SHARED DECISION MAKING IN PRIMARY CARE: BARRIERS AND FACILITATORS OF SHARED DECISION MAKING IN THE CONTEXT OF DECREASING THE USE OF UNNECESSARY ANTIBIOTICS FOR PRESCHOOL CHILDREN AGES 3-5 WITH UPPER RESPIRATORY TRACT INFECTIONS

by

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Abstract

The unnecessary use of antibiotics for upper respiratory infections is a global public health concern (Alumran, Hou & Hurst, 2013; Lucas et al., 2015; Dwibedi et al., 2015; Kutty, 2011; Llor & Bjerrum, 2014; Rouusounides et al., 2011). This issue is most prevalent in preschool aged children, due to the frequency of upper respiratory tract infections in this group (Alumran, Hou, & Hurst, 2013; Clavenna & Bonati, 2011; Vodicka, et al., 2013). An integrative review was done and ten articles were chosen to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? Barrier subthemes identified were ineffective communication and lack of parental knowledge. Conversely, facilitator subthemes identified were education of primary care providers surrounding shared decision making, direct and open communication as a facilitator of shared decision making, and delayed prescribing in conjunction with parental education. Key recommendations include the need for direct and open communication, increasing parental knowledge of URIs, implementation of shared decision making into primary care provider continuing education programs and primary care offices, and the use of delayed prescribing when diagnostic uncertainty exists. Additional recommendations stemming from the research analysis were the need for the inclusion of shared decision making content into student primary care provider education, as well as an increase in Canadian based research, and research regarding Nurse Practitioners as primary care providers.

TABLE OF CONTENTS

Glossary of Terms

Anaphylaxis Severe systemic reaction to allergen that triggers an immune response (Abate, 2013).

Antigenic variation Changes in surface molecules of pathogens to evade the body's immune mechanisms (Rote & Huether, 2014).

Colonize Inhabit without causing infection

Clostridium Difficile Bacteria normally occurring in bowels that exceeds normal growth after antibiotic use due to changes in normal flora, leading to diarrhea (Taylor, 2013).

Cytokines Cellular protein whose function is to communicate with other cells regarding the inflammatory response (Rote, Huether & McCance, 2014).

Comorbidities Concurrent illness or chronic disease which contributes to the bodies' susceptibility and response to pathogens

Diagnostic Reasoning The formation of a diagnosis from the patient's history, physical exam, and diagnostic tests.

Effective communication The exchange of information in an open and direct manner that conveys important points regarding upper respiratory infections and allows for meaningful dialogue (Mangione-Smith et al., 2015; Mustafa et al., 2014; van der Velden et al., 2013).

Effusion Presence of fluid

Epistemology The study of knowledge

Erythema Redness of the skin

Health Literacy The understanding and ability to understand health related information in order to make decisions regarding one's own health (World Health Organization [WHO], 2016).

I-CAM1 receptor A specific immune system receptor on the cell which is the common site for rhinovirus to enter (Rote et al., 2014).

Ineffective communication Lack of open and direct dialogue, avoidance of direct questions and omission of important points regarding the ineffectiveness of antibiotics for viral upper respiratory tract infections and provision of non-antibiotic treatment recommendations (Mangione-Smith et al., 2015; Mustafa et al., 2014; van der Velden et al., 2013).

Inflammation Immune response characterized by redness, swelling, and warmth

Myalgia Muscle aches

Neutrophils The most common type of white blood cells, which are the first cells to respond to inflammation (Rote, Huether, & McCance, 2014).

Organelle Component of cell, each with many differing and specific purposes (McCance, 2014).

Pathogen Bacteria, virus or fungus that causes disease

Pharmacokinetics The absorption, distribution, metabolism and excretion of drugs or how the body's system processes medications (Fernandez et al., 2011)

Primary care Care received in an outpatient or clinic setting where the health care provider is familiar with the patient and their family. Examples of primary care providers are family physicians and nurse practitioners.

Rhinorrhea Runny nose

Stevens-Johnson syndrome Eruptive skin reaction to certain diseases and a broad range of medications that covers a large portion of skin and mucous membranes (McCance & Huether, 2014).

T-helper cells Type of cell that helps protect against infection

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Dedication

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Introduction

The unnecessary use of antibiotics is a worldwide public health issue (Alumran, Hou & Hurst, 2013; Lucas et al., 2015; Dwibedi et al., 2015; Kutty, 2011; Llor & Bjerrum, 2014; Rouusounides et al., 2011). There are multiple factors that cause concern regarding unnecessary antibiotic use, including complications related to antibiotic resistant bacteria, side effects of antibiotic use, and the possibility that antibiotics will become ineffective against bacteria. The overuse of antibiotics carries a large cost for health care (Alumran, Hou, & Hurst, 2013; Lowman & Bowden, 2010), with over one billion dollars spent annually in Canada on treatment of resistant bacteria alone (Outhwaite & Taylor, 2015). Despite the consequences, as well as multiple strategies to reduce antibiotic use, unnecessary use continues.

Preschool aged children account for the highest rate of unnecessary antibiotic prescriptions (Alumran, Hou, & Hurst, 2013; Clavenna & Bonati, 2011; Vodicka, et al., 2013). Within the preschool population, unnecessary antibiotics are most commonly prescribed for viral upper respiratory infections (URIs) (Clavenna & Bonati, 2011; Kutty, 2011). Upper respiratory tract infections (URIs) include viral rhinitis (the common cold), influenza type A and B, acute viral rhinosinusitis, non-streptococcal tonsillitis, and pharyngitis (Boonacker et al., 2010; Rouusounides et al., 2011), and account for the highest number of emergency visits and the second highest number of primary care and outpatient visits in children (Touchie, 2013). Approximately 50% of total antibiotic prescriptions for preschool children are unnecessary, with 20% being attributed to URIs (Clavenna & Bonati, 2011; Maor et al., 2011). In healthy preschool children living in Canada, the majority of URIs are viral and self-limiting, which means that they resolve on their own without antibiotic treatment (Lynch, 2014). Secondary bacterial infections such as acute bacterial sinusitis (ABS) and acute otitis media (AOM) occur in approximately 6-13% and 37% of URIs respectively and rarely require antibiotics (Lynch, 2014; Wald, 2011).

The purpose of this integrative review is to analyze data surrounding the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? The use of antibiotics in preschool aged children with URIs, and their immediate complications, acute otitis media and acute bacterial sinusitis will be the central diagnosis of this review. This review will focus on primary care settings such as outpatient or ambulatory care, and not on in-hospital or emergency settings. Children with underlying comorbidities, altered immunity, or congenital structural deformities of the upper airways are not included in this review because their treatment differs (Vayalumkal, 2014). As there are many different forms of families and parents, the word parents will be used in this review to describe all forms of caregivers of children.

Antimicrobial stewardship is the practice of reducing unnecessary antibiotic use to decrease the creation of antibiotic resistant bacteria (Alberta Health Services & British Columbia Center for Disease Control, 2016). When antibiotics are indicated, antimicrobial stewardship promotes a targeted approach to antibiotic use such as using specific antibiotics for specific bacteria, rather than broad-spectrum antibiotics. Antimicrobial stewardship requires a multifaceted approach including education of primary care providers (PCPs) and the public on the risks of antibiotic overuse (Boonacker et al., 2010; Maor et al., 2010).

Education and advertisement campaigns have been shown to be effective in decreasing antibiotic consumption (Lowman & Bowden, 2010). The combination of global, federal, provincial, and primary care initiatives provides the most effective strategy in reducing unnecessary antibiotic use (Llor & Bjerrum, 2014).

Interventions to decrease unnecessary antibiotic use that are aimed at collaboration and communication between parents and clinicians are more successful than those aimed at parents or clinicians alone (Vodicka et al., 2013). Shared decision making effectively includes parents in the treatment and care of their child, which increases parental knowledge of URIs, and the best course of treatment (Hansen et al., 2015a). Shared decision making can be implemented in a primary care setting as a method to compliment current strategies such as public health and education campaigns. With current public health and primary care efforts, antibiotic prescriptions are declining; however, a substantial amount of work remains to further decrease unnecessary antibiotic use.

As the primary, and sometimes only health care contact for patients, PCPs have an important role in educating parents and acting as gatekeepers for unnecessary antibiotic use. In order to decrease antibiotic use in the preschool population, PCPs must be able to collaborate and communicate with parents effectively regarding their child's health care (Vodicka et al., 2013). As primary care providers, family nurse practitioners (FNPs) have an important role in the care of families in British Columbia (BC). In BC, the FNP has a professional commitment to incorporate shared decision making and education into practice (College of Registered Nurses of British Columbia [CRNBC], 2010). This review was produced from a student FNP perspective, and is focused on primary care in BC, although it is applicable to PCPs in primary care settings in Canada. In this review, PCP refers to health care providers who deliver ongoing health care in a therapeutic and professional relationship with patients, often long term.

In my past practice as a registered nurse, working in an emergency department, I have witnessed many different strategies surrounding the prescription of antibiotics. The most common are delayed prescribing, prescribing when not indicated, or no prescribing. As I prepare to begin my novice practice as a FNP, I have found myself considering which method of communication and practice I will adopt when patients, or their parents, request antibiotics when their use is not indicated or supported by evidence. Shared decision making invites patients and parents to voice their concerns as well as contribute to a plan that they understand and are comfortable with. Some PCPs are less effective at explaining the rationale behind not prescribing antibiotics, and do not include parents in decision making. As a result, parents may revisit the emergency department or request treatment other than suggested by the PCP (Lucas et al., 2015; White, Moir, & Zweifler, 2011). From my observation as an RN practicing in an emergency department, the shared decision making approach appears to be more effective in decreasing antibiotic prescriptions and increasing patient satisfaction.

According to the literature, PCPs who have effective communication and are engaged with the parents in their child's care have a 22% lower antibiotic prescription rate than those who do not (Hansen, et al., 2015a; Vodicka et al., 2013). As shared decision making requires excellent communication between PCPs and parents, this leads to the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections?

The following section will provide the background regarding URIs, NP practice, and shared decision making. The background will be followed by the methods section, which will describe in detail the approach to the literature review. Following the methods section, findings will be presented by review and analysis of the literature. A discussion of the literature and the implications for primary care practice, education, and further research will follow the findings section. Lastly, key points of the review will be summarized.

Chapter One

Background

Upper respiratory tract infections in preschool aged children occur an average of 6-8 times per year for children attending daycare, and 3-6 times per year for children not attending daycare (Van Der Gaag & Van Drofflelaar, 2012). URIs are the second most recorded purpose for which parents bring their children to a PCP in Canada, with the first most common PCP visit being annual well-child check-ups (Touchie, 2013). Chapter one will provide a background of this integrative review by discussing the epidemiology of URIs, anatomy and physiology of the upper respiratory system, pathophysiology of URIs, rhinovirus structure and mechanism of action, and the pathophysiology of acute otitis media and acute bacterial sinusitis. Following will be a discussion of the use of guidelines for URI consultations, and prevention, diagnostics, and treatment of URIs, current primary care prescribing trends, the NP role in prescribing antibiotics, antimicrobial mechanism of action, microbiology of antibiotic resistance, adverse reactions in children, antimicrobial stewardship, and shared decision making in primary care.

Epidemiology of Upper Respiratory Tract Infections in Preschool Children

The majority of URIs in children do not require antibiotics, as they are caused by viruses and not bacteria (Hersh, Jackson, Hicks & The Committee on Infectious Diseases, 2013). Viral URI symptoms such as a runny nose, ear pain, cough, and fever peak 1-3 days after infection and resolve without treatment within 7-10 days, although symptoms can last for up to three weeks (Allan & Arroll, 2014; Lustig & Schindler, 2015). Upper respiratory infections are contracted through direct or indirect contact with secretions from an infected person (Allan & Arroll, 2014). The increased rate of URIs in daycare is due to poor transmission prevention such as the touching of infected toys, decreased hand-washing, and lack of use of barriers, such as the use of one's own elbow or tissue during sneezing or coughing.

Two main complications of URIs in children are acute otitis media (AOM) and acute bacterial sinusitis (ABS). AOM and ABS can occur independently, or simultaneously due to the similarities in pathogens and mode of transmission (Lynch, 2014). Children under five who attend daycare are more likely to develop AOM during or shortly after a viral URI, with 50% of AOM occurring in children under 5 (Huether, Rodway, & DeFriez, 2014; Lynch, 2014). ABS occurs during or shortly after a viral URI in 6-13% of children (Fryters & Blondel-Hill, 2014). ABS can occur up to 14 days after the beginning of a URI, and is characterized by failure of URI resolution (Zoorob et al., 2012). Symptoms of ABS include nasal congestion, facial or dental pain, and thick green nasal discharge (Zoorob et al., 2012). The main bacteria responsible for AOM and ABS in children are Streptococcus Pneumoniae, Haemophilus Influenzae, and Moraxella Catarrhalis (Lynch, 2014; Vayalumkal, 2014; Zoorob et al., 2012). Antibiotics are most commonly prescribed for young children with AOM, although they are not indicated in 80% of cases (British Columbia Guidelines, 2010; Centers for Disease Control and Prevention, 2015; LeSaux et al., 2016).

Over 90 % of URIs are viral (Centers for Disease Control and Prevention, 2016; Infectious Diseases Society of America, 2012), and the use of antibiotics does not significantly decrease the duration of URIs or the development of complications (British Columbia Guidelines, 2010; Centers for Disease Control and Prevention, 2015; LeSaux et al., 2016). AOM lasts an average of 4 days, and follows URIs at an incidence of 22%

(LeSaux et al., 2016; Wald, 2011). ABS lasts an average of 2.5 weeks, and usually resolves within four weeks (Alberta Health Services & BC Center for Disease Control, 2014; Fryters & Blondell-Hill, 2014). Group A streptococcus (GAS) pharyngitis is a bacterial infection which can be often confused with viral pharyngitis (Schulman et al., 2012). GAS is most common in children aged 5-15, and uncommon in children under age 5, so it will not be discussed further in this review (Schulman et al., 2012). In order to understand the pathophysiology of URIs in children, a discussion on the normal anatomy and physiology of the upper respiratory system follows.

Normal Anatomy and Physiology of the Upper Respiratory System in Children

The upper airway diameters of children are smaller than that of an adult, while the surrounding structures such as tonsils, epiglottis, and adenoids are comparatively large (Brashers & Huether, 2014). This difference causes children to be more symptomatic than adults when upper respiratory mucosal swelling and increased secretions are present (Brashers & Huether, 2014). The Eustachian tubes in children under 6 are less vertical and shorter than the Eustachian tubes of an adult (LeSaux et al., 2016; National Institute on Deafness and Other Communication Disorders, 2015). This provides less protection against bacteria and viruses, impairs ventilation, and prevents adequate drainage of the middle ear from the Eustachian tubes to the nasopharynx (LeSaux et al., 2016; National Institute on Deafness and Other Communication Disorders, 2015; Peterson-Smith & Becton-MacKenzie, 2013).

The upper respiratory system consists of the nose, parasinuses, pharynx, and larynx (Brashers, 2014). The structural mechanisms of the upper respiratory system are designed to prevent bacteria, noxious gas, and foreign particles from entering the lower respiratory system, where vital gas exchange occurs (Brashers, 2014). The function of the upper respiratory tract mucosa is to humidify and maintain a consistent temperature of inhaled gases, as well as protect against foreign particles, bacteria, and harmful inhalants (Brashers, 2014). The nasal passages consist of the medial septum; which separates the two naris; the inferior, middle and superior turbinate's; and the frontal, ethmoid, and maxillary sinuses (Wald, 2011). Inhaled air enters the nose, nasopharynx, oropharynx, and then the lower airways. The nasal hairs and turbinates filter harmful gases, bacteria, and foreign particles from inhaled air. The sneeze reflex is triggered by irritant receptors in the nostrils that expel chemical or mechanical particles quickly (Brashers, 2014). The nasopharynx is colonized with bacteria, which under normal circumstances do not cause infection (Vayalumkal, 2014).

Cilia are microscopic hair like organelles that line the upper respiratory mucosa, and move trapped particles towards the oropharynx for expulsion by expectoration, or into the gastrointestinal system to be swallowed (Brashers, 2014). The oropharynx and mouth also aid in ventilation, although they are less efficient at filtering and humidifying air without the assistance of the nose and nasopharynx. The larynx is lined with cilia and contains the true and false vocal cords or endolarynx; and the cricoid, thyroid, and epiglottis cartilage or laryngeal box, and connects the upper and lower airways (Brashers, 2014). Next, the pathophysiology of URIs will be discussed. See figure 1 for an image of the upper respiratory system.

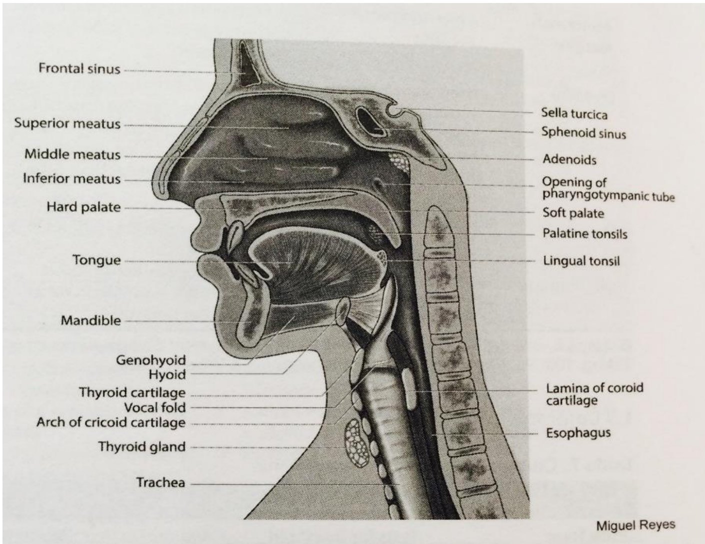


Figure 1. Used with permission (Hall, Piggott, Vojvodic & Zaslavsky, 2013).

Pathophysiology of URIs in Children

Symptoms experienced during a URI are due to external factors resulting from the viral infection itself, combined with internal factors of the body's own immune response (Naclerio, Bachert, & Baraniuk, 2010; Rote & Huether, 2014). As there are over 200 identified viruses responsible for URIs, with many similarities between viral strains, only the pathophysiology of most common cause in children, the rhinovirus, will be discussed (Lustig & Schindler, 2015).

Rhinovirus belongs to the picornavirus family and is the most common cause of URIs in children, occurring in 52-76% of reported cases (Allan & Arroll, 2014; Kennedy et al., 2012). There are 100 different subtypes of the Rhinovirus. Rhinovirus structure, mechanism of action, rhinovirus effects on the upper airway, and the most common secondary bacterial infections associated with viral URIs in children will now be discussed.

Rhinovirus structure and mechanism of action. Rhinovirus consists of a single protective protein shell or capsid, which surrounds nucleic acid in a single stranded ribonucleic acid (RNA) non-enveloped form (Kennedy et al., 2012; Rote, Huether &

McCance, 2014). All viruses, including rhinovirus, are exclusively intracellular, meaning they live only within their hosts cell. Their life cycle consists of six stages: attachment, penetration, uncoating, replication, assembly, and release (Rote et al., 2014). First the virion, or single virus, attaches to the outer cell membrane of the host. In 90% of rhinovirus subtypes, the virus gains access to the cell by binding to the cells ICAM-1 receptor. The virion then uncoats, or releases viral nucleic acid allowing for replication, where the viral protein and RNA are duplicated. Next, assembly occurs where more virions are produced. Lastly, the assembled virus is released. Host cellular mechanisms are designed to prevent penetration into the cells (Rote et al., 2014). An example of a host cellular mechanism is the nasal mucosa and secretions, which trap particles and expel them with nasal secretions, as well as triggering a sneeze response in some cases.

During a URI, the ciliated pseudostratified columnar cells that line the upper respiratory mucosa are affected by rhinovirus (Vayalumkal, 2014). This increases the risk of bacterial infection due to the inability of the ciliary body to remove bacteria and debris from the nose and ears, as well as allowing bacteria that colonize the nasopharynx to enter the middle ear (Vayalumkal, 2014). Pro-inflammatory cytokines are secreted which increase the inflammation of the nasal mucosa, through the stimulation of neutrophils and T helper cells (Naclerio et al., 2010). Inflammation results in increased nasal secretions, swelling of the nasal and paranasal tissues, and venous engorgement (Naclerio et al., 2010; Wilder, 2013). The most frequently affected sinuses in children are the ethmoid and maxillary sinuses (Wald, 2011).

Common symptoms associated with rhinovirus infection are runny nose and nasal congestion due to the stimulation of the host’s inflammatory response, leading to enhanced vascular permeability and hypersecretion of mucous (Kennedy et al., 2012). Symptoms may also include headaches, earaches, cough, and fever (Kennedy et al., 2012; Lustig & Schindler, 2015). Rhinovirus can cause cough in infected persons due to nasal secretions draining into the posterior pharynx. The inflammation in the nasal mucosa impedes drainage of the sinuses and Eustachian tubes leading to the secondary bacterial infections: AOM and ABS (Lustig and Schindler, 2015; Vayalumkal, 2014). Disruption of the airway endothelial barrier leads to increased permeability, which allows pathogens to pass through, including bacteria (Kennedy et al., 2012). The pathophysiology of AOM and ABS will now be discussed.

Acute otitis media pathophysiology. Acute otitis media (AOM) is identified as the presence of bulging, effusion, and erythema of the tympanic membrane (TM), and can be caused by viral or bacterial causes (LeSaux et al., 2016; Vayalumkal, 2014). Viral URIs lead to Eustachian tube inflammation, which diminishes the host's natural mucociliary defenses as well as altering the pressure in the middle ear, allowing bacteria to enter the tympanic membrane causing a secondary bacterial infection (Kalu, 2011; LeSaux et al., 2016; Wald, 2011).

For AOM, antibiotics are recommended in children with fever, bilateral ear involvement, and ear pain, as they can reduce the duration of ear pain by 1-2 days in 5% of children (Hansen, 2015b; LeSaux et al., 2016). Antibiotics do not decrease the incidence of further possible complications such as mastoiditis and intracranial infection (Hersh et al., 2013). AOM will resolve without antibiotic treatment in 80% of cases (Kutty, 2011; LeSaux et al., 2016). Secondary bacterial infections caused by Streptococcal bacteria can benefit more from antibiotic treatment in comparison to infection caused by Moraxella Catarrhalis and Haemophilus Influenzae (Hersh et al., 2013).

Acute bacterial rhinosinusitis pathophysiology. Acute bacterial rhinosinusitis (ABS) is characterized by thickening and/or inflammation in one or more of the ethmoid, maxillary, or frontal paranasal sinuses. It can persist up to four weeks, lasting an average of 2.5 weeks (Alberta Health Services & British Columbia Center for Disease Control, 2014; Fryters & Blondell-Hill, 2014). A preceding viral URI causes inflammation of the nasal and paranasal sinus mucous membrane lining (Wald, 2011). The inflammation leads to obstruction of the paranasal opening that increases the pressure in the sinuses (Wald, 2011). Changes in paranasal sinus pressure encourages the in-drawing of bacteria into the sinuses. The mucociliary lining of the nose usually filters bacteria, during a viral URI, the lining becomes inflamed, which allows the bacteria to pass through to the sinuses (Wald, 2011). Treatment of ABS with antibiotics results in a shorter length of illness in only 5% of patients treated (Lustig & Schindler, 2015).

In summary, there are physiological factors that increase a preschool aged child's susceptibility to URIs and consequent complications. The virus itself is not wholly responsible for the symptoms associated with URIs, as the immune system also contributes to symptoms experienced. Next the use of guidelines, prevention, diagnostics, and treatment of URIs in children will be reviewed.

Upper Respiratory Infection: Use of Guidelines, Prevention, Diagnostics, and Treatment

Prevention is the most important way to limit the spread of URIs (Hansen et al., 2015a). Diagnostic evaluation for URIs is focused on eliminating the possibility of bacterial infections. In preschool children, the goal of treatment in URIs is symptom relief and prevention of dehydration from fever. This section will discuss the use of clinical guidelines, followed by prevention, diagnostic evaluation, and treatment of URIs.

Use of guidelines for diagnosis and treatment. Use of guidelines assist PCPs in the prevention, appropriate diagnostics, and treatment of URIs, and are present to provide recommendations that promote safe and appropriate care (BC Guidelines, 2010). Clinical guidelines can be used in conjunction with shared decision making (Guerrier et al., 2013). Shared decision making is included in various guideline recommendations, including the Canadian Pediatric Society AOM guidelines (LeSaux et al., 2016). Information on treatment of AOM is also available through the British Columbia (BC) Guidelines (2010). The Infectious Disease Society of America (IDSA) (Chow et al., 2012), provides guidelines on the treatment of ABS.

Prevention. URI prevention can be aimed at reduction of transmission or protection to reduce susceptibility to infection (Hansen et al., 2015a). Prevention of URIs is focused on reducing transmission from person to person (Allan & Arroll, 2014; Lynch, 2014). Handwashing continues to be the most effective method of preventing URI transmission (BC Guidelines, 2010; Lynch, 2014; Vayalumkal, 2014). Coughing and sneezing into tissues or sleeves, and discarding used tissues can also help prevent transmission of URIs (Allan & Arroll, 2014; Lynch, 2014). Isolation of the sick individual and remaining home from daycare or preschool while ill are also important URI prevention techniques (Allan & Arroll, 2014; Lynch, 2014). Prevention of AOM includes hand-washing, pneumococcal immunizations, breastfeeding, and avoidance of second-hand smoke exposure and pacifiers (Fortanier et al., 2014; LeSaux et al., 2016; Vayalumkal, 2014).

Protection methods of URI prevention include herbal remedies and immunizations. The influenza vaccine, available in the fall and winter months, helps reduce URIs caused by strains of influenza A and B, and is recommended for preschool aged children (Bowles & Strang, 2014; LeSaux et al., 2016). A systematic review by Allan & Arroll (2014) determined that zinc supplements and probiotics may reduce the frequency of URIs in children, with no clear benefit from the use of garlic, ginseng, iodine gargle, water gargle, exercise, homeopathy, vitamins C and D, and Echinacea.

Diagnostics. Diagnosis of URIs is based on clinical symptoms, related history, and physical examination (Lynch, 2014). No laboratory or diagnostic investigations are usually required for URIs (Lynch, 2014). Diagnostic tools such as lab work and chest x-rays are used in more severe illnesses to help differentiate between viral and bacterial causes of URIs. Chest x-rays are indicated to rule out bacterial pneumonia, which can cause similar symptoms as viral infections (LeSaux et al., 2015). To help diagnose influenza, nasopharyngeal swabs can be collected where two cases of influenza like illness occur within 72 hours in daycare centers, schools, or elderly residential facilities (Wald, 2011). However, nasopharyngeal swabs provide little diagnostic aid in ABS and AOM (Wald, 2011). Laboratory tests such as a white blood cell count can help differentiate between bacterial, viral, or fungal causes of infection. C-reactive protein, which is a blood test that detects inflammation, is elevated in bacterial infections, although it is not routinely performed or recommended for URIs (Pagana & Pagana, 2013). Next, treatment options will be discussed.

Treatment. Non-pharmacologic treatment of URIs includes rest and maintenance of usual fluid intake (Lynch, 2014). Over the counter medications, such as acetaminophen 10-

15 mg/kg or ibuprofen 10mg/kg, can be used to decrease discomfort from myalgia and for fever reduction (Lynch, 2014). Treatment of the majority of URIs is centered around symptom relief, as there is no curative measure other than the passage of time. Use of decongestants in children under 12 is not recommended due to lack of supporting evidence (Allan & Arroll, 2014; Lynch, 2014). The use of 2.5-10 mls of honey at bedtime in preschool children may be beneficial for cough suppression and improving sleep during a URI (Allan & Arroll, 2014). In comparison to prevention of URIs, there is no current evidence that treatments of URIs, such as nasal irrigation, zinc, Echinacea, ginseng, or vitamin C are beneficial in children to shorten the duration or symptoms or prevent complications (Allan & Arroll, 2014).

Antibiotic treatment for viral URIs does not shorten the course or prevent secondary infections, with risks outweighing benefits (Allan & Arroll, 2014; Fashner, Ericson, & Werner, 2012; Lynch, 2014). Antibiotic treatment for AOM and ABS can be beneficial in a small portion of cases. Each case of AOM or ABS should be evaluated individually, with the adjunctive use of guidelines to determine the specific child's risk versus benefits (Hersh et al., 2013). According to the Canadian Pediatric Guidelines (2016), antibiotic treatment should be considered in children with bilateral AOM under age 2, fever higher than 39 degrees Celsius, and persistent, severe ear pain (LeSaux et al., 2016). The Canadian Pediatric Society (LeSaux et al., 2016) includes shared decision making in the management of AOM, specifically when delayed prescribing is indicated. BC Guidelines (2010) recommend treatment for AOM in children that remain unwell after analgesia treatment for 48-72 hours.

Antiviral agents such as oseltamivir and zanamavir for preschool aged children reduce the duration of URI symptoms by an average of one day, with no apparent decrease in complications (Bowles & Strang, 2014). Risks versus benefit must be considered prior to administration of antiviral agents, due to risk of adverse effects and increased cost (Bowles & Strang, 2014). Antiviral agents are more strongly recommended for the elderly and children between the ages of 1 and 2 (Bowles and Strang, 2014; Upton & Canadian Pediatric Society Infectious Diseases and Immunization Committee, 2013). Complications of influenza are more effectively reduced with antiviral treatment in these age groups (Bowles & Strang, 2014). Treatment of influenza with antiviral agents is not recommended for otherwise healthy children with mild influenza illness (Upton & Canadian Pediatric Society Infectious Diseases and Immunization Committee, 2013).

In summary, there are several options for the prevention, diagnosis and treatment of URIs. Clinical guidelines can be helpful in determining the need for diagnostic evaluation and antibiotic treatment. Antibiotics are not included in the primary treatment of URIs, as they are not indicated in self-limiting viral infections. In over 90% of bacterial URIs, there is little use for antibiotics (Chow et al., 2012). The next section will examine prescribing trends in primary care, Nurse Practitioners as prescribers of antibiotics, antibiotic resistance, and adverse effects of antibiotics in children.

Current Antibiotic Prescribing Trends in Preschool Aged Children in Canada

Pediatric antibiotic prescribing rates in Canada are the second highest globally in comparison with Italy, Denmark, The Netherlands, USA, Sweden, Croatia, and the UK (Clavenna & Bonati, 2011). The most common antibiotics prescribed in Canada are amoxicillin, clarithromycin, and Cefalcor (Clavenna & Bonati, 2011). Canadian prescribing patterns demonstrate an increase in broad-spectrum antibiotics such as quinolones and macrolides (Glass-Kaastra et al., 2014). If antibiotics are chosen, the best approach is to target antibiotic treatment towards the most likely cause, which in URIs includes Streptococcus Pneumoniae, Moraxella Catarrhalis, and Haemophilus Influenzae. First line treatment for these pathogens are beta-lactam antibiotics, such as amoxicillin (Vayalumkal, 2014).

Parents and PCPs both have important roles in the reduction of unnecessary antibiotic use. Antibiotic prescribing patterns for URIs in children are due to several factors, the most common being PCP to parent communication, unique PCP prescribing patterns, time constraints, and appearance of the child with a URI (Alumran, Hou, & Hurst, 2013). Misconceptions surrounding antibiotic usage persist, as approximately 60% of the public believe antibiotics are effective for viral URIs, with only 50% aware of antibiotic resistance (van der Velden et al., 2013).

Nurse practitioners (NPs) as PCPs and Prescribers of Antibiotics in Primary Care

NPs in BC are health care professionals who have completed Master's level education (College of Registered Nurses of BC [CRNBC], 2016). NPs provide direct patient care in an autonomous and collaborative manner (CRNBC, 2016). The CRNBC (2016) is the governing body of NPs in BC, that provides professional standards and expected competencies for NPs in BC. CRNBC (2010) incorporates shared decision making in their NP core competencies. NPs embrace collaboration and patient centered care into their daily practice (Brykczynski, 2011). Achieving optimal patient health care encourages using a multifaceted approach including pharmacological and non-pharmacological treatments (CRNBC, 2010).

The integrative approach of caring that NPs bring into primary care is rooted in nursing theory and philosophy (Brykczynski, 2011). NP education fosters a collaborative, patient centered approach to diagnostic reasoning, which is communicated through role modeling and case studies (Brykczynski, 2011). Certain core values that NPs carry from the philosophy of nursing are education, support, and counseling with a holistic, context based focus (Brykczynski, 2011). Risjord (2010) discussed the unique perspective of nursing knowledge, which stems from standpoint epistemology, or the ability of nurses to see many different perspectives and social situations including that of the patient and their family. NPs bring this knowledge into primary care, which may allow a deeper understanding of the individual patient, and their families' social context (Risjord, 2010). Brykczynski (2011) determined that the ability to provide individualized patient centered care was a primary characteristic of NP practice, as well as promoting change in healthcare delivery through excellence in leadership. The next section will discuss antibiotic mechanism of action, microbiology of bacterial resistance, and adverse effects of antibiotics in children.

Antibiotics: Mechanism of Action, Microbiology of Bacterial Resistance, and Adverse Effects in Children

Since the initial discovery of penicillin by Alexander Fleming in 1929, antibiotics have saved numerous lives, along with shortening the course of illness for many people (Aminov, 2010). The unnecessary use of antibiotics can lead to bacterial resistance, where antibiotics commonly used are no longer effective against the bacteria they are designed to eradicate due to bacterial evolution (Aminov, 2010). Geographical regions with an increased rate of antibiotic use also have an increased rate of resistant strains of bacteria (Atliner et al., 2014; Rouusounides et al., 2011). Multi-drug bacterial resistance, which is bacteria resistant to more than one antibiotic, and hospital acquired resistant bacteria, which are bacteria more commonly acquired within the hospital such as Methicillin Resistant Staphylococcus Aureus (MRSA) are responsible for health care costs of $42 to $59 million dollars annually in Canada (Public Health Agency of Canada, 2013). The increased cost is due to longer duration of treatment, increased complexity of disease, cost associated with development of new antibiotics, and the inability to eradicate resistant infections (Hersh et al., 2013; LeSaux et al., 2014). Antibiotic resistance is also associated with increased mortality and morbidity (Public Health Agency of Canada, 2013).

Resistant strains of Streptococcus Pneumoniae, one of the most prevalent pathogens identified in AOM, are more common in children who attend daycare (Lowman & Bowden, 2010). Penicillin and cephalosporin's have become ineffective in approximately 40% of Streptococcus pneumoniae cases in children. Next, a review of antibiotic mechanism of action will be provided, followed by an explanation of the microbiology of antibiotic resistance, and subsequently, adverse effects of unnecessary antibiotics in children.

Antibiotic mechanism of action. A large number of antibiotics exist with slightly differing mechanisms of action. For the purpose of this review, the mechanism of action of beta lactam antibiotics will be explained, as amoxicillin, a beta lactam antibiotic, is a first-line treatment for most URIs (BC Guidelines, 2010; Fryters & Blondell-Hill, 2014).

The primary mechanism of action of beta lactam antibiotics is the disruption of the bacterial polysaccharide cell wall structure (Cho, Uehara, & Bernhardt, 2014). The cell wall prevents rupture of the cytoplasmic membrane, and if ruptured, lysis or death of the cell occurs (Cho et al., 2014). Bacteria possess enzymes on their cell wall called penicillin binding proteins, and beta lactam antibiotics inhibit the creation and processing of enzymes needed to maintain bacterial cell wall function (Cho et al., 2014). The mechanism of antibiotic action is important to understand in the context of antibiotic resistance, which will be discussed next.

Microbiology of antibiotic resistance. The human body is host to many differing bacteria, which live without causing infection (Cox & Wright, 2013). Bacteria are equipped with protective mechanisms against the body's immune system, inflammation, and antibiotics (Rote & Huether, 2014). The main mechanisms of resistance to antibiotics by bacteria are classified as either target or bullet (Aminov, 2010; Rote & Huether, 2014).

Target mechanisms include mutations or modifications in bacterial RNA, production of protective barriers or protective substance against antibiotics, and enzyme modification to decrease effectiveness of antibiotics (Aminov, 2010). Bacteria are able to change their surface molecules through antigenic variation (Rote & Huether, 2014). The change in surface molecules deters detection by the host's immune system (Rote & Huether, 2014).

Bullet mechanisms aim at destroying, modifying or resisting the action of antibiotics (Aminov, 2010). Bacteria are also naturally resistant to specific antibiotic types, due to intrinsic protective mechanisms (Cox & Wright, 2013). Gram negative bacteria, which have a protective outer membrane, are naturally resistant to antibiotics aimed at gram positive bacteria, and as a result, have limited permeability (Cox & Wright, 2013). Resistant genes can be inherited, or transferred between bacteria during duplication (Cox & Wright, 2013; Rodriguez-Rohas et al., 2013).

In children, resistance is not the only issue regarding unnecessary use of antibiotics, as children experience adverse effects to antibiotics more commonly than adults. These adverse effects are a common reason for emergency room visits (Murray & Amin, 2014). This topic will be discussed next.

Adverse effects of unnecessary antibiotic use in children. Children younger than six years of age are more susceptible to adverse effects from antibiotics than adults, due to alterations in pharmacokinetics (Alomar, 2014; Alumran, Hou, & Hurst, 2013; Fernandez et al., 2011). Children have higher total body water and less body fat than adults, causing increased drug distribution (Fernandez et al., 2011). Immature metabolic enzymes in children may alter plasma concentrations of medications, which can increase the risk of adverse drug effects (Fernandez et al., 2011). Common adverse effects from antibiotics include diarrhea, rash, and abdominal pain (Hersh et al., 2013). More severe adverse effects such as Clostridium Difficile, Steven Johnson's syndrome, and anaphylaxis occur less frequently, but are a possible risk of antibiotic use (Hersh et al., 2013).

Children who receive antibiotics earlier in life are at an increased risk of developing certain illnesses later in life, such as eczema, inflammatory bowel disease, obesity, and asthma (Hersh et al., 2013). The development of these illnesses is thought to be a result of alterations in gastrointestinal flora or normal bacteria. Reserving antibiotics for necessary use is important in decreasing short and long term adverse effects.

As previously discussed, there are several risks to unnecessary antibiotic use in children, with a multitude of strategies useful in antibiotic reduction. Shared decision making is one of the strategies that has not been fully explored in primary care. A brief discussion of antimicrobial stewardship and shared decision making will follow.

Antimicrobial stewardship. Antimicrobial stewardship promotes the reduction of unnecessary antibiotic use in order to decrease adverse effects and bacterial resistance to antibiotics (LeSaux et al., 2014). Reduction of antibiotics is achieved through awareness and education of the public and PCPs (LeSaux et al., 2014). Education surrounding antibiotic use includes recommendations on the duration of antibiotic therapy and tailoring antibiotic choices based on the most likely pathogen (Alberta Health Services & British Columbia Center for Disease Control, 2016; LeSaux et al., 2016). Antimicrobial stewardship programs also include delayed prescribing or 'watchful waiting' as well as careful consideration of whether antibiotics are necessary or unnecessary (LeSaux et al., 2016). Although not specifically focused on antibiotics, Canada's 'Choosing Wisely' campaign encourages PCPs to engage in shared decision making with patients on procedures and treatments which may or may not be supported by evidence, in order to decrease invasive, costly, and unnecessary tests and treatments (Born et al., 2015).

The *Do Bugs Need Drugs* (Alberta Health Services & British Columbia Center for Disease Control, 2016) antimicrobial stewardship program began in Alberta and expanded to British Columbia. The program provides many resources, including internet based games, activities, and education targeted at preschool to school aged children.

The Global Respiratory Infection Partnership (GRIP) (Atliner et al., 2014; van der Velden et al., 2013) is a global antimicrobial stewardship organization with a focus on providing URI treatment framework with a goal to reduce unnecessary antibiotic use. The framework developed by GRIP (2014) is focused on improving PCP to patient/parental communication by a patient centered approach to URI consultations. GRIP (Atliner et al., 2014) determines that strategies focused on improving the PCP/patient communication could be effective in the reduction of unnecessary antibiotics. GRIP (Atliner et al., 2014) provides clear and practical recommendations for decreasing unnecessary antibiotic use for

URIs in primary care. GRIP recommendations will be discussed further in Chapter 4 of this review. Shared decision making, an integral component of family centered care, will be discussed next.

Shared Decision Making in Primary Care

Shared decision making is an essential component of patient centered care in which patients, or in the context of preschool aged children, parents, are involved in their health care decisions (Friedberg et al., 2013). Friedberg et al. (2013) identified three key steps in the shared decision making process. The first step is to recognize an opportunity for shared decision making; the second is to select and provide an appropriate decision making aid such as a handout or information on the subject; and the third is to have a discussion with the patient after information has been considered (Friedberg et al., 2013).

Shared decision making is a central concept in family-centered care (Barry & Edgman-Levitan, 2012). The British Columbia (BC) Ministry of Health (2015) incorporates the following key factors in *The British Columbia Patient-Centered Care Framework:* “self-management; shared and informed-decision making; an enhanced experience of health care; improved information understanding; and the advancement of prevention and health promotion activities” (pg. 1). The BC Ministry of Health (2015) includes shared decision making and supported participation of patients and families in their health care “Core Principles” (pg. 2). Patient/family centered care contains many components, one of which is shared decision making (Yin et al., 2012). This review looks specifically at shared decision making as one intervention that can be provided at the primary care level. Considering all aspects of patient centered care is outside of the scope of this project.

Shared decision making enables PCPs to share evidence based medicine and education in a collaborative and supportive manner (Barry & Edgman-Levitan, 2012). Patients and their families are able to share their thoughts, concerns and values on the proposed treatment. Shared decision making allows parents to remain active in their child's health care needs. Plans of care are personalized and created in collaboration with parents, which increases adherence to treatment plans, and improves health outcomes (Fiks & Jimenez, 2010). The values and specific needs of the parents and their child are included when making decisions regarding health care (Fiks & Jimenez, 2010). Shared decision making can increase parental confidence in the ability to care for their child's health needs (Yin et al., 2012).

Benefits of shared decision making are: increased patient or parental satisfaction with care provided, improved adherence to treatment plans, and improved health outcomes of patients (Altin & Stock, 2016). Shared decision making is beneficial in sharing information with parents, which research has determined to be an important factor in parental satisfaction (Fiks & Jimenez, 2010; Hansen et al., 2015b; Rousounidis et al., 2011).

Shared decision making effectively enhances the therapeutic relationship between PCPs and their patients as autonomy and self-determination of the patient are supported and encouraged (Elwyn et al., 2012). When several treatment options exist, shared decision making allows parents to determine their preferences based on their values and expectations. Shared decision making includes the provision of information and patient education prior to the decision making step, which allows parents to understand the lack of benefit of antibiotics for URIs.

PCPs may perceive shared decision making as contrary to the implementation of guidelines and evidence-based medicine, due to the misconception that the two cannot occur simultaneously (Guerrier et al., 2013; Legare et al., 2014). Shared decision making can be used to discuss the guidelines, evidence and current treatment options with the parents (Guerrier et al., 2013). In the context of unnecessary antibiotic use, parents who are informed of the risks and benefits of antibiotics for URIs, and are included in the decision making process, would either decline antibiotics, or choose a watchful waiting approach (Born et al., 2015; Guerrier et al., 2013; Legare et al., 2014).

In summary, most URIs are self-limiting and cause no long-term effects, while the use of unnecessary antibiotics poses a threat not limited to adverse effects, but also to long term resistance. NPs are well equipped to provide education and information to enable patients to make informed choices. The unique epistemological standpoint of NPs, combined with education based on mentorship, encourages a collaborative and inclusive approach to primary care. Shared decision making is an integral component of patient centered care and informed consent, and can be implemented in primary care within the framework of antimicrobial stewardship. The following section will discuss the methods used to select ten articles for the integrative literature review to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections?

Chapter 2

Methods

This section will provide an in-depth description of methods used for the integrative literature review to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? The purpose of an integrative review is to combine and analyze knowledge from many different sources in order to present current consensus of literature on a specified topic (Tavares de Souza, Da Silva, & De Carvalho, 2010). A four-step approach to the literature review was utilized. The first step of the literature search was to create a search strategy and determine terms for inclusion and exclusion. The next step was a preliminary literature search, followed by a focused search, and lastly, analysis and reporting.

Step One: Identification and Search Strategy

In order to develop a literature search strategy, the method of population, intervention, and outcomes (PIO) was utilized. The population was parents of preschool children ages 3-5 with URIs in the primary care setting, the intervention was shared decision making, and the outcome was reduced unnecessary antibiotic use. The PIO method was useful in identifying inclusion and exclusion criteria as well as providing structure and organization to search terms (Davies & Logan, 2012). Inclusion and exclusion criteria are described in Table 1.

Table 1 *Inclusion and exclusion criteria*

Inclusion	Exclusion	Rationale
Date range from 2005-2015	Date prior to 2005	To include both current and seminal research
English Language	Not available in English	No available translator
Published in academic journal	Opinion pieces	Focus on peer-reviewed and research articles
Child or pediatric focus	Adult focused	Age group included in scope of project
Focus on URIs	Lower respiratory tract infections or infections of other origins	Treatment differs for infections other than URIs
Articles focused on the overuse of antibiotics	Infections where antibiotics are indicated	Purpose of review is for unnecessary antibiotic use
Articles including primary care, NPs or MDs	Articles focused on in-patient or hospital setting	Outside scope of review

Step Two: Preliminary Search

The preliminary search was completed using the University of Northern British Columbia's online library. Databases searched were Academic Search Complete, Google Scholar, the Cumulative Index to Nursing Allied Health Literature (CINAHL), Science Direct, and Pub-Med. These databases were chosen as they have a large amount of scholarly, peer reviewed, and current literature. Available guidelines were reviewed regarding antibiotics in primary care including the Center for Disease Control (CDC) (2015), the Infectious Disease Society of America [IDSA] (Chow et al., 2012), The BC Guidelines (2010), and the Towards Optimized Practice (TOP) (2008) guidelines from Alberta. A large knowledge base regarding URIs and children exists, although many of the guidelines were outdated with last updates in 2008. Information in the guidelines reviewed is still regarded as best practice until newer guidelines are available, and guidelines are updated as new information becomes available (British Columbia Ministry of Health and Doctors of British Columbia, 2014).

The preliminary database search yielded an abundance of results. See Appendix A for the broad search terms, databases, and correlating results. After several broad preliminary searches, the focus of population, intervention, and outcomes were narrowed to a more manageable and realistic number. As shared decision making is closely related to family centered care (Legare & Thompson-Leduc, 2014), a decision was made to search both terms. Databases searched included Academic Search Complete, Google Scholar, CINAHL, Science Direct, and MedLine OVID. Search terms were combined with AND, OR, and * in Boolean search mode. The date limit was originally from 2005-2015, then narrowed to 2010-2015 to elicit more current information in smaller, more manageable numbers.

Table 2: *Second preliminary search*

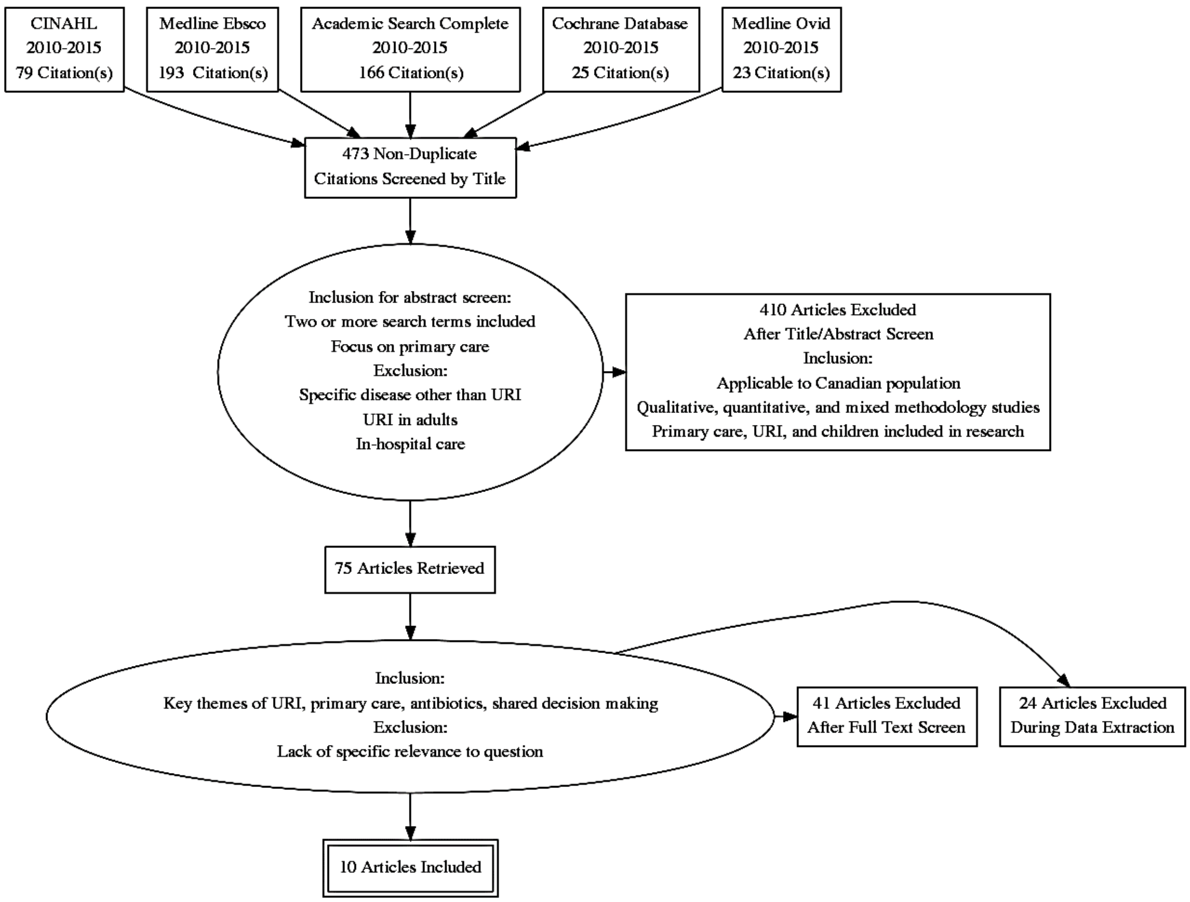
Population	Children, viral illness, overuse, antibiotics, primary care, parental influence, parental concern, fever, worry, sick infants, anxiety, parents, and antibiotics, parental thoughts, antibiotics not prescribed, infection, stress, febrile, primary care provider role in primary care, parents and antibiotics
Intervention	Shared decision making
Outcome	Decreased unnecessary antibiotic use

Step Three: Focused Literature Search

The next step in the literature search was the focused literature search. Search terms were again divided into population, intervention, and outcome, to ensure that each category had sufficient coverage for review. The literature search began with CINAHL, with dates excluded prior to 2010, to ensure current literature was reviewed, and to narrow down the number of articles searched. Search terms were combined with AND, OR, and * in Boolean search mode, and medical subject headings (MeSH) terms were used including decision making, family, antibiotics, and respiratory infections. Table 3 demonstrates the flow of article selection. Searches were then completed using the Medline Ebsco, Academic Search Complete, Cochrane Database, and Medline Ovid with the same search terms and parameters.

Articles were chosen based on the number of key words contained. 75 articles which contained two or more of the key words: children, URI, parents, shared decision making, primary care, and antibiotics were chosen for further investigation by abstract screening. Of the 75 articles, 34 were chosen for full text-screen. The 34 articles chosen that had the highest relation to the key words in the integrative review question were then screened by full text. 10 articles which were most closely correlated with the review question were selected. Articles were excluded after full-text screening that focused too much on parental knowledge and attitudes while excluding either the topic of shared decision making or primary care. Articles were also excluded that focused on specific complications of URIs, such as AOM or sinusitis. Qualitative, quantitative, and mixed method research were selected to gain a more in-depth perspective on the topic. Table three demonstrates the focused search strategy.

Table three: *Focused search strategy, using the PRISMA Flow Diagram Generator (The Collaborative, 2016).*



Step Four: Analysis and Reporting

The selection of the articles for further analysis was completed with consideration of identifying common themes. Major themes identified were facilitators and barriers to shared decision making with barrier subthemes identified as ineffective communication and lack of parental knowledge of URIs. Facilitator subthemes identified were direct and open communication, education of primary care providers surrounding shared decision making, and delayed prescribing in conjunction with parental education. These themes became apparent during the full text screen of 75 articles. Final selection of the ten articles was made with consideration of research that included one of the three key themes.

Chosen literature was analyzed using the Critical Appraisal Skills Programme (CASP) (2013) checklists, as well as checklists provided by Davies and Logan (2012). The checklists were used as a template to systematically analyze each article, as they provided a stepwise approach in determining the quality of research reviewed (CASP, 2013; Davies & Logan, 2012).

In summary, a four-step approach to the literature search provided a manageable amount of literature for the scope of this project, with ten research articles selected to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? The next chapter will discuss the findings from the selected literature with an analysis of each of the ten articles, organized into key themes.

Chapter 3

Findings

Ten articles were selected to answer the review question (Brookes-Howell et al., 2014; Butler et al., 2012; Giguere et al., 2012; Hoye et al., 2010; Legare et al., 2013; Legare et al., 2012; Mangione-Smith et al., 2015; Mustafa et al., 2014; Panagakou et al., 2012; & Yin et al., 2012). Of the ten articles, three articles explored barriers to shared decision making in the context of reducing unnecessary antibiotic use for URIs (Mustafa et al., 2014; Panagakou et al., 2012; & Yin et al., 2012), and seven articles examined facilitators of shared decision making (Brookes-Howell et al., 2014; Butler et al., 2012; Giguere et al., 2012; Hoye et al., 2010; Legare et al., 2013; Legare et al., 2012; & Mangione-Smith et al., 2015).

As the facilitators provide clarity to the barriers, barriers will be presented first. A literature review matrix is provided in Appendix B which includes a detailed synopsis of each research article including methods; intervention; objectives; sample size; key interview/questionnaire themes; and tool validity if provided and/or applicable; as well as strengths; limitations; and significant findings.

Barriers to Shared Decision Making in Primary Care

Barriers to shared decision making identified in the literature were ineffective communication between PCPs and parents, and parental lack of knowledge surrounding the use of antibiotics for viral URIs. In this review, effective communication refers to the meaningful dialogue between PCPs and parents that at least includes the components outlined in the Global Respiratory Infection Partnership (GRIP) (Atliner et al., 2014; van der Velden et al., 2013) framework for URI consultations, presented in Appendix C.

The minimum components of effective communication in a URI consultation would include: educating parents on the signs and symptoms of URIs, providing benefits versus risks of antibiotics, informing patients and/or parents when antibiotics are unnecessary versus necessary, and discussion of evidence based non-pharmacologic treatments (Atliner et al., 2014; van der Velden et al., 2013). According to the GRIP framework, communication is also more effective if parental concerns and reasons for consultation are acknowledged, and reassurance surrounding the child's illness is provided (Atliner et al., 2014; van der Velden et al., 2013). I chose to use the suggestions provided by GRIP (2013) as a framework for the analysis of the ten articles reviewed, rather than analyze it in the review. During this review, it became apparent that parental education and effective communication are closely connected in the context of URIs. According to GRIP (Atliner et al., 2014), effective communication includes parental education, and parental education requires effective communication to be successful. For this reason, it is difficult to discuss one without the other.

Research by Mustafa et al. (2014) that explored PCP perception of communication surrounding parental expectations for antibiotics for URIs will be reviewed first, followed by research by Panagakou et al. (2012) that examined parental risk factors contributing to lack of knowledge surrounding antibiotic use for URIs. Finally, research by Yin et al. (2012), will be reviewed, which investigated socioeconomic status in relation to shared decision making.

Communication between PCPs and parents related to antibiotic prescribing. Parents often seek reassurance and a thorough assessment of their child with a URI rather than an antibiotic prescription (Hansen et al., 2015b; Rouusounides et al., 2011). Direct and open communication can help determine the reason for a URI consultation, and as a result reduce unnecessary antibiotic prescriptions due to PCP/parental miscommunication (Mustafa et al., 2014). In a qualitative study, Mustafa et al. (2014) explored PCP perspectives and communication practices surrounding patient expectations for antibiotics.

Results of the research by Mustafa et al. (2014) found that parental consultation for URIs was seen by many of the PCPs participating in the study as an area for possible conflict, as PCPs anticipated parents might request antibiotics in cases where they were not indicated (Mustafa et al., 2014). A consensus among the PCPs was that a majority of their patients expected antibiotic treatment. Participating PCPs stated that they avoided conflict by asking indirect questions surrounding antibiotics, which included avoiding asking parents the main reason for consultation. A small portion of participants expressed no intention to determine patient expectations, as the participants would rather determine whether antibiotics are needed without parental input due to their professional responsibility (Mustafa et al., 2014). In addition, PCPs were more likely to collaborate if they saw a value in exploring concerns as a method of improving their therapeutic physician/patient relationship.

Research by Mustafa et al. (2014) is significant as it reveals that some PCPs were reluctant to openly discuss antibiotics with patients during URI consultations. Mustafa et al. (2014) concluded that promoting direct and open communication in practice may help reduce antibiotic use, as parents are less likely to request antibiotics once they understand the negative implications and adverse effects of antibiotics for URIs, as well as lack of efficacy. As a result of their findings, they recommended direct discussion of patient or parental expectations for antibiotics, and supported the use of shared decision making. These recommendations are also supported by GRIP (Atliner et al., 2014). Research that identified risk factors for lack of parental knowledge will be discussed next.

Parental lack of knowledge surrounding unnecessary antibiotic use. Two studies examined parental lack of knowledge surrounding unnecessary antibiotic use for URIs. Panagakou et al. (2012) explored parental risk factors leading to lack of knowledge surrounding unnecessary antibiotic use, and Yin et al. (2012) examined barriers to shared decision making in parents of low socioeconomic status.

Panagakou et al. (2012) identified parental risk factors as single father families, low parental education, low family socioeconomic status, language barriers, and immigrant status. The researchers determined that education related to unnecessary antibiotic use should be targeted to all parents, but specifically to the risk groups identified. They also suggested the implementation of PCP education surrounding unnecessary antibiotic use due to the important role of PCPs in unnecessary antibiotic reduction.

Like Panagakou et al. (2012), Yin et al. (2012) identified low socioeconomic status as a risk factor for decreased parental knowledge surrounding URIs, as well as a reduction in shared decision making inclusion among parents of low socioeconomic status. Yin et al. (2012) reported that clear PCP communication is essential in order to increase parental knowledge, and as a result, parental confidence and desire to engage in shared decision making. They also linked the absence of a partnership between parents and PCPs to a lack of parental knowledge surrounding their child's illness, and suggest the implementation of clear communication strategies into clinical practice. In their study, they describe clear communication strategies that can be used in every URI consultation: the use of plain language, printed materials, and incorporating the method of teach back or repetition to confirm understanding. These communication techniques are suggested in order to provide the same health education to all parents, despite their socioeconomic status.

Research by Yin et al. (2012) is significant as it dispelled the assumption that parents with low socioeconomic status do not wish to be involved in their child's care or participate in shared decision making, and determined that these parents may feel less like partners in care. Research by both Yin et al. (2012) and Mustafa et al. (2014) supported the implementation of open and direct communication to reduce unnecessary antibiotic use.

In summary, ineffective communication between primary care providers and parents of children with URIs, as well as lack of parental knowledge, can be a barrier to shared decision making in the context of URIs and unnecessary antibiotic use. Next, findings related to the facilitators of shared decision making will be presented.

Facilitators of Shared Decision Making in Primary Care

Three main facilitator subthemes that supported shared decision making between primary care providers and parents of children with a URI identified in the literature were: education of primary care providers surrounding shared decision making, effective communication as a facilitator of shared decision making, and the use of strategies such as delayed prescribing in conjunction with parental education. Seven articles were chosen to further examine facilitators of shared decision making (Brookes-Howell et al., 2014; Butler et al., 2012; Giguere et al., 2012; Hoye et al., 2010; Legare et al., 2013; Legare et al., 2012; Mangione-Smith et al., 2015). Giguere et al. (2012) and Butler et al. (2012) provided research on the effects of shared decision making education targeted towards PCPs on antibiotic prescribing trends. Research by Legare et al. (2012) and Legare et al. (2013) explored the implementation of shared decision making education into primary care settings.

Effective communication to facilitate shared decision making and reduce antibiotic use will be discussed by analysis of research by Mangione-Smith et al. (2015) and Brookes-Howell et al. (2014). Finally, research by Hoye, Frich and Lindboek (2010) that focused on delayed prescribing will be analyzed.

Education of primary care providers. In a randomized clinical trial, Giguere et al. (2012) determined that shared decision making can effectively reduce unnecessary antibiotic use with the implementation of PCP education. Included in the PCP workshops within the research project were education on the low incidence of bacterial URIs that require antibiotics, the high incidence of viral URIs, risks versus benefits of antibiotic use for URIs, communication approaches, and strategies to promote engagement of patients in shared decision making. Research findings were in congruence with suggestions provided by GRIP (Atliner et al., 2014; van der Velden et al., 2013).

Research by Butler et al. (2012) demonstrated the effectiveness of shared decision making included in educational interventions as a cost-effective method of decreasing unnecessary antibiotic use. Antibiotics that were reduced were those used commonly for URIs (Butler et al., 2012). There was no reported increase in hospital admissions or re-consulting associated with decreased antibiotic prescriptions. The lack of increased hospital admissions and re-consulting indicated that non-antibiotic interventions were successful in treatment of URIs in this study. The research by Butler et al. (2012) provided support for the education of PCPs on using shared decision making to reduce antibiotic use.

Research by Giguere et al. (2012) and Butler et al. (2012) demonstrated a measurable reduction in antibiotic use with PCP education on shared decision making. The next section will analyze research by Legare et al. (2012) on training of PCPs in shared decision making, followed by research by Legare et al. (2013) on implementation of shared decision making into practice.

Implementing shared decision making into practice. Legare et al. (2012) and Legare et al. (2013) explored PCP education and implementation of shared decision making into practice. Although this research also discussed education of PCPs, it was focused more specifically on implementing shared decision making into practice with education and effective communication. Research by Giguere et al. (2012) is linked to the research by Legare et al. (2012) and Legare et al. (2013). While Giguere et al. (2012) studied a shared decision making measurement tool in combination with an education program, Legare et al. (2012) looked specifically at the implementation of the program into practice.

Research by Legare et al. (2012) demonstrated that interventions effective at increasing patient participation can be utilized in decreasing unnecessary antibiotic use. The inclusion of patients is beneficial, as PCPs may think that shared decision making has occurred, when it was not actually perceived by the patient. Legare et al. (2012) found an increase in shared decision making with the use of PCP education on shared decision making, as well as an additional increased ability for PCPs to encourage patients to participate in their own health care.

Although the studies by Legare et al. (2013) and Legare et al. (2012) were very similar in nature, Legare et al. (2013) demonstrated a congruency between patient and PCP concept of shared decision making more clearly. Another important finding in this research was that shared decision making was not consistently sustained after the trial. The research by Mangione-Smith et al. (2015) will be analyzed next, which is a study of communication practices.

Communication as a facilitator of shared decision making. A cross-sectional study by Mangione-Smith et al. (2015) researched trends between PCP/parental communication and antibiotic prescribing effects on parental satisfaction. The study by Mangione-Smith et al. (2015) demonstrated the importance of direct and open communication between PCPs and parents to decrease unnecessary antibiotic use in children with URIs, as well as increased parental satisfaction with care provided.

Mangione-Smith et al. (2015) classified three types of communication practices during URI consultations that PCPs provided to parents as: positive and negative treatment plan recommendations, and provision of contingency plans. Positive treatment recommendations were identified as non-antibiotic treatments that would provide symptom relief. Negative treatment recommendations were identified as the communication of symptoms that indicated a lack of need for antibiotics. Contingency plan communication was described as the provision of a follow-up plan. Providing parents with both positive and negative treatment recommendations and contingency plans during an exam were determined to be useful communication points to include in URI consultations in order to decrease antibiotic use and increase parental satisfaction (Mangione-Smith et al., 2015). Next, qualitative research exploring trust, openness and continuity of care in the context of communication by Brooks-Howell et al. (2014) will be discussed.

Research by Brookes-Howell et al. (2014) emphasized the importance of the PCP-parent relationship. Direct communication, trust, openness, respect, and recognition were identified as central characteristics of a therapeutic PCP-patient relationship (Brookes-Howell et al., 2014). Open communication was valued as a factor that increased parental comfort with participating in the decision making process.

Findings of the research by Brookes-Howell et al. (2014) are important for practice as they highlighted the need for PCPs who are proficient at effective communication. The importance of open and direct communication and shared decision making as a method to decrease antibiotic use was also addressed in this research. Parental agreement with the plan of care and comfort participating in shared decision making was increased with familiarity with the PCP, and as a result, adherence with treatment advice. As PCPs often relate higher antibiotic prescribing to parental pressure for antibiotics, this research was significant as it demonstrated that parents were more likely to disagree when treatment with antibiotics was suggested. The findings in both Mangione-Smith et al. (2015) and Brookes-Howell et al. (2014) demonstrated the benefit of open and direct communication in relation to unnecessary antibiotic use. Hoye, Frich & Lindboek (2010) researched PCP views of delayed prescribing in conjunction with parental education, and will be discussed next.

Delayed prescribing and parental education in shared decision making. Delayed prescribing facilitates shared decision making, as collaboration, education, and effective communication are required between parents and their PCP (Hoye et al., 2010). According to Hoye et al. (2010), delayed prescribing requires patient teaching and education for optimal efficacy, and can reduce unnecessary antibiotic prescriptions by up to 40%. Key physician responsibilities determining the success of delayed prescribing identified were: the provision of clear and understandable instructions through effective communication, and reasoning regarding delayed prescribing. Patient responsibilities included being able to understand the reasoning for the delayed antibiotics, as well as motivation to participate in shared decision making. Participants concluded that if patients are educated and aware of their health conditions, delayed prescriptions can be helpful in decreasing unnecessary antibiotic use in conditions such as AOM and ABS (Hoye et al., 2010).

Research by Hoye et al. (2010) explored the methods of watchful waiting and delayed prescribing from a PCP perspective. These methods promote the use of shared decision making to increase parental understanding of URIs, normal progression of URIs, and when to follow up or administer antibiotics. These methods are beneficial where there may be uncertainty whether antibiotics are needed or not, such as in AOM and ABS.

Summary of Findings

Ten research articles were selected to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? Ineffective communication between PCPs and patients or their parents was identified as a key barrier to shared decision making, due to PCP avoidance of possible conflict, as well as misperception of parental requests (Mangione-Smith et al., 2015; Mustafa et al., 2014). Panagakou et al. (2012) determined that low socioeconomic status, single parent status, care by single male parents, immigrant status, and language barriers were risk factors contributing to lack of knowledge surrounding unnecessary antibiotic use for URIs. Research by Yin et al. (2012) concluded that parents of low socioeconomic status, single parents, and parents with language barriers can have a low level of health literacy, however they still wish to be involved in their child's care by being asked questions and given choices regarding treatment plans for their child.

Research by Giguere et al. (2012), Butler et al. (2012), Legare et al. (2012), and Legare et al. (2013) determined that shared decision making education for PCPs could be a cost-effective method to implement into practice to decrease the unnecessary use of antibiotics. Mangione-Smith et al. (2015) and Brookes-Howell et al. (2012) found that parents were more likely to be satisfied with care when there was effective communication between PCPs and parents on diagnosis, treatment, and expected course of illness. Alternately, discordance when PCPs suggested antibiotics for a URI diagnosis was identified when effective communication had not taken place. Hoye et al. (2010) determined that the provision of delayed prescriptions can reduce unnecessary antibiotic use for URIs by encouraging shared decision making through the use of open dialogue and education.

The next chapter will provide a synthesis of the research, beginning with barriers to shared decision making in primary care, facilitators of shared decision making, and a table of recommendations to implement the findings into clinical practice. This will be followed by a discussion on student PCP education, further areas of research, and a short summary.

Chapter Four

Discussion

The following chapter will provide a synthesis of the literature reviewed, followed by a presentation of recommendations for practice, including implementing shared decision making into clinical practice by addressing the barriers and facilitators. Finally, brief recommendations for student primary care provider education, and areas for further research will be presented.

Addressing Barriers to Shared Decision Making in Primary Care

Key findings that emerged in the literature related to the barriers to shared decision making were the need for direct and open communication, and a need for increasing parental knowledge surrounding unnecessary antibiotic use for URIs. As previously mentioned, effective communication and parental education are closely related, and an overlap of both concepts is inevitable. This section will provide a synthesis of the research analyzed for the purpose of this review. Recommendations to implement the literature review findings into clinical practice are provided in Table 4.

Increasing direct and open communication between PCPs and Parents. As communication was identified as both a facilitator and a barrier to shared decision making, both aspects of communication will be discussed together. The ability of the PCP and parents to participate in meaningful dialogue to make an informed decision requires confidence of the PCP in shared decision making, as well as use of evidence-based medicine to guide the PCP in educating parents on the risks versus benefits of antibiotic use (Brookes-Howell et al., 2014; van der Velden et al., 2013).

Mangione-Smith et al. (2015) and Mustafa et al. (2014) concluded that unnecessary antibiotic use could be avoided in the majority of cases if PCPs explored the reason for URI consultation and parental concerns surrounding their child's illness. Shared decision making allows a more interactive approach to communication between PCPs and parents (van der Velden et al., 2013). Direct and open communication as outlined by GRIP (Atliner et al., 2014) is encouraged as a facilitator of shared decision making to avoid PCP misperception of parental requests (Mustafa et al., 2014). Adverse effects of antibiotics, lack of need for antibiotics for URIs, symptomatic relief of URIs, and the ineffectiveness of antibiotics against URIs are important messages to be communicated to parents during the shared decision making process, and are included in the GRIP URI framework (Atliner et al., 2014; Mangione-Smith et al., 2015).

Due to the success of antimicrobial stewardship programs that include a multifaceted approach to unnecessary antibiotic use, continuation of antimicrobial stewardship programs targeted at the general public to increase knowledge surrounding URIs is advised (Brookes-Howell et al., 2014). As prescribers, PCPs have a responsibility to participate in the conservation of antibiotics and the prevention of antimicrobial resistance. The utilization of a shared decision making approach for unnecessary antibiotic use allows PCPs to contribute to antimicrobial stewardship at a primary care level without increased costs or increased hospital admissions (Butler et al., 2012; Legare et al., 2013; Legare et al., 2012).

Shared decision making can increase awareness of the barriers faced by parents in relation to URIs, as it encourages the PCP to explore the parents' specific needs and concerns regarding their child's illness. Shared decision making can also increase parental knowledge and understanding of risks of antibiotic use in parents who may not have exposure to other modalities of antimicrobial stewardship campaigns.

Despite the integration of shared decision making into practice, parents may still request antibiotics that are not clinically indicated. Research by Brooks-Howell et al. (2014) determined that this discordance is rare. Strategies to move forward without prescribing antibiotics were not provided in any of the literature reviewed. Although parents may request an antibiotic at the beginning of the consultation, a consensus evident in the literature was that improving the communication between PCPs and patients/parents will reduce requests for antibiotics for viral URIs at the end of a consultation, after shared decision making has occurred (Brookes-Howell et al., 2014; Butler et al., 2012; Giguere et al., 2012; Hoye et al., 2010; Legare et al., 2013; Legare et al., 2012; Mangione-Smith et al., 2015; Mustafa et al., 2014; Panagakou et al., 2012; van der Velden et al., 2013; & Yin et al., 2012). Parents who received non-antibiotic therapy suggestions as well as a follow up plan were also more satisfied with their PCP (Mangione-Smith et al., 2015). See table 4 for specific recommendations to implement shared decision making into practice during URI consultations.

Increasing parental knowledge of URIs and antibiotic use. PCPs can support the decision making process by guiding parents through options and preferences, as well as addressing any parental concerns (Mangione-Smith et al., 2015). Use of URI visit templates, such as the GRIP framework for URI consultations (Atliner et al., 2014; van der Velden et al., 2013) provide PCPs with a clear indication of educational information to be covered in each URI consultation, to be used in conjunction with effective communication skills. Other frameworks for URIs could also be utilized, GRIP (Atliner et al., 2014; van der Velden et al., 2013) is an example of a template that is straightforward, and includes many of the findings and recommendations identified in the research reviewed. No formal clinical validation information is available for the GRIP framework (Atliner et al., 2014; van der Velden et al., 2013).

Parents may not be aware of the potential risks and limited benefits of antibiotics for URIs (Panagakou et al., 2012; Rouusounides et al., 2011; Yin et al., 2012). Continued education of parents surrounding the lack of efficacy of antibiotics for the majority of URIs is required to reduce unnecessary antibiotic use (Atliner et al., 2013; Panagakou et al., 2012). In order to provide information about URIs, PCPs must first explore and assess the parent's pre-existing knowledge, and then allow parents to ask questions once URI education has been provided.

Engaging in shared decision making to educate parents on the risks and lack of benefits of antibiotics for viral URIs can not only help decrease antibiotic use, but build lasting relationships between parents and PCPs (Brookes-Howell et al., 2014; Mangione-Smith et al., 2015). Maintaining a trusting and therapeutic relationship was important not only to patients, but to PCPs (Brookes-Howell et al., 2014; Butler et al, 2012; Mangione-Smith et al., 2015; Mustafa et al., 2014). It is reassuring to note that the implementation of shared decision making into practice for URI consultations can help preserve and strengthen the PCP/parental relationship.

The main risk factor identified that impacted parental knowledge of URIs was low socioeconomic status, with associated factors identified as language barriers, immigrant status, low health literacy, being a single parent, and care provided by single fathers (Panagakou et al., 2012; Yin et al., 2012). Research findings are significant to NPs specifically, as a larger percentage of NPs provide care to patients who are marginalized or of lower socioeconomic status in comparison to other PCPs (Sangster-Gormley et al., 2014). Yin et al. (2012) demonstrated that the majority of parents would like to be involved in shared decision making for their child's health care, and that the desire for involvement was not dependent on socioeconomic factors. Based on the research findings, the invitation to participate in shared decision making should be inclusive, regardless of socioeconomic status.

Although low socioeconomic status and additional risk factors are out of the control of the PCP, there are some things PCPs can do to increase shared decision making in parents of this demographic. Awareness to assess parental knowledge and use of universal communication skills is recommended by Yin et al. (2012). Universal communication skills are useful in determining parental knowledge levels and parental desire to be included in their child's care. Taking a more inclusive and standardized approach to shared decision making with universal communication skills may effectively provide education that could be easily understood by all parents during URI consultations.

In order to increase parental knowledge and encourage open dialogue between PCPs and parents, educational handouts can be utilized (Butler et al., 2012; Yin et al., 2012). Educational handouts allow parents to learn about the benefits versus risks of antibiotic use for URIs. Parents are invited to return to their provider for further discussion, or given several minutes to consider the options for their child prior to making a decision. Information including signs and symptoms of URIs, when to follow up with a PCP, symptom management, and the lack of evidence to support antibiotic use for URIs are necessary components of parental education (Atliner et al., 2014; Mangione-Smith et al., 2015; van der Velden et al., 2013).

Enhancing the Facilitators to Shared Decision Making in Primary Care

Key facilitators identified in the literature review were open and direct communication, the continuing education of PCPs on shared decision making, and delayed prescribing. As communication is both a barrier and facilitator of shared decision making in primary care, it was discussed above. This section will first discuss delayed prescribing, followed by the promotion of shared decision making into primary care clinic culture, and finally, the continuing education of PCPs on the topic of shared decision making.

Delayed prescribing in conjunction with parental education. One of the strategies that did emerge from the literature was the use of delayed prescribing when parents and PCPs disagreed on whether an antibiotic was needed or not. The use of delayed prescribing allows for parental education surrounding URIs, and requires open and direct communication (Hoye et al., 2010). As antibiotics may be necessary in a small number of URIs in preschool children, PCPs must be able to balance the use of evidence informed medicine and current guidelines with shared decision making. This means a thorough history, physical assessment, diagnosis, and plans for follow-up. When diagnostic uncertainty is present, PCPs may consider a watch and wait or delayed prescribing approach for care of preschool children with URIs. These skills are well within the NP competencies and scope of practice (CRNBC, 2016).

Promoting a culture of shared decision making. The integration of shared decision making into primary care to reduce unnecessary antibiotic use requires a collaborative and supportive approach (Butler et al., 2012). Promoting a culture of shared decision making in all medical clinics would require shared decision making be the norm for PCPs. Role modeling by PCPs more experienced in shared decision making, in order to encourage all providers to adopt shared decision making into practice could be beneficial as demonstrated by research by Mustafa et al. (2014). PCPs who practice in clinics with many providers practicing shared decision making are more likely to practice shared decision making themselves (Butler et al., 2012). A clinic's culture of shared decision making is also more sustainable, as demonstrated by the research by Butler et al. (2012). Supporting the integration of shared decision making into practice as a routine procedure could benefit both patients and PCPs in many aspects, including the reduction of unnecessary antibiotics for URIs.

PCP awareness that shared decision making can be practiced in conjunction with clinical practice guidelines is beneficial in implementing shared decision making into practice, as it may deter PCPs from having to choose between the two (Guerrier et al., 2013; Legare & Thompson-Leduc, 2014). Shared decision making allows parents to be included in the care of their child, while PCPs may benefit from open and direct communication and relationship building with their patients (Brookes-Howell et al., 2014; Mangione-Smith et al., 2015). The following section will provide a synthesis of the information supporting the continued education of PCPs, which was identified as a facilitator of shared decision making during this review.

PCP continuing education related to shared decision making. A key facilitator identified in the literature review was the need for continued education of PCPs to implement shared decision making as usual practice in primary care settings for URI consultations (Giguere et al., 2012; Legare et al, 2013; Legare et al., 2012). Research by Butler et al. (2012) and Giguere et al. (2012) demonstrated that continuing education of PCPs who are experienced practitioners, as well as intermittent short educational reminders on the use and implementation of shared decision making into practice can produce sustainable decreases in unnecessary antibiotic use. Research by Butler et al. (2012) and Legare et al. (2012) determined that the effects of PCP shared decision making education on the reduction of unnecessary antibiotics requires reminders to maintain sustainability. These findings imply that PCPs need reminders to employ shared decision making into their patient visits. Continuing education sessions that present shared decision making as a beneficial method to employ during URI consultations are recommended. Shared decision making continuing education should be a priority in primary care as the increase in parental knowledge and improved communication between patients and/or parents and PCPs gained from shared decision making is not isolated to URI consultations, and can be applied to many other situations in primary care. Further recommendations are provided in Table 4.

Table 4: Summary of practice recommendations

Key Issue Identified	Practice Recommendations	Supporting evidence	Implementation Strategies
PCP/Parental direct and open communication	▪ Engage in open and direct communication with parents about past and current URI knowledge and concerns.	(Atliner et al., 2014; Brookes-Howell et al., 2014; Mangione-Smith et al., 2015; Mustafa et al., 2014).	▪ Ask patients directly about their expectations for the URI consultation, including expectations for antibiotics. ▪ Invite parents to ask questions and voice concerns. ▪ Use of a URI framework such as GRIP (Atliner et al., 2014). ▪ Bookmark URI links on office computer (if used). ▪ Download available GRIP clinical resources from website.
	▪ Use of universal communication strategies to address all health literacy levels	(Butler et al., 2012; Yin et al., 2012)	▪ Adapt universal communication strategies: use of information handouts, clear and concise language with an emphasis on only 2-3 main concepts, and the use of repetition. ▪ Download evidence based URI handout. ▪ Ensure printed and web based copies of information handouts available in several different languages.
	▪ Use of direct and open communication	(Atliner et al., 2014; Brooks-Howell et al., 2014; Mangione-Smith et al., 2015; Mustafa et al., 2014; van der Velden et al., 2013).	▪ Invite parents to express their opinions, fears, and questions regarding their child's illness. ▪ Utilize all three treatment recommendations; positive, negative, and use of contingency plan during URI consultations.

Key Issue Identified	Practice recommendations	Supporting evidence	Implementation strategies
Parental education to increase knowledge surrounding URIs and unnecessary antibiotic use	▪ Assess parental knowledge, provide positive and negative treatment recommendations, as well as contingency plans and clear recommendations on follow up.	(Atliner et al., 2013; Hoye et al., 2010: Mangione-Smith et al., 2015; Panagakou et al., 2012).	▪ Educate parents on evidence based symptom management: ▪ Example: teaspoon of honey for cough suppression for children over 1 (Allan & Arroll, 2014). ▪ Acetaminophen or ibuprofen for fever and muscle aches, as well as ensuring adequate fluid intake (Lynch, 2014).
	▪ Continue to educate parents on the risks of antibiotics and lack of benefit for URIs and provide adequate information regarding URIs	(Atliner et al., 2014; Hoye et al.,2010; Mangione-Smith et al., 2015; Mustafa et al., 2014; Panagakou et al, 2012).	▪ In each URI consultation provide parents with: ▪ Information surrounding risks and benefits of antibiotics for URIs. ▪ Lack of evidence supporting antibiotics for the majority of URIs. ▪ Normal progression of URIs. ▪ Provide follow-up recommendations.
Delayed prescribing	▪ Delayed prescribing in conjunction with parental education and shared decision making	(Hoye et al., 2010)	▪ Assess severity of infection: evaluate for risk factors or alarming symptoms (Atliner et al., 2014). ▪ Initiate delayed prescribing in mild AOM or ABS, or when diagnostic uncertainty exists. ▪ Educate parents on when to initiate antibiotics and/or follow up.
	▪ Follow-up is necessary when diagnostic uncertainty or PCPs are unsure whether to provide antibiotics, or when a child's condition worsens. With complete education and information, parents usually feel confident to care for their child at home.	(Mangione-Smith et al., 2015).	▪ Development of a contingency plan with parents including: ▪ When to follow-up ▪ Symptoms of concern ▪ Symptom management (Atliner et al., 2014).

Key Issue Identified	Practice recommendations	Supporting Evidence	Implementation Strategies
Continued education for PCPs	▪ Inclusion of shared decision making content in continuing education sessions on the topic of URIs and antibiotics	(Atliner et al., 2014; Butler et al., 2012; Legare et al., 2013; Legare et al., 2012; Mustafa et al., 2014).	▪ Provision of multimodal education programs focused on shared decision making that PCPs can easily choose the education format such as web-based courses, educational literature, or workshops. ▪ Educational reminder of shared decision making six months after the initial education to increase program sustainability. Education should be short and concise. ▪ Provision of shared decision making education programs by health authorities or antimicrobial stewardship organizations due to the many benefits of decreasing unnecessary antibiotic use.
	▪ Inclusion of education for PCPs on open and direct communication skills	(Atliner et al., 2014; Mangione-Smith et al., 2015; Mustafa et al., 2014; Yin et al., 2012)	▪ Include communication skills in continuing education sessions for PCPs. ▪ Provide multiple modalities of education on communication skills tailored to differing learning needs and availability.
Promote a culture of shared decision making	▪ Develop and encourage role modeling and promotion of shared decision making into primary care offices	(Butler et al., 2012).	▪ Encourage other PCPs to attend continuing education on shared decision making. ▪ Awareness of shared decision making benefits for PCP/patient relationships and antimicrobial stewardship.

Recommendations for Student Primary Care Provider Education

Implementation of shared decision making education into residency and graduate programs has already begun (Legare et al., 2012). Continuation of programs which include shared decision making in their curriculum is recommended. Shared decision making content in student PCP education programs could include: how to initiate shared decision making, when shared decision making is appropriate, and what the main components of shared decision making are (Legare et al., 2012). A growing number of programs, organizations, and universities understand the value of shared decision making in patient care and satisfaction, which can be useful in the reduction of unnecessary antibiotic use for URIs. Nurse practitioner faculty can include shared decision making into modules and case studies.

Recommendations for Future Research

During the literature review there were five main areas identified for future research to determine the use of shared decision making to reduce unnecessary antibiotic use for preschool aged children with URIs: specific research focused on NPs, Canadian based research, how to change PCPs perception of shared decision making, use of delayed prescribing as a facilitator of shared decision making, and long term studies that measured sustainability of unnecessary antibiotic use reduction with shared decision making continuing education.

There was a lack of research including NPs in the participants of the study. As the number of NPs grows, the research including all PCPs may emerge. Geographically applicable research for BC and Canada is also a potential area for increasing literature, as the majority of studies were centered in Europe and the USA. Although much of the research is applicable to Canada, there are variations in demographics and health care models between the countries. An additional important area for further research includes how to change PCP perception of shared decision making. The need for this research was outlined in the qualitative research by Mustafa et al. (2014), where PCPs avoided shared decision making due to a misconception that open and direct communication may create conflict between PCPs and patients/parents. This could be achieved by dispelling myths and misconceptions about shared decision making.

The literature search revealed a lack of research exploring the combination of delayed prescribing and shared decision making as a method to reduce unnecessary antibiotic use. Further research in this area could be beneficial in determining whether delayed prescribing and shared decision making together are sustainable methods of antibiotic reduction. The majority of research reviewed looked at shared decision making and PCP education in the short term. Research examining the effects of intermittent continuing education on shared decision making may be useful in determining any sustainable benefits on the reduction of unnecessary antibiotic use (Legare et al., 2012; Legare et al., 2013).

Summary of Discussion

Key recommendations identified in the literature were the need for continued efforts to increase parental knowledge surrounding URIs, as well as a requirement to encourage direct and open communication in order to facilitate shared decision making to reduce unnecessary antibiotic use. Recommendations for practice also include using delayed prescribing in conjunction with parental education to facilitate shared decision making, fostering a culture where shared decision making is the norm, and the education of PCPs in shared decision making, which can effectively reduce unnecessary antibiotic use for URIs. Reminders to reiterate the importance of shared decision making, as well as tools to implement shared decision making into practice would be beneficial to maintain sustainability for a continued reduction in unnecessary antibiotic use.

Education programs which include shared decision making into the curriculum content are becoming more common, and continuing this trend is important for the training of student PCPs. A need for future research based in BC and Canada, the inclusion of NPs in current research, further research on the link between delayed prescribing and shared decision making, changing PCP perception of shared decision making, and longer term studies was identified. A conclusion of this literature review will follow.

Conclusion

The purpose of this literature review was to answer the question: What are the barriers and facilitators to implementing shared decision making in relation to unnecessary antibiotic use in primary care settings when primary care providers are working with parents of preschool aged children with upper respiratory infections? Barriers identified were ineffective parent and PCP communication, and lack of parental knowledge surrounding URIs. Facilitators identified were education of primary care providers surrounding shared decision making, communication as a facilitator of shared decision making, and delayed prescribing in conjunction with parental education.

Recommendations for practice include adapting universal communication techniques, using direct and open communication, use of a URI consultation framework such as that provided by GRIP (Atliner et al., 2014; van der Velden et al., 2013), providing continuing education sessions to PCPs with 6-month short reminder education sessions on shared decision making, and fostering an environment which embraces shared decision making and antimicrobial stewardship (Butler et al., 2012; Giguere et al., 2012; Legare et al., 2013; Legare et al., 2012; Mangione-Smith et al., 2015; Mustafa et al., 2014; van der Velden, 2013, Yin et al., 2012). Recommendations for further research include Canadian based research, and an increase in NPs included in the PCP participants of studies, how to change the PCP perception of shared decision making, use of delayed prescribing as a facilitator of shared decision making, and longer term studies to determine the sustainability of shared decision making education on reducing unnecessary antibiotic use. Future education should include teaching student PCPs how to integrate shared decision making into patient interactions.

Unnecessary antibiotic use for URIs in children is a global public health concern, and continued vigilance and education is required to reduce the number of prescriptions through antimicrobial stewardship programs. PCPs are a primary source of health information for parents (Rouusounides et al., 2011), and information on URI prevention and treatment can be effectively communicated to parents within the shared decision making model. In order to maintain a lasting therapeutic relationship between PCPs and their patients, a collaborative approach such as shared decision making can be effective. It is important to understand the implications surrounding unnecessary antibiotic use, the benefits of effective communication, and shared decision making.

Shared decision making is an approach that can be implemented into practice to decrease unnecessary antibiotic use, while still maintaining parental trust and satisfaction with care (Fiks & Jimenez, 2010; Hansen et al., 2015b; Legare et al., 2010; Yin et al., 2012). Open and direct communication, parental involvement, delayed prescribing, and education can help me employ shared decision making into practice. Encouragement of other PCPs to employ shared decision making by information sharing and role modelling will also help reduce the unnecessary use of antibiotics.

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Appendix A

Preliminary search results

Search terms	Search site	Results
Antibiotic overprescribing	Academic Search Complete Google Scholar CINAHL Science Direct	10 2510 8 7576
Antibiotic prescribing in primary care	Academic Search Complete Google Scholar CINAHL Science Direct	0 1930 24 2171
Antibiotic misuse primary care	Academic Search Complete Google Scholar CINAHL Science Direct	0 11,600 0 5208
Antibiotic misuse	Academic search Complete Google Scholar CINAHL Science Direct	44 16,200 39 5208
Antibiotic overuse in primary care	Academic search Complete Google Scholar CINAHL Science Direct	0 11,500 0 2806
Non-bacterial use of antibiotics	Academic Search Complete Google Scholar CINAHL Science Direct	0 5530 0 31,614
Non-adherence to guidelines and antibiotics	Academic search Complete Google Scholar CINAHL Science Direct	3 7520 0 7420
Guideline adherence and antibiotics	Academic Search Complete Google Scholar CINAHL Science Direct	421 17,800 0 3641

Nurse practitioner and antibiotics	Academic Search Complete Google Scholar CINAHL Science Direct	0 16,800 0 2099
Nurse practitioner	Academic Search Complete Google Scholar CINAHL Science Direct	12,172 42,100 0 24,458
Primary care provider and antibiotic overuse	Academic Search Complete Google Scholar CINAHL Science Direct	0 16,400 0 962
Antibiotic overuse and children	Academic Search Complete Google Scholar CINAHL Science Direct	28 10,900 0 2605
Antibiotic overuse	Academic Search Complete Google Scholar CINAHL Science Direct	123 16,100 69 5700
Antibiotics and viral illness	Academic Search Complete Google Scholar CINAHL Science Direct	33 16,900 0 5531
Are primary care providers adhering to best practice guidelines regarding antibiotic prescriptions for viral illness?	Academic Search Complete Google Scholar CINAHL Science Direct	0 12,100 0 206

Appendix B

Literature Review Matrix

Article synopsis	Strengths	Limitations	Significant findings
1. Brookes-Howell et al. (2014). Method: Qualitative study Semi-structured face-to-face-interviews with parents of children who had consulted a PCP for URI in the last three months. Objective: To explore the effects of PCP/parent interaction on unnecessary antibiotic use. Interview/research topics: ▪ Agreement of URI management between PCPs and parents. ▪ Disagreement of URI management between PCPs and parents. ▪ Trust and familiarity in decision making regarding management with antibiotics. ▪ Parental adherence with URI consultation advice. Sample size: n=63	Applicable and generalizable to practice: Overall sample represented pediatric demographic characteristics for URI consultations (equal gender distribution with a mean age of 4) Parental: Varied socioeconomic status, average 34-years old Geographic: all four cities yielded similar results, therefore applicability to Canada is assumed. Examined unique perspective of parents regarding antibiotic use for URIs.	Based in Europe, with four different cities which differ in health care funding and priorities. Parental participants mostly female. Small sample size Possible bias related to higher enrollment of parents interested in participating in their child's care and parents who lived close to city centers. Although reverse translation was performed to increase accuracy of parental interviews, there was a possibility of inaccurate parental answers due to translation/language.	High level of parental/PCP agreement on URI treatment management in all four research centers. Only 3 of the 63 of parents interviewed would have liked antibiotics but did not receive them. Disagreement was reported by 13 parents when the PCP recommended antibiotics and the parent did not think they were necessary. Parents valued trust and continuity in care surrounding decision making for antibiotic use for URIs. Increased adherence with URI treatment plan when parents felt comfortable voicing their opinion with their PCP.

Article Synopsis	Strengths	Limitations	Significant findings
2. Butler et al. (2012). Method: randomized control trial Intervention: STAR seven step PCP education program focused on reduction of unnecessary antibiotic use with a six-month reminder module. Control group: no exposure to education program Objective: Measure cost and effectiveness of education program STAR designed to reduce unnecessary antibiotics. Main themes/topics: URI prescribing patterns and self-reflection, motivational interviewing, shared decision making, use of new skills, Sample size: 68 clinics with 244 PCPs seeing approximately 480,000 patients	Large sample size Focus was on PCPs antibiotic prescribing patterns. The fourth step of the STAR program was focused on shared decision making. UK based study: publicly funded system similar to Canada.	Identified limitations are for the purpose of this study and may not be a limitation for other studies: Study included prescriptions for adults and children Study does not focus specifically on URIs, although AOM and ABS are mentioned as a main diagnosis that PCPs may prescribe unnecessary antibiotics. Applicable outside of study: Time demands of the educational intervention (4 hours per PCP)	Decrease in antibiotic prescriptions by 4.2% in the group that received education. The largest reduction in the intervention group was for penicillin type antibiotics and macrolides, commonly used for URIs. Higher rates of unnecessary antibiotic reduction reported in clinics with a higher percentage of PCPs included in the study. No increase in cost or hospital admissions with reduction in antibiotic use.

Article synopsis	Strengths	Limitations	Significant findings
3. Giguere et al. (2012). Method: Randomized control study Interventions: ▪ PCP education program (DECISION +) intended to implement shared decision making in primary care. ▪ Education program evaluation with PRIDe; a shared decision making assessment tool. Research objectives: ▪ Reduce unnecessary antibiotic use for URIs with DECISION + a PCP shared decision making education program. ▪ Evaluate effectiveness of PCP education program with use of the PRIDe tool. Sample size: n=27 Validity: PRIDe tool not statistically significant (P=0.08) reliability (P=0.03 intervention group and P= 0.008 in control group)	Canadian study: geographically applicable Relevant topic: demonstrates PCP education as a facilitator of shared decision making	Small sample size Mostly male PCP participants PRIDe may not be an accurate tool to measure the occurrence of shared decision making in primary care, as researchers conclude further validity testing required.	16% reduction in antibiotic use in PCPs who received shared decision making education in comparison to PCPs who did not.

Article synopsis	Strengths	Limitations	Significant findings
4. Hoye et al. (2010). Method: Qualitative research Intervention: One-day seminar with PCP attendees that addressed delayed prescribing and antibiotic use in a small group format as part of an antibiotic prescribing improvement program. Objective: To explore the perception of PCPs regarding delayed prescribing. Key themes/topics: Shared decision making, effective communication, and patient education were identified as key themes in delayed prescribing. Sample size: n=33 PCPs	Demonstrates perspective of PCPs and delayed prescribing, which reveals use of shared decision making. PCP demographic generalizable: equal involvement of male and female participants, with varied age (mean age=50)	Geographic differences: Norway has lower antibiotic prescribing rate than Canada Small sample size Research does not disclose if PCP attendance was mandatory or elective and whether participants were compensated for their time. Study method validity and reliability not disclosed.	Delayed prescribing and watchful waiting can be enhanced with shared decision making, and are used mainly for URI complications, AOM and ABS. Participants viewed delayed prescribing as a useful and practical method to decrease unnecessary antibiotic use for URIs.

Article synopsis	Strengths	Limitations	Significant findings
5. Legare et al. (2012). Method: Randomized control trial. Intervention: PCP intervention: ▪ Two-hour online tutorial, plus a two-hour interactive work-shop administered to PCPs. ▪ Education followed by URI consultation preceded and followed by questionnaire focused on shared decision making. Patient intervention: ▪ Completed questionnaire to determine whether shared decision making had occurred. Objective: To determine whether PCPs engaged in shared decision making while providing information on URIs including bacterial versus viral causes, antibiotic indications, and benefits versus risks of antibiotic use Intervention participants: 181 patients and 77 PCPs Control participants: 178 patients, 72 physicians.	Canadian based study. Questions altered for consideration of differences between rural and urban areas. Large sample size Applicable to future PCPs: Medical residents included in research. Included patient perception of whether shared decision making had occurred.	Included only French speaking participants.	Decision to choose antibiotics after shared decision making occurred was decreased. Antibiotic prescription reduction of 25% in intervention group.

Article synopsis	Strengths	Limitations	Significant findings
6. Legare et al. (2013). Method: Randomized control trial. Intervention: PCP: Three-hour online tutorial followed by interactive workshops for PCPs based on modified training program DECISION+2. PCPs and Patients: Pre/post URI consultation questionnaire that was used to determine whether shared decision making had occurred during the consultation. Sample size: Participants included 151 PCPs and 239 patients in the intervention group and 99 PCPs and 210 patients in the control group.	Canadian based study Demonstrates congruency between PCP and patient perception of shared decision making. Large sample size	Control group smaller than the intervention group. Walk-in clinic setting, may not represent primary care accurately. Patient participant demographics not provided in the study.	PCPs play an active role in encouraging patients to participate in their own health. Perception of shared decision making is similar between PCPs and patients. PCPs were more likely to engage in shared decision making after the DECISION+2 education, as well as encourage patients to participate in shared decision making. Reduction in antibiotic use was not sustained over time.

Article synopsis	Strengths	Limitations	Significant Findings
7. Mangione-Smith et al. (2015). Method: Cross-sectional study Intervention: PCPs: completed post consultation surveys and confirmed a diagnosis of URI Parents: post-visit survey Objective: To determine the effect of positive, negative, and contingency plans on parental satisfaction and adherence to the treatment plan Sample size: Parental participants: n=1,194 PCP: n=28	Large sample size Describes differing types of PCP communication strategies in the form of treatment recommendations: ▪ Positive: things parents can do to help their child ▪ Negative: providing reasons why antibiotics are not appropriate in a child's illness ▪Contingency: follow up Focus on children and viral URIs.	Based in US, with different health care system. No PCP demographics provided, other than all PCPs were pediatric specialists. Not generalized to all populations: most parental participants were Caucasian in middle to upper class socioeconomic status Parents not consistently able to identify positive and negative treatment plans.	52% decrease in antibiotic prescriptions when positive treatment recommendations were provided. 84% decrease in antibiotic prescriptions when positive and negative treatment recommendations were provided. Increase in parental satisfaction with positive treatment recommendations and contingency plan. Negative treatment plans in isolation were associated with a higher level of parental dissatisfaction.

Article synopsis	Strengths	Limitations	Significant Findings
8. Mustafa et al. (2014) Qualitative study: Single face-to face anonymous semi-structured interview of PCPs, including open-ended questions Objective: To examine the unique perspective of PCPs surrounding patient expectations for unnecessary antibiotics for URIs. Major themes: PCP view on URI consultation management, development of PCP strategies to deter conflict such as physical exams and information sharing, the professional influence of peers, and the desire to provide good care. Sample size: n=20	Reveals PCP characteristics and misconceptions of shared decision making Reveals distinct communication patterns that are a barrier to shared decision making	Small sample group, poor response to request for PCPs to participate in the study. Geographic and demographic differences from Canada: study performed in Wales, United Kingdom, and 80% had more than ten-years' experience as PCPs.	Revealed the need for improved communication by PCPs. URI consultations were seen by PCPs as an area for possible conflict due to PCP perception that patients may request antibiotics when they were not necessary. PCPs preferred to ask indirect questions regarding a patients reason for URI consultation. PCPs were likely to engage in open and direct communication with their patients if they thought it would improve their professional relationship with their patient

Article synopsis	Strengths	Limitations	Significant findings
9. Panagakou et al. (2012). Method: cross sectional study Intervention: A survey distributed to parents. Survey questions focused on three main topics: parental knowledge, attitudes, and practices regarding antibiotic use for URIs. Answers to the survey were correlated to parental demographics. Objective: To explore the effects of parental risk factors on unnecessary antibiotic use in Greece Sample size: n=5312	Large sample size of parents surveyed with geographic variation to capture many different parental demographics.	Geographic differences: antibiotics can sometimes be obtained without a prescription over the counter in Greek pharmacies. Data correlation: it was unclear what researchers meant by an incorrect answer to a survey question. The assumption was made that an incorrect answer refers to an incorrect attitude towards antibiotics for viral URIs. Researchers provide explanations for the differences in parental responses, although no data was provided to support their thoughts.	Parental risk factors for unnecessary antibiotic use related to parental lack of knowledge surrounding URIs were identified as: Care provided by fathers, low level of completed education, low socioeconomic status, language barriers, and immigrant status.

Article synopsis	Strengths	Limitations	Significant findings
10. Yin et al. (2012). Method: Cross-sectional analysis Intervention: Parental surveys assessing health literacy, socioeconomic status, parent's perception of shared decision making, parental preferences surrounding shared decision making, and frequency of perceived involvement in their child's care. Objective: to identify whether perceived barriers to care in parents of low socioeconomic status with low health literacy affected shared decision making. Sample size: n=823	Large parental participant sample size Provided clear consensus that parents wish to be involved in their child's care,	Geographic Location (Urban New York) may not be applicable to rural Canadian settings or smaller Canadian cities. Possible translation barrier as Spanish was primary language of participants Lack of cultural diversity (81.9% Spanish participants)	Parents with low health literacy and/or low socioeconomic status still wish to be included in child's health care decisions. 80% reported a lack of perceived partnership with their child's PCP. Parents with lower health literacy were less likely to feel included in their child's health care needs and decisions.

Appendix C

GRIP Framework

Table 1. Framework outline for the non-antibiotic treatment of acute respiratory tract infections.

- Policy to advance antibiotic stewardship and conservancy imperatives
- Prevention of inappropriate antibiotic use by providing guidance on the indications, signs and symptoms of RTIs, and subgroups of patients where antibiotic use is appropriate
- Patient participation to encourage patient empowerment, combined with appropriate evidence-based symptomatic management of RTIs
- Prescriber guidance on strategies for an effective dialogue between primary care healthcare professionals and patients during and after consultation for a RTI, resulting in clear take-home messages, supplemented with appropriate materials or referral to available resources, including, but not limited to:
    - acknowledging the reasons for patient consultation for an RTI
    - providing reassurance and counselling on non-antibiotic treatment, resulting in patient satisfaction with the consultation
    - offering evidence-based, symptom-focused advice
    - educating the patient on antibiotic conservancy
    - outlining what follow-up is required and what symptoms would necessitate further intervention

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