Oregon Health & Science University
School of Medicine

Scholarly Projects Final Report

Title *(Must match poster title; include key words in the title to improve electronic search capabilities.)*

Health Outcomes of the SUMMIT Ambulatory-ICU Primary Care Model in an Urban Federally Qualified Health Center

Student Investigator's Name

RUI HENG CHEN

Date of Submission *(mm/dd/yyyy)*

03/04/2022

Graduation Year

2022

Project Course *(Indicate whether the project was conducted in the Scholarly Projects Curriculum; Physician Scientist Experience; Combined Degree Program [MD/MPH, MD/PhD]; or other course.)*

Scholarly project

Co-Investigators *(Names, departments; institution if not OHSU)*

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Mentor's Name

Brian Chan, MD, MPH

Mentor's Department

Division of General Internal Medicine and Geriatrics, School of Medicine

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Concentration Lead's Name

Mark Baskerville

Project/Research Question

Does intensive primary care team (SUMMIT) improve clinical quality measures (HTN, lipidemia, A1c) compared to regular primary care for medically and socially complex patients?

Type of Project *(Best description of your project; e.g., research study, quality improvement project, engineering project, etc.)*

Research Study; Nested randomized controlled trial

Key words *(4-10 words describing key aspects of your project)*

Primary care innovation, Complex care, Health Outcome, Socially Complexed, High-need high-cost

Meeting Presentations
If your project was presented at a meeting besides the OHSU Capstone, please provide the meeting(s) name, location, date, and presentation format below (poster vs. podium presentation or other).

OHSU Research Week 2021, Lighting Talk

Publications *(Abstract, article, other)*
If your project was published, please provide reference(s) below in JAMA style.

Abstract

Submission to Archive
Final reports will be archived in a central library to benefit other students and colleagues. Describe any restrictions below (e.g., hold until publication of article on a specific date).

None

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Next Steps
What are possible next steps that would build upon the results of this project? Could any data or tools resulting from the project have the potential to be used to answer new research questions by future medical students?

> Data useful for designing a stronger study, specifically addressing the low power and inconsistent follow up in this study.

Please follow the link below and complete the archival process for your Project in addition to submitting your final report.

https://ohsu.ca1.qualtrics.com/jfe/form/SV_3ls2z8V0goKiHZP

Student's Signature/Date *(Electronic signatures on this form are acceptable.)*
This report describes work that I conducted in the Scholarly Projects Curriculum or alternative academic program at the OHSU School of Medicine. By typing my signature below, I attest to its authenticity and originality and agree to submit it to the Archive.

X ☐

Student's full name

Mentor's Approval *(Signature/date)*

X

Ment   Brian Chan, March 15, 2022

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Report*: Information in the report should be consistent with the poster, but could include additional material. Insert text in the following sections targeting 1500-3000 words overall; include key figures and tables. Use Calibri 11-point font, single spaced and 1-inch margin; follow JAMA style conventions as detailed in the full instructions.*

Introduction *(≥250 words)*

A large percentage of the total health care expenditure lies in a small percentage of the total population.[1] Among the large-expenditure groups are the "High-cost, high-need" patients, defined as those with multiple or complex medical conditions often combined with socioeconomic and/or behavioral health problems. Many care management programs have been developed to reduce cost while improving health outcomes.[2] Effective programs share the common characteristics of customized management approaches to their patient population, enhanced care coordination and rapport-building as key focuses, and creating care teams specific to the patients' needs.[2] Similarly, the streamlined unified meaningfully managed interdisciplinary team (SUMMIT) intervention at a Federally Qualified Health Center (FQHC) in Portland Oregon was created to balance the health care cost and health outcome for patients impacted by homelessness (figure 1).[3] Many of these care management programs focused on reducing costs and hospitalization rate for patients, however, we believe that it is equally important for these programs to improve patient outcome such as blood pressure control. Therefore, the primary goal of this study is to identify improvements in cardiovascular health markers in patients in the SUMMIT compared to traditional care.
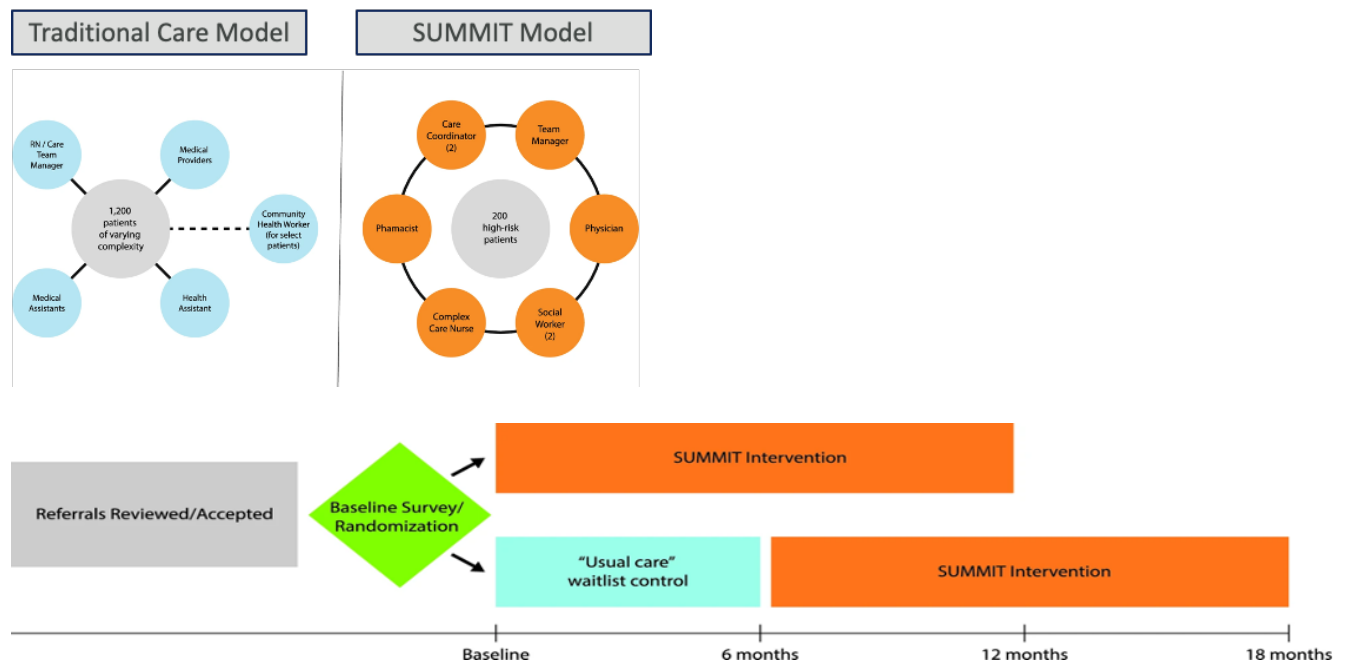

Figure 1. SUMMIT model and study group design

Methods *(≥250 words)*

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This is a nested randomized controlled trial of primary data from the SUMMIT study. The intervention involved having a team of one full time physician with board certification in addiction medicine, one complex care nurse, two care coordinators, two licensed clinical social workers, pharmacist, team manager, and quality analyst. The main activities consisted of weekly panel review, case management of social issues, medication management, comprehensive patient intake with medical and behavioral teams. Participants were included if they had one or more of the following diagnoses according to ICD-10 codes: Hypertension (I10, I11.9, I11.0), Heart conditions (I50.X), Hyperlipidemia (E78.X), and Diabetes (E11.X). Exclusion criteria: incomplete data at either date of enrollment or at 6-months follow up. We abstracted the participants' blood pressure at time of enrollment and at 6 months using chart review of the electronic health record (EHR) system. Recorded blood pressures that were closest to the 6 months date were used for patients with no recorded blood pressures at 6 months. Outcome measures include recorded blood pressure at time of enrollment and at 6 months and change in percentage of patients with blood pressure at goal per National Committee for Quality Assurance (NCQA) guidelines.

Statistical Methods

Power calculation – This study would require a sample size of 160, with 80 participants in each group, in order to reach significant statistical power.

Chi-Square, Paired T-tests, ANOVA, and Regression analysis were performed on SPSS software to assess the difference in percentage of patients meeting goal blood pressure at 6 months between the two groups. Sensitivity analysis was performed via linear mixed models with repeated measures to account for missing data.

Results *(≥500 words)*

Of the 160 enrolled in the SUMMIT trial, 128 patients met inclusion criteria. Eighteen participants were excluded due to missing or incomplete blood pressure data, making a total of 110 participants (figure 2). There were 56 patients in the control group and 54 patients in the treatment group.

Figure 2. Flow Diagram of Study Participants

In the SUMMIT cohort, 76.0% of patients meet goal blood pressures during initial enrollment and 76% meet goal blood pressure at 6 months. In comparison, the control group had 88.0% and 76% patients meeting goal blood pressure at initial enrollment and at 6 months, respectively (p=0.74).

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Table 1. Baseline Cohort Characteristics

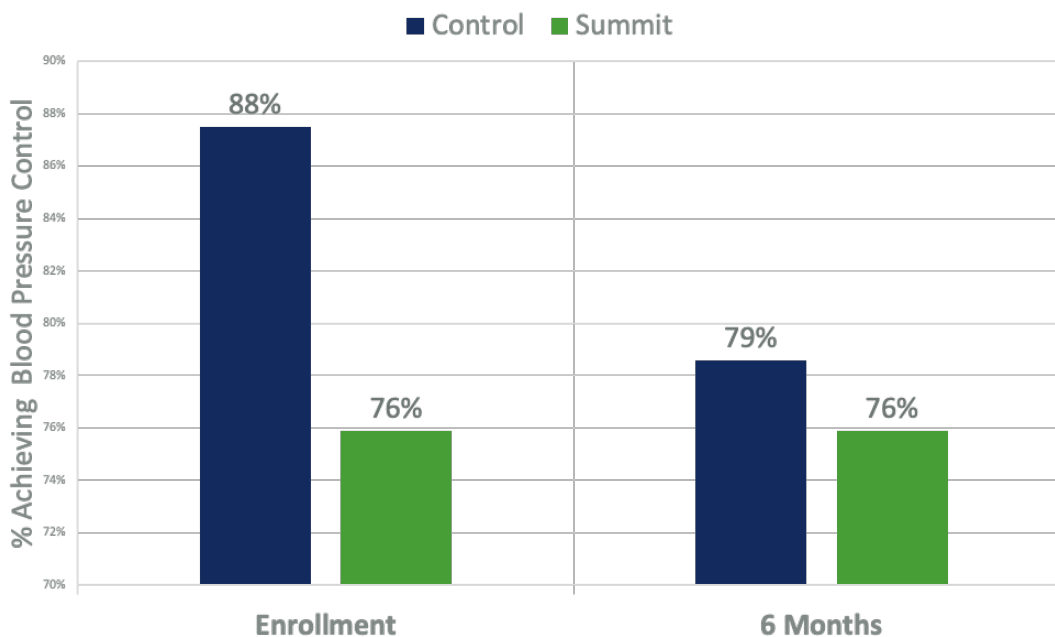|		Control (n=56)	SUMMIT (n=54)
Gender, %			
	Male	64.6%	68.3%
	Female	35.4%	31.7%
Age, mean		56	55
Race/Ethnicity, %			
	Caucasian	73.8%	77.8%
	Black	10.8%	11.1%
	Other	15.4%	11.1%
Number of diagnoses at baseline, mean		18	18
With heart condition or hyperlipidemia, %		92.3%	84.1%
With diabetes, %		43.1%	50.8%
Number of office visit since enrollment, mean		6.43	18.15
Blood pressure at goal, %		88.0%	76.0%

Figure 3. Blood Pressure outcome at enrollment and 6-months follow up

Discussion *(≥500 words)*

This nested randomized controlled study explored the potential improvement of health markers, such as blood pressure, in a socially complex, high-cost, and high-need population. Interestingly, both study groups had a high percentage of patient meeting goal blood pressure at baseline, which made it difficult

to analyze the true effect the SUMMIT intervention (table 1 & figure 3). Despite the lack of improvement in blood pressure control at 6 months in the treatment group, it is worth noting that there was no worsening of blood pressure control in this group either; whereas there's an 8.9% decrease in blood pressure control in the control cohort. This observation suggests a positive relation between the SUMMIT model and blood pressure control, although it is not statistically significant.

It is worth discussing the observation that the SUMMIT cohort had a greater number of office visits after enrollment compared to the controlled cohort. This may be related to the design of the SUMMIT team being more patient-friendly and had a more flexible schedule system that allows for more consistent follow up.

The limitations of this study were small sample size, missing data, and inconsistent record of blood pressure on the health record system, all of which limits the statistical power and reduces the accuracy of the results. This study was not able to achieve significant statical power because the data was abstracted from the original SUMMIT study, which had only 160 participants to begin with, leading to a small sample size. Many participants also had missing or incomplete blood pressure data on the electronic health record system, which further reduced the sample size. The intervals in which the participants blood pressure was recorded varied greatly; it ranged from 1-2 weeks around the initial enrollment date or the 6-months mark to 3-6 months. This greatly reflects the difficulty of managing the high-cost, high-need patients at this FQHC due to inconsistent follow up intervals.

Going forward, an adequate sample size, achieved through sample size calculation and subsequent recruitment, would increases the chance of statically significant findings. Consistent recording of patient health markers, such as blood pressure, would allow for more accurate results and thus demonstrate the true effect of the intervention. Other health markers such as hemoglobin A1c for diabetes outcome may be more feasible as patients with that chronic condition tend to have more consistent follow up and lab result recording.

Conclusions *(2-3 summary sentences)*

An intensive primary care intervention for HNHC patients demonstrated clinically significant, but not statistically significant, improvements in blood pressure control in the high-cost & high-need houseless population. The results may reflect the challenges of improving such quality measures in a socially complex and high-poverty context. A large-sample study with close follow up may demonstrate a more obvious relationship between the ambulatory ICU primary intervention and clinical outcome.

References *(JAMA style format)*

1. Chan, B., Edwards, S.T., Devoe, M. et al. The SUMMIT ambulatory-ICU primary care model for medically and socially complex patients in an urban federally qualified health center: study design and rationale. Addict Sci Clin Pract 13, 27 (2018). https://doi.org/10.1186/s13722-018-0128-y
2. "Controlling High Blood Pressure." NCQA, 22 Dec. 2020, www.ncqa.org/hedis/measures/controlling-high-blood-pressure/.
3. "Comprehensive Diabetes Care." NCQA, 22 Dec. 2020, www.ncqa.org/hedis/measures/comprehensive-diabetes-care/.
4. Cohen S, Yu W. The concentration and persistence in the level of health expenditures over time: estimates for the U.S. Population, 2008–2009. Statistical Brief #354 Agency for Healthcare Research and Quality, Rockville, MD 2012.

5. Hong CS, Siegel AL, Ferris TG. Caring for high-need, high-cost patients: what makes for a successful care management program? Issue Br. 2014;19:1–19

6. Chan B, Edwards ST, Devoe M, et al. The SUMMIT ambulatory-ICU primary care model for medically and socially complex patients in an urban federally qualified health center: study design and rationale. Addict Sci Clin Pract. 2018;13(1):27. Published 2018 Dec 14. doi:10.1186/s13722-018-0128-y

7. Hatch B, Marino M, Killerby M, et al. Medicaid's Impact on Chronic Disease Biomarkers: A Cohort Study of Community Health Center Patients. J Gen Intern Med. 2017;32(8):940-947. doi:10.1007/s11606-017-4051-9