Acute otitis media guidelines 2019

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## AMERICAN ACADEMY OF PEDIATRICS AND AMERICAN ACADEMY OF FAMILY PHYSICIANS

### **CLINICAL PRACTICE GUIDELINE**

Subcommittee on Management of Acute Otitis Media

### Diagnosis and Management of Acute Otitis Media

ABSTRACT. This evidence-based clinical practice guideline provides recommendations to primary care clinicians for the management of children from 2 months through 12 years of age with uncomplicated acute otitis media (AOM).

The American Academy of Pediatrics and American Academy of Family Physicians convened a committee composed of primary care physicians and experts in the fields of otolaryngology, epidemiology, and infectious disease. The subcommittee partnered with the Agency for Healthcare Research and Quality and the Southern California Evidence-Based Practice Center to develop a comprehensive review of the evidence-based literature related to AOM. The resulting evidence report and other sources of data were used to formulate the practice guideline recommendations. The focus of this practice guideline is the appropriate diagnosis and initial treatment of a child presenting with AOM.

The guideline provides a specific definition of AOM. It addresses pain management, initial observation versus antibacterial treatment, appropriate choices of antibacterials, and preventive measures. Decisions were made based on a systematic grading of the quality of evidence and strength of recommendations, as well as expert consensus when definitive data were not available. The practice guideline underwent comprehensive peer review before formal approval by the partnering organizations. This clinical practice guideline is not intended as a sole

This clinical practice guideline is not intended as a sole source of guidance in the management of children with AOM. Rather, it is intended to assist primary care clinicians by providing a framework for clinical decisionmaking. It is not intended to replace clinical judgment or establish a protocol for all children with this condition. These recommendations may not provide the only appropriate approach to the management of this problem.

ABBREVLATIONS. AOM, acute otitis media; OME, otitis media with ethasion; AAP, American Academy of Pediatrics; AAFP, American Academy of Family Physicians; AHRQ, Agency for Healthcare Research and Quality; MEE, middle-ear effusion; CAM, complementary and alternative medicine.

A cute otitis media (AOM) is the most common infection for which antibacterial agents are prescribed for children in the United States. As such, the diagnosis and management of AOM has

a significant impact on the health of children, cost of providing care, and overall use of antibacterial agents. The illness also generates a significant social burden and indirect cost due to time lost from school and work. The estimated direct cost of AOM was \$1.96 billion in 1995. In addition, the indirect cost was estimated to be \$1.02 billion.1 During 1990 there were almost 25 million visits made to office-based physicians in the United States for otitis media, with 809 antibacterial prescriptions per 1000 visits, for a total of more than 20 million prescriptions for otitis media-related antibacterials. Although the total number of office visits for otitis media decreased to 16 million in 2000, the rate of antibacterial prescribing was approximately the same (802 antibacterial prescriptions per 1000 visits for a total of more than 13 million prescriptions).2-4 An individual course of antibacterial therapy can range in cost from \$10 to more than \$100.

There has been much discussion recently as to the necessity for the use of antibacterial agents at the time of diagnosis in children with uncomplicated AOM. Although in the United States the use of antibacterial agents in the management of AOM has been routine, in some countries in Europe it is common practice to treat the symptoms of AOM initially and only institute antibacterial therapy if clinical improvement does not occur. For the clinician, the choice of a specific antibacterial agent has become a key aspect of management. Concerns about the rising rates of antibacterial resistance and the growing costs of antibacterial prescriptions have focused the attention of the medical community and the general public on the need for judicious use of antibacterial agents. Greater resistance among many of the pathogens that cause AOM has fueled an increase in the use of broader-spectrum and generally more expensive antibacterial agents.

It is the intent of this guideline to evaluate the published evidence on the natural history and management of uncomplicated AOM and to make recommendations based on that evidence to primary care clinicians including pediatricians, family physi-

The recommendations in this guideline do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate. PEDATRICS (DSN 0031 4007). Copyright © 2014 by the American Acaderry of Pediatrics. ciaro, physician assistants, nurse practitioners, and emergency department physicians as well as otolaryngologists. The scope of the guideline is the diagnosis and management of uncomplicated AOM in children from 2 months through 12 years of age without signs or symptoms of systemic illness unre-

PEDIATRICS Vol. 113 No. 5 May 2004 1451

#### CONTINUING MEDICAL EDUCATION

# Acute Otitis Media—a Structured Approach

Jan Peter Thomas, Reinhard Berner, Thomas Zahnert, Stefan Dazert

### SUMMARY

Background: Two-thirds of all children have an episode of acute otitis media (AOM) before their third birthday. Antibiotic treatment is often given immediately, even though adequate scientific evidence for this practice is lacking. Methods: This review is based on a selective literature search including previously published evidence-based recommendations, particularly those of the current American guidelines.

Results: A purulent tympanic effusion, possibly associated with inflammation of the tympanic membrane, is indicative Buchem et al. were the first to demonstrate that of AOM. Only some patients with AOM need immediate antibiotic treatment: children with severe otalgia and/or fever of 39.0°C or above, infants under 6 months of age, and children with certain specific risk factors, including immune deficiency and Down syndrome. In other cases, symptomatic treatment is appropriate. Antibiotic therapy (preferably with amoxicillin) should be initiated only if the symptoms and signs do not improve within two to three

Conclusion: As the currently available data are not fully consistent, there is still a need for controlled trials with well-defined endpoints to determine the relative benefits of immediate antibiotic treatment versus two to three days of watchful waiting ► Cite this as:

Learning goals After studying this article, the reader should be in a Thomas JP. Berner R. Zahnert T. Dazert S: Acute otitis position to: media: a structured approach. Dtsch Arztebl Int 2014: · Accurately diagnose AOM 111(9): 151-60. DOI: 10.3238/arztebl.2014.0151

Incidence

in this age group.

· Differentiate uncomplicated AOM from cases where complications may arise · Initiate and monitor appropriate treatment of AOM

Acute otilis media (AOM) is one of the most

commonly occurring inflammatory diseases of infancy and childhood and the third most frequent reason for prescription of antibiotics

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cy and childhood and the third most frequent reason for

20th century was followed by a dramatic decrease in

occurrence of the previously severe complications of

this disease (e1). Up to the 1980s no-one doubted the

necessity of immediate antibiotic treatment as soon as

AOM was diagnosed (e2). In 1981, motivated by the increasingly evident resistance to antibiotics, van

children over the age of 2 years with uncomplicated

AOM could tenably be managed by observation with

purely symptomatic treatment (2). Although this para-

digm shift has become embodied in various countries'

guidelines (3, 4, e3-e5) in the intervening years, some

An S2 guideline for the treatment of AOM is cur-

rently being prepared under the aegis of the German Society of Oto-Rhino-Laryngology, Head and Neck Surgery. The German College of General Practitioners

and Family Physicians issued an S3 guideline on "Ear-

ache" that was initially valid until December 2011 and

studies have questioned this practice (5, 6).

is currently under revision (e6).

The introduction of antibiotics in the first half of the

prescription of antibiotics in this age group (1).

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Deutsches Ärztebiott International Disch Arztebi int 2014, 111(9): 151-60

#### Requires the following: 1) Acute onset on signs and symptoms 2) the presence of middle ear effusion (MME) and 3) signs and symptoms of middle ear inflammation 1) Acute onset of signs Recent, usually abrupt, onset of sings and symptoms of middle-ea and symptoms 2) The presence of MME that is indicated by any a. Building of the tympanic membrane imited or absent mobility of the tympanic membran of the following: Air-fluid level behind the tympanic membrane Otorrhea Signs or symptoms of middle-ear Distinct erythema of the tympanic membrane Distinct otalgia (discomfort clearly referable to the ear[s] inflammation as that results in interference with or precludes normal indicated by eithe

Acute otitis media guidelines. Acute otitis media guidelines adults.

Tiffanie Bourgeois1, Catie Griffith1, Ema-Chanel Johnson1\*, Betty Leblanc1, Brooke Melancon1 1Northwestern State University of Louisiana in Shreveport This review's purpose is to identify barriers on adherence of treatment guidelines in the management of pediatric Acute Otitis Media (AOM). The American Academy of Pediatrics (AAP) and American Academy of Family Physicians (AAFP) released revised AOM practice guidelines in 2013. These guidelines address diagnosis and management of AOM is the most common reason children are prescribed antibiotics. Previous and continued antibiotic overuse presents increasing problems pertaining to antibiotic resistance, overall children's health, and healthcare costs2. This guideline recommends treatment, while conserving antibiotic use. This guideline includes diagnostic criteria, promotes the use of pneumatic otoscopy, and provides appropriate treatment regimens based on findings. Despite this, there is evidence that these guidelines are not being followed in multiple disciplines that provide care to this population. A comprehensive review of the literature obtained from several databases, produced 650 articles after inclusion and exclusion criteria was applied. In order to include the highest possible level of research, the articles were individually reviewed, and 19 articles were included in this review. Major barriers identified and compares these multidisciplinary barriers in hope of understanding reasons for the lack of guideline adherence and possibly help facilitate behavioral changes to improve patients' wellbeing. Keywords defined • Acute Otitis Media (AOM)- rapid progression of signs and symptoms of inflammatory responses of middle ear3. • Uncomplicated AOM- AOM that does not include otorrhea3. • Severe AOM- AOM with moderate to severe ear pain or temperature 102.2 F 3. • Otitis Media with Effusion (OME)- fluid in middle ear with inflammation where no acute infection signs or symptoms are present3. • Middle Ear Effusion (MEE)- fluid in the middle ear without inflammation 3. • Otorrhea- ear discharge from external auditory canal, middle ear, mastoid, inner ear, or intracranial space 3. • Otitis externa- external auditory canal infection 3. • Initial encounter 3. • Initial observation (watchful waiting/WW)- Symptomatic relief where antibiotics are only initiated if child's condition does not improve within 48 to 78 hours after diagnosis, and a follow up plan should be in place3. Acute Otitis Media Impact AOM will affect most children before 10 years of age. The most common risk factors include winter months, low socioeconomic status, poor nutrition, nursery or daycare attendance, bottle-feeding, flat feeding, use of pacifiers, siblings with recurrent ear infections, insufficient vaccinations, parental smoking, and poor hygiene4. Hirst and Neill (2013)4 report that it is most common in boys and can have a viral or bacterial etiology with the most common pathogens being Streptococcus pneumoniae and Haemophilus influenzae. Evidence based guidelines are available for treatment of AOM, but they are not being followed. As medicine advances, evidenced based practice is essential to provide the best patient outcomes. Background and Significance AOM commonly follows an upper respiratory infection when the infection travels up the eustachian tube to the middle ear, resulting in inflammation and effusion. Exudate from the inflammatory process causes the tympanic membrane to bulge and could potentially result in permanent hearing loss4. Antibiotics were used as first-line treatment for AOM in the beginning of the 20th century, resulting in a decrease in AOM occurrence and complications, but this also led to flippant, widespread use of antibiotic for anything mimicking this condition. In the 1980s, the phenomena of antibiotic resistance became evident, which has led to widespread efforts to decrease unnecessary antibiotic use5. Later studies have suggested that antibiotics are not effective for uncomplicated cases of AOM and may cause unwanted side effects including diarrhea, vomiting, and rashes which lead to poor outcomes. This is especially true in the pediatric population because children tend to have relatively more severe side-effects when compared to adults4. According to Hirst and Neill (2013)4, one of the most serious complications that may arise from untreated or irresponsive AOM is mastoiditis, an infection of the mastoid bone, which should be suspected when the child presents with earache, otorrhea, pain, headache, fever hearing loss, redness, and ear swelling; this condition should be immediately referred to an ear, nose, and throat specialist. They also report other potential, but very rare, complications including chronic suppurative otitis media, eardrum perforation, cholesteatoma, facial nerve paralysis, and meningitis. al. (2014)5 includes labyrinthitis, sinus vein thrombosis, epidural abscess, subdural abscess, and Gradenigo syndrome. Again, although there is some risk of complications associated with not treating AOM with antibiotics, the occurrence is very rare, especially in comparison to the emerging risks of antibiotic resistance. Current Guidelines In 2004, the AAP and AAFP released guidelines which include recommendations for diagnosing, managing, and preventing AOM in healthy children with underlying clinical conditions, immune deficiencies, and the presence of cochlear implants3. The guidelines are intended to assist providers from a variety of disciplines, including nurse practitioners, in the appropriate diagnosis and management of AOM in clinical settings where these patients will seek care. Some illnesses have specific defining characteristics, also known as gold standards, but this has not been made apparent for AOM. Efforts have been made to create videography or photography through otoscopy and use of tympanocentesis for culture and sensitivity analysis can aid in more definitive diagnosis of AOM, but these measures are not routinely utilized, and sometimes they are not feasible in this population AOM can resemble otitis media with effusion (OME) and can be differences. A normal tympanic membrane (TM) should appear pearly gray, translucent, ground-glass appearance, mobile, and specific landmarks of the internal ear should be easily visualized3. Based on the AAP and AAFP guidelines, symptoms in the pediatric population may include fever, diagnosis should be made based on stringent otoscopic changes3. The guidelines also state that otoscopic signs include cloudy bulging, red, or yellow TM and TM with decreased mobility, assessed by using pneumatic otoscopy, a standard tool for diagnosing otitis media (OM). Accurate diagnosing otitis media (OM). AOM depends on the age of the patient and severity of signs or symptoms. More severe symptoms include otoscopic examination findings, high pain level, and temperature over 102.2, or otalgia beyond 48 hours. Criteria for antibiotic use in children six months to two years old include otorrhea with AOM, unilateral AOM with severe symptoms, and unilateral/bilateral AOM without otorrhea3. The guidelines also state that if the child is over 2 years of age, antibiotics should only be used for otorrhea with AOM, unilateral or bilateral AOM with severe symptoms. What is unique with this population is that watchful waiting can be used in unilateral/bilateral AOM without otorrhea with provider discretion3. Watchful waiting is defined by Lieberthal et al. (2013)3 as initial observation of uncomplicated AOM with planned follow up or an alternative plan if the child's symptoms worsen. The guidelines also state that it is important when using watchful waiting for AOM to provide a rescue antibiotic if necessary. This can be done in two ways, a "wait-and-see" prescription at the initial office visit where the caregivers are given instructions to fill the prescription at the initial encounter but instruct the caregiver to call or return to the clinic if the child worsens or fails to improve in 2-3 days. does not improve within 2-3 days3. Of course, this approach of AOM management may require increased caregiver. Current guidelines for antibiotic treatment in the management of AOM are also included by the AAP and AAFP. Lieberthal et al. (2013)3 report that if antibiotics are indicated in AOM, as mentioned in the criteria previously, providers should prescribe amoxicillin for treatment if the child has not consumed amoxicillin; if amoxicillin use in the past 30 days has occurred or AOM is unresponsive to amoxicillin, B-lactamase coverage should be used. They also recommend that if symptoms worsen or there is no response to the initial antibiotics, the clinician should consider a change in antibiotic therapy. First-line treatment in most patients is high-dose Amoxicillin (80-90 mg/kg/day in 2 divided doses) or Amoxicillin-clavulanate (90 mg/kg/day of amoxicillin with 6.4 mg/kg/day of clavulanate in 2 divided doses)3. Amoxicillin is the recommended first-line because of its efficacy against common AOM bacterial pathogens, safety, affordability, acceptable taste, and narrow microbiologic spectrum3. Alternative initial treatment of AOM in penicillin allergic patients includes oral Cefdinir, cefuroxime, cefpodoxime, or ceftriaxone administered intramuscularly3. Alternative treatment options for antibiotic failure after 48-72 hours includes ceftriaxone or clindamycin, with or without a third-generation cephalosporin, tympanocentesis, and/or specialist consult3. Appropriate duration of therapy is 10-days, but a third-generation cephalosporin, tympanocentesis, and/or specialist consult3. 5 to 7-day course may be adequate3. Prevention of AOM is also important and is addressed in the AAP and AAFP guidelines. Lieberthal et al. (2013)3 state that prophylactic antibiotics for reduction of AOM occurrences in children with frequent AOM should not be prescribed by the clinician. These guidelines also suggest that annual influenza vaccines and pneumococcal conjugate vaccine should be recommended by the provider to all children based on the schedule of the Advisory Committee on Immunization Practices. Other preventions that should be emphasized includes breastfeeding for 4-6 months should be encouraged as well as avoidance of tobacco smoke exposure to reduce occurrences of AOM. Current practice AOM is a localized and internal process which makes it very difficult for the clinician to determine the causative organism based on physical exam. As a result, it has often been routinely treated with antibiotics "just in case," which can put the client at risk for complications. In response, the AAP released revised guidelines for treatment of AOM which suggest initial observation in uncomplicated AOM3. The growing concern, though, is the lack of clinician compliance with these guidelines3. Inclusion of literature of clinical management of AOM or other disciplines. One study discovered health care providers prescribed antibiotics for pediatric patients most of the time despite severity; this study included 100 participants that all had temperatures less than 102.2 F and no severe ear pain), and 92% received an antibiotic prescription. In this study, providers diagnosed AOM on this basis of one single finding such as erythematous tympanic membrane with no other signs, but a diagnosis of AOM should consist of findings of both middle ear effusion and inflammation6. Statement of the Problem Current practice does not reflect current guidelines are available for treatment of AOM, but they are not being followed. Following evidenced base guidelines leads to better outcomes for patients. Barriers for implementing these guidelines are not fully known, but it is important to identify these so that better care may be given to patients. Possible barriers include physicians' concern of follow-up, physic and ease of medication regimen. Further exploration of barriers is necessary for this study. Research question of the 2004 American Academy of Family Physicians clinical practice guidelines for acute otitis media in the pediatric population. Rationale for the Study The purpose of this integrative review is to identify and examine current research on barriers of implementing the 2004 AAP and AAFP clinical practice, benefits and limitations of current recommendations. Few studies have addressed barriers associated with implementing the 2004 AAP and AAFP clinical practice guidelines of AOM treatment. Methods This type of review calls for a comprehensive, systematic review, pilot study, or concept analysis would not be appropriate for study of this problem. Systematic reviews seek to answer a specific clinical question. There is not much research on this topic specifically related to our question, so we must utilize integration of several disciplines. The problem requires observation and identification of specific barriers related to lack of guideline compliance, so a pilot study would not be helpful and would be too time consuming. In addition, there is no intervention to test, which is the basis of pilot studies. Concept analysis studies seek to describe and explain vague concepts, which is not affiliated with this clinical problems that are relevant to advanced practice nursing. An integrative review is an appropriate approach for this clinical problem. project because it combines diverse methodologies such as quantitative and qualitative research to create a more well-rounded evidence review. It will allow incorporation of varied perspectives and support enhanced data collection strategies, as well as comparing discipline adherence and success rates. practice, pediatrics, and ear, nose, and throat (ENT) disciplines. These disciplines were chosen as they encounter this issue the most of all disciplines, leading to a comprehensive, integrated review of literature pertaining to them. Significance to Advanced Practice Nursing As this issue is one of the most common childhood illnesses as well as one of the most frequent reasons for antibiotic prescribing in the pediatric population, it is directly related to advanced practice nursing. Advance Practice nursing. Advance Practice nursing in the pediatric population, it is directly related to advanced practice nursing. common childhood illnesses encountered in primary care. The disconnect between current guidelines and current practice produces a barrier for these providers. This is significant to advanced practice nursing because over usage of antibiotic resistance Review of Literature Data collection involved a comprehensive search and review of literature including relevant information correlating with the inclusion criteria. Methods of research and review of literature (CINAHL), Clinical Key by Elsevier, Google Scholar, Medical Literature Online (MEDLINE), independent searching of references from included and excluded articles, and wide internet searching for articles compiled with systematic reviews, cohort studies. Al articles were reviewed by title and abstract to determine relevance to the study. Studies that could not be determined through analysis of abstract and title only were further investigated through the body of the article. Research evidence was divided into hierarchy levels of research which determined the qualities of each article and were implemented throughout this study. Research levels of information obtained. These research levels included observational surveys, retrospective descriptive studies, systematic reviews, cohort studies, survey analysis, randomized clinical trials, retrospective interventional studies, and case-controlled trials. Levels V, VI, and VII of hierarchy research included retrospective analysis of patient records, surveys, data analysis, retrospective studies of databases, descriptive statistics of post-tests, semi-structured interpretive qualitative studies which were utilized only as supporting evidence to findings throughout the rest of this study. Inclusion and Exclusion Criteria The first inclusion criteria defined research studies that were focused on the diagnosis of AOM. This was then narrowed to pediatric populations, 6 months to 12 years of age. Each article was then further required to have been peer reviewed and written in the English language. Final inclusion criteria included AAF and AAFP clinical practice guidelines and adherence to practice. Exclusions applied to this search included abstract-only articles, pediatric populations with significant medical comorbidities (prematurity, heart defects, asthma, and immunocompromise), otitis media with effusion, and any article referencing other guidelines for AOM that does not include the AAP and AAFP guidelines. Search terms The following search terms where utilized in different Boolean phrase combinations, treatment outcomes, drug therapy, trends, otitis media physician adherence, parents, physicians' attitudes on otitis media, education, and complications. Electronic Search Methods Electronic searches were conducted utilizing Northwestern State University's online database library which included CINAHL, MEDLINE, and Clinical Key by Elsevier. and did not permit any new referencing material. CINAHL A keyword search consisting of different configurations, implementation, barriers, adherence and practice guidelines through CINAHL were performed. Over 4,000 articles were found in this search. Inclusion criteria were applied to this initial search which narrowed the results to under 200 articles. Each of these articles was analyzed by review of its abstract and validated or removed from the study based on exclusion criteria. These articles were then analyzed by review of its abstract and validated or removed from the study based on hierarchy level of research to include in the review of literature. MEDLINE A keyword search consisting of multiple configurations of acute otitis media, adherence, practice guidelines, outcomes, physician completed using the search keywords. Inclusion criteria were applied with less than 300 articles remaining. These articles were then individually reviewed and either included or excluded based on criteria. The articles were again reviewed to identify the hierarchy levels of evidential research. Clinical Key by Elsevier A keyword search was conducted utilizing the Clinical Key by Elsevier A keyword search was conducted utilizing the following keywords. otitis media, adherence, otitis media physician adherence, parents, antibiotics, physicians' attitudes on otitis media, and guideline practice. This keyword search results and narrowed to 150 articles. These articles were individually reviewed through analysis of abstracts to further siphon through results to produce only the high levels of research to be discussed in the review of literature. Alternative Resources Utilized Further research was conducted by utilizing references from articles that were included and excluded in this study to further validate research findings. evidence in support of the identified high-level evidential research. Hierarchy Level Determination Melnyk, & Fineout-Overhol (2015)7 produced literature defining the different levels of hierarchy research which was utilized in this integrated review to provide high quality research which was utilized in this integrated review. (2015)7 defined level I hierarchy of research to consist of systematic reviews and metanalysis of randomized controlled trials which can include guidelines based on systematic reviews and metanalyses. Level II of research hierarchy was defined as a controlled trial (Melnyk, & Fineout-Overholt, 2015). Level IV of research hierarchy consists of case-controls or cohort studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. Level VI of research hierarchy contains single descriptive and qualitative studies7. 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Refer to Table 1 for further in-depth evaluation of the updated 2004 the introduction of the updated 2004 the introduction of the updated 2004 the integration of the updated 2004 the introduction of the updated 2004 the integration of the updated 2004 the updated 2004 the integration of the updated 2004 the u AAP and AAFP guidelines on treatment of AOM has brought forth multiple barriers among practitioners, parents of children with AOM, and clinical influences. These barriers prevent providers from implementing treatment guidelines in current practice. and concern for unnecessary antibiotic treatment. Each barrier was identified and described thoroughly after extensive and systematic investigation of literature pertaining to non-adherence with these guidelines. Major barriers identified and other clinically related factors. Refer to Table 1 for an in-depth analysis of the studies identified and their research details and findings. Table 1. Review of Literature Table Author(s) / Year Design / Hierarchy Level: III 1,000 surveys to physicians - Response rate was only 48% - Only 1.4% answered all six items Clinical practice guidelines have little effect on changing physicians' treatment patterns with regards to AOM. - Lack of knowledge on guideline accessibility and ease of reading through less volume of material - Negative feelings about guidelines - Disagreement with guidelines because they believe it will not lead to appropriate outcomes - Unwillingness to go against patient preferences Francis, et al. (2006) Design: Cohort study Hierarchy Level: II 153 pediatricians 206 internists 127 family practitioners - Pediatricians and internists adhered to AOM treatment guidelines by 41.5% Family practitioners did not improve adherence to overall guidelines after interventional teaching of such guidelines. - Complexity of patient care - Local and cultural influences - Lack of education on new guidelines in various disciplines of medicine practitioners (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers Boatright, Holcomb, & Repogle (2015) Design: Retrospective descriptive study Hierarchy Level: IV 100 pediatric patients ages 6-months to 12 years diagnosed with non-severe AOM - 92 of the 100 children were prescribed antibiotics - None of the NPs observed WW Health care providers are not following the AAP 2004 guidelines to diagnose and treat AOM in children - Parental pressures - Lack of monitoring - Lack of mo databases Hierarchy Level: III 2.6 million pediatric populations in 1996 with AOM in 2005 with AOM in 2005 with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients presenting with AOM in 2005 were prescribed antibiotics - 91.3% of patients prescribed current 2004 AAP and AAFP guidelines to treat AOM in pediatric patients. - Physicians do not believe WW is appropriate in the ED - Physicians concerned patients will not follow-up closely as recommended in guidelines Schilder, et al. (2017) Design: Systematic Review of Randomized clinical trials and cohort studies Hierarchy Level: I 118 relevant articles - Antibiotic prescription numbers remained stable for AOM despite AAP 2004 guidelines to treat AOM in pediatric populations are not being implemented in practice today. - Lack of physician's knowledge on current guidelines Inaccurate diagnosis due to lack of method to classify severity of AOM (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers Coco, Vernacchio, & Anderson (2010) Design: Retrospective chart review / survey analysis Hierarchy Level: IV 1,114 children 6 months to 12 years of age diagnosed with AOM - After new guidelines, the percent of AOM diagnosed managed without antibiotics did not significantly change - Amoxicillin prescription rates have increased. - Parental reluctance - Physicians more willing to add treatment than to withhold treatment - Lack of agreement with the guideline recommendations Spiro, et al. (2006) Design: Randomized control trial Hierarchy Level: II 283 randomized children with AOM age 6 months to 12 years - More parents in WW group did not fill the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in reference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in reference between WW and antibiotic treatment groups in reference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in reference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in reference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant difference between WW and antibiotic treatment groups in the prescription (62% vs. 13%) - There was no significant differen to subsequent fever, and otalgia WW approach substantially reduced unnecessary use of antibiotics in children with AOM but can be hindered by parental expectation. Habits, and lack of training. - Parental expectation, habits, and lack of training. Observational study through surveys from 2006 showed that after This study correlates that physicians accept the concept of the AAP and AAFP 2004 guidelines but fail to use it consistently due to - Parental expectations and/or demand for antibiotic treatment - Cost/time/follow-up visit compliance - Complications or further (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers to practice. concern for related symptoms - Concern for parent's reliability/adherence - Concern that parent will find another doctor that will prescribe Bradshaw, et al. (2016) Design: Prospective interventional before/after study Hierarchy Level: III 101 physicians in pediatric, emergency, and family practice - 97 out of 98 physicians selected amoxicillin for OM - 13 out of 95 physicians changed from amoxicillin to cefdinir after taste testing - Amoxicillin remained the most palatable antibiotic based on taste tests Better taste of antibiotic treatment based off antibiotic taste rather than guideline recommendations Jensen & Lous (1999) Design: Prospective cohort study Hierarchy Level: II 790 surveys to practitioners - Diagnostic criteria and performance was small Appropriate diagnosis of AOM and grading of severity impact the severity impact to severity impact the severity impact to severity impact the severity impact to severity treatment guidelines enacted by the AAP and AAFP 2004 guidelines. - Diagnostic certainty is based on personal opinion (Continued) Author(s) / Year Design / Hierarchy Level: I 232 children age 2-7 years with OM - 87% of parents reported they did not give their children the antibiotics or see another physician within the three-day observation period - 7-10-day follow-up: 81% of parents in the observation period reported they did not give antibiotics and 53% of parents in the observation and prescription group did give antibiotics - 95% of parents from both groups were satisfied with the visit contrary to the advice of the physician. This shows that physicians do not believe parents will be compliant with current recommended AAP and AAFP 2004 guidelines. - Physicians predict nonadherence to WW and will prescribe antibiotics because they know the parents want it (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers Vaz, et al. (2015) Design: Mailed surveys Hierarchy Level: III 707 parents with a child < 6 years old with AOM responded to surveys - Knowledge gaps are widespread and more common among parents publicly insured Insurance group parents had high rates of acceptable answers regarding illnesses in which antibiotics are indicated but were not good at identifying illness or symptoms which antibiotics were needed Parents are knowledgeable in the need for antibiotics to treat infection but are uneducated when it comes to specific symptoms of illnesses that require antibiotic treatment. - Deficit in parental knowledge of antibiotic treatment. themes: o Quality of relationships with healthcare providers o Dealing with conflicting messages o Rationalizing antibiotic use o parental practices from past experiences Parents want reassurance and advice regarding their children and illnesses. Parents have poor knowledge on appropriate antibiotic use o parental practices from past experiences and advice regarding their children and illnesses. leading physicians to continue antibiotic treatment as opposed to WW based on AAP guidelines. - Parents lack knowledge on antibiotic indications (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers Kautz-Freimuth, et al. (2015) Design: Exploratory survey through descriptive statistical analysis Hierarchy Level: III 138 parents seeking treatment for their children age 2-7 years-old with AOM - 66% of parents believe AOM is caused by a virus 30.5% of parents believe AOM resolves spontaneously - 56.6% of parents do not believe AOM resolves spontaneously - 92.5% of parents believe AOM needs to be treated with antibiotics Uncertainties of parental knowledge on AOM's natural course and effects antibiotics pose to those that do not need them solidify that parental education is paramount in physician adherence to current AAP and AAFP 2004 treatment of AOM guidelines. - Lack of parental knowledge on AOM natural course - Misconceptions of effectiveness in AOM treatment - Realistic views of undesired effects McCormick, et al. (2005) Design: Randomized clinical trial Hierarchy Level: I 223 children 6 months to 12 years old - 66% of WW group completed study without antibiotics - parent satisfaction was the same regardless of treatment - immediate antibiotic treatment This study has shown that implementation of AAP and AAFP 2004 guidelines is determinant on being able to classify AOM severity - Parents need education on disease profile - Access to follow-up care variable by patient - Management of AOM symptoms and (Continued) Author(s) / Year Design / Hierarchy Subjects Findings Relevance to Study Barriers was associated with decreased treatment failures and improved symptom control but had increased side effects from treatment of the control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment of the control but had increased side effects from treatment of the control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from treatment failures and improved symptom control but had increased side effects from t with access to follow-up care. compliance in question Tahtinen, Laine, & Ruohola (2017) Design: Analysis of randomized, double blind, placebo-controlled trial Hierarchy Level: II 319 children age 6 months to 35 months of age with AOM - Treatment failure occurred in 31.7% in all children - Highest treatment failure was seen in children with severe bulging of the TM resulting in 1.9 of patients needing treatment This study concluded the unnecessariness of prescribing antibiotics for less severe AOM in pediatric populations. This affirms the need for implementing AAP and AAFP 2004 guidelines in current practice. - Need for diagnostic criteria to grade severity of AOM uniformly Sun, McCarthy & Liberman (2017) Design: Cohort study Hierarchy Level: II 250 patients < 18 years old with AOM in the emergency department - WW current guidelines will save \$5,573 per 1,000 patients WW for AOM is more cost-effective than current practice and improves patient outcomes - No continuity of care influencing decision-making in emergency departments (Continued) Author(s) / Year Design / Hierarchy Level: I 281 Children 6 months to 35 months old with AOM - The nurse could exclude AOM 20% of visits - Spectral gradient acoustic reflectometry was able to exclude 8% of AOM visits Nurses, if properly trained, could help minimize costs and increase provider compliance with guidelines by minimizing time constraints from expensive ineffective equipment. - Time constraints from expensive ineffective equipment. comparison Hierarchy Level: II 36,585 Children 0-12 years of age with AOM diagnosis in identified populations based on sex, race, season and year of diagnosis - Positive relations to the probability of patients being prescribed antibiotics - Higher cure rates with severe AOM cases and patient comorbidities that were prescribed antibiotics rather than WW patients (82.34%-74.44%) This study demonstrates treatment variation within observational databases can provide useful information to implement guidelines in practice Provider Factors Throughout the literature, specific provider barriers were the greatest motive for providers' lack of implementing AAP and AAFP guidelines in treating AOM in pediatric populations. Stewart, Manolidis, Wynn, and Bautista (2001)8 identified four main physician factors - knowledge, attitude, disagreement, and behaviors of practitioners not implementing AOM treatment quidelines. Physicians' lack of knowledge on current AAP and AAFP quidelines and its content was identified as part of time constraint due to volume of information available, quideline accessibility, and lack of distribution of knowledge among other disciplines8. Francis, Beckman, Chamberlain, Partridge, and Greene (2006)9 identified that information was not effectively shared amongst other disciplines of medicine including nurse practitioners and physician assistants. Boatright, Holcomb, and Replogle (2015)6 conducted a retrospective descriptive study that found about 98% of patients were prescribed antibiotics. This study consisted of 16% nurse practicioners and 84% physicians which concluded that multiple disciplines continue to not follow guidelines not because they are not knowledgeable, but because they do not feel it is an appropriate strategy for the emergency department. Schilder et al. (2017)11 suggested that adherence to practice guidelines of AOM are poorly followed because of lack of medical education. This study also proposes that the knowledge barrier may stem from insufficient educational interventions, cultural beliefs, social beliefs regarding antibiotic use, and inconsistency of diagnosing severity of AOM11. Many of the providers that have access and time to review these guidelines as they feel the guidelines as the guid Horst, and Anderson (2010)12 found that physicians are more willing to adopt a recommendation from the guidelines to add a treatment rather than to withhold treatment rather than to withhold treatment. Stewart et al. (2001)8 also found that there is little evidence to predict actual behaviors in practice compared with guideline recommendations due to individual case scenarios. Lack of training and education impact the effectiveness of AOM treatment and adherence to evidence-based guidelines in practice. Recent evidence suggests that continuing medical education is imperative to improve implementation of AOM guidelines in practice. guidelines recommend antibiotic therapy, physicians continue to not follow the guidelines by prescribing long-course antibiotic therapy instead of the recommendations of high-dose amoxicillin-clavulanate due and interval and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due and interval and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due and interval and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due and interval and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due and interval and the second and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due and interval and the second antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the recommendation of high-dose amoxicillin-clavulanate due antibiotic therapy instead of the r to the guideline straying from evidence of practice and associated infective pathogens. Bradshaw et al. (2016)15 found in an interventional study that physicians were also more apt to prescribing certain antibiotics due to palatability after taste testing despite updated guideline recommendations. Jensen and Lous (1999)16 suggest that one barrier to practice stems from personal provider opinions and degree of certainty in diagnosing AOM in pediatric patients. Jensen and Lous (1999)16 suggest that diagnostic criteria. Finally, physician non-compliance with implementing the updated AAP and AAFP 2004 guidelines to treat AOM in pediatric populations is contributed to habits of practice13. Physicians in the United States have routinely prescribed antibiotics for AOM and believe many parents have become accustomed to and expect a prescription for treatment13. Vernacchio, Vezina, and Mitchell (2007)14 identified that poor patient outcomes are a result of parental reluctance to accepting the guidelines' watchful waiting approach. Chao, Kenkov, Reyes, Lichten, and Crain (2008)17 conducted a prospective randomized trial that found a physician's ability to predict adherence had a sensitivity of 21% and a specificity of 100%. They also found that parents expressed resistance to treatment plan of observation with a prescription and an increased rate of noncompliance by 95%17. Physicians are also skeptical to adhere to guidelines, fearing the parent will prescribe an antibiotic14. Parental Factors Another major barrier identified in physician non-adherence to the updated AAP and AAFP 2004 guidelines on AOM in pediatric populations were parental factors. Despite educational campaigns implemented to decrease misuse of antibiotics, deficits in parental knowledge continue18. Parents need further education on the natural course of AOM and realistic views on undesired effects and misconceptions of effective treatment. Bosley et al. (2017)19 found that parents relied on previous experiences with antibiotic treatment. Bosley et al. (2017)19 found that parents relied on previous experiences with antibiotic treatment. condition if physicians do not prescribe antibiotics and comply with the recommended guidelines. This indicates a lack of knowledge and beliefs of parental education regarding the risks and benefits of AOM treatment was a key factor in poor provider adherence to implementing treatment guidelines. As research demonstrates, it is imperative to implement readily accessible and easy-to-understand management options to improve parent's health literacy in treating AOM in pediatric populations. Vernacchio, Vezina, and Mitchell (2007)14 conducted a study that listed parents' reluctance to adhering to guidelines based on anxiety about observation and further demand antibiotics for AOM13. This routine practice has influenced parents' ideals on AOM treatment and expect antibiotic treatment when their child has AOM symptoms13. Coco, Vernacchio, Horst, and Anderson (2010)12 found that parental reluctance to accepting the guideline recommendations is a major barrier to implementation. This cycle of parental expectation and provider willingness presents a significant barrier to implementing guidelines. AOM Severity / Complication Risk Certainty of AOM diagnosis is influenced by diagnostic equipment, provider's experience with physical exam problems 16. Tahtinen, Laine, and Ruohola (2017)22 conducted a randomized, double-blind, placebo-controlled trial that concluded children with severe bulging of the tympanic membrane seemed to benefit from antimicrobial therapy. This research indicates that guidelines should also include specified criteria on diagnosis of AOM is a key factor for overdiagnosis and overtreatment with antibiotics against the AAP and AAFP recommendations11. McCormick et al. (2005)21 also suggest that physician compliance with implementing AOM treatment guidelines would be improved with an appropriate method to classify AOM severity. Vernacchio, Vezina, and Mitchell (2007)14 conducted mailed surveys that concluded a major barrier to practitioner adherence to AOM treatment guidelines included physicians' fear of children not improving within an acceptable time frame. This concern lead to physicians prescribing backup antibiotic therapy with parental follow-up strategies 14. This leads to increased responsibility of parents and may not be appropriate for all families. McCormick et al. (2005)21 conducted a randomized clinical trial that discovered that the watchful waiting treatment from updated treatment guidelines are appropriate if the patient maintains a non-severe status and is kept comfortable with symptom management. Follow-up Concerns Physicians have identified difficulty associated with follow-up care for children managed initially with observation as an important barrier to AAP and AAFP guideline adherence14. Increased time and costs of care influence parental deterrence in complying with follow-up management14. Fischer, Singer, Lee, and Thode (2007)10 conducted a retrospective study sampling emergency department visits that identified declines in guideline implementation of AOM treatment because providers felt they are not an appropriate strategy for treatment in the emergency department. Sun, McCarthy & Liberman (2017)23 also found during a cohort study that physicians are reluctant to complying with guidelines because of the need for close follow-up and risk of complications. A critical element of guideline practice about observational strategies is that close follow-up must be ensured so intervention with antibiotic therapy can be initiated if the patient's condition worsens10. Doubting patient follow-up often leads to cautious diagnostic and therapeutic plans in emergency settings that would otherwise be followed more closely in primary care settings17. McCormick et al. (2005)21 suggest that guideline adherence in treating AOM must have access to follow-up care to receive effective continuance of care and appropriate antibiotic regimen if needed. Clinical Factors Patient complexity of treatment has been implicated in the lack of adherence to AOM guideline treatments by practitioners9. Pediatric patients generally have less comorbidities, but those children that present to practice with multiple comorbidities increase physician skepticism of following practice guidelines for all children as parents feel the need for treatment regardless of comorbidities?. Costs to patients and practice influence practicioner's decision to implement AOM guidelines practices by weighing benefits and costs to both parties9. The magnitude of practitioner and patient cost trade-off was identified as insignificant to induce physicians to change new guidelines from long-held practices9. These long-held practices include personal opinions in diagnosis of AOM in pediatric populations. Jensen and Lous (1999)16 identified a major barrier to practice guideline implementation among providers as a lack of specified diagnostic criteria of AOM leading to more diagnostic uncertainty. Local and cultural influences and self-reinforcing interventions of cultural i are needed to empower and improve compliance with AOM treatment guidelines. Stewart, Manolidis, Wynn, and Bautista (2001)8 further discovered time constraints as a barrier to physicians' adherence to AOM treatment guidelines. constraint in learning to implement them into practice. Laine, Tahtinen, Ruuskanen, Loyttyniemi, and Ruohola (2015)24 also addressed the barrier identified was that facilities lack defined policies toward implementing AAP and AAFP recommendations to provider practice25. Park et al. (2008)25 concluded that policymakers should implement beneficial models of guidelines can adherence to guidelines. Furthermore, suggesting policies with clinical scenarios that implement these guidelines can

improve adherence and understanding of AAP and AAFP guidelines on treating AOM in pediatric populations25. Synthesis of Relevant Literature Findings was a major activity in this integrative review. In this section, information discussed will be divided into disciplines by comparing themes regarding barriers to implementation of the 2004 AAP and AAFP guidelines. Disciplines involved included in the review of literature. Three articles related to nursing were included in the review of literature. Three articles were included in the review of literature. ambulatory or emergency care. Five of the articles were related to pediatric practice, and two included were focused on ENT. Many of these articles overlap with other disciplines, which was discussed in detail. Findings of Nursing Literature Pediatric Nursing journal published a study regarding treatment patterns and inaccurate prescribing by health care providers in relation to current guidelines. Boatright, Holcomb, and Repogle (2015)6 orchestrated a retrospective descriptive study and found health care providers treated AOM based on one exam finding and they prescribed antibiotics more for pediatric patients, even those with nonsevere AOM, which was incongruent with current guidelines.? Sixteen percent of the study participants were nurse practitioners, while 84% were physicians.? No relationship was determined among these providers regarding treatment, but it was noted that no nurse practitioner utilized watchful waiting.? These results, however, were not statistically significant.? Boatright, Holcomb, and Repogle among these providers regarding treatment, but it was noted that no nurse practitioner utilized watchful waiting.? (2015)6 suggested educational interventions, policy changes, and monitoring interventions should be implemented for better adherence to current guidelines. Laine et al. (2015)24 found that a major barrier to following current guidelines. Laine et al. (2015)24 found that a major barrier to following current guidelines. whether trained nurses could rule out AOM in children after being trained in pneumatic otoscopy.? The nurses' findings were compared to the control, the physician's findings (bulging position, decreased or absent mobility, abnormal color, or opacity not related to scarring). The second criteria included acute inflammatory signs including at least one of the following: distinct reddened patches or streaks over a bulging or yellow tympanic membrane.? Finally, the patient must also have had systemic signs or symptoms 24.? This study revealed that these tests performed by nurses were effective at ruling out AOM.? Limitations to this study include uncooperative children and nurse inexperience. Bosley et al. (2017)19 conducted a systematic review utilizing CINAHL, MEDLINE, PsycINFO, The Cochrane Library, British Nursing Index, EMBASE and PUBMED databases for primary articles published between 2006-2016. They determined that parents want reassurance and insight when caring for their children. However, parents had poor knowledge on the appropriate use of children improving on antibiotics, and they thought when their child was ill that they needed an antibiotic to make them better. This study recommended specialized education for parents, incorporating adequate time, reassurance, easy-to-read information, education level of parents, and attitudes and practices of parents. Findings of Family Practice Literature Park et al. (2008)25 conducted a case-controlled variable comparison of antibiotic treatment for otitis media among family practice, general practice, pediatrics, otolaryngologists, and other specialties.? This study stated that overprescribing leads to the spreading of antibiotic resistance, a serious problem.? Approximately 33% of patients were treated with antibiotics by family practice physicians as opposed to 16% by pediatricians and 0.88% of otolaryngologists.? Family practice had a higher physician supply per capita had a greater chance of receiving an antibiotic prescription for treatment of AOM.? Park et al. (2008)25 suggested that a policy for lowering unnecessary antibiotic prescribing is needed. Francis et al. (2006)9 conducted a cohort study of pediatricians', family practitioners', and internists' adherence rates to otitis media practice guidelines following a multi-faceted intervention.? This study found a statistically significant difference among these groups.? They found pediatricians initially had the poorest baseline adherence rate than internists and family physicians, but they improved more than the other two disciplines.? The intervention included targeted education, patient-specific outcomes data, feedback, and a financial incentive. Speculation of pediatricians' drastic improvement included a culture that promotion.? Family practitioners also had worked with patients that have increased comorbid conditions than those of pediatrics, which lead to a more individualized decision than guidelines allow.? Family physicians also seemed to focus on the individual experience as opposed to population-focused outcomes9. One family practice study identified the barrier of diagnostic uncertainty due to unclear diagnostic standards16 (Jensen & Lous, 1999).? Though this study was performed in 1999, the key variables remain true today.? AOM is still one of the most common reasons for office visits in pediatrics, and there is still much diagnostic uncertainty of AOM in children, being one of the first studies with that focus.? They found that providers base their diagnosis of AOM on their own opinion, and their level of diagnostic uncertainty was high.? The study proposed use of tympanometry and pneumatic otoscopy as possible means to eliminate this barrier; however, it was found that time constraints in family practice settings may prevent utilization of these methods of assessment16.? A pediatric study by Tahtinen, Laine, and Ruohola (2017)22 elaborated on this barrier and concluded there was that a need for diagnostic criteria that would grade the severity of AOM in attempt to prevent unnecessary prescribing of antibiotics.? This study was further discussed in the pediatric literature findings section. Findings of Emergency Care Literature AAP and AAFP endorsed clinical guidelines regarding AOM as discussed, but one study questioned whether those guidelines are relevant, safe, or effective for an emergency department (ED) setting.? Fischer, Singer, Lee, and Thode (2007)10 performed a retrospective study using national databases to determine the trence the tren of antibiotic prescriptions from the ED for AOM before and after guideline publication.? Through their research, evidence revealed that antibiotic prescribing rates increased by about 2% from 1996 to 2005.? This is contrary to what should have happened; a decrease should have been noted.? One important barrier related to this discipline is that the American College of Emergency Physicians (ACEP) has not endorsed this guideline.? Other factors, such as uncertainty of close follow-up and severity of presentation to ED, were unique barriers to this discipline. Spiro et al. (2006)13 conducted a randomized controlled trial related to current guidelines.? They observed that most physicians in the United States are trained to routinely provide antibiotics due to training or parental pressures.? The study sought to determine if wait-and-see prescription (WASP) would reduce antibiotic use.? Children with AOM from age 6 months to 12 years in an ED were randomly assigned groups: WASP or standard prescription (SP).? The WASP intervention included a written prescription for an antibiotic that would expire three days after the child's ED visit.? Parents were given clear instructions and educated on circumstances to fill prescription.? This study found that WASP intervention reduced antibiotic use by 56%.? relationship with the provider, and follow-up care is difficult.? This study also presented barriers to guideline usage in this discipline and potential solutions. Another study added to the concept of WASP, also known as watchful-waiting (WW).? Sun, McCarthy, and Liberman (2017)23 sought to determine the cost effectiveness of WW.? They found through a retrospective review, including randomly selected charts of patients less than 18 years of age, that guidelines were not being followed.? In the study population (n= 231), 93.5% were prescribed antibiotics, 2.8% were advised to undergo WW, and 3.6% were sent home without an antibiotic.? Of these patients, 42.1% met criteria for immediate antibiotic prescription while 57.9% were candidates for WW.? This study added that ED care has challenges compared to primary care as encounters with patients are episodic in nature, and continuity of care is not feasible.? WW necessitated patient follow-up, and education to providers and parents on appropriate treatment guidelines. This will reduce health expenditures, improve health outcomes, and be cost-efficient to society23. Surprising results about parental adherence to delayed antibiotic therapy with and without a physical prescription for AOM.? Ultimately, parents accepted observation therapy as a valid treatment option; however, adherence was greater in the group that received a written prescription.? The study found that parents were more likely to fill the written prescription therapy as a valid treatment option; however, adherence was greater in the group that received a written prescription.? explained AAP guidelines.? Barriers reported in this study include parental desire for antibiotics and perception that AOM is a condition that always requires symptomatic care and close follow-up though it may be difficult for physicians and parents to accept17. Findings of Pediatric Literature One study observed trends in management since the release of the 2004 AAP and AAFP guidelines regarding AOM.? Vernacchio, Vezina, and Mitchell (2007)14 identified the most common barriers to physicians not implementing guidelines regarding AOM.? improve (30.9%).? Though educational solutions to parental reluctance have been thought to be helpful, one study revealed deficits in parental knowledge exist despite these efforts 18.? Vernacchio, Vezina, and Mitchell (2007)14 found that though physicians accept observation as a valid treatment option for uncomplicated AOM, they only utilize it occasionally.? In fact, providers that were most accepting of observation therapy include pediatricians, and providers in suburban and urban non-inner-city locations.? In this study, pediatricians, and providers in suburban and urban non-inner-city locations.? In this study, pediatricians (more than family physicians, and providers in suburban and urban non-inner-city locations.? In this study, pediatricians (more than family physicians, and providers in suburban and urban non-inner-city locations.? In this study, pediatricians (more than family physicians), younger physicians. conducted a pediatric study that found parental reluctance as a key barrier in implementing guidelines appropriately.? Like the emergency care studies, they implemented a watchful waiting prescription.? Forty percent of parents were accepting of the "wait-and-see" prescription and only gave it to the child once symptoms had continued for two days or gotten worse.? Parental reluctance is also a consistent barrier across disciplines. A pediatric study was conducted to evaluate the safety, efficacy, acceptability, and costs of watchful waiting intervention for children with nonsevere AOM21.? Results of the study concluded that 66% of patients in the WW group completed the study without using antibiotics.? Patient and parent satisfaction among the two groups were the same.? The results of this study reveal WW is an acceptable option to parents, reduces amount and cost of antibiotics.? resistant bacteria in children after an AOM episode.? McCormick et al. (2005)21 suggest that five factors are key to implementing these guidelines: a way to classify AOM severity, parent education, AOM symptom management, follow-up care access, and utilizing appropriate antibiotics when necessary. An aspect of the 2004 guidelines includes pain management for AOM.? Coco, Vernacchio, Horst, and Anderson (2009)12 studied providers' management of AOM before and after guideline publication.? They found that of the disciplines, pediatricians have significantly increased treating pain associated with AOM after guideline introduction.? One reason for this may be that the substitution of an unnecessary antibiotic prescription with pain treatment alleviates parental concerns.? This study found that providers do not agree with prescribe a broader, safer drug such as cefdinir.? This study also concluded that education on guidelines will not be enough to promote adherence to guidelines. Findings of ENT Literature It is noted in the medical profession that specialists tend to be more aware of guidelines were lower than expected among pediatricians, otolaryngologists, and pediatric otolaryngologists.? In this study, adherence to guidelines was poor across disciplines; in fact, close to half of practice recommendations were inconsistent with guidelines, whether physicians disagreed with guidelines, or whether other factors existed that lead to a decreased rate in adhering to guidelines. A rigorous systematic review of randomized controlled trials and cohort studies provides additional information on this topic.? Schilder et al. (2017)11 explained that accurate diagnosis and treatment of otitis media is key to decreasing rates of overdiagnosis and overtreatment, and current practice shows suboptimal compliance to quidelines.? This study found that general physicians, pediatricians, and otolaryngologists were equally noncompliant with treatment quidelines.? They suggested barriers may be combated with educational programs, electronic health record feedback systems, and targeting specific scenarios of otitis media for research to achieve better adherence to guidelines. Findings Across Disciplines These disciplines affected treatment compliance among the pediatric population, which is also true for AOM management.? Bradshaw et al. (2016)15 studied prescribing preferences of physicians based on medication phased on taste of medication than pediatricians or family. physicians.? This may be due to greater familiarity of treating AOM among these disciplines have in common include parental anxiety, knowledge deficit of providers and parents, time constraints, poor follow up, fear of complications, and use of watchful waiting as a solution to guideline implementation.? There are also differences among the disciplines.? For example, the nursing studies were the only studies to mention nurses as a solution to time constraint.? ED follow up was more challenging than other disciplines.? Pediatricians seemed the most compliant, followed by ENT and family practitioners based on this literature review. Integration of Major Findings Studies met inclusion criteria. This section discusses major findings after literature was studied. Consolidation of major areas of agreements and disagreements in the chosen fields are also discussed. Throughout all studies, it was obvious that evidence-based guidelines were identified. There was not an abundance of literature pertaining to barriers of implementing the 2004 guidelines, which makes this study so unique. Areas of Agreement Areas of Agreement are discussed first, which include similar barriers identified among the disciplines reviewed.? Barriers related to attitudes and lack of knowledge from both parents and providers include: inability to coordinate continuity of care, lack of follow up, poor parental adherence to provider's advice, lack of parental or provider knowledge, fear of complications, legal liability, institutional policy, and parental anxiety.? Additional barriers relating specifically to provider knowledge deficit include inaccurate diagnosis and poor adherence to pain management. Additionally, this review of literature has revealed a common theme of improper prescribing of antibiotics among providers in the disciplines of study.? Identified barriers related to following the established guidelines, more convenient dosing schedule of medication, ability to use broader spectrum antibiotic, physicians habit, taste of medication, and overload of guidelines. Areas of Disagreement Areas of Disagreement include differences among the disciplines.? All areas studied were noncompliant with guidelines, but pediatricians seem to be the most willing to change their behaviors.? The culture of disciplines may be the cause of this.? Fischer, Singer, Lee, and Thode (2007)10 discuss the culture of pediatrics as one that is most willing to learn when compared to family practice.? The AAP and AAFP collaborated in establishing the 2004 AOM treatment guidelines which should encourage these disciplines to equally adopt the guidelines over any other discipline.? Ambulatory care, on the other hand, does not endorse professional guidelines regarding AOM management. Another area of difference is dependent upon the healthcare setting.? For instance, ambulatory care centers such as family practice, pediatrics, and ENT have few problems with scheduling follow up appointments. Gaps in Research One of the major gaps in research identified was that there have been a few studies that have investigated a solution like a watchful waiting prescription for ambulatory settings with clear instructions on filling the prescription 13.? Other gaps in research were knowledge of a standard length of treatment time and a gold standard length of treatment time and treatment time and treatment time and a gol There have been attempts to study outcomes of providing education to parents and providers.? Many studies recommend an educational intervention as a solution.? However, one study implemented a program of this nature and found that being familiar with guidelines does not always result in their adoption12.? Schilder et al. (2017)11 state that the power of education is insufficient, and this may be due to cultural or social beliefs.? This study also recommends studying specific scenarios such as a weekend versus specialist care. Another gap in research is the appropriateness of antibiotic choices for AOM among providers.? A large gap exists in choices of antibiotics and guideline recommendations14.? Finally, more research is needed to understand the complexity of variables that influence providers to respond to guidelines in a positive way9. Conclusion?of Finding The studies on AOM guideline adherence presented in this review presented areas of agreements and disagreements.? Areas of agreement include parental knowledge, parental anxiety, provider knowledge, exam hinderances, and medication compliance.? Areas of disagreement include setting, policy, and culture.? The major findings of nineteen articles were discussed as they relate to the disciplines chosen, and gaps in the literature were identified.? Some gaps in research include barriers to guideline adherence, diagnostic standardization, treatment length, educational interventions, and invoking positive change to guideline adhering to these guidelines exist. Implications for Practice AOM continues to be a common health problem in the pediatric population.? As medicine advances, evidence-based practice is essential to for quality patient outcomes.? Clinical practice guidelines are based upon the latest research findings and are created in order to assist providers in caring for patients with certain medical problems.? Antibiotics have been used effectively as first-line treatment for AOM since the 20th century.? Liberal and unnecessary prescribing of antibiotics.? Current practice guidelines promote conservative use of antibiotics in order to lessen the threat of resistance.? In 2013 the AAP and AAFP revised the 2004 clinical practice guidelines specifically for the management of AOM. Summary The research question of this integrative review is to determine what barriers affect the implementation of the 2004 AAP and AAFP clinical practice guidelines for acute otitis media in the pediatric population.? Numerous studies and literature reviews have been completed to understand various aspects of nonadherence to AOM guidelines. This integrative review is unique in that it discusses the parental and provider attitudes, diagnostic criteria, and treatment methods for the management of AOM.? It has been demonstrated through this integrative review of the literature that multiple aspects of the AAP and AAFP clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the management of AOM in pediatric patients are not being followed by parents or by clinical practice guidelines for the patient health, increase costs to the patient, and contribute to the increasing problem of microbial resistance to antibiotics. Conclusions There are many reasons for nonadherence to the AAP and AAFP clinical practice guidelines for AOM management which apply to all areas of the client encounter.? The reasons discussed in this literature review include physician and parental unacceptance of the recommendations, disagreement with the recommended antimicrobial, time constraints, lack of standardized diagnostic test, and fear of poor patient follow up or complications.? These findings are significant for advanced practice nursing because the identification of existing barriers will assist in overcoming them. As guidelines are changed there is an expected change in behavior, so barriers should be identified before the guideline is implemented 26. Additionally, education about the expected behavior change should occur in all components of the guideline is implemented 26. Additionally, education about the expected behavior change should occur in all components of the guideline is implemented 26. 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Additionally, education about the expected behavior change should occur in all components of the guideline is implemented 26. review that prescribers should be self-aware of their own biases whether it is personal preference to prescribe antibiotics instead of watchful waiting or partiality to a specific antibiotic due to taste or easier dosing schedule, as well as their own limitations in diagnosing AOM. This review also demonstrates the importance of parental education on antibiotic resistance and rationale for current guidelines. Recommendations Accurate diagnosis of AOM is critical in the prevention of overdiagnosis and overtreatment of this common childhood illness.? Currently, AOM is diagnosed based on a spectrum of clinical signs such as bulging TM, presence of middle ear effusion and sudden onset of symptoms.? Studies of gold standard tests to confirm AOM diagnosis are recommended for future practice in order to establish a universal standardized method for diagnosis on signs.? Additional recommendations for future studies include prescriber's feedback for nonadherence to the guidelines, evaluation of parental understanding of AOM pathogenesis and antimicrobial properties, interventions for changing behavioral practice of providers, and strategies to increase providers, and strategies to increase providers. Nursing. We thank our colleague, Robyn Ray, DNP, APRN, FNP-BC, from Northwestern State University of Louisiana who provided insight and expertise that greatly assisted this research. Conflict of Interest Statement This document seeks to provide a high level of research review to identify barriers across medical care disciplines that hinder adherence of AOM guidelines in diagnosis and treatment of personal research, application of previously published research, application of previously published research, and personal gain. Research was not conducted for financial or non-financial interests and relationships. References Spiro DM, Arnold DH. Acute otitis media. Pediatric decision making. St Louis MO Mosby. 2011) doi: 10.1001/jama.296.10.1235 World Health Organization (WHO). Antimicrobial resistance. 2011. Retrieved from Lieberthal AS, Carroll AE, Chonmaitree T, et al Clinical practice guidelines: The diagnosis and management of acute otitis media. Pediatrics. 2013; 131(3): e964-e999. doi: 10.1542/peds.2012-348 Hirst S, Neill S. Treatment of acute otitis media in childhood. 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New Clinical Practice Guidelines for Acute Otitis Media. April 12, 2004. Recently a subcommittee representing the American Academy of Family Physicians published new clinical practice guidelines for the diagnosis and management of acute otitis media (AOM). mediX Guidelines beruhen auf evidenzbasierten wissenschaftlichen Erkenntnissen und internationalen Richtlinien. ... Otitis media; 05/2022 - Schlafstörungen ... 11/2019 - Entzündlich-rheumatische Gelenkerkrankungen; 11/2019 - Prostatakarzinom+PSA-Screening; Otitis media is among the most common issues faced by physicians caring for children. Approximately 80% of children will have at least one episode of acute otitis media (AOM), and between 80% and ... 01/1/2021 · Recurrent acute maxillary sinusitis; ICD-10-CM) 2017 (effective 10/1/2015): New code (first year of non-draft ICD-10-CM) 2017 (effective 10/1/2016): No change 16/09/2020 · Updated national guidelines. The National Institute for Health and Care Excellence (NICE) has updated its guidance about treatment of middle ear infection. ... Campbell A, Harting L, 2019 Mar6(1):53-61. doi: 10. ... These recommendations are based on the American Academy of Head and Neck Surgery Clinical Practice Guidelines (ISPORL) Clinical Practi

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