

**Translational Research Scholars Program
Personal Statement**

Dear Translational Research Scholars Program Selection Committee:

I am writing to express my interest in the Translational Research Scholars Program. The opportunity to apply for this program is very exciting and I believe that my community pharmacy practice and teaching experience combined with my previous research experience make me a strong candidate. I am currently a Clinical Assistant Professor in the Pharmacotherapy Department at the Washington State University College of Pharmacy. I am the Instructor of Record for three courses designed to teach student pharmacists about patient interaction and have undertaken several previous research projects focused on providing quality patient care in a community pharmacy setting because that is where my passion lies.

I believe that my years of experience providing compassionate, quality patient care would make me a valuable member of the Translational Research Scholars Program. Membership in this program would be an excellent opportunity to expand my research knowledge and I believe that the mentorship and peer-review involved with being a part of this organization would be very beneficial. With a focus on translating clinical innovation into patient care initiatives, it is evident that the ITHS research interests are well-aligned with my personal research goals. Since becoming a faculty member in 2013 and gaining research experience in my current position, I have submitted two separate R15 applications which were not funded but did receive reviewer comments. It is my hope that the skills I learn as a Research Scholar could be directly implemented to improve my application and lead to funding with an R15 NIH grant. Conducting research through an R15 grant would lead to several benefits including improving patient health in my community, providing broader research experience that would enrich my career as a faculty member, and offering a foundation for training student pharmacists who are also knowledgeable and passionate about community practice research.

My personal career goals in the next five years include developing my own research skills and starting a Center for Pharmacy Practice Research at WSU. This would allow me to focus more of my time on my own research and also to create and provide research training and material to my junior faculty colleagues. By participating in the ITHS Research Scholars Program, I will learn skills that will benefit my career personally but could also be shared with my colleagues to improve the breadth and depth of translational research undertaken by the College of Pharmacy. My current faculty assignment includes fifty-percent time-dedication to research which will allow me the opportunity to fully commit to the ITHS Research Scholars Program. I am also very pleased that Sterling McPherson, Associate Professor and Director for Biostatistics and Clinical Trial Design for the Elson S. Floyd College of Medicine, has agreed to act as my on-site faculty mentor. Dr. McPherson has an extensive history of NIH funding as well as significant experience mentoring junior and mid-level faculty on research.

Please let me know if I can provide any additional information or answer any questions. I appreciate being considered for the ITHS Research Scholars Program.

Sincerely,

Kimberly McKeirnan, PharmD, BCACP
Clinical Assistant Professor
Washington State University College of Pharmacy

Research Proposal: Understanding patient opinions about utilizing smart-phone technology to improve medication adherence and health outcomes**SPECIFIC AIMS**

- To determine pharmacy patient interest in using smart-phone applications as a reminder to take medication as directed and to refill medication on time. Hypothesis: smart-phones are currently being utilized by pharmacy patients and patients are willing to use smart-phone applications as medication reminders.
- To develop pilot data which can be utilized to apply for an NIH R15 grant. An R15 research proposal on this topic, "Utilizing smart-phone technology to improve medication adherence and health outcomes", was previously submitted but was not funded. While many reviewer comments were positive, insufficient pilot data was cited as one reason that this project was not funded. Hypothesis: Having pilot data to demonstrate that current pharmacy patients use smart phones and would be willing to use a smart-phone application as part of a study will increase the likelihood of receiving an NIH R15 grant.

SIGNIFICANCE

Medication adherence remains a critical step in the reduction of morbidity and mortality as related to treatment of chronic disease. Medication non-adherence can lead to worse clinical outcomes, decreased quality of life, and increased healthcare costs.¹ Specifically, among patients with hypertension, approximately 90,000 individuals could be saved annually by taking the appropriate medications.² Although significant research has been done surrounding medication adherence, current adherence rates remain around 50%.³

Medication non-adherence is complex and often times patient specific. Medication non-adherence can result from multiple factors including socioeconomic, healthcare system, condition related, therapy related, and patient related determinants.⁴ Currently, best practices to improve adherence to medications or promotion of healthy behaviors have not been identified. Interventions utilizing prompts or cues for taking medications, habit-focused intervention, motivational interviewing, and face-to-face activities have had the greatest effects. However, commonly adherence interventions are too complex, time consuming, or costly to sustain and employ.^{1,3} Mobile device technology is a potential solution to help aid in clinical intervention which targets simply forgetting to take medications which is a common reason for poor adherence.^{5,6,7,8} Moreover, the app can assist with medication tracking and providing a communication channel directly to the pharmacy.

INNOVATION

As of July 2015 an estimated 68% of Americans now own a smartphone.⁹ With increased use of "smart" technology, we have also seen a rise in the mobile applications that have been developed. Healthcare and medication adherence has been a common target for these applications. Patient reported factors with mobile technology are improved patient satisfaction, personalized cost savings, personalized healthcare messaging, and patient empowerment.¹⁰ Mobile technology has demonstrated improved outcomes in the areas of adherence to antiretroviral therapy for individuals with HIV, attendance to healthcare

appointments, self-management of chronic illness, preventative healthcare, tuberculosis, contraception use, secondary prevention of cardiovascular disease, and medication adherence in chronic diseases.^{11,12,13,14,15,16,17,18,19} Mobile phone text messaging has demonstrated significant benefits in the area of medication adherence for chronic disease state management. Based on evidence reported by Thakkar and colleagues, users reported an increase in adherence by almost 20% when using text messaging. However, these studies had a short intervention and data collection period.^{20,21,22,23} The long term effect of these adherence interventions has not been studied.

APPROACH

The project that was previously submitted as an R15 application would consist of identification and recruitment of 150 community pharmacy participants at local independent community pharmacies. Each participant shall serve as their own control group through the collection of previous refill data. Patients will be required to have 3 months or more of previous antihypertensive medication therapy to determine a baseline level of adherence. Once enrolled, the research team will evaluate adherence rates at 3 months pre and post enrollment, 6 months, and 12 months post enrollment. Blood pressure will be evaluated upon enrollment, 6 months, and 12 months post enrollment. Participants will also be encouraged to take a two surveys, one regarding self-perception of adherence and one regarding patient activation, upon enrollment and again at conclusion of the study.

The long term goal of this ITHS project is to implement an NIH funded project to analyze the impact of smart-phone technology on medication adherence and health among community pharmacy patients. The short term goal is to create pilot data by determining pharmacy patient opinions about using smart phone applications as a reminder to take and refill medication.

In order to accomplish these goals, patients of an independent community pharmacy will be surveyed and interviewed to determine current use of smart phones, self-perceived medication adherence, and interest in using a smart-phone app as a reminder to take and refill medication on time. The Likert-scale survey data will be analyzed using descriptive statistics. The interview audio files will be transcribed and analyzed with qualitative data analysis software to identify recurring themes. All data and information related to this study will be stored securely under the protocol of the WSU IRB.

The results of this pilot research will lead to multiple deliverables. A podium presentation outlining the research process and findings will be delivered at the Northwest Pharmacist Convention in Coeur D'Alene, Idaho in June 2019. Additionally, a poster will be developed for presentation at the APhA Annual Meeting in March 2019. Research results will also be published in a peer-reviewed pharmacy practice journal, ideally the Journal of the American Pharmacist Association. Ideally, the most significant result of the pilot research will be a future R15 grant for the originally proposed project, "Utilizing smart-phone technology to improve medication adherence and health outcomes"

TRANSLATIONAL IMPACT

Medication non-adherence costs \$100-289 billion dollars annually with rates of medication adherence dropping after the first six months of therapy.²⁴ Pharmacists are in a key position to improve adherence due to their accessibility to patients and ability to identify medication-related problems. Utilizing smart-phone technology as an interface between patients and their pharmacist can open the lines of communication. Utilization of smart-phone technology as a medication adherence tool could prevent negative health outcomes for patients with chronic diseases who own smart-phones world-wide.

Applicant Name: McKeirnan, Kimberly C

 Institute of Translational Health Sciences Accelerating Research. Improving Health.						DETAILED BUDGET		FROM 03/01/18	THROUGH 02/28/19
List PERSONNEL (Applicant Organization Only) Enter Dollar Amounts Requested (omit cents) for Salary Requested and Fringe Benefits						Use Cal, Acad, or Summer to Enter Months Devoted to Project			
NAME	ROLE ON PROJECT	Cal. Mnth	Acad. Mnth	Summer Mnth	INST.BASE SALARY	SALARY REQUESTED	FRINGE BENEFITS	TOTAL	
Kimberly McKeirnan	PI					0	0	0	
SUBTOTALS →						0	0	0	
CONSULTANT COSTS									
EQUIPMENT <i>(Itemize)</i>									
Digital audio recorders								100	
Audio Transcriptions								500	
SUPPLIES <i>(Itemize by category)</i>									
Poster printing & office supplies								200	
Amazon Gift Cards								500	
TRAVEL									
Dissemination travel to 2 Natl Meetings								4,500	
OTHER EXPENSES <i>(Itemize by category)</i>									
Manuscript submission fee								500	
CONSORTIUM/CONTRACTUAL COSTS						DIRECT COSTS			
SUBTOTAL DIRECT COSTS FOR BUDGET PERIOD						\$ 9,300			
CONSORTIUM/CONTRACTUAL COSTS						FACILITIES AND ADMINISTRATION COSTS			
TOTAL DIRECT COSTS FOR BUDGET PERIOD						\$ 9,300			
TOTAL INDIRECT COSTS FOR BUDGET PERIOD						\$ 9,300			
TOTAL COSTS FOR BUDGET PERIOD						\$ 9,300			

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Budget Justification

Data collection:

- Data for this research will be collected in the form of surveys and participant interview audio recording files. Ipads to collect the surveys will be purchased and kept at the participating pharmacies. Two ipads at \$750 each will be used in each of the two locations for a cost of \$3000. Two audio recorders will be purchased at \$50 each for a total of \$100.
- The exact number of interviews that will be conducted is unknown since the number required to reach saturation will be dependent on results but approximately 20 interviews are anticipated. Each interview participant will receive a \$25 gift card as appreciation for participating for a total of \$500 requested for gift cards.
- The interview audio files will be transcribed into electronic word documents for data analysis. Funding in the amount of \$500 has been allotted to transcribe audio files based on an estimate of 20 interviews at 30 minutes each transcribed at a cost of \$1.00 per audio file minute.

Data analysis and dissemination:

- Manuscript submission fees totaling \$500 are requested so that manuscript submission will not be limited to only journals which do not have publication fees.
- This research is expected to produce results that are interesting to the broader healthcare community. Funding of \$4500 is requested for Dr. McKeirnan to present as a podium or poster presentation at two national meetings with costs of \$2250 each.
- Additional funding of \$200 is requested for poster printing and office supplies.

BIOGRAPHICAL SKETCH
DO NOT EXCEED FIVE PAGES.

NAME: Kimberly C. McKeirnan

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

POSITION TITLE: Clinical Assistant Professor

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
Washington State University Pullman, WA	B.S.	05/06	Biology
Washington State University Spokane, WA	PharmD	05/08	Pharmacy

A. Personal Statement

As a practicing pharmacist I have observed first hand the impact that poor adherence can have on patient health. I have 8 years of experience providing personalized and professional pharmacy services in a community setting. My intrapersonal skills and commitment to the health and safety of my patients have helped me to establish strong, positive relationships with my patients, pharmacy colleagues, and other healthcare providers.

As a junior faculty member at Washington State University, my research focus providing patient care services in community pharmacy that demonstrate improvement in patient health. During my first four years as an educator I have undertaken several research projects although they have not yet been completed. As the instructor of record for the second-year Applied Patient Care series, I provide instruction on patient interaction skills, motivational interviewing, immunization technique and counseling, and medication therapy management services. Additionally, I developed a new course in our curriculum focused on training student pharmacists to provide clinical patient care services and point-of-care testing.

In the next year I look forward to publishing and presenting the data from my current research projects and continuing to add to my experience in pharmacy practice research with a goal of improving patient health. I believe that my commitment to public health aligned with my knowledge of patient care and student pharmacist education provide a solid foundation for the success of this proposal.

1. **McKeirnan, KC.**, Akers, JM., Czapinski, JC., Robinson, JD. Implementation of a Course to Train Student Pharmacists to Provide Clinical Patient Care Services using Collaborative Drug Therapy Agreements. *American Journal of Pharmaceutical Education*. Accepted August 2016, awaiting publication.
2. **McKeirnan K**, Panther S, Akers J. Redesigning the Traditional Community Health Screening Model to Provide Blood Glucose Screening and Interdisciplinary Health Education to Faculty and Staff in K-12 Institutions. *Clinical Diabetes*, October 2015; 33(4).
3. **McKeirnan, K.** "Factors Influencing the Decision to Receive an Influenza Vaccination Among Manufacturing Plant and Day Care Center Employees" *Workplace Health Saf* 2016 May;64(5):228.
4. Pharmacists are an integral member of any healthcare team,

5. Clark JA, Gates BJ, **McKeirnan K**, Sclar DA. Assessed value of consultant pharmacist services in home health care agency. *Consult Pharm* 2016;31(3):161-167.

B. Positions and Honors

Positions

2008 - 2012	Community Pharmacist, Albertson's Savon Pharmacy
2012 - 2013	Pharmacy Manager, Albertson's Savon Pharmacy
2013 - Present	Float Pharmacist (Part Time), Albertson's-Safeway
2013 - Present	Clinical Assistant Professor, Washington State University College of Pharmacy, Spokane WA
2014 - Present	Guest Lecturer, University of Washington MEDEX PA Program, Seattle WA
2016 - Present	Adjunct Faculty, University of Washington School of Medicine, Seattle WA

Scholarships, Honors and Awards

2013	Human Subjects Research Training, Collaborative Institutional Training Initiative
2013	Pharmacy-Based Immunization Delivery, American Pharmacists Association
2014	Tuberculin Skin Test Training Certificate, Washington State Pharmacy Association
2014	Board Certified Ambulatory Care Pharmacist, Board of Pharmacy Specialties
2015	Pharmacy-Based Travel Health Services, American Pharmacists Association
2015	Academic Detailing Training, National Resource Center for Academic Detailing, Harvard Medical School, Brigham and Women's Hospital
2016	Adult Immunization Train-the-Trainer Certificate, American Pharmacists Association
2016	Medication Therapy Management Train-the-Trainer Certificate, American Pharmacists Association
2015 - 2016	Teacher of the Year, College of Pharmacy, WSU, Selected by second year students,
2014 - 2015	Teacher of the Year, College of Pharmacy, WSU, Selected by second year students,
2013 - 2014	Teacher of the Year, College of Pharmacy, WSU, Selected by second year students,
2014	Golden Apple Speaker Award, MEDEX Program, University of Washington, Spring Quarter

C. Contribution to Science

1. As a junior faculty member starting my fourth year at Washington State University I have ongoing funded research but only a few publications to list. Two of my roles within the Washington State University College of Pharmacy are to educate student pharmacists about patient care and to provide health services to the local community. These publications are examples of my work as an educator but also demonstrate my interest in providing quality patient care within my community. I was the PI on three of these publications and Co-I on the fourth.
 - a. **McKeirnan K**, Panther S, Akers J. Redesigning the Traditional Community Health Screening Model to Provide Blood Glucose Screening and Interdisciplinary Health Education to Faculty and Staff in K-12 Institutions. *Clinical Diabetes*, October 2015; 33(4).
 - b. **McKeirnan, KC.**, Akers, JM., Czapinski, JC., Robinson, JD. Implementation of a Course to Train Student Pharmacists to Provide Clinical Patient Care Services using Collaborative Drug Therapy Agreements. *American Journal of Pharmaceutical Education*. Accepted August 2016, awaiting publication
 - c. **McKeirnan, K.** "Factors Influencing the Decision to Receive an Influenza Vaccination Among Manufacturing Plant and Day Care Center Employees" *Workplace Health Saf* 2016 May;64(5):228.
 - d. Clark JA, Gates BJ, **McKeirnan K**, Sclar DA. Assessed value of consultant pharmacist services in home health care agency. *Consult Pharm* 2016;31(3):161-167.

D. Research Support

Ongoing Research

Grant # Not Available (McKeirnan)

November 2017- May 2019

Cardinal In Power Home Visit Pilot Adherence Project (Cardinal Health)

\$82,016 awarded. The goal of this research is to improve patient adherence through use of the Cardial InPower Device.

Grant # Not Available (McKeirnan)

March 2016-March 2018

Building the Prototype of a Regional System that will Increase Access to Quality Patient Care through Medication Optimization in Rural Eastern Washington State (Empire Health Foundation)

\$323,003 awarded. The goal of this research is to improve patient health in Rural Eastern Washington through an interdisciplinary approach with interventions targeted to patients with multiple chronic medical conditions.

Grant # Not Available (McKeirnan)

August 2015-December 2017

Improving Pneumococcal Vaccination Rates in Older Adults Through Enhanced Academic Detailing: Medicine, Nursing and Pharmacy Partnerships (Pfizer Independent Grants for Learning & Change)

\$260,806 awarded. The goal of this project is to improve pneumococcal immunization rates in two counties in rural Eastern Washington with the lowest immunization rates in the state.

Completed Research

Grant # Not Available (McKeirnan)

August 2015-July 2016

Pharmacist, Physician, and Patient Opinions Regarding Creation of Collaborative Drug Therapy Agreements Allowing Community Pharmacists to Identify and Treat Minor Ailments and Conditions (National Association of Chain Drug Stores Foundation)

\$2500 awarded. The goal of this research was to learn about patient opinions regarding treatment of minor ailments and conditions from pharmacists utilizing collaborative drug therapy agreements.