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The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Assistant Dean for MSN and DNP Studies, on behalf of the program; we verify that this is the final, approved version of the student's DNP Project including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Deborah J. Whitehurst, Student

Dr. Leslie Scott, Advisor

Running head: ANTIBIOTIC PRESCRIBING BY ADVANCED PRACTICE NURSES

DNP Final Project Report

Antibiotic Prescribing for Treatment of Acute Pediatric Illnesses

By Advanced Practice Nurses

Deborah J. Whitehurst, APRN, PPCNP-BC

University of Kentucky

College of Nursing

April 12, 2018

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Dianna Inman DNP, RN, APRN, CPNP, PMHS, PMHNP —Committee Member

Mary Kay Rayens, PhD—Committee Member

Dedication

This work and my DNP Project is dedicated to God, my “sisters in the faith”, my “biological” sisters, and my daughters who were behind me and knew that I could accomplish this goal for myself. Thanks to my husband Gary who showed his support by attending my DNP Presentation. It is also dedicated to those who did not think I could reach my goal or to those who put obstacles in my path along the way. Their lack of faith or road blocks actually made me more determined to complete the requirements and to graduate!

Acknowledgements

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Abstract

Antibiotic over-prescribing by physicians for the treatment of acute respiratory tract illnesses have been examined in a variety of settings. Different studies have examined nurse practitioner (NP) prescribing practices both in the United States and various international settings. There have been limited studies specifically examining antibiotic prescribing practices in the pediatric population. However, no studies were found which compared population specific NP groups. The purpose of this study was to understand differences in antibiotic prescribing practices among advanced practice pediatric providers.

The goal of this project was to describe and compare antibiotic prescribing practices of pediatric nurse practitioners (PNP) and family nurse practitioners (FNP) in the management of acute pediatric illnesses in the primary care setting.

A descriptive, cross-sectional design was used to evaluate and compare prescribing practices of advanced practice pediatric providers to determine appropriateness of antibiotic prescribing in various clinical situations. Survey data was analyzed and chi-square test for independence indicated no significant difference between PNP and FNP for appropriateness of antibiotic prescribing. However, analysis of individual vignettes indicated NPs did well on ear, nose and throat questions but not questions with other content. This may indicate a need for antibiotic stewardship continuing education in management of cough and genitourinary issues in young children.

In conclusion, advanced practice pediatric providers prescribe antibiotics similarly in the primary care setting.

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The Essentials of Doctoral Education for Advanced Nursing Practice

1. Scientific Underpinnings for Practice
2. Organizational and Systems Leadership for Quality Improvement and Systems Thinking
3. Clinical Scholarship and Analytical Methods for Evidence-Based Practice
4. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care
5. Health Care Policy for Advocacy in Health Care
6. Interprofessional Collaboration for Improving Patient and Population Health Outcomes
7. Clinical Prevention and Population Health for Improving the Nation's Health
8. Advanced Nursing Practice

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Introduction

Antibiotic over-prescribing by physicians for the treatment of acute respiratory tract illnesses have been examined in a variety of settings (Table 1). Hicks et al (2011) report that more than 250 million outpatient antibiotic prescriptions are written in the United States each year, most of these prescriptions are for acute upper respiratory tract infections, and Grijalva et al (2009) adds that most of these antibiotic prescriptions are unnecessary. There have been different studies published which examine nurse practitioner (NP) prescribing practices both in the United States (US) and international studies examining NPs from the US, Canada, United Kingdom, and Australia; a study defining and describing rational prescribing practices of NPs, and another study examining antibiotic selection amongst physicians, NPs and physician assistants (Buckley et al, 2013; Crigger & Holcombe, 2008; Kennedy-Malone et al, 2008; Sanchez et al, 2014). Although the studies looked at different reasons for overprescribing antibiotics, all agreed that nurse practitioners in various adult healthcare settings overprescribe antimicrobials.

There have been limited studies specifically examining antibiotic prescribing practices in the pediatric population in general: most of which are pediatric inpatient hospital setting or outpatient parenteral antibiotic therapy (Arun et al, 2013 & Doby et al, 2013). A single study examining antibiotic prescribing practices by nurse practitioners in a pediatric ambulatory care setting (Weddle et al, 2013) found that there is variability in inappropriate prescribing of antibiotics among nurse practitioners. However, no studies were found which compared different NP groups, specifically PNPs and FNPs in the treatment of acute pediatric illnesses (Appendix B). As a result there are definite gaps in the current research data.

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Background/Rationale

Hicks et al (2011) report that more than 250 million outpatient antibiotic prescriptions are written in the United States each year; most of these prescriptions are for acute upper respiratory tract infections, and written in healthcare locations where antibiotic stewardship programs have not reached. Grijalva et al (2009) confirms that most antibiotic prescriptions are unnecessary. Fortunately, there have been some recent studies that are beginning to explore these issues and attempting to solve the problem of unnecessary antibiotic prescribing for acute, viral illnesses.

Weddle et al (2013) looked at variations in antibiotic prescribing practices among nurse practitioners in a pediatric urgent care center. A descriptive study was done to evaluate antibiotic use in the treatment of urinary tract infection (UTI), skin and soft tissue infection (SSTI), pharyngitis, upper respiratory tract infection (URI), otitis media (AOM) and sinusitis (Weddle, 2013). Weddle (2013) described significant variability in inappropriate initial antibiotic use amongst prescribing nurse practitioners. Moreover, Huang et al (2005) looked at the issue from a parental education approach. They found that their results supported the hypothesis that better parental education does help to reduce the frequency of injudicious antibiotic prescribing and confirms the thought that many parents have misconceptions regarding the effectiveness of antibiotics for children with viral infections (Huang, 2005). The findings of these studies suggest nurse practitioners working in pediatric settings do overprescribe but can decrease use of antibiotics through parental education about appropriate treatment practices.

A randomized clinical trial by Meeker et al (2016), examined the impact of three different behavioral interventions on the prescribing trends of providers in primary care

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practices. Suggested alternatives presented electronic order sets suggesting non-antibiotic treatments; accountable justification prompted clinicians to enter free-text justifications for prescribing antibiotics into patients' EHR; peer comparison sent emails to clinicians that compared their antibiotic prescribing rates with those of "top performers" (those with the lowest inappropriate prescribing rates) along with a control group (Meeker, 2016). Of the three interventions, accountable justification and peer comparison both had a bigger impact than the suggested alternatives intervention. Unfortunately, although several pediatric practices were included in the sample, only data from visits with patients over age 18 were used in the analysis.

Although one can see the advantage of hiring one nurse practitioner (NP) who can see all ages of patients, one must consider if training or population focus affects the ability to evaluate and manage all aspects of pediatric care, especially children less than 5 years of age. The results of this project could point to a need for pediatric-focused education including an antibiotic stewardship program.

Purpose

The purpose of this study is to understand differences in antibiotic prescribing practices between Family Nurse Practitioners (FNPs) and Pediatric Nurse Practitioners (PNPs) through a survey of FNPs and PNPs through the membership of the Kentucky Coalition of Nurse Practitioners and Nurse Midwives (KCNPNM) and nurse practitioners employed by the Department of Pediatrics at the University of Kentucky. KCNPNM has 972 FNP members versus only 49 PNP members (KCNPNM, 2017). There are 36 nurse practitioners employed by the Department of Pediatrics at the University of Kentucky. These organizational numbers compare

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to a total of 2671 FNPs and 183 PNPs licensed in the Commonwealth of Kentucky (KBN, 2017).

The results of this project could provide vital information to both organizations.

The goal of this project is to describe and compare antibiotic prescribing practices of PNPs and FNPs in the management of acute pediatric illnesses. Since this will be a descriptive study, the aims of this project are to:

1. Compare prescribing practices for the management of acute pediatric illnesses by Pediatric (PNPs) and Family Nurse Practitioners (FNPs).
2. Evaluate appropriateness of current prescribing practices by PNPs and FNPs.
3. Describe differences in antibiotic prescribing practices by demographic (sex, age, years in practice, educational attainment) and practice characteristics (percentage of children seen in the practice, urban vs rural practice setting).

Methods

A descriptive, cross-sectional design was used to describe and compare prescribing practices of 2 groups of APRNs according to appropriateness of antibiotic prescribing, demographic characteristics, and practice characteristics.

Setting

This study surveyed FNPs and PNPs through the membership of the Kentucky Coalition of Nurse Practitioners and Nurse Midwives (KCNPNM) and a group of nurse practitioners employed by the Department of Pediatrics at the University of Kentucky (UK). KCNPNM has 972 FNP members and 49 PNP members. KCNPNM's mission is to empower the Kentucky Advanced Practice Registered Nurses (APRNs) in providing quality, accessible, and compassionate

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healthcare through education, leadership and advocacy (KCNPNM, 2016). There are 36 nurse practitioners (mostly pediatric NPs but a few family NPs) employed by the Department of Pediatrics at the University of Kentucky.

Sample

The sample for this evaluation was obtained through a survey sent to the FNP and PNP members of KCNPNM and nurse practitioner employees of the UK Department of Pediatrics (Appendix A). The survey consisted of questions eliciting demographic information and practice characteristics. Then several clinical vignettes for five acute pediatric illness visits were given including symptoms, history, and physical findings after which the NP was asked to make a decision about treatment and follow-up from multiple choice answers. Inclusion criteria for the survey included FNPs and PNPs in practices that work in primary care or urgent care settings and see at least 10% pediatric clients. Exclusion criteria include FNPs or PNPs in practices that see less than 10% pediatric clients, Acute Care NPs (ACNPs), Adult NPs (ANPs), Medical Doctors (MDs), and Physician Assistants (PAs). Targeted sample size was to be 30 participants.

Data Collection

The survey was sent by the Kentucky Coalition of Nurse Practitioners and Nurse Midwives to their FNP and PNP members (approximately 1020 NPs) and to nurse practitioner employees of the Department of Pediatrics at the University of Kentucky (36 NPs) in early October 2017 with a link to the survey on <https://uky.az1.qualtrics.com>. Several reminder emails were sent to the nurse practitioners from October through early December until the projected end of the recruitment period. The completed survey data was stored on Qualtrics.com. The goal of 80-100 completed surveys was reached in late November 2017 when

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80 surveys were completed. There were 47 participants who met the inclusion criteria for the study.

Data Analysis

The following measures were used for the study.

1. Demographic variables: These included gender, race, certification, and highest NP education. This data was used to determine the impact on the antibiotic prescribing practice results of the two groups.
2. Practice Characteristics: These included years in NP practice, percentage of pediatric patients seen in practice, RN practice background, rural versus urban location of practice, and type of practice setting. This data was used to determine the impact on the antibiotic prescribing practices of the two groups.
3. Appropriateness of Antibiotic Prescribing: This will be based on the number of correct responses to six (6) clinical vignettes. Respondents must score 100% in order to be determined as having an appropriate prescribing practice. Those with a score of 0-5 will be coded as overprescribing and those with a score of 6 will be coded as appropriately prescribing.

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Results

There were 47 participants who met the inclusion criteria for the study.

Demographic characteristics were similar to the demographics represented by advanced practice providers in Kentucky (Table 1). The majority of survey respondents were female (95.7%), Caucasian (97.9%), Certified as a Family Nurse Practitioner (78.7%), and level of NP education was at the Master's degree level (70.2%). Practice characteristics provided more interesting results as follows: 25.5% of NPs have been practicing more than 15 years (Table 2), 38.3% of NPs see 80-100% pediatrics while a close number 34.0% of NPs who see 10 - 30% pediatrics (Table 3), responding NPs practice evenly in rural versus urban areas of the state, 57.4% had a mixed adult/pediatric RN background, and 40.4% of their practices are in outpatient or hospital-based clinics (Table 4).

Table 1. Frequency Distributions for Demographic Variables (N=47)

Variable	Frequency	Percent (%)
Gender Identity	47	100
Female	45	95.7
Male	1	2.1
Other	1	2.1
Race	47	100
White	46	97.9
Other	1	2.1
NP Certification	47	100
Family	37	78.7
Pediatric	10	21.3
Highest NP Education	47	100
NP Certificate	3	6.4
MS/MSN	33	70.2
DNP/PhD	11	23.4

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Chi-square test was used to compare the appropriate antibiotic prescribing score to the provider's characteristics. FNPs had appropriate antibiotic prescribing score 81.3% of the time compared to PNP's who had appropriate antibiotic prescribing score 70% of the time. A chi-square test for independence indicated no significant difference between FNPs and PNP's for appropriateness of antibiotic prescribing, $\chi^2 (2, n=47) = 2.17, p = .34$. Comparison was also analyzed for appropriate prescribing score and practice setting, years in practice, and NP education level. Results were not statistically significant (Table 6).

Table 6. Chi-Square Results for Comparison with Perfect Prescribing Score (N=47)

Variables	Frequency (%)	χ^2	df	p-value
Practice Setting	47	2.08	3	0.56
Years in Practice	47	6.84	4	0.15
NP Education Level	47	4.16	2	0.13

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Table 7. Clinical Summary of Survey Vignettes

Vignette Number	Question #11	Question #12	Question #13	Question #14	Question #15	Question #16
Symptoms	Runny nose 3-4 days	Ear pain, no fever, runny nose	Ear pain, fever, poor sleep	Sore throat, no fever	Cough w headache 3-4 days	Burning w urination
PE Findings	Exam normal	Retracted TMs	Bulging red TMs	Pharyngeal erythema, no tonsillar exudate. Negative rapid Strep test	Exam normal	Labial erythema, clear discharge, tenderness w exam
Diagnosis	URI	Otalgia	AOM-bilateral	Sore Throat	Cough	Vulvo-vaginitis
Management	Symptom Mgt	Auralgan or analgesic only	Amox 90mg/kg divided BID for 10 days	Symptom Mgt	Symptom Mgt	Sitz baths w baking soda, education re wiping.

Considering individual vignettes (See Table 7), the following was noted:

- 1) Level of NP education did not seem to make a difference in the ability to obtain a perfect score for survey vignettes 11 to 16.
- 2) NPs with 5-10 years of NP experience scored perfect prescribing scores for all clinical vignettes.
- 3) PNPs and FNPs had similar success in attaining perfect scores for survey vignettes 11 to 13, which contained ENT clinical scenarios.
- 4) PNPs had consistent success in achieving perfect scores for survey vignettes 14 to 16, similar to 11 to 13.
- 5) FNPs had more variability in their response to vignettes 14 to 16.
- 6) NPs had the most difficulty with vignette #16, except those with 5-10 years of NP experience.

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Discussion

This nurse practitioner prescribing practices study provided the opportunity to compare the antibiotic prescribing practices for the treatment of acute pediatric illnesses between FNPs and PNs in Kentucky. Overall, these results indicate no significant difference in the antibiotic prescribing practice between PNs and FNPs who care for children in practices which see more than 10 percent pediatrics. Chi-square test for independence indicated no significant difference between PNs and FNPs based on practice setting despite much lower perfect prescribing scores for NPs who practice in UTCs and anecdotal findings by PNs in pediatric practices. Antibiotic stewardship programs are making a difference especially in regards to management of ear, nose and throat conditions; unless participants answered based on what they know to be appropriate antibiotic prescribing.

Although analysis of the data indicated no significant differences in perfect prescribing score based on population-focused certification and NP education, examination of prescribing scores based on the individual clinical vignettes indicate a need for education focused more on the ability to distinguish between cough and sinusitis, the treatment of streptococcal versus non-streptococcal pharyngitis, and the management of vulvovaginitis in young children. NPs who have been practicing five (5) to ten (10) years, had perfect prescribing scores on all six (6) clinical vignettes. Likely this group has been practicing long enough to have the knowledge regarding antibiotic stewardship and the confidence due to their years in practice not to succumb to parental pressure.

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Conclusion

The goal of this project was to describe and compare antibiotic prescribing practices of pediatric nurse practitioners (PNP) and family nurse practitioners (FNP) in the management of acute pediatric illnesses in the primary care setting. Results indicated no significant difference between PNPs and FNPs for appropriateness of antibiotic prescribing. It might have been interesting to separately analyze the years of experience within each education level to see how that impacted the trends that were noted with the clinical vignettes.

Although the sample size was attained, a larger sample size could have impacted the results in a different way. There was a significant response to the study; however, many of the survey respondents' data had to be dropped due to the exclusion criteria. Pediatric NPs, although a definite minority within the Commonwealth of Kentucky, could have been better represented by using the membership of the Kentucky Chapter of the National Association of Pediatric Nurse Practitioners, which was considered but had more stringent requirements for use.

Suggestions for future studies include: 1) Conducting a similar survey with an increased number of clinical vignettes, representing both appropriate antibiotic use and use of alternative treatment measures, and 2) Conducting a nationwide survey using the membership of the American Association of Nurse Practitioners (AANP) and the National Association of Pediatric Nurse Practitioners (NAPNAP).

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Appendix A

September 30, 2017

Dear Potential Research Participant:

You are being invited to take part in a research study to understand antibiotic prescribing practices of Advanced Practice Nurses via a survey of FNPs and PNP's through the membership of the Kentucky Coalition of Nurse Practitioners and Nurse Midwives (KCNPNM) and PNP's accessed through the University of Kentucky website. If you volunteer to take part in this study, you will be one of about 100 people in the state of Kentucky to do so. The purpose of this study is to understand antibiotic prescribing practices of Advanced Practice Nurses in the treatment of Acute Pediatric Illnesses. By doing this study, we hope to learn what those are, if any. This research survey is being done as one of the requirements for the Doctorate of Nursing Practice at the University of Kentucky College of Nursing.

APRN's whose practice has less than 10% pediatrics should not take part in this study, nor anyone who practices exclusively outside the Commonwealth of Kentucky. APRN's who manage the care for all ages including children or just children will be included in this study.

The survey consists of 10 questions regarding demographics and practice characteristics then there will be clinical vignettes for six (6) acute pediatric illness visits including symptoms, history, and physical findings after which the NP will be asked to make a decision about treatment from multiple choice answers. The survey can be accessed through the following link: https://uky.az1.qualtrics.com/jfe/form/SV_6tISOILKP1WZEh I will not have access to your identity information, only your answers which will be de-identified. Your answers will be combined with other participants' data for data analysis and interpretation. The total amount of time it should take you to complete the survey is approximately 30 minutes. There are no costs for your participation. If you decide to take part in the study you still have the right to decide at any time that you no longer want to continue.

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There is no guarantee that you will get any benefit from taking part in this study. However, some people have experienced confidence in their antibiotic prescribing practices when answering similar questions. Your willingness to take part, however, may, in the future, help faculty in APRN educational programs better understand how they need to educate future APRN students. The only anticipated risk associated with your participation in this study is that the questions and answer choices may make you question your antibiotic prescribing practices in the treatment of pediatric acute illnesses.

“Please be aware, while we make every effort to safeguard your data once received from the online survey/data gathering company, given the nature of online surveys, as with anything involving the Internet, we can never guarantee the confidentiality of the data while still on the survey/data gathering company’s servers, or while en route to either them or us. It is also possible the raw data collected for research purposes may be used for marketing or reporting purposes by the survey/data gathering company after the research is concluded, depending on the company’s Terms of Service and Privacy policies.”

Thank you for your participation,

Deborah Whitehurst, MS, APRN, PNP-C

Survey Tool

**Antibiotic Prescribing for Treatment of Acute Pediatric Illnesses by
Advanced Practice Nurses**

Q1 NP Certification?

Family NP (1)

Pediatric NP (2)

Both Family and Pediatric NP (3)

Both Adult and Pediatric NP (4)

Other (5)

Q2 Years in NP practice?

0 to 2 years (1)

2 to less than 5 years (2)

5 to less than 10 years (3)

10 to 15 years (4)

Greater than 15 years (5)

Q3 Highest NP Education?

NP Certificate (1)

MS/MSN (2)

DNP/PhD (3)

Q4 Percentage of Pediatric Patients in the Practice?

Less than 10% (1)

10 to 29% (2)

30 to 49% (3)

50 to 79% (4)

80 to 100% (5)

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Q5 Pre NP Nursing Background?

All Adult (1)

Mixed Pediatrics/Adults (2)

All Pediatrics (3)

Q6 State of Practice?

Kentucky (1)

Other state (2)

Q7 How Would You Best Describe Your Clinic Community?

Rural (1)

Urban (2)

Q8 How Would You Best Describe Your Practice Setting?

Outpatient Clinic/Hospital-Based Clinic (1)

Urgent Care Clinic (2)

Private Practice (3)

Emergency Department (4)

Q9 How Would You Best Describe Your Gender Identity?

Male (1)

Female (2)

Prefer Not to Answer (3)

Q10 Race?

White (1)

Black (2)

Other (3)

Prefer Not to Answer (4)

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Q11 RW is an 8 year old male, weight 60#, NKDA, no chronic health issues who presents with: Symptoms include yellow runny nose for 3-4 days, no fever, occasional sneezing, no change in appetite with cough only at night for 2 nights.

PE Findings include: Thin yellow nasal discharge, nares slightly reddened and swollen, no facial tenderness to palpation, pharynx benign, TMs clear with visible light reflex (LR).

Treatment choices:

- a) Symptomatic-decongestant or other OTC cold medicine. (1)
- b) Amoxicillin 40mg/kg divided BID for 10 days. (2)
- c) a & b (3)

Q12 AS is a 2 year old female who presents with ear pain and following history: wt 25#, NKDA, no chronic health issues including no prior AOM. Symptoms include left ear pain for 1 day, no fever, clear runny nose, good appetite, sleeping well.

PE Findings include: Clear nasal drainage, TMs slightly thickened and retracted with distorted LR but NO erythema, no visible inner ear fluid.

Treatment choices:

- a) Symptomatic-oral analgesic with oral decongestant. (1)
- b) Auralgan-topical otic analgesic/anesthetic. (2)
- c) Amoxicillin 40mg/kg divided bid for 10 days. (3)
- d) b & c (4)

Q13 BM is a 4 year old male who presents with a chief complaint of ear pain with fever and the following history: wt 32#, NKDA, H/O 2 ear infections but last AOM was 4 months ago, Type 1 Diabetes for 2 years (followed by Pediatric Endocrinology). Symptoms include ear pain for 48 hours, fever 102 for 24 hours, usual appetite, didn't sleep well last night.

PE Findings include: No nasal discharge, TMs full with significant erythema, no LR visible, no pharyngeal erythema.

Treatment choices:

- a) Symptomatic Treatment-oral analgesic/antipyretic. (1)
- b) Auralgan 1-2 gtts to bilateral ear canals q4h prn ear pain. (2)
- c) Amoxicillin 80-90mg/kg divided BID for 10 days. (3)
- d) All of the above. (4)

Q14 VS is a 14 year old female who presents with a chief complaint of sore throat and the following medical history: wt 120#, PCN allergy but has taken amoxicillin without reaction, and seasonal allergies. Symptoms include sore throat upon arising in morning but resolves during day, sneezing, decreased appetite for breakfast only, sleeping well.

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PE Findings include: No facial tenderness; no nasal discharge or nasal erythema; TMs slightly retracted but otherwise normal (clear w LR); pharyngeal erythema but no exudate or no tonsillar enlargement; slightly enlarged, nontender tonsillar lymph nodes.

Diagnostic Testing: Rapid Strep negative.

Treatment choices:

- a) Throat culture since rapid strep negative (1)
- b) Symptomatic Treatment-oral analgesic or analgesic throat spray or lozenges and/or NS gargles; (2)
- c) Amoxicillin 40mg/kg divided BID for 10 days (3)
- d) a & b (4)
- e) a, b & c (5)

Q15 BB is a 13 year old male who presents with a headache and cough and the following medical history: 150#, NKDA, No chronic health issues. Symptoms include no runny nose, headache for 2 days, productive cough with yellow mucus in morning but clears as day progresses for 3-4 days, cough initially when goes to bed but sleeps well, good appetite, no fever.

PE Findings include: Nares slightly swollen but not reddened, no pain with palpation over frontal or maxillary sinuses, TM's clear with LR and no fluid visible, pharynx benign, occasional cough with clear mucus during exam.

Treatment choices:

- a) Symptomatic-oral analgesic with oral decongestant (1)
- b) Symptomatic-OTC multi-symptom sinus/cough preparation; (2)
- c) Amoxicillin 40mg/kg divided BID for 10-14 days (3)

Q16 AB is a 10 year old female who presents with burning with urination and the following medical history: 90#, H/O Mild Asthma-well-controlled, rare bubble baths, allergic to PCN/amoxicillin. Symptoms include burning with urination for 2 days, denies pruritis, minimal clear discharge, denies odor. PE Findings include: Labial erythema, minimal clear discharge, + tenderness with exam.

Diagnostic Testing: Clean caught Urinalysis - SG 1.010, pH 5.0, Leukocyte Esterase negative, Nitrites negative, WBC 3, RBC 0

Treatment choices:

- a) Symptomatic: Sitz baths with baking soda daily until improved, cotton underwear, no bubble baths, showers only. (1)
- b) Bactrim 8mg/kg (trimethoprim dosage) divided BID for 10 days. (2)

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Table 1

Background Research Table

Citation	Design	Sample/Setting	Findings	Level of Evidence	Quality of Evidence
Outpatient PCP					
Huang et al <i>Pediatrics</i> , 116(4)	Retrospective study to determine effect on antibx prescribing if parent with medical/pharmacy background.	53,700 episodes of care with viral illnesses from Nat'l Health Insurance Data for Taiwan	better parental education reduced the frequency of injudicious antibiotic prescribing	6	Good quality study but only looked at MDs/RPh with note for "nurses" kids being same as control group.
Meeker <i>JAMA</i> , 315(6)	RCT	248 clinicians in 47 practices; primary care practices	2 of 3 interventions resulted in lower rates of inappropriate antibx prescribing	2	Excellent quality but did not clarify NP or MD clinicians; results for <18y/o pts excluded.
Weddle et al www.idweek.org	Descriptive study to determine prescribing practices of NPs.	23 NPs; Midwest children's hospital w 4 satellite Urgent Care Clinic (UCC)	12% overall rate of inappropriate antibx prescribing	6	Good quality study but did not clarify NP specialty.
Inpatient Pediatrics					
Arun et al www.idweek.org	Retrospective chart review to determine (AMS= 7 vars)	101 episodes of pos blood cultures; Pediatric inpt ICUs	Antibx Mgt Score (AMS) PICU>NICU	6	Not applicable to this project. Showed need for this project.
Doby et al www.idweek.org	Retrospective chat review to determine outpt parenteral antibx therapy (OPAT)	100 randomly selected OPAT discharges without ID consult from a children's hospital	1 or more modifications likely recommended for 78% of OPAT episodes	6	Not applicable to this project. Showed need for this project.

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Adult					
Buckley et al Jnl of Clinical Nursing, 22(13-14)	Descriptive study based on response to a survey of NP prescribing practices in Australia	209 respondents completed >50% of survey items	Antibiotics were the most frequently prescribed drugs by NPs	6	Used study to determine practice and demographic characteristics
Crigger & Holcombe The Jnl for NPs , 4(2)	N/A not a study	N/A	N/A	N/A	Used for background information
Kennedy-Malone et al Jnl of AANP, 20	Descriptive study to determine prescribing practices of GNP's.	234 GNP's; Survey sent to GNP's certified by the ANCC	75% had low scores indicating low rate of inappropriate prescribing for pts>65y/o.	6	Not applicable to this project. Showed need for this project.
Sanchez et al Emerging Infectious Diseases, 20(12)	Qualitative study based on interviews	36 provider interviews incl MDs, NPs, PAs in variety of PC practices	Inappropriate antibx selection not d/t lack of knowledge but attempt to improve cure rates & meet pt demands	6	Used for background information
Miscellaneous					
Grijalva et al JAMA, 302 (7)	Retrospective study using a national data base for years 1995-2006.	Data was divided into age groups <age 5 years and all those >age 5 years.	Decreased antibiotic use for both groups but overall increase prescribing of broad-spectrum antibiotics.	6	Used for background information.
Hicks et al Clinical Infectious Diseases, 60(9)	Retrospective study using a national data base for 2011.	Data was analyzed according to geography, patient population, & provider specialty.	Family Practitioners prescribed the most antibiotics.	6	Used for background information

Table 2

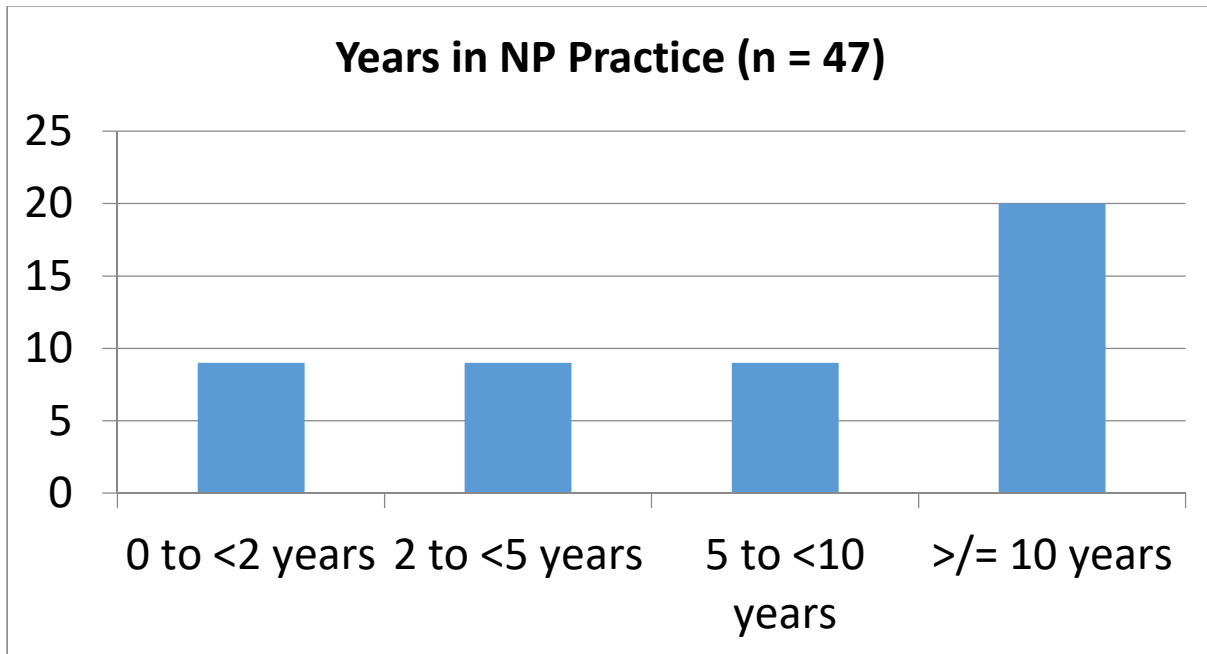


Table 3

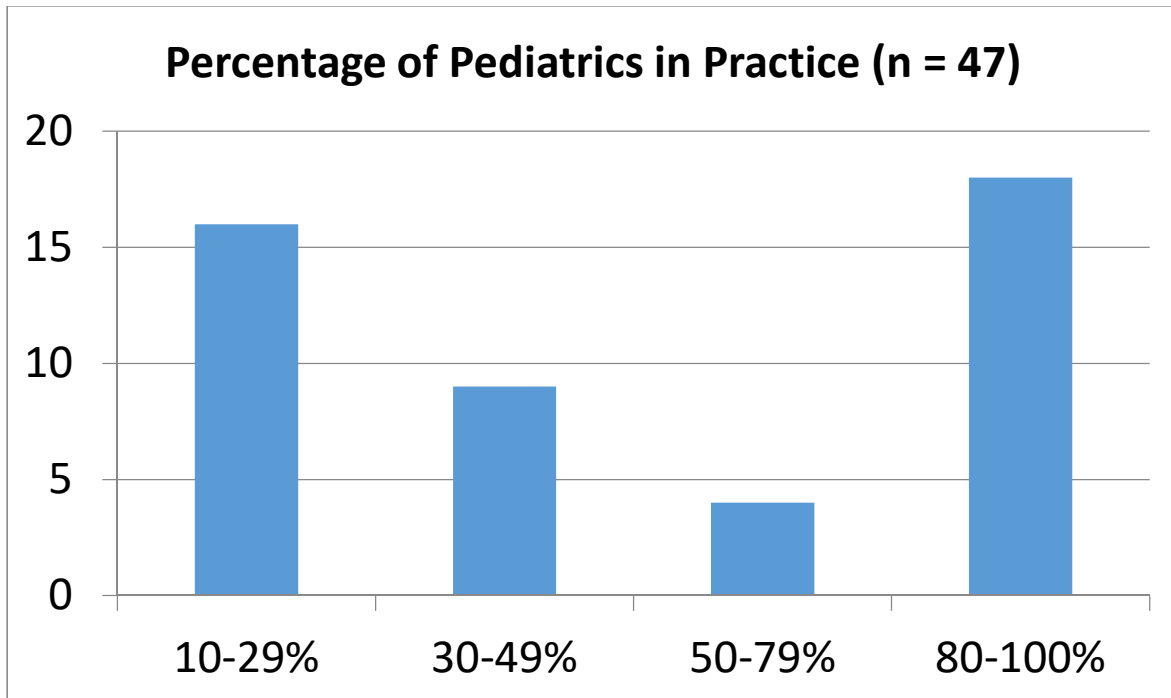


Table 4

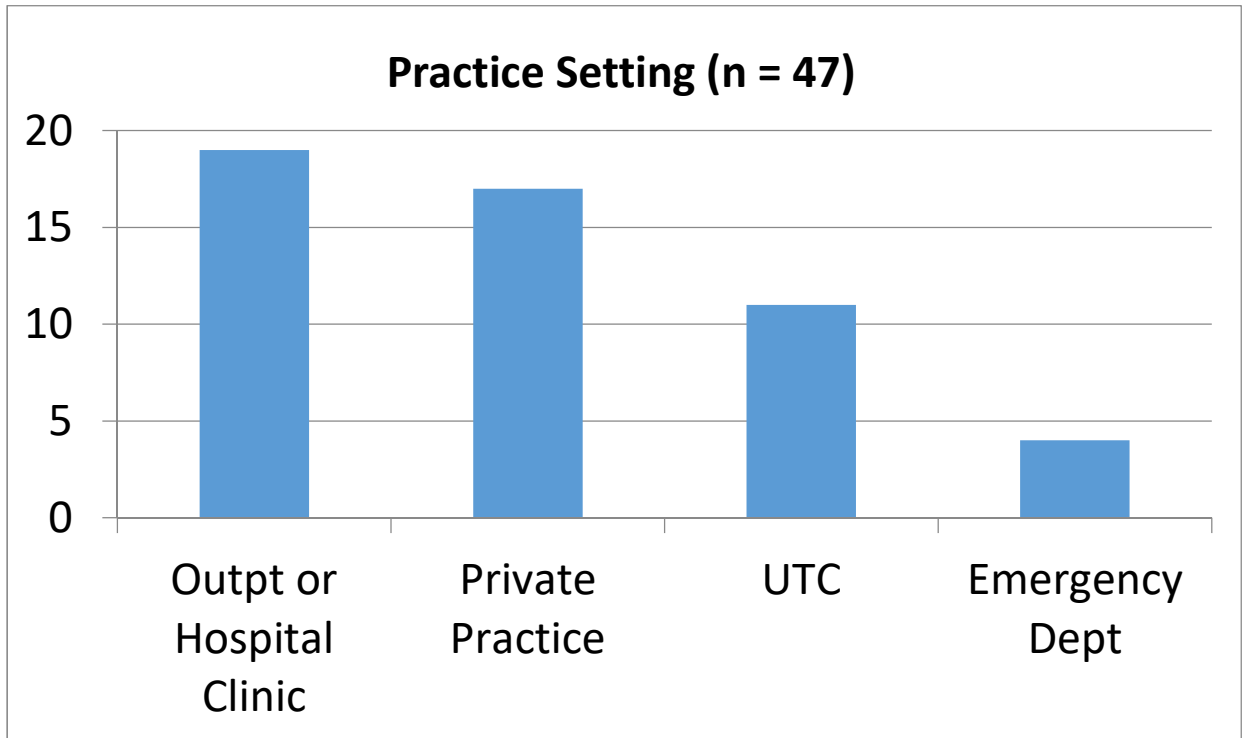
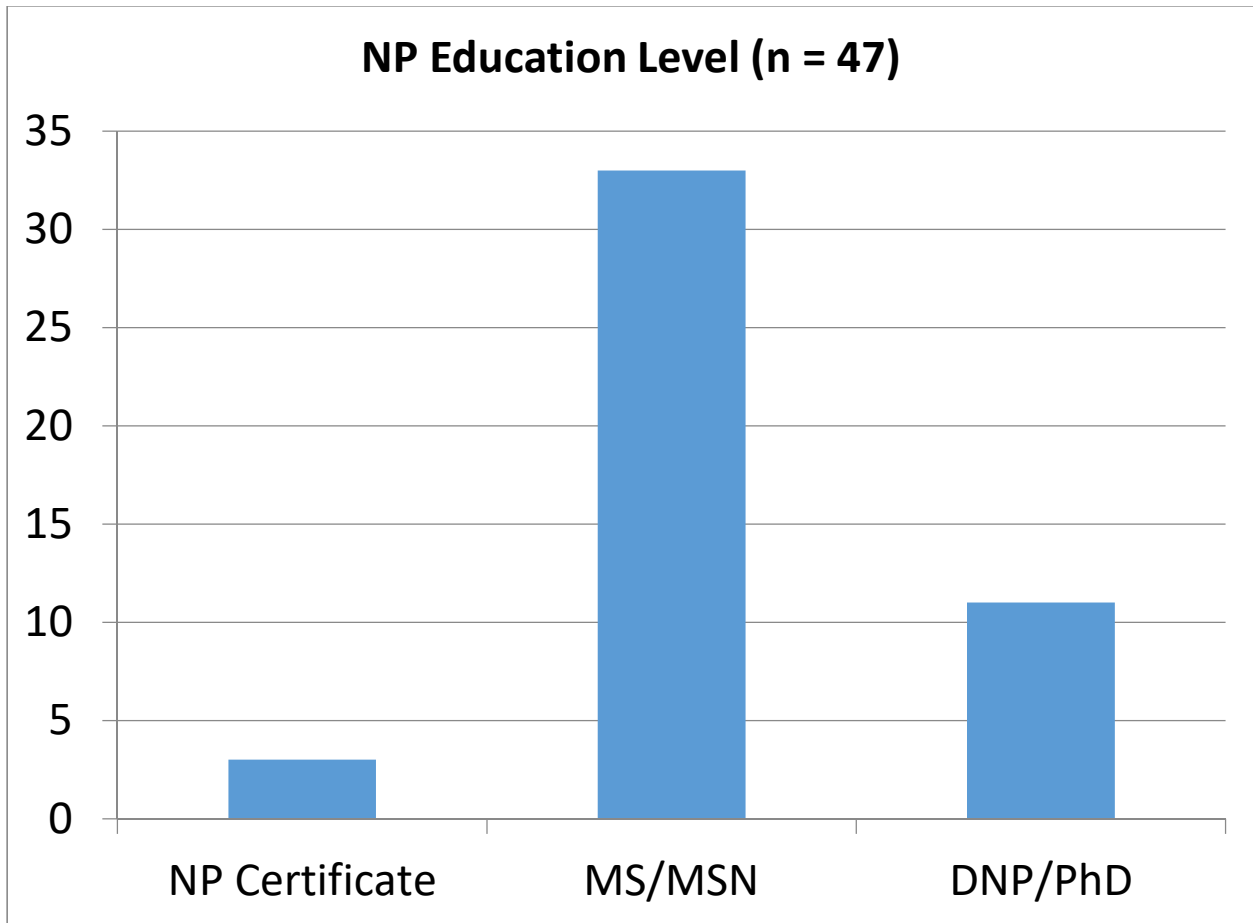


Table 5



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