PI: **Hogg, Rachel A.**	Title: Examining the Integration of Hospitals, Public Health, and Social Services to Target the Social Determinants of Health Using Patient-Centered and Comparative Effectiveness Research Methods	
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Senior/Key Personnel:	*Organization:*	*Role Category:*
Rachel Hogg	UNIVERSITY OF KENTUCKY	PD/PI
Glen Mays	University of Kentucky	Other Professional-Mentor
Mark Williams	University of Kentucky	Other Professional-Co-Mentor
Patrick Kitzman	University of Kentucky	Other Professional-Co-Mentor
Danielle Varda	University of Colorado - Denver	Other Professional-Co-Mentor
Allison Scott	University of Kentucky	Other (Specify)-Other Significant Contributor

Reference Letters

Adam Atherly	Colorado School of Public Health	05/19/2021
Shoou-Yih Lee	The University of North Carolina at Chapel Hill	05/19/2021
Frank Scutchfield	University of Kentucky	05/19/2021

Abstract

This is an application for a K01 award for Dr. Rachel Hogg, an Assistant Professor at the University Of Kentucky College Of Health Sciences. Dr. Hogg is establishing herself as a young investigator who uses Patient Centered Outcomes Research (PCOR) and Comparative Effectiveness Research (CER) methods to examine the effect models of clinical and community collaboration around the health-related social determinants of health have on improved health care quality and reduced hospitalizations and readmissions. This K01 award will provide Dr. Hogg with the support necessary to achieve the following goals: (1) develop expert knowledge in the types of models being used to integrate clinical and community organizations to address not only health care, but also the health-related social determinants of health, (2) establish herself as an independent researcher with mastery of using advanced Comparative Effectiveness Research methods to determine effect heterogeneity in how clinical-community models address diverse population needs, and (3) To secure R01 level funding using the Public Health and Social Service Sensitive Admission Measures as an outcome. Dr. Hogg has assembled a mentoring team comprised of primary mentor, Dr. Glen Mays, and Co-Mentors, Drs. Patrick Kitzman, Danielle Varda, and Mark Williams.

Addressing the health-related social determinants of health has emerged as a leading strategy to combat the increasing economic and financial burden of preventable hospitalizations and readmissions. Dr. Hogg's study will use a mixed methods approach to examine in greater detail the models being used across the US to integrate public health and social services with clinical care provided in hospitals as a mechanism to target the social, behavioral, and environmental factors that contribute to hospitalizations and readmissions (Aims 1 and 2). Dr. Hogg's project will also engage patients, caregivers, and community stakeholders to determine the extent to which patient, caregiver, and provider experiences with health care are influenced by the surrounding delivery systems for public health and social services (Aim 3). The findings will cumulate in a template model that will be proposed for pilot testing as part of a R01 application to be submitted before the end of the K award.

Project Narrative

This study has the potential to reveal how health care system organization and delivery policies can be used to improve health and lower health care costs across the US by examining the benefits of integration between hospitals and other community organizations to address patient needs. Results have the potential of leading to beneficial changes in policy at the local, state, and federal level that impact individual health. The value of the knowledge to be gained from this research is considerable given its potential health and economic implications on a broad, population-wide basis.

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Introduction to Application

The long-term objective of this application for a K01 award is to establish myself as a young investigator who uses Patient Centered Outcomes Research (PCOR) and Comparative Effectiveness Research (CER) methods to examine the effect models of clinical and community collaboration around the health-related social determinants of health have on improved health care quality and reduced hospitalizations and readmissions.

First, I would like to thank the reviewers and the PO for their extremely thorough and helpful comments. I was excited and optimistic to see that the reviewers found the topic to be timely, needed, and innovative and that they thought I was a strong candidate in a well-suited environment. However, they did identify some important weaknesses to consider and places where I can strengthen the application. In response to the major criticisms, I have worked closely with the mentorship team, who, along with the Institution, are very committed to my training and the proposed project, to address the weaknesses identified.

One weakness highlighted was concern about my quantitative skills and whether or not I would be able to develop the skills in comparative effectiveness research (CER) necessary to carry out the research proposed with the required level of rigor. After rereading the narrative, I realized I did not describe my quantitative background sufficiently, leading to a misunderstanding about my skills and abilities. I have a strong quantitative foundation, but need to build on these skills to advance my career and research agenda. I have updated the narrative to better reflect my background and the experience I have had leading my quantitative analyses and using big data. I have also added an econometrics course developed at the University of Kentucky that will cover many of the techniques used in CER analyses to strengthen this training goal.

A second weakness noted regarding my training was the lack of a qualitative mentor. The reviewers noted that this was especially apparent in the development of Aim 3. This was a very fair criticism and led me to think more carefully about the training plan and proposed analysis. As such, I have included a fourth mentor, Dr. Danielle Varda, and a collaborator, Dr. Allison Scott-Gordon. Both are experienced qualitative researchers. They have been integrated into mentorship team meetings and have helped me work through the reviewer feedback to strengthen the training and research plans. You will see this reflected in the narrative in addition to more detail on their background and roles in the proposed project.

In addition to the above weaknesses, I identified three areas highlighted by the reviewers as weaknesses of the research plan:

1. Recruitment Strategies: A large portion of the quantitative data we are analyzing is data that already exists. The sample sizes are known and large. I have updated the narrative to better reflect this information. In terms of the PARTNER tool, we have had great success in the past and have a track record of 70% response and above. In part, this is driven by the unique and valuable information each member of the network receives back. The tool has developed key quality improvement points that the network and organizations can use immediately to improve practices. Additionally, adding Dr. Varda as a qualitative mentor gives us the benefit of having her, as the PARTNER creator, to assist with recruitment and response.

2. Proposed Quantitative Methodologies: Reviewers noted the research plan lacked detail in the proposed analyses to be carried out. I was not as clear as I should have been and have updated the narrative to reflect more detail in the plans. More specifically, the main methods used will be approaches for treatment effect heterogeneity. Our sample includes lots of communities with heterogeneous populations. I hypothesize that different network arrangements will have different effects across communities and population subgroups within those communities and want to focus on methods that will tease out these relationships so we can develop better understanding of the dynamics between organizational arrangements and outcomes.

3. Quality and Limitations of the Data: Reviewers were concerned about the quality of the data and whether there was enough information available. The preliminary data is just one source on collaborative arrangements and what we are proposing to do will give us much more granular data. PARTNER is a very rich data source and has been published extensively.[1-8] We will have a combination of patient and organization data, making this proposed study very unique in what it will be able to tell us about the arrangements being formed to address the social determinants of health and their impact on health outcomes. More detail on the data has been incorporated into the narrative as well.

Candidate's Background: My goal in seeking an Agency for Healthcare Research and Quality (AHRQ) K01 Mentored Research Scientist Development Award is to acquire the necessary training, practical experience, and knowledge to become a leading independent researcher who uses Patient Centered Outcomes Research (PCOR) and Comparative Effectiveness Research (CER) methods to examine the effect models of clinical and community collaboration around the health-related social determinants of health have on improved health care quality and reduced hospitalizations and readmissions. To continue my progress toward this goal, I am proposing a mixed-methods study that examines how local public health and social services agencies are engaging with hospitals to address the health-related social determinants of health. The knowledge and experience gained from this proposed project will allow me to compete for R01 funding where I can test a model that focuses on understanding how the impact of hospital integration with public health and other community organizations, like social services, to address the social determinants varies across different community and patient characteristics to understand what models work for whom.

I received my Bachelor of Arts in History from Transylvania University (2008) and Master of Arts in History from the University of Kentucky (2010) with a focus on the history of health and medicine. During my time at UK in the history program, I developed an interest in understanding how community relationships impact health and well-being, both positively and negatively. I grew to understand how history influenced our current health care system, resulting in fragmentation and limited care coordination. I became interested in switching to public health with the intent of pursuing a research-oriented degree that would allow me to continue examining the complexity of evolving health care systems and how organization collaboration can impact health outcomes and quality of life. During my undergraduate and masters career, I had taken mathematics and social science research methods courses, but knew that I would need to expand my statistics and health research methods knowledge through a doctoral program to do the type of work I desired.

I completed my Doctorate in Public Health (DrPH) at the University of Kentucky in 2014 where I received both didactic and experiential training that focused on applying traditional health services research methods to population health problems. My primary research interests were developed during this course of study and focused on how relationships between health care systems develop and change over time, and the influence collaboration can have on the effectiveness of public health actions to improve population health and reduce health disparities. Through this work, I realized that a critical connection in these systems is that between the local public health agency and hospitals. I worked closely with my professors to develop a curriculum plan to help me better understand these issues using quantitative methods. To build on the math courses I had taken during my undergraduate training, we designed a plan including statistics and biostatistics courses and independent studies with experiential application to develop a strong quantitative base. I moved on from those courses to take econometric classes that helped me to better understand how to best analyze the complex data and questions that arise in health services research. Additionally, I used both my coursework and role as a Research Assistant in the National Coordinating Center for Public Health Services and Systems Research as mechanisms to develop my understanding and research skills in using large datasets and econometric methods to explore collaboration in health systems. I was also exposed to numerous primary data collection efforts and helped lead the 2012 wave of the National Longitudinal Survey of Public Health Systems. During this time, my preliminary research on hospital and public health collaboration was featured in *Modern Healthcare* and earned the American Public Health Association Health Administration Section Outstanding Student Abstract Award. The final work was published in a first-author publication in the *American Journal of Public Health* under the mentorship of Dr. Glen Mays, my primary mentor for this proposed project. For this work, I led and carried out the statistical analysis and the writing of the manuscript. In addition to the AJPH manuscript, I co-authored four peer-reviewed publications and one book chapter as a student.

After completing my DrPH, I determined that I did want to stay in an academic setting and took a postdoctoral fellowship in Public Health Services and Systems Research at the University of Colorado Denver so that I could continue to hone my research agenda and build my research and grant-writing skills. During this time, I continued to more deeply explore the integration of health care and public health systems through two grant opportunities. I served as PI on an AcademyHealth New Investigator Small Grant Program Award looking at health care organization participation in public health systems and the impact participation has how efficiently population health services are delivered. I also served as a Co-Investigator on a Robert Wood Johnson Foundation Grant that was awarded during my time as a postdoctoral fellow. This project examined hospital investment and interaction in public health at a much more granular level using social network analysis measures, IRS Schedule H Community Benefit data, and American Hospital Association data. I was able to

continue growing my quantitative skills during this project while building a dataset that combined three sets of large, messy data and subsequently analyzing that data to better understand what factors influence hospital investment in population health. Being exposed to large administrative datasets and using network data throughout my postdoctoral fellowship helped broaden my understanding of what organizations participate in the health care system and the role that social services agencies can play, particularly in addressing the health-related social determinants that are typically not addressed in clinical encounters. I also developed an interest in combing unique datasets to answer complex questions around the impact organizational arrangements can have on health outcomes and quality of life. I have one first-author manuscript published in *Health Affairs* based on this work.

I am now at the University of Kentucky, College of Health Sciences as an Assistant Professor where I saw a unique opportunity to grow as a researcher and expand my expertise in health system integration and the quality of health care delivery to include PCOR and CER methods. Although Dr. Mays has and will continue to be my primary mentor, I have expanded to research agenda to now include collaborators within Health Sciences and also the College of Medicine, including my co-mentors Drs. Patrick Kitzman and Mark Williams. I have also continued to work closely with my postdoctoral mentor at the University of Colorado Denver, Dr. Danielle Varda, who will also serve as a co-mentor on this proposed project. During this time, I have increasingly been exposed to the growing complexity of health care delivery systems, especially around the social determinants of health and understanding which organizations are best equipped to deal with the health and social needs of patients. The unique interests and expertise of Drs. Mays, Kitzman, Williams, and Varda have helped to continue the growth of my knowledge and skills, particularly in quantitative methods and the analysis of big data. My work with Drs. Kitzman and Varda has also exposed me to the importance of engaging the community to understand how health care and mechanisms designed to link individuals to the services they need impacts both community organizations and patients. However, I recognize that taking my research agenda and career development to the next level will require additional training and research experience.

While I have developed strong skills in advanced health services research methods, I do not have the experience in PCOR or CER necessary to apply these methods to my research with rigor. Successfully developing my research agenda to examine the system-level interventions aimed at addressing the social determinants of health will require skills that allow me to examine community and population group differences and integrate patient and stakeholder experiences into the analyses. This K01 award will be integral in my development of the skills I need to grow my research and establish independence. Additionally, PCOR and CER are emerging focus areas at the University of Kentucky. My development as an independent researcher with the expertise to carry out studies using PCOR and CER techniques would be an important contribution to the continuing development of programs at the University that address AHRQ priorities. This training would allow me to take a leadership role as an expert and future mentor for others interested in expanding research that utilizes PCOR and CER.
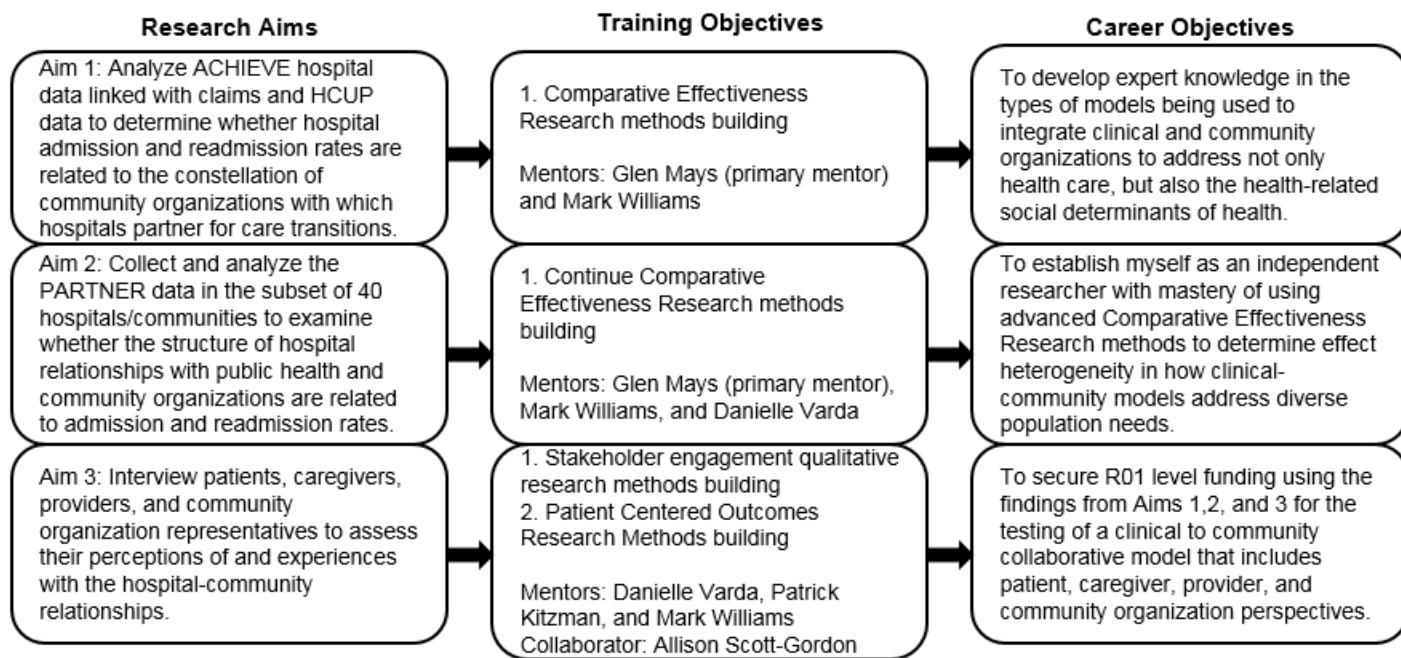
Career Goals and Objectives: I am committed to a career in health services research and believe the proposed project is particularly salient to the goals of AHRQ. First, the integration of PCOR methods and emphasis on patient and stakeholder perspectives and experiences in the project and my training positions me well to be an active contributor throughout my career to Priority 1, "Improve Health Care Quality by Accelerating Implementation of PCOR." Second, Priority 4, "Improve Health Care Affordability, Efficiency, and Cost Transparency", calls for research comparing the performance of delivery systems, and seeks understanding of what systems include public health and non-medical providers. This proposed project will compare system performance using CER methods with an emphasis on those systems that integrate hospital care with public health and social services agencies, speaking directly to Priority 4.

To accomplish this proposed study successfully, there are some challenges I will need to overcome. Most importantly, the deficits in my skill set around PCOR and CER methods. I have focused on developing my quantitative skills in health services research and have a strong base to build from, but there are three areas where I need additional training: qualitative research that focuses on stakeholder engagement, patient-centered and reported outcomes, and comparative effectiveness research methods. The following section includes a detailed career development plan that includes both didactic and experiential training to address my

deficiencies and grow my skills so that the completion of this project cumulates in successfully competing for R01 funding.

Career Development and Training Activities During Award Period: My training efforts during the course of the Mentored Research Scientist Development Award will focus on three areas critical to establishing myself as an independent researcher: comparative effectiveness research methods, patient-centered outcomes research methods, and stakeholder engagement. These skills will be critical in achieving both my short and long term goals. Over the course of the development of this project, I have had meetings with the mentorship team, Drs. Mays, Kitzman, Williams, and Varda, where all mentors were present and additional meetings with each mentor one-on-one. During these meetings we have developed my research, training, and career objectives so that each piece builds on the other. I have cross-walked each research aim to the corresponding training and career objectives below.

Research Aims	Training Objectives	Career Objectives
Aim 1: Analyze ACHIEVE hospital data linked with claims and HCUP data to determine whether hospital admission and readmission rates are related to the constellation of community organizations with which hospitals partner for care transitions.	1. Comparative Effectiveness Research methods building Mentors: Glen Mays (primary mentor) and Mark Williams	To develop expert knowledge in the types of models being used to integrate clinical and community organizations to address not only health care, but also the health-related social determinants of health.
Aim 2: Collect and analyze the PARTNER data in the subset of 40 hospitals/communities to examine whether the structure of hospital relationships with public health and community organizations are related to admission and readmission rates.	1. Continue Comparative Effectiveness Research methods building Mentors: Glen Mays (primary mentor), Mark Williams, and Danielle Varda	To establish myself as an independent researcher with mastery of using advanced Comparative Effectiveness Research methods to determine effect heterogeneity in how clinical-community models address diverse population needs.
Aim 3: Interview patients, caregivers, providers, and community organization representatives to assess their perceptions of and experiences with the hospital-community relationships.	1. Stakeholder engagement qualitative research methods building 2. Patient Centered Outcomes Research Methods building Mentors: Danielle Varda, Patrick Kitzman, and Mark Williams Collaborator: Allison Scott-Gordon	To secure R01 level funding using the findings from Aims 1,2, and 3 for the testing of a clinical to community collaborative model that includes patient, caregiver, provider, and community organization perspectives.

Comparative Effective Research Methods Training: Developing my skills in comparative effectiveness research methods is essential to my ability to complete the project proposed here and to develop myself as an independent researcher in this area. During my doctoral and postdoctoral training, I was exposed to the increasing usefulness of comparative effectiveness' techniques for determining what works best in population health oriented interventions. I also developed the quantitative base and experience with data and measurement necessary to effectively develop comparative effectiveness methods proficiency during the duration of this award. System-level interventions aimed at addressing the health-related social determinants of health are likely to look very different from community to community. Additionally, the effects of these interventions are going to vary across patient subgroups based on health needs and risks. I need applied experience in using comparative effectiveness techniques to determine heterogeneity in the effectiveness of models that use local public and social services agencies to address the health-related determinants of health.

This training goal will be supervised by my primary mentor, Dr. Glen Mays, with participation from my co-mentor, Dr. Mark Williams. Dr. Mays is a national expert in the delivery and financing systems for health care and public health, with a specific focus estimating the health and economic impact of these efforts. He serves as the Scutchfield Endowed Professor of Health Services and Systems Research in the UK College of Public Health where he runs the Systems for Action National Program Office. He also serves as Associate Director of the Center for Health Services Research. Dr. Mays has authored many first-author manuscripts on these subjects and has extensive experience using comparative effectiveness and other advanced research methods to examine complex health systems and problems.

Dr. Mark Williams serves as Professor and Vice-Chair of the Department of Internal Medicine, Chief of the Division of Hospital Medicine at the University of Kentucky, and Director of the Center for Health Services Research. His research focuses on quality improvement, care transitions, teamwork and the role of

health literacy in the delivery of health care. Dr. Williams has a substantial record of successful external funding and peer-reviewed publications, including funding from PCORI and AHRQ. He will ultimately play a mentorship role throughout each training goal and the proposed research plan as an expert hospitalist and will be responsible for my development in understanding the clinical perspective. Dr. Williams has also been actively engaged in qualitative work to better understand the effectiveness of care transitions taking place around long-term care. I will speak more about this and his role as a mentor in the training plan for Aim 3.

Coursework: As a part of this training, I will enroll in formal coursework at UK that focuses on advancing my quantitative skills so that I can become proficient in CER.

PA 692 Econometrics for Policy Analysts: PA 692 is taught in the Martin School of Public Policy and Administration. This course advances on the knowledge built in the econometrics courses I have already had and goes further into the application of techniques including instrumental variables analysis, heteroscedasticity consistent regression, fixed and random effects models, probit, logit and tobit models, and identification and two-stage least squares estimation of simultaneous equations models.

Structured Tutorial: At this time there are no courses that focus solely on comparative effectiveness research methods at the University of Kentucky. Rather, the techniques are covered in a number of econometric and biostatistics courses that I have completed or will complete in this proposed training plan. To complement that formal coursework in a more cohesive CER narrative, Dr. Mays will carry out a structured tutorial based around the *Tufts Clinical and Translational Science Institute Comparative Effectiveness Research (CER) Survey Course.* The series includes 15 two-hour lectures that cover the current state of CER, define CER tools, and explain CER methodologies. We will meet weekly for 4 months during Year 1 where I will have to recap what I learned in the course and apply that to my research questions and hypotheses. Additionally, Dr. Mays will be compiling relevant health services and population health readings that focus on the application of CER methods in these disciplines.

Outside Trainings: In addition to the structured tutorial, I will seek outside opportunities including webinars and intensive trainings as they come available. These will include the Ohio State University CER Online Training Center's modules, AcademyHealth webinars and Annual Research Meeting Methods Workshops. I will also attend workshops held by the UK Quantitative Initiative for Policy and Social Research (QIPSR), where they have held CER trainings in the past.

Practical Experience: Experiential training will be a critical piece to my development of CER skills. This portion of the training will be guided by Dr. Mays and will begin with the application of CER techniques including instrumental variable, propensity score, non-inferiority analyses, and testing for treatment heterogeneity using data from Project ACHIEVE (Achieving Patient-Centered Care and Optimized Health in Care Transitions by Evaluating the Value of Experience). ACHIEVE is funded by Patient Centered Outcome Research Institute (PCORI) and housed at the UK Center for Health Services Research. Using ACHIEVE as an opportunity for experiential training is a nice compliment to my proposed project, as ACHIEVE uses a mixed-methods approach to first determine which long-term care transition outcomes matter most to patients and caregivers, and then use CER techniques to examine programs across the US. Dr. Williams will also assist with practical experience in this goal through the development of my skills in accounting for the clinical perspective in collaboration and how that has influenced their ACHIEVE findings.

My trainings and guided experiences with analyzing the ACHIEVE data will then be utilized to complete Research Aim 2, where I will focus on examining the effect models of clinical and community collaboration have on hospital admissions and readmissions and how that might vary across communities and subgroups of the population. This will ultimately lead to my career objective of establishing myself as an independent researcher with mastery of using advanced CER methods to determine effect heterogeneity in how clinical-community models address diverse population needs.

Patient Reported Outcomes Research Methods Training: Addressing the health-related social determinants will be most effective if patient, caregiver, and stakeholder opinions regarding high priority needs and what they have perceived to be the most effective mechanisms used by clinicians and community organizations are identified. Understanding the preferences and experiences of the patients and their

caregivers will be critical in designing clinical and community collaborative models that are responsive to the populations they serve. As such, it will be integral to this project that I develop skills in patient-centered and reported outcomes methodology.

This training goal will be supervised by my co-mentor, Dr. Patrick Kitzman. Dr. Kitzman serves as a professor and Associate Dean for Research in UK's College of Health Sciences. He has also served on the PCORI Advisory Panel on Addressing Disparities. Dr. Kitzman's research focuses on the community re-integration of individuals with neurological impairments who live in rural communities, with a particular emphasis on patient perspectives and community-based participatory research. He has an extensive history of successful funding in this work, including funding from PCORI, and numerous peer-reviewed publications and presentations.

Coursework: As a part of this training, I will enroll in formal coursework at UK that focuses on developing PCOR skills.

CPH 758 Consumer and Patient Centered Outcomes Research: CPH 758 is taught in the College of Public Health and focuses on conceptualizing, designing, and conducting consumer- and patient-centered studies at both the clinical and population levels. Specific methods covered in this course include measuring patient reported outcome measures and measures of patient experience. The cumulating project is a research proposal. For my purposes, that proposal will be an enhanced research plan for Aims 1 and 3 of this project based on the new skills I develop in this course.

Outside Trainings: Because of the limited course work available at UK in PCOR methods, I will also seek outside trainings. These will include webinars and seminars hosted by PCORI so that I can stay on top of their methodology standards as they are updated.

Practical Experience: Experiential training in PCOR will first be developed through exposure and participation in Dr. Kitzman's projects and methodology that are used by the Kentucky Appalachian Rural Rehabilitation Network (KARRN) to engage with patients and community stakeholders. That exposure coupled with the skills developed in CPH 758 and the planned outside trainings will then be applied in Aim 3 of this project where I will gain hands-on experience by carrying out my own key informant interviews with patients, caregivers, and other community stakeholders to determine their perspectives on the usefulness and success of interventions targeting the health-related determinants and how those experiences with community organizations impact their health and quality of care.

Qualitative Research Methods Training: To round out my training in PCOR methods, I will also need to develop my general qualitative research skills so that I can most effectively analyze and apply the information I receive from patients and stakeholders. Evidence-based practice is a significant part of the "patient-centered" piece of PCOR.

This training goal will be supervised by my co-mentor, Dr. Danielle Varda. Dr. Varda is an Associate Professor at the School of Public Affairs, University of Colorado Denver with a secondary appointment in the Colorado School of Public Health, Department of Health Systems, Management, and Policy. She is Director of the Center on Network Science and leads the Network Leadership Training Academy held annually in Denver at the School of Public Affairs. Dr. Varda's research focuses on evaluating the network structure of interorganizational collaborations between the public, private, and nonprofit sectors and the subsequent network effects of these recorded interactions. Her research portfolio includes projects in the areas of maternal/child health, public health and health networks, nonprofit community networks, economic inclusion/wealth building, and systems evaluation. She is an experienced interviewer, facilitator, and has extensive experience developing and administering surveys. Dr. Varda has also been very engaged in recent efforts in Colorado to bring members of the health system together around the social determinants of health and will bring that expertise and experience to this proposed training plan and project. As the creator of the PARTNER Tool, Dr. Varda will also assist with data collection in Aim 2 in conjunction with her role as mentor in the implementation of Aim 3.

Although she is very committed to this project and her role as a co-mentor, Dr. Varda is located in Colorado. As such, we have also added Allison Scott Gordon as a collaborator on the project to strengthen the

qualitative team. Dr. Gordon is an Associate Professor in the Department of Communication at the University of Kentucky. Her research focuses on how the quality of people's interpersonal communication affects their health decisions. She is currently working with the Dr. Williams and the ACHIEVE team to qualitatively asses which long-term care transition outcomes matter most to patients and caregivers and will be natural fit for this project.

Coursework: UK has a strong history of community-based participatory research, particularly in the College of Communication and Information, providing me with opportunity to develop a strong qualitative foundation through didactic training.

CJT 664 Qualitative Methods in Communication Research: CJT 664 is taught in the College of Communication and focuses on the goals, epistemology, and methods of qualitative inquiry. The course covers the strengths and limitations of different qualitative methods and the contributions of qualitative research to theory and practice.

CLD 670 Community Engagement: CLD 670 is taught in the Community Leadership and Development Program in the College of Agriculture, Food and Environment at UK. This course is designed to be a service learning/community engagement experience with a field experience, making it a nice compliment to CJT 664 by giving me the opportunity to apply the methods of qualitative inquiry in a guided setting.

Practical Experience: Experiential training will first be developed through work Dr. Varda is currently doing to evaluate the capacity of nonprofits to handle hospital referrals around the social determinants of health and Dr. Gordon's work with ACHIEVE. I will be exposed to and engaged in appropriate methodology and theory application, interview guide development, subject recruitment, interview completion, and data analysis. There will also be direct feedback between my training in PCOR methods as a part of Aim 2, as these two goals are closely related. My training in qualitative methods during these experiences coupled with my didactic work will then be applied directly to the proposed research project in tandem with the PCOR components of Aim 3.

Mentorship Meetings: Throughout the duration of the K-Award, I will continue to have monthly mentorship team meetings with Drs. Mays, Kitzman, Williams, and Varda to discuss the current state of the project, plan for upcoming goals and objectives in the research strategy, and troubleshoot any issues that might arise. Dr. Varda will be included in these meetings either by phone or video conference. In addition to our monthly team meetings, I will have weekly meetings with Dr. Mays, bi-weekly meetings with Dr. Kitzman, bi-weekly video conferences with Dr. Varda, and monthly meetings with Dr. Williams. I will meet with Dr. Gordon as needed and have monthly meetings with Dr. Gordon and Varda. As I move into years 4 and 5 of the project, the goal is that I will begin achieving greater independence as a researcher. As such, we will likely reevaluate our meeting structure at this point and move toward maintaining our monthly team meetings, but meeting with primary and co-mentors on an as needed basis.

Conference Travel, Presentations, and Seminars: I plan on attending at least two conferences a year, including the AcademyHealth Annual Research Meeting and the PCORI Annual Research Meeting. AcademyHealth has a strong commitment to PCOR and CER research and regularly features sessions using these techniques at the Annual Meeting. The AcademyHealth meeting will provide me with the opportunity to learn from leading health services researchers using PCOR and CER methods and to vet my work as findings come available throughout the project. The PCORI meeting will help expand my knowledge and understanding of current PCOR projects taking place and allow me to take those ideas and methodology back to my project and apply them in the R01 model and application. As a part of my training, I will attend any grants or research workshops put on by the UK Office of the Vice President for research. I will also take part in the College of Health Sciences Grantsmanship presentations and will regularly attend the Works-in-Progress presentations put on by the Center of Health Services Research at UK. These sessions will provide me with the opportunity to learn from researchers at UK using PCOR and CER methods. In addition to attending the sessions, I plan on regularly presenting my work from this project. This will afford me the opportunity of having additional feedback from not only my mentorship team, but also the broader community of researchers at UK interested in health services research.

Specific Aims

Individuals with unmet social needs are more likely to be hospitalized and readmitted and almost half of all deaths in the United States and 86% of health care costs can be attributed to the upstream behavioral, social, and environmental circumstances of the individual.[9-12] These social and environmental factors are rarely addressed in clinical encounters.[9] In part, this is due to the imbalance in the US between a focus on acute medical care and community health.[9,11] In response to the health and financial burden of social and community factors, federal policies have been created to hold clinical providers more accountable for population health and to address the social determinants of health. These include the Affordable Care Act enhanced IRS requirements for nonprofit hospitals, the Centers for Medicare and Medicaid Services Accountable Health Communities (AHC) model, and value-based delivery models like Accountable Care Organizations.[9,13-15]

These mechanisms are designed to address the health-related social needs of patients collaboratively by integrating health care, public health, and social services systems. What is not known is whether efforts to create hospital-community collaboration as a mechanism to address the social determinants of health will be effective and what impact they will have on hospital admissions and readmissions. Most research to-date focuses on single organizations providing clinical care and not the cross-sector collaboration with other public and private organizations occurring in communities around the social determinants of health.[16]

The objective of this application is to determine whether interventions that seek to connect clinical and community organizations to address health-related social factors have a positive impact on health outcomes. My central hypothesis, formulated based on my previous research, is that a broader array of partnerships between the hospital and community organizations will be associated with lower admissions and readmissions. I also expect there to be significant heterogeneity in the effectiveness of these models and how their value is perceived by patients, caregivers, and stakeholders. My long-term goal is to establish a research program that examines the ways health care, public health, and social services agencies address the social determinants of health and a way to improve health outcomes and the quality of care delivery. In pursing the following specific aims, I will gather data to build a model of hospital-community collaboration that can be tested with R01 level funding.

Aim 1: Analyze ACHIEVE hospital data linked with claims and HCUP data to determine whether hospital admission and readmission rates are related to the constellation of community organizations with which hospitals partner for care transitions. To accomplish this aim, ACHIEVE data will be matched to Medicare claims and Healthcare Cost and Utilization Project (HCUP) data to measure trends in hospitalizations and readmissions based on variation in hospital, local public, and social service collaboration to address the health-related social determinants.

Aim 2 Collect and analyze the PARTNER data in the subset of 40 hospitals/communities to examine whether the structure of hospital relationships with public health and community organizations are related to admission and readmission rates. I will implement the Program to Analyze, Record, and Track Networks to Enhance Relationships (PARTNER) Tool to gather granular data on the type of collaboration that is occurring between hospitals, local public health agencies and other community organizations. I will then use comparative effectiveness research (CER) techniques to examine effect heterogeneity.

Aim 3: Interview patients, caregivers, providers, and community organization representatives to assess their perceptions of and experiences with the hospital-community relationships. Using patient-centered outcomes and qualitative research methods, I will determine the extent to which patient, caregiver, and provider experiences with health care are influenced by the surrounding delivery systems for public health and social services.

Research Strategy

Significance: Failing to address the health-related social determinants that impact an individual places a significant burden on patients and the health care system in the U.S.[9] Individuals with unmet social needs are more likely to be hospitalized and readmitted and almost half of all deaths in the United States and 86% of health care costs can be attributed to the upstream behavioral, social, and environmental circumstances of the individual.[9-12] The determinants include factors such as housing, transportation, access to health food, and exposure to environmental hazards and typically are not addressed by clinical providers.[17] Clinical encounters focus on acute events and time is rarely spent collecting information on socioeconomic and environmental factors that may pinpoint social determinants that adversely impact the patient's health and well-being.[9,18] While it is becoming increasingly important for clinicians to identify the health-related social determinants that may play a role in their patient's hospitalization or readmission, those organizations that are best equipped to address social and environmental needs typically fall outside of the health care sector.[18-21] As a result, national efforts that call for the integration of health care, public health, and social services systems have emerged.[9,13-16]

Most research to-date focuses on single organizations providing clinical care and not the cross-sector collaboration with other public and private organizations, in particular social services and local public health agencies, which might be occurring in communities around the social determinants of health.[16] Those studies that have examined determinants tend to focus on broad socioeconomic factors like income and education and how they impact health outcomes, but still do not address the ways organizations work together to connect patients with the most appropriate services.[18] The failure to factor in community models that target the social determinants may account for the recent controversies surrounding socioeconomic determinants of hospital readmission rates.[22] In fact, it might be the strength of the local public health and social services systems and how those systems interface with the hospital that prevents hospitalizations and readmissions. Additionally, very few studies take advantage of patient and stakeholder engagement and comparative effectiveness research techniques as a strategy to both understand how patients perceive efforts made to address the determinants of health and how the effects of models that utilize local public health and social services agencies may differ from community to community.

The proposed research will contribute to the knowledge base by examining the impact local public health and social services engagement with hospitals in addressing the social determinants of health has on hospitalizations and readmissions. This contribution will be significant because understanding the way these sectors work together and the impact of that collaboration will help delivery systems creates models of integration with the potential to improve quality of care and health outcomes of population groups disproportionately impacted by the social determinants of health. Additionally, examining the approaches public health, social services, and hospitals use to address the social determinants and how that varies across communities and population subgroups will help determine heterogeneity in the effectiveness of models and identify what system and population characteristics are most related to hospitalizations and readmissions.

Innovation: The evidence-base that examines how local public health and social services agencies are engaged in addressing the health-related socials determinants with clinical care providers like hospitals to improve health care quality and the patient experience is very limited. This proposed research study is unique in that it will not only examine models being used to integrate hospitals, public health, and social services systems around the determinants of health, but it will also use longitudinal comparative effectiveness research (CER) and patient-centered outcomes research (PCOR) techniques to examine impact collaboration has on hospitalizations and readmissions and how those outcomes vary across communities and subgroups of the population. To do this, The proposed study will develop an approach modeled after the literature on ambulatory sensitive hospital admissions to identify whether certain types of hospital admissions, readmissions, and emergency department visits are sensitive to the surrounding delivery systems for public health and social services.[15] The project will also engage patients, caregivers, and community stakeholders to determine the extent to which patient, caregiver, and provider experiences with health care are influenced by the surrounding delivery systems for public health and social services. The unique examination and evaluation of these models will cumulate in a template model that will then be proposed for pilot testing as part of a R01 application.

Approach

Research Design and Methods

Overview of the Research Design

The study builds from an ongoing PCORI-funded national study to evaluate the comparative effectiveness of hospital-to-community care transition programs led by mentors Williams and Mays (TC-1403-14049). This study collects survey data from a national cohort of 500 hospitals regarding their care transition strategies and the range of clinical and community organizations they work with to manage post-discharge care and outcomes.[23] Survey data are linked with 5 years of Medicare claims data for all fee-for-service Medicare patients discharged from these 500 hospitals. The study also collects detailed survey data from patients, family caregivers, and health care providers in a subset of 40 communities regarding their experiences with care.

This proposed study will build on the PCORI study by using a mixed methods approach to examine in greater detail the models being used across the US to integrate public health and social services with clinical care provided in hospitals as a mechanism to target the social, behavioral, and environmental factors that contribute to hospitalizations and readmissions. Hospitals, local public health, and social services agencies will be targeted for primary data collection using the ACHIEVE data on collaboration around complex health issues to identify locations where partnerships are happening between the three sectors so that we can achieve more in-depth understanding of the interventions.

Preliminary Studies

This study builds on preliminary work examining the collaborative arrangements between hospitals and local public health agencies and how those partnerships influence the availability of population health services.[24] Additionally, it builds on more recent work that examines the broader array of organizations that comprise that health system and determined what resources these organizations bring to their networks and how the varying sectors value and trust each other.[1] Given that this proposed study builds from the ACHIEVE project, we are analyzing a lot of data that already exists. As such, the sample sizes are known and large. The preliminary data available is just one source, and what this project will provide is rich and granular data on the models being used to integrate public health and social services with clinical care provided in hospitals.

Aim 1: Analyze the ACHIEVE hospital data linked with claims and HCUP data to determine whether hospital admission and readmission rates are related to the constellation of community organizations with which hospitals partner for care transitions.

Analytical Strategy

Using multivariate regression for cross-section data, ACHIEVE data will be matched to Medicare claims and Healthcare Cost and Utilization Project (HCUP) data to measure trends in hospitalizations and readmissions based on variation in hospital, local public, and social service collaboration to address the health-related social determinants. Because the HCUP data is not available in every state, I will also access Medicare claims data through ACHIEVE for the communities that are not covered by HCUP. The Medicare data is already in hand and will not be a problem to obtain. In addition to the HCUP and claims data, data from the Area Health Resources Files (AHRF) will be merged in to capture community measures of health care availability and any population and environmental data that will need to be included in the models. A number of econometric specification tests will be performed to ensure that the model includes the appropriate covariates and has the best functional form.

H1: Broader array of partnerships between the hospital and community organizations will be associated with lower admissions and readmissions.

Data and Measures

Dependent Variables: The primary dependent variables will include hospital admission and 30-day readmissions rates. The measures will be pulled from the **Healthcare Cost and Utilization Project (HCUP)** and 5 years of **Medicare claims data** for all fee-for-service Medicare patients. HCUP is a set of databases that contain encounter-level, clinical and nonclinical information, discharge status, patient demographics, and charges for all patients regardless of payer. For this study, I will be using the State Inpatient Databases (SID). The SID contains the universe of inpatient discharge abstracts and is unique in its ability to allow researchers to conduct market area and small area analyses. SID data on admission and readmissions will be used as the primary dependent variables in Aim 2. Data on patient demographic characteristics will also be used as

predictor variables in determining what individual-level factors influence the success of hospital, public health, and social service efforts to address health and social service needs. SID data for purchase will be identified based on the states represented in the ACHIEVE sample.

Primary Independent Variables: The primary independent variables will include an indicator of hospitals that report working with local public health, an indicator of hospitals that report other community agencies, and an indicator of hospitals that report working with both in their care transitions. Those hospitals working with both agencies will be categorized as high interaction compared to low if a hospital is working with public health or community agencies alone. These data have been generated from the **ACHIEVE** survey that asked hospitals about their long-term care transition strategies and the range of clinical and community organizations they work with to manage post-discharge care and outcomes. The data has already been collected and preliminary analysis indicates a viable sample with 20% of the ACHIEVE respondents reporting local public health as partners and 39% reporting partnerships with community-based organizations. The data is just a yes/no report of collaboration, making Aim 1 an important first step before Aim 2, when much more granular information on the collaborative arrangements will be collected.

Other Control Variables: A variety of other measures will be constructed using the **Area Health Resources Files (AHRF)** for use in the analysis as control variables. These measures include race/ethnicity, education, income, employment status, gender, rural/urban continuum, population size, type of insurance coverage, and availably of health care facilities and providers. AHRF is a collection of more than 50 data sources including the American Medical Association Physician Masterfile, the American Hospital Association Annual Hospital Survey, and U.S. Census Bureau.

Aim 2: Collect and analyze the PARTNER data in the subset of 40 hospitals/communities to examine whether the structure of hospital relationships with public health and community organizations are related to admission and readmission rates.

Analytical Strategy

Using the sample of 40 hospitals the ACHIEVE team has identified for their key informant interviews, I will implement a modified version of the **Program to Analyze, Record, and Track Networks to Enhance Relationships (PARTNER) Tool**, a social network analysis tool, to gather more granular data on the type of collaboration that is occurring between hospitals, local public health agencies and other community organizations to determine if there are network structure signatures associated with admission and readmission rates.[2] I will also use the PARTNER survey to begin collecting data that examines whether collaboration is focused on addressing the social, behavioral, and environmental factors that impact health and well-being as a way to increase the quality of care. The factors will include determinants such as housing, transportation, and nutrition.

Using the data from the PARTNER survey as measures of the delivery systems for public health and social services, I will identify my candidate measures of community-sensitive admissions and readmissions to be examined. Specifically, using multivariate regression to determine what partnership structures are associated with lower hospital admissions and readmissions in specific subgroups of the population. Moving from the initial regression results, comparative effectiveness methods will then be applied. While the development of the analysis plan for this aim will be influenced by the didactic and experiential training, the main comparative effectiveness methods used in this aim will be the approaches that examine treatment effect heterogeneity. I hypothesize that different network structures and relationships will have varied effects across communities and subgroups within communities. Our goal is to understand what drives networks and clinical to community collaborative models to have different effects so that network interventions can be tailored based on community characteristics. Given this goal, I anticipate two methods that will be critical in this aim: higher order interactions and Person-Centered Treatment (PeT) effects.

First, higher order interactions will be used to examine the complex interactions between network characteristics and community and demographic characteristics. The PARTNER data will provide multiple network structural signatures that may interact with each other to impact the system. Additionally, certain community and demographic characteristics are also likely to interact with both network characteristics and each other. Machine learning algorithms will be used to test network variables with each other and between the following community characteristics: geographic location (rural or urban), gender, ethnicity, race, age, and socioeconomic status. In particular, we are interested in examining interactions that occur between network characteristics and rurality and socioeconomic status. Constraints on the network likely exist in communities

that are faced with greater social and health inequities. As a result, the network structure and mechanisms used to create collaborative arrangements may look different than those that work well in other places. One measure for socioeconomic status we are interested in interacting with our network variables is the Area Deprivation Index (ADI), a measure that captures patient-level social risk factors. After consulting with the mentorship team, I have decided this will be the best approach given that this topic has not been previously explored and it is likely 100s of interactions will need to be tested. Using machine learning algorithms will allow me to efficiently tease out the relationships that might exist.

Second, I anticipate using Anirban Basu's methods for estimating Person-Centered Treatment (PeT) effects using instrumental variables (IV).[25] This methodology makes strong sense for the hypotheses to be explored in this aim. First, I would like to tease of the varied effect network structures may have across communities and population subgroups and the application of Local Instrumental Variable (LIV) techniques will allow us to measure effect heterogeneity. Second, networks are endogenous and it is likely unmeasured moderators will impact how networks effect hospital admissions and readmissions. Basu's PeT uses an IV based approach to control for endogeneity and explore treatment effect heterogeneity. Dr. Mays has been using this method with Project ACHEIEVE data and I anticipate building the necessary skills to carry out this analysis both with my didactic and experiential training.[23] Additionally, our team has had previous contact with Dr. Basu and I plan on vetting this application of his methodology by him as well to ensure that it is being carried out appropriately. I am aware that the most difficult part of any IV analysis can be the identification of viable instruments. We will evaluate several possible instruments for this model that Dr. Mays has previously had success using in population health system analyses. Specifically, measures of state and local governance work particularly well and we already have this data in hand. I also anticipate identification of instruments to test during my didactic and experiential training and in consultation with the mentorship team.

Given that this is not a randomized control trial, and we are using observational data, close attention will be paid to model functional form and the covariates that are included to ensure results are robust to bias and measurement error. A number of econometric specification tests will be run and results will be vetted with the mentorship team and community stakeholders to ensure they have been done with rigor and are logical.

Although the PARTNER data collection will be prospective, we anticipate no problems in combining this with the HCUP data, as we intend to be very clear about the time period we are asking participants for information on and have budgeted for data appropriately. In fact, the addition of PARTNER data will add rich and granular information on the collaborative structures being formed between hospitals and community organizations to address the social determinants of health.

Additionally, the team does not anticipate any challenges with the collection of PARTNER data. The Dillman survey method will be used with the goal of reaching a 70% response rate, although previous network research suggests a 50% response rate provides enough information to produce accurate and meaningful network data.[26,27] Dr. Danielle Varda, creator of PARTNER, will be participating as a co-mentor on the project and will help with implementation and analysis of the PARTNER Tool. She has had success with response rates and this is partially driven by the valuable information given back to the network organizations. These network reports will be provided to all participants and used in the recruitment strategy.

H2.1: More intense collaboration between the hospital and community organizations will be associated with lower admissions and readmissions.

H2.2: Significant effect heterogeneity will exist based on community and population subgroup characteristics.

Data and Measures

Dependent Variables: The primary dependent variables will again include hospital admission and 30-day readmissions rates from HCUP.

Key Independent Variables: The primary independent variables will examine the quality and quantity of relationships occurring the clinical-community networks examined. They will include network density, centrality, and intensity of partnership. I also anticipate including interactions identified as key independent variables. Specifically, those between network variables and community characteristics. These measures will be derived from the PARTNER social network survey results and the higher order interactions identified. PARTNER is an online survey and analysis tool consisting of a 19-question survey that can be customized, with additional multiple choice and open-ended questions. Data collection is centrally managed by a third party. The data collected in the survey are linked to an analysis tool that uses network mapping to visualize the data and social

network analysis to analyze the data. This information provided through PARTNER will permit us to make nuanced observations about relationships among organizations in clinical-community networks, which tell us more about the quality of the exchange relationships within a network than simply understanding how the network is organized or how frequently members meet. While this information is important, other dimensions highlighted, such as the quality of the interactions between members and the meaning the members attribute to those exchanges, offer more insights into how well the group is working together.

Other Control Variables: AHRF measures will again be used as control variables. In this portion of the analysis, they will also be effect modifiers, and subgroup variables. These measures include race/ethnicity, education, income, employment status, gender, rural/urban continuum, population size, type of insurance coverage, and availably of health care facilities and providers. AHRF is a collection of more than 50 data sources including the American Medical Association Physician Masterfile, the American Hospital Association Annual Hospital Survey, and U.S. Census Bureau.

Aim 3: Interview patients, caregivers, providers, and community organization representatives to assess their perceptions of and experiences with the hospital-community relationships.

Five communities that show particularly robust networks will be identified from the PARTNER data sample in Aim 2. In each community. Patients and their caregivers, providers, and community organization representatives will be identified using purposive sampling based on the initial PARTNER Tool contacts identified in Aim 2. I will identify 2-3 key informants from each community, one each from the hospital/public health/social sector to interview at the start of this task. I will ask each key informant to weigh in on the recommended interviewees to sample to achieve a representative perspective from the three sectors and the patients in their community on the questions outlined below. I anticipate that I will interview up to 20 people in each community.

The goal in this aim is to gain an understanding of clinical-community collaborations occurring in the US from the perspective of multiple stakeholders. It is important that we include representatives from all subgroups in the population. As such, communities will be identified based on geographic location (rural or urban) and population demographics including: gender, ethnicity, race, age, and socioeconomic status. Stakeholders will then be identified using our PARTNER contacts. Drs. Varda and Gordon will help guide recruitment in this aim. In particular, Dr. Varda has had success returning to the organizations surveyed in PARTNER for qualitative interviews and recommendations for patients and other stakeholders to interview.

The interview protocol will be designed in conjunction with the project mentors and will integrate training I will receive in patient-reported measures as a part of my career development plan. In addition, the interview protocol will be based on extant literature as well as preliminary findings from Aim 2. In particular, questions will gather information on:

- The usefulness and success of interventions that seek to connect patients with the community agencies best equipped to address their social, behavioral, and/or environmental needs
- Patient and community priority health-related social needs
- Whether the needs perceived to be critical are actually being addressed
- Whether the hospital-community partnership influenced health status

A semi-structured interview format will be used to generate detailed information and allow for probing follow-up questions to the responses given. In particular, participants will be asked to share specific examples from their experience with hospital-community relations. Recruits will be will be sent a short introductory letter and asked to participate in an interview. If more detailed information is requested, a phone call will be setup with the PI. Consent will be obtained, and participant interviews will be recorded and then transcribed verbatim for analysis. Saturation will be achieved when the interviews are no longer providing new information. Based on similar previous work, we anticipate that saturation will be reached within 30 interviews.

H3: Patient care experiences will be better when they have received care in more intense networks where hospitals are working with local public health and other community agencies.
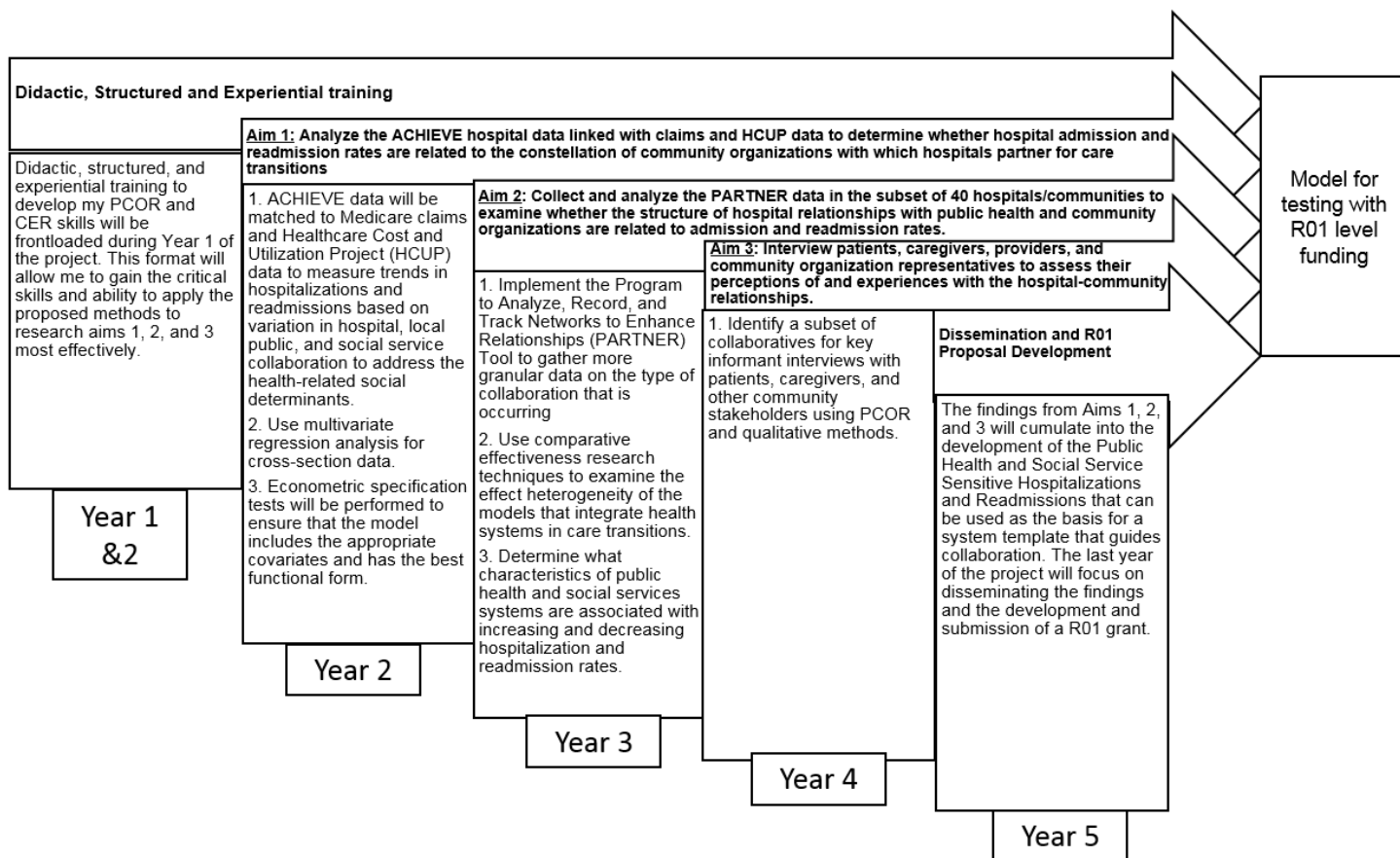
<u>Analytical Strategy</u>

Inductive thematic coding will be used to analyze the data. Specifically, we will use qualitative descriptive analysis, an inductive, low-inference method designed to gain an accurate accounting of a phenomenon in the everyday terms of the stakeholders who experience the phenomenon.[28] I will identify pre-set themes in

conjunction with the mentorship team, Dr. Gordon, and as suggested by relevant literature and experience working with the ACHIEVE project and Drs. Kitzman and Varda's work. As mentioned above, we will identify the distinct stakeholders, but also consider where cross-over between groups occurs. The data will be coded for initial themes and these will then be vetted with the research team to determine if codes need to be changed or broken down in more granular detail. These data will be used in conjunction with the quantitative findings in Aims 1 and 2 to generate a robust and unique picture of the hospital-community collaborations occurring in the US to address the social determinants of health. The goal will be to identify major themes across the interviews, as well as unique experiences and factors. A data analysis program such as NVIVO will be used to store and organize the coding work.

Timeline, Dissemination, and Future Directions

Below is a table that summarizes the research strategy with a timeline.

Didactic, Structured and Experiential training

Didactic, structured, and experiential training to develop my PCOR and CER skills will be frontloaded during Year 1 of the project. This format will allow me to gain the critical skills and ability to apply the proposed methods to research aims 1, 2, and 3 most effectively.

Year 1 &2

Aim 1: Analyze the ACHIEVE hospital data linked with claims and HCUP data to determine whether hospital admission and readmission rates are related to the constellation of community organizations with which hospitals partner for care transitions

1. ACHIEVE data will be matched to Medicare claims and Healthcare Cost and Utilization Project (HCUP) data to measure trends in hospitalizations and readmissions based on variation in hospital, local public, and social service collaboration to address the health-related social determinants.

2. Use multivariate regression analysis for cross-section data.

3. Econometric specification tests will be performed to ensure that the model includes the appropriate covariates and has the best functional form.

Year 2

Aim 2: Collect and analyze the PARTNER data in the subset of 40 hospitals/communities to examine whether the structure of hospital relationships with public health and community organizations are related to admission and readmission rates.

1. Implement the Program to Analyze, Record, and Track Networks to Enhance Relationships (PARTNER) Tool to gather more granular data on the type of collaboration that is occurring

2. Use comparative effectiveness research techniques to examine the effect heterogeneity of the models that integrate health systems in care transitions.

3. Determine what characteristics of public health and social services systems are associated with increasing and decreasing hospitalization and readmission rates.

Year 3

Aim 3: Interview patients, caregivers, providers, and community organization representatives to assess their perceptions of and experiences with the hospital-community relationships.

1. Identify a subset of collaboratives for key informant interviews with patients, caregivers, and other community stakeholders using PCOR and qualitative methods.

Year 4

Dissemination and R01 Proposal Development

The findings from Aims 1, 2, and 3 will cumulate into the development of the Public Health and Social Service Sensitive Hospitalizations and Readmissions that can be used as the basis for a system template that guides collaboration. The last year of the project will focus on disseminating the findings and the development and submission of a R01 grant.

Year 5

Model for testing with R01 level funding

My didactic, structured, and experiential training will be frontloaded in Years 1 and 2 so that I can develop the PCOR and CER skills needed to carry out the proposed research project and develop my independence as a researcher. Hands-on application of the CER and PCOR techniques gained during my career development and training activities will take place starting in Year 2 where I will focus on research Aim 1. Years 3 and 4 will continue skill application with the completion of research Aims 2 and 3, with Year 5 being devoted to dissemination and the development of a R01 submission based on the model that will developed as the final cumulating product of the research findings from each Aim. The model will be vetted with the patients and stakeholders engaged in Aim 3, along with health services researchers who have related expertise. The model will likely become a modifiable template so that hospitals, public health, and other community organizations targeted for testing in the R01 can adapt their model based on their community and patient characteristics and needs. In addition to dissemination of findings through the vetting of the model template with previously engaged patients and stakeholders, I will also present findings at each stage throughout the project through conference presentations, works-in-progress seminars in the College of Health Sciences at UK and the Center for Health Services Research, and webinars with the Systems for Actions Program Office. Findings will also be written up for journal articles and more rapid policy briefs when identified as appropriate.