855</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>.975</td>
<td>1</td>
<td>.323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.366</td>
<td>.366</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.165</td>
<td>1</td>
<td>.280</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.2**

*2021 Antibiotic Prescription*

Antibiotic prescribed?

30 responses

![Pie chart showing 80% yes and 20% no]
Participant Age. A chi square test of independence was calculated comparing the ages of the two groups of participants. A significant interaction was found ($x^2(550) = 570.833, p>0.05$). The ages of the two groups were dependent on each other, meaning the two groups are similar (see Figure 4.4). A chi square test of independence was elected for analysis even though the data were scale because a t-test could not be conducted within SPSS.

Figure 4.3

2022 Antibiotic Prescription

Participant Age Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>570.833*</td>
<td>550</td>
<td>.261</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>170.434</td>
<td>550</td>
<td>1.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.163</td>
<td>1</td>
<td>.687</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Participant Sex.** A chi square test of independence was calculated comparing the sex of the two groups of participants. A significant interaction was found $x^2(1) = 0.714, p > 0.05$. The sexes of the two groups were dependent on each other, meaning the two groups are similar (see Figure 4.5). A chi square test of independence was elected for analysis because the data were nominal.

**Figure 4.5**

*Participant Sex Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.714a</td>
<td>1</td>
<td>.398</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>.179</td>
<td>1</td>
<td>.673</td>
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<tr>
<td>Likelihood Ratio</td>
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<td>1</td>
<td>.403</td>
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<td></td>
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<tr>
<td>Fisher’s Exact Test</td>
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<td></td>
<td>.431</td>
<td>.331</td>
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</tr>
<tr>
<td>Linear-by-Linear Association</td>
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<td>.406</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Participant Race.** A chi square test of independence was calculated comparing the race of the two groups of participants. A significant interaction was found $(x^2(9) = 6.398, p > 0.05)$. The race of the two groups were dependent on each other, meaning the two groups are similar (see Figure 4.6). A chi square test of independence was elected for analysis because the data were nominal.
**Figure 4.6**

*Participant Race Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
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<tr>
<td>Pearson Chi-Square</td>
<td>6.398a</td>
<td>9</td>
<td>.700</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>6.601</td>
<td>9</td>
<td>.679</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.156</td>
<td>1</td>
<td>.693</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ICD 10 Code.** A chi square test of independence was calculated comparing the ICD-10 codes used for encounters of the two groups of participants. A significant interaction was found ($x^2(9) = 6.242, p>0.05$). The ICD 10 codes used for the encounters of the two groups were dependent on each other, meaning the two groups are similar (see Figure 4.7). A chi square test of independence was elected for analysis because the data were nominal.

**Figure 4.7**

*Participant ICD-10 Code Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.242a</td>
<td>9</td>
<td>.715</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.629</td>
<td>9</td>
<td>.572</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.014</td>
<td>1</td>
<td>.314</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Secondary Outcome**

There were no secondary outcomes that were measured during this EBP project.
CHAPTER 5
DISCUSSION

This EBP project evaluated the effectiveness a multimodal approach targeting both providers and patients would have on decreasing antibiotic prescription rates for URTI's in the urgent care setting in central Indiana. It addressed the PICOT question: Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30 patient charts (T) help to decrease antibiotic overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)?

Interventions that the project manager implemented targeting providers included providing two free CME courses to brush up on antibiotic stewardship and antimicrobial resistance that were provided by the CDC. The providers were also provided with the CDC protocol on how to manage the following: viral URI/ common cold, pharyngitis, acute rhinosinusitis, and acute uncomplicated bronchitis/ cough. These protocols were placed by their computers for easy access. The patient targeted intervention included education posters that were hung in the waiting room and each exam room. The posters were placed in a way that the patient would be able to visualize and read while in both the waiting room and exam room.

The findings of the statistical analysis for the primary outcome will be explained in this chapter. The strengths, limitations, and sustainability of this EBP project will be evaluated. The relevance of the EBP model will be explored. Recommendations for future practice will be discussed, and parting thoughts will be examined.

Explanation of Findings

Primary Outcome

Antibiotic Use

The primary outcome of this EBP project was to determine whether antibiotic prescription rates would decrease for URTIs. The analysis of the 30 patient charts from both 2021 and 2022
determined that the overall rate of antibiotic prescription rate did decrease from 20% to 6.7%, respectively. Although it was clinically significant, this decrease in prescription rates was not found to be statistically significant (p= 0.272).

Between the two groups of participants from the years 2021 and 2022, race, sex, age, and the ICD 10 codes used were similar between each group in each category. With the two groups being compared being similar in those aspects, it is easy to make assumptions and generalize.

The findings from this EBP can be attributed to several different causes. The impact of COVID 19 could have largely attributed to the results of this EBP project. There was a markedly lower rate of flu and URTI cases in 2021 due to the COVID 19 pandemic since people were social distancing, wearing masks, and practicing better hygiene. Subsequently, the rates of influenza, respiratory syncytial virus (RSV) and other URTIs were significantly lower as compared with previous falls and winters (Elsevier, 2022). On the other hand, the CDC (2023) estimates that the Fall and Winter season of 2022-2023 had an incredibly high surge of influenza, RSV, and URTI cases, with an estimated 26-52 million flu illnesses, 12-25 million flu medical visits, 290,000 – 630,000 flu hospitalizations, and 18,000-56,000 flu deaths across the US from October 1, 2022 – March 18, 2023. Having two extremes of results in the years 2021 and 2022 may have largely skewed the results of this project.

Another cause that could have contributed to the results of this EBP project and one of the most recurring themes that was the most noticeable while on site by the project manager was that of time constraints. As evidenced by the literature, the same barrier of time constraints and not having adequate time with patients to educate them was witnessed at this site (Aplin-Snider et al., 2020; Garcia et al., 2022; Hansen et al., 2015; McNicholas & Hooper, 2022). While this may have played a role in the findings of this EBP project, the educational posters in each exam room provided a means for the providers to point out a credible source while providing a chance
Another reason for the cause of these results can be attributed to having such a large number of providers that took part in this. While no data was collected on who the provider was for each case chart, there were different providers for each day that was audited. This could have played a part in the results since no provider practices the same. Some are more thorough than others, and some have practiced for longer than others. Additionally, the lack of consistency with having the same providers made it difficult for the project manager to establish rapport with them, thus, making it challenging for the project manager to connect with them. Therefore, the fact that not the same few providers were checked in 2021 and 2022 could have also contributed to why there were more antibiotics prescribed in one year than another.

Another cause for the potential results of this project could have been due to the timeframe the 30 charts were obtained. The PICOT for this project was “Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30 patient charts (T) help to decrease antibiotic overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)?” with the timeframe being an 8-week period or 30 patient charts. The project was initially set out to be conducted over an 8-week period, but after realizing how complex this would have gotten since the urgent care was open 12 hours a day, 7 days a week, the number of charts the project manager would have had to go through proved to be extremely cumbersome rather quickly. The initial adjustment to the timeframe was to only collect data on Fridays, Saturdays, and Sundays since most primary care offices were closed while also eliminating some days to go through. The timeframe was altered once more to limit the number of charts to 30 patient charts for each year, for a total of 60 charts, in order to further simplify the design.
During the Fall of 2021, it only took two weeks for the 30-chart limit to be reached and 3 weeks for the Fall of 2022. Consequently, not every provider’s chart was looked at or could have been checked during this short of a time frame. The project manager believes that with a proper team of research assistants, had the project been carried out for longer than 30 charts and instead conducted for everyday during the full 8 weeks, the results may have been found to be both clinically and statistically significant.

Lastly, it is worthwhile to mention that one case was thrown out from the results in the year 2022. The patient was prescribed antibiotics for pharyngitis despite a negative strep test. This test was followed up with a culture, which ended up being positive. After this positive culture was received, the patient’s antibiotic was changed to something more suitable and upon follow up, the patient was feeling better. Since it was appropriate in this case for the patient to be given antibiotics, it was not included in the results.

**Strengths and Limitations of the DNP Project**

**Strengths**

The project manager believes that the ease of the intervention for this EBP project is what contributed to the clinical significance of the implementation. Having posters to help educate patients in each exam room and the waiting room is something so simple while being loaded with important information regarding antibiotics and antibiotic resistance. Additionally, the posters also provided information for remedies to do at home for symptom management.

Moreover, in addition to the ease of the intervention implementation, it is also cost effective. The patient education posters that were hung in the clinic were all mailed from the CDC to the project manager at no cost. Additionally, the CMEs that the providers were given directions to complete were also complimentary through the CDC.

Another aspect that helped lead to the clinical success of the implementation was the accountability from the project manager. The project manager was present at the clinic through various days during the implementation phase, helping to spread awareness to the floating
providers, pointing out the protocol that sat by their computers, and answering any questions anyone had regarding the project. The project manager also held the providers accountable for completing the provider collection survey by sending email reminders and follow up emails.

An additional strength would be the consistency the project manager had with data collection. Because there was a lot of data to collect and sift through, the project manager had to develop a way to collect and organize pertinent data. The data collection tool that was used to collect data helped to keep the data collection focused and organized.

The employees at this site, both clinical and nonclinical, were incredibly kind and welcoming to the project manager. Everyone was cooperative and helpful with the project implementation and even allowed the project manager to use their office supplies such as the laminator that was used to laminate the CDC education posters. For this kind behavior, the project manager is extremely grateful.

Limitations

One of the biggest limitations of this project was the lack of a team to assist with the EBP project and time constraints. Since the project manager was the only person conducting this entire project, the project design had to be simplified. It was difficult to ensure each, and every case was included, some cases may have been missed since the project manager was individually sifting through the charts one by one from the electronic medical record (EMR). Also, it is important to note that the software that was initially supposed to be used to help the project manager collect data- SlicerDicer- ended up not being used due to complexity of the project manager gaining access to use it and lack of a proper understanding of how to use it. For this reason, the charts were individually checked one by one, day by day, and the charts that had the ICD 10 codes listed were the ones utilized. Additionally, only certain ICD 10 codes were included in the data collection. There is a multitude of additional ICD 10 codes that could have been used to gain more data, however for the purposes of simplifying the project design as well as aligning with the ICD 10 codes in the CDC protocol – only certain ones were utilized.
Another barrier with time constraints the project manager ran into was the lack of follow up with providers on whether or not they actually completed the CMEs or took the time to review and look at the protocol. Same is true for whether or not patients took the time to actually read the posters. No survey was conducted at the end of a patient’s visit, nor was one conducted to ensure the providers actually completed the CMEs was done for the same reason of a lack of a team to help with data collection and that of time constraints. However, these are all important aspects to consider for future practice.

Another barrier the project manager ran into was lack of consistency with providers. Because of how this clinic and its sister clinics are set up, the providers float and rotate to all the locations. This made it very challenging for the project manager to establish rapport with the providers since they were different almost each time the project manager was at the site. The project manager was not able to meet all of them during the planning phase, which also made it difficult during the implementation phase. Also because the providers float to different locations, it was crucial for the project manager to constantly remind them of the EBP project when they were at the location the project took place.

It is also important to note that while the majority of the providers were the same from 2021 to 2022, not all of them were. Some had retired, moved, or changed jobs so some of the providers’ names seen in the charts from 2021 were not seen in 2022. Another limiter was that one of the providers chose not to participate for reasons unknown to the project manager.

Lastly, the last limitation for this EBP project could be the lack of randomization with the cases picked for this study. The sample of charts chosen for this study were not randomized nor were they “chosen.” They were simply selected for this project based on dates. The project manager went in order of day on the EMR and cases were looked through one by one, day by day, and selected based on the inclusion and exclusion criteria that were initially established.

Sustainability
The sustainability of the EBP project can be easily implemented for years to come with some very simple changes to the office. The CDC education posters can be reused year after year during the Fall and Winter seasons as long as the information on them is not outdated. If any changes were to ever come about, anyone in the office can go on the CDC website and order more updated educational posters to hang in the waiting room and exam rooms. Same can be said for the CDC treatment protocol. The CDC treatment protocol was obtained from the CDC website by the project manager and similar to the education posters, they too can be reused unless the information on them becomes outdated, in which case, they also can be reprinted from the CDC website. As far as the CMEs go, the providers can use the same link provided to them by the project manager to access a multitude of free CMEs provided by the CDC. The printing and hanging of the educational posters can be done by any clinical personnel in the office. The CDC treatment protocol can be printed by any RN or provider in the clinic, and the directions for whichever desired topic of the CME can be followed by any provider choosing to complete the CMEs.

Due to the cost-effective nature of the implementation of this EBP project, it is one that can be implemented year after year without burdening anyone in the clinic financially while its positive effects can greatly impact patient care.

The only challenging or time-consuming aspect would be the data collection and data analysis if someone chose to follow up and see if this implementation truly makes a difference in patient care. In this case, the person collecting the data could use the data collection tool (Appendix K) and even tweak it to add a column for the provider role, whether the provider was a physician, NP, or PA. This way, the data can be further analyzed with a secondary outcome of whether the role of the provider played a role in achieving statistically significant results. Additionally, the software program SlicerDicer may be utilized to further facilitate the data collection portion of the project which may allow data to be collected over a longer period of time, such as a full eight weeks as the project manager had initially intended.
The project manager left all the patient education material as well as the CDC treatment protocol retrieved from the CDC at the site with the clinic manager so that they can be utilized year after year, as long as the information is still up to date. The clinic seemed to like the design of the project due to its ease, practicality, and cost-effectiveness. It is likely that the clinic will continue to hang up the patient education posters during the Fall and Winter seasons to provide a basic foundation of information for patients on antibiotic use and antibiotic resistance.

A recommendation for future projects would be to conduct this project with a team of assistants to aid in data collection. Having more than one person to aid in data collection would allow for more data to be collected over a longer period of time. The time frame could be divided up between the assistants and as long as the same information was being collected, such as that shown in Appendix K, with the same inclusion and exclusion criteria being utilized, there wouldn’t be variance within data collection. Additionally, utilizing the software program SlicerDicer may be beneficial to guaranteeing no cases are missed.

Another recommendation would be to also collect data on the provider role to analyze whether there is a significant difference among prescribing practices and provider roles. Another recommendation or suggestion would be to explore collecting data on a third outcome—did patient comorbidities play a role in their treatment? This was not included in the original design of the project because it would complicate data collection. However, if given a research team and more time to redo this project, this would be an interesting outcome to explore. As evidenced by (Kim and Marikar, 2020; NICE, 2015), patients with certain comorbid conditions were treated more aggressively than others without any comorbid conditions since they were more at risk for complications.

**Relevance for EBP Model**

The 2022 JHNEBP Model was utilized to guide this evidence-based project. The JHNEBP model is divided into the three PET phases which is then further broken down into a total of 19 steps. The first phase, the Practice question phase, allowed the project manager to
cultivate a question regarding current practice. This led the project manager to the PICOT question that drove this EBP project. Each of the six steps in this phase were conducive to the implementation of this project. Recruiting an interprofessional team, identifying key stakeholders, identifying leadership roles, and scheduling team meetings were all critical steps. Due to the nature of the staffing of providers, it proved to be rather difficult to schedule team meetings. In order to stay in touch with everyone however, the project manager sent out emails to the providers to ensure everyone knew what was happening with the project.

Next, came the Evidence seeking phase. A literature search was conducted with all of the best practice evidence being gathered, appraisal of the evidence, synthesis of the evidence, and developing best practice recommendations. This part was useful in guiding the project since it broke down each step of the evidence gathering. It allowed the project manager to really go through the evidence and decide which data to discard due to its low level of evidence or quality and which to keep due to its strength.

Lastly, came the Translation phase. This phase was especially helpful in providing the project manager a checklist with how to successfully create an action plan implement the plan, evaluate the outcomes, and disseminate the findings. Initially, the JHNEBP model seemed daunting as it contains a total of 19 steps, however, after reading about it, the project manager decided it would best suit the needs of the project due to its clarity. Some of the steps were very straightforward and didn’t require much thought or effort, while others required more time and focus to complete.

As previously mentioned, the only steps that didn’t exactly align with this project would be the scheduled team meetings. This was, again, due to the nature of how this clinic scheduled its rotating providers. However, communication was maintained with the providers and key stakeholders via email. Based on these experiences, the JHNEBP model is a great model to use for a project such as this one based on its ease of use, straightforwardness, and practicality. The most helpful aspect of this model was how much it stressed to include stakeholders early on in
the process for the overall success of the project. This aligned well with this EBP project design since the free CMEs served as critical buy ins for the stakeholders. The participation of the providers in this project was crucial since they are the ones who ultimately decided whether to prescribe a patient an antibiotic for their visit.

Recommendations for the Future

Research

There was some evidence that found that some providers believed there was a correlation between patient expectations of having an antibiotic prescribed during their visit and patient satisfaction scores (Aplin-Snider et al., 2020; Durante et al., 2017; Garcia et al., 2022; Hansen et al., 2015). This can be used to guide further research on how to best reach both providers and patients to resolve this.

Regarding the specific intervention implemented during this EBP project, more research should be conducted on a secondary outcome as suggested before. Collecting and analyzing data on whether the type of provider played a role in antibiotic prescription could shed light on if provider role is even a factor.

Research could also explore a tertiary outcome such as whether a patient's comorbid conditions plays a role in how aggressive a treatment plan is, and if so, what comorbid conditions. The evidence pointed that providers treated some patients with certain comorbidities more aggressively than others given that they were labeled high risk for complications.

Education

Patients need to be educated on the detrimental effects unnecessary antibiotics can have on their bodies. They also need to be educated on the difference between bacterial infections which do require antibiotics and viral infections which do not. They need to be educated that most URTIs are viral in nature and do not in fact need any antibiotics, but rather simple symptomatic management that they can do at home through over the counter medications or natural home remedies. They need to be educated on that rest, hydration, symptom
management as mentioned are the key to treating these viral infections, and most importantly, letting the viral infection run its course, while also being on the lookout for any red flags that would require medical care. It is also essential that undergraduate students understand this distinction between viral and bacterial infections so that they can, in turn, educate these patients when they show up to their primary care office, urgent care, or emergency room. Also having knowledge of ways to keep safe and healthy through primary prevention – hand hygiene, vaccinations, wearing masks when needed, staying home from school and work when sick can all contribute to the overall well-being of a society. Also possessing knowledge of antibiotic resistance and how antibiotic overprescription contributes to that is key in helping resolve this antibiotic resistance crisis which we face today.

This same fundamental knowledge can be applied to graduate students except on a much deeper level of understanding. Graduate students are required to understand the treatment protocols for viral and bacterial infections since they will be the ones ultimately prescribing medications.

**Conclusion**

Antibiotic resistance is a serious public health threat both nationally and globally. It is estimated to be the cause of two million infections annually in the US (Durante et al., 2017; Garcia et al., 2016; Harris et al, 2016). It has been shown through the literature that a patient who is prescribed an antibiotic can develop resistance to it for up to 12 months (Hansen et al., 2015). Antibiotic resistance has shown time and time again the type of financial and economic burden it has on the healthcare system as a whole. This kind of bacterial evolution has been linked to significant increases in patient morbidity and mortality, increased lengths of hospital stays, and significant increases in healthcare costs (Durante et al., 2017; McNicholas & Hooper, 2022).

The purpose of this EBP project was to address the PICOT question: Does the implementation of patient education posters and protocol plus online training modules for providers (I) over an 8-week period or 30 patient charts (T) help to decrease antibiotic
overprescription (O) in upper respiratory tract infections (P) in the urgent care setting compared to no intervention (C)? Although not statistically significant, implementing certain changes within an urgent care clinic has shown to clinically reduce the number the antibiotic prescriptions for URTIs. The intervention proved to be very cost effective and easy to implement. The material that was sent to the project manager by the CDC was free of charge, the CDC treatment protocol is public information, and the CMEs provided to the physicians, NPs, and PAs were also free from the CDC. The decrease of antibiotic prescription rates from 20% during the Fall of 2021 to 6.7% during the Fall of 2022 was promising. Had other factors been taken into place, such as having a longer time frame to conduct this project or observing more than 30 charts per year, perhaps a statistical significance would have been observed in addition to this clinically significant data. The design of this EBP project can be implemented with ease at no cost at pretty much any primary care office, urgent care, or even emergency room to help aid in lowering the statistics associated with increased antibiotic prescription and antibiotic resistance.
REFERENCES


O’Sullivan, J. W., Harvey, R. T., Glaszious P.P., & McCullough A. (2016). Written information for patients (or parents of child patients) to reduce the antibiotics for acute upper respiratory tract infections in primary care (review). *Cochrane Library*. Doi: 10.1002/14651858.CD011360.pub2


*Upstate Medical University.*

https://guides.upstate.edu/c.php?g=1023176&p=7411256#Step4
BIOGRAPHICAL MATERIAL

Amina Boudaia

Mrs. Boudaia graduated from Indiana University Purdue University of Indianapolis in 2017 with a Bachelor of Science in Nursing and a minor in Spanish. Following graduation, she worked on a medical intensive care unit for Indiana University Health in Indianapolis for two years before making the transition to working in the emergency department at the Richard L. Roudebush Veterans Affairs (VA) Medical Center for two years. During her time at the VA, she served as chair of the Voice of the Veterans, a committee dedicated to improving patient satisfaction. She then signed up to be a travel nurse and began assisting different hospital systems with staffing shortages during the COVID-19 pandemic to various cities in Indiana. Mrs. Boudaia has earned her preceptor certification which she has been able to use to orient new nurses as well as mentor nursing students. She also holds certifications in Advanced Cardiac Life Support, Basic Life Support, Pediatric Advanced Life Support, and National Institutes of Health Stroke. The pursuit of her Doctorate in Nursing Practice (DNP) began in the Fall of 2019 with an anticipated graduation date in May of 2023 from Valparaiso University. Mrs. Boudaia is a proud member of the American Nurses Association, Indiana State Nurses Association, and the Coalition of Advanced Practice Nurses. She has been invited to present her DNP project at Sigma Theta Tau’s 34th International Nursing Research Congress in Abu Dhabi this summer. Following certification, Mrs. Boudaia will continue her true passion of serving and caring for others through evidence-based practice as a future nurse practitioner.
ACRONYM LIST

ACP: American College of Physicians
ANA: American Nurses Association
AGREE II: Appraisal of Guidelines for Research and Evaluation II
CASP: Critical Appraisal Skills Programme
CC: citation chased
CDC: Centers for Disease Control and Prevention
CINAHL: Cumulative Index to Nursing and Allied Health Literature
CITI: Collaborative Institutional Training Initiative
CME: continuing medical education
CPG: clinical practice guidelines
DNP: Doctorate of Nursing Practice
EBP: evidence-based practice
EMR: electronic medical record
HCP: health care provider
IRB: Institutional Review Board
JBI: Joanna Briggs Institute
JHNEBP: Johns Hopkins Nursing Evidence-Based Practice
NICE: National Institute for Health and Care Excellence
NP: nurse practitioner
PA: physician assistant
PCP: primary care provider
PET: Practice Question, Evidence, and Translation
PICOT: population, intervention, comparison, outcome, timing
QE: quasi-experimental
QI: quality improvement
QS: qualitative study
RSV: respiratory syncytial virus
SR: systematic reviews
TRIP: Turning Research Into Practice
URI: upper respiratory infection
URTI: upper respiratory tract infections
US: United States
VA: Veterans Affairs
WHO: World Health Organization
APPENDIX A

AGREE II Instrument

How to assess the Quality (Methodological rigor and confidence in resulting Recommendations) of any Clinical Practice Guideline?

APPRAISAL OF GUIDELINES FOR RESEARCH & EVALUATION II
(AGREE II) Instrument

DOMAIN 1. SCOPE AND PURPOSE
1. The overall objective(s) of the guideline is (are) specifically described.
2. The health question(s) covered by the guideline is (are) specifically described.
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

DOMAIN 2. STAKEHOLDER INVOLVEMENT
4. The guideline development group includes individuals from all relevant professional groups.
5. The views and preferences of the target-population (patients, public, etc.) have been sought.
6. The target users of the guideline are clearly defined.

DOMAIN 3. RIGOUR OF DEVELOPMENT
7. Systematic methods were used to search for evidence.
8. The criteria for selecting the evidence are clearly described.
9. The strengths and limitations of the body of evidence are clearly described.
10. The methods for formulating the recommendations are clearly described.
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.
12. There is an explicit link between the recommendations and the supporting evidence.
13. The guideline has been externally reviewed by experts prior to its publication.
14. A procedure for updating the guideline is provided.

DOMAIN 4. CLARITY OF PRESENTATION
15. The recommendations are specific and unambiguous.
16. The different options for management of the condition or health issue are clearly presented.
17. Key recommendations are easily identifiable.

DOMAIN 5. APPLICABILITY
18. The guideline describes facilitators and barriers to its application.
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.
20. The potential resource implications of applying the recommendations have been considered.
21. The guideline presents monitoring and/or auditing criteria.

DOMAIN 6. EDITORIAL INDEPENDENCE
22. The views of the funding body have not influenced the content of the guideline.
23. Competing interests of guideline development group members have been recorded and addressed.

OVERALL GUIDELINE ASSESSMENT
1. Rate the overall quality of this guideline.
2. I would recommend this guideline for use (Yes/Yes, with modifications/No)

NOTES

AGREE
Advancing the science of practice guidelines
http://www.agreetrust.org/

King Saud University Hospitals’ CPGs Program is supported by the Hospitals’ CPGs Committee and the Quality Management Department, KUUH/KAUH.
For more information please contact: 91341, 91281
Email: yamer@ksu.edu.sa, dvillela@ksu.edu.sa
APPENDIX B

CASP for Systematic Reviews

CASP Checklist: 10 questions to help you make sense of a Systematic Review

How to use this appraisal tool: Three broad issues need to be considered when appraising a systematic review study:

- Are the results of the study valid? (Section A)
- What are the results? (Section B)
- Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions. There is some degree of overlap between the questions, you are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

About: These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA ‘Users’ guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist, a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.


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Paper for appraisal and reference:

Section A: Are the results of the review valid?

1. Did the review address a clearly focused question?
   - Yes
   - Can't Tell
   - No

   HINT: An issue can be 'focused' in terms of
   - the population studied
   - the intervention given
   - the outcome considered

   Comments:

2. Did the authors look for the right type of papers?
   - Yes
   - Can't Tell
   - No

   HINT: 'The best sort of studies' would
   - address the review's question
   - have an appropriate study design
   (usually RCTs for papers evaluating interventions)

   Comments:

Is it worth continuing?

3. Do you think all the important, relevant studies were included?
   - Yes
   - Can't Tell
   - No

   HINT: Look for
   - which bibliographic databases were used
   - follow up from reference lists
   - personal contact with experts
   - unpublished as well as published studies
   - non-English language studies

   Comments:
4. Did the review’s authors do enough to assess quality of the included studies?

   Yes  
   Can’t Tell  
   No  

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies’ results ("All that glitters is not gold" Merchant of Venice – Act II Scene 7)

Comments:

5. If the results of the review have been combined, was it reasonable to do so?

   Yes  
   Can’t Tell  
   No  

HINT: Consider whether
   - results were similar from study to study
   - results of all the included studies are clearly displayed
   - results of different studies are similar
   - reasons for any variations in results are discussed

Comments:

Section B: What are the results?

6. What are the overall results of the review?

   HINT: Consider
   - If you are clear about the review’s “bottom line” results
   - what these are (numerically if appropriate)
   - how were the results expressed (NNT, odds ratio etc.)

Comments:
7. How precise are the results?  

HINT: Look at the confidence intervals, if given

Comments:

Section C: Will the results help locally?

8. Can the results be applied to the local population?  

Yes  
Can’t Tell  
No  

HINT: Consider whether
- the patients covered by the review could be sufficiently different to your population to cause concern
- your local setting is likely to differ much from that of the review

Comments:

9. Were all important outcomes considered?  

Yes  
Can’t Tell  
No  

HINT: Consider whether
- there is other information you would like to have seen

Comments:

10. Are the benefits worth the harms and costs?  

Yes  
Can’t Tell  
No  

HINT: Consider
- even if this is not addressed by the review, what do you think?

Comments:
APPENDIX C

CASP for Qualitative Studies

CASP Checklist: 10 questions to help you make sense of a Qualitative research

How to use this appraisal tool: Three broad issues need to be considered when appraising a qualitative study:

- Are the results of the study valid? (Section A)
- What are the results? (Section B)
- Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions. There is some degree of overlap between the questions, you are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

About: These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMMA ‘Users’ guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist, a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.: Critical Appraisal Skills Programme (2018). CASP (insert name of checklist i.e. Qualitative) Checklist. [online] Available at: URL. Accessed: Date Accessed.

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### Paper for appraisal and reference:

#### Section A: Are the results valid?

1. **Was there a clear statement of the aims of the research?**
   - **Yes**
   - **Can't Tell**
   - **No**
   
   **HINT:** Consider
   - what was the goal of the research
   - why it was thought important
   - its relevance

   **Comments:**

2. **Is a qualitative methodology appropriate?**
   - **Yes**
   - **Can't Tell**
   - **No**
   
   **HINT:** Consider
   - if the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
   - is qualitative research the right methodology for addressing the research goal

   **Comments:**

### Is it worth continuing?

3. **Was the research design appropriate to address the aims of the research?**
   - **Yes**
   - **Can't Tell**
   - **No**
   
   **HINT:** Consider
   - if the researcher has justified the research design (e.g., have they discussed how they decided which method to use)

   **Comments:**
4. Was the recruitment strategy appropriate to the aims of the research?

- Yes
- Can’t Tell
- No

HINT: Consider
- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
- If there are any discussions around recruitment (e.g. why some people chose not to take part)

Comments:

5. Was the data collected in a way that addressed the research issue?

- Yes
- Can’t Tell
- No

HINT: Consider
- If the setting for the data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
- If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews are conducted, or did they use a topic guide)
- If methods were modified during the study. If so, has the researcher explained how and why
- If the form of data is clear (e.g. tape recordings, video material, notes etc.)
- If the researcher has discussed saturation of data

Comments:
6. Has the relationship between researcher and participants been adequately considered?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Can't Tell</th>
<th>No</th>
</tr>
</thead>
</table>

HINT: Consider
- If the researcher critically examined their own role, potential bias and influence during (a) formulation of the research questions (b) data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

Comments:

Section B: What are the results?

7. Have ethical issues been taken into consideration?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Can't Tell</th>
<th>No</th>
</tr>
</thead>
</table>

HINT: Consider
- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

Comments:
8. Was the data analysis sufficiently rigorous?

HINT: Consider
- If there is an in-depth description of the analysis process
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings
- To what extent contradictory data are taken into account
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

Comments:

9. Is there a clear statement of findings?

HINT: Consider whether
- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researcher's arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

Comments:
10. How valuable is the research?

**HINT:** Consider
- If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g., do they consider the findings in relation to current practice or policy, or relevant research-based literature)
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

**Comments:**
### APPENDIX D

**JBI Appraisal Checklist**

#### JBI Critical Appraisal Checklist for Quasi-Experimental Studies  
(non-randomized experimental studies)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. Were the participants included in any comparisons similar?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?</td>
<td></td>
<td></td>
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<tr>
<td>4. Was there a control group?</td>
<td></td>
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<tr>
<td>5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?</td>
<td></td>
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<tr>
<td>7. Were the outcomes of participants included in any comparisons measured in the same way?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8. Were outcomes measured in a reliable way?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. Was appropriate statistical analysis used?</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Overall appraisal:**  Include [X]  Exclude [X]  Seek further info [X]  Comments (Including reason for exclusion)

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## APPENDIX E

**Literature Search Table**

### Evidence Table

<table>
<thead>
<tr>
<th>Lead Author/Year/Quality</th>
<th>Purpose/Design/Sample</th>
<th>Interventions</th>
<th>Measurement/Outcomes</th>
<th>Results/Findings</th>
<th>Strengths/Limitations</th>
</tr>
</thead>
</table>
| Harris/2016/High         | Clinical Practice Guideline | Authors looked at research and clinical guidelines r/t antibiotic use for acute respiratory tract infections to develop this summary | Antibiotic use for acute respiratory tract infections | 1. Clinicians should not prescribe abx for patients with bronchitis; only for pneumonia.  
2. Clinicians should test patients with symptoms that could be strep; abx should only be prescribed if strep test is positive.  
3. Clinicians should not prescribe abx for sinusitis unless symptoms last more than 10 days or patients whose symptoms improve then worsen.  
4. Clinicians should not prescribe antibiotics for the common cold. | Strengths: Information gathered for this CPG is clear cut, concise, and to the point. Limitations: Methodology not included |

**Level I Evidence**
| **Kenealy/2013/High** | **Systematic Review** | **Review of 11 randomized control trials; Six studies contributed to analyses r/t the common cold with up to 1047 participants. Five studies contributed to analyses r/t purulent rhinitis with up to 791 participants. Antibiotics versus placebo for common cold and acute rhinitis** | **Abx use for common cold and acute rhinitis** | **Participants receiving abx for the common cold did no better than those on placebo.**  
**Risk ratio 0.95, 95% confidence interval 0.51-1.63**  
**There is no benefit from abx for the common cold in children or adults, however, there is evidence that abx cause significant adverse effects in adults when given for the common cold and all ages for rhinitis.**  
**Use of abx for these conditions is not recommended** | **Strengths:**  
**Limitations:** Authors reported moderate risk of bias d/t unreported methods details or bc an unknown number of participants were likely to have chest or sinus infections** |
| **Kim/2020/High** | **Clinical Practice Guideline** | **Guidelines for antibiotic prescription for acute sinusitis and acute sore throat** | **-** | **When to prescribe abx:**  
**-for acute sore throat: use Centor criteria to identify who is most likely to benefit from abx**  
**-consider backup prescription/ delayed prescription for acute sinusitis where symptoms persist for 10 days or more without improvement. Make sure to give clear education to patient.** | **Strengths:** Guidelines are very informative and give treatment recommendati ons as well as alternatives for allergies. They also include FeverPAIN and Centor Criteria** |
<table>
<thead>
<tr>
<th>NICE/ 2015/ High</th>
<th>Clinical Practice Guideline</th>
<th>-</th>
<th>-</th>
<th>Evidence shows that antibiotics offered for treating URTIS such as the common cold, acute otitis media, acute bronchitis, and the common cold offer little benefit in treating adults and children in primary care. These URTIs are self-limiting, and complications are likely rare if antibiotics are withheld. The unnecessary use of abx has the potential to cause drug related adverse events, increases the prevalence of antibiotic resistance and increased medical consultations for minor illness. Educate patients on the average length of time they</th>
<th>Strengths: Extensive and thorough guidelines that detail how to approach different scenarios. Limitations: None</th>
<th>Limitations: methodology not included</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-Do not give abx routinely for children with evidence of acute tonsillitis or sinusitis -Educate patients on usual course of sore throat (1 week) and sinusitis (2-3 weeks) -Educate on self-care including increasing fluid intake and analgesia -Give safety netting advice for when to seek medical help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O'Sullivan/ 2016/ High</td>
<td>Systematic Review</td>
<td>To assess if written information for patients or parents of patients decreases the rate of antibiotic use for URTIs in primary care</td>
<td>General practitioners who provided written information to patients with URTIs can reduce the number of antibiotics used without any kind of negative impact on consultation rates or patient satisfaction rates</td>
<td>Strengths: Strong evidence showing that written information can drastically reduce antibiotic use for URTIs. Limitations: The UK study had a high risk of bias d/t lack of blinding, US cluster-randomized study also had high risk of bias d/t unclear methodology of participant recruitment.</td>
<td></td>
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<tr>
<td>-----------------------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two randomized control trials involving 827 participants in England, Wales, and the US.</td>
<td>-</td>
<td>RR 0.53, 95% CI to 0.35 to 0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

should wait before seeing the doctor: Acute otitis media: 4 days Common cold: 1.5 weeks Acute rhinosinusitis: 2.5 weeks Acute cough/bronchitis: 3 wks
<table>
<thead>
<tr>
<th>Sivapuram/ 2021/ Moderate</th>
<th>Evidence Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Summary is based on a systematic review with meta-analysis of 48 studies, a prospective inception cohort study of 485 children in 331 families, a retrospective observational study, and two national guidelines with expert opinion</td>
</tr>
<tr>
<td></td>
<td>Purpose is to determine the best evidence regarding expected duration of symptoms of common URTI</td>
</tr>
</tbody>
</table>

**Summary**

- Earaches resolve by 7-8 days
- Sore throat resolve by 2-7 days
- Croup resolves by 2 days
- Bronchiolitis resolves by 21 days
- Acute cough resolves by 25 days
- Common cold resolves by 15 days
- Nonspecific respiratory tract infections resolve by 1y6 days without special treatment

**Strengths:** methodology clearly described

**Limitations:** none

---

**Level III Evidence (use this format to add additional levels as your evidence warrants)**

<p>| Aplin-Snider/ 2020/ High | Quasi-Experimental Retrospective chart review | Acute viral respiratory infection protocol Provider educational program: series of | Chi square analysis | A total of 71 patients included: 35 in the pre-implementation period and 36 in the post implementation period. | Strengths: Sustainable and transferrable to other clinics |</p>
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Purpose</th>
<th>Methods</th>
<th>Findings</th>
<th>Limitations</th>
<th>Strengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durante/2017/High</td>
<td>Quasi-Experimental</td>
<td>Purpose is to determine whether provider</td>
<td>A retrospective chart review of adult patients between March 2014 and June 2014 was conducted with URI diagnosis of cough.</td>
<td>Chi-Square analysis indicated no statistical significance, but there was clinical significance with a 6% decline from 2014 to 2015</td>
<td>Limitations: Lack of randomization, small sample size, comorbid conditions which could impact decision making not included. Findings not generalizable</td>
<td>Strengths: Clinically significant results</td>
</tr>
</tbody>
</table>
| Education on antibiotic resistance will change prescribing practices
| Simple random sampling used to review charts of patients pre and post intervention in a primary care practice for patients aged 18-64 with URTI diagnosis or URTI symptoms
| Nasal drainage, and sore throat
| "lunch and learn" sessions were conducted to provide educational presentations along with lunch for the provider, medical assistants, and front office staff
| Evidence based information on antibiotic prescribing for URTIs was presented
| Pocket cards developed by the Institute for Clinical Systems Improvement were handed out
| CDC's: "Get Smark: Know When Antibiotics Work" campaign supplemental materials were provided during the lunch sessions
| Decrease in the post intervention group
| Proposed outcome was a 20% reduction of antibiotic prescriptions
| Providers were encouraged to utilize watchful waiting approach
<p>| Limitations: Small clinic, only one provider, lack of follow up from the provider, small sample size |</p>
<table>
<thead>
<tr>
<th>Garcia/ 2022/ High</th>
<th>Quasi-Experimental</th>
<th>E learning education session, evidence based tx flowsheet, provision of CDC antibiotic prescribing tools</th>
<th>A priori power analysis</th>
<th>Abx rx rate during preintervention was 71.5% which significantly decreased in postintervention to 42.3%</th>
<th>Strengths: great sample size, statistically significant results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent care setting in Houston, Texas Quality improvement study Pre/post design used to compare rates of abx prescribing for URIs before and after implementation fo the QI intervention.</td>
<td>Intervention implemented for one month from Feb 2021 through March 2021 Each provider received an educational session via prerecorded presentation and received tx flowsheet to guide treatment with weekly follow-up meetings that addressed any questions</td>
<td></td>
<td></td>
<td>Statistically significant and clinically significant results</td>
<td>Limitations: Preintervention group did not include COVID 19 as a URI dx bc testing was not readily available</td>
</tr>
<tr>
<td>McNicholas/ 2022/ High</td>
<td>Quasi-Experimental</td>
<td>Meeting held with physicians, medical assistants, receptionists, and office manager. A PowerPoint presentation including information on the CDC guidelines Be Antibiotics Aware initiative, skills training video, and educational posters.</td>
<td>Mann-Whitney U test showed a statistically significant decrease in antibiotic prescriptions</td>
<td>Antibiotic prescription rates decreased 12.6% (p=0.44) post intervention Consultation rate for repeat antibiotic prescription decreased by 12.2% (p=0.007) Antibiotic prescribing rates for all providers in the clinic decreased post intervention</td>
<td>Strengths: Good sample size, statistically significant results</td>
</tr>
<tr>
<td>To implement an antibiotic stewardship program in primary care office to educate patients about URTIs and antibiotic use and to assess its effectiveness</td>
<td></td>
<td></td>
<td></td>
<td>Limitations: Only patient demographic included was age, difficult to determine</td>
<td></td>
</tr>
</tbody>
</table>
through antibiotic prescribing rates.
Study included 250 males and females ages 19-90 who presented with URI symptoms (runny nose, sore throat, cough). 62 patients were provided education while 188 served as comparison/control group.

Antibiotic prescription data gathered through EMR review for September and October 2019 and 2020.
Diagnoses used included: URI, pharyngitis, rhinitis, bronchitis, and cough.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Included 250 males and females ages 19-90 who presented with URI symptoms (runny nose, sore throat, cough). 62 patients were provided education while 188 served as comparison/control group.</td>
</tr>
<tr>
<td>Antibiotic Prescription</td>
<td>Data gathered through EMR review for September and October 2019 and 2020. Diagnoses used included: URI, pharyngitis, rhinitis, bronchitis, and cough.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Level VI Evidence (use this format to add additional levels as your evidence warrants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Hansen/2015/Moderate Qualitative Study</td>
</tr>
</tbody>
</table>

Below are the categories and subcategories of the recurring themes identified in the study:

Primary prevention: vaccination, exercise, complementary and alternative medicine, hygiene and physical barriers.
People with symptoms:

Strengths: summary of recurrent themes thought to cause antibiotic overprescription for URTIs.
| Provider consultation: Provider’s prescribing habits, perceived patient demand and patient expectations, diagnostic uncertainty, time constraints, mismatch between guidelines and antibiotic packet size |
| Limitations: unclear methodology |

| Reassurance, expectations of antibiotics, symptom relief |
| Limitations: unclear methodology |
APPENDIX F

Provider Handout

Provider Handout

• Brief description of the EBP project:
  o Goal is to decrease antibiotic prescription rates for URI’s with the implementation of provider-targeted and patient-targeted interventions
  o Provider-targeted interventions include implementation of the CDC protocol and the 2 free CME’s. Both are linked below. To help with data collection, please complete the quick 4 question survey, also linked below.
  o Patient-targeted interventions include the implementation of educational posters in the waiting room and each exam room.
  o Chart reviews will be conducted this fall.
  o Retrospective chart reviews during the same period from 2021 will be conducted to compare the results to determine if the implementation of the protocol, CE’s, and patient education posters truly decreased antibiotic prescription rates

• Please complete the following survey to aid with data collection
  o https://www.surveymonkey.com/r/GTL5W9B

• Link to CDC protocol:
  o https://www.cdc.gov/antibiotic-use/clinicians/adult-treatment-rec.html

• Link to free CME’s:
  o https://www.train.org/cdctrain/login
  o You can create an account for free if you don’t already have one
  o Search for: CDC’s Antibiotic Stewardship Training Series
  o Click on the first link that says “CDC’s Antibiotic Stewardship Training Series”
  o Scroll down and please complete the following two modules.
    ▪ Modules 7B (0.46h) CDC Training on Antibiotic Stewardship: Module 7B – Antibiotic Stewardship Considerations for Bronchitis, Asthma and COPD Exacerbations, Viral Upper Respiratory Infection, and Acute Sinusitis - WB4061R
    ▪ Module 7C (0.41h) CDC Training on Antibiotic Stewardship: Module 7C – Antibiotic Stewardship Considerations for the Management of Acute Otitis Media and Pharyngitis - WB4062R
  o Note: focus is placed on the underlined topics, but to get the CME’s the full module must be completed
  o After completing the modules, go under the “your learning” tab to claim your CME’s.
APPENDIX G
Survey Monkey Provider Survey

Provider Data Collection, New

1. Select your profession.
   - physician
   - physician assistant
   - nurse practitioner
   - Other (please specify)

2. How many years have you been a provider?

3. What field(s) do you have experience in?

4. Please enter your name.
## APPENDIX H

### CDC Protocol

### Antibiotic Prescribing and Use

#### Adult Outpatient Treatment Recommendations

The table below summarizes the most recent recommendations for appropriate antibiotic prescribing for adults seeking care in an outpatient setting. Antibiotic prescribing guidelines establish standards of care and focus quality improvement efforts.

The table also offers information related to over-the-counter medication for symptomatic therapy. Over-the-counter medications can provide symptom relief, but have not been shown to shorten the duration of illness. They also have a low incidence of minor adverse effects. Providers and patients should weigh the potential for benefits and minor adverse effects when considering symptomatic therapy.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Epidemiology</th>
<th>Diagnosis</th>
<th>Management</th>
</tr>
</thead>
</table>
| Acute rhinosinusitis | • About 1 out of 8 adults (12%) in 2012 reported receiving a diagnosis of rhinosinusitis in the previous 12 months, resulting in more than 30 million diagnoses  
• Ninety-nine percent of rhinosinusitis cases are viral, and antibiotics are not guaranteed to help even if the causative agent is bacterial. | • Diagnose acute bacterial rhinosinusitis based on symptoms that are:  
  ◦ Severe (>3-4 days), such as a fever ≥39°C (102°F) and purulent nasal discharge or facial pain;  
  ◦ Persistent (>10 days) without improvement, such as nasal discharge or daytime cough; or  
  ◦ Worsening (3-4 days) such as worsening or new onset fever, daytime cough, or nasal discharge after initial improvement of a viral upper respiratory infections (URI) lasting 5-6 days.  
• Sinus radiographs are not routinely recommended. | If a bacterial infection is established:  
• Watchful waiting is encouraged for uncomplicated cases for which reliable follow-up is available.  
• Amoxicillin or amoxicillin/clavulanate is the recommended first-line therapy.  
• Macrolides such as azithromycin are not recommended due to high levels of Streptococcus pneumoniae antibiotic resistance (~40%).  
• For penicillin-allergic patients, doxycycline or a respiratory fluoroquinolone (levofloxacin or moxifloxacin) are recommended as alternative agents. |
<table>
<thead>
<tr>
<th>Condition</th>
<th>Epidemiology</th>
<th>Diagnosis</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute uncomplicated bronchitis&lt;sup&gt;2-5&lt;/sup&gt;</td>
<td>- Cough is the most common symptom for which adult patients visit their primary care provider, and acute bronchitis is the most common diagnosis in these patients.</td>
<td>- Evaluation should focus on ruling out pneumonia, which is rare among otherwise healthy adults in the absence of abnormal vital signs (heart rate ≥ 100 beats/min, respiratory rate ≥ 24 breaths/min, or oral temperature ≥ 38 °C) and abnormal lung examination findings (focal consolidation, egophony, fremitus).&lt;br&gt;- Colored sputum does not indicate bacterial infection.&lt;br&gt;- For most cases, chest radiography is not indicated.</td>
<td>Routine treatment of uncomplicated acute bronchitis with antibiotics is not recommended, regardless of cough duration. Options for symptomatic therapy include:&lt;br&gt;- Cough suppressants (codeine, dextromethorphan);&lt;br&gt;- First-generation antihistamines (diphenhydramine);&lt;br&gt;- Decongestants (phenylephrine). Evidence supporting specific symptomatic therapies is limited.</td>
</tr>
<tr>
<td>Common cold or non-specific upper respiratory tract infection (URI)&lt;sup&gt;6,7&lt;/sup&gt;</td>
<td>- The common cold is the third most frequent diagnosis in office visits, and most adults experience two to four colds annually.&lt;br&gt;- At least 200 viruses can cause the common cold.</td>
<td>- Prominent cold symptoms include fever, cough, rhinorrhea, nasal congestion, postnasal drip, sore throat, headache, and myalgias.</td>
<td>Decongestants (pseudoephedrine and phenylephrine) combined with a first-generation antihistamine may provide short-term symptom relief of nasal symptoms and cough.&lt;br&gt;- Non-steroidal anti-inflammatory drugs can be given to relieve symptoms.&lt;br&gt;- Evidence is lacking to support antihistamines (as monotherapy), opioids, intranasal corticosteroids, and nasal saline irrigation as effective treatments for cold symptom relief. Providers and patients must weigh the benefits and harms of symptomatic therapy.</td>
</tr>
<tr>
<td>Condition</td>
<td>Epidemiology</td>
<td>Diagnosis</td>
<td>Management</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pharyngitis&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>• Group A beta-hemolytic streptococcal (GAS) infection is the only common indication for antibiotic therapy for sore throat cases.</td>
<td>• Clinical features alone do not distinguish between GAS and viral pharyngitis; a rapid antigen detection test (RADT) is necessary to establish a GAS pharyngitis diagnosis.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Only 5–10% of adult sore throat cases are caused by GAS.</td>
<td>• Those who meet two or more Centor criteria (e.g., fever, tonsillar exudates, tender cervical lymphadenopathy, absence of cough) should receive a RADT. Throat cultures are not routinely recommended for adults.</td>
<td></td>
</tr>
<tr>
<td>Acute uncomplicated cystitis&lt;sup&gt;10,11&lt;/sup&gt;</td>
<td>• Cystitis is among the most common infections in women and is usually caused by E. coli.</td>
<td>• Classic symptoms include dysuria, frequent voiding of small volumes, and urinary urgency. Hematuria and suprapubic discomfort are less common. '&lt;br&gt;• Nitrites and leukocyte esterase are the most accurate indicators of acute uncomplicated cystitis.</td>
<td>For acute uncomplicated cystitis in healthy adult non-pregnant, premenopausal women:  '&lt;br&gt;• Nitrofurantoin, trimethoprim/sulfamethoxazole (TMP-SMX, where local resistance is &lt;20%), and fosfomycin are appropriate first-line agents. '&lt;br&gt;• Fluoroquinolones (e.g., ciprofloxacin) should be reserved for situations in which other agents are not appropriate.</td>
</tr>
</tbody>
</table>
APPENDIX I

CDC Education Poster 1

IMPROVING ANTIBIOTIC USE

Do I really need antibiotics?

SAY YES TO ANTIBIOTICS when needed for certain infections caused by bacteria.

SAY NO TO ANTIBIOTICS for viruses, such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won’t help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.

Do antibiotics have side effects?

Anytime antibiotics are used, they can cause side effects. When antibiotics aren’t needed, they won’t help you, and the side effects could still hurt you. Common side effects of antibiotics can include:

- Rash
- Dizziness
- Nausea
- Yeast infections
- Diarrhea

More serious side effects include Clostridium difficile infection (also called C. difficile or C. diff), which causes diarrhea that can lead to severe colon damage and death. People can also have severe and life-threatening allergic reactions.

Antibiotics save lives. When a patient needs antibiotics, the benefits outweigh the risks of side effects.

1 out of 5 medication-related visits to the ED are from reactions to antibiotics.
APPENDIX J

CDC Education Poster 2

What are antibiotic-resistant bacteria?

Antibiotic resistance occurs when bacteria no longer respond to the drugs designed to kill them. Anytime antibiotics are used, they can cause antibiotic resistance.

More than 2.8 million antibiotic resistant infections occur in the United States each year, and more than 35,000 people die as a result.

Bacteria, not the body, become resistant to the antibiotics designed to kill them. When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply. Some resistant bacteria can be harder to treat and can spread to other people.

Can I feel better without antibiotics?

Respiratory viruses usually go away in a week or two without treatment. To stay healthy and keep others healthy, you can:

- Clean Hands
- Cover Coughs
- Stay Home When Sick
- Get Recommended Vaccines

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.
### APPENDIX K

#### Data Collection Tool

<table>
<thead>
<tr>
<th>Participant Initials</th>
<th>Age</th>
<th>Race</th>
<th>Sex</th>
<th>ICD 10 CODE</th>
<th>Prescribed Abx? (Yes or no)</th>
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## APPENDIX L

### Implementation Calendar

<table>
<thead>
<tr>
<th>August 2022</th>
<th><strong>August 25:</strong> Will send out survey to providers for data collection as well as CMEs. Project manager will hang education posters in the waiting room and each exam room. CDC protocols will also laminate and placed by the providers’ computers.</th>
</tr>
</thead>
</table>
| September 2022 | **September 1:** Project launch  
 **September 4:** Start of Data Collection |
| October 2022   | **October 29:** Projected end of data collection |
| November 2022  | Retrospective chart review and data collection of preceding year (2021) will be conducted from September 5, 2021 to October 30, 2021. Develop codebook. |
APPENDIX M

CITI Certificate

This is to certify that:

**Amina Boudaia**

Has completed the following CITI Program course:

- **Group 1: Social Behavioral Educational Researchers**
  (Curriculum Group)
- **Group 1: Social Behavioral Educational Researchers**
  (Course Learner Group)
  - **1 - Basic Course**
  (Stage)

Under requirements set by:

**Valparaiso University**

Verify at www.citiprogram.org/verify/?wbafe56d0-0d28-4050-b69e-c77ed57c71a5-48501415
APPENDIX N

IRB Questionnaire

IRB Review Not Required

The project you described does not meet the federal definition of "Research" that needs IRB review.

Based on your answers, your study does NOT require IRB review, and you may continue with your study without additional interaction with the IRB.

If you are a student, your faculty mentor is responsible for overseeing ethical conduct of your study. YOU MAY ONLY BEGIN YOUR STUDY AFTER YOUR FACULTY MENTOR HAS APPROVED YOUR PROJECT. THE IRB WILL NOTIFY YOU ONCE THEY HAVE RECEIVED APPROVAL FROM YOUR FACULTY MENTOR.

If you include an informed consent process in your study, do not say that this study has been reviewed by the IRB.

I certify that the information provided in this application is complete and accurate. I understand that as the Principal Investigator I have ultimate responsibility for the conduct and ethical performance of the study, the protection of the rights and welfare of human participants. *

I agree with this statement
APPENDIX O

IRB Approval Exemption Email

Re: External: IRB

You are not required to have IRB approval. Per out meeting and discussion, you are approved to continue the project.

Thank you,

From: Amina Boudaia <amina.boudaia@valpo.edu>
Sent: Tuesday, July 26, 2022 5:33 PM
APPENDIX P

Permission to Use JHNEBP Model

JOHNS HOPKINS EBP MODEL AND TOOLS- PERMISSION

Thank you for your submission.
We are happy to give you permission to use the Johns Hopkins Evidence-Based Practice model and tools to adhere to our legal terms noted below.
No further permission for use is necessary.

You may not modify the model or the tools without written approval from Johns Hopkins.
All references to source forms should include “©The Johns Hopkins Hospital/The Johns Hopkins University.”
The tools may not be used for commercial purposes without special permission.
If interested in commercial use or discussing changes to the tool, please email ijhn@jhmi.edu.

Downloads:

2022 JHEBP Tools- Printable Version
2022 JHEBP Tools- Electronic Version

Would you like to join us? Group rates are available, email ijhn@jhmi.edu to inquire.

EBP Boot Camp: We are offering a 5-day intensive Boot Camp where you will learn and master the entire EBP process from beginning to end. Take advantage of our retreat-type setting to focus on your project, collaborate with peers, and get the expertise and assistance from our faculty.

EBP Skill Build: This 3-day virtual workshop gives you a front-row seat to our EBP training and provides every participant with the guidance and support they need to get their EBP projects started.