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.)*

Age as an Effect Modifier of Patient Activation in Medically and Socially Complex Patients Enrolled in the SUMMIT Ambulatory ICU Intervention

Student Investigator's Name

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

3/18/2022

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 Projects Curriculum

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Project/Research Question

How does age effect patient engagement and activation in ambulatory-ICUs?

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

Research Study

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

Ambulatory ICU
Patient Activation

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).

Will be presented as an accepted poster at the Society for General Internal Medicine (SGIM) national meeting, April 8-11, 2022 Orlando, FLA.

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

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).

No Restrictions

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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?

Further research on how comorbidities impact patient activation in various models of care.

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 _____
Mentor Name

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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 disproportionate amount of health care expenditures is directed towards a small group of high cost-high needs patients throughout the country[1,2]. Individuals aged 45 and older represented a significantly disproportionate percentage of the top decile of healthcare expenditures[1,3], with the aged population maintaining the highest proportion of utilization. The complexity of healthcare issues among the aged population is likely to contribute to this disproportionate utilization. These complexities may include poor functional status, comorbidities such as asthma, bronchitis/COPD, severe heart disease, and diabetes[4]. Underutilization of primary care resources equipped to address these complexities is a key contributor in the high use of hospital services. Additionally, the presence of adverse social factors such as poverty, substance use disorders, and homelessness influence the preferential use of hospitals and emergency departments more than ambulatory care in this population[5].

The resulting increase in overutilization of hospital resources translates to a higher risk assumed by healthcare systems whose mission is to provide high quality of care for patients. To address this issue, innovative intensive primary care (IPC) programs implement multi-disciplinary teams aimed at improving coordination, continuity of care, and increased primary care access[6,7]. These programs utilize social resources to promote patient engagement and empowerment over their own health. Encouraging patient engagement, or "activation," has been shown to have a positive effect on health-related outcomes, as patients are better educated and empowered to take action on their healthcare[8-10]. Patient activation is also a tool to gauge compliance with healthcare plans in a number of populations including surgical and primary care patients.[11-14] Additionally, targeting health engagement in aging patients is crucial, as this subgroup of HCHN patients is especially vulnerable to low patient activation levels[15].

Current data supports patient activation as a means to promote positive outcomes in vulnerable populations, including high utilizing aged individuals, yet few studies have directly assessed how age effects patient activation within implemented IPC programs. Furthermore, this vulnerable population often has independent risk factors, such as substance use disorders and mental illness, for utilization of healthcare, especially in urban environments[16]. This study aims to address this by measuring changes in patient activation in patients enrolled in SUMMIT (Streamlined Unified Meaningfully Managed Interdisciplinary Team), an ambulatory-ICU program that utilizes a waitlist-controlled design to measure patient outcomes during program participation[16]. SUMMIT is made up of dedicated healthcare workers including a pharmacist, care coordinators, a team manager, a physician, social workers, and a complex care nurse, all focused on providing focused care to roughly 150 patients. The SUMMIT team works towards increasing self-efficacy and decreasing treatment burden, aims that closely align with Shippee and Montori's theory of cumulative complexity[16,17].

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Methods *(≥250 words)*

This is a secondary analysis of a recently completed trial of the SUMMIT A-ICU intervention, a randomized controlled study utilizing a wait-list control design described in prior practice-based research literature[18,19]. Participants (n=189) were patients at a Federally Qualified Health Center in Portland, Oregon serving over 5,000 low-income patients with high rates of homelessness and substance use disorders. In addition to primary care services, OTC provides co-located mental health services delivered by psychiatric nurse practitioners; SUD counseling services; chronic disease pharmacists and onsite pharmacy and laboratory services; wellness activities; and social work services and community health workers (CHWs). Participants met one of the following criteria: >1 hospitalization over the past 6 months; at least one medical co-morbidity including uncontrolled diabetes, heart failure, chronic obstructive pulmonary disease, liver disease, soft-tissue infection; and 1 mental health diagnosis or substance use disorders. Patients were randomized to either immediate start with the SUMMIT team or a 6-month wait-list, with a 1:1 allocation per computer-generated randomization schedule as per CONSORT statement recommendations for randomized clinical trials of non-pharmacological treatment[20]and grouped into tertiles by age (<53; 53-59; >60). The primary outcome was change in patient activation measured by Patient Activation Measurement using Patient Activation Measure (PAM-10)[21,22], a validated tool used widely in research to assist in personalizing care and evaluation assessment. PAM-10 is the successor of both PAM-13 and PAM-22, designed with fewer questions to reduce clinical and patient survey administration fatigue. Since its development, multiple investigations have validated PAM-10 in various patient populations.[23-26]. We calculated average PAM scores between age groups and compared differences between age groups using descriptive statistics. A Linear mixed effects model with a random effect for subject was used to determine whether SUMMIT's impact on PAM differed by age group.

Results *(≥500 words)*

There were 189 total patients in this sample, with an average age of 54.9. Roughly a third of patients were women (34.2%); average number of hospitalizations over six months at baseline were 2.7 and 2.8 for SUMMIT and usual care, respectively. There were 76.1% non-Hispanic whites, 12.6% Black/African American, and 3.1% Latino (Table 1). The difference in average change in PAM score over six months in SUMMIT vs usual care was +1.2 (95% C.I., -3.3, 5.7). The differences in PAM score changes between arms by age groups, as seen in Figure 1, were +.66 for the younger age group (-7.65, 8.97), +4.69 for those in the middle age group (-2.86, 12.25), and -1.85 for the older group (9.32, 5.63). Middle age group patients in SUMMIT arm showed the greatest average change in PAM score over six months of +7.09 ($p<.05$).

	Total	*Usual Care*	*SUMMIT*
	N=189	*N=79*	*N=110*
Gender			
Female	*67 (36.2%)*	*26 (34.2%)*	*41 (37.6%)*
Male	*118 (63.8%)*	*50 (65.8%)*	*68 (62.4%)*
Age (years)	*54.8 (9.5)*	*56.5 (9.0)*	*53.6 (9.7)*
Average PAM Score	*55.6 (11.8)*	*54.6 (11.3)*	*56.3 (12.2)*
Asian	*3 (1.6%)*	*1 (1.3%)*	*2 (1.8%)*
Black/African American	*24 (12.7%)*	*9 (11.4%)*	*15 (13.6%)*
Hispanic/Latino	*5 (2.6 %)*	*1 (1.3%)*	*4 (3.6%)*
White	*139 (73.5%)*	*59 (74.7%)*	*80 (72.7%)*

Table 1. Patient demographics

	Usual Care			Waitlist				
Age Group in Years	Baseline	6-month	Within-group change	Baseline	6-month	Within-group change	Difference (C.I.)	P
24-52 (n=65)	57.65 (2.0)	61.36 (2.47)	3.72 (2.66)	53.51 (2.58)	56.57 (3.02)	3.06 (3.30)	0.66 (-7.65, 8.97)	0.877
53-59 (n=65)	51.52 (2.4)	58.60 (2.56)	7.09 (2.84)	52.62 (2.18)	55.01 (2.33)	2.39 (2.61)	4.69 (-2.86, 12.25)	0.223
63-73 (n=61)	59.98 (2.36)	60.06 (2.55)	0.08 (2.82)	57.27 (2.1)	59.20 (2.32)	1.93 (2.56)	-1.85 (-9.32, 5.63)	0.63

Table 2. Difference in patient activation across age groups within and between arms

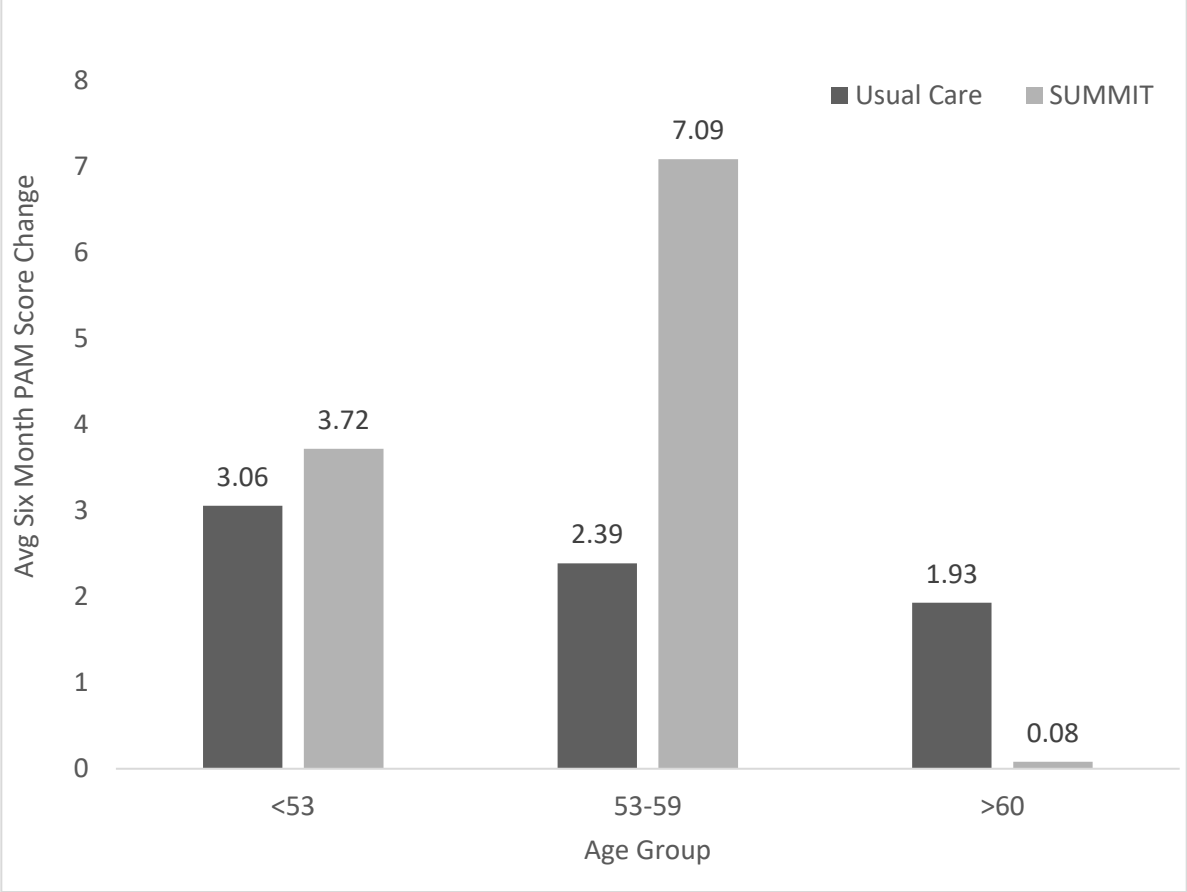

Figure 1. Average six month change in PAM score across age groups between arms

Discussion *(≥500 words)*

While not statistically significant, this secondary analysis of a randomized, waitlist-controlled trial identified a differential impact of SUMMIT on patient activation across different age groups. The greatest difference in PAM score change was observed in the middle age group, and SUMMIT patients within this group additionally experienced the greatest overall 6-month increase in PAM score. This difference was not as prominent in the first age group, and interestingly SUMMIT patients within the oldest age group experienced a lower average increase in PAM score compared to those in usual care. This data suggests patients aged 53-59 participating in ambulatory-ICU models of care are more likely to increase their level of activation over time compared to similarly aged counterparts receiving usual care.

The underlying force driving these differences in patient activation between age groups is likely multifactorial. As seen in Table 2, average baseline PAM score was lowest in patients within the second age group, consistent with prior research showing lower patient activation in older patients, particularly those who are frail and most vulnerable[15]. This lower level of baseline engagement in health may represent a greater opportunity to increase engagement, particularly in an ambulatory-ICU model of care where patients have an increased level of access to care that is both defragmented and designed to reduce utilization and increase activation. While this hypothesis does propose a likely explanation, baseline activation was higher in the oldest group of patients as seen in Table 2. Generally older patients, especially those with significant comorbidities similar to those in this patient population, utilize healthcare at increasing numbers due to increased disease burden. Because of this, patients may already have greater

levels of activation, though the degree to which their comorbidities influence healthcare utilization may overpower the level at which activation can better one's health. Further research is therefor needed to investigate both reasons behind why patient activation may vary between age groups, and whether certain comorbidities influence how patient activation can change over time across different healthcare models.

Interestingly, SUMMIT patients in the oldest age group experienced almost no difference in patient activation over six months, compared with a slight increase in those under usual care. As postulated previously, this may indicate these patients are already maximally engaged in their healthcare, however other factors may also be at play. Patients at this stage of life participating in an A-ICU model may have an increased level of access previously not experienced, highlighting areas of engagement that were both unknown and would take longer than six months to improve on. These areas of improvement may be more readily apparent and easier to improve on in younger patients who may also be more motivated to increase their activation. Further research would be needed to identify capacity to improve patient activation across age groups to further investigate the differences observed in this data.

Conclusions *(2-3 summary sentences)*

While not statistically significant, a differential impact of SUMMIT on patient activation by age was observed. SUMMIT patients in the 53-59 age range experienced the greatest increase in PAM score over 6-months. These results suggest there are differences in how SUMMIT affected patient activation, reflecting differences in medical and social conditions experienced during these life periods.

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