

Patient Satisfaction Outcomes Following Antibiotic Resistance Education for Adults  
in Primary Care

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### Abstract

Antibiotics have saved many lives since their discovery, but today, due to overuse, are becoming less effective. A portion of provider reimbursement from Medicare and Medicaid is based on patient satisfaction. Because of the previous effectiveness of antibiotics, patients have come to expect them from their provider when being seen for bronchitis, sinusitis, otitis media, and pharyngitis. Evidence suggests that educating patients, utilizing shared decision-making strategies, and communicating the reason for or against antibiotic prescriptions can produce positive outcomes when treating upper respiratory infections. The purpose of this evidence based quasi experimental project was to determine if patient education and shared decision-making with regards to pharmacologic treatment for adults with upper respiratory infections will increase patient satisfaction in the primary care setting. The setting of this project was an urban clinic with 125 total participants over the age of 18 with complaints of an upper respiratory infection. Antibiotic resistance education was provided to 64 participants who are over the age of 18 and present to the clinic with upper respiratory complaints. Patient satisfaction was measured with the Consumer Assessment of Healthcare Providers and Systems survey and compared to 61 participants who were treated for upper respiratory complaints prior to implementation of the standardized educational intervention. Demographic and treatment data were obtained from the electronic health record. Evidence suggests the two groups were not comparable ( $p=0.02$ ), and no significant improvement in satisfaction was shown pre-post intervention. By demonstrating that education and shared decision-making about antibiotic resistance is effective, patient satisfaction scores increase with or without prescribing an antibiotic.

*Keywords:* multidrug-resistance, antibiotics, shared decision-making, patient satisfaction, clinical practice guidelines, antibiotic education

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In 2017, the Centers for Disease Control and Prevention (CDC) released a vital directive on the importance of antibiotic stewardship. By only prescribing antibiotics when necessary and significantly decreasing antibiotic use, an impact on infection rates may occur (Martinez-Gonzalez et al., 2017). Modifying antibiotic prescribing practices are valuable to providers when monitoring antibiotic resistance patterns (Pourmand, Mazer-Amirshahi, Jasani, & May, 2017). Providers should not avoid educating their patients about adverse drug events with antibiotics due to decreased patient satisfaction scores and prescribe antibiotics that are medically required for appropriate therapy (Roberts, Albert, Johnson, and Hicks, 2015). Please reference Appendix A for operational definitions related to the student investigator's evidence-based practice project proposal.

**Significance with Economic, Policy, and Health System**

Antibiotics are one of the greatest discoveries of modern medicine (Davies & Davies, 2010). During the 1950's new evidence of resistant strains of methicillin developed, this finding triggered the need to develop new antibiotics (Davies & Davies, 2010). Over 700,000 deaths worldwide are attributed to antibiotic resistant infections each year and will likely reach 10 million by 2050 (Goff et al., 2017). Because multidrug resistant microbes present a life-threatening risk to the community and science has not been able to develop new antibiotics for these bacteria, being judicious with the current antibiotic regimen has become critical (CDC, 2017; Davies & Davies, 2010).

Nurses constitute the highest percentage of U.S. healthcare workers with greater than 205,000 being nurse practitioners (Manning, Pfeiffer, & Larson, 2016). Advanced practice

providers are in critical positions to prevent resistant bacteria as they are prescribing a considerable number of antibiotics to the community and communicating directly with patients (Manning et al., 2016). Ladd (2005) compared antibiotic prescription rates between nurse practitioners and physicians and found that physicians were 19% more likely to prescribe an antibiotic for a viral upper respiratory infections (URI) than an advanced practice nurse. More recently, Sanchez, Hersh, Shapiro, Cawley and Hicks (2016) reviewed prescribing rates of nurse practitioners and physician assistants versus physicians only visits and reports a 5% higher prescribing rate for the non-physician group. Sanchez et al. (2016) noted that the number of non-physician providers has significantly increased in the last 10 years and the recent CDC antibiotic awareness campaign has focused on physicians. All providers need to adhere to clinical guidelines and educate patients appropriately.

Without the ability to perform a rapid test for all types of bacterial infections, the decision to treat is debatable, requiring critical decision-making skills (Libman, Brockmeyer, & Gold, 2017). Protocols have been developed for each disease process that include best practice guidelines for antibiotic treatment and include prevention of multidrug resistance (Wiskirchen, Summa, & Perrin, 2016). These protocols of clinical guidelines have been defined through research by medical specialty associations, such as infectious disease, otolaryngology, and internal medicine. Evidence based practice (EBP) has become the gold standard for medical care (Seisha et al., 2014). There are many providers that rely on EBP studies to guide patient practice, yet there is recent concern for financial bias, personal motivation, and notoriety, impacting EBP results (Seisha et al., 2014). Melnyk & Newhouse (2014) explain evidence informed practice involves taking the published or established guidelines to determine the best treatment plan for an individual patient. By taking responsibility for the ongoing dilemma of multidrug resistance, the patient's desire to be treated

efficiently and quickly, and the society's need for all providers to be involved, nurse practitioners are at the forefront and readily available to make an impact.

### **Local Issue**

Providers need to follow the clinical guidelines for infections in their region (CDC, 2017). In 2010, Missouri averaged 899-972 antibiotic prescriptions per 1,000 people and by 2015, the prescribing rate increased to 918-1016 per 1,000 (CDC, 2017; Hicks, Taylor, & Hunkler, 2013). Although not every person in the state of Missouri receives an antibiotic annually, many patients receive multiple in one year. In 2017, Missouri received \$1.7 million in funds to support the antibiotic resistance campaign with \$165,244 designated to health departments (CDC, 2018).

### **Diversity Considerations**

The project clinic serves the urban area of Kansas City. The metropolitan area includes five primary cities (Kansas City, Overland Park, Lee's Summit, Olathe, and Independence) and has a population of 2,071,133 (Abouhalkah, 2015). Gotham (2014) discussed the diversity of the area and how Kansas City is geographically segregated due to uneven real estate development over the last 80 years. A majority of the non-white population live just south of the river (Gotham, 2014). The most updated census information available describes the county as 67% White, 23.7% African American, and 28% Hispanic. Of those living in the county, 78% report being high school graduates and almost 20% are living at or below the poverty level (Census, 2017). This will impact the diversity in the EBQI and most of the participants will be Hispanic or African American.

### **Problem & Purpose Statement**

The CDC (2017) reviewed current prescribing rates nationally, finding that of the 154 million antibiotics prescribed in outpatient settings and emergency departments, 30% of the prescriptions were not necessary and URI represent 44% of the antibiotics prescribed; inappropriate antibiotic prescribing furthers resistance and threatens public health in the United States. The purpose of this convenience sampling evidence-based practice project proposal is to determine if patient education and shared decision-making with regards to pharmacologic treatment for adults with upper respiratory infections will increase patient satisfaction in the primary care clinic setting.

### **Facilitators and Barriers**

The project setting was finalized on June 13, 2018. This student investigator collaborated with providers to collect patient satisfaction survey results for the evidence-based quality improvement project (EBQI). The clinic in Kansas City implemented the project at the downtown location.

This project is beneficial to the clinic because it measures the satisfaction of not only self-pay patients, but also those enrolled in Medicare and Medicaid. The EBQI has the potential to positively trigger change in policy at the clinic (see Appendix B). By recognizing the impact education can give to patient satisfaction scores, tools can be used to improve education with other complaints like URI. If the results suggest one area of communication needs improvement, the clinic will have the opportunity to adjust current practices.

There are concerns for sustainability due to the cost associated with printing the color CDC materials for all provider rooms in the clinic and participation gift cards. With grant opportunities dwindling in the summer and fall months, the funds will be primarily from this

student investigator. Barriers to the success of the student investigator's project may impact the results. Due to volunteer staff at the clinic, consistent communication with the patients over the seven months may fluctuate. Patients will need to complete the shortened version of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey and mail the survey back to the clinic. Further discussion with Dr. Zaudke is anticipated to discuss methods of patient participation that may be successful in the clinic population.

### **Review of Evidence**

#### **Inquiry**

The following inquiry led to the review of evidence: In adults over the age of 18, does shared decision-making and education about the appropriate use of antibiotics influence patient satisfaction from October 1st to April 30th in a primary care clinic?

#### **Search Strategy**

The primary databases and search engine accessed through the University of Missouri Health Studies Library included: Medline, PubMed, CINAHL, Google scholar, and OVID. Key terms utilized in the search of evidence were antibiotic resistance, patient satisfaction in primary care, shared decision-making and antibiotic use, antibiotic resistance and patient education. The date was searched within the last five years with only one exception related to patient satisfaction. Within online searching, key terms, and date, 80 articles were found. Articles were reviewed for criteria, setting, application, and appropriateness. By utilizing Melnyk & Fineout-Overholt (2015) rating system twenty articles were chosen (see Appendix C). The studies concerning antibiotic resistance were reviewed as follows (see Appendix D). Two level I articles are systematic reviews, four level II randomized control trials were relevant, five level III studies (one quasi-experimental, one cohort, and three quantitative cross-sectional in nature), three level



IV studies utilized quantitative and qualitative methods to evaluate understanding of antibiotic resistance, and six articles are categorized as level V (one systematic review) evidence.

### **Synthesis of Evidence**

The literature on antibiotic resistance and patient satisfaction was synthesized into four subtopics. Six studies from the search were found relevant to prescribing guidelines and antibiotic stewardship. There are five studies appropriate to the student investigators proposal regarding patient expectations with antibiotics. Much research has been done regarding education and communication with antibiotic resistance thus six studies were included in the synthesis. Lastly, patient satisfaction in relation to providers and prescribing has three studies.

**Guidelines and Antibiotic Stewardship.** Stewardship includes documentation, education for the patient and provider, and periodic reassessment of need (Goff et al., 2017; Shallcross, Beckley, Rait, Hayward, & Peterson, 2017). Clinical guidelines for evidence-based treatment of upper respiratory infections are available from many professional sources. The American Academy of Otolaryngology, Infectious Diseases Society of America, the Society for Healthcare Epidemiology of America, and the Pediatric Infectious Diseases Society have published similar evidence-based practice recommendations supported by research (Barlam, 2016; Rosenfeld, 2015). Van Hecke, Wang, Lee, Roberts, and Butler (2017) concluded from a systematic review ( $n=26$ ) of clinical studies that treatment response failure with antibiotics after 7-14 days is correlated to antibiotic resistance. Due to the significance of this finding, Van Hecke et al. (2017) made the directive to diminish patient expectations, implement shared decision-making, and explain to the patients multidrug resistant (MDR) infection outcomes.

Two systematic reviews validate the importance of treating URI with the shortest and lowest dose antibiotic only when appropriate (Costelloe et al., 2010; Harris et al., 2016). Harris

et al. (2016) utilized systematic review ( $n=15$ ) to create a clinical guideline for four acute respiratory tract infections: acute bronchitis, pharyngitis, acute rhinosinusitis and the common cold. An antibiotic prescribing recommendation of being judicious with URIs was developed because almost all are self-limiting and viral (Harris et al., 2016). Costelloe et al. (2010) reviewed 22 studies to reveal an odds ratio of 2.5 for resistance after exposure to an antibiotic (95% confidence ratio) and concluded primary care plays a vital role in the complex MDR problem. Prescribing antibiotics for upper respiratory infections directly impacts the risk for resistance and found that MDR rates increased one month after peak antibiotic prescribing months (Costelloe et al., 2010).

**Patient Expectations of Antibiotics.** The development of antibiotics introduced a cure to many bacterial infections (Manning, 2016; Goff et al., 2017). Today many patients expect antibiotics for an upper respiratory infection upon a visit to their primary care provider (Davis et al., 2017; McNulty et al., 2013; Wiskirchen, Summa & Perrin, 2016). This expectation for antibiotics when visiting the clinic has been explored thoroughly and literature attributes this to the misunderstanding that an antibiotic can treat all bacteria and viruses alike (Coxeter, Del Mar, & Hoffmann, 2017; Martinez-Gonzalez et al., 2017; Rowbotham et al., 2012). Finkelstein et al. (2008) reinforced the ongoing difficulty with patient expectations and high rates of antibiotic use on a national and state level. A more community and local approach is needed to make a true impact (Finkelstein et al., 2008).

Shared decision-making is a process of communication, cultural assessment, relationship building between provider and patient which uses planned negotiations (Truglio-Londrigan, 2016). Patient focused care and evidence-based practice principles are utilized to allow the patient to mutually make health care decisions with the provider in shared decision-making

(Guerrier, Legare, Turcotte, Labrecque, & Rivest, 2013). By combining shared decision-making and communication, the patient and provider develop a partnership and strengthen the battle against resistant bacterial infections in evidence-based practice (Zoffmann, Harder, & Kirkevold, 2008). Knowledgeable patients that are involved in their healthcare and aware of the options available are more likely to follow through with treatment with or without an antibiotic (Schroeck, 2015; Truglio-Londrigan, 2016). When asking a patient to wait 48 hours in the outpatient setting before treating with an antibacterial, a collaboration between the patient and provider is essential (Rowbotham, 2012). Shared decision-making improves the relationship by collaborating to reach a goal and will impact the community in decreasing the rate of antibiotic resistance on a global scale (Wills, 2010). Guerrier et al. (2013) conducted a clustered randomized trial ( $N=236$ ) to evaluate the effectiveness of shared decision-making and clinical practice guidelines (CPG) with physicians. The study determined that there is no evidence that shared decision-making negatively impacts CPG (Guerrier et al., 2013).

**Education and Communication.** Education is twofold for prevention of antibiotic resistance including providers and patients. Holmes, Struwe, & Waltman (2018) implemented a stewardship education program for providers and noted a decreased antibiotic prescribing rate ( $p=.08$ ). Providers reported the impression that patients were more satisfied ( $p=.02$ ) with the visit when shared decision-making was utilized (Holmes et al., 2018). Hawkings, Wood, & Butler (2007) performed a British qualitative study ( $n=46$ ) to evaluate misconceptions of antibiotic resistance. Patient participants verbalized a lack of concern on a personal level of their responsibility with MDR. Not only did they deny ownership but expressed dissatisfaction with hospitals for causing the spread of bacterial infection. The patients were unaware of their ability to contribute positively to battle of resistance (Hawkings et al., 2007).

Cross, Tolfree, & Kipping (2017) published a systematic review of educational antibiotic use interventions in Europe (n=7) and the United States (n=7). Outcome search terms included antibiotic, antimicrobial resistance and intervention terms included communication, mass media, and campaign (Cross et al., 2017). Initially 5553 articles were found and through inclusion and exclusion criteria, 14 articles were included. Required inclusion criteria were English language, focus on the general public, intervention involving communication and randomized control trials. The interventions are divided by nationwide (n=4), community (n=7), and site or households (n=3). Consistently antibiotic use and prescribing declined with educational interventions in households, but there is not a significant improvement with nationwide or community programs (Cross et al., 2017). Cross et al. (2017) concluded a multi-dimensional education campaign is more successful than one method alone.

**Patient Satisfaction.** Value-based reimbursement with the Affordable Care Act has changed practice in primary care (Henkel & Maryland, 2015). Over the last four years, Medicare and Medicaid have decreased reimbursement by 1% for providers and an additional 2% is given as a bonus dependent on quality measures. Patient satisfaction accounts for 30% of this quality bonus and the pressure for providers to have high patient satisfaction ratings has increased (Newgard et al., 2017; Zamora, 2012). Patient satisfaction is challenging to define as one variable but has repeatedly been shown to include variables such as patient expectations, provider communications skills, outcomes, the severity of illness, and demographics (Jackson, Chamberlin, & Kroenke, 2001).

Shared decision-making and patient satisfaction are integral concepts related to the study of antibiotic resistance (Ashworth, 2016). Interpersonal relationships are incorporated into patient satisfaction and education by the nurse or provider (Hagerty, Samuels, Norcini-Pala, and

Gigliotti, 2017). Welch (2010) suggests patient satisfaction reflects bedside manner, capability, and communication skills. Another aspect of satisfaction scores is the relationship made with the provider in the outpatient setting (Fan, Burman, McDonell, & Fihn, 2005). Prakash (2010) recommends improving satisfaction by being courteous, listening, explaining the condition appropriately, attentiveness, and responsiveness to questions. The most valuable indicator of patient satisfaction is interpersonal relationships and has a positive influence on health outcomes (Prakash, 2010).

Empirically, Lundborg, and Tamhankar (2014) concluded one of the five primary human behaviors that can be influenced is interpersonal relationships. Behavior modification is evaluated in all aspects of antibiotic consumption and dispensing (Lundborg & Tamhankar, 2014). The interpersonal relationship between the patient and provider is one variable in the MDR crisis. Hagerty et al. (2017) determined sixteen Consumer Assessment of Healthcare Providers and Systems-Hospital Survey (HCAHPS) items echo Peplau's interpersonal theory. The items measured in HCAHPS are reflective of communication and patient-nurse relationships (Hagerty et al., 2017). Kemp, McCormack, Chan, Santana, & Quan (2015) studied HCAHPS results ( $n=27,492$ ) and determined the highest correlation of survey questions ( $r = 0.45$ ,  $p < .001$ ) are with patient satisfaction and nurse communication.

Tang, Soong, and Lim (2013) studied the satisfaction of patients ( $N=100$ ) with a 4-point Likert scale in relation to knowledge the patient has been given to manage their health conditions. This study determined caring behaviors and respect ( $m=3.22$ ) measured the highest versus merely providing health information ( $m= 3.09$ ). Fan et al. (2005) found in an extensive cross-sectional study ( $n=21,689$ ) that continuity of care (17.3 points higher, 95% confidence interval) with their primary care provider impacts patient satisfaction. Continuity of care is

reflected in the respect the provider shows the patient, trust, communication, and overall relationship (Fan et al., 2005).

### **Peplau's Interpersonal Relationship Theory**

Peplau's theory of interpersonal relationships involves nurses and patients working through three phases of orientation, working, and termination (Hagerty et al., 2017). During the orientation phase, an introduction is made, with the focus placed on listening to the patient. Peplau suggests this step is setting the stage for connecting (Hagerty et al., 2017). The working period involves the patient accepting the nursing staff as educators or providers (Hagerty et al., 2017). In Peterson and Bredow (2017), the termination phase is known as the resolution phase. In this aspect, new goals are established and sets the stage for an ongoing relationship to effectively treat the patient (Peterson & Bredow, 2017). Peplau (1991) emphasized providing information to help a patient understand healthcare decisions, allow patients to express their thoughts, and give clinical educational support to the patient. Peplau's theory forms a solid foundation for shared decision-making because it emphasizes communication and knowledge (Wills, 2010).

Fernandes and Naidu (2017) applied Peplau's interpersonal relationship theory to diabetic management. By comparing self-care management before application of the theory and after (n=30), diabetic patients displayed better glucose control and wellness ( $p<0.05$ ) after utilization of interpersonal relationship theory (Fernandes & Naidu, 2017). Building relationships in a methodological approach as mentioned in Peplau's theory turn the primary care visit from informative to collaborative (see Appendix E).

## **Methods**

### **IRB, Ethical Considerations, and Funding**

The primary institutional review board (IRB) is the UMKC IRB, and the project was classified as non-human subject research (see Appendix L). The reason the subject was considered non-human was that the implementation of education and shared decision-making was designed for improvement and not generation of knowledge. The intervention of education on antibiotic resistance focused on enhancing the patient's understanding of care. A site agreement was established with the clinic operations committee.

There is an ethical responsibility to use antibiotics appropriately because they are a scarce resource that cannot be renewed at this time (Littmann, Buyx, & Cars, 2015). Informing the public and patients of this problem is vital for future generations (Littmann et al., 2015). By implementing the student's project, the patients are given more autonomy to understand the treatment given. Privacy and confidentiality will be maintained with the EBQI and information will be provided without divulging the reason for the visit in the waiting room. The investigator may have internal conflict with the providers if antibiotics are misappropriately prescribed with no regard for evidence-based guidelines.

The Sigma Theta Tau provided a grant of \$500 for this student present at the AANP conference in Indianapolis, IN. Funding was also provided by the UMKC Women's Council Graduate Assistance Fund for \$1000. The total financial support needed was \$1,846.19 and included all supplies (see Appendix F). Expenses included the electronic tablet, disposable headphones, printed education material, and cleaning supplies. The student investigators time was donated. A \$2 Sonic gift card was initially considered for each participant, but clinic management decided it was unnecessary because they request surveys throughout the year.

### **Setting & Participants**

The EBQI took place at an urban free clinic in Kansas City, KS. Participants were over the age of 18, either male or female, and reporting upper respiratory symptoms. Convenience

sampling was utilized with the goal of obtaining 67 participants during October and November and their charts were reviewed for age, gender, nationality, upper respiratory complaint, prescription written, and comorbidities. After collecting the data and completing the CAHPS survey from this baseline group, the EBP intervention was introduced. The intervention group also had a goal of 67 participants and complete the same CAHPS survey. Exclusion criteria were non-English or non-Spanish speaking, hard of hearing and blind.

### **EBP Intervention**

Evidence based education was provided to the intervention group of participants (see Appendix G, H, and I). The educational intervention for this project employed general antibiotic resistance materials and videos. The CDC has produced a variety of antibiotic awareness information to download and distribute. Approval was verified via email to reproduce the antibiotic awareness materials (see Appendix J). Pamphlets, handouts, and posters are available as part of an antibiotic awareness education in primary care (see Appendix K). Along with the reading materials, the CDC has posted several videos in English and Spanish that reiterate the antibiotic awareness campaign. All staff either speak Spanish fluently or there is a translator available during office hours.

During the months of October through December 2018, providers continued giving care as appropriate for patients with upper respiratory infections. A patient satisfaction survey was given to the patients and included in the survey were the eight CAHPS questions, demographic data collection, and URI complaints. This data represented the baseline for comparison to the intervention data. From January to the first week of March, the educational intervention took place with patients viewing educational materials pre-visit and providers employing shared decision-making during visits for upper respiratory infections. The videos were downloaded on



to an iPad or tablet and readily available for the participants to watch in the intake room or take to the patient room to finish watching before seeing the provider. An easy to read poster, similar to the handouts, was displayed in the waiting areas and patient rooms. Printed materials were provided to the patients to read while waiting to be called back to the patient examination room. Participants completed the survey prior to leaving the day of their visit.

### **Change Process and EBP Model**

The Roger's Diffusion of Innovations model was helpful when implementing this EBQI due to the use of an electronic tablet for educating the participants and changing the process of educating a patient prior to the visit with the provider. Understanding the diffusion innovation S-curve of adoption by the healthcare team influences time management. Cain and Mittman (2002) explained that there are five distinct categories of adopters with change. The categories are innovators, early adopters, early majority, late majority, and laggards. The leadership of the clinic are innovators and have recognized the early adopters from previous process changes. Utilizing Roger's model and focusing on the early and late majority adopters, the project will be effectively implemented (Cain & Mittman, 2002).

Patient-centered care, invitation to be involved, and autonomy are at the core of evidence-based practice and the shared decision-making model simultaneously leads to an opportunity for patients to develop self-management skills (Zoffman et al., 2008). This model complements the Promoting Action on Research Implementation in Health Sciences (PARIHS) framework. The continuum from high to low that is represented by evidence, context, and facilitation built this student's DNP project (Rycroft-Malone, 2004). There are concerns for sustainability after the student investigator completes the project because current staff or

volunteers will need to continue providing the education prior to the visit and CDC materials after the visit.

### **Study Design**

The EBQI design is quasi-experimental with an intervention group and a non-intervention group who did not receive the educational intervention. Convenience sampling was utilized.

### **Validity**

AHRQ continues to collect data and utilize online data reporting to evaluate the validity of the CAHPS survey. There is a risk of impacting the validity with inaccurate data entry which will be avoided with double checking the data entry. Because the instrument has already been translated into Spanish and the survey has been tested repeatedly for readability, the data clearly represents patient satisfaction.

Internal validity can be impacted by process mistakes. There was potential for participants to not bring the survey back after the intervention, the lack of shared decision-making by the provider, and the office staff choosing to not distribute the tablet at check in while busy. Other influences in internal validity include high numbers of comorbidities with the patient population and literacy with Spanish speaking participants.

External validity could be influenced by the demographics of the clinic population. Many participants were Spanish speaking and below the poverty level. This impacts the ability to apply the results to the general public. Although the population may be different, multiple hurdles were overcome by initially implementing the EBQI in this setting and thus making the study intervention transferable.

### **Outcomes and Measurements**

The primary outcome for the project is patient satisfaction. The CAHPS survey was utilized to compare those patients with and those without the education intervention. The Agency for Healthcare Research and Quality (AHRQ) has provided the CAHPS survey online free for use in many healthcare arenas including provider clinics and groups with no permission required. The survey is available in English and Spanish versions for patient satisfaction (see Appendix M and N). Eaton et al. (2017) performed qualitative interviews with patients and compared the AHRQ survey and found the results very similar. Due to the length of the CAHPS survey studies have been conducted to determine the options for shortening the survey to measure specific outcomes. Stucky et al. (2016) studied the full length and minimum length surveys (n=63,441) finding there is a strong correlation between the two and the shortened version is reliable. With this in mind, the student investigator utilized the shorter version to increase patient participation. The survey of eight questions will take approximately five minutes to complete.

There are four secondary outcomes that were evaluated by the student investigator. With chart review, the demographic data, antibiotic prescription rate, and URI complaints were collected by the student investigator (Appendix P). Demographic data included gender, age (18-35, 36-65, 66+), race, and language spoken. Complaints of cough, sore throat, nasal drainage, ear pain, and sinus pressure were noted in the data collection with yes or no responses. If an antibiotic was prescribed or given, the data was collected. If the patient had comorbidities, this was noted as well.

### **Quality of Data**

Due to the nominal data from demographics, standardized ICD 10 coding, and clarity of prescribing in the EHR format, the data was valid. CAHPS survey material includes statistical

analysis instructions. With a medium effect 0.5, power of 0.8, and alpha .05, the sample size was calculated at n=67 in each group (CAHPS, 2017). Drake et al. (2014) reviewed the CG CAHPS survey and validated the effect and power. On review of the literature, no benchmark studies were identified that utilized a combination of electronic patient education and shared decision-making interventions and measured patient satisfaction scores to determine effectiveness.

## **Results**

### **Setting and Participants**

The EBQI project was completed in an urban low-income clinic in Wyandotte County, Kansas. Patients are required to prove income, residence in Wyandotte County, lack of insurance coverage, and commit to paying \$10 at each appointment although not required. There are six primary care providers, multiple volunteer specialty providers that evaluate referrals, free diabetic counseling, laboratory testing, medication programs, and free referrals for preventive screening tests. The clinic is funded by multiple grants, fundraising efforts, and donations. The sample size was 125 (61 in the baseline group and 64 in the intervention group).

### **Demographics**

The demographics of the baseline and intervention groups were similar with most patients being female, Hispanic, and between the ages 36 to 65 (see Appendix O, Table 2 Demographics of EBQI project with Chi Square). Because most patients were Hispanic, the largest group of patients was also Spanish speaking with 72% and 86%, respectively to baseline and intervention participants. The CDC provided fully translated materials in Spanish and should not negatively impact the data.

### **Intervention Course**

For the baseline group, the study began on October 1, 2018 by asking patients to complete the eight-question survey at checkout. Initially, every patient was asked if they had any of the URI symptoms and given a survey if they reported yes. There was some resistance from patients to answer the question at checkout and at the end of October the decision was made to give the survey to every patient at checkout. The student investigator then reviewed each survey to determine if the patients had URI complaints and included the patients that met the criteria. By December 27<sup>th</sup>, 61 baseline participants were included. The average number of symptoms for the baseline group was 2.27 while 59% had comorbidities.

The intervention began on January 2, 2019. At check in patients were asked if they had any of the URI symptoms, and this question was well received unlike at checkout with the baseline group. If patients had one or more of the five symptoms, the education materials were provided at check-in. Once called to check vitals, participants viewed the 2.5-minute CDC video in English or Spanish. The satisfaction survey was completed at check out as in the baseline group. On March 4, the study concluded with 64 participants in the intervention group. The average number of symptoms for the intervention group was 2.75, while 72% had comorbidities.

### **Outcome Data**

The CAHPS survey utilizes likert scale type questions. The Mann-Whitney *U* test was used to analyze the CAHPS survey questions with SPSS. Nominal data was analyzed with chi square (see Appendix O, Table 3 for the statistical analysis of the URI complaints, comorbidities, and demographics. The clinic was under the national average for antibiotic prescribing with a rate of 3% in the baseline group and 14% in the education group.

**Comparing the groups.** Although the demographics and the number of participants were similar, the Mann Whitney *U* test reported the two groups were not similar due to the number of

URI symptoms. More patients reported a sore throat (baseline 43%, intervention 64%) and nasal drainage (baseline 51%, intervention 67%) in the intervention group. When evaluating the total number of symptoms, the baseline group had a mean of 55.5 while the intervention group had a mean of 70.15 ( $p = 0.020$ ). The comparison of comorbidities initially appeared to validate the differences between groups, but the  $p$  value was not significant ( $p = 0.133$ ; see Appendix N for mean of total symptoms). Each symptom was worth 1 point with total points of 5.

**Satisfaction survey.** The CAHPS survey question 11 on *surveying ability to understand the provider* had an average of 3.77 in the baseline group and 3.62 in the intervention group. Question 12 related to the participant's perspective that the *provider listens* had an average of 3.78 (baseline) and 3.74 (intervention). Question 13 gauged *providers knowledge* of the patient's history with an average of 3.69 and 3.63 respectively. Question 14 measured the participants view of *respect from the provider* and the average was 3.64 and 3.78. Question 15 allows the participant to rank their perspective of the *amount of time the provider spent* with the patient during the visit and the average was 3.62 and 3.51. Question 16 reviewed how the patient *perceived follow up* over the last 6 months with laboratory and other testing, the average was 3.43 and 3.06. Question 20 focused on the participants *understanding and discussion of medication* and there was an increase in this score with averages 3.47 and 3.52 respectively. Lastly question 18 was ranked 0-10 of the participants *overall impression of the provider* with 9.53 and 9.44 averages. The Mann Whitney U analysis reported the only significantly relevant finding was question 17 ( $p = 0.051$ ). Question 17 asked patients to rate their level of satisfaction for *good follow up* with test results from the provider.

Missing data was most frequently noted with survey questions on the second page. The participants that did not answer were excluded. The clinic front desk staff began to recognize if a patient did not complete the second page and very few had missing information.

### **Discussion**

The most important success in the study was the implementation of shared decision-making complimented with the antibiotic resistance education. The clinic staff supported the concept of each team member participating in the outcomes associated with patients making decisions from screening at the front desk, education by the medical assistant while starting the visit, provider interactions, and staff at checkout. Another positive outcome was reported by the providers. Many patients asked questions regarding antibiotic necessity, bacteria versus viral and potential side effects. Providers stated patients showed interest and the decision to prescribe antibiotics was a discussion versus simple instruction by the provider.

The most significant finding within the results is that the two groups were not similar. The results initially suggested that patient satisfaction declined with the intervention, but the data is not comparable due to the unlike groups. The patients during January and February were overall sicker as noted by the five URI symptoms. Many participants in the fall reported only having one or two symptoms, typically a cough. In the winter, the symptom of a sore throat was significantly higher.

### **Strengths**

The support for the project was noted from the administration to the clinic personnel and professionals. The medical director was encouraging over the entire five months. When there were difficulties in collecting results, the team evaluated the process and made adjustments. The organizational culture valued providing the best care to the patients regardless of their literacy,

finances, health, and cultural beliefs. Understanding the community impact on the care provided set the clinic apart from other health care in the area.

Implementation of the intervention was not difficult. The staff was briefed on the study in December and educated about shared decision-making. Collecting the surveys was the most challenging aspect. The clinic front desk staff have many responsibilities and are the center of patient communication. Many days the front desk is not only doing the expected tasks but also educating patients about their upcoming appointments and explaining qualifications for receiving care in detail. These team members are fluent in English and Spanish. The front desk staff verbalized that keeping up with offering the satisfaction survey was overwhelming at times. The team stated patients denied participation in the survey several times due to time constraints or transportation arrangements.

### **Evidence in literature**

There are many actors related to satisfaction (Bunn, et al., 2017; Fann, et al., 2005). By understanding that wellness impacts satisfaction, this student investigator recognized the disparity between the baseline and intervention groups. It is not surprising based on the evidence that survey scores decreased in some areas. Fann et al. (2005) pointed out that there are multiple variables to patient satisfaction and one of these is continuity of care. With a change in providers at the clinic in the fall, it is expected to see a satisfaction decline in provider follow-up.

Although the *p* value for CAHPS question 20 related to explaining medications was 0.5, there was a noted higher satisfaction score in the intervention group (average of 0.05) while other satisfaction scores decreased. Toma et al. (2009) and Holmes et al. (2017) found similar results in their studies of patient satisfaction and antibiotic education, suggesting congruence with findings in the current project.



### **Limitations**

Overall the flu season was shorter than in previous years and the flu season peaked later (CDC, 2019). In comparison to the 2017-18 flu season, the CDC (2019) reported half as many cases in weeks 2-12. Patients did not present with as many URI symptoms in the Fall 2018 and most reported a cough. Patients declined participation due to completing a survey for various reasons although receiving the education. Reported reasons included lack of time to complete and not feeling well enough to participate.

### **Internal Validity**

Collection of the data was impacted by completion of the satisfaction survey. Although participants received the intervention, measuring effectiveness by survey results hindered validating benefit of education related to antibiotic resistance. Bias existed due to staff expectation that patients did not have URI symptoms at check in or out, but ultimately discussed URI concerns with the providers. This was verified in chart review of progress notes retrospectively.

### **External Validity**

The ability to transfer the intervention within the clinic to other patient populations is reliant on the clinic staff incorporating the education process into the flow of the patient check-in by the front desk and medical assistants. Generalizability within the setting could be developed in the education and shared decision-making for different health concerns. With ICD codes available on each chart, targeted education for diabetes, hypertension, obesity, hypothyroidism, heart disease, and other diagnoses could be similarly transferred.

### **Sustainability**

Over time the patients could be desensitized to learning with a video that is short and repetitive. Keeping the topics specific, clear, and appropriate for the learner is needed for continued impact. Verifying understanding would need to be evaluated and this could be done during discussions with the providers.

### **Minimize Limitations**

Although the clinic staff knew a survey was taken by the baseline participants, details of the survey was not discussed. Shared decision-making and the implementation of the education were the only changes made to the normal process. Encouraging the staff to continue the study was necessary to remain consistent with data collection. Over weeks, the assumption could be made that the change in process would be automatic. This can not be assumed and requires frequent follow up with the clinic staff.

## **Interpretation**

### **Outcomes**

The clinic lost a provider in the Fall due to illness thus decreasing the patient visits by 75 per week. In January, the clinic utilized a locum provider to assist in meeting the needs of the patients. In February, patients were reassigned to a new full-time provider. This impacts patient satisfaction results because the questions reflect on the last several months.

Results were not as expected from the student investigators perspective. The severity of the 2017-18 flu season effected the expectations for 2018-19. Because fewer patients had URI symptoms in the months of November and December 2018, the overall satisfaction scores were not comparable to January and February 2019. The ability to gauge the effectiveness of antibiotic resistance education was limited.

### **Effectiveness**

The ability to identify the need for education can be done prior to meeting with the provider. The clinic staff understood shared decision-making is started at the front desk and carried through the whole visit. Identifying who had URI symptoms at the beginning led to productive conversation with the provider. Effectiveness is reliant on staff assessing patient needs, concerns, and moving forward with education.

### **Intervention Modifications**

Performing a multi-year study would be beneficial to studying the satisfaction surveys over several flu seasons. This would allow for staffing changes and gauge effectiveness over time. Another option that was considered is to provide the intervention to every other participant. Eliminating the variable of peak season would give a more balanced sampling of URI symptoms.

### **Impact to Health System**

By implementing targeted education via electronic tablet, important principles can be relayed to patients in short periods of time. This incorporates the patient into the shared decision-making process and opens discussion with the provider. The clinic appreciated the ability to educate patients in a timely fashion without interfering with work flow. Patient satisfaction is multifactorial even when the demographic data is consistent. Understanding the wellness of the participant impacts satisfaction feedback. Satisfaction perceptions are not a task-oriented list but involves overall wellness.

By providing straight forward problem focused education and utilizing shared decision-making, the long-term benefit of fewer antibiotic resistant infections would decrease health care costs. The funding necessary would be limited to printing materials and having electronic tablets available to educate patients and families.

### **Conclusion**

The EBP intervention is useful in clinics to foster shared decision-making, heighten antibiotic awareness, and improve patient satisfaction. Work flow processes in clinics were moderately increased due to the education, yet clinic staff appreciated participating in the shared decision-making process. In a busy clinic, the ability to continually monitor the electronic device, clean supplies, and disperse education materials can be cumbersome. The participants in the intervention group verbalized understanding of the differences between viral and bacterial infections. Transferability of the intervention will be to settings with similar patient demographics including Spanish speaking and urban low-income communities. Educating the community with specific targeted education like antibiotic resistance is beneficial and impactful.

Comorbidities play a role in antibiotic prescribing because of the complex nature of the chronic illness. Further study is needed to determine the best practice for antibiotic prescribing in this population. Due to the fact the clinic does not have as many urgent care type patients, the results of this project may need further evaluation. A written analysis of the results was shared with the clinic on April 9, 2019. The EBQI project proposal was presented as a poster at the annual Advanced Practice Nurse of the Ozarks in November 2018. Poster results were presented at the Midwest Nursing Research Society annual conference at the end of March 2019 and will be presented at the annual The American Association of Nurse Practitioners conference in June 2019.

Antibiotic resistance is a growing problem at an alarming rate, and educating the community is imperative. Synthesis of the evidence suggests educating the community on a local level will impact patient satisfaction and decrease unnecessary antibiotic use. This

evidence-based practice project incorporated this evidence and sought to educate patients about appropriate treatment of upper respiratory infections.

## References

- Abouhalkah, Yael. (2015, July 25). Kansas City metropolitan area thumps St. Louis in new population growth. *Kansas City Star*. Retrieved on March 23, 2018 at <http://www.kansascity.com/opinion/>
- Agency for Healthcare Research and Quality. (2017) CAHPS: Surveys and tools advanced patient-centered care. Retrieved April 10, 2018 from <https://www.ahrq.gov/cahps/index.html>
- Ashworth, M., White, P., Jongsma, H., Schofield, P., & Armstrong, D. (2016). Antibiotic prescribing and patient satisfaction in primary care in England: Cross-sectional analysis of national patient survey data and prescribing data. *British Journal of General Practice*, 66(642), e40-e46.
- Barlam, T., Cosgrove, S, Abbo, L., MacDougall, C., Schuetz, A. N., Septimus, E. J., ... & Hamilton, C. W. (2016). Implementing an antibiotic stewardship program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. *Clinical Infectious Diseases*, 62(10), e51-e77.
- Bunn, F., Goodman, C., Manthorpe, J., Durand, M., Hodkinson, I., Rait, G., & Wilson, P. (2017). Supporting shared decision-making for older people with multiple health and social care needs: A protocol for a realist synthesis to inform integrated care models. *British Medical Journal Open*, 7(2), e014026. doi:10.1136/bmjopen-2016-014026
- CAHPS Surveys and Guidance (2017). Agency for Healthcare Research and Quality, Rockville, MD. Retrieved April 10, 2018 from <http://www.ahrq.gov/cahps/surveys-guidance/index.html>
- Cain, M., & Mittman, R. (2002). Diffusion of innovation in health care.
- Centers for Disease Control (2017). Antibiotic/Antimicrobial Resistance. Retrieved

from <https://www.cdc.gov/drugresistance/>

Centers for Disease Control (2017). Unnecessary-prescriptions. Retrieved from

<https://www.cdc.gov/media/releases/2017/p0503-unnecessary-prescriptions.html>

Centers for Disease Control (2019). 2018-2019 Influenza Season. Retrieved April 4, 2019 from

<https://www.cdc.gov/flu/weekly/>

Coxeter, P. D., Del Mar, C., & Hoffmann, T. C. (2017). Parents' expectations and experiences of antibiotics for acute respiratory infections in primary care. *The Annals of Family Medicine*, 15(2), 149-154.

Costelloe, C., Metcalfe, C., Lovering, A., Mant, D., & Hay, A. D. (2010). Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. *British Medical Journal*, 340.

Courtenay, M., Rowbotham, S., Lim, R., Deslandes, R., Hodson, K., MacLure, K., ... & Stewart, D. (2017). Antibiotics for acute respiratory tract infections: a mixed-methods study of patient experiences of non-medical prescriber management. *British Medical Journal Open*, 7(3), e013515.

Cross, E., Tolfree, R., & Kipping, R. (2017). Systematic review of public-targeted communication interventions to improve antibiotic use. *Journal of Antimicrobial Chemotherapy*, 72(4), 975-987.

Davies, J., & Davies, D. (2010). Origins and evolution of antibiotic resistance. *Microbiology and Molecular Biology Reviews: MMBR*, 74(3), 417-433. doi:10.1128/MMBR.00016-10

Davis, M. E., Liu, T. L., Taylor, Y. J., Davidson, L., Schmid, M., Yates, T., ... & Spencer, M. D. (2017). Exploring patient awareness and perceptions of the appropriate use of antibiotics: A Mixed-Methods Study. *Antibiotics*, 6(4), 23.

Dictionary, M. W. (2006). *The Merriam-Webster Dictionary*. Merriam-Webster, Incorporated.

Drake, K. M., Hargraves, J. L., Lloyd, S., Gallagher, P. M., & Cleary, P. D. (2014). The effect of response scale, administration mode, and format on responses to the CAHPS Clinician and Group survey. *Health services research, 49*(4), 1387-1399.

Eton, D. T., Ridgeway, J. L., Linzer, M., Boehm, D. H., Rogers, E. A., Yost, K. J., ... Anderson, R. T. (2017). Healthcare provider relational quality is associated with better self-management and less treatment burden in people with multiple chronic conditions. *Patient Preference and Adherence, 11*, 1635–1646.

Fan, V., Burman, M., McDonell, M., & Fihn, S. (2005). Continuity of care and other determinants of patient satisfaction with primary care. *Journal of General Internal Medicine, 20*, 226-233. doi:10.1111/j.1525-1497.2005.40135.x

Fernandes, S., & Naidu, S. (2017). Promoting participation in self care management among patients with diabetes mellitus: An application of Peplau's Theory of Interpersonal Relationships. *International Journal of Nursing Education, 9*(4).

Finkelstein, J. A., Huang, S. S., Kleinman, K., Rifas-Shiman, S. L., Stille, C. J., Daniel, J., ... & Goldmann, D. (2008). Impact of a 16-community trial to promote judicious antibiotic use in Massachusetts. *Pediatrics, 121*(1), e15-e23.

Goff, D., Kullar, R., Goldstein, E., Gilchrist, M., Nathwani, D., Cheng, A., & Mendelson, M. (2017). A global call from five countries to collaborate in antibiotic stewardship: United we succeed, divided we might fail. *The Lancet Infectious Diseases, 17*(2), e56-e63. doi:10.1016/S1473-3099(16)30386-3

Gotham, K. F. (2014). *Race, real estate, and uneven development: The Kansas City experience, 1900–2010*. Retrieved from <https://ebookcentral.proquest.com>

Guerrier, M., Legare, F., Turcotte, S., Labrecque, M., & Rivest, L. (2013). Shared decision



- making does not influence physicians against clinical practice guidelines. *PLoS One*, 8(4), e62537. doi:10.1371/journal.pone.0062537
- Hagerty, T., Samuels, W., Norcini-Pala, A., & Gigliotti, E. (2017). Peplau's theory of interpersonal relations: An alternate factor structure for patient experience data? *Nursing Science Quarterly*, 30(2), 160-167. doi:10.1177/0894318417693286
- Harris, A. M., Hicks, L. A., & Qaseem, A. (2016). Appropriate antibiotic use for acute respiratory tract infection in adults: Advice for high-value care from the American College of Physicians and the Centers for Disease Control and Prevention. *Annals of Internal Medicine*, 164(6), 425-434. doi:10.7326/M15-1840
- Hawkings, N., Wood, F., & Butler, C. (2007). Public attitudes towards bacterial resistance: A qualitative study. *Journal of Antimicrobial Chemotherapy*, 59, 1155-1160.
- Henkel, R. J., & Maryland, P. A. (2015). The risks and rewards of value-based reimbursement. *Frontiers of Health Services Management*, 32(2), 3.
- Hicks, L., Taylor, T., & Hunkler, R. J. (2013). U.S. outpatient antibiotic prescribing, 2010. *The New England Journal of Medicine*, 368(15), 1461-1462.
- Holmes, L., Struwe, L., & Waltman, N. (2018). Evaluation of an antibiotic stewardship program in a university health center. *The Journal for Nurse Practitioners*, 14(3), e57-e61. doi:10.1016/j.nurpra.2017.11.025
- Jackson, J., Chamberlin, J., & Kroenke, K. (2001). Predictors of patient satisfaction. *Social Science & Medicine*, 52(4), 609-620. doi:10.1016/S0277-9536(00)00164-7
- Jerant, A., Fenton, J. J., Kravitz, R. L., Tancredi, D. J., Magnan, E., Bertakis, K. D., & Franks, P. (2018). Association of clinician denial of patient requests with patient satisfaction. *JAMA Internal Medicine*, 178(1), 85-91.

- Kemp, K., McCormack, B., Chan, N., Santana, M., & Quan, H. (2015). Correlation of inpatient experience survey items and domains with overall hospital rating. *Journal of Patient Experience, 2*, 1-8.
- Ladd, E. (2005). The use of antibiotics for viral upper respiratory tract infections: An analysis of nurse practitioner and physician prescribing practices in ambulatory care, 1997–2001. *Journal of the American Academy of Nurse Practitioners, 17*(10), 416–424.  
doi:10.1111/j.1745-7599.2005.00072.x
- Lee, T. H., Wong, J. G., Lye, D. C., Chen, M. I., Loh, V. W., Leo, Y. S., ... & Chow, A. L. (2017). Medical and psychosocial factors associated with antibiotic prescribing in primary care: survey questionnaire and factor analysis. *British Journal of General Practice, 67*(656), e168-e177.
- Libman, H., Brockmeyer, D., & Gold, H. (2017). Should we prescribe antibiotics to this patient with persistent upper respiratory symptoms: Ground rounds discussion for Beth Israel Deaconess Medical Center. *Annals of Internal Medicine, 166*(3), 201-208.  
doi:10.7326/M16-2766
- Littmann, J., Buyx, A., & Cars, O. (2015). Antibiotic resistance: An ethical challenge. *International Journal of Antimicrobial Agents, 46*(4), 359-361.  
10.1016/j.ijantimicag.2015.06.010
- Lundborg, C., & Tamhankar, A. (2014). Understanding and changing human behavior-antibiotic mainstreaming as an approach to facilitate modification of provider and consumer behavior. *Uppsala Journal of Medical Sciences, 119*(2), 125-133.  
doi:10.3109/03009734.2014.95664
- Manning, M., Pfeiffer, J., & Larson, E. (2016). Combating antibiotic resistance: The role of

- nursing in antibiotic stewardship. *American Journal of Infection Control*, 44, 1454-1457.  
doi:10.1016/j.ajic.2016.06.023
- Martínez-González, N. A., Coenen, S., Plate, A., Colliers, A., Rosemann, T., Senn, O., & Neuner-Jehle, S. (2017). The impact of interventions to improve the quality of prescribing and use of antibiotics in primary care patients with respiratory tract infections: a systematic review protocol. *British Medical Journal Open*, 7(6), e016253.
- McNulty, C. A., Nichols, T., French, D. P., Joshi, P., & Butler, C. C. (2013). Expectations for consultations and antibiotics for respiratory tract infection in primary care: The RTI clinical iceberg. *British Journal of General Practice*, e429-e433.  
<http://dx.doi.org/10.3399/bjgp13x669149>
- Melnyk, B & Fineout-Overholt, E (2015). *Evidence-based practice in nursing and healthcare: A guide to best practice* (3<sup>rd</sup> ed.). Philadelphia: Wolters Kluwer. The levels of evidence adapted by Lindholm, L (2017) from Melnyk & Fineout-Overholt, Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions (p.11).
- Melnyk, B. M., & Newhouse, R. (2014). Evidence-based practice versus evidence-informed practice: A debate that could stall forward momentum in improving healthcare quality, safety, patient outcomes, and costs: Editorial. *Worldviews on Evidence-Based Nursing*, 11(6), 347-349. 10.1111/wvn.12070
- Newgard, C., Fu, R., Heilman, J., Tanski, M., John Ma, O., Lines, A., & Burton, J. H. (2017). Using press ganey provider feedback to improve patient satisfaction: A pilot randomized controlled trial. *Academic Emergency Medicine*, 24(9), 1051-1059.  
doi:10.1111/acem.13248
- Pourmand, A., Mazer-Amirshahi, M., Jasani, G., & May, L. (2017). Emerging trends in

- antibiotic resistance: Implications for emergency medicine. *American Journal of Emergency Medicine*, 35, 1172-1176. doi:10.1016/j.ajem.2017.03.010
- Prakash, B. (2010). Patient satisfaction. *Journal of Cutaneous and Aesthetic Surgery*, 3(3), 151–155. doi:10.4103/0974-2077.74491
- Roberts, R. M., Albert, A. P., Johnson, D. D., & Hicks, L. A. (2015). Can improving knowledge of antibiotic-associated adverse drug events reduce parent and patient demand for antibiotics? *Health Services Research and Managerial Epidemiology*, 1-5. <http://dx.doi.org/10.1177/2333392814568345>
- Rosenfeld, R. M., Piccirillo, J. F., Chandrasekhar, S. S., Brook, I., Ashok Kumar, K., Kramper, M., ... & Walsh, S. A. (2015). Clinical practice guideline (update): Adult sinusitis. *Otolaryngology–Head and Neck Surgery*, 152(2 suppl), S1-S39.
- Rowbotham, S., Chisholm, A., Moschogianis, S., Chew-Graham, C., Cordingley, A., & Peters, S. (2012). Challenges to nurse prescribers of a no-antibiotic prescribing strategy for managing self-limiting respiratory tract infections. *Journal of Advanced Nursing*, 68(12), 2622-2632. doi:10.1111/j.1365-2648.2012.05960.x
- Rycroft-Malone, J. (2004). The PARIHS framework--a framework for guiding the implementation of evidence-based practice. *Journal of Nursing Care Quality*, 19(4), 297-304. 10.1097/00001786-200410000-00002
- Sanchez, G. V., Hersh, A. L., Shapiro, D. J., Cawley, J. F., & Hicks, L. A. (2016). Outpatient antibiotic prescribing among United States nurse practitioners and physician assistants. *Open Forum Infectious Diseases*, 3(3), 168. doi: org/10.1093/ofid/ofw168
- Schroeck, J. L., Ruh, C. A., Sellick, J. A., Ott, M. C., Mattappallil, A., & Mergenhagen, K. A. (2015). Factors associated with antibiotic misuse in outpatient treatment for upper respiratory tract infections. *Antimicrobial Agents and Chemotherapy*, 59(7), 3848-3852.

- Seshia, S. S., Makhinson, M., Phillips, D. F., & Young, G. B. (2014). Evidence-informed person-centered healthcare part I: Do 'cognitive biases plus' at organizational levels influence quality of evidence? *Journal of Evaluation in Clinical Practice*, 20(6), 734-747.  
10.1111/jep.1228
- Shallcross, L., Beckley, N., Rait, G., Hayward, A., & Peterson, I. (2017). Antibiotic prescribing frequency amongst patients in primary care: a cohort study using electronic health records. *Journal of Antimicrobial Chemotherapy*, 72, 1818-1824.
- Stucky, B. D., Hays, R. D., Edelen, M. O., Gurvey, J., & Brown, J. A. (2016). Possibilities for shortening the CAHPS clinician and group survey. *Medical care*, 54(1), 32-37.
- Tang, W., Soong, C., & Lim, W. (2013). Patient satisfaction with nursing care: A descriptive study using interaction model of client health behavior. *International Journal of Nursing Science*, 3(2), 51-56. doi:10.5923/j.nursing.20130302.04
- Toma, G., Triner, W., & McNutt, L. (2009). Patient satisfaction as a function of emergency department previsit expectations. *Annals of Emergency Medicine*, 54(3), 360-367.  
<http://dx.doi.org/10.1016/j.annemergmed.2009.01.024>
- Truglio-Londrigan, M. (2016). Shared decision-making through reflective practice: Part II. *Medsurg Nursing*, 25(5), 341-345, 350.
- Van Hecke, O., Wang, K., Lee, J., Roberts, N., & Butler, C. (2017). Implications of antibiotic resistance for patients' recovery from common infections in the community: A systematic review and meta-analysis, *Clinical Infectious Diseases*, 65(3), 371-382.
- Welch, S. (2010). Twenty years of patient satisfaction research applied to the emergency department: A qualitative review. *American Journal of Medicine Quality*, 25, 64-72.
- Wills, C. (2010). Sharing decisions with patients: Moving beyond patient-centered care. *Journal*

*of Psychosocial Nursing*, 48(3), 4-5. doi:10.3928/02793695-20100202-03

Wiskirchen, D. E., Summa, M., & Perrin, A. (2016). Antibiotic stewardship: the FP's role. *Journal of Family Practice*, 65(12), 876-885.

Zamora, D. (2012). Using patient satisfaction as a basis for reimbursement: Political, financial, and philosophical implications. *Creative Nursing*, 18(3), 118-23. doi.org/10.1891/1078-4535.18.3.118

Zoffmann, V., Harder, I., & Kirkevold, M. (2008). A person-centered communication and reflection model: Sharing decision-making in chronic care. *Qualitative Health Research*, 18(5), 670-685. doi:10.1177/1049732307311008

## Appendix A

### Definitions

Antibiotic resistance – infections that are unresponsive to an antibiotic treatment (Pourmand, 2017).

Clinical guidelines – The evidence-based treatment considered best for most patients with the diagnosis made by the provider (Rosenfeld, 2015).

Multidrug resistant – infections that are unresponsive two or more antibiotic treatments (Davies & Davies, 2010).

Patient satisfaction – A patient's perception of the treatment and interaction when visiting the provider (Prakash, 2010).

Shared decision-making – the stepwise approach to determining the best treatment by communication between the patient and provider (Zoffman et al., 2008).

Viral infection – An infection that is determined to not be bacterial, thus not requiring an antibiotic (Dictionary, M. W., 2006).

Appendix B



Logic Model for DNP Project					
Student: Ami Koelliker					
Inquiry, PICOTS: In adults over the age of 18, how does shared decision-making and education about the appropriate use of antibiotics influence patient satisfaction from October 1st to April 30th in a primary care clinic?					
Inputs	Intervention(s)		Outcomes -- Impact		
	Activities	Participation	Short	Medium	Long
<p><b>Evidence, sub-topics</b></p> <ol style="list-style-type: none"> <li>1. Patient Expectations of Antibiotics</li> <li>2. Education and Communication</li> <li>3. Patient Satisfaction</li> <li>4. Guidelines and Antibiotic Stewardship</li> </ol> <p><b>Major Facilitators or Contributors</b></p> <ol style="list-style-type: none"> <li>1. Clinical Manager</li> <li>2. Providers</li> <li>3. Support Staff</li> <li>4. Patient Participants</li> </ol> <p><b>Major Barriers or Challenges</b></p> <ol style="list-style-type: none"> <li>1. Provider participation</li> <li>2. Obtaining patient satisfaction survey results in timely manor</li> <li>3. Too many patients with comorbidities</li> </ol>	<p><b>EBP intervention</b></p> <p>Education to patients with URI – short video, pamphlet regarding antibiotic prescribing and resistance, poster in patient room.</p> <p><b>Major steps of the intervention (brief phrases)</b></p> <ol style="list-style-type: none"> <li>1. Short lunch and learn to encourage provider participation.</li> <li>2. Provide 3-5 minute video to patients in the waiting room.</li> <li>3. Provide educational pamphlet to give more information.</li> <li>4. Reference poster during shared decision making in patient room.</li> </ol>	<p><b>The participants</b></p> <p>Patients in the clinic with upper respiratory infection</p> <p><b>Site</b></p> <p>Duchesne Clinic or Saint Lukes Primary Care clinic</p> <p><b>Time Frame</b></p> <p>October to April</p> <p><b>Consent</b></p> <p>Obtained before presenting video</p> <p><b>Other person(s) collecting data</b></p> <p>No</p> <p><b>Others directly involved in consent or data collection</b></p> <p>Possibly front desk staff</p>	<p><b>(Completed during DNP Project)</b></p> <p><b>Outcome(s) to be measured from previous you</b></p> <p>Primary: Patient Satisfaction scores</p> <p>Secondary: Antibiotic prescribing rates per patients seen</p> <p><b>Measurement tool(s)</b></p> <ol style="list-style-type: none"> <li>1. HCAPS (or similar)</li> <li>2. quantitative results of type of URI and antibiotic prescribed from previous year</li> </ol> <p><b>Statistical analysis to be used</b></p> <ol style="list-style-type: none"> <li>1. Mann-Whitney <i>U</i></li> <li>2. t test</li> </ol>	<p><b>(after student DNP)</b></p> <p><b>Outcomes to be measured after intervention</b></p> <p>Primary: Patient Satisfaction scores</p> <p>Secondary: Antibiotic prescribing rates per patients seen.</p>	<p><b>(after student DNP)</b></p> <p><b>Outcomes that are potentials</b></p> <p>Patient satisfaction scores will either remain the same or improve due to intervention with education. Antibiotic prescribing will decrease compared to previous year.</p>

Appendix C

Hierarchy of Evidence

<b>Rating System for the Hierarchy of Evidence                      For an Interventional Inquiry</b> (Modification by Dr. Lindholm for course N5613)	
Level I	Evidence from a systematic review or meta-analysis of all relevant RCTs. <i>Evidence-based clinical practice guidelines based on systematic reviews of RCTs</i> .*
Level II	Evidence obtained from well-designed RCT. <i>Quantitative systematic review of well-designed controlled trial without randomization.</i>
Level III	Evidence obtained from well-designed controlled trial without randomization ( <i>quasi-experimental</i> ). <i>Quantitative systematic review of case-control, cohort, or correlational studies.</i>
Level IV	Evidence from well-designed case-control or cohort study ( <i>or cross-sectional study</i> )
Level V	Evidence from systematic review of <i>quantitative</i> descriptive ( <i>no relationships to examine</i> ) or qualitative studies.
Level VI	Evidence from a single <i>quantitative</i> descriptive ( <i>no relationships to examine in the study</i> ) or qualitative study
Level VII	Evidence from the opinion of authorities and/or reports of expert committees

Melnyk, B.M.& Fineout-Overholt., E. (2015). *Evidence-based practice in nursing and healthcare*. Philadelphia Lippincott Williams & Wilkins.

Appendix D

Evidence Table

In adults over the age of 18, how does shared decision-making and education about the appropriate use of antibiotics influence patient satisfaction from October 1st to April 30th in a primary care clinic?						
First author, Year, Title, Journal	Purpose	Research Design <sup>1</sup> , Evidence Level <sup>2</sup> & Variables	Sample & Sampling, Setting	Measures & Reliability (if reported)	Results & Analysis Used	Limitations & Usefulness
<b>Antibiotic Stewardship</b>						
Goff, D. A. (2017) A global call from five countries to collaborate in antibiotic stewardship: united we succeed, divided we might fail. <i>The Lancet</i>	Review antibiotic stewardship education in other countries	Level V  Review of the WHO mandate and five countries approach.	n/a	n/a	Each approach has positive outcomes against resistance. Providers must seek change in prescribing, system wide and nationally.	No statistical analysis of the tools used to educate.  Useful to discuss the need for individual and international change to impact the antibiotic resistance problem.
Lee (2017) Medical and psychosocial factors associated with antibiotic prescribing in primary care: survey questionnaire and factor analysis.	To evaluate knowledge, attitudes, and practices for antibiotic prescribing	Single Qualitative study  Level V	Singapore survey of primary care providers. N=351 in private practice, n=76 in multi-care practice	Utilized factor analysis and varimax rotation to preserve factors. Logistic regression performed to identify factors. STATA 5% significance	Medical knowledge, competency, good clinical practice was associated with decreased antibiotic prescribing. OR	Limitations: Bias possible with choosing to not participate.  Positive: Protection of identity and no financial gain.

<i>British Journal of General Practice</i>			Likert scale 1-5 appropriateness of prescribing <u>abx</u> for URI		3.2 with CI 2.4-4.3  Conservative (treat just in case) was significantly associated with prescribing OR 0.7 (CI 0.5-0.9)	
Shallcross, L. (2017) Antibiotic prescribing frequency amongst patients in primary care: a cohort study using electronic health records. <i>Journal of Antimicrobial Chemotherapy</i>	To investigate the relationship between overall <u>abx</u> use and use for individuals with comorbidities	Design: Retrospective Cohort study Level III	UK, medical record data base, ages 18-100, antibiotic usage over 3-year period. N= 1.9 million patients  Primary Care	THIN database has been proven as an accurate representation of the national healthcare documentation in UK.	Negative binomial regression model and incidence rate ratios were utilized.  Amongst patients with comorbidities: <u>abx</u> prescription rate increased by 1/3. (95% CI 2.98-3.04) Smokers: increased 13% over non.	Limitations: Unable to measure the appropriateness of the antibiotics prescribed. Patients that died or changed providers are excluded.  Useful: data is broken down by 10 major comorbidities and number of antibiotics prescribed over 3 years.
Harris, A. M. (2016) Appropriate Antibiotic Use for Acute	Presents best practices for acute respiratory infections: bronchitis,	Systematic Review of EBP Level I	Acute uncomplicated bronchitis n=15	The article only presents the recommendations for treatment	Narrative review. Clinical guidelines from IDSA.	The article does not give further statistical analysis for the reader.

<p>Respiratory Tract Infection in Adults: Advice for High-Value Care <u>From</u> the American College of Physicians and the Centers for Disease Control and Prevention. <i>Annals of Internal Medicine</i></p>	<p>pharyngitis, rhinosinusitis, common cold</p>		<p>Total articles referenced n=69</p>	<p>with/without antibiotics.</p>	<p>EBP meta-analysis. Literature review. Article reviewed by CDC and ACP High Value Care Task Force.  No statistical analysis</p>	<p>Useful: The article was presented to the CDC for establishing practice guidelines for 5 ARTIs</p>
<p><u>Schroeck</u> (2015) Factors associated with antibiotic misuse in outpatient treatment for upper respiratory tract infections. <i>Journal of American Society for Microbiology</i></p>	<p>Examined all URIs in the Get Smart campaign and looked at prescribing rates and clinical presentation.</p>	<p>Retrospective chart review with randomized consecutive sampling of otherwise healthy Adults. Level III</p>	<p>VA primary care chart review  n= 1662</p>	<p>Multivariant regression was used to determine predictors of correct treatment. Odds Ratio with CI 95%</p>	<p>Bivariant analysis to compare those treated appropriately or inappropriately.  35% of patients were treated per Get Smart protocol and overall 77% received an antibiotic.</p>	<p>Limitations: No data validates the Get Smart campaign definition of inappropriate. Only veterans in the VA setting. Due to being retrospective some information may have not been documented.  Useful discussion of Get Smart.</p>
<p><u>Costelloe</u>, C. (2010). Effect of</p>	<p>To evaluate the prescribing rates</p>	<p>Systematic review and</p>	<p>24 studies</p>	<p>Quantitative relationships</p>	<p>Comparison of different</p>	<p>Limitations are this is publication</p>

<p>antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis. <i>British Medical Journal</i></p>	<p>in PRIMARY CARE and correlation to antibiotic resistance.</p>	<p>meta-analysis of similar studies Level I</p>	<p>5 RCT 19 observational (2 prospective) 17 retrospective controlled or case controlled</p>	<p>between primary care prescribed <u>abx</u> and subsequent <u>abx</u> resistance  Odds ratio of resistance exposed to <u>abx</u></p>	<p>antibiotics in same class do not reduce resistance.  Resistance is noted at <u>6-12 month</u> period. (p=0.004)  Concludes that primary care contributes to resistance problem.  Forest Plot</p>	<p>bias noted for urinary tract infections.  Useful: Explanation to providers the need to be good stewards now and impact may be later.</p>
<p>Patient expectations</p>						
<p>Davis, M. E. (2017). Exploring Patient Awareness and Perceptions of the Appropriate Use of Antibiotics: A Mixed-Methods Study. <i>Antibiotics</i></p>	<p>This study shows evidence of patients misunderstanding of antibiotics</p>	<p>Sequential explanatory mixed methods Quantitative and qualitative Level IV</p>	<p>n=190 primary care clinics and urgent care locations that are part of a large integrated health care system in North Carolina</p>	<p>16-item paper-based <u>Lickert</u> survey A literature review and iterative process was used to validate.  p= 0.03 for understanding of need for antibiotic</p>	<p>53% of patients thought <u>abx</u> work for virus  College educated 58% vs. w/o college education 41%, (p = 0.04) to believe that taking an antibiotic unnecessarily can weaken how well the antibiotic will work for other</p>	<p>Limitations include that only 4 patients participated in the qualitative portion.  Useful: adds to existing knowledge by highlighting when and how to communicate with patients about the</p>

					people in the future <u>Fischer's</u> Exact Test	appropriate use of antibiotics in their treatment.
Courtenay, M. (2017), Antibiotics for acute respiratory tract infections: a mixed-methods study of patient experiences of non-medical prescriber management. <i>BMJ Open</i>	Examine whether patient expectation impact likelihood of receiving an antibiotic  Understand patient satisfaction with ARTI visit	Qualitative and Quantitative  Level IV	UK Patients n=120 (quantitative) and n=22 (qualitative)  NP n=16  Primary care	Likert scale of satisfaction. (1-5)  Qualitative: line-by-line coding utilized with independent coding of two researchers.	Quantitative: Fisher's test used for patient expectations and management strategies received. (p<0.001)  $\alpha$ 0.05 applied for age groups, symptoms or Bonferroni correction was used to control for type 1 error	Limitations: Unsure if dissatisfied patients were filtered out by providers.  Useful: First study to look at links between NP and RTI patient experience. Patients reported exam, communicating plan and explaining treatment impacts satisfaction.
<u>Coxeter</u> , P. (2017) Parents' expectations and experiences of antibiotics for acute respiratory infections in primary care.	Explore beliefs of families regarding antibiotic necessity.	Randomized quantitative study  Level II	Australia phone interviews of parents with children age 1-12 years.  n=401	Verified reliability and validity with 37 interviews  Likert like scale of Yes, Sometimes, No, don't know.	72% of families do not recall talking with provider about antibiotics. Parents over estimated the value of	Limitations: Only contacted landlines not mobile. Sample had higher number of educated parents.

<i>Annals of Family Medicine</i>					antibiotics for cough (p<0.5).	Useful: Large sample size. Questions about expected benefit of antibiotics.
McNulty (2013) Expectations for consultations and antibiotics for respiratory tract infection in primary care: the RTI clinical iceberg. <i>British Journal of General Practice</i>	Estimate how many patients' URI in last 6 mo., treatment, expectations for <u>abx</u> treatment and patient adherence	Two <u>phase</u> - Randomized Qualitative study  Level V	England with recent complaint of URI  Phone interview n=1767 and personal interview n=17	Recorded interviews, subjected to thematic analysis and coded. Significance test with Person chi square test.	53% that contacted provider expected antibiotics. 24% believed antibiotic works on cough/colds. 40% believe cough with green phlegm can be shortened with antibiotics.	Limitations: survey was retrospective up to 6 months – patients may have forgotten details.  Positive: Reviews motives for contacting providers.
<u>Hawkings</u> , N. (2007) Public attitudes towards bacterial resistance: a qualitative study. <i>Journal of Antimicrobial Chemotherapy</i>	Understanding attitudes of the public regarding bacterial resistance.	Qualitative  Level V	Sample from urban, rural and industrial populations  n=46	Interview guide with questions about resistance.  Compared to quantitative studies independently.	Limited understanding of bacterial resistance and low understanding of personal responsibility or risk.  No reason to change on personal level.	Limitations: Eleven of the participants have a strong science background leaving the sample at 35. Considerable number are female in one age group.  Useful: Evaluates general understanding.



Education & Communication						
<p>Holmes, L. (2018) Evaluation of a n antibiotic stewardship program in a university health center. <i>The Journal for Nurse Practitioners</i></p>	<p>Evaluate program to inform providers the critical necessity for antibiotic management and how to discuss with pt.</p>	<p>Quasi experimental – repeated measures  Level III</p>	<p>Primary care office - <u>Univ Nebraska</u>  n=7 providers n=100 patients Half acute sinusitis and half acute bronchitis</p>	<p>Antibiotic stewardship survey 1-9 <u>likert scale</u> Factor analysis used for questionnaire <math>\alpha=.92</math> Pre/post/2 months intervention survey presented to providers. Data for <u>abx</u> prescribing obtained from charts. 60-minute presentation on appropriate prescribing and strategies for discussing with patients.</p>	<p>Prescribing rates decreased (p=.08) with the program implementation. Providers felt the patients were more satisfied (p=.02) even with rates down.  Utilized chi square and independent t test</p>	<p>Limitations: Although rates of prescribing decreased, a <u>large number of meds</u> were prescribed although the clinical guidelines suggest they were not necessary  Useful: Represents a similar study concept of this author.</p>
<p>Hagerty, T. (2017) Peplau’s theory of interpersonal relations: an alternate factor structure for</p>	<p>Apply Peplau’s interpersonal theory to HCAPS survey related to patient understanding.</p>	<p>Randomized Retrospective quantitative  Level II</p>	<p>Patients with at least one overnight stay on <u>med-surg</u> or maternity  n=12,436</p>	<p>HCAPS survey  SPSS analyzed multivariate norms and missing data.</p>	<p>Three factor <u>model</u> of Peplau is comparable to HCAPS and questions from it can be used to determine if</p>	<p>Limitation: Measured in only one hospital system. Approximately 20% was removed from</p>

<p>patient experience data? <i>Nursing Science Quarterly</i></p>				<p>BIC approximation and chi-square.</p>	<p>Peplau's theory is useful for gauging communication quality. Three Factor (<math>\chi^2=129.74</math>, <math>p&lt;.0001</math>)</p>	<p>study due to missing information.  Useful: Studied nursing theory application.</p>
<p>Roberts, R. (2015) Can improving knowledge of antibiotic-associated adverse drug events reduce parent and patient demand for antibiotics? <i>Health Services Research and Managerial Epidemiology</i></p>	<p>Explore patient knowledge and feelings about antibiotic use/adverse effects.</p>	<p>Randomized Qualitative  Level V</p>	<p>Outpatient setting: Patients or parents of children 2-11 years old.  n=45</p>	<p>Themes emerged to be coded and were completed twice. Cohen <math>k=.67</math> Intercoder Reliability was 20%</p>	<p>Parents are interested in discussing adverse reactions and adults were not as willing.</p>	<p>Limitations: Small sample size. May not be generalizable.  Useful: Noted differences between parent view point and adults personal care.</p>
<p>Guerrier, M. (2013) Shared decision making does not influence physicians against clinical practice guidelines. <i>PLOS One</i></p>	<p>Providers intentions to use shared decision making and clinical guidelines together after education/training for antibiotic</p>	<p>Multicenter, two <u>arm</u>, Clustered randomized trial  Level III</p>	<p>Primary care Providers Canada  n=242</p>	<p>DECISION+2 intervention. Quebec CPGs were reviewed. Likert scale -3 to +3. Measured attitude. Correlation measure with pair t test.</p>	<p>Initially intent for SDM low after study completed intent to use SDM and CPG were equal. <math>p&lt;.05</math>  There should not be concern for</p>	<p>Limitations: Embedded into another study not designed for SDM. Not able to infer to other practices.  Useful: Evidence based practice</p>

	treatment for URI.				utilizing both practices together.	and shared <u>decision making</u> tools can be utilized simultaneously.
<p><u>Rowbotham, S. (2012)</u> Challenges to nurse prescribers of a no-antibiotic prescribing strategy for managing self-limiting respiratory tract infections. <i>Journal of Advanced Nursing</i></p>	Examine the experience of NP in managing patients with ARTI	<p>Qualitative study and literature review</p> <p>Level V</p>	<p>UK: N=35 NPs</p> <p>Semi structured interviews (n=14) and focus groups (n=21)</p> <p>Primary Care</p>	<p>Conceptual categories were organized by theme. Data collection analysis was completed with parallel sampling.</p> <p>Interviews were analyzed by multiple team <u>members</u>, all interviews were recorded to preserve accuracy of data.</p>	<p>Themes Identified:</p> <p>Reason for visit</p> <p>Challenges with <u>RTI bacterial</u> vs viral</p> <p>Physician override of non-prescribing NP</p> <p>Patient education key</p> <p>Reinforcement of no prescribing practice to patient</p> <p>Address patient concerns</p>	<p>Limitations:</p> <p>Concern if NP answered questions as “expected” vs disclose real experiences. Bias may have been prevalent due to study being performed alongside an educational training session.</p> <p>Recommends future study of actual behavior of NP with patients</p>
<p>Finkelstein, J.A. (2008) Impact of a 16-Community Trial to Promote Judicious Antibiotic Use in Massachusetts. <i>Pediatrics</i></p>	Community wide intervention to educate regarding unnecessary antibiotics with children	<p>Cluster-randomized trial over 3 years</p> <p>Level II</p>	<p>Massachusetts communities</p> <p>N=223,135</p> <p>Primary care</p>	Physician education of what the community received, parent intervention (REACH) with education	With children 4-6 years of age, 6.7% decrease overall with intervention (p=0.0001) and 9% decrease in Medicaid pts.	<p>Limitations:</p> <p>Studies were done on individual communities and there may be differing</p>

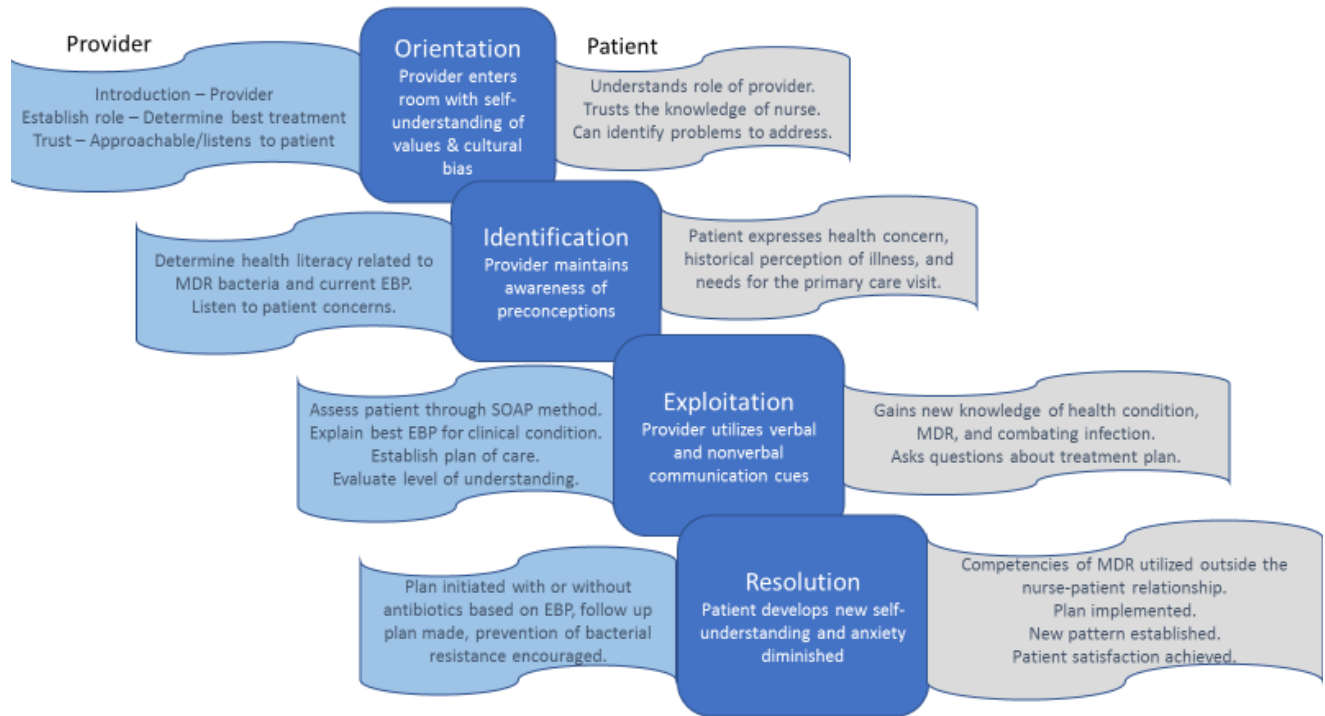
			Compare insured and Medicaid patients			practices amongst them.  Useful: Proves intervention does impact overall use of <u>abx.</u>
<b>Patient Satisfaction</b>						
Jerant, A. (2018) Association of clinician denial of patient requests with patient satisfaction. <i>Journal of American Medical Association: Internal Medicine</i>	Measured patient satisfaction and denied patient requests	Cross sectional study – convenience sample Level IV	University of California family medicine  n=1141 with 1319 office visits	CG-CAHPS survey (Z score), yes/no questions, Likert scale via tablet/device  Performed a sensitivity analysis and adjusted for patient characteristics	80% of patient requests were met. Overall if requests were not made, satisfaction scores decreased. Most frequent request was laboratory testing. Dissatisfaction was decreased by 20 <u>percentile</u> for medication requests.	Limitations: the p value for antibiotics was .76 which was much higher than any of the other items measured.  Positive: Recommends targeted clinician training in brief communication approaches to foster positive experience.
Ashworth, M. (2016) Antibiotic prescribing and patient satisfaction in primary care in England: cross	To determine if there is a link between antibiotic prescribing and patient satisfaction	Retrospective cross-sectional study  Level III	UK  Data from national database: n=7800 GP	General Practice Patient Survey  Quality and Outcomes Framework	Lower prescribing rates correlates with lower satisfaction scores. Which is 3-6 centile drop	Limitations: Unable to determine how many of the respondents received an antibiotic in last

<p>sectional analysis of national patient survey data and prescribing data. <i>British Journal of General Practice</i></p>			<p>offices and <u>abx</u> prescribing rate</p> <p>Satisfaction survey n=982,999</p>	<p>dataset for England</p>	<p>in satisfaction ranking. B regression model high predictive power CI 95% with all questions in survey related to patient satisfaction</p>	<p>year. Does not include visits to emergency room or urgent care setting.</p> <p>Useful: Antibiotic prescribing was found to impact satisfaction.</p>
<p><u>Toma, G.</u> (2009) Patient satisfaction as a function of emergency department <u>previst</u> expectations. <i>Annals of Emergency Medicine</i></p>	<p>Determine the impact of patient expectations with patient satisfaction.</p>	<p>Cross-sectional with consecutive sampling</p> <p>Level III</p>	<p>ED urban setting. June-September.  n=504</p>	<p>Data utilized was from third draft of tool, but no outcome measures were used to measure reliability. Sample size was determined by bivariant assoc. Poisson regression.</p>	<p>Overall satisfaction was related to interpersonal skills and explanation by provider NOT by expectations alone.</p> <p>Ethnic and socioeconomic status affected satisfaction.</p>	<p>Limitations: Excluded extremely ill or language/literacy barrier. Suggested they had a shift toward satisfaction with communication.</p> <p>Useful: Tool used to measure satisfaction and patient expectations.</p>

Melnyk, B & Fineout-Overholt, E (2015). *Evidence-based practice in nursing and healthcare: A guide to best practice* (3<sup>rd</sup> ed.). Philadelphia: Wolters Kluwer. The levels of evidence adapted by Lindholm, L (2017) from Melnyk & Fineout-Overholt, Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions (p.11)

Appendix E

Peplau’s Theory of Interpersonal Relationships Applied to EBP



Peplau, H. (1992). Interpersonal Relations: A theoretical framework for application in nursing practice. *Nursing Science Quarterly*, 5(1), 13-18.

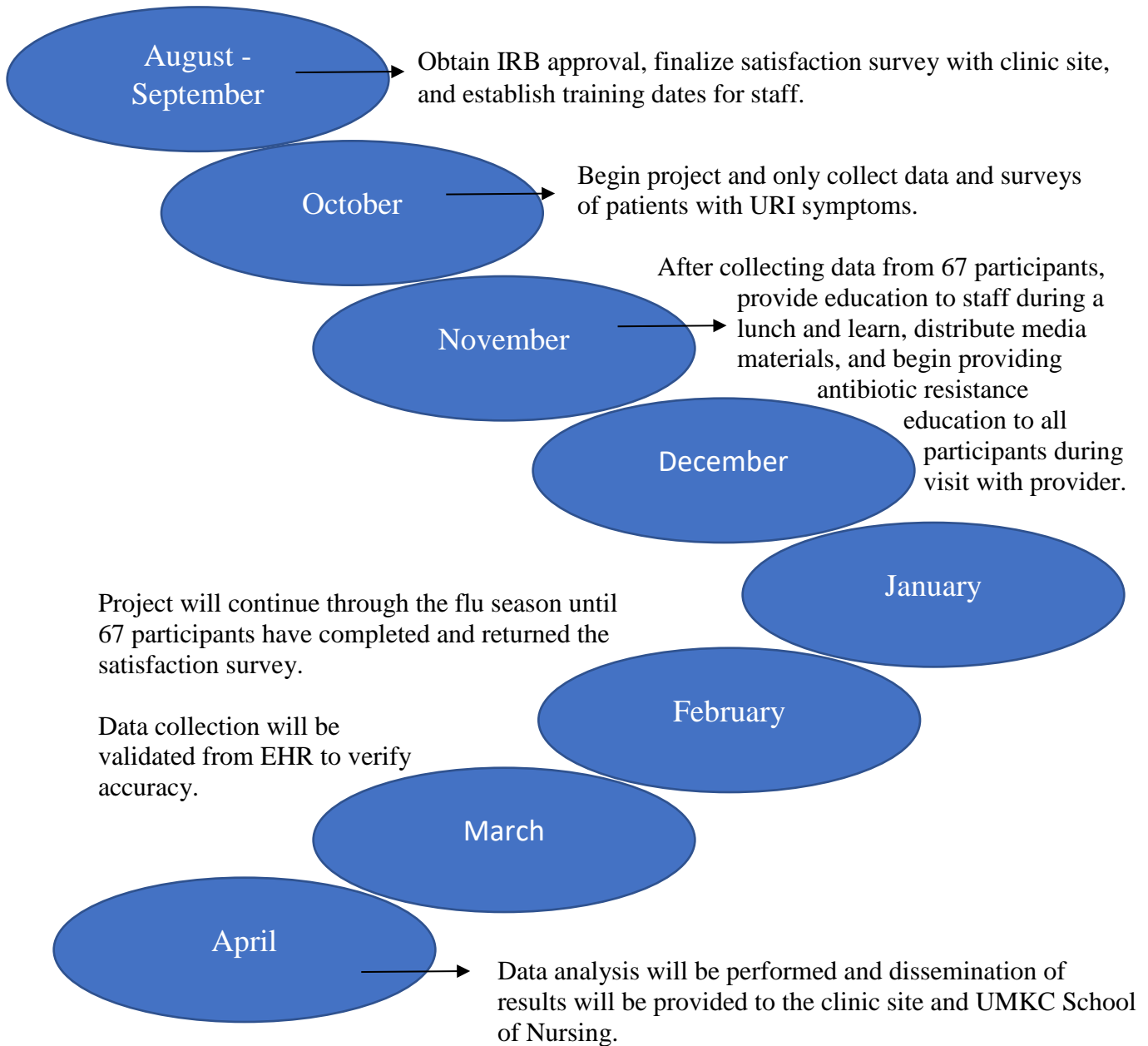
## Appendix F

Table 1. Budget and Cost

Item	Description	Quantity	USD
Disposable head phones	TFD Supplies Wholesale Bulk Earbuds Headphones	100	\$78.95
CDC Antibiotic Resistance Materials	Printing fee (posters/brochures)	10/400	\$750
Office supply	Copy Paper	500	\$27.49
Cleaning	Microfiber Tablet/PC Cleaner Cleaning Cloth Kit with Antimicrobial Technology	4	\$43.80
Cleaning	Surface Disinfectant Super Sani-Cloth Wipes	160	\$9.95
Participant appreciation	Sonic Route 44 drink coupon (\$2)	100	\$200.00
Results Analysis	DNP Student	1	(\$1,500.00) Donated
Personnel	DNP Student 12 hour/day (\$31.25/hr)	14 days	(\$5,250) Donated
Equipment	Apple Ipad (donated/used)	4	\$736
	Funds Needed		\$1846.19
	Donated		\$6,750
	<b>Total Costs</b>		<b>\$8,596.19</b>

Appendix G

Project Timeline Flow Graphic





## Appendix H

## Recruitment Introduction

“During this visit, do you need to talk to your provider about an upper respiratory infection that may include: Complaints of cough, sore throat, nasal drainage, ear pain, and sinus pressure?”

If yes, continue below.

“Would you be willing to participate in an educational study about upper respiratory infections and antibiotics? “

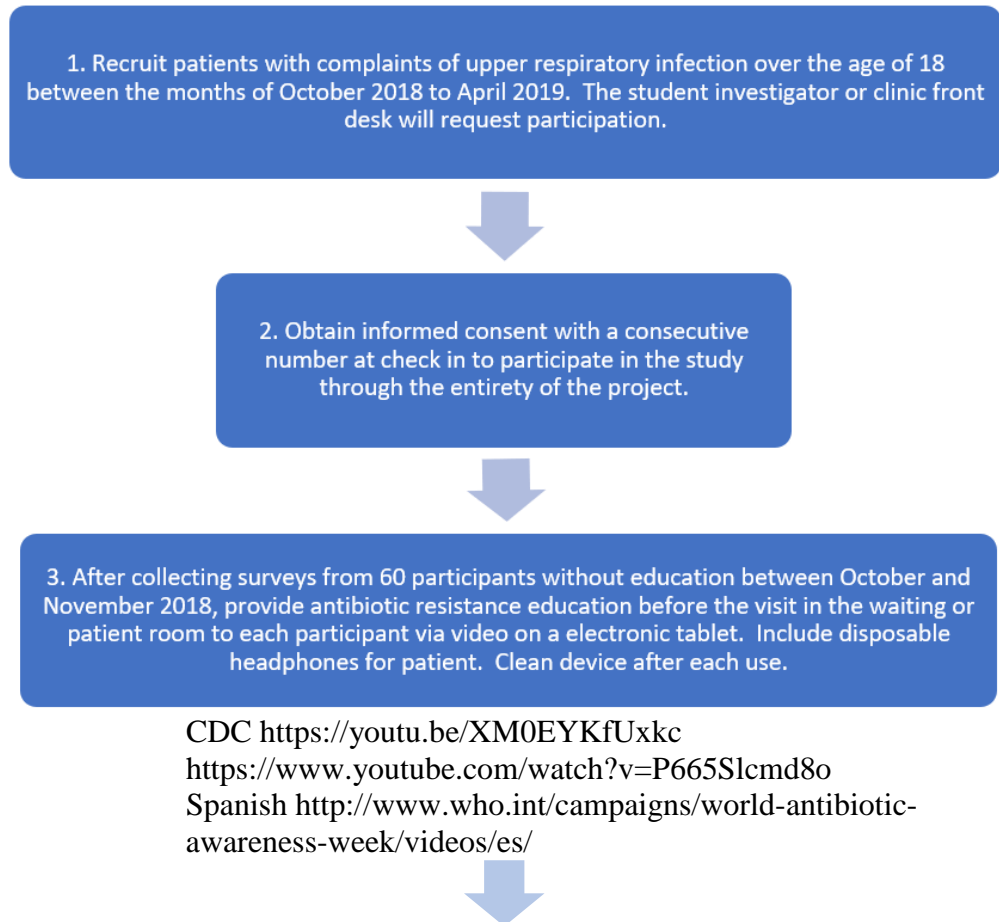
If yes, continue below.

“By agreeing to participate, you are agreeing to watch a short video, review materials about antibiotic resistance, and complete a brief survey after the visit. Your personal health information will be kept private and anonymous.”

Present the ipad with the video loaded in the appropriate language while waiting for their provider.

## Appendix I

## Intervention Participant Flow Diagram



4. During October and November the provider will perform care as appropriate. December through April, provide appropriate care to participants with shared decision making during visit for upper respiratory infection. Antibiotic resistance education pamphlet will be given and posters will be in the patient rooms.



5. Give every participant through the entirety of the project, a patient satisfaction survey (with same consecutive number as consent form) in the appropriate language when leaving the clinic with self addressed envelope to complete and return.



6. Review chart to obtain demographics, diagnosis, treatment, and plan of all patients in the study.

## Appendix J

### Permission for Educational Materials



Mon 6/10/2018 1:15 PM

CDCInfo <cdcinfo@cdcinqury.onmicrosoft.com>

RE: CDC-INFO: DNP project for antibiotic resistance in Kansas City [CDC-27544-V4J3F5] CRM:0006894

To: Koelliker, Ami L. (UMKC-Student)

Action Items

+ Get more ad

We hope you find the following information about CDC publications helpful.

CDC Stacks is a free, digital collection of scientific research and literature. This online repository includes all issues of CDC's *Morbidity and Mortality Weekly Report (MMWR)* and articles from CDC journals like *Emerging Infectious Diseases (EID)* and *Preventing Chronic Disease (PCD)*. The repository also includes peer-reviewed articles written by CDC personnel or sponsored by CDC grants and contracts published in commercially published scientific journals since 2013.

CDC Stacks is tailored for public health research needs and is available for public health professionals, researchers, and the general public. It contains journal articles, journal issues, reports, pamphlets, fact sheets, posters, and maps.

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Appendix K

CDC Antibiotics Awareness Reproducible Handouts

# 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.



Antibiotics are only needed for treating certain infections caused by bacteria.

Antibiotics do NOT work on viruses.

## 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.

## 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.



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.

Each year in the United States, at least **2 million people** get infected with antibiotic-resistant bacteria. At least **23,000 people** die as a result.

## 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](http://www.cdc.gov/antibiotic-use).



# Virus o bacterias ¿Qué lo enfermó?

Los antibióticos solo tratan las infecciones bacterianas. Las enfermedades virales no pueden ser tratadas con antibióticos. Si no le recetan antibióticos, pídale a su médico o enfermero que le dé consejos sobre cómo aliviar los síntomas y sentirse mejor.

Enfermedad	Causa habitual		Se necesitan antibióticos
	Virus	Bacterias	
Resfriado/Moqueo	✓		<b>NO</b>
Bronquitis (en niños y adultos que, excepto por la bronquitis, están sanos)	✓		<b>NO</b>
Tosferina		✓	Sí
Influenza (gripe)	✓		<b>NO</b>
Infección estreptocócica de la garganta		✓	Sí
Dolor de garganta (excepto en infecciones estreptocócicas de la garganta)	✓		<b>NO</b>
Líquido en el oído medio (otitis media exudativa)	✓		<b>NO</b>
Infección urinaria		✓	Sí



*Los antibióticos no son siempre la solución.*

**INFÓRMESE**  
Automedicarse con antibióticos puede perjudicar su salud



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

[www.cdc.gov/antibioticos](http://www.cdc.gov/antibioticos)

## Appendix L

## IRB Approval



FAX: (816) 235-5602

**NOT HUMAN SUBJECTS RESEARCH DETERMINATION**

Principal

Investigator: Ms.

Janet Wood

6372 S. Farm Rd.

119

Brookline Station, MO 65619

Protocol Number: 18-209

Protocol Title: Patient Satisfaction Outcomes Following Antibiotic Resistance  
Education for Adults in Primary Care Type of Review: Not Human Subjects  
Determination

**Date of Determination: 07/27/2018**

Dear Ms. Wood,

The above referenced study, and your participation as a principal investigator, was reviewed and determined to be Not Human Subjects Research (NHSR). As such, your activity falls outside the parameters of IRB review. You may conduct your study, without additional obligation to the IRB, as described in your application.

The NHSR Determination is based upon the following Federally provided definitions:

**"Research"** is defined by these regulations as "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge."



The regulations define a "**Human Subject**" as "a living individual about whom an investigator (whether professional or student) conducting research obtains: data through intervention or interaction with the individual, or identifiable private information."

Attachments include the following:

Zauke Letter for DNP Project.pdf; CAHPS questions.docx; CDC handouts.docx; CDC permission.docx; Intervention diagram with video links.docx; Participant introduction.docx; Timeline.docx; Methodology.docx; Koellikerfacultyapproval.pdf

All Human Subjects Research must be submitted to the IRB. If your study changes in such a way that it becomes Human Subjects Research, please contact the Research Compliance office immediately for the appropriate course of action.

Please contact the Research Compliance Office (email: [umkcirb@umkc.edu](mailto:umkcirb@umkc.edu); phone: (816)235-5927) if

you have questions or require further information. Thank you,



Rebekah Lee

UMKC IRB Administrative Office

## Appendix M

## Short Version CAHPS Survey - English

**Survey Instructions**

Answer each question by marking the box to the left of your answer.

- 1
- 2
- 3
- 4

**11.** In the last 6 months, how often did this provider explain things in a way that was easy to understand?

- 1 Never
- 2 Sometimes
- 3 Usually
- 4 Always

**12.** In the last 6 months, how often did this provider listen carefully to you?

- 1 Never
- 2 Sometimes
- 3 Usually
- 4 Always

**13.** In the last 6 months, how often did this provider seem to know the important information about your medical history?

- 1 Never
- 2 Sometimes
- 3 Usually
- 4 Always

**14.** In the last 6 months, how often did this provider show respect for what you had to say?

- 1 Never
- 2 Sometimes
- 3 Usually
- 4 Always

**15.** In the last 6 months, how often did this provider spend enough time with you?

- <sup>1</sup> Never
- <sup>2</sup> Sometimes
- <sup>3</sup> Usually
- <sup>4</sup> Always

**17.** In the last 6 months, when this provider ordered a blood test, x-ray, or other test for you, how often did someone from this provider’s office follow up to give you those results?

- <sup>1</sup> Never
- <sup>2</sup> Sometimes
- <sup>3</sup> Usually
- <sup>4</sup> Always

**18.** Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?

- 0 Worst provider possible
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 Best provider possible

**20.** In the last 6 months, how often did you and someone from this provider’s office talk about all the prescription medicines you were taking?

- <sup>1</sup> Never
- <sup>2</sup> Sometimes
- <sup>3</sup> Usually
- <sup>4</sup> Always

## Appendix N

## Short Version CAHPS Survey – Spanish

**Instrucciones para el cuestionario**

Conteste cada pregunta marcando el cuadrado que aparece a la izquierda de la respuesta que usted elija.

- 1
- 2
- 3
- 4

**11.** En los últimos 6 meses, ¿con qué frecuencia este profesional médico le explicó las cosas de una manera fácil de entender?

- 1 Nunca
- 2 A veces
- 3 La mayoría de las veces
- 4 Siempre

**12.** En los últimos 6 meses, ¿con qué frecuencia este profesional médico le escuchó con atención?

- 1 Nunca
- 2 A veces
- 3 La mayoría de las veces
- 4 Siempre

**13.** En los últimos 6 meses, ¿con qué frecuencia este profesional médico parecía saber la información importante sobre sus antecedentes médicos?

- 1 Nunca
- 2 A veces
- 3 La mayoría de las veces
- 4 Siempre

**14.** En los últimos 6 meses, ¿con qué frecuencia este profesional médico demostró respeto por lo que usted tenía que decir?

- <sup>1</sup>  Nunca  
<sup>2</sup>  A veces  
<sup>3</sup>  La mayoría de las veces  
<sup>4</sup>  Siempre

**15.** En los últimos 6 meses, ¿con qué frecuencia este profesional médico pasó suficiente tiempo con usted?

- <sup>1</sup>  Nunca  
<sup>2</sup>  A veces  
<sup>3</sup>  La mayoría de las veces  
<sup>4</sup>  Siempre

**17.** En los últimos 6 meses, cuando este profesional médico le mandó a hacerse una prueba de sangre, rayos X o alguna otra prueba, ¿con qué frecuencia alguien del consultorio de este profesional médico se comunicó con usted para darle los resultados?

- <sup>1</sup>  Nunca  
<sup>2</sup>  A veces  
<sup>3</sup>  La mayoría de las veces  
<sup>4</sup>  Siempre

**18.** Usando un número del 0 al 10, el 0 siendo el peor profesional médico posible y el 10 el mejor profesional médico posible, ¿qué número usaría para calificar a este profesional médico?

- 0 El peor profesional médico posible  
 1  
 2  
 3  
 4  
 5  
 6  
 7  
 8  
 9  
 10 El mejor profesional médico posible

**20.** En los últimos 6 meses, ¿con qué frecuencia habló usted con alguien de este consultorio médico acerca de todas las medicinas recetadas que usted estaba tomando?

- <sup>1</sup>  Nunca
- <sup>2</sup>  A veces
- <sup>3</sup>  La mayoría de las veces
- <sup>4</sup>  Siempre

**CAHPS Clinician & Group Adult Survey 3.0**

CAHPS Surveys and Guidance (2017). Agency for Healthcare Research and Quality, Rockville, MD.

Appendix O

SPSS Data Collection Template

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure
1	Participant	Numeric	8	4	Patient Number	None	None	9	Right	Scale
2	Gender	Numeric	8	1	Gender	{1.0, Male}...	None	8	Right	Nominal
3	Age	Numeric	8	1	Age Ranges	{1.0, 18-35}...	None	8	Right	Nominal
4	Race	Numeric	8	1	Race	{1.0, Cauca...}	None	8	Right	Nominal
5	Language	Numeric	8	1	Language spoken	{1.0, Englis...}	None	8	Right	Nominal
6	Comorbidities	Numeric	8	1	Comorbidities	{1.0, Yes}...	None	11	Right	Nominal
7	Cough	Numeric	8	1	Cough	{1.0, Yes}...	None	8	Right	Nominal
8	SoreThroat	Numeric	8	1	Sore throat	{1.0, Yes}...	None	9	Right	Nominal
9	NasalDraina...	Numeric	8	1	Nasal drainage	{1.0, Yes}...	None	8	Right	Nominal
10	EarPain	Numeric	8	1	Ear pain	{1.0, Yes}...	None	8	Right	Nominal
11	SinusPress...	Numeric	8	1	Sinus pressure	{1.0, Yes}...	None	12	Right	Nominal
12	AbxRx	Numeric	8	1	Antibiotic presc...	{1.0, Yes}...	None	8	Right	Nominal
13	Education	Numeric	8	1	Education provi...	{1.0, Yes}...	None	8	Right	Nominal
14	Survey1	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
15	Survey2	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
16	Survey3	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
17	Survey4	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
18	Survey5	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
19	Survey6	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
20	Survey7	Numeric	8	1	CAHPS Questi...	{1.0, Never}...	None	8	Right	Ordinal
21	Survey8	Numeric	8	1	CAHPS Questi...	{0, 0 Worst...	None	8	Right	Ordinal

(SPSS software UMKC, 2018)

Variable Values

<b>Gender</b>	1 Male	<b>Comorbidities</b>	1 Yes
	2 Female		2 No
<b>Age</b>	1 18-35	<b>Cough</b>	1 Yes
	2 36-65		2 No
	3 66+	<b>SoreThroat</b>	1 Yes
<b>Race</b>	1 Caucasian		2 No
	2 Hispanic	<b>NasalDrainage</b>	1 Yes
	3 African American		2 No
	4 Other	<b>EarPain</b>	1 Yes
<b>Language</b>	1 English		2 No
	2 Spanish	<b>SinusPressure</b>	1 Yes
<b>Education</b>	1 Yes		2 No
<b>Intervention</b>	2 No	<b>AbxRx</b>	1 Yes
			2 No
<b>Survey1</b>	1 Never	<b>Survey5</b>	1 Never
	2 Sometimes		2 Sometimes
	3 Usually		3 Usually

<b>Survey2</b>	4 Always			4 Always
	1 Never	<b>Survey6</b>		1 Never
	2 Sometimes			2 Sometimes
	3 Usually			3 Usually
<b>Survey3</b>	4 Always	<b>Survey7</b>		4 Always
	1 Never			1 Never
	2 Sometimes			2 Sometimes
	3 Usually			3 Usually
<b>Survey4</b>	4 Always	<b>Survey8</b>		4 Always
	1 Never			0 0 Worst provider possible
	2 Sometimes			1 1
	3 Usually			2 2
	4 Always			3 3
				4 4
				5 5
				6 6
				7 7
				8 8
				9 9
				10 10 Best provider possible



## Appendix P

## Statistical Analysis

Table 2. Demographics of EBQI project with Chi Square

Demographics	Baseline Group (%) <i>n</i> =61	Education Group (%) <i>n</i> =64	Significance (Chi Square)
<b>Gender</b>			
Male	24 (39)	17 (26)	<b>0.128</b>
Female	37 (61)	47 (74)	
<b>Age</b>			
18-35	5 (8)	2 (3)	<b>0.373</b>
36-65	54 (89)	61 (95)	
+66	2 (3)	1 (2)	
<b>Race</b>			
Caucasian	11 (18)	3 (5)	<b>0.061</b>
Hispanic	45 (73)	55 (86)	
African American	5 (9)	6 (9)	
<b>Language</b>			
English	17 (28)	9 (14)	<b>0.057</b>
Spanish	44 (72)	55 (86)	
<b>Comorbidities</b>			
Antibiotic prescribed	36 (59)	46 (72)	<b>0.130</b>
	2 (3)	9 (14)	<b>0.033</b>
<b>URI Symptoms</b>	Mean 2.27	Mean 2.50	
Cough	34 (56)	41 (64)	<b>0.342</b>
Sore Throat	26 (43)	41 (64)	<b>0.016</b>
Ear Pain	23 (38)	24 (38)	<b>0.981</b>
Nasal Drainage	31 (51)	43 (67)	<b>0.063</b>
Sinus pressure	25 (41)	28 (44)	<b>0.754</b>

Table 3. Comparing CAHPS Results with Antibiotic Resistance Education

CAHPS Questions	Baseline group		Intervention group	
	<i>n</i>	<i>Avg Score</i>	<i>n</i>	<i>Avg Score</i>
11 Easy to understand	61	3.77	64	3.62
12 Listened to patient	61	3.78	64	3.74
13 Know pertinent history	61	3.69	64	3.63
14 Respectful	61	3.64	64	3.78
15 Spent enough time	61	3.62	64	3.51
17 Good follow-up	61	3.43	64	3.06
20 Discussed medicines	61	3.47	64	3.52
18 Rate provider 0-10	61	9.53	64	9.44

## Appendix Q

## UMKC School of Nursing and Health Sciences Proposal Approval Letter



July 13, 2018

UMKC Institutional Review Board  
Primary Project Site IRB  
UMKC DNP Student

UMKC IRB, Primary Project Site IRB, and DNP Student

This letter serves to provide documentation regarding Ami Koelliker's Doctor of Nursing Practice (DNP) Project proposal. Ms. Koelliker obtained approval for her project proposal, *Patient Satisfaction Outcomes Following Antibiotic Resistance Education for Adults in Primary Care*, from the School of Nursing and Health Studies DNP faculty on July 13, 2018.

If we can provide further information, please feel free to contact us.

Sincerely,

A handwritten signature in blue ink that reads "Dr. Cheri Barber".

Cheri Barber, DNP, RN, PPCNP-BC, FAANP  
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DNP Program Director  
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