

Antibiotic Over-prescribing: Is “Practice Courage” the Solution?

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## Introduction

The following scenario is realized numerous times in primary care offices every day: A patient with any combination of the following symptoms presents to the provider: sore throat, cough, runny nose, and/or fatigue. The provider’s assessment confirms a respiratory tract infection (RTI) and the provider prescribes antibiotics to treat the disease process. The patient leaves, satisfied that the illness has been addressed.

Although this may make some sense to the untrained observer, healthcare providers know that RTIs are most often the result of a viral etiology (Fletcher-Lartey, Yee, Garslev, & Khan, 2016; Lee et al., 2014; Strandberg, Brorsson, Hagstam, Troein, & Hedin, 2013). Prescribing antibiotics for a viral disease process provides no benefit to the patient other than meeting erroneous expectations and “are not recommended for the common cold, acute rhinitis, and acute bronchitis” (Lee et al., 2014, p. e168). According to the American College of Physicians, the presence of specific indicators that suggest a bacterial infection is the only reason to prescribe antibiotics for respiratory tract infections (Harris, Hicks, & Qaseem, 2016). These symptoms include suspected pneumonia, confirmation of streptococcal pharyngitis, and persistent severe symptoms with purulent discharge and/or facial pain (Harris et al., 2016). Additionally, a 2016 study concluded that 30% of all antibiotic prescriptions were inappropriate, given when there was no indication for them (Fleming-Dutra et al., 2016).

## The Problem

The over-prescribing of antibiotics drives an increase in antibiotic-resistant organisms and results in a greater number of adverse events “ranging from allergic reactions to *Clostridium difficile* infections” (Fleming-Dutra et al., 2016, p. 1865). Patients who receive antibiotics for RTIs are twice as likely to retain antibiotic-resistant organisms for the next year (Fitzgerald,

2018). Retention of these organisms places patients and their households at greater risk for an antibiotic-resistant infection. In the United States alone, 2 million antibiotic-resistant infections occur annually, causing 23,000 deaths and costing the U.S. economy over \$30 billion (Harris et al., 2016).

The side effects of taking antibiotics can place the patient at unnecessary risk of adverse events. Antibiotics cause as many as 20% of adverse drug reaction events seen in emergency departments, events ranging from mild to potentially life-threatening, such as anaphylaxis, Stevens-Johnson syndrome, or sudden cardiac death (Harris et al., 2016). Over 500,000 *Clostridium difficile* infections occur in the United States each year, causing nearly 30,000 deaths; more often than not, the infections are the result of antibiotic administration (Harris et al., 2016).

The fact should concern all that, too often, clinicians make prescribing decisions that are not in the best interest of the patient or the community at large. Although a 2012 study in the *Journal of Antimicrobial Therapy* suggested that clinicians agree that antibiotic resistance is a serious problem, providers may be in denial of this fact because they are willing to believe that antibiotic resistance “was not a problem in their practice” (Wood et al., 2012, p. 237). An Australian study of general practitioners found that they believed “there were negligible negative consequences from their inappropriate prescribing” (Fletcher-Lartey et al., 2016, p. 1). This finding indicates that there may be opportunity for further research and clinician education regarding this issue.

Previous research has attempted to illuminate the determinants of improper or inappropriate antibiotic prescribing for RTIs. The lack of standardized definitions of factors that are considered make this attempt difficult. In addition, many of the studies are based on

simulations and hypothetical situations that may test the provider's knowledge but do not consider the interactions between provider, patient, and healthcare system that may drive behaviors that lead to improper prescribing (Lopez-Vazquez, Vazquez-Lago, & Figueiras, 2012).

One would think that practice should be guided by the latest evidence and understanding of the impact of pharmacology on the disease process. However, factors other than knowledge impact prescribing, such as characteristics of the provider, the doctor-patient relationship, and expectations of the patient. For example, a provider may fear that his or her assessment skills are insufficient to fully rule out a bacterial etiology. Other characteristics that have been identified are complacency, fear, ignorance, indifference, and attributing responsibility to other professionals (Lopez-Vazquez et al., 2012). Expanding on these factors is necessary to correct improper antibiotic prescribing. When understanding is achieved, interventions to improve this problem can be created and implemented.

### **Purpose of the Study**

This researcher conducted an integrative review to synthesize current evidence in an attempt to create a novel understanding of factors that drive inappropriate antibiotic prescribing and identify the interventions that are most effective in addressing this issue. Previous interventions addressing this healthcare problem are assessed and concepts that focus on the doctor-patient relationship are clarified. For this purpose, the researcher coined a new phrase: "practice courage." The concept of practice courage is used to address issues of trust, knowledge, and the willingness to practice ethically in light of pressure to do otherwise.

### **Methods**

This research aims to determine interventions to remedy the over-prescription of antibiotics in the primary care setting. To determine the obstacles to evidence-based practice of

appropriate antibiotic administration, an integrative review guided by the theoretical framework of Whittmore and Knafl (2005) was performed. Multiple studies on the problem itself, perceptions of provider and patient, and the results of current interventions were reviewed. An integrative review allows for the synthesis of multiple types of studies, experimental and non-experimental, to broaden the potential for analysis and synthesis of information (Whittmore & Knafl, 2005). To ensure rigor of this integrative review, the following five-step process outlined by Whittmore and Knafl was used: formulating a problem, searching literature, evaluating data, analyzing and synthesizing data, and presenting conclusions. This review was performed in the academic setting using existing research.

### **People Involved and Resources Needed**

This research required the assistance of a project committee, which included a faculty advisor, a mentor, and a content expert. This committee provided guidance and offered suggestions to clarify analysis and define conclusions. In addition, hospital and university librarians aided in the search of relevant information. No other resources were required and no institutional review board approval was needed as the search of current studies provided all needed data. No ethical considerations were involved because no patient information was viewed.

The costs of this study consisted of those related to printing the studies for review and displaying initial results in poster form. These costs were negligible and were absorbed into the regular, planned expenses of the graduate program.

### **Sample Methods, Access, and Recruitment**

A search of PubMed, CINAHL, evidence-based journals, Google Scholar, and the Cochrane Library was conducted with an emphasis on systematic reviews of quantitative and

qualitative studies. Mixed-methods studies, random controlled trials, and qualitative studies were included in this search. The initial search was performed with the search term “inappropriate antibiotic prescribing.” However, further investigation led to adding the search term “respiratory tract infection” as this disease process appeared relevant to the topic. PubMed MeSH terms included “anti-bacterial agents,” “primary health care,” and “perceptions.” An ancestry search of potential studies was also conducted. No studies published before 2010 were considered.

### **Instruments**

The Critical Appraisal Skills Programme (CASP) literature appraisal tool was used to systematically determine the value of each study reviewed. This tool was necessary for evaluating rigor of the literature selected and appropriateness for inclusion in this integrative review. Each study was assessed according to questions regarding the validity and congruence of results in the context of this discussion. Studies that demonstrated validity, were believable, and had minimal bias formed the basis of this review. Less rigorous studies were used only to provide additional insights to inform this review.

### **Data Extraction and Analysis**

Included studies were placed in a literature review matrix that displayed their size, scope, and relevant results. In addition, a data table was created comparing and contrasting the resulting conclusions. Results were analyzed and a synthesis of novel concepts was performed. Also, gaps in information were determined and recommendations were made.

### **Theoretical Context**

The theoretical framework for this integrative review was Pender’s health promotion model. This middle-range theory places the role of the nurse as “raising consciousness related to

health-promoting behaviors, promoting self-efficacy, enhancing the benefits of change, controlling the environment to support behavior change, and managing barriers to change” (Butts & Rich, 2015, p. 400). These behaviors encourage the patient and the patient’s community toward health. This model is an appropriate theoretical foundation for this study because reduction in inappropriate antibiotic prescribing promotes the health of the patient and the community. Pender’s theory suggests that providing evidence can raise consciousness to lead to improved outcomes. Lowering inappropriate antibiotic consumption by decreasing over-prescribing requires behavior change in the patient and the provider. Pender’s model was chosen because of its focus on behavior change.

### **Practice Courage**

The idea of “practice courage” was introduced in this study. According to a 2010 theoretical analysis, “Courage is a disposition to confront fear that contributes to advancement of the personal good of the moral agent and is a common good of human communities” (Lindh, Da Silva, Berg, & Severinsson, 2010, p. 551). In other words, courage is facing fear to accomplish a greater good. In nursing, courage is defined by the terms “inner strength, authenticity, authority, rootedness, perseverance, confidence... and decisiveness” (Lindh et al., 2010, p. 562). The application of these characteristics to practice for the purpose of achieving improvements in patient health and safety defines the concept of practice courage.

### **Literature Review**

Eighteen articles were reviewed in this study. They were divided into two categories: studies on barriers to appropriate antibiotic prescribing for RTIs and assessment of interventions to reduce inappropriate antibiotic prescribing. The articles are described below and their important features are summarized in the literature review matrix that follows.

**Barriers to Appropriate Antibiotic Prescribing for RTIs**

Nine studies were reviewed that identified barriers physicians face in appropriately prescribing antibiotics.

**Are patient views about antibiotics related to clinician perceptions, management and outcome? A multi-country study in outpatients with acute cough.** In an observational study, Coenen et al. (2013) surveyed 3402 patients with acute cough in 13 European countries and their providers. The study addressed the patients' perceptions and the providers' understanding of provider choices in management of RTIs. The researchers followed and surveyed a large population from developed nations to improve understanding of the patient-provider relationship in the context of antibiotic prescribing. They found that patients' views about antibiotic treatment were not consistent or useful for identifying the indication for antibiotic prescribing. Patients hoping for antibiotics were less satisfied, in general, with the care they received. It is concerning that patient dissatisfaction may pressure providers into prescribing antibiotics against indication. Clinicians' perceptions were not consistent with patient views. This finding indicates an opportunity for practitioners to improve communication with patients. This study was helpful in illustrating the conflict in the doctor-patient relationship stemming from differing perceptions.

**Primary care clinicians' perceptions about antibiotic prescribing for acute bronchitis: A qualitative study.** In a limited qualitative study, Dempsey, Businger, Whaley, Gagne, and Linder (2014) garnered insights from semi-structured interviews with 13 primary care clinicians in Boston, Massachusetts. Although specific quantitative data were not obtained in this study, the study provided significant insights into the perceptions of primary care clinicians. The study directly addressed the beliefs and pressures on providers that drive

inappropriate antibiotic prescribing. Its value is in its understanding of barriers to guideline adherence. The researchers' insights are consistent with findings from similar studies and provide direction for further investigation. Reasons for overprescribing included perceived patient demand, lack of accountability for over-prescribing, and savings of time and money. The insights gained can be used to clarify the pressures providers encounter and may lead to interventions that combat obstacles to adherence.

**Why do general practitioners prescribe antibiotics for upper respiratory tract infections to meet patient expectations: A mixed methods study.** Fletcher-Lartey et al. (2016) surveyed 584 Australian general practitioners (GPs) to assess the extent to which patient expectation played a role in antibiotic prescribing. They conducted semi-structured interviews with 32 of the GPs to gain deeper understanding of the influence of patient expectation. Although this study was performed in Australia, its size and the cross-sectional nature of the survey sample allows for some generalization to healthcare settings globally. Over half of the surveyed GPs reported that they would prescribe antibiotics for RTI to meet patient expectations. Qualitative findings suggest that the term "patient expectations" encompassed themes in addition to actual expectations such as limited time, poor doctor-patient communication, and diagnostic uncertainty. Additionally, GPs believed their antibiotic prescribing was a negligible factor in the development of antibiotic resistance. Although this study provided no direct measure of the impact of patient expectations, it points to a significant obstacle to guideline adherence in antibiotic administration and indicates the need for interventions to combat the problem.

**A mixed methods study to understand patient expectations for antibiotics for an upper respiratory tract infection.** In another Australian study, Gaarslev, Yee, Chan, Fletcher-Lartey, and Khan (2016) used qualitative and quantitative methods to examine patient

expectations for antibiotic prescription from a doctor when presenting with a cold or flu. The researchers surveyed 1,509 patients representative of the general Australian population. They held focus groups with 40 participants as well. They found that gaps in knowledge, investment in time, miscommunication with doctor, and erroneous beliefs all had impact on patient expectation. The quantitative portion of the study was relatively large and represented, fairly accurately, the composition of the population. Generalizations can be reasonably made. This study underscores the need for patient education, which plays a role in antibiotic over-prescribing and, in part, can affect patient expectation.

**Misprescription of antibiotics in primary care: A critical systematic review of its determinants.** In a systematic review of quantitative studies (and quantitative portions of mixed-methods studies), Lopez-Vazquez et al. (2012) explored the factors that lead to improper prescription of antibiotics. The inclusion of 46 papers in this review provided high quality evidence that can be considered when addressing antibiotic over-prescribing. The researchers found two specific provider attitudes to be associated with misprescription: complacency of surrendering to patient expectations and fear of potential complications. This study reinforces the idea that provider-centered interventions may yield the best results for decreasing inappropriate antibiotic prescribing. As in the Gaarslev et al. (2015) study, it places responsibility for over-prescribing squarely on the shoulders of the provider. If additional studies support this conclusion, the present integrative review may create a point of focus for interventions.

**Systematic review of factors associated with antibiotic prescribing for respiratory tract infections.** In a systematic review of quantitative studies McKay, Mah, Law, McGrail, and Patrick (2016) examined drivers of antibiotic prescribing for patients presenting with RTIs.

They reviewed diverse populations over 28 studies; therefore, their results provide reliable evidence to inform the current investigation. McKay et al.'s purpose was to determine what factors, if any, signaled the provider to prescribe antibiotics. Because differentiating between viral and bacterial etiologies is rarely possible, providers often prescribe antibiotics. The McKay et al. review pointed to differing perceptions of providers and patients. They found that provider perception of patients' expectation was greater than patients' expectation of receiving an antibiotic for their disease process. This finding points to the need for provider-focused interventions. This review supports the understanding that patient expectation, or the perception of patient expectation, drives, in part, the over-prescription of antibiotics and provides an area of focus for the current integrative review.

**Expectations for antibiotics increase their prescribing: Casual evidence about localized impact.** Sirota, Samaranayaka, Round, and Kostopoulou (2017) surveyed 305 certified, practicing family physicians to investigate associations between patient expectations and physician prescribing. Participants completed a 20-minute online questionnaire comprised of hypothetical patient vignettes. The size of this study was limited, and it is possible that bias may have been introduced through sampling methods. However, it appeared that patient expectation played a role in increased antibiotic prescribing, although it did not impact the physicians' assessment of bacterial etiology. This finding suggests that psychological factors play a role in antibiotic over-prescribing. Although a small qualitative study cannot be used to confirm specific evidence, this study provides insight and its results are consistent with current understanding of the impact of patient expectations on provider prescribing behaviors. Interventions to reduce antibiotic prescribing should consider these factors.

**“I’m Dr Jekyll and Mr Hyde”: Are GPs’ antibiotic prescribing patterns contextually dependent? A qualitative focus group study.** Strandberg, Brorsson, Hagstam, Troein, and Hedin (2013) conducted two focus groups examining the prescribing patterns of 13 GPs in Sweden. Although extremely limited, this research may provide direction and context to the investigation of factors that lead to antibiotic over-prescribing, which informs this discussion. Factors and sub-factors identified in this study can be further investigated to provide additional support. The Swedish study focused on the doctor-patient encounter and the dynamics that impact the decision (collaboration) to prescribe antibiotics when none are indicated. Continuity of care, mutual trust, knowledge, and professionalism all play a role in this relationship.

#### **Assessment of Interventions for Reducing Inappropriate Antibiotic Prescribing**

The literature described above examined barriers to appropriate prescribing of antibiotics for RTIs. To overcome these barriers, researchers and healthcare professionals have implemented a variety of interventions they hope will reduce inappropriate prescribing. The eight studies presented below assessed some of these interventions.

**Prescription strategies in acute uncomplicated respiratory infections: A randomized clinical trial.** In a small, open-label, randomized clinical trial, Abad et al. (2015) studied 405 adults at 23 primary care centers in Spain to determine the impact of delayed antibiotic prescribing on the health status of patients with RTIs. Two delayed interventions were considered; no statistically significant difference in symptoms resulted from either. This study suggests delayed prescribing may be a safe option for treating respiratory infections, reducing antibiotic prescribing without impacting patient satisfaction. The results provide direction for further study and informs the discussion with a plausible option for an intervention that reduces

antibiotic consumption. Although study size prohibits a definitive conclusion, this research adds evidence that suggests possible interventions for reducing antibiotic administration.

**One size does not fit all: Evaluating an intervention to reduce antibiotic prescribing for acute bronchitis.** Ackerman, Gonzales, Stahl, and Metlay (2013) conducted a mixed-methods study to understand the strengths of and obstacles to interventions that reduce inappropriate antibiotic prescribing. Quantitative results from the interventions were produced by a cluster-randomized trial; qualitative research was focused on perceptions of providers. This study, performed at the Geisinger Health System in Pennsylvania, examined clinical decision-support strategies (written and electronic), printed educational materials, and educational seminars on antibiotic prescribing. Providers reported patient expectation, time pressure, and diagnostic uncertainty as barriers to reducing prescribing. Although not the strongest source of evidence, the findings from this study support previous research, and the study's setting has much in common with the local setting. The researchers investigated possibilities but failed to provide quantitative evidence. For the sake of this discussion, this study provided clues to potential interventions and further research.

**Antibiotic prescription strategies and adverse outcome for uncomplicated lower respiratory tract infections: Prospective cough complication cohort (3C) study.** In a cohort study, Little et al. (2017) followed 28,883 patients with RTIs to determine outcomes related to antibiotic prescribing strategies. They produced significant evidence to recommend a delayed prescription strategy with reduced consultations for worsening symptoms. This study was large, in a developed nation, and provided strong evidence to inform this discussion. It spoke to the value of delayed antibiotic prescribing for reducing antibiotic administration and improving the clinical picture.

**Improving antibiotic prescribing for uncomplicated acute respiratory tract infections.** McDonagh et al.'s (2016) systematic review of effectiveness of interventions for decreasing inappropriate antibiotic prescribing speaks directly to the current discussion. The researchers reviewed 133 studies; strict selection criteria and peer review ensured the veracity of data. The difficulty of combining information with definitional differences and multiple methods limited the results. However, these results can be used to inform current over-prescribing concerns. The best evidence in the study pointed to four interventions: clinic-based parent education, patient/clinician education campaigns, procalcitonin testing in adults, and electronic decision support systems.

**Nudging guideline-concordant antibiotic prescribing: A randomized clinical trial.** Meeker et al. (2014) conducted an RCT to investigate the use of behavioral interventions to reduce inappropriate antibiotic prescribing. They examined 14 clinicians from Los Angeles County who served 954 patients who presented with a diagnosis of acute respiratory infection during a 1-year period. As a simple intervention, a "commitment poster" was placed in exam rooms for patients and providers to observe. A significant reduction in antibiotic prescribing was recorded in the intervention group. This result shows that a simple, inexpensive intervention aimed at provider behavior can produce results greater than more costly interventions. This local randomized study of a simple intervention provides strong evidence to inform the current discussion.

**Effect of behavioral interventions in inappropriate antibiotic prescribing among primary care practices: A randomized clinical trial.** In a cluster randomized clinical trial, Meeker et al. (2016) assessed behavioral interventions for decreasing inappropriate antibiotic prescribing in primary care clinics in Boston and Los Angeles. Data were collected from 14,753

visits in 47 primary care practices. Randomization without blindness provided less than ideal evidence; however, two interventions showed decreased antibiotic over-prescribing rates. These interventions focused on provider accountability. The results of this study speak directly to the question of which interventions for reducing prescribing may hold the greatest promise, accountable justification, and peer comparisons.

**Behavioral interventions to reduce inappropriate antibiotic prescribing: A randomized pilot trial.** In a randomized trial Persell et al. (2016) assessed the effectiveness of three different provider-centered interventions, each paired with patient education. In a group of Chicago primary care practices, rates of antibiotic prescribing in 3,276 visits in the pre-intervention year were compared to rates in 3,099 visits in the intervention year. The researchers found a significant decrease in antibiotic prescribing in all groups, both intervention and non-intervention. Although the Hawthorne effect may be to blame, the improved outcomes suggest that reduced rates of antibiotic prescribing are attainable. The results are consistent with those of previous studies that show that multiple interventions have a greater impact than use of a single intervention. For this reason, this study is relevant to the current discussion.

**Improving antibiotic prescribing quality by an intervention embedded in the primary care practice accreditation: The ARTI4 randomized trial.** Van der Velden, Kuyvenhoven, & Verheij (2016) performed a cluster-randomized trial in 88 Dutch primary care practices to determine if a practitioner-focused intervention combined with practice accreditation would decrease antibiotic prescribing for RTIs. They found substantial differences in prescribing practices between control and intervention groups. This study showed the promise of education, accountability, and specific interventions for improving guideline adherence. The researchers

offered information that could help launch programs for improving prescribing, which speaks directly to the intent of the current discussion.

**Effectiveness of physician-targeted interventions to improve antibiotic use for respiratory tract infections.** Van der Velden et al. (2012) conducted a literature review to assess the effectiveness of provider-focused interventions for reducing inappropriate antibiotic prescribing and to determine which features of the interventions are the most successful. The review included 58 studies and was relevant to this discussion as it sought to provide evidence for specific interventions. The researchers found that provider education is effective and its effectiveness increases when combined with a second intervention such as educational meeting, audit/feedback, or written patient information.

**Effectiveness of interventions in reducing antibiotic use for upper respiratory infections in ambulatory care practices.** In a quasi-experimental pre/post study, Vinnard et al., (2013) examined the impact of specific interventions on decreasing the prescribing of antibiotics for upper respiratory infections. They examined 28 providers affiliated with the University of Pennsylvania and 808 patients. One intervention was a provider-approved patient mailing. A more intensive intervention included provider education and provider materials with the patient mailing. The study showed that the intensive provider intervention that included the support materials reduced antibiotic prescribing whereas mailings to patients provided no benefit. The use of multiple modalities to create a deeper understanding and accountability appears to be necessary for behavior change. It is significant that provider-focused interventions resulted in improved outcomes. Although the quality of evidence was reduced due to lack of blindness and potential selection bias of the providers, this study supports interventions that have been shown in previous studies to have promise.

Table 1

*Matrix of Literature on Barriers to Appropriate Antibiotic Prescribing for RTIs*

<ul style="list-style-type: none"> <li>• Author</li> <li>• Year Published</li> <li>• Country</li> </ul>	Level of Evidence	Study Design	Sample Size	Sample Characteristics	Methods	Results	Conclusions and Limitations
Coenen et al., 2013, Europe	Level IV, single observational study	Observational study of perceptions and management of patients presenting with acute cough	3402	Adult patients with acute cough presenting at 14 primary care networks in 12 European countries	Clinicians reported symptoms on presentation and management; patients filled out survey	45.1% of patients expected, 40.6% hoped for, and 10.2% asked for antibiotics. Patient hope and expectation and clinicians’ perception were associated with antibiotic prescribing.	<p>Clinician views inconsistent with patient perceptions but influenced antibiotic prescribing. Patients hoping for but not prescribed antibiotics were less satisfied with care.</p> <p>This was a European study with differing healthcare systems than the US.</p> <p>Data dependent on clinician and patient surveys, which may be subject to bias.</p>
Dempsey, Businger, Whaley, Gagne, & Linder, 2014, United States	Level VI, single qualitative study	Qualitative study	13	12 medical doctors and 1 nurse practitioner from 3 primary care practice-based research clinics in Boston, MA	Semi-structured interviews	Barriers to guideline adherence: perceived patient demand, lack of accountability, saving time and money, other clinicians’ misperceptions, diagnostic uncertainty, clinical dissatisfaction in failing to meet patient expectations.	Study size extremely small.

<p>Fletcher-Lartey, Yee, Garslev, &amp; Khan, 2016, Australia</p>	<p>Level VI, single qualitative study</p>	<p>Mixed methods</p>	<p>584 32 interviewed.</p>	<p>General practitioners, stratified to include a cross-section.</p>	<p>Quantitative—584 surveys.  Qualitative—34 structured interviews</p>	<p>More than half of GPs reported giving antibiotics to meet patient expectations, which included limited time, poor doctor-patient communication, and diagnostic uncertainty.</p>	<p>Survey contained only one question about antibiotic prescribing. Sample small and may not reflect the practices of younger practitioners.  Limited to GPs practicing in Australia, thus may not be generalized to other countries.</p>
<p>Gaarslev, Yee, Chan, Fletcher-Lartey, &amp; Khan, 2016, Australia</p>	<p>Level VI, single qualitative study</p>	<p>Mixed-methods, cross-sectional survey with follow-up by focus groups.</p>	<p>1509 surveyed, 40 in focus groups</p>	<p>Survey results from a cross-section of Australian population.  Focus groups comprised of adults age 25-60. Varied groups to capture differing perceptions of antibiotic use.</p>	<p>Cross-sectional survey (response rate 22%) followed by multiple focus groups.</p>	<p>36.5% correctly understood antibiotics. 19.5% expect doctor to prescribe antibiotics for cold or flu. Focus groups reinforced considerable gaps in knowledge of antibiotics. Doctor-patient communication gaps also revealed.</p>	<p>Primary care physicians need training to develop better communication/education strategies for dealing with patients.  Australian government-run healthcare system and culture different from US, may result in different patient expectations. Differing immigrant populations may also cause disparities between the two systems.</p>
<p>Lopez-Vazquez, Vazquez-Lago, &amp; Figueiras, 2012, Spain</p>	<p>Level V</p>	<p>Systematic review of qualitative studies</p>	<p>46 papers, 165,821 total patients/data points</p>	<p>Papers written in English or Spanish addressed attitudes/knowledge, &amp; other factors related to antibiotic prescribing, used quantity or quality indicators to define misprescription.</p>	<p>Search of MEDLINE-PubMed, and EMBASE Databases.</p>	<p>Factors in misprescription identified: complacency, indifference, ignorance, fear, and responsibility of other professionals</p>	<p>Several studies based on fictitious cases or simulation, which does not allow for impact of doctor-patient interactions on prescribing. Multiple other methodological limitations.  More studies are required to clarify factors that affect prescribing.</p>

<p>McKay, Mah, Law, McGrail, &amp; Patrick, 2016, Canada</p>	<p>Level III</p>	<p>Systematic review of correlational/observational studies</p>	<p>28 studies , 32,961 patients plus 252,372 patient encounters</p>	<p>Factors in antibiotic prescribing for RTIs searched. Studies using actual prescribing data, assessing factors associated with prescribing, and performing multivariate analysis of associations.</p>	<p>Search of Medline, Embase and international pharmaceutical abstracts.</p>	<p>Good evidence that factors beyond bacterial etiology are associated with antibiotic prescribing.  Prescribing may be driven by concern for missed diagnosis of a bacterial etiology.</p>	<p>Physician perception of patient expectation for antibiotics was a greater predictor of prescribing than actual patient expectation.  Little definitional standardization across studies. Also possible bias toward statistically significant associations, and factors of less significant association excluded.</p>
<p>Sirota, Samaranyaka, Round, &amp; Kostopoulou, 2017, United Kingdom</p>	<p>Level VI, single descriptive survey</p>	<p>Qualitative study</p>	<p>305</p>	<p>Primary care physicians from clinical research networks in the UK.</p>	<p>Primary care physicians asked to response to various hypothetical situations</p>	<p>Patient expectation for antibiotics increased physician intention to prescribe</p>	<p>Patient expectation increases providers' willingness to prescribe antibiotics but does not affect perceived probability of bacterial etiology.  Hypothetical doctor-patient encounters were studied, which may lead to some bias.</p>
<p>Strandberg, Brorsson, Hagstam, Troein, &amp; Hedin, 2013, Sweden</p>	<p>Level VI, single qualitative study</p>	<p>Qualitative study</p>	<p>13 in 2 focus groups</p>	<p>Urban and rural physicians</p>	<p>Focus groups</p>	<p>Decision to prescribe antibiotics takes place in the encounter between GP and patient, initially characterized by harmony or fight, and the subsequent process by collaboration or negotiation resulting in agreement, compromise, or disagreement.</p>	<p>The doctor-patient relationship is vital and is based on mutual trust.  The study is small and the findings cannot be generalized; however, they provide context for deeper understanding.</p>

Table 2

*Matrix of Literature on Assessment of Interventions for Reducing Inappropriate Antibiotic Prescribing*

<ul style="list-style-type: none"> <li>• Author</li> <li>• Year Published</li> <li>• Country</li> </ul>	Level of Evidence	Study Design	Sample Size	Sample Characteristics	Methods	Results	Conclusions and limitations
Abad et al., 2015, Spain.	Level II	Single randomized clinical trial, open-label	405	Adults with acute, uncomplicated RTIs from 23 primary care centers	Patients randomized to 1 of 4 interventions. Measured outcomes: duration and severity of symptoms, antibiotic use, and patient satisfaction	Delayed prescription strategies were associated with slightly greater but clinically similar symptom burden and substantially reduced antibiotic use.	<p>Delayed prescription strategies showed only small differences in clinical outcomes; however, they reduced antibiotic use.</p> <p>Study was relatively small, and the open format may be vulnerable to placebo effect.</p>
Ackerman, Gonzales, Stahl, & Metlay, 2013, United States	Level VI	Qualitative observational study	29	29 clinicians, including 26 physicians, 2 NPs, and 1 PA	Clinicians were surveyed after 1 year of interventions to reduce antibiotic over-prescribing	Results were compared to a study conducted 10 years earlier. Providers demonstrated greater awareness of antibiotic resistance and impact of prescribing decisions. Most popular strategy was an exam room poster depicting a diagnostic algorithm.	<p>Results suggest there has been improvement in the culture of over-prescribing, particularly in the area of awareness. The interventions in this study were not comprehensive enough to make a considerable change in inappropriate prescribing.</p> <p>The study was small and provided perceptual information from the clinicians' perspective rather than prescribing/patient outcome data.</p>

<p>Little et al., 2017, United Kingdom</p>	<p>Level IV</p>	<p>Prospective cohort study</p>	<p>28,883</p>	<p>Patients with lower RTI symptoms, 16 years of age or older</p>	<p>Symptoms and severity were documented at first consultation, along with antibiotic prescribing. Outcomes including reconsultation, worsening of severity, hospitalization, and death (within the following 30 days) were measured.</p>	<p>No significant differences in adverse outcomes, regardless of prescription strategies</p>	<p>Delayed prescription strategy showed no adverse outcome changes and did reduce antibiotic use; therefore, it may be one preferable strategy for combatting antibiotic overprescribing.</p> <p>Standardization of provider measurements of clinical signs was not achieved, and time constraints due to numerous patients caused some missing data (O2 saturations in some patients).</p> <p>Patients were not blinded to the interventions of antibiotic prescribing, creating vulnerability to placebo effect.</p>
<p>McDonagh et al., 2016, United States</p>	<p>Level I to Level III</p>	<p>Systematic review of current literature</p>	<p>133 studies, including 88 RCTs</p>		<p>Review of studies on criteria for using interventions to reduce antibiotic prescribing for RTIs when antibiotics were not indicated</p>	<p>The best evidence pointed to four interventions: clinic-based parent education, patient/clinician education campaigns, procalcitonin testing in adults, and electronic decision support systems</p>	<p>This study showed some potential for interventions for decreasing antibiotic prescribing.</p> <p>Due to lack of consistency among study designs, definitions of specific interventions, and ascertainment methods, this study failed to provide strong evidence.</p>

<p>Meeker et al., 2014, United States</p>	<p>Level II</p>	<p>RCT  IV. Poster-sized commitment letter displayed in exam room.  DV. Antibiotic prescribing rates</p>	<p>954</p>	<p>Adult patients presenting with acute respiratory tract infections</p>	<p>RCT in 5 outpatient clinics that measured antibiotic prescribing rates.</p>	<p>Displaying poster-sized commitment letters in exam rooms decreased inappropriate antibiotic prescribing for ARIs.</p>	<p>Significant effect of this simple, relatively low-cost intervention.  Relatively small, brief study in a limited geographic area.</p>
<p>Meeker et al., 2016, United States</p>	<p>Level II</p>	<p>Single cluster, randomized clinical trial</p>	<p>14,753 primary care patient visits during baseline, 16,959 visits during intervention period.</p>	<p>Patients with URIs, bronchitis, and influenza</p>	<p>Inappropriate antibiotic-prescribing visits for RTIs where prescribing was measured in the context of interventions to reduce prescribing.</p>	<p>The use of accountable justification (documented in free text in EHR) and peer comparison resulted in lower rates of inappropriate antibiotic prescribing.</p>	<p>Accountable justification and peer comparison are two potentially beneficial interventions to decrease antibiotic over-prescribing.  The number of clinicians was relatively small. Return visits were counted only when returns were to the clinic within the study.</p>
<p>Persell et al., 2016, United States</p>	<p>Level II</p>	<p>Single randomized pilot trial</p>	<p>3,099 primary care visits with intervention vs 3,276 without</p>	<p>Patients with ARTI symptoms</p>	<p>PCPs randomized with 3 interventions. Rates of antibiotic prescribing for ARTIs was measured.</p>	<p>Antibiotic prescribing rates decreased for all interventions.</p>	<p>Achieving reduced antibiotic prescribing is possible, even if this study was unable to determine specific interventions' impact.  Concern for Hawthorne effect among participants, possible clinician to clinician contamination.</p>

<p>Van der Velden, Kuyvenhoven, &amp; Verheij, 2016, Netherlands</p>	<p>Level II</p>	<p>Single cluster-randomized intervention trial</p>	<p>169 general practitioners in 88 primary care practices</p>	<p>Total antibiotic prescriptions and type of antibiotic were measured</p>	<p>Physician education and audit/feedback on prescribing quantity and quality was the intervention.  Numbers and types of antibiotics prescribed measured 1 year pre and 2 years post intervention</p>	<p>Provider education and an audited improvement plan around antibiotics for RTIs, as part of an accreditation program, sustainably improved prescribing rates.</p>	<p>Significant decreases in antibiotic prescribing resulted from this intervention.  Measurements were limited to prescriptions given, not prescriptions consumed (or partially consumed) by the patient. Did not measure patient health status.</p>
<p>Van der Velden et al., 2012, Netherlands</p>	<p>Level III</p>	<p>Systematic review</p>	<p>58 studies</p>	<p>Studies on effectiveness of interventions for reducing antibiotic prescribing</p>	<p>Intervention features were extracted and effectiveness sizes were calculated in multivariate regression analysis</p>	<p>On average antibiotic prescribing was reduced by 11.6% and first-choice prescription was increased by 9.6%.</p>	<p>Provider education and the addition of at least one intervention created the greatest reduction in antibiotic prescribing. Patient-directed elements provided no further improvement.  Including a broad variety of study designs within this review decreased quality. Selection bias was a concern.</p>
<p>Vinnard et al., 2013, United States</p>	<p>Level IV (Possibly Level II, a single non-randomized trial)</p>	<p>Quasi-experimental pre/post study with concurrent control groups for each intervention</p>	<p>808 patients followed by 28 providers.</p>	<p>Adult patients presenting with acute RTIs.</p>	<p>Antibiotic prescribing (data extracted from the EMR) was measured before and after interventions.</p>	<p>There was a significant decrease in antibiotic prescribing for the intensive intervention group but no change in the mild and no intervention groups.</p>	<p>Significant decreases in antibiotic prescribing require robust interventions that are provider focused.  The study was small and, although controlled, was not randomized.</p>

## Results

### Barriers to Appropriate Antibiotic Prescribing for RTIs

Eight studies were reviewed that identified barriers to adherence to guidelines for appropriate prescribing of antibiotics for RTIs. It is significant to note that several studies pointed to patient expectation as a motivator for clinicians to prescribe antibiotics without indication (Coenen et al., 2013; Dempsey et al., 2014; Fletcher-Lartey et al., 2016; Sirota et al., 2017). It seems clear that this expectation is based on an erroneous understanding of the nature of the disease process and that patients expect a return, in the form of a prescription, for the time and money they invest in seeing a provider (Coenen et al., 2013; Gaarslev et al., 2016). However, although those who “hoped for” an antibiotic prescription were less satisfied when they did not receive one, overall patient satisfaction with the patient-provider encounter received high scores (Coenen et al., 2013). In other words, patients who did not receive an antibiotic prescription were satisfied with the provider’s care. This suggests that the true barrier to guideline adherence may not be the patient’s expectation of receiving a prescription, but may be more precisely identified as the provider’s perception of the patient’s expectation. Clinicians’ perception of patient expectation was identified in as a barrier to appropriate antibiotic prescribing in multiple studies (Coenen et al., 2013; Dempsey et al., 2014; Fletcher-Lartey et al., 2016; McKay et al., 2016). McKay et al. (2016) clarified the evidence: “Physician perception of patient ... expectation for antibiotics was a more consistent predictor of antibiotic prescription than actual patient expectation of antibiotics” (p. 4114).

Other barriers to adherence to current guidelines appear to rest with the provider rather than with the clinical picture or the patient’s expectations. They include lack of accountability, constraints of time and money, diagnostic uncertainty, and doctor-patient communication

(Dempsey et al., 2014; Fletcher-Lartey et al., 2016; Lopez-Vazquez et al., 2012). According to Dempsey et al. (2014), providers experienced no pressure to prescribe according to guidelines when “there was no accountability, oversight, or feedback for prescribing antibiotics” (p. 4). In two studies, providers voiced concerns that they did not have the time required to educate, and ultimately convince, the patient that an antibiotic prescription will not reduce the severity and duration of symptoms (Dempsey et al., 2014; Fletcher-Lartey et al., 2016). Diagnostic uncertainty results from providers’ concern that they may have misdiagnosed a patient; they fear the potential complications caused by lack of treatment (Dempsey et al., 2014; Lopez-Vazquez et al., 2012). Communication gaps between the provider and patient were the result of “limited time with patients to explain, limited educational resources ... and communication barriers (such as patients’ poor English language skills)” (Fletcher-Lartey et al., 2016, p. 5). In at least two studies, providers suggested that their specific practice did not contribute to antibiotic over-prescribing, suggesting that, for them, there is little impetus to increase efforts toward guideline adherence (Dempsey et al., 2014; Fletcher-Lartey et al., 2016).

### **Assessment of Interventions for Reducing Inappropriate Antibiotic Prescribing**

Research that assessed specific interventions for reducing antibiotic prescribing pointed to multiple interventions that may be effective. Clinician-focused interventions appear to provide the greatest impact. Intensive clinician education, which includes an educational meeting, provided significant results in two studies (Van der Velden et al., 2012; Vinnard et al., 2013). Mixed results were obtained when adding patient educational material to the clinician education; one study showed no additional benefit (Van der Velden et al., 2012; Vinnard et al., 2013).

Accountability in the form of audit/feedback and accountable justification appeared to produce an improvement in guideline adherence. Audit/feedback includes direct auditing of prescription information to provide the clinician with a review of prescribing practices. Accountable justification requires that the clinician free-text the justification for antibiotics if they are to be prescribed. Van Der Velden et al. (2016) found that use of audit/feedback, when tied to accreditation for guideline adherence, decreased antibiotic prescribing rates for 2 years after intervention. Accountable justification increased guideline adherence in some studies as well (Meeker et al., 2016; Persell et al., 2016). Related to accountability, a simple intervention in which a poster-sized commitment to guideline adherence document, signed by the clinician was displayed in the exam room significantly lowered antibiotic prescribing rates (Meeker et al., 2014).

Peer comparison, in which providers' prescribing is compared to that of their peers, decreased antibiotic prescribing in some studies (Meeker et al., 2016; Persell et al., 2016). Similarly, recognition through accreditation provided significant results (Van der Velden et al., 2016). Prescribing rates were also significantly reduced when peer comparison was added to intensive clinician education (Van der Velden et al., 2012).

Electronic decision support, in the form of order sets suggesting antibiotic alternatives or requiring justification of the antibiotic prescription, was associated with guideline adherence in multiple studies (McDonagh et al., 2016; Meeker et al., 2016; Persell et al., 2016). However, one study found that physicians were concerned that the electronic medical record interventions failed to address patient pressure to prescribe (Ackerman et al., 2013). One study showed moderate-strength evidence to suggest that justification by procalcitonin testing may be effective in guideline adherence (McDonagh et al., 2016).

Lastly, two studies provided evidence that a significant decrease in antibiotic administration can be achieved through delayed prescribing strategies (Abad et al., 2015; Little et al., 2017). Although this strategy fails to address guideline adherence or antibiotic prescription reduction, it may lead to fewer patients taking antibiotics without indication.

### **Conclusions/Synthesis**

The studies appraised suggest that many factors contribute to antibiotic over-prescribing. Although antibiotic stewardship campaigns started in the 1990s, antibiotic overuse remains a problem (Lee et al., 2014). Continued antibiotic overuse suggests that large-scale educational campaigns are insufficient to provide the impetus for change. Research focused on overcoming barriers appears to converge on three areas: patient expectation, provider perception, and provider characteristics.

#### **Patient Expectation**

Clinicians are susceptible to the pressure of a patient's expectation of receiving an antibiotic prescription for signs and symptoms specific to a viral etiology (Coenen et al., 2013; Fletcher-Lartey et al., 2016). In other words, the demand created by patient expectation drives the prescriber's non-adherence to prescribing guidelines. At the same time, patients are generally satisfied with the care they receive, regardless of whether they receive an antibiotic prescription (Abad et al., 2015; Coenen et al., 2013).

#### **Provider Perception**

The research clarifies the point that antibiotic over-prescribing is related more to the provider's perception of patient expectation than the patient's actual expectation (McKay et al., 2016). This understanding may be the single greatest opportunity for creating an intervention that encourages guideline adherence. It may suggest that if the provider were willing to trust that

the patient could understand and follow a plan of care that did not include antibiotic prescribing, a decrease in antibiotic prescribing may be possible. Providers must be confident in their own ability to understand and communicate the consequences of antibiotic prescribing when there is no indication. Accepting this evidence may relieve the pressure to prescribe based on an erroneous assumption.

### **Provider Characteristics**

Effective interventions address the characteristics of providers, creating motivation, or pressure, toward guideline adherence. Accountability for prescribing behaviors may provide a “nudge” toward appropriate prescribing practices. When audit/feedback interventions are performed, over-prescribing decreases (Van der Velden et al., 2016). Accountable justification, a process whereby a clinician must document specific indications for antibiotic prescribing, also improves guideline adherence (Meeker et al., 2016; Persell et al., 2016). In other words, clinicians benefit from oversight; that is, their practice changes for greater benefit to the patient. Accountability may also apply to the clinician’s commitment to the patient. Use of a simple commitment letter, signed by the provider and placed in examination rooms, resulted in decreases in antibiotic prescribing (Meeker et al., 2014).

### **Practice Courage**

The Merriam-Webster dictionary defines courage as the “mental or moral strength to venture, persevere, and withstand danger, fear, or difficulty” (Courage, n.d.). Courage can be seen as doing the right thing, making the ethical choice, in the presence of fear or difficulty. Healthcare providers exhibit practice courage when they do the right thing in the presence of obstacles. An impediment might be conflict created by not meeting inappropriate patient expectations. The obstacle may arouse fear that patients will seek a provider who will comply

with their wishes and take their business there. It may spark fear because of the cost in time to properly educate and advocate for the patient. Practice courage enables the provider to make the ethical choice despite the fear or difficulty.

The professional nurse has committed to the ethical principle of beneficence. This principle is not upheld in the presence of inappropriate prescribing. With proper, intensive clinician training, providers can learn to adhere to guidelines and develop the communication skills that enable them to educate and encourage patients toward health and reframe and repair the behaviors that place patients and communities at risk. The training must be supported by evidence to produce the skills that build relationships of trust and explain the importance of guideline adherence. Such training empowers the provider to operate courageously, with “inner strength, authenticity, authority, rootedness, perseverance, confidence... and decisiveness,” and holds the possibility of confronting the problem of inappropriate antibiotic prescribing (Lindh et al., 2010, p. 562). Creating a culture of practice courage is one way to achieve a decrease in over-prescribing and advocate for the patient and the community.

### **Limitations of the Research**

There are several limitations to this research. Funding limitations prohibited assessment of studies requiring payment. Rigorous research of this issue is lacking and several studies, although appropriate to the discussion, lacked the strength of evidence to ensure reliability. Selection bias on the part of the author is possible.

### **Recommendations for Further Research**

There are many opportunities for further research regarding this issue. A deeper understanding of the determinants of guideline non-adherence would allow for direction of future studies and potential interventions for both the clinician and the patient. Additionally, rigorous

quantitative studies assessing intervention outcomes are needed to provide clarity and make recommendations toward decreasing antibiotic over-prescribing.

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# Antibiotic Over-Prescribing: Is “Practice Courage” The Solution?



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*A patient with any combination of the following symptoms presents to the provider; sore throat, cough, runny nose and/or fatigue. The provider's assessment confirms a respiratory tract infection (RTI) and the provider prescribes antibiotics to treat the disease process. The patient leaves, satisfied that the illness has been addressed.*

## Introduction

Prescribing antibiotics for a viral disease process provides no benefit to the patient, other than meeting erroneous expectations. In fact, inappropriate “antibiotic prescriptions provide no clinical improvement, expose patients to the risk of adverse drug events, increase the prevalence of antibiotic resistant bacteria, and increase healthcare costs” (Dempsey et al, 2014).

Previous research has attempted to illuminate the determinants of improper or inappropriate antibiotic prescribing for ARTIs. Practice should be guided by the latest evidence and understanding of the impact of pharmacology on the disease process, however, characteristics other than knowledge impact prescribing. These may be characteristics of the provider, the doctor-patient relationship and factors that drive expectations of the patient.

It is necessary to determine and expand on these factors in an attempt to correct improper antibiotic prescribing. When understanding is achieved, interventions to improve this problem can be created and implemented.

This integrative review attempted to synthesize current evidence to create a novel understanding of factors that drive inappropriate antibiotic prescribing and the interventions that are most effective in addressing this issue. Previous interventions to address this healthcare problem were assessed and concepts that focus on the doctor-patient relationship were clarified. For this purpose, a new phrase has been coined; “practice courage.” The concept of practice courage is used to address issues of trust, knowledge and the willingness to practice ethically in light of pressure to do otherwise.

*What are the factors that contribute to inappropriate antibiotic prescribing for respiratory tract infections and which interventions are most successful to remedy this problem?*

## Methods

To determine the obstacles to evidence-based practice of appropriate antibiotic administration for RTIs, an integrative review guided by the theoretical framework of Whittemore and Knafl was performed. Multiple studies to determine the existence of the problem, perceptions of provider and patient, and the results of current interventions were reviewed (Whittemore & Knafl, 2005).

A search of PubMed, CINAHL, Evidence-Based Journals, Google Scholar and the Cochrane Library with an emphasis on systematic reviews of quantitative and qualitative studies. Mixed-method studies, RCTs and qualitative studies are also included in this effort. The initial search is being performed on the phrase “inappropriate antibiotic prescribing,” and “respiratory tract infection.” PubMed MeSH terms include “anti-bacterial agents,” “primary health care” and “perceptions.” Further research is being determined through an ancestry search of potential studies. No studies published before 2010 were considered.

## Practice Courage

The concept of “practice courage” was assessed for congruence with results of these studies to determine if inclusion is appropriate. According to a 2010 theoretical analysis, “Courage is a disposition to confront fear that contributes to advancement of the personal good of the moral agent and is a common good of human communities” (Lindh, Da Silva, Berg, & Severinsson, 2010, p. 551). In other words, courage is facing fear to accomplish the greater good. In nursing, courage is defined by the terms, “inner strength, authenticity, authority, rootedness, perseverance, confidence... and decisiveness” (Lindh et al., 2010, p. 562). These characteristics, applied to practice and used to accomplish improvements in patient health and safety, define practice courage.

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## Results

**Eight studies were reviewed that identified barriers to adherence to guidelines for appropriate prescribing of antibiotics for RTIs.**

Factors that contribute to over-prescribing:

- Provider's perception of patient desire
- Patient's erroneous expectation
- Lack of accountability
- Saving time and money/quick resolution
- Diagnostic uncertainty/fear
- Complacency
- Poor doctor-patient communication

*“Patients'... expectations increase antibiotics prescribing”* (Sirota et al., 2017).

*“Physicians preferred to assess perceived expectations and manage those”* (McKay et al., 2016).

**Effectiveness of interventions to decrease antibiotic over-prescribing:**

Strategies that were more effective:

- Intensive provider training/accountability from peers
- Poster displaying public commitment
- Poster/algorithm displayed for patient/doctor

Strategies that were less effective:

- EMR and print based algorithms
- Educational mailings

*Accountability in the form of audit/feedback and accountable justification appeared to produce an improvement in guideline adherence* (Meeker et al., 2016; Persell et al., 2016).

*Peer comparison, in which providers' prescribing is compared to that of their peers, decreased antibiotic prescribing in some studies* (Meeker et al., 2016; Persell et al., 2016).

*Physicians were concerned that the electronic medical record interventions failed to address patient pressure to prescribe* (Ackerman et al., 2013).

## Conclusion

### Patient Expectation

Clinicians are susceptible to the pressure of a patient's expectation of receiving an antibiotic prescription for signs and symptoms specific to a viral etiology (Coenen et al., 2013; Fletcher-Lartey et al., 2016). In other words, the demand created by patient expectation drives the prescriber's non-adherence to prescribing guidelines. At the same time, patients are generally satisfied with the care they receive, regardless of whether they receive an antibiotic prescription (Abad et al., 2015; Coenen et al., 2013). Providers can be confident that patient satisfaction is not significantly impacted by guideline adherence.

## Conclusion

### Provider Perception

The research clarifies the point that antibiotic over-prescribing is related more to the provider's perception of patient expectation than the patient's actual expectation (McKay et al., 2016). This understanding may be the single greatest opportunity for creating an intervention that encourages guideline adherence. It may suggest that if the provider were willing to trust that the patient could understand and follow a plan of care that did not include antibiotic prescribing, a decrease in antibiotic prescribing may be possible. Providers must be confident in their own ability to understand and communicate the consequences of antibiotic prescribing when there is no indication.

### Provider Characteristics

Effective interventions address the characteristics of providers, creating motivation, or pressure, toward guideline adherence. Accountability for prescribing behaviors may provide a “nudge” toward appropriate prescribing practices. When audit/feedback interventions are performed, over-prescribing decreases (Van der Velden et al., 2016). Accountable justification, a process whereby a clinician must document specific indications for antibiotic prescribing, also improves guideline adherence (Meeker et al., 2016; Persell et al., 2016). In other words, clinicians benefit from oversight; that is, their practice changes for greater benefit to the patient.

### Practice Courage

Courage can be seen as doing the right thing, making the ethical choice, in the presence of fear or difficulty. Healthcare providers exhibit practice courage when they do the right thing in the presence of obstacles. Practice courage enables the provider to make the ethical choice despite the fear or difficulty. The professional nurse has committed to the ethical principle of beneficence. This principle is not upheld in the presence of inappropriate prescribing. With proper, intensive clinician training, providers can learn to adhere to guidelines and develop the communication skills that enable them to educate and encourage patients toward health and reframe and repair the behaviors that place patients and communities at risk. Such training empowers the provider to operate courageously, with “inner strength, authenticity, authority, rootedness, perseverance, confidence... and decisiveness,” and holds the possibility of confronting the problem of inappropriate antibiotic prescribing (Lindh et al., 2010, p. 562). Creating a culture of practice courage is one way to achieve a decrease in over-prescribing and advocate for the patient and the community.