Translational Research Scholars Program: Personal Statement

My long-term career goal is to become an independent clinical investigator of pediatric antibiotic prescribing in community healthcare settings. To continue my progress towards this goal, I propose a study that will address parent expectations for antibiotics and the role of a decision aid in improving antibiotic prescribing for children in family medicine (FM) clinics.

I first became interested in medicine and research at the University of Texas at Austin, where I received a full undergraduate scholarship, completed a Bachelor of Science in neurobiology, and worked at a neuropsychology lab that studied the face recognition capabilities of infants. In medical school at the University of Texas at Houston, my interests turned to global health medicine and infectious diseases, and I sought mentorship from Dr. Herbert DuPont, an expert in travel medicine and enteric illnesses. As a graduate research assistant in his lab, I worked on a rapid diagnostic method for detecting toxin-positive *Clostridium difficile*. In addition to lab techniques, I learned practical aspects of research including study design, methodical execution of study protocols, problem solving, and perseverance.

However, it was working with children in underserved regions of Tanzania, Malawi, Peru, Ecuador, and China where I found my passion and formulated my plans to pursue a career in research. My experiences were diverse, but each highlighted the importance of well-trained community health workers and a sound public health system in improving health outcomes. I realized that short-term medical work is limited in ability to create sustainable and generalizable change on a larger scale. With the goal of learning how high-functioning organizations best deliver health care to underserved communities, I completed a Masters of Public Health program in Healthcare Organization after medical school. My courses focused on health services delivery, social and behavioral determinants of health, and health policy. I use this knowledge now to think critically and creatively about the environmental and social constructs of unnecessary antibiotic prescribing, and to formulate hypothesis-driven questions in antimicrobial stewardship research. As a pediatric resident at the University of Chicago, I co-founded *Read, Run, and Have Fun!*, a multi-stakeholder engaged program to improve literacy and physical activity in high-risk children. This work was awarded Grand Prize in the AAP Read, Lead, Succeed Advocacy Campaign, and solidified my interest in conducting collaborative studies with patients, clinics, and the community to improve child health.

Early in my Infectious Diseases fellowship at the University of Washington (UW), I began to learn about the field of hospital epidemiology and antimicrobial stewardship. Under the mentorship of Dr. Zerr, I designed and conducted a retrospective cohort study evaluating the impact of a clinical guideline on narrow-spectrum antibiotic prescribing for children with urinary tract infections (manuscript in press). This study provided opportunities to manage data, conduct descriptive analyses, and learn rigorous quality improvement (QI) methods designed for health care settings where experimental conditions cannot be tightly controlled. My second study evaluated antibiotic prescribing patterns for children in emergency departments (EDs) across the United States using a large national survey dataset. The results identified first-line guideline-concordant antibiotic prescribing for children in non-pediatric EDs as a target for improvement, and underscored the importance of community settings for stewardship efforts. This work was awarded top abstract from the Pediatric Infectious Disease Society at IDWeek, with a manuscript under review at the CDC. In July 2018, I joined faculty in the UW Division of Pediatric Infectious Diseases, and entered a career development program that provides 50% protected time for research. I have begun a retrospective cohort study characterizing antibiotic prescribing for children in FM clinics, which will be complete by January 2018 and provide preliminary data for this study proposal.

As I prepare for a K08 resubmission, the Translational Research Scholars Program would offer an exciting opportunity to further develop grant and proposal writing skills, receive expert feedback on the study proposal, and provide critical research funds, including the research incentives for parent- and clinician engaged QI work. I am motivated to reach my career goals as a physician-scientist with research focused on family, community, and physician- engaged approaches to improving antibiotic prescribing.

Translational Research Scholars Program: Research Proposal

SPECIFIC AIMS: The goal of this work is to decrease inappropriate antibiotic prescribing for children in family medicine (FM) clinics by improving the quality of parent-clinician dialogue about expectations for antibiotics. Aim 1: To create a novel parent decision aid (DA) that increases parent-clinician dialogue about parental expectations and antibiotic decision-making. Through qualitative research methods and the quality improvement (QI) framework of participatory design, the outcome of this work will be a tool developed by parents and clinicians. The impact of this DA on antibiotic prescribing will be tested in Aim 2.
Aim 2: To determine the impact of a parent DA on the frequency of inappropriate antibiotic prescribing for children in FM clinics. I *hypothesize* that an intervention with parent DAs will decrease the frequency of inappropriate antibiotic prescribing when compared to standard care, and clinics that use parent DAs in combination with clinician communication tutorials will *further* decrease inappropriate antibiotic prescribing for children when compared to a parent DA or a clinician communication tutorial alone.

SIGNIFICANCE: Antibiotic overuse is directly linked to the increasing prevalence of antibiotic resistant infections[1-9] and unnecessary adverse drug events in children.[10-12] Over 50 million antibiotics are prescribed to children in outpatient clinics each year. Studies of antibiotic use in FM clinics are lacking. I am currently conducting a retrospective cohort study characterizing antibiotic prescribing in 20 FM clinics in the Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) region using an administrative database. This work will identify factors associated with inappropriate prescribing and identify evidence-based targets and outcome metrics for Aim 2 of this study and future interventional research.

Previous work shows approximately 30% of antibiotics prescribed to children in outpatient settings are inappropriate.[13-16] Clinicians identify parent expectations and pressure for antibiotics as driving factors in inappropriate antibiotic prescribing.[17,18] Significantly more antibiotics are prescribed if clinicians believe a parent expects antibotics;[18-26] however, clinicians are often incorrect in their perceptions of parent expectations for antibiotics,[20] and parents often communicate a desire for antibiotics indirectly or late in a clinic visit.[27] Interventions to improve antibiotic prescribing have targeted *clinician* communication when parents expect antibiotics,[28-30] but factors that could improve *parent* communication about expectations for antibiotics - and the impact this could have on unnecessary antibiotic prescribing - have yet to be explored.

DAs are tools shown to improve patient and parent knowledge about treatment options and accurate risk perceptions, improve patient-clinician communication, and reduce decisional conflict in treatment decisions.[31] DAs have been utilized for certain pediatric conditions, such as Pediatric Osteomyelitis[32] and Acute Otitis Media.[33,34] The impact of DAs on antibiotic prescribing practices has not been described. DAs offer a unique opportunity to promote meaningful and efficient dialogue about parental expectations and indications for antibiotics, potentially decrease miscommunication surrounding parent expectations for antibiotics, and subsequently improve prescribing influenced by parent expectations.

INNOVATION: This study explores a novel approach to improving antibiotic prescribing by targeting parent communication techniques in order to improve dialogue between parents and clinicians. This work uses participatory QI methods to create a unique DA as an intervention to promote parent-clinician dialogue about antibiotics and then test the effect of this DA on inappropriate antibiotic prescribing.

APPROACH: The QI framework of participatory design will be used to conduct a series of parent- and clinician-engaged interactive meetings and develop a DA **(Figure 1).** The site of this work will be one rural FM clinic from the WWAMI Practice Research Network (WPRN), which is a collaborative group of 26 health care organizations, comprised of 58 primary care clinics in the WWAMI regions. The methods have been

developed in collaboration with WPRN site representatives. Subjects will include 6-8 parents and at least 2 FM clinicians. The WPRN Coordinating Center and a designated "project champion" staff member at the clinic will assist in the recruitment. The DA will have a tablet computer medium. Application development will be in collaboration with the Digital Health Initiative at Seattle Children's Hospital (SCH).

Objectives: The Focus Group will review background and goals of the DA; participants will be asked open-ended questions about indications for antibiotics, parent expectations about antibiotics, and parent priorities for a DA about antibiotics. The MDs Meetings will review background and goals, share results of the parent focus group, and solicit input on DA. The Advisory Panel will be a smaller working group of parents and MDs that will work to develop the DA prototype and provide feedback/modifications each week. The DA will be tested first with mock parents and MDs, and then be tested in the real clinic setting.

Aim 2 will be a pilot cluster randomized controlled trial (RCT) with factorial design **(Table 1)** to assess the feasibility and preliminarily test the effect of the intervention designed in Aim 1. Eight clinic sites within WPRN will be included over a 9-week period. The subjects will be clinicians, and parents of patients aged 2mo-10yo. Patients must have an in-person acute care visit with one of the following chief complaints: fever, ear pain, cough, nasal congestion, sore throat, difficulty breathing, vomiting or pain with urination. When a parent expects an antibiotic that is not indicated, there are specific physician communication techniques that have shown to help avoid inappropriate antibiotic prescribing while maintaining high parent satisfaction scores.[28,30] Therefore, clinician participants in Arms 3 & 4 of the study will be asked to view a previously developed 43-min professional-quality online clinician communication tutorial,[28,30] outlining communication techniques shown to improve antibiotic prescribing when parents expect an antibiotic that is inappropriate.

TABLE 1: Study Design for Aim 2

	Baseline Data	Pre-Intervention	Intervention	
Duration	4 weeks	1 week	4 weeks	
			DA	Tutorial
Arm 1: Clinic 1&2	Data Collection: Patient and Clinician Post-Visit Surveys	Standard Practice	-	-
Arm 2: Clinic 3&4		Pre-Intervention Education Sessions for Clinicians	+	-
Arm 3: Clinic 5&6			-	+
Arm 4: Clinic 7&8			+	+
	EMR Data Collection on Antibiotic Prescribing			

DA: the parent Decision Aid developed in Aim 2
Tutorial: Clinician Communication Training

TABLE 2: Measures and Variables for Aim 2

Primary Outcome	**Definition**	**Survey Source**	
Frequency of inappropriate antibiotic prescribing	Antibiotic prescribing by clinic by diagnosis		
Secondary Outcomes		**Parent**	**Clinician**
Quality of communication during visit	11-item communication satisfaction scale	Q4	
Frequency of dialogue about antibiotics	Yes or no response to whether a conversation occurred about antibiotics	Q3a	Q4a
Initiation of conversation	Response to who initiated the conversation about antibiotics	Q3b	Q4b
Process Measures			
Decision Aid Utilization	Yes or no response to whether the decision aid was used	Q5-6	Q5
Accuracy of physician perceptions of parent expectations for antibiotics	Yes or no response to whether the parent expected antibiotics at the visit	Inclusion survey	Q2
Balancing Measures			
Decision Aid Acceptability	Response to Likert scale: quality of decision aid	Q7-11	
	Response to Likert scale: propensity to recommend decision aid	Q12	Q6

The variables, definitions, and sources of information for the outcomes, process measures and balancing measures are outlined in **Table 2.** Antibiotic prescribing data and visit diagnoses for patients <18 years old in each clinic over the duration of the study will be collected from electronic medical record network. Antibiotic prescribing will be defined as inappropriate if the antibiotic is unnecessary based on existing national guidelines for the treatment of AOM, pharyngitis, sinusitis, CAP, and SSTI.[35-37]

TRANSLATIONAL IMPACT: Previous work has demonstrated that parent expectations for antibiotics leads to inappropriate antibiotic prescribing, and clinicians are often incorrect in perceiving parent expectations. This proposal translates these findings into creating a parent DA to improve parent-clinician dialogue about antibiotics, and test use of the DA on the frequency of inappropriate prescribing.

References:

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Applicant Name (Last, First, Middle): Poole, Nicole

ITHS Institute of Translational Health Sciences
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DETAILED BUDGET

FROM	THROUGH
03/01/18	02/28/19

List PERSONNEL *(Applicant Organization Only)*
Acad, or Summer to Enter Months Devoted to Project
Dollar Amounts Requested (omit cents) for Salary Requested and Fringe Benefits

Use Cal, Enter

NAME	ROLE ON PROJECT	Cal. Mnths	Acad. Mnths	Summer Mnths	INST.BASE SALARY	SALARY REQUESTED	FRINGE BENEFITS	TOTAL
Nicole Poole	PI	2.40			115,808	0	0	0
SUBTOTALS →						0	0	0

CONSULTANT COSTS Gina Keppel, Research Coordinator at the WWAMI Practice Research Network (0.60 calendar months)	5,304
EQUIPMENT *(Itemize)*	
SUPPLIES *(Itemize by category)* Training Related Expenses - research supplies, scientific poster materials, research publications	

	296
TRAVEL Airfare to NIH Training Institute for Dissemination and Implementation Research in Health; Bethesda, MD	400
OTHER EXPENSES (Itemize by category) Tuition costs for NIH Training Institute for Dissemination and Implementation Research in Health; Bethesda, MD	800
<u>Total Participant Incentives:</u> Parent Focus Group: $30/hr/parent x 3 hrs x 8 parents = $720 Clinician Meeting #1: $50/hr/clinician x 1 hr x 2 clinicians = $100 Advisory Panel: $50/hr/participant x 4 participants x1.5 hr/meeting x 6 meetings = $1,800 Test DA #1: $30/hr/participant x 1.5 hrs x 4 participants = $180 Test DA #2: $10/parent x 10 parents + $50/hr/clinician x 3 hrs x 2 clinicians = $400	3,200

CONSORTIUM/CONTRACTUAL COSTS	DIRECT COSTS	
SUBTOTAL DIRECT COSTS FOR BUDGET PERIOD		**$** 10,000
CONSORTIUM/CONTRACTUAL COSTS	FACILITIES AND ADMINISTRATION COSTS	
TOTAL DIRECT COSTS FOR BUDGET PERIOD		$ 10,000
TOTAL INDIRECT COSTS FOR BUDGET PERIOD		$
TOTAL COSTS FOR BUDGET PERIOD		**$ 10,000**

BUDGET JUSTIFICATION

PERSONNEL

Senior/Key Personnel

Nicole Poole, MD, MPH, Principal Investigator, 2.40 calendar months, 20% effort. Dr. Poole is an Acting Instructor in the Department of Pediatrics within the Division of Pediatric Infectious Diseases at the University of Washington. Dr. Poole will carry out the research project and training plan as described in this proposal. Dr. Poole will be responsible for initiating the studies, protocol development, IRB approval; overseeing data pull, recruitment, enrollment, conducting data analysis and publishing the study findings. She will coordinate the work of Ms. Keppel at the WWAMI Practice Research Network. Note: Dr. Poole's effort on this project will be 20%. All of her effort will be covered by a non-federal funding source. No effort is being requested from ITHS to support Dr. Poole's salary.

CONSULTANT COSTS: $5,304

Gina Keppel, MPH, Research Scientist, 0.60 calendar months, 5% effort: Ms. Keppel is a research scientist and member of the WWAMI Practice Research Network (WPRN) Coordinating Center at the University of Washington. Ms. Keppel will assist with recruitment of parents and coordinate survey administration and data collection. She will assist Dr. Poole with the development of the Decision Aid for the study. Fringe benefits are calculated at 32.4% per institutional policy.

SUPPLIES: $296

Requesting funds to purchase research supplies, scientific poster materials, and research publications.

TRAVEL: $400

Requesting funds for airfare to attend NIH Training Institute's *Dissemination and Implementation Research in Health*, in Bethesda, MD.

OTHER EXPENSES: $4,000

Tuition: Requesting $800 to cover the cost of tuition to attend the Dissemination and Implementation Research in Health, in Bethesda, MD.

Participant Incentives: A total of $3,200 is requested for study participant incentives. The breakout for the incentives is as follows:

- Parent Focus Group: $30/hour/parent x 3 hours x 8 parents = $720
- Advisory Panel: $50/hour/participant x 4 participants x 1.5 hours/meeting x 6 meetings = $1,800
- Test DA #1: $30/hour/participant x 1.5 hours x 4 participants = $180
- Test DA #2: $10/parent x 10 parents + $50/hour/clinician x 3 hours x 2 clinicians = $400

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Nicole Marie Poole

eRA COMMONS USER NAME (credential, e.g., agency login): NICOLEP4

POSITION TITLE: Fellow, Department of Pediatrics, Division of Infectious Diseases

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Texas at Austin	B.S.	05/2005	Biology
University of Texas Medical School at Houston	M.D.	09/2010	Medicine
University of Texas School of Public Health, Houston	M.P.H.	05/2011	Health Services Organization
University of Chicago, Illinois		06/2014	Pediatrics
University of Washington, Seattle, WA		06/2017	Pediatric Infectious Diseases

A. Personal Statement

I have the experience, mentorship, training opportunities, and personal drive necessary to successfully carry out the proposed study. I have a background in pediatric infectious diseases, with specific training in clinical antimicrobial stewardship, basic epidemiology and biostatistics, health services organization, and quality improvement research. My research thus far focuses on the epidemiology of antimicrobial use in children, and patient outcomes associated with antibiotic prescribing patterns. I have been the Primary Investigator on three studies which have demonstrated my capability in conducting sound research in retrospective cohort and cross-sectional studies, and my success in collaborating with researchers outside of the Seattle Children's Hospital network.

Much of the coursework and projects conducted in my Masters in Public Health and Health Services Organization concentrated on the design and evaluation of community health programs, including data compilation and primary outcome evaluation of community-based programs. I understand the importance of a collaborative relationship when designing a project that involves community partners, which will be fostered through the partnership with the Washington, Wyoming, Alaska, Montana, Idaho (WWAMI) Region Practice Research Network (WPRN) in this study. The WPRN has contributed to the design of this study protocol, including an outline of the timeline and budget, to ensure successful implementation given the scope of the award. I am confident in the success of this collaboration.

I have experience in quality improvement research, and plan to use the results of the proposed study inform an R-01 proposal to conduct a larger cluster randomized controlled trial to assess the effect of a parent DA about antibiotics on the rate of unnecessary antibiotic prescribing for children in rural FM clinics. I have a highly qualified and successful mentorship team that is invested in the success of this proposal and my development as an independent investigator in the field of outpatient pediatric antimicrobial research.

B. POSITIONS AND HONORS

Positions and Employment

2011-2014 Pediatric Resident, University of Chicago

2014-2017 Fellow, Pediatric Infectious Diseases, Seattle Children's Hospital
2017- Acting Instructor, Seattle Children's Hospital

Other Professional Training:

02/2015 SHEA Antimicrobial Stewardship Training Course
04/2015 APA Advancing QI Science for Children's Healthcare Research V Conference
2015-2016 Certificate Program in Patient Safety and Quality, University of Washington, Seattle, WA
04/2016 APA Advancing QI Science for Children's Healthcare Research VI Conference
05/2016 SHEA/CDC Training Certificate Course in Healthcare Epidemiology
06/2016 SHEA Primer on Healthcare Epidemiology, Infection Control, and Antimicrobial Stewardship
11/2016 SHEA Antibiotic Stewardship Research Workshop

Honors and Awards:

2001-2005 Terry Undergraduate Full Scholarship, University of Texas at Austin
2001-2005 Dean's Scholars Honors Program, University of Texas at Austin
2004-2005 Health Careers Mentorship Program, University of Texas at Austin
2005 Phi Beta Kappa
10/2013 Read, Lead, Succeed Advocacy Campaign, Grand Prize, American Academy of Pediatrics
05/2014 Resident of the Month, University of Chicago Pediatric Residency Training Program
04/2016 Jonathan Freeman Scholarship, Society of Healthcare Epidemiology of America
07/2016 ID Week 2016 Trainee Travel Grant
09/2016 Posters in the Park, Top Abstract Selection, Pediatric Infectious Disease Society

Professional Memberships and Other Responsibilities:

2011 - American Academy of Pediatrics
2014 - Infectious Disease Society of America
2014 - Society for Healthcare Epidemiology of America
2014 - Pediatric Infectious Disease Society
2014- Center for Clinical & Translational Research, Seattle Children's Research Institute
2014- Antibiotic Stewardship Subcommittee, Seattle Children's Hospital
2015- Health Quality and Safety Committee, University of Washington
2016- Antimicrobial Stewardship Advisory Group, Washington State Hospital Association

Board Certification:

2014 American Board of Pediatrics Certificate in General Pediatrics, Received: October 9, 2014

Current License to Practice:

2014 - Physician and Surgeon License, Washington State Department of Health

C. CONTRIBUTIONS TO SCIENCE

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1xAOPKIG3DekB/bibliography/46926425/public/?sort=date&direction= descending

1. **My research has helped demonstrate that quality improvement interventions can improve antibiotic selection. I was the primary investigator of a retrospective study looking at the effect of a clinical decision support pathway on antibiotic selection for children with uncomplicated urinary tract infection (UTI). This study was conducted in a large cohort of patients in the Seattle Children's healthcare network using electronic medical record data.** With input and guidance from mentors, I conducted the entirety of study, including: development of the study question, study design and methodology, data management, statistical analyses, and the writing and submission of the manuscript (in

press). Prior to this work, studies on clinical pathway implementation had been conducted in other common pediatric infections (such as community acquired pneumonia), but had not been demonstrated in the emergency department setting. The impact of narrow-spectrum antibiotic prescribing for pediatric UTI on patient outcomes had also not been described**. The results of this study demonstrated a significant increase in narrow spectrum antibiotic (fist-generation cephalosporin) use and a subsequent significant decrease in overly broad spectrum antibiotic use after the implementation of a clinical pathway, which was sustained over time.** Additionally, narrow spectrum, oral first-generation cephalosporin antibiotic use as empiric treatment in children with UTI did not result in treatment failures or adverse patient outcomes. This work resulted in the abstracts listed below as well as a manuscript, which is in press.

i. Caglar D, **Poole N**, Migita R, Kronman M, Zerr D, Rutman L. Improving Care for Pediatric Urinary Tract Infection: Relationship Between Implementation of a Clinical Pathway and Prescribing Patterns in the ED. *BMJ* Qual Saf. 2015;24:727-728 (Abstract)

ii. **Poole, N.** "Improving Care of Pediatric Urinary Tract Infections: Effect of a Clinical Pathway on Antibiotic Prescribing in the Emergency Department". Selected abstract for oral platform presentation at the following conferences:
   a. Pediatric Academic Society Annual Meeting, April 2016
   b. Academic Pediatric Association Advancing QI Science for Children's Healthcare Research VI Conference, April 2016
   c. 7th Annual International Pediatric Antimicrobial Stewardship Conference Infectious Disease Society, June 2016

iii. **Poole N**, Caglar D, Kronman MP, Rutman L, Weissman S, Migita R, Zerr DM. Improving Antibiotic Prescribing for Children with Urinary Tract Infection in Emergency and Urgent Care Settings. *Pediatr Emerg Care.* 2017. (*in press*)

2. **My work has been important in characterizing the use of antibiotics for children in emergency departments (EDs) across the United States. I was the primary investigator of** a study that characterized antibiotic use for children in the ED setting. This cross-sectional retrospective study was conducted in collaboration with **the Center for Disease Control and Prevention (CDC),** using the National Hospital Ambulatory Medical Care Survey (NHAMCS) dataset. **Prior to this study, the characteristics of antimicrobial prescribing for children in EDs had not been well described**. This study described antibiotic use by patient, provider, and ED characteristics. The results of this study demonstrated that one-third of antibiotics (2.2 million courses/year) given to children in EDs are unnecessary. Non-pediatric EDs were shown to prescribe 90% of all antibiotics for children in the ED setting. Antibiotic prescribing concordant with national guideline recommendations was found to be significantly lower in the South and Midwest regions of the United States and for the diagnosis of sinusitis. This study also showed that broad spectrum prescribing for children in EDs is high, especially macrolide use in non-pediatric EDs. This work resulted in the two abstracts below and a manuscript that has been submitted for CDC clearance.

i. **Poole, N.** "Characteristics of Antibiotic Use for Ambulatory Visits for Children in Emergency Across in the United States, 2009-2011." ID Week 2016™ New Orleans, LA (Abstract oral platform presentation)

ii. **Poole NM**, Shapiro DJ, Fleming-Dutra KE, Hicks LA, Hersh AL, Kronman MP "Characteristics of Antibiotic Use for Ambulatory Visits for Children in Emergency Across in the United States, 2009-2011" Posters In The Park®, ID Week™. New Orleans, LA. Oct 2016. (Distinguished abstract selection poster presentation)

D. RESEARCH SUPPORT

Ongoing Research Support:

Clinical Research Scholars Program (PI: Poole, NM) 10/01/2017-09/30/2019
Center for Clinical Translational Research
"Identifying Antimicrobial Stewardship Targets and Testing a Novel Intervention to Improve the Quality of Antibiotic Prescribing for Children in Rural Family Medicine Clinics"

To characterize the quality of antibiotic prescribing and establish targets for improvement in antibiotic prescribing for children in family medicine clinics, as well as design and test the feasibility of a parent decision aid as an intervention to improve parent-provider communication about antibiotics and inappropriate antibiotic prescribing.