ENGAGING OPIOID OVERDOSE SURVIVORS: IMPACT OF PEER RECOVERY SPECIALISTS ON PATIENT UTILIZATION AND COST

by
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Abstract

Peer recovery specialists play a key role in addressing the current opioid crisis. The Opioid Survivor Outreach Program (OSOP) peer recovery specialist intervention was designed to support opioid overdose survivors. In this program, patients are connected with a peer recovery specialist and are provided connection to treatment, support services, and harm reduction tools. This study was a quasi-experimental, mixed-methods approach to evaluate the impact of OSOP on opioid-related and all-cause hospital visits and acute care cost avoidance. Chapter 1 focuses in on evaluating impact of OSOP on hospital visits while Chapter 2 evaluates the impact on cost avoidance through the assessment of hospital charges. The third chapter leverages in-depth interviews from OSOP peer recovery specialists, nurses, and physicians to allow for a more comprehensive understanding of the program's efficacy. Narrative content analysis was used to analyze the interview data from 11 participants.

A historical control group was selected through propensity score matching to compare hospital visit and charges data with a study population at four study setting hospitals. A negative binomial regression was used to assess the differences in hospital visits among the groups while two sample t-test was used to analyze differences in hospital charges. OSOP was found to reduce expected opioid-related visits by 32.5% in the pre and post-enrollment OSOP study group, as well as all-cause hospital visits. Opioid-related hospital visits result in $703 more in charges when compared to non-opioid related visits. When analyzing gross charges and programmatic costs, the OSOP program allows the healthcare system to avoid $1.1M in opioid-related hospital charges over one year and $770K in all-cause hospital charges. The findings suggest that the

OSOP program is an intervention that assists patients in seeking substance use and supportive services while reducing acute hospital utilization and cost. Interviews from participants confirmed that a peer recovery specialist lived experiences encourage patients to enroll in OSOP. Peers have a command of the treatment ecosystem to effectively advocate and link patients to care. Further, insights from providers give other health institutions considerations on how to build a successful OSOP program in the emergency department environment.

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Preface

Bruce Moran, my grandfather, was a coal miner in West Virginia. He was one of the leading organizers to fight management for a fair wage and safe working conditions. He avowed that none of his children or grandchildren would have a career in the dark underground. Possessing only a grade school education, he believed that going to college was the most plausible way for such a dream to become reality. The lack of the application of environmental and public health protections took my grandfather's life. He died from black lung disease. I wish he was here to witness his grandson receive a doctorate from the best public health institution in the world.

I am forever grateful for his dreams consecrated in the darkest of places.

I am indebted to his wife, my grandmother, Colleen Mae Riggleman Moran, for her unwavering love, support, and demands to "make an A." At 94, she is my rock. She's here to witness this milestone.

I dedicate this personal journey of receiving my doctoral degree to them.

I also want to acknowledge teachers and professorial scholars throughout my life. There are too many to personally acknowledge. I am grateful for their belief in me.

Their belief is why I find myself here today.

This research is more than an analysis of raw data. It is about the real lives of people.

The tragic implications of the opioid epidemic are personal to me.

I dedicate the dissemination of results to the lives lost from the disease of addiction.

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Introductory Chapter

The opioid epidemic has had a profound impact on residents in the United States. Its impact has left peril in nearly every corner of the country, including a rapid increase in opioid-related deaths over the past decade. Families experience the peril of the epidemic in different ways. Babies are born with neonatal abstinence syndrome, and grandparents are often forced to raise their grandchildren due to the death of parents from opioid misuse. In Maryland alone, nearly 2,000 residents have died from opioid-related events in each of the last few years ("National Institute on Drug Abuse," 2019). In response, state and federal agencies have stepped in to address the crisis through the declaration of emergencies and new sources of funding. The 21st Century Cures Act of 2016 passed by Congress provided states with funds to develop initiatives to curb deaths. One of the promising interventions to curb the epidemic is to deploy peer recovery specialists to the frontline in hospital settings.

Peer recovery specialists, who play an increasingly prominent role within the behavioral health medicine field, have lived experience with mental health issues or substance use in their past. Their role is to work with patients or clients to assist in their care and recovery journey. Leveraging the role of peer recovery specialists, this research study seeks to evaluate the implementation of an initiative in Maryland to respond to the opioid epidemic using funds from the federal 21st Century Cures Act of 2016. The Opioid Survivor Outreach Program (OSOP) launched at four regional hospitals in the Baltimore area integrates a peer recovery specialist in emergency departments. The peer's role is specifically to work with individuals who have experienced a near-fatal opioid overdose, providing them with emotional support,

developing rapport, and eventually connecting them to treatment as part of the program's long-term success metrics.

With these interventions and supports provided through OSOP, this research hypothesizes a potential impact on reducing future opioid-related hospital visits, and therefore, provides for the hospital or healthcare system to avoid healthcare costs. This research seeks to inform whether interventions such as peer support are not only valuable to improve patient outcomes, but also are beneficial as it relates to healthcare system financial incentives and value-based payment models. This research leverages a mixed-methods approach of quantitative and qualitative data to guide and frame future practice and policy implications of the program's impact. This dissertation thesis is compiled in four separate chapters. The purpose of the research is to bring new evidence to the field of public health on a current, relevant public health crisis. The following components, facilitated through a three-part manuscript, are outlined below.

- **Chapter 1: Engaging Opioid Overdose Survivors: Impact of Peer Recovery Specialists on Patient Utilization:** This chapter explores whether engagement with an OSOP peer recovery specialists reduces emergency department, observation and inpatient admissions specific to opioid-related and all-cause visits. The analysis includes a retrospective review of data comparing a group of patients that received the intervention versus a historical control group that did not receive the intervention.
- **Chapter 2: Engaging Opioid Overdose Survivors: Impact of Peer Recovery Specialists on Health System Cost Avoidance:** This chapter builds on patient utilization trends and findings from the first chapter. Specifically, this section

explores whether engagement with an OSOP peer recovery specialist results in health system cost avoidance by preventing unnecessary utilization. The analysis uses real charges from hospital visits to estimate the financial value and impact of the program's implementation.

- **Chapter 3: Engaging Opioid Overdose Survivors: Insights from the Field on the Role and Efficacy of Peer Recovery Specialists:** This chapter involves adding qualitative data through in-depth interviews with frontline personnel engaged with the targeted patient population within the study hospitals. It involves interviewing OSOP peers, as well as physician and nurses to provide a more comprehensive understanding of three areas – effective strategies used to engage patients in OSOP, best practices in linking and referring patients to care, and assessing the integration of the OSOP peer as a member of the multidisciplinary healthcare team.
- **Policy Memorandum: Practice and Policy Considerations from Research:** This thesis includes a separate analysis to bring findings from each of the three manuscripts together to provide public health practice and policy implications of this research. The items outlined translate the favorable research results – reduction in hospital visits by engaging in OSOP and significant, compelling healthcare costs avoided by hospitals and healthcare system – into concrete recommendations for changes in the public and behavioral health medicine science field. There are four specific opportunities detailed in this section:

  Practice Implications:

  - Adoption of Peer Recovery Specialists Program in Other Hospitals

- Expansion of Peer Recovery Specialists in Alignment with Value-Based Payment Models

Policy Implications:

- Provides Evidence for Reimbursement of Peers in Maryland and Broader Reimbursement Strategies for Commercial Payors
- Provides Evidence of the Need to Expand the Adoption of Outpatient Treatment Options

Chapter 1: Engaging Opioid Overdose Survivors: Impact of Peer Recovery Specialists on Patient Utilization

Abstract

Objectives: To evaluate the effectiveness of Opioid Survivor Outreach Program (OSOP) peer recovery specialist intervention on opioid-related and all-cause hospital visits.

Design: Program evaluation with a study and historical control group using propensity score matching. Negative binomial regression was performed to assess the differences in hospital visits among the two groups.

Setting: Four hospitals in urban and suburban areas of Baltimore, Maryland metro region.

Participants: There were 416 in the study group that received the OSOP intervention. Individuals are identified primarily in the emergency department and are known opioid overdose survivors. A historical control group of 416 individuals was used to compare results.

Intervention: OSOP provides peer recovery specialist services to patients, including opioid education, harm reduction tools, and refers and/or links patients to substance use treatment and recovery support services.

Main Outcome Measure: Analysis of opioid-related and all-cause hospital visits.

Results: As an intervention, OSOP helps to reduce expected opioid-related visits at a statistically significant level. There is a 32.5% reduction in expected opioid-related visits pre and post-enrollment into OSOP among the study group. There were also observed differences in expected opioid-related visits when comparing the historical and control

groups. OSOP also proved effective in finding observed reductions in expected all-cause hospital visits.

Conclusions: The findings suggest that the OSOP program is an intervention that assists patients in seeking substance use and supportive services while reducing acute hospital utilization.

Introduction and Statement of the Problem

Opioid-related deaths in Maryland have been increasing since 2010. According to the Centers for Disease Control (CDC), Maryland experienced 504 opioid-related deaths in 2010 compared to 2,087 deaths in 2018 ("National Institute on Drug Abuse," 2019). The increase in deaths has garnered attention at both the state and national levels. In March 2017, Republican Governor Larry Hogan declared the epidemic a state of emergency ("Governor Larry Hogan - Official Website," 2018). Central to the response to the epidemic in partnership with emergency medical service responders, local communities, and policy departments are hospitals. Hospitals serve as a front door to treating individuals experiencing substance use disorders, as well as opioid overdose events.

In 2013, a review of all opioid-related deaths in the state of Maryland showed that 66% had at least one emergency department visit before their death and 59% had an opioid-related visit based on coding data sources (Holler, 2016). In fact, 14% of those patients had 4 or more visits that were opioid-related in the 12 months before their death (Holler, 2016). In 2014-2015, 140,000 patients with a hospital emergency visits related to substance use were six times more likely to experience a fatal overdose compared to patients presenting with non-opioid-related concerns (Krawczyk et. al., 2020). More recent studies in other states also report similar fatality trends. In a review of nearly 12,000 patients treated for opioid-related events in emergency departments across Massachusetts in 2015-2016, 5.5% of patients (1 in 20) died within 1 year of their first hospital encounter. And 1 in 25 patients died within the first two days (Tobin, 2020).

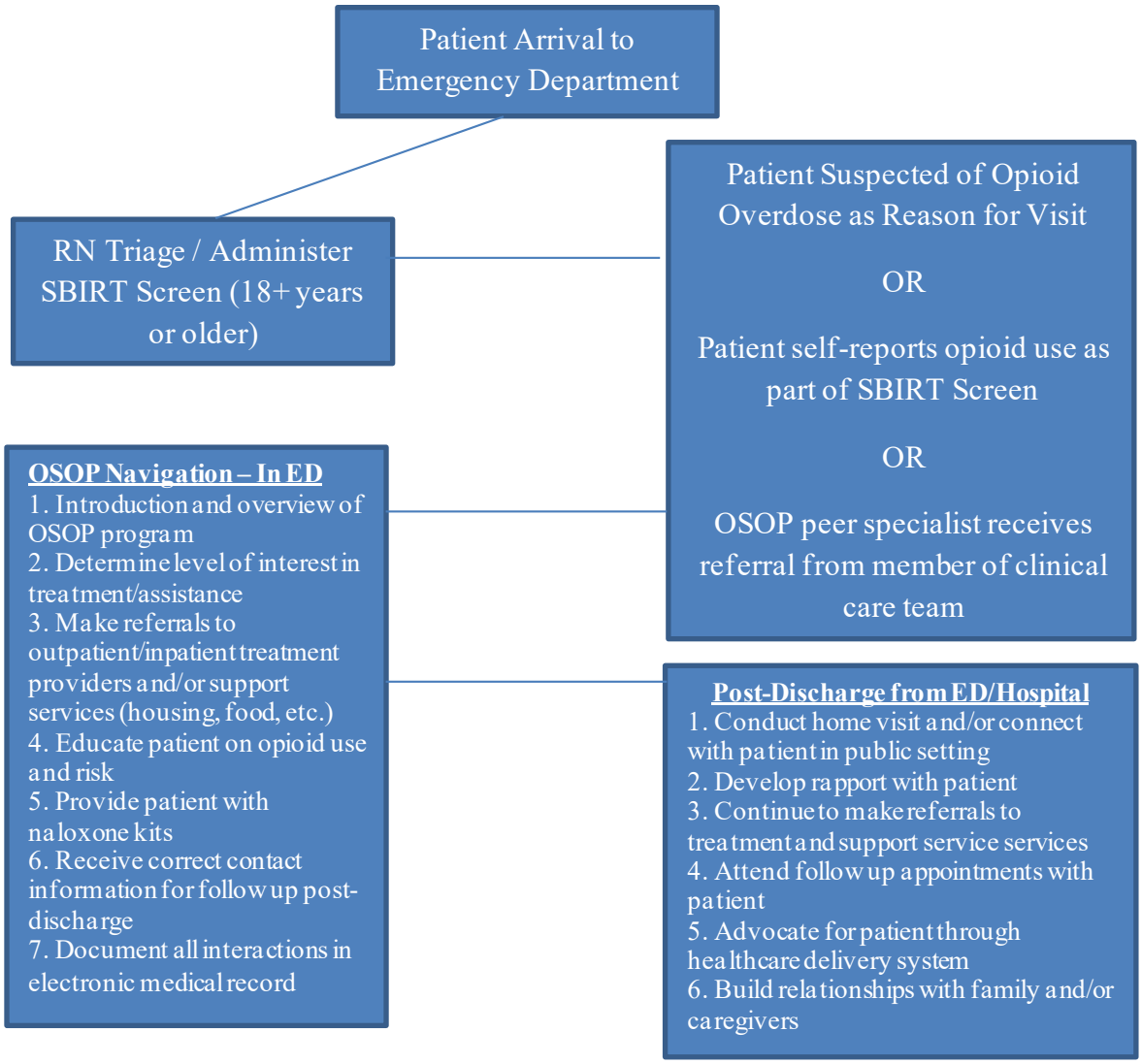
In Maryland, hospitals across the state began to implement evidence-based protocols such as Screening, Brief Intervention, and Referral to Treatment (SBIRT – **Appendix: Figure 1**), a universal substance use screening tool. Through July 2014 and November 2018, more than 1 million patients have been screened and 17.2% of patients reported alcohol or substance use over the previous year (Monico, et. al, 2020). As a front door to communities and people experiencing substance use disorders, hospitals have become an increasingly important stakeholder to leverage SBIRT to identify, address, and refer patients to substance use treatment using peer recovery specialists (Hargraves et al., 2017). Peer recovery specialists are being adopted rapidly by hospitals and health systems across the country, largely in response to federal and state recognition that such services could potentially be a critical component of saving lives. Initial studies have examined the impact of these programs as it relates to the number of patients connected to peers, such as studies in Rhode Island. Deployment of peers in hospital settings resulted in 1,208 people being served by peers with almost half receiving substance use treatment (Waye et al., 2019). This research seeks to go beyond an evaluation of process metrics related to these programs and determine its impact on subsequent hospital utilization after being connected with a peer recovery specialist specific to targeting opioid overdose survivor patients.

At all four MedStar hospitals in the Baltimore region, funds to implement OSOP peer recovery specialist positions were provided through state grants as apportioned by the 21st Century Cures Act of 2016. Metrics from all four hospitals are collected and reported as they relate to how many patients engage with the OSOP peer recovery specialist, as well as how many patients are referred to and linked to treatment.

Nonetheless, metrics related to the value-based payment model in the state of Maryland known as Total Cost of Care, an effort to reduce the total cost of care by reducing emergency, observation, and inpatient hospital expenditures, have not been evaluated ("Maryland's Total Cost of Care Model," 2017).

Informed in partnership with the Maryland Department of Health and the Mosaic Group, a community health services national consulting firm, a detailed workflow and description of the intervention and navigation process conducted by the opioid survivor outreach specialist is detailed in **Figure 1** below (Holler, 2016). The OSOP peer recovery specialist conducts a multi-pronged effort as part of the intervention, which on average is a 30-90-day engagement period with each enrolled patient. Without the OSOP peer recovery specialist as an integrated member of the healthcare team, those experiencing an opioid overdose event would not receive any of the navigation services in the hospital or post-discharge as listed below.

Figure 1: Opioid Survivor Outreach Program Navigation Process



Implementation at MedStar Health was first launched in the Baltimore regional hospitals in March 2018. The hospitals included MedStar Harbor Hospital, MedStar Good Samaritan Hospital, MedStar Union Memorial Hospital and MedStar Franklin Square Medical Center. MedStar Harbor Hospital and MedStar Franklin Square Medical Center employ one OSOP peer recovery specialist each for their respective campuses. Given the overlapping service areas, MedStar Union Memorial Hospital and MedStar Good Samaritan Hospital share an OSOP peer recovery specialist between their two

campuses. Therefore, three OSOP peer recovery specialists cover all four hospitals. Through the period of March 2018 – July 2019, the OSOP peer recovery specialists have worked with 615 patients. **Table 1** lists the process metrics that have traditionally been tracked to measure the success of the program.

Table 1: Opioid Survivor Outreach Program Process Metrics from March 2018 – July 2019 at MedStar Health

Metric	# of Patients
Patients Successfully Engaged with OSOP Peer Recovery Specialists	615
Patients Referred to Recovery Support Services	286 or 47%
Patients Referred to Treatment	188 or 31%
Patients Confirmed to be Linked to Treatment	142 or 23%

**Note: Patients may fall within multiple categories; therefore, may add up to more than 100%

The current study aims to evaluate whether the OSOP program reduces avoidable, unnecessary hospital utilization, which in turn would align with the health care policy goals of the state. Specifically, this study seeks to answer the following research questions:

1. Did patients receiving the OSOP peer recovery specialist intervention (study group) experience a reduction in opioid-related and all-cause hospital visits pre and post-enrollment in the program over a 12-month period?
2. Did patients that received the OSOP peer recovery specialist intervention (study group) when compared to a historical control group of patients experience a reduction in opioid-related and all-cause hospital visits over a 12-month period?

Literature Review

Defining Peer Recovery Specialist Services, History, and Significance

Individuals offering peer support without formal clinical training as an integral member of the healthcare delivery system have manifested in a variety of forms. One type of community health worker that has emerged as providing specific peer support often focused on a specific disease state or specific disease state(s) is known as a peer recovery specialist. Other names for this role include peer recovery coach, mentor, and advocate (Davidson, Chinman, Sells, and Rowe, 2005). Peer recovery specialists have been instrumental in assisting individuals with substance use and mental illness. The United States Substance Abuse and Mental Health Services Administration (SAMHSA) defines these peer providers as "a person who uses his or her lived experience of recovery from mental illness and/or addiction, plus skills learned in formal training, to deliver services in behavioral health settings to promote mind-body recovery and resilience ("Peer Providers," n.d.). Peer recovery specialists have gained traction as advocacy, self-help organizations, and twelve-step-based programs began to rise with more prominence (Myrick and Vecchio, 2016). One of the first programs, Alcohol Anonymous, began in the late 1930s. Throughout the past century, other similar groups have been created that model the organization's approach, including Narcotics Anonymous and Al-Anon, which targets family and friends of individuals with alcoholism ("Center for Substance Use Treatment," 1999). The integration of peers into these programs started to first occur in the 1970s (Myrick and Vecchio, 2016).

Use of Peer Recovery Specialist Services in Healthcare Settings

In 2010, the Affordable Care Act's passage included a mandate of mental health and substance use services as an essential covered benefit under health insurance plans. This inclusion caused the adoption of peer recovery specialists within the healthcare industry to increase (Myrick and Vecchio, 2016). Given the heightened response of the opioid epidemic by local governments, corresponding legislation followed at the federal level that provided funding to state and local governments to implement interventions that would curb the epidemic and decrease opioid-related deaths. The 21st Century Cures Act was passed in 2016. The legislation provided more than 1 billion dollars ($1B) to be distributed to states and local entities through SAMHSA. States designed interventions to increase peer recovery specialists as part of the healthcare ecosystem. For example, in Indiana, the state used its funds to embed peer recovery specialists in emergency departments (Watson et al., 2019). The logic behind Indiana's approach was to identify patients with opioid use disorder to connect them to outpatient treatment, commonly known as medication-assisted treatment (MAT). The goal of Indiana's program was to connect the patient to the outpatient setting within 48 hours of discharge from the hospital. Additionally, the peers offer patients naloxone, a life-saving medication that rapidly reverses an opioid overdose and provides them access to sexually transmitted disease testing (Watson et al., 2019).

In 2015, Rhode Island's Overdose Prevention and Intervention Task Force also recommended using peer recovery specialists as an intervention to combat the opioid epidemic. Like Indiana, Rhode Island used funds provided through SAMHSA to develop a program to deploy peers to hospital emergency departments across the state (Waye

et al., 2019). Peers were not employed by hospitals but through the largest state-wide recovery center in the state. All peer recovery specialists hired were formally certified. Peers received referrals through a hotline. Similar to Indiana's model, once a connection is made to a patient, peer recovery specialists work with patients to connect them to outpatient treatment centers for follow-up care after discharge from the hospital and train patients to administer naloxone (Waye et al., 2019). Healthcare entities are not the only source of employers or referral sources into peer recovery services. Other states such as Massachusetts leverage the work of police and fire departments to identify patients with opioid use disorder to refer them to health care entities that provide peer recovery services (Formica et al., 2018).

Assessing Impact of Peer Recovery Specialist Services in Healthcare Settings

The primary logic for the use and development of peer recovery specialists is that they can leverage their lived experiences to motivate and convince patients to participate in treatment modalities in a way that other healthcare providers may be less able. Further, the primary reason for peers to be embedded in and/or receive referrals from emergency departments at hospitals is because hospital environments serve as a frontline access point to potential opioid overdoses and other related events that result from substance use disorder (Masson et al., 2002). Indiana's program evaluated its success in a six-month pilot. In one emergency department during that time, a total of 82 patients were engaged with a peer recovery specialist. Thirty-seven patients (44% of those engaged) were confirmed to attend at least 1 follow-up appointment while 19 (23% of those engaged) were still receiving treatment for opioid use after 6 months (Watson et al., 2019). Rhode Island's evaluation yielded similar results with significantly

more patients. Peer recovery specialists worked with 1,208 people through the period of July 2016 through June 2017. Of the 1,208 people, 51% were connected to treatment, which was defined broadly and included but was not limited to inpatient and outpatient treatment and medication-assisted treatment. Nearly 90% of all individuals engaged received training to administer naloxone and were provided naloxone kits (Waye et al., 2019).

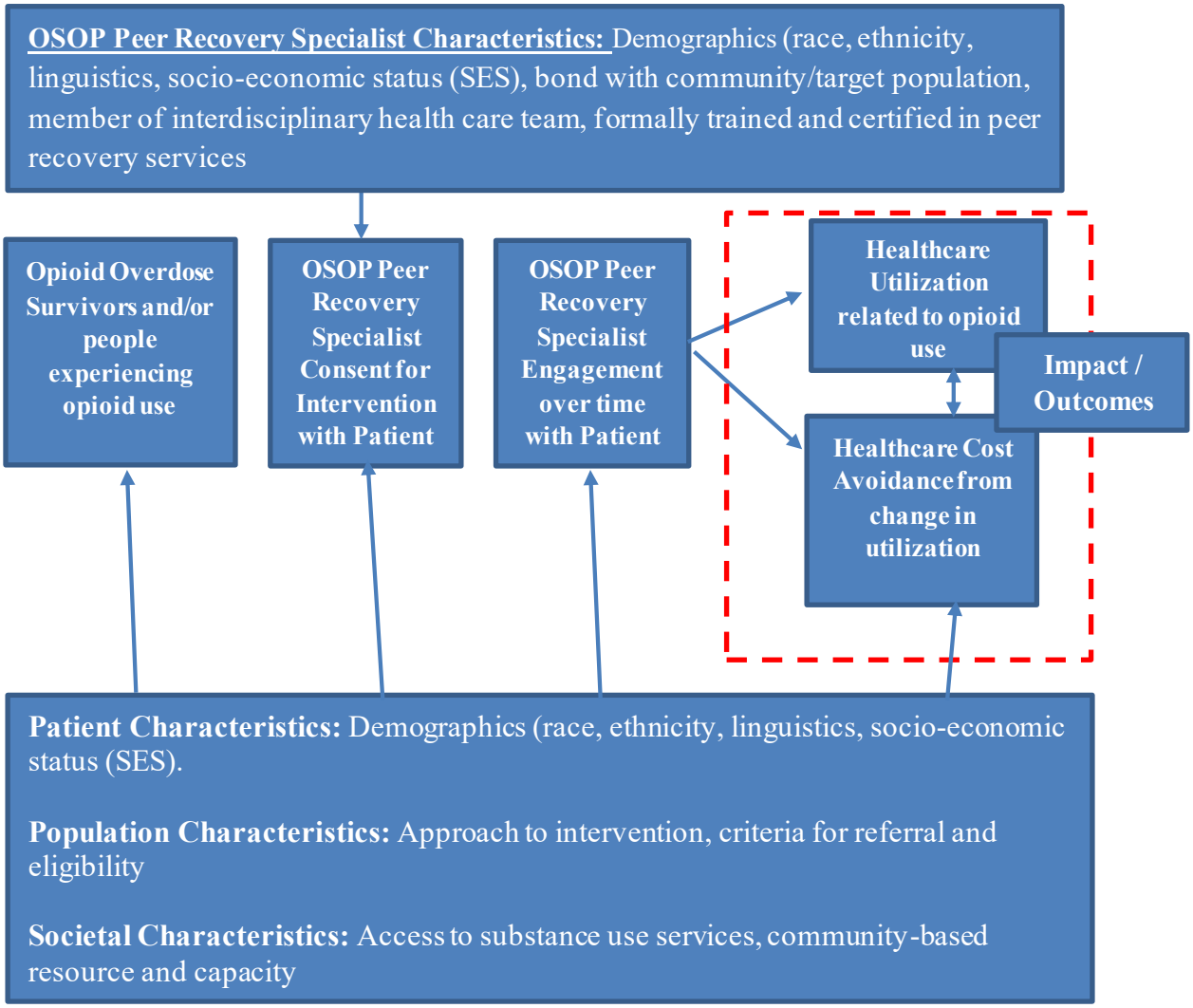
Methods

Conceptual framework

The conceptual framework used for this study builds upon the relationship between the OSOP peer recovery specialist and their various stakeholders. These stakeholders include the relationship that the peer has with patients, the healthcare delivery system, broader patient population, and community/society. This conceptual framework depicted in **Figure 2** is adapted from the United States Department of Health and Human Service's Agency of Healthcare Research and Quality (AHRQ) (Viswanathan et al., 2009). The model was tailored to specifically highlight the effectiveness of the role of community health workers; however, as designed, its intent is applicable to the research questions and analysis proposed in this dissertation.

Figure 2: Conceptual Framework of Opioid Survivor Outreach Program Peer Recovery Specialist Navigation: Detailed perspective into the profile of OSOP peer recovery specialist and their impact

Adapted from the Agency of Healthcare Research and Quality. (Viswanathan et al., 2009)



The literature review identified that a key aspect of community health workers and peer recovery specialist roles operating within the healthcare system is their ability to serve as a conduit between their lived experiences, the lived experiences of their patients, and the healthcare delivery system. The conceptual framework examines the

vulnerable population of those experiencing opioid use disorder and how their life and experience can match with the characteristics of the OSOP peer recovery specialist. Furthermore, it is plausible that the patient also reflects the societal characteristics of the community, which influences them and their interactions with both the OSOP peer recovery specialist and the healthcare system. In this framework, the OSOP peer recovery specialist receives training that allows them to assist patients in a way that reflects their lived experience and ability to connect with the targeted population without compromising them as a formal medically trained provider or clinician.

These combined attributes allow the use of an analytical framework to assess outcomes and impact of the OSOP recovery specialists' interactions and intervention with patients. The research aims of this study test the interaction between the OSOP peer recovery specialist and the patient to discern downstream impact on reducing avoidable, unnecessary hospital utilization specifically related to opioid use.

Study Design

For this study, a quasi-experimental design was used to compare patients that received the OSOP peer recovery specialist intervention to a historical control group of patients that did not receive the intervention. The design includes a pre and post-observation analysis of opioid-related emergency department visits, and observation and inpatient admissions for the study group and the historical control group, which was determined through the process of propensity score matching by age, race, ethnicity, and gender. Data for both sets of patients used in this analysis were retrospectively extracted from two main sources – MedStar Health's electronic record known as MedConnect and Chesapeake Regional Information System for our Patients (CRISP).

CRISP is the regional health information exchange system that serves as a central hospital utilization data warehouse in Maryland and Washington, D.C. Data collected through CRISP included aggregate emergency department, observation, and inpatient admission data for the study group population pre and post-enrollment into the OSOP program. For the historical control group, aggregate emergency department, observation, and inpatient admission data were also collected through CRISP. Leveraging CRISP data allows for emergency department, observation and inpatient admission data to be collected for the four MedStar hospitals, as well as hospital visits for opioid-related events located within the state of Maryland. Further, CRISP also served to retrieve a payor source for all patients as part of the study and historical control groups.

Retrospective data were used; therefore, patients were not formally recruited to participate in the study. Patients in the study group included those that were 18+ years old, were suspected of an opioid overdose, self-reported opioid use as part of the SBIRT screen or were referred to OSOP peer recovery specialist by a member of the clinical care team for a consultation. Further, all patients that were engaged with the OSOP peer recovery specialist and used within the study sample must include an ICD-10 diagnosis code related to opioid use, dependence, abuse, and other opioid-related events. Opioid-related codes were selected through the recommendations of the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project (H-CUP) (Moore and Barrett, 2017). A full list of these diagnosis codes is listed in **Appendix: Figure 2.** Patients that met the criteria had an initial encounter with the OSOP peer recovery specialist between March 2018 – July 2019. Patients without an

opioid-related diagnosis were excluded from the study. This exclusion was necessary to most appropriately select a historical control group for analysis. The application of this inclusion and exclusion criteria allowed for a total of 416 patients to be included as part of the study group out of 615.

The study group was compared to a historical control group that reflects similar inclusion criteria based on a set of similar characteristics. The period for patients selected for the historical control group was from May 2017 – February 2018. This timeframe was deemed appropriate for patient selection because the OSOP program was not implemented during this timeframe, but all four hospitals had launched the evidence-based SBIRT protocol **(Appendix: Figure 1).** Patients selected for the historical control group included those that were 18+ years old and have an ICD-10 diagnosis code related to opioid use, dependence, abuse, and other opioid-related events **(Appendix: Figure 2).** Patients in the historical control group were also assigned a study enrollment date based on their opioid-related visits to one of the four study population hospitals; for patients with multiple hospital opioid-related encounters, the earliest encounter within the period of May 2017 – February 2018 was used as the enrollment date for the historical control group and used to determine the 12-month follow-up period for collecting the outcome data.

Further, to more appropriately match the intervention group with the historical control group, the selection of the historical control group was modeled after like characteristics as found in the study group. Specifically, propensity score matching was used in selecting the historical control group. These characteristics included race, ethnicity, age category, and gender. The method of propensity scores matching helps

align the study group and the historical control group to reduce bias and mirror a randomized control study (Austin, 2011). A full description of the inclusion and exclusion criteria for the study and historical control groups can be found in **Appendix: Figure 3**. The study was approved by three Institutional Review Boards (IRBs), including MedStar Health Research Institute, Johns Hopkins Bloomberg School of Public Health, and Maryland Department of Health.

Data Analysis

A negative binomial regression analysis was used to estimate the association between the OSOP intervention, and the expected number of opioid and all-cause hospital visits, including emergency department, observation, and inpatient admissions. Leveraging the regression technique, a predicted number of opioid-related and all-cause emergency department, observation, and inpatient admissions were calculated over a 12-month pre and post period, which was dictated by the enrollment date of individuals in the historical control and study group. **Table 2** provides an overview of the design in comparing pre and post-period visits for both the historical control and study groups.

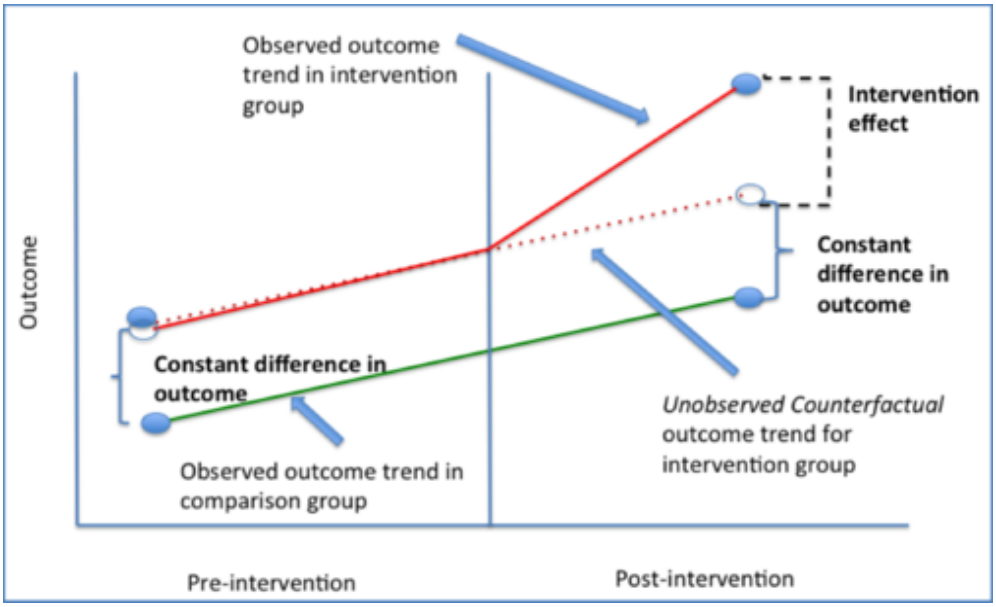
Table 2: Overview of Design in Analyzing Hospital Visits of Historical Control and Study Groups with Enrollment Dates

Pre-Enrollment Hospital Visits	Enrollment Date	Post-Enrollment Hospital Visits
Hospital visits for 12 months before individual enrollment date	Historical Control Group May 2017 – February 2018	Hospital visits for 12 months post to individual enrollment date
Hospital visits for 12 months before individual enrollment date	Study Group March 2018 – July 2019	Hospital visits for 12 months post to individual enrollment date

The predicted number of these visits were compared between the pre and post periods for the study group, as well as the pre and post periods for the control and study groups, respectively. The negative binomial regression model also allows for a difference in difference estimation to be conducted. Common in research that includes the comparison of two groups before and post a specific intervention, the difference in difference estimation allows for the comparison among the groups and intervention periods to be assessed ("Difference-in-Difference Estimation," 2020).

Figure 3: Difference in Differences Approach

("Difference-in-Differences Estimation," 2020)



This analysis included determining the date of enrollment into OSOP for each study group patient by using data collected from MedStar's electronic medical record. The medical record was used to determine other hospital visits at other non-MedStar hospitals through CRISP. Further, the novel coronavirus (COVID-19) may have impacted hospital visits for the study population. Because this analysis included a 12-month pre and post-enrollment of hospital visits, those enrolling in OSOP as part of the

study population between the periods of March 2019 – July 2019 may have been impacted by the pandemic. Hospital visits at the onset of COVID-19 rapidly declined with the onset of the virus spread in the United States in early March 2020. To account for any impact related to COVID-19, a sensitivity analysis was conducted. Those in the study group that enrolled between the periods of March 2019 – July 2019 were excluded from the analysis. The statistical software used for data analysis was STATA 16.0.

Results

Characteristics of the study population (n=416) are included in **Table 3**. Among those that were included in the study group were 39.66% Black, Other, or Unknown and 60.34% White. Those in the study population ranged in age from 18 to 83. The mean age of participants was 44.43. Of those in the study group, 25.96% were 18-34 years old, 31.73% were 35 – 49 years old, 35.82% were 50-64 years old, and 6.49% were over the age of 65. Like the study group, the historical control group included participants that were 39.66% Black, Other, or Unknown and 60.34% White. Of those matched to the historical control group, 25.96% were 18-34 years old, 29.81% were 35 – 49 years old, 33.17% were 50-64 years old, and 11.06% were over the age of 65. 65.87%, of those in the study group were male.

The payor source was also captured using CRISP. For the study population, 9.29% of those enrolled were covered under commercial plans, 53.85% under Maryland Medicaid – Managed Care (MC) plans, 6.01% under Maryland Medicaid – Fee for Service (FFS) plan, 14.90% under Medicare FFS, 3.37% under Medicare MC, and 11.06% were noted as self-pay / charity care. A payor source could be attributed to 409

participants in the study group and 412 in the historical control group. For the historical control group, 11.41% of those enrolled were covered under commercial plans, 54.81% under Maryland Medicaid – Managed Care (MC) plans, 7.45% under Maryland Medicaid – Fee for Service (FFS) plan, 18.03% under Medicare FFS, 2.16% under Medicare MC, and 5.05% were noted as self-pay / charity care. The only significant differences in demographics between the two groups were those in the category of age greater than 65 and those with self-pay insurance.

Table 3: Patient Characteristics: OSOP Peer Recovery Specialist Study Group and Historical Control Group

Demographic	Study Population (n=416)	Historical Control Group (n=416)	P-Value
Race/Ethnicity			
White	251 (60.34%)	251 (60.34%)	1.00
Black / Other / Unknown	165 (39.66%)	165 (39.66%)	1.00
Age			
18-34 years	108 (25.96%)	108 (25.96%)	1.00
35-49 years	132 (31.73%)	124 (29.81%)	0.55
50-64 years	149 (35.82%)	138 (33.17%)	0.42
65+ years	27 (6.49%)	46 (11.06%)	0.02*
Gender			
Male	274 (65.87%)	274 (65.87%)	1.00
Female	142 (34.12%)	142 (34.12%)	1.00
Payor Source	*(n=409)*	*(n=412)*	
Commercial Other	38 (9.29%)	47 (11.41%)	0.30
MD Medicaid – Managed Care	224 (53.85%)	228 (54.81%)	0.78
MD Medicaid – FFS	25 (6.01%)	31 (7.45%)	0.40
Medicare – FFS	62 (14.90%)	75 (18.03%)	0.22
Medicare – MC	14 (3.37%)	9 (2.16%)	0.29
Self-Pay / Charity	46 (11.06%)	21 (5.05%)	0.001*

**p <0.05*

Descriptive statistics for the historical control and study groups regarding the total number of opioid-related, non-opioid-related, and all-cause hospital visits are listed in

Table 4. Hospital visits included in the table are an aggregate total of emergency department and observation and inpatient admissions. When comparing the pre and post periods of the study group, there were decreases in the number of hospital visits in all three areas –opioid-related visits, non-opioid-related visits, and all-cause visits. The largest percentage decrease when comparing the pre and post-enrollment periods of the study group were opioid-related visits, which decreased by 16.8%. The historical control group, however, observed an increase in all three visit categories with a 42.1% increase in opioid-related visits.

Table 4: Descriptive Statistics: OSOP Historical Control and Study Groups Opioid-Related, Non-Opioid-Related, and All-Cause Hospital Visits Pre and Post-Enrollment

	Opioid-Related Hospital Visits	Non-Opioid-Related Hospital Visits	All-Cause Hospital Visits
Pre-Enrollment – Historical Control	413	1,693	2,106
Post-Enrollment – Historical Control	587	1,731	2,318
Pre-Enrollment – Study Group	535	1,146	1,681
Post-Enrollment – Study	445	1,028	1,473
Total – Combined	1,980	5,598	7,578

A negative binomial regression model was used to analyze the impact of OSOP on hospital utilization trends. Like a Poisson regression model, this technique was used because the variance was not equal to the mean of a typical Poisson model. In other words, a negative binomial regression model is used when there is evidence of variability greater than what is expected (Hilbe, 2016). The negative binomial

regression analysis was then used to calculate the expected number of opioid-related and all-cause hospital visits for the historical control and study groups.

Table 5 provides the difference-in-difference analysis and coefficients for each corresponding variable. These variables listed below were used in the negative binomial regression analysis to calculate expected opioid-related and all-cause hospital visits for both groups. The regression results found a statistically significant difference between the historical control and study groups as it relates to opioid-related visits (Variable: Treatment; CE: 0.633; p = 0.001). These results indicate that the study group is known to have a higher number of opioid-related visits compared to the historical control group. The OSOP intervention was noted to reduce expected opioid-related visits (Variable: Interaction; CE: -0.721; p = 0.001).

Table 5: Negative Binomial Regression of Expected Opioid-Related Hospital Visits

Variable	Difference in Differences Coefficient and Standard Error
Post-Period	0.333***
	0.104
Treatment	0.633***
	0.102
Post X Treatment (Interaction)	-0.721***
	0.143
Age	-0.048
	0.0408
Black	0.207***
	0.078
Other	-0.816**
	0.299
Female	-0.082
	0.077
Constant	0.263
	0.095
**** p<0.01, **p<0.05, *p<0.10*	

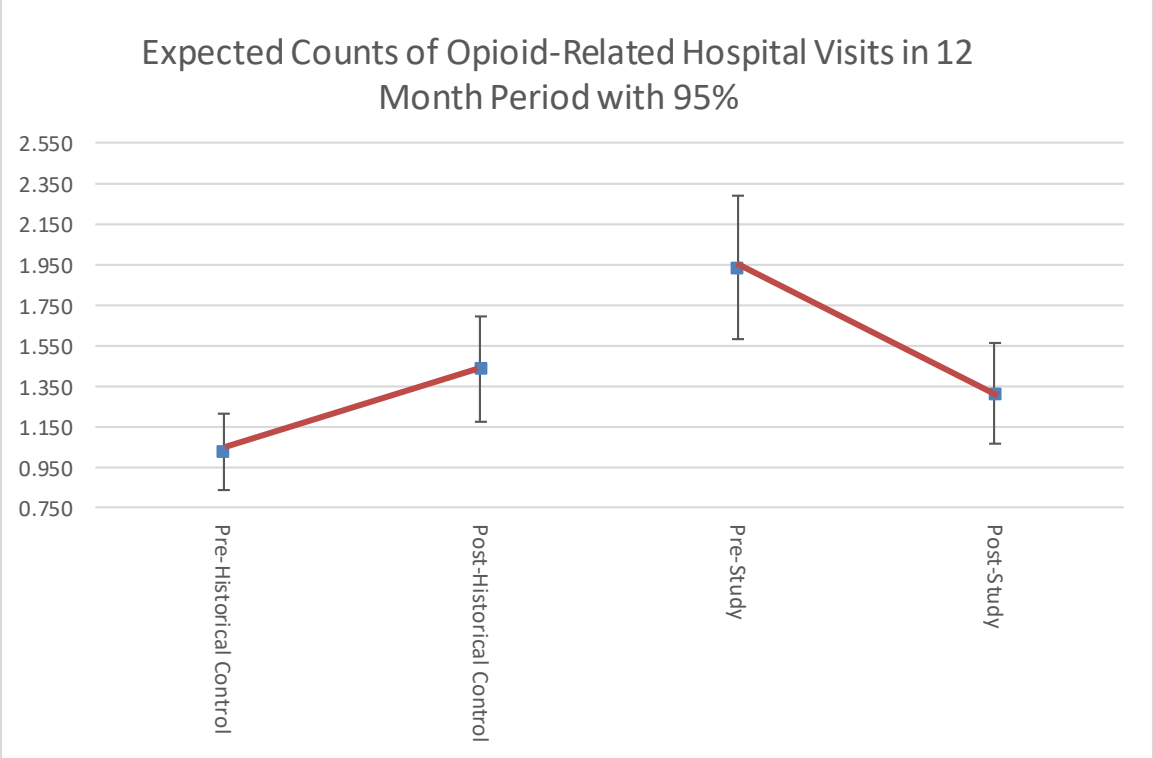
Table 6 provides results for expected opioid-related visits for the historical control and study groups. Though not statistically significant, the results of this analysis observe an 8.4% reduction in the expected number of opioid-related hospital visits over a 12-month period when comparing the study group to the historical control group. This is calculated by comparing the number of expected opioid-related visit in the post-enrollment period of the historical control group of 1.433 (**CI:** 1.172, 1.692) and the study group of 1.312 (**CI:** 1.064, 1.561)). Statistically significant results were derived when comparing the impact on expected opioid-related hospital visits between the pre and post-enrollment period of the study population. A 32.2% reduction in the expected opioid-related hospital visits after enrollment in OSOP was observed in the study group. This is calculated by comparing the number of expected opioid-related visits from the study group in the pre-enrollment period, 1.934 (**CI:** (1.580, 2.288)) to the post-enrollment period, 1.312 (**CI:** (1.064, 1.561)).

Table 6: Expected Opioid-Related Hospital Visits for Historical Control and Study Groups with Confidence Interval

	Expected Visits	**Confidence Intervals**
Pre-Enrollment – Historical Control	1.027	(0.835, 1.212)
Post-Enrollment – Historical Control	1.433	(1.172, 1.692)
Pre-Enrollment – Study Group	1.934	(1.580, 2.288)
Post-Enrollment – Study	1.312	(1.064, 1.561)

It is important to note the difference in the results of expected opioid-related visits in the historical control group pre and post-enrollment. While the study population showed a reduction in the total number of expected opioid-related hospital visits, the historical control group saw a significant increase when comparing participants in the pre and post periods. The expected number of opioid-related visits increased by 39.5%. **Figure 4** depicts the same information as presented in **Table 6.** However, it visually demonstrates the reduction in expected opioid-related visits in the study group compared to the increase of expected opioid-related visits in the historical control group. This divergence of results between the historical control and study groups demonstrated the effect of the intervention observed in the study group.

Figure 4: Expected Counts of Opioid-Related Hospital Visits in 12 Month Period with 95% CI



The expected number of all-cause hospital visits for the historical control and study groups were also analyzed. **Table 7** provides the difference in difference analysis and coefficients for each corresponding variable for the all-cause hospital visit negative binomial regression analysis. When comparing the historical control and study groups, a statistically significant difference was not observed in reducing all-cause hospital visits (Variable: Interaction; CE: -0.208; p = 0.164)

Table 7: Negative Binomial Regression of Expected All-Cause Hospital Visits

Variable	Difference in Differences Coefficient and Standard Error
Post-Period	0.080
	0.104
Treatment	-0.284***
	0.105
Post X Treatment (Interaction)	-0.208
	0.149
Age	0.164***
	0.042
Black	0.465***
	0.081
Other	-0.475*
	0.271
Female	0.125
	0.081
Constant	1.201***
	0.098
*** p<0.01, **p<0.05, *p<0.10	

Table 8 provides results for expected all-cause visits for the historical control and study groups. The results of this analysis observe a 38.9% reduction in the expected number of all-cause hospital visits over a 12-month period when comparing the historical control and study groups. This is calculated by comparing the number of expected all-cause hospital visits in the post-enrollment period of the historical control

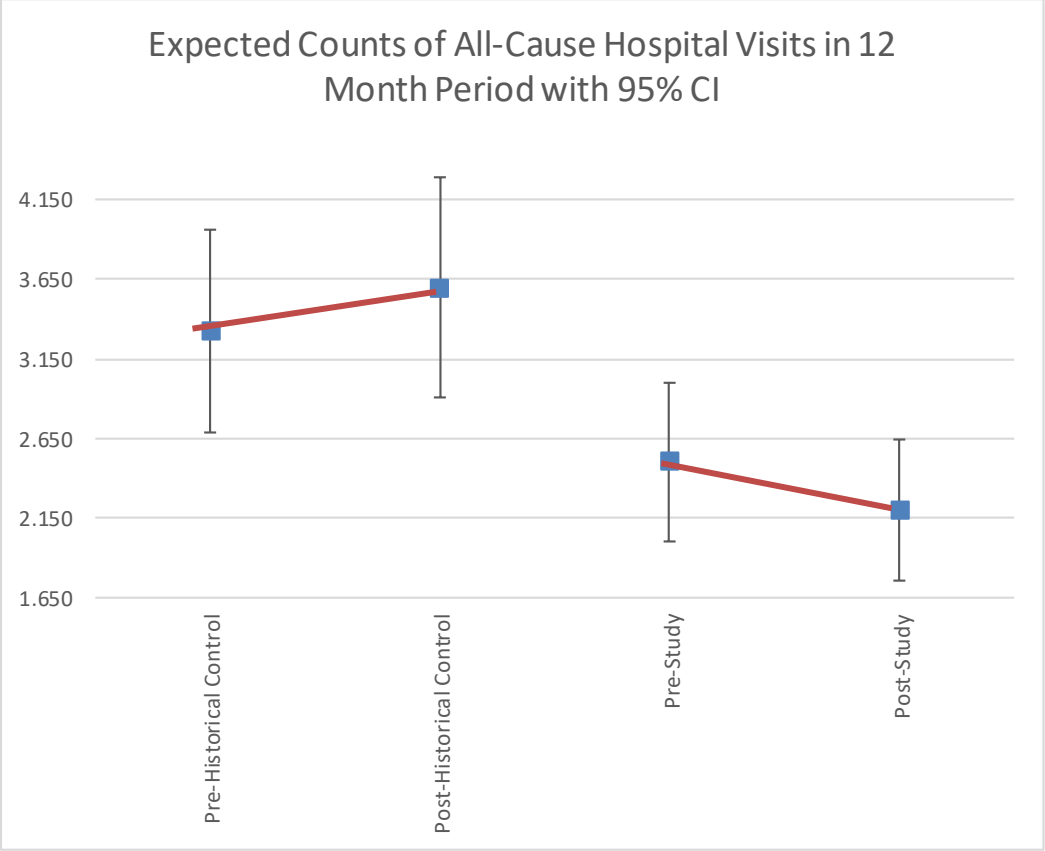
group of 3.598 (**CI:**(2.907, 4.289)) and the study group of 2.200 (**CI:** (1.757, 2.643). Similar results were also derived when comparing the impact on expected all-cause hospital visits between the pre and post-enrollment period of the study population. A 12.0% reduction in the expected all-cause hospital visits after enrollment in OSOP was observed.

Table 8: Expected All-Cause Hospital Visits for Historical Control and Study Groups with Confidence Interval

	Expected Visits	Confidence Intervals
Pre-Enrollment – Historical Control	3.323	(2.687, 3.960)
Post-Enrollment – Historical Control	3.598	(2.907, 4.289)
Pre-Enrollment – Study Group	2.501	(2.003, 2.999)
Post-Enrollment – Study	2.200	(1.757, 2.643)

As observed in the analysis of opioid-related visits, it is also relevant to note other differences when comparing expected all-cause hospital visits. While the study population showed a 12.0% reduction in the expected number of all-cause hospital visits, the historical control group saw an 8.3% increase. **Figure 5** depicts the same information as presented in **Table 8.** However, it visually demonstrates the reduction in expected all-cause hospital visits in the study group compared to the increase of expected all-cause hospital visits in the historical control group. This phenomenon demonstrates the effect of the intervention observed in the study group.

Figure 5: Expected All-Cause Hospital Visits for Historical Control and Study Groups with Confidence Interval



Leveraging this negative binomial regression analysis, a predicted number of opioid-related hospital visits were calculated. The predicted number of these visits were compared between the pre and post periods for the study group, as well as the pre and post periods for the control and study groups, respectively. **Table 9** outlines these results in predicting less than or equal to 1, 2, 3, 4, or 5 opioid-related visits over a 12-month period. Among those in the study group, 59.4% of patients were predicted to have less than or equal to one opioid-related visit before enrollment into OSOP. Following enrollment in OSOP, 69.3% of patients were predicted to have less than or equal to one opioid-related visit. These trends continue when comparing pre and post-

enrollment in OSOP through 5 visits, although not as drastic of predicted probability as that observed in the less than or equal to one visit.

Among those in the control group, 75.1% of patients were predicted to have less than or equal to one opioid-related visit before their selected enrollment date. Following their enrollment date, 67.1% of patients were predicted to have less than or equal to one opioid-related visit. Specifically, the observations for the historical control group can be interpreted as patients having less than or equal to 1 visit for an opioid-related event in the pre-enrollment period than in the post-enrollment period. These trends continue when comparing pre and post-enrollment through 5 visits, although not as drastic of predicted probability at less than or equal to one visit. Similarly, among those in the post period of the control group, 67.1% of patients were predicted to have less than or equal to one opioid-related visit post-enrollment compared to 69.3% of patients in the study period following enrollment in OSOP.

Table 9: Predicted Probability of Opioid-Related Visits Over 12-Month Period with Confidence Intervals

Predicted Probability of Opioid-Related Visits over 12-month period (CI)					
Treatment Group	Less < =1 Visit	Less < =2 Visits	Less <= 3 Visits	Less <=4 Visits	Less <=5 Visits
Pre - Study Group	0.594 (0.545, 0.643)	0.724 (0.676, 0.771)	0.809 (0.767, 0.852)	0.867 (0.831, 0.904)	0.907 (0.877, 0.938)
Post - Study Group	0.693 (0.646, 0.740)	0.816 (0.775, 0.857)	0.888 (0.855, 0.921)	0.931 (0.906, 0.956)	0.958 (0.939, 0.976)
Pre - Control Group	0.751 (0.710, 0.794)	0.865 (0.831, 0.899)	0.926 (0.901, 0.950)	0.956 (0.941, 0.976)	0.977 (0.965, 0.988)
Post - Control Group	0.671 (0.625, 0.717)	0.797 (0.756, 0.838)	0.873 (0.839, 0.907)	0.919 (0.892, 0.946)	0.949 (0.928, 0.969)

COVID-19 Sensitivity Analysis

To account for any impact related to COVID-19, a sensitivity analysis was conducted. Those in the study group that enrolled between the periods of March 2019 – July 2019 were excluded. After these exclusions, a total of 139 patients were removed from the study population. **Table 10** provides the difference in difference analysis and coefficients for each corresponding variable for expected opioid-related visits. These variables listed below were used in the negative binomial regression analysis to calculate expected opioid-related and all-cause hospital visits for both groups. **Table 11** provides the results when analyzing expected opioid-related hospital visits. The OSOP intervention was found to reduce opioid-related events when comparing the two groups (Variable: Interaction; CE: -0.833; $p = 0.001$). The study group pre and post-enrollment, although not statistically significant, showed a 39.3% decrease in the expected opioid-related visits. This is slightly larger than the 32.2% reduction observed when included for all study participants, although that reduction was deemed statistically significant.

Table 10: Negative Binomial Regression of Expected Opioid-Related Hospital Visits

Variable	Difference in Differences Coefficient and Standard Error
Post-Period	0.334***
	0.110
Treatment	0.787***
	0.126
Post X Treatment (Interaction)	-0.833***
	0.179
Age	-0.069
	0.050
Black	0.122
	0.094
Other	-1.265***
	0.379
Female	-0.116
	0.093
Constant	0.099
	0.106
**** p<0.01, **p<0.05, *p<0.10*	

Table 11: COVID-19 Sensitivity Analysis: Expected Opioid-Related Hospital Visits for Historical Control and Study Groups with Confidence Interval

	Expected Visits	Confidence Intervals
Pre-Enrollment – Historical Control	1.105	(0.875, 1.334)
Post-Enrollment – Historical Control	1.542	(1.227, 1.858)
Pre-Enrollment – Study Group	2.425	(1.824, 3.026)
Post-Enrollment – Study Group	1.472	(1.090, 1.854)

The same analysis was completed for all-cause hospital visits. **Table 12** provides the difference in difference analysis and coefficients for each corresponding variable for expected all-cause hospital visits. **Table 13** provides the results when analyzing expected all-cause hospital visits. The OSOP intervention was found to not have a statistical significance on reducing all-cause hospital events when comparing the two groups (Variable: Interaction; CE: -0.177; p = 0.308). The study group pre and post-enrollment, although not statistically significant, showed a similar reduction in expected all-cause hospital visits. In the full analysis, the reduction in expected all-cause hospital visits was 12% when comparing pre and post-enrollment of the study group versus the 9% reduction when comparing pre and post-enrollment of the study group in this analysis.

Table 12: COVID-19 Sensitivity Analysis: Negative Binomial Regression of Expected All-Cause Hospital Visits

Variable	Difference in Differences Coefficient and Standard Error
Post-Period	0.080
	0.102
Treatment	-0.147
	0.123
Post X Treatment (Interaction)	-0.177
	0.174
Age	0.167***
	0.048
Black	0.393***
	0.088
Other	-0.789***
	0.295
Female	0.109
	0.089
Constant	1.238***
	0.102
*** p<0.01, **p<0.05, *p<0.10	

Table 13: COVID-19 Sensitivity Analysis: Expected All-Cause Hospital Visits for Historical Control and Study Groups with Confidence Interval

	Expected Visits	Confidence Interval
Pre-Enrollment – Historical Control	3.450	(2.761, 4.140)
Post-Enrollment – Historical Control	3.738	(2.988, 4.488)
Pre-Enrollment – Study Group	2.978	(2.235, 3.720)
Post-Enrollment – Study	2.703	(2.016, 3.390)

Discussion of Results

The results of this analysis indicate that with the implementation of OSOP, there is an observed effect in reducing emergency department visits, as well as observation and inpatient admissions for both opioid-related and all-cause events. The results of this study conclude that the OSOP intervention assists in reducing opioid-related visits, and these results are statistically significant. Specifically, there is a statistically significant 32.5% reduction in expected opioid-related visits pre and post-enrollment when analyzing the study group. Though not statistically significant, the results of this analysis observe an 8.4% reduction in the expected number of opioid related hospital visits over a 12-month period when comparing the historical control and study groups. These reductions are especially compelling as it's important to note that those in the study population are deemed high-risk for fatality as survivors of previous opioid overdose events.

Pertaining to all-cause hospital visits, the results demonstrate an observed but not statistically significant 12.0% reduction in all-cause hospital visits pre and post-enrollment into OSOP. There was a statistically significant 38.9% reduction in all-cause visits between the historical and control group. A sensitivity analysis conducted to examine the potential impact of hospital visits for patients enrolled in OSOP during the period of COVID-19 demonstrated even stronger results and reductions in expected opioid-related and all-cause hospital visits. These findings support the hypothesis of the study that the OSOP peer recovery specialist can support reducing subsequent hospital visits by offering a variety of different supports to participating patients, including referral to substance use treatment, access to harm reduction tools (e.g. naloxone), and education on opioid-use.

Strengths and Limitations

This analysis of the impact of the OSOP peer recovery specialists on patient utilization carries several strengths that support the external validity of the study. First, the study population, targeted as opioid overdose survivors, reflects a similar demographic when comparing opioid-related overdose deaths in Maryland. Specifically, the study population was 66% male. In 2018, males accounted for 73% of all opioid-related deaths in Maryland. The study population also was 60% White, and 33% Black compared to opioid-related deaths in Maryland in 2018 being represented by 63% White, and 34% Black, respectively ("Opioid Overdose Deaths," 2020). While this study may not be generalizable to other areas in the country, the characteristics of those included in the study group enhance its generalizability for assessment and broad application for practice or policy implications. Additionally, the payor sources were also

similar when comparing the study population and the historical group. While payor source could not be derived for all study participants, Medicaid FFS or MC made up 59.9% of the study population and 62.3% of the historical control group. Medicare FFS or MC enrollees accounted for 18.3% of the study population and 20.2% of the historical control group.

External validity is also strengthened using CRISP hospital utilization data. CRISP data allows for the analysis to incorporate hospital visits by patients at any hospital facility in the state of Maryland. The use of these data adds validity by including statewide hospital visit data rather than hospital visits exclusive to MedStar Health hospital facilities. However, if a patient visited a hospital in neighboring states such as Pennsylvania or West Virginia, this utilization would not be captured on CRISP or other regional health information exchange platforms.

The analysis of the impact of the OSOP peer recovery specialists on patient utilization carries several limitations and vulnerabilities, including study design, secular trends, and coding and/or documentation accuracy. First, as a quasi-experimental study, the study and historical control groups were not selected or analyzed as a formal randomized control trial. The use of propensity score matching helps to address this limitation, although this type of study nevertheless poses threats to both the internal and external validity (Campbell and Stanley, 1963). Relating to internal validity, the selection period of the historical control group was before the implementation of the OSOP program, but during a period in which the SBIRT protocol was already live. Thus, some patients included within the historical control group may have received assistance from a peer recovery specialist as part of SBIRT's implementation. However, the difference

between the other peer recovery specialists staffed in the emergency department versus the OSOP peer recovery specialist is the intensive nature, duration, and resource provided through OSOP.

It is also reasonable to think that the study population was more at risk than those in the historical control group because of the role of secular trends, specifically, the increase of availability and accessibility of fentanyl. It was necessary to select the historical control group that met the inclusion and exclusion criteria as close as possible to when OSOP went live at each of the hospitals within this study. As cited earlier, opioid-related deaths in Maryland have been increasing since 2010. According to the Centers for Disease Control and Prevention (CDC), Maryland experienced 504 opioid-related deaths in 2010 compared to 2,087 deaths in 2018 ("National Institute on Drug Abuse," 2019). However, it is important to understand the rise in deaths related to fentanyl. Fentanyl is a synthetic opioid that is known to be more potent than other opioids such as heroin or prescription drugs. In 2015, fentanyl-related deaths in Maryland totaled 340. The selection of the historical control group began during 2017. However, hospital-visit data for pre-enrollment visit analysis began in 2016. In 2016, fentanyl-related deaths in Maryland jumped 229% totaling 1,119. In 2017, the number continued to climb to 1,594. In 2018, fentanyl-related deaths in Maryland skyrocketed to 1,888 (**Appendix: Figure 5**). Baltimore City, the primary location of hospitals and patients in the setting of this study had the most fentanyl-related deaths with 758 ("Maryland Department of Health, 2019). This is an example of how the changes in the drug market may have influenced an assessment of patient utilization of hospital services when comparing both study groups.

Another secular trend that may have impacted the results was the impact of the coronavirus disease 2019 (COVID-19) pandemic for patients enrolled in OSOP from March 2019 – July 2019. The global pandemic altered the nature of communities accessing hospital services, such as visiting the emergency department beginning in late March or early April. The fear of transmission of COVID-19 by visiting a hospital may have caused an unknown reduction in the number of opioid-related or all-cause hospital visits in the post-enrollment period for the study group. On the contrary, during this time, there may have been an increased chance for relapse due to the social consequences of COVID-19, such as isolation. While it is too early to know COVID-19's impact on opioid overdoses, as well as corresponding hospital visits, initial data from the University of Baltimore shows that opioid overdoses increased by almost 20% from the state day of mandated state restrictions (Alter and Yeager, 2020). The historical control group and pre-enrollment study group hospital visits would not have been influenced by COVID-19. The sensitivity analysis conducted demonstrated that reductions of expected opioid-related visits were more significant when excluding patients that may have been impacted by the pandemic.

Another limitation of this study is assessing patient utilization through opioid-related events with the ICD-10 diagnostic codes as the source of the assessment. Relying on diagnostic codes for this study is dependent on the accuracy of the coding and documentation. In this study, the use of coding data may underreport the number of opioid-related emergency department visits, and observation and inpatient admissions. This can be a result if coding is based on presenting symptoms. For example, if the provider documents and codes the symptoms of an overdose as respirartory failure and

does not assign a final diagnosis code related to an opioid-related event the patient would not have been selected for the study. This is especially true as CRISP served as a key data source for data to be analyzed. Patient emergency department, inpatient, or observation visits from CRISP only included up to six specific codes per visit.

Future Research

Since the launch of OSOP at the four hospitals in this study, five other acute care facilities within MedStar have now implemented the program since late 2019. These hospitals are located outside the Baltimore region, such as hospitals in other jurisdictions of Maryland and Washington, DC. The training of OSOP peer recovery specialists and hospital clinicians was modeled after the original OSOP implementation in the four hospitals within this study. As their implementation matures, additional patient utilization data could be used to determine a more robust, regional assessment. Data could also be assessed for non-opioid related visits to inform hospital utilization trends on the impact of OSOP for all-cause hospital visits. One may hypothesize that even though the OSOP intervention is geared toward addressing opioid use disorder, the OSOP peer recovery specialists may also assist patients in navigating patients for other specialty service needs. As this study was also focused on assessing patient utilization over a pre and post-enrollment period of one-year, additional research could examine whether the reduction in hospital visits continues after the one-year post-enrollment, especially with the vulnerability of the study population to relapse.

Designing future methods of evaluation of this program may include studying the change in hospital visits from specific interventions that patients received. For example, future studies might include assessing whether a referral and linkage by the OSOP peer

recovery specialist to medication therapy for opioid use, such as buprenorphine, naltrexone, or methadone resulted in a greater impact or reduction of hospital-related visits than patients that did not receive such treatments. On a similar note, future research may seek to implement the expansion of providers eligible to provide these medication therapies. Additionally, more robust data regarding other psychosocial or clinical conditions may clarify the underlying drivers to both opioid use and hospital utilization. Future programmatic improvements to research systemic drivers may be to include incorporating a social needs assessment tool to begin tracking the specific needs of this vulnerable patient population.

Conclusion

The ability to identify and effectively evaluate the efficacy of interventions that states, local jurisdictions, and hospitals have implemented to combat the opioid epidemic is critical in determining whether such investments are making an impact. In an era of constrained federal and state funds, it is important to use public health funding wisely to help eradicate the opioid epidemic in Maryland and across the country. This study suggests that the Opioid Survivor Outreach Program peer recovery specialist, which provides several supportive services and resources to patients – the connection of shared lived experiences, referrals to treatment programs, naloxone, education on opioid-use – is effective in reducing opioid-related and all-cause hospital visits. These results validate OSOP as an effective intervention to engage opioid overdose survivors and should be explored to replicate in other hospitals.

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Appendix

Figure 1: Screening, Brief Intervention, and Referral to Treatment Components

("Evidence Supporting the Effectiveness of SBIRT," 2011)

Component	Goal
Screening (S)	• Quickly assess all ED patients' severity of substance use w/ validated tool as part of initial patient ED intake process • Identify appropriate level of intervention
Brief Intervention (BI)	• Peer Recovery Specialists provide real-time feedback • Increase insight and awareness regarding substance use and motivation to change • Negotiate and set goals
Referral to Treatment (RT)	• For those identified as needing more extensive care • Peer Recovery Specialists provide linkage to behavioral health provider for further assessment, diagnosis, and intake at proper level of care

Figure 2: ICD-10 Opioid-Related Diagnostic Codes

("Opioid-Related Codes Hospital Use," 2019)

ICD-10-CM Code	ICD-10-CM Description
F11.10	Opioid abuse, uncomplicated
F11.120	Opioid abuse with intoxication, uncomplicated
F11.121	Opioid abuse with intoxication delirium
F11.122	Opioid abuse with intoxication with perceptual disturbance
F11.129	Opioid abuse with intoxication, unspecified
F11.14	Opioid abuse with opioid-induced mood disorder
F11.150	Opioid abuse with opioid-induced psychotic disorder with delusions
F11.151	Opioid abuse with opioid-induced psychotic disorder with hallucinations
F11.159	Opioid abuse with opioid-induced psychotic disorder, unspecified
F11.181	Opioid abuse with opioid-induced sexual dysfunction
F11.182	Opioid abuse with opioid-induced sleep disorder
F11.188	Opioid abuse with other opioid-induced disorder
F11.19	Opioid abuse with unspecified opioid-induced disorder
F11.20	Opioid dependence, uncomplicated
F11.220	Opioid dependence with intoxication, uncomplicated
F11.221	Opioid dependence with intoxication delirium
F11.222	Opioid dependence with intoxication with perceptual disturbance
F11.229	Opioid dependence with intoxication, unspecified
F11.23	Opioid dependence with withdrawal
F11.24	Opioid dependence with opioid-induced mood disorder
F11.250	Opioid dependence with opioid-induced psychotic disorder with delusions

F11.251	Opioid dependence with opioid-induced psychotic disorder with hallucinations
F11.259	Opioid dependence with opioid-induced psychotic disorder, unspecified
F11.281	Opioid dependence with opioid-induced sexual dysfunction
F11.282	Opioid dependence with opioid-induced sleep disorder
F11.288	Opioid dependence with other opioid-induced disorder
F11.29	Opioid dependence with unspecified opioid-induced disorder
F11.90	Opioid use, unspecified, uncomplicated
F11.920	Opioid use, unspecified, with intoxication, uncomplicated
F11.921	Opioid use, unspecified, with intoxication delirium
F11.922	Opioid use, unspecified, with intoxication with perceptual disturbance
F11.929	Opioid use, unspecified, with intoxication, unspecified
F11.93	Opioid use, unspecified with withdrawal
F11.94	Opioid use, unspecified with opioid-induced mood disorder
F11.950	Opioid use, unspecified with opioid-induced psychotic disorder with delusions
F11.951	Opioid use, unspecified with opioid-induced psychotic disorder with hallucinations
F11.959	Opioid use, unspecified with opioid-induced psychotic disorder, unspecified
F11.981	Opioid use, unspecified with opioid-induced sexual dysfunction
F11.982	Opioid use, unspecified with opioid-induced sleep disorder
F11.988	Opioid use, unspecified with other opioid-induced
F11.99	Opioid use, unspecified with unspecified opioid-induced disorder
T40.0X1A	Poisoning by opium, accidental (unintentional), initial encounter
T40.0X1D	Poisoning by opium, accidental (unintentional), subsequent encounter
T40.0X1S	Poisoning by opium, accidental (unintentional), sequela
T40.0X4A	Poisoning by opium, undetermined, initial encounter
T40.0X4D	Poisoning by opium, undetermined, subsequent encounter
T40.0X4S	Poisoning by opium, undetermined, sequela
T40.0X5A	Adverse effect of opium, initial encounter
T40.0X5D	Adverse effect of opium, subsequent encounter
T40.0X5S	Adverse effect of opium, sequela
T40.1X1A	Poisoning by heroin, accidental (unintentional), initial encounter
T40.1X1D	Poisoning by heroin, accidental (unintentional), subsequent encounter
T40.1X1S	Poisoning by heroin, accidental (unintentional), sequela
T40.1X4A	Poisoning by heroin, undetermined, initial encounter
T40.1X4D	Poisoning by heroin, undetermined, subsequent encounter
T40.1X4S	Poisoning by heroin, undetermined, sequela
T40.2X1A	Poisoning by other opioids, accidental (unintentional), initial encounter
T40.2X1D	Poisoning by other opioids, accidental (unintentional), subsequent encounter
T40.2X1S	Poisoning by other opioids, accidental (unintentional), sequela
T40.2X4A	Poisoning by other opioids, undetermined, initial encounter
T40.2X4D	Poisoning by other opioids, undetermined, subsequent encounter
T40.2X4S	Poisoning by other opioids, undetermined, sequela
T40.2X5A	Adverse effect of other opioids, initial encounter
T40.2X5D	Adverse effect of other opioids, subsequent encounter

T40.2X5S	Adverse effect of other opioids, sequela
T40.3X1A	Poisoning by methadone, accidental (unintentional), initial encounter
T40.3X1D	Poisoning by methadone, accidental (unintentional), subsequent encounter
T40.3X1S	Poisoning by methadone, accidental (unintentional), sequela
T40.3X4A	Poisoning by methadone, undetermined, initial encounter
T40.3X4D	Poisoning by methadone, undetermined, subsequent encounter
T40.3X4S	Poisoning by methadone, undetermined, sequela
T40.3X5A	Adverse effect of methadone, initial encounter
T40.3X5D	Adverse effect of methadone, subsequent encounter
T40.3X5S	Adverse effect of methadone, sequela
T40.4X1A	Poisoning by synthetic narcotics, accidental (unintentional), initial encounter
T40.4X1D	Poisoning by synthetic narcotics, accidental (unintentional), subsequent encounter
T40.4X1S	Poisoning by synthetic narcotics, accidental (unintentional), sequela
T40.4X4A	Poisoning by synthetic narcotics, undetermined, initial encounter
T40.4X4D	Poisoning by synthetic narcotics, undetermined, subsequent encounter
T40.4X4S	Poisoning by synthetic narcotics, undetermined, sequela
T40.4X5A	Adverse effect of synthetic narcotics, initial encounter
T40.4X5D	Adverse effect of synthetic narcotic, subsequent encounter
T40.4X5S	Adverse effect of synthetic narcotic, sequela
T40.601A	Poisoning by unspecified narcotics, accidental (unintentional), initial encounter
T40.601D	Poisoning by unspecified narcotics, accidental (unintentional), subsequent encounter
T40.601S	Poisoning by unspecified narcotics, accidental (unintentional), sequela
T40.604A	Poisoning by unspecified narcotics, undetermined, initial encounter
T40.604D	Poisoning by unspecified narcotics, undetermined, subsequent encounter
T40.604S	Poisoning by unspecified narcotics, undetermined, sequela
T40.605A	Adverse effect of unspecified narcotics, initial encounter
T40.605D	Adverse effect of unspecified narcotics, subsequent encounter
T40.605S	Adverse effect of unspecified narcotics, sequela
T40.691A	Poisoning by other narcotics, accidental (unintentional), initial encounter
T40.691D	Poisoning by other narcotics, accidental (unintentional), subsequent encounter
T40.691S	Poisoning by other narcotics, accidental (unintentional), sequela
T40.694A	Poisoning by other narcotics, undetermined, initial encounter
T40.694D	Poisoning by other narcotics, undetermined, subsequent encounter
T40.694S	Poisoning by other narcotics, undetermined, sequela
T40.695A	Adverse effect of other narcotics, initial encounter
T40.695D	Adverse effect of other narcotics, subsequent encounter
T40.695S	Adverse effect of other narcotics, sequela
T40.0X2A	Poisoning by opium, intentional self-harm, initial encounter
T40.0X2D	Poisoning by opium, intentional self-harm, subsequent encounter
T40.0X2S	Poisoning by opium, intentional l self-harm, sequela
T40.0X3A	Poisoning by opium, assault, initial encounter
T40.0X3D	Poisoning by opium, assault subsequent encounter

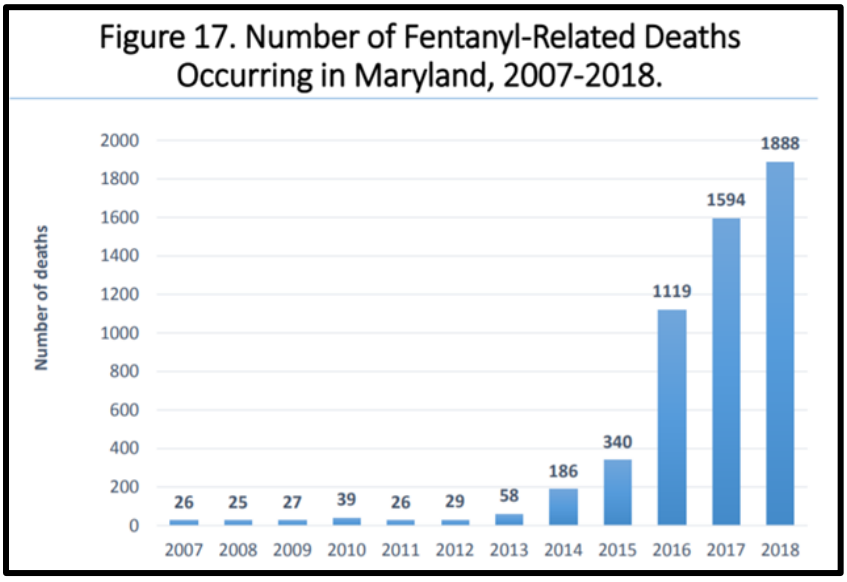
T40.0X3S	Poisoning by opium, , assault, sequela
T40.1X2A	Poisoning by heroin, intentional self-harm, initial encounter
T40.1X2D	Poisoning by heroin, intentional self-harm, subsequent encounter
T40.1X2S	Poisoning by heroin, intentional self-harm, sequela
T40.1X3A	Poisoning by heroin, assault, initial encounter
T40.1X3D	Poisoning by heroin, assault, subsequent encounter
T40.1X3S	Poisoning by heroin, assault, sequela
T40.2X2A	Poisoning by other opioids, intentional self-harm, initial encounter
T40.2X2D	Poisoning by other opioids, intentional self-harm, subsequent encounter
T40.2X2S	Poisoning by other opioids, intentional self-harm, sequela
T40.2X3A	Poisoning by other opioids, assault, initial encounter
T40.2X3D	Poisoning by other opioids, assault, subsequent encounter
T40.2X3S	Poisoning by other opioids, assault, sequela
T40.3X2A	Poisoning by methadone, intentional self-harm, initial encounter
T40.3X2D	Poisoning by methadone, intentional self-harm, subsequent encounter
T40.3X2S	Poisoning by methadone, intentional self-harm, sequela encounter
T40.3X3A	Poisoning by methadone, assault, initial encounter
T40.3X3D	Poisoning by methadone, assault, subsequent encounter
T40.3X3S	Poisoning by methadone, assault, sequela encounter
T40.4X2A	Poisoning by other synthetic narcotics, intentional self-harm, initial encounter
T40.4X2D	Poisoning by other synthetic narcotics, intentional self-harm, subsequent encounter
T40.4X2S	Poisoning by other synthetic narcotics, intentional self-harm, sequela
T40.4X3A	Poisoning by other synthetic narcotics, assault, initial encounter
T40.4X3D	Poisoning by other synthetic narcotics, assault, subsequent encounter
T40.4X3S	Poisoning by other synthetic narcotics, assault, sequela
T40.602A	Poisoning by unspecified narcotics, intentional self-harm, initial encounter
T40.602D	Poisoning by unspecified narcotics, intentional self-harm, subsequent encounter
T40.602S	Poisoning by unspecified narcotics, intentional self-harm, sequela encounter
T40.603A	Poisoning by unspecified narcotics, assault, initial encounter
T40.603D	Poisoning by unspecified narcotics, assault, subsequent encounter
T40.603S	Poisoning by unspecified narcotics, assault, sequela
T40.692A	Poisoning by other narcotics, intentional self-harm, initial encounter
T40.692D	Poisoning by other narcotics, intentional self-harm, subsequent encounter
T40.692S	Poisoning by other narcotics, intentional self-harm, sequela
T40.693A	Poisoning by other narcotics, assault, initial encounter
T40.693D	Poisoning by other narcotics, assault, subsequent encounter
T40.693S	Poisoning by other narcotics, assault, sequela

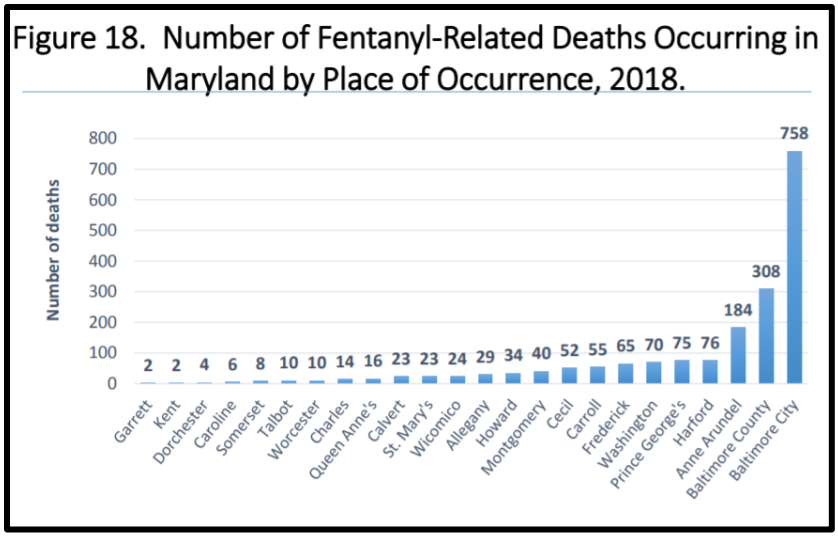
Figure 3: Inclusion and Exclusion Criteria – Study Group and Historical Control Group

Study Group	
Inclusion	**Exclusion**
18+ years of age	<18 years of age
Enrolled/consented to OSOP program via SBIRT screen, referral from clinician, suspected overdose	Enrolled, consented to OSOP program via SBIRT screen, referral from clinician, suspected overdose, but without ICD-10 diagnosis-specific to opioid-related event at time of enrollment/consent to OSOP program
Emergency Department visit at 4 study setting hospitals – MedStar Harbor Hospital, MedStar Union Memorial Hospital, MedStar Good Samaritan Hospital, MedStar Franklin Square Medical Center during the time period of March 2018-July 2019	
ICD-10 diagnosis code specific to opioid-related event at the time of enrollment/consent to OSOP program – **Appendix: Figure 2**	
Historical Control Group	
18+ years of age	<18 years of age
Did not enroll in OSOP program	ICD-10 diagnosis-specific to opioid-related event not present
Emergency Department visit at 4 study setting hospitals – MedStar Harbor Hospital, MedStar Union Memorial Hospital, MedStar Good Samaritan Hospital, MedStar Franklin Square Medical Center – during the time period of May 2017 – February 2018	
ICD-10 diagnosis code specific to opioid-related event – **Appendix: Figure 2**	

Figure 4: Fentanyl-Related Deaths in Maryland by Year

"Maryland Department of Health, 2019"





Chapter 2: Engaging Opioid Overdose Survivors: Impact of Peer Recovery Specialists on Health System Cost Avoidance

Abstract

Objectives: To evaluate the impact of Opioid Survivor Outreach Program (OSOP) peer recovery specialist intervention on opioid-related and all-cause hospital charges.

Design: Program evaluation with a study and historical control group using propensity score matching. A difference of means statistical analysis was completed to assess the differences in charges on opioid-related and non-opioid related visits. Aggregate charges were then analyzed to determine differences between pre and post-enrollment periods of both groups.

Setting: Four hospitals in urban and suburban areas of Baltimore, Maryland metro region.

Participants: There were 416 patients in the study group that received the OSOP intervention. Individuals are identified primarily in the emergency department and are known opioid overdose survivors. A historical control group of 416 individuals was used to compare results.

Intervention: OSOP provides peer recovery specialist services to patients, including opioid education, harm reduction tools, and refers and/or links patients to substance use treatment and recovery support services.

Main Outcome Measure: Associated hospital charges of opioid-related and all-cause hospital visits.

Results: The results of this research demonstrate that opioid-related visits result in an average increase in total charges $703 when compared to non-opioid related hospital

visits. When analyzing gross charges and considering the annual costs to operate the OSOP program, the OSOP program allows the healthcare system to avoid $1.1M in opioid-related hospital charges over one year and $770K in all-cause hospital charges. **Conclusions:** The results suggest that the OSOP peer recovery specialist, which provides several supportive services and resources to patients is effective in reducing opioid-related and all-cause hospital visits and is an effective cost-avoidance strategy for hospitals and health systems.

Introduction and Statement of the Problem

Opioid-related deaths in Maryland have been increasing since the year of 2010. According to the Centers for Disease Control (CDC), Maryland experienced 504 opioid-related deaths in 2010 compared to 2,087 deaths in 2018 ("National Institute on Drug Abuse," 2019). Chapter 1 outlined the important role that hospitals play in responding to the opioid epidemic. In reviewing opioid-related data in Maryland and Massachusetts, most patients that experienced a fatal opioid-overdose had at least one opioid-related visit to a hospital before their fatality (Holler, 2016; Tobin, 2020). States have utilized funds from the 21st Century Cures Act of 2016 to deploy opioid-related interventions within hospital settings. The focus of this research is to determine the effectiveness of one of those programs, the Opioid Survivor Outreach Program (OSOP).

The OSOP peer recovery specialist conducts a multi-pronged effort as part of the intervention, which on average is an engagement with patients of 30-90 days. Without the OSOP peer recovery specialist as an integrated member of the healthcare team, those experiencing an opioid overdose event would not receive any of the navigation services in the hospital or post-discharge (Hollar, 2016). Implementation of the program at MedStar Health was first launched in the Baltimore regional hospitals – MedStar Harbor Hospital, MedStar Good Samaritan Hospital, MedStar Union Memorial Hospital, and MedStar Franklin Square Medical Center. There were 416 patients included in this study.

Chapter 1 sought to explore the relationship of patients enrolling in OSOP and its impact on hospital visits. The results found that enrollment in OSOP reduces the probability of experiencing subsequent opioid-related and all-cause hospital visits. This

chapter explores the value of cost avoidance to a health system for the reduction of these subsequent visits. This aim is relevant to the policy and practice implications of the OSOP program. Specifically, Maryland has a unique all-payer model whereby a state-run rate commission sets hospital rates under a global budget revenue system. Known currently as Total Cost of Care, the goals of the model are to reduce overall per capita spending, improve quality, reduce hospital-acquired conditions, and focus on rooting out spending through initiatives that reduce readmissions and potentially avoidable utilization (Maryland All-Payer Model 2020). Maryland defines potentially avoidable utilization as "hospital care that is unplanned and can be prevented through improved care, care coordination, or effective community-based care or care cost increases that result from a potentially preventable complication occurring in a hospital" ("Health Services Cost Review Commission," 2014). Additionally, as part of the Total Cost of Care model, it encourages a hospital to focus on population health initiatives in three areas in partnership with state agencies – behavioral health, including both mental health and substance use, diabetes, and care for medically complex older adults ("Maryland's Total Cost of Care Model," 2017).

Assessing the impact of OSOP from a cost avoidance perspective offers the ability to determine its financial value because of its success in reducing emergency, observation, and inpatient opioid-related hospital visits. No studies have been done to evaluate the financial value proposition of the OSOP program. Therefore, the research aim of this Chapter is to fill this gap within the literature and ascertain the value of cost avoidance for the health system by implementing OSOP. This research seeks to answer the following questions:

1. Given the reduction of subsequent hospital-related visits found in Chapter 1 by enrolling in OSOP, what was the difference of opioid-related and all-cause hospital visit costs for patients receiving the OSOP intervention compared to a historical control group of patients that did not?
2. What is the net total cost avoidance benefit (value) to the health system after accounting for operational costs to implement and sustain the program?

Literature Review

As outlined in Chapter 1, the rapid adoption of peer recovery specialist programs, ignited by funding from the 21st Century Cares Act in 2016 to states to address the opioid epidemic has led to only a handful of studies that evaluate impact. Most of the evaluation studies are based on process-metrics. For example, Indiana's implementation of a peer recovery program receives referrals from hospital emergency departments through a call center, which then dispatches them to that site. Like OSOP, the program looks to connect patients to outpatient treatment centers for follow-up care after discharge from the hospital and train patients to administer naloxone (Waye et al., 2019). Indiana's program evaluated its success in a six-month pilot. In one emergency department during that time, a total of 82 patients were engaged with a peer recovery specialist. Thirty-seven patients (44% of those engaged) were confirmed to attend at least 1 follow-up appointment while 19 (23% of those engaged) were still receiving treatment for opioid use after 6 months (Watson et al., 2019). A similar process-metric oriented study in Rhode Island issued similar results. Rhode Island's evaluation yielded similar results with significantly more patients. Peer recovery specialists worked with 1,208 people through the period of July 2016 through June 2017. Of the 1,208 people,

51% were connected to treatment, which was defined broadly and included but was not limited to inpatient and outpatient treatment and medication-assisted treatment. Nearly 90% of all individuals engaged received training to administer naloxone and were provided naloxone kits (Waye et al., 2019).

The literature on assessing peer recovery specialist programs, specific to substance use support for patients, in addition to determining their impact on avoiding cost to the health system, is scant. However, studies have demonstrated that healthcare systems that have better mechanisms to identify people with opioid use disorder and connect them to treatment in outpatient settings can reduce rates of mortality and healthcare expenditures. While reviewing charts of 3,000+ patients with opioid use and/or dependence, Masson et. al (2002) found that people with opioid use disorder use the emergency department for overdose-related events, as well as for care associated with their opioid use such as infections. Healthcare expenditures for these patients were more than double in a comparison of patients that did not include opioid users (Masson et al., 2002). It is important to note that this study did not use a peer recovery specialist as an intervention.

Another research study assessed the difference in healthcare costs for patients with opioid dependence that received medication treatment – methadone, buprenorphine, and naltrexone – versus patients that did not receive any medication. An assessment of almost 13,316 patients showed total health care costs, including hospital visits and pharmacy costs, were 29% lower for patients that received one form of these medication treatments (Baser, Chalk, Fiellin, & Gastfriend, 2011). In a more recent, similar study evaluating Medicaid expenditures in Vermont, results concluded that

connection to these medication treatments reduced hospital visits and overall healthcare costs, although not statistically significant, when reviewing 6,000 beneficiary records (Mohlman et. al., 2016). The results of both studies have strong ties in the consideration of assessing OSOP's role in generating cost avoidance to the health system. One of the key aspects of the role of the OSOP peer recovery specialist is to build a rapport with the patients to encourage treatment. Referrals and linkages to providers that provided these medication treatment modalities are often facilitated through the OSOP peer recovery specialist.

Methods

Study Design

For this research aim, a quasi-experimental design was used to compare patients that received the OSOP peer recovery specialist intervention to a historical control group of patients that did not receive the intervention. Data for this analysis was provided through the Chesapeake Regional Information System for our Patients (CRISP). CRISP is the regional health information exchange system that serves as a central hospital utilization data warehouse in Maryland and Washington, D.C. Specifically, the data acquired through CRISP provided the gross patient charges per encounter for all opioid-related and non-opioid related emergency department visits and observation and inpatient admissions for the pre and post-encounter periods for both the study and historical control groups. Operational costs to facilitate the program were provided by MedStar Health's finance team. These costs will be used in the analysis of this research to help calculate an overall net value of health system cost avoidance. The population of both the study and control groups were the same as described in Chapter

1 and listed below in **Figure 1**. The study was approved by three Institutional Review Boards (IRBs), including MedStar Health Research Institute, Johns Hopkins Bloomberg School of Public Health, and Maryland Department of Health.

Table 1: Inclusion and Exclusion Criteria – Historical Control and Study Groups

Study Group	
Inclusion	**Exclusion**
18+ years of age	<18 years of age
Enrolled/consented to OSOP program via SBIRT screen, referral from clinician, suspected overdose	Enrolled, consented to OSOP program via SBIRT screen, referral from clinician, suspected overdose, but without ICD-10 diagnosis-specific to opioid-related event at time of enrollment/consent to OSOP program
Emergency Department visit at 4 study setting hospitals – MedStar Harbor Hospital, MedStar Union Memorial Hospital, MedStar Good Samaritan Hospital, MedStar Franklin Square Medical Center during the time period of March 2018-July 2019	
ICD-10 diagnosis code specific to opioid-related event at the time of enrollment/consent to OSOP program	
Historical Control Group	
18+ years of age	<18 years of age
Did not enroll in OSOP program	ICD-10 diagnosis-specific to opioid-related event not present
Emergency Department visit at 4 study setting hospitals – MedStar Harbor Hospital, MedStar Union Memorial Hospital, MedStar Good Samaritan Hospital, MedStar Franklin Square Medical Center – during the time period of May 2017 – February 2018	
ICD-10 diagnosis code specific to opioid-related event	

Data Analysis

The analysis included two parts. The first part included tests to understand the differences in the average hospital charges between opioid-related and all-cause hospital visits between the historical control and study groups. The first test was to calculate an average charge for opioid-related and non-opioid related hospital visits. This analysis was completed to validate existing literature for the historical control group and study populations, which previously found that opioid-related visits tend to be associated with more hospital charges (Masson et. al, 2002). To improve statistical significance, all opioid-related and all-cause hospital visits were analyzed across both pre and post-enrollment periods of the historical control and study groups. A two-sample t-test was conducted to determine the difference in means. **Table 2** provides an overview of the design as replicated from Chapter 1 in analyzing opioid-related and all-cause hospital visits. For this analysis, hospital visit charges in the pre and post-enrollment periods are dictated by the enrollment date of the individuals in the historical control and study groups.

Table 2: Overview of Design in Analyzing Hospital Visit Charges of Historical Control and Study Groups with Enrollment Dates

Pre-Enrollment Hospital Visits	Enrollment Date	Post-Enrollment Hospital Visits
Hospital visit charges for 12 months before individual enrollment date	Historical Control Group May 2017 – February 2018	Hospital visit charges for 12 months post to individual enrollment date
Hospital visit charges for 12 months before individual enrollment date	Study Group March 2018 – July 2019	Hospital visit charges for 12 months post to individual enrollment date

Because the OSOP peer recovery specialist provides patients with connection to recovery services, treatment, and harm reduction tools (e.g. naloxone), it is

hypothesized that this may potentially reduce the associated visit charges of patients in the post-period for the study group. To understand this phenomenon, a two-sample t-test to determine the difference in means between the average charge of an opioid-related hospital visit in the post-enrollment periods of the historical control and study groups was conducted.

The second part of this analysis included quantifying avoidable utilization to determine the overall numerical value of cost avoidance to the health care system. As outlined earlier, avoidable utilization prevents the need for resource consumption and other related expenses to be incurred by the healthcare system. Health system cost avoidance was calculated by reviewing the gross charges of patients specific to the opioid-related emergency department visits and observation and inpatient admissions at any hospital within the state of Maryland. Total gross charges were then aggregated for the historical control and study groups for pre and post-enrollment opioid-related and non-opioid-related hospital visits. To account for the change in the value of gross charges throughout the study, the annual update factor issued by the Maryland Health Services Cost Review Commission (HSCRC) was applied. For example, any visit in the study that occurred in fiscal year (FY) 2020 was considered the base year. Charges associated with visits occurring before FY20 were reduced by 1.83%, the update factor provided by the rate-setting commission for FY19. Charges associated with visits occurring before FY19 were reduced by 3.14%; before FY18 were reduced by 2.16%; and FY17 were reduced by 2.40% (“Annual Update to Unit Rates…, 2020).

Once a total for the value of aggregate cost avoidance related to hospital charges was calculated, the amount was then compared to the operational costs of

administering the OSOP program to calculate an overall net cost avoidance to the healthcare system. The operational costs of the OSOP program were calculated to be inclusive of salaries, fringe benefits, equipment (e.g. computer/laptop), office supplies, and associated mileage expenses for travel within the community. The value of cost avoidance from unnecessary spending and patient utilization was then compared with the cost to operate the OSOP program to determine its total benefit (value) to the health system.

Results

Characteristics of the study population (n=416) are included in Table 3. Among those that were included in the study group were 39.66% Black, Other, or Unknown and 60.34% White. Those in the study population ranged in age from 18 to 83. The mean age of participants was 44.43. Of those in the study group, 25.96% were 18-34 years old, 31.73% were 35 – 49 years old, 35.82% were 50-64 years old, and 6.49% were over the age of 65. Like the study group, the historical control group included participants that were 39.66% Black, Other, or Unknown and 60.34% White. Of those matched to the historical control group, 25.96% were 18-34 years old, 29.81% were 35 – 49 years old, 33.17% were 50-64 years old, and 11.06% were over the age of 65. 65.87%, of those in the study group were male.

The payor source was also derived using CRISP. For the study population, 9.29% of those enrolled were covered under commercial plans, 53.85% under Maryland Medicaid – Managed Care (MC) plans, 6.01% under Maryland Medicaid – Fee for Service (FFS) plan, 14.90% under Medicare FFS, 3.37% under Medicare MC, and 11.06% were noted as self-pay / charity care. Th payor source could be attributed to

409 participants in the study group and 412 in the historical control group. For the historical control group, 11.41% of those enrolled were covered under commercial plans, 54.81% under Maryland Medicaid – Managed Care (MC) plans, 7.45% under Maryland Medicaid – Fee for Service (FFS) plan, 18.03% under Medicare FFS, 2.16% under Medicare MC, and 5.05% were noted as self-pay / charity care. The only significant differences in demographics between the two groups were those in the category of age greater than 65 and those with self-pay insurance.

Table 3: Patient Characteristics: OSOP Peer Recovery Specialist Study Group and Historical Control Group

Demographic	Study Population (n=416)	Historical Control Group (n=416)	P-Value
Race/Ethnicity			
White	251 (60.34%)	251 (60.34%)	1.00
Black / Other / Unknown	165 (39.66%)	165 (39.66%)	1.00
Age			
18-34 years	108 (25.96%)	108 (25.96%)	1.00
35-49 years	132 (31.73%)	124 (29.81%)	0.55
50-64 years	149 (35.82%)	138 (33.17%)	0.42
65+ years	27 (6.49%)	46 (11.06%)	0.02*
Gender			
Male	274 (65.87%)	274 (65.87%)	1.00
Female	142 (34.12%)	142 (34.12%)	1.00
Payor Source	*(n=409)*	*(n=412)*	
Commercial Other	38 (9.29%)	47 (11.41%)	0.30
MD Medicaid – Managed Care	224 (53.85%)	228 (54.81%)	0.78
MD Medicaid – FFS	25 (6.01%)	31 (7.45%)	0.40
Medicare – FFS	62 (14.90%)	75 (18.03%)	0.22
Medicare – MC	14 (3.37%)	9 (2.16%)	0.29
Self-Pay / Charity	46 (11.06%)	21 (5.05%)	0.001*

*$p < 0.05$

The analysis focused on the differences in the charges associated with opioid-related hospital visits and non-opioid-related hospital visits. **Table 4** shows these

results. When collectively analyzing all visits for both the historical and study groups, the average charge of an opioid-related hospital visit, including emergency department, observation, and inpatient admissions, was $703 more than the average charge of a non-opioid related hospital visit. The average charge of an opioid-related hospital visit was $4,227.39 compared to $3,524.16 for non-opioid-related visits, a 16.6% difference. This difference was found to be statistically significant (t = -2.70; p = 0.0069).

Table 4: Historical Control Group and Study Group Average Charge Per Hospital Visit Combined with Confidence Intervals

Visit Type	Visit #	Average Charge Per Visit	Confidence Interval
Opioid-Related Visits	1,980	$4,227.39	($3,828.45, $4,626.33)
Non-Opioid Related Visits	5,598	$3,524.16	($3,255.79, $3792.53)
Total Visit and Overall Aggregate Charge	7,578	$3,707.90	($3,483.86, $3,931.95)
Difference	-	$703.23	(-$1,212.98, -$193.48) ***

***p<0.01 (0.0069)

Further, when comparing opioid-visits in the post-enrollment period for the historical control and study groups, the average charge per visit in the study group was observed to be lower by $893. **Table 5** denotes that the average charge per hospital visits for opioid-related events in the post-period for the study group was $4,035.40 compared to $4,929.26 for the historical control group, a 18.1% reduction. This difference was not found to be statistically significant. (t= 1.445; p = 0.1488). As noted in Chapter 1, there were fewer opioid-related visits in the post-enrollment period for the study group than observed in the historical control group.

Table 5: Average Charge per Opioid-Related Hospital Visits for Historical Control and Study Groups Post-Enrollment with Confidence Intervals

Visit Type	Visit #	Average Charge Per Visit	Confidence Interval
Opioid-Related Visits – Historical Control Group	587	$4,929.26	($4,044.13, $5,814.39)
Opioid-Related Visits – Study Group	445	$4,035.40	($3,270.53, $4,800.27)
Total – Combined	1,032	$4,543.83	($3,942.27, $5,145.38)
Difference	-	$893.85	(-$320.17, $2,107.88)

Table 6 below provides a summary of the aggregate hospital visit charges for opioid and non-opioid related visits pre and post-enrollment periods for both the historical control and study group over a twelve-month period. The results demonstrate an impact of the OSOP intervention on cost avoidance to the healthcare system when compared to the historical control group for opioid-related visits. When comparing the pre and post-enrollment of those in the study group, the reduction in opioid-related visits resulted in a decrease of $145,801 in charges. However, the historical control group experienced the exact opposite results. When comparing pre and post-enrollment of the historical control group, the increase in overall opioid-related hospital visits resulted in the health system incurring $1,154,032 in charges. The best estimate of total charges avoided by the health system for opioid-related visits as a result of implementing the OSOP program is approximately $1,299,833.

Table 6: Total Charges for Opioid and Non-Opioid Related Hospital Visits Pre and Post Enrollment for Historical Control and Study Group (12 Months)

Historical Control Group N=416; Enrollment Period: May 2017-February 2018				Difference: Pre vs. Post
Pre-Enrollment: Non-Opioid Diagnosis	$5,714,165	**Post-Enrollment: Non-Opioid Diagnosis**	$6,137,773	-$423,608
Pre-Enrollment: Opioid Diagnosis	$1,739,443	**Post-Enrollment: Opioid Diagnosis**	$2,893,475	-$1,154,032
Pre-Enrollment: Total – Combined	$7,453,608	**Post-Enrollment: Total – Combined**	$9,031,248	-$1,577,640
Study Group N=416; Enrollment Period: March 2018 – July 2019				
Pre-Enrollment: Non-Opioid Diagnosis	$3,561,934	**Post-Enrollment: Non-Opioid Diagnosis**	$4,314,374	-$752,440
Pre-Enrollment: Opioid Diagnosis	$1,941,556	**Post-Enrollment: Opioid Diagnosis**	$1,795,755	$145,801
Pre-Enrollment: Total – Combined	$5,503,490	**Post-Enrollment: Total – Combined**	$6,110,129	-$606,639

Similarly, when combining non-opioid and opioid-related hospital visits, the study group yields different results. When combining non-opioid and opioid-related hospital visit costs, the study group incurs $606,639 in charges. When combining non-opioid and opioid-related hospital visit costs, the historical control group incurs $1,577,640. Opioid-related visit costs made up 73% of the total costs incurred in the historical control group. Therefore, for all-cause hospital visits, the best estimate of net total costs avoided by

the health care system through the implementation of OSOP is $971,001 ($1,577,640 increase in the historical control group less $606,639 in the study group). The overall operational costs of the OSOP program during the study period totaled $197,678. **Table 7** shows the total budget for the costs to facilitate the program for the four study hospitals included in this research.

Table 7: Operational Costs of OSOP from Study Setting Hospitals

Budget Item	Amount
Salaries (3.0 full-time) OSOP peer recovery specialists)	$106,080
Fringe Benefits (@ 23%)	$24,398
Supplies and Equipment (laptop, phone, materials, educational items, etc.)	$34,650
Other Expenses (mileage, printing/copying, training, professional development, etc.)	$32,550
Total	$197,678

If you incorporate the operational costs of OSOP, the best estimate of total hospital charges avoided by the health system through the implementation of OSOP for opioid-related hospital visits net of the program's operational costs is approximately $1,102,155 ($1,299,833 of opioid-related hospital charges less the $197,678 in OSOP program costs). The net best estimate of total hospital charges avoided for all-cause hospital visits is approximately $773,323 ($971,001 of all-cause hospital charges less the $197,678 in OSOP program costs). These figures represent a summary of a net benefit analysis of implementing the program, and therefore, avoiding unnecessary acute care spending.

Discussion of Results

The results indicate that the implementation of OSOP results in a reduction of hospital charges of $1,102,155 for opioid-related hospital visits. The results also show a reduction in avoiding hospital charges when combining opioid and non-opioid related hospital visit costs. Hospital charges avoided for all-cause hospital visits totaled $773,323. In a total cost of care model, where the incentive is to reduce potentially avoidable utilization and the associated charges, the reduction in charges observed represents a cost-avoidance to the health system and a saving to the overall national healthcare expenditure. These findings demonstrate that OSOP may be effective in referring or linking patients to other medical services outside of substance use treatment. For example, OSOP may be effective in linking patients to primary care, or infectious disease services for those that may present complications or other medical concerns stemming from the use of substances. Additional analysis data would be needed to document and understand this phenomenon.

The findings also suggest an incentive exists for hospitals to address opioid-related events for patients because of statistically significant difference in the cost per visit compared to non-opioid related visits. The results showed that opioid-related hospital visits on average generate $703 more in associated hospital charges. Although not determined to be statistically significant, another finding of this study is that the costs for opioid-related visits for those in the study group after enrolling in OSOP were lower by $893 than patients with opioid-related in the historical control group. It is recognized that differences in associated visit charges for opioid-related visits between the historical control and study groups observed do exist. One may justify this reduction

of associated visit charges for opioid-related events if there were differences in the insurance type between the historical control and study groups. However, the insurance type between patients in both groups was very similar. See **Table 2** earlier in the chapter as a reference. Other reasons for this observed difference could be that the acuity of visits for those in the OSOP program was lessened by the resources provided to the patient as a participant in the program. These resources include naloxone, fentanyl-test strips, or connection to medication treatment modalities such as buprenorphine, methadone, or naltrexone. More data collection is needed to understand what might have led to the observed differences.

Strengths and Limitations

As mentioned in Chapter 1, one of the strengths of this study was that the regional information exchange system, CRISP, was leveraged to capture hospital utilization, charges, and insurance type. The use of this data allowed the analysis to capture a more comprehensive review of the OSOP program by incorporate hospital visit information beyond only MedStar hospitals. However, there are some limitations to using CRISP data in this analysis. As discussed in Chapter 1, as it pertains to analyzing patient utilization and cost data, that information is dependent upon the accuracy of provider documentation and ICD-10 coding. Both sources of data used for this analysis – MedStar Health's electronic medical record and CRISP – provided patient utilization data with diagnostic codes that were used to determine whether a visit was opioid-related or non-opioid related. The accuracy of coding data is not the sole concern. Information from CRISP only provided the first six diagnostic codes for a unique patient visit, allowing for the likelihood that opioid-related events may have been underreported

for inclusion in this analysis. If opioid-related codes were not among the top six in a patient's record for a visit, that patient's visit would be classified as a non-opioid related visit.

The other limitations and strengths of this study are consistent with the themes discussed in Chapter 1. For limitations, this cost analysis was completed using data from the historical control and study groups that included a quasi-experimental study design and not a randomized control trial. Further, the analysis was completed by not knowing how the rapid increase in availability and use of fentanyl impacted hospital visits, as well as associated hospital charges. The impact of the coronavirus disease 2019 (COVID-19) pandemic may have influenced patient utilization patterns. The strengths include the external validity of the historical control and study groups being a close reflection of opioid overdose deaths in the state of Maryland as it pertains to their demographics of gender, age, and race/ethnicity.

Future Research

The results of this study only include an analysis of the savings derived from acute care utilization. Therefore, the analyzed results are not reflective of a patient's total cost of care. One of the goals of OSOP is to connect patients to healthcare services outside of the hospital that are proven to be less costly. If a patient enrolls in OSOP and gets connected to an outpatient treatment therapy such as buprenorphine to manage their opioid use disorder, the costs of those services were not included as part of this study. Future studies could follow the longevity of healthcare services accessed by patients through OSOP to get a more comprehensive view of the total cost of their care that is inclusive of inpatient and outpatient spending.

As mentioned in the previous chapter, this study also was limited to assessing cost avoidance over a 12-month pre and post period for the historical control and study groups. Additional research could examine the longer-term impact of cost avoidance. For example, the aggregate value of cost avoidance may decrease in subsequent years as some members included in the study design experience to relapse, resulting in additional hospital visits and associated costs. This analysis could be paired with a broader view of not only assessing changes in hospital charges but narrowing the scope further to the actual unit-level cost of care delivered by the healthcare system. This analysis would include applying cost-to-charge ratio for each hospital visit. The cost-to-charge ratio is a mechanism for determining the actual cost of hospital care when comparing what was charged to the patient and their respective health insurance plan. The cost-to-charge ratio varies by each specific hospital entity based upon the mix of services (e.g. tertiary services such as transplant procedures) ("Outlier Payments," 2013).

Conclusion

This result of this study suggests that the OSOP peer recovery specialist, which provides several supportive services and resources to patients – the connection of shared lived experiences, referrals to treatment programs, naloxone, education on opioid-use – is effective in not only reducing opioid-related and all-cause hospital visits but is an effective cost-avoidance strategy for the hospital or healthcare system. The OSOP peer recovery specialists support patients to receive care and treatment outside of the hospital in outpatient environments, which in turn is a more cost-effective means for them to be served. Such results have both policy and practice implications in

providing an incentive for broader application in other hospital settings and encourage dialogue on the potential for peers to be reimbursed in Maryland for their services so that more hospitals could adopt such service.

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Appendix

Figure 1: Screening, Brief Intervention, and Referral to Treatment Components

("Evidence Supporting the Effectiveness of SBIRT," 2011)

Component	Goal
Screening (S)	• Quickly assess all ED patients' severity of substance use w/ validated tool as part of initial patient ED intake process • Identify appropriate level of intervention
Brief Intervention (BI)	• Peer Recovery Specialists provide real-time feedback • Increase insight and awareness regarding substance use and motivation to change • Negotiate and set goals
Referral to Treatment (RT)	• For those identified as needing more extensive care • Peer Recovery Specialists provide linkage to behavioral health provider for further assessment, diagnosis, and intake at proper level of care

Chapter 3: Engaging Opioid Overdose Survivors: Insights from the Field on the Role and Efficacy of Peer Recovery Specialists

Abstract

The previous two chapters evaluated a health system's implementation of a peer recovery specialist intervention known as Opioid Survivor Outreach Program (OSOP). Chapters 1 and 2 demonstrated a favorable impact on achieving reductions in subsequent hospital utilization for opioid-related events, and therefore, reduced associated hospital charges. This study sought to interview the frontline peer recovery specialists, as well as emergency department physicians and nurses to provide a comprehensive evaluation of the efficacy of the program. A total of 11 individuals in these roles participated in in-depth interviews. Interviews included three key areas of questions – effective strategies to engage patients in OSOP, best practices to refer and link patients to treatment, and gaining insights of the OSOP peer recovery specialist as a member of the multidisciplinary healthcare team. Interviews from participants confirmed that a peer recovery specialist lived experiences encourage patients to engage in the program. Peers also have a command of the treatment ecosystem to effectively advocate and link patients to care. Further, insights from providers give other health institutions considerations on how to build a successful OSOP program in the emergency department environment.

Introduction and Statement of the Problem

Opioid-related deaths in the state of Maryland increased by an alarming 300% between 2010 and 2018. As outlined in the previous two chapters, states and local jurisdictions have sought to develop and deploy a variety of strategies to address the nation's opioid epidemic. These interventions are often multi-faceted given the complexity of the crisis. Specific interventions within these areas included expanding access to medication therapy treatment, monitoring and placing limitations on providers to prescribe opioids, increasing the availability of naloxone, and creating drug courts to support rehabilitation over criminalization ("Executive fOrder…," 2017; "Missouri Department of Public Safety," 2017). States have also found that nonfatal overdoses are a strong risk factor for fatal overdose events. In 2013, Maryland found that 66% of individuals that died from an opioid overdose had at least one hospital visit before their death (Holler, 2016). Knowing this risk factor, states have also used federal and state funding to develop hospital-based programs that seek to engage individuals with substance use disorders.

One of those strategies is to integrate peer recovery specialists, those with lived experience with substance use in their past, into emergency department environments. Many states, including New Jersey, Nevada, and Indiana have deployed peer recovery specialists within hospital environments to connect with patients at-risk for overdose. These programs work directly in and/or with emergency department providers to connect patients to treatment and provide them with naloxone administration training (McGuire et. al., 2020). The purpose of this research is to evaluate the effectiveness of Maryland's approach to deploy peer recovery specialists. Now implemented across the

state, MedStar Health was one of the first hospital systems in Maryland in partnership with the state Department of Health and Mosaic Group to implement the Opioid Survivor Outreach Program (OSOP). Driven by a peer recovery specialist with lived experience specific to opioid use in their past, the tenets of the intervention are to connect with patients in hospital environments that experience opioid overdoses. The program provides patients with several supportive services and resources – the connection of shared lived experiences, referrals to treatment programs, naloxone, and education on opioid use.

The first two chapters demonstrate that OSOP supports reducing subsequent opioid-related and all-cause hospital visits after enrollment, even when compared to a historical control group. These findings support the ability to reduce unnecessary hospital utilization and provide an effective means of cost avoidance by the healthcare system. While the literature is vast in its depth of qualitative research on the efficacy of peer recovery specialists in the mental health and substance use arena, the goal of this research is to learn more about the efficacy of the OSOP program in achieving the reductions in hospital utilization and cost avoidance. Building upon the quantitative data analyzed, qualitative methods will be applied in structuring, conducting, and analyzing the results of interviews with OSOP peer recovery specialists, emergency department nurses, and emergency department physicians. The insights gained will assist in a comprehensive evaluation of OSOP using not only quantitative data analyzed in the previous two chapters, but also qualitative data. The intention of collecting qualitative data provides additional insights to be leveraged in guiding other hospitals in their quest

to implement the same or similar peer-driven intervention. Specifically, the aims of this research through interviews with frontline staff are to glean the following:

- Summarize effective strategies used in the OSOP intervention to avoid future acute hospital utilization
- Review and determine best practices in referring and linking patients to substance use treatment to prevent future inpatient utilization
- Understand the OSOP peer recovery specialist's relationship as a member of the healthcare system and an integrated member of the interdisciplinary healthcare workforce
- Document any barriers or improvements that could be made to strengthen the program as it is considered for broader implementation at other hospital systems

Literature Review

The United States Substance Abuse and Mental Health Services Administration (SAMHSA) defines peer providers as "a person who uses his or her lived experience of recovery from mental illness and/or addiction, plus skills learned in formal training, to deliver services in behavioral health settings to promote mind-body recovery and resilience ("Peer Providers," n.d.)". Peer recovery specialists have gained traction as advocacy, self-help organizations, and twelve-step-based programs began to rise with more prominence (Myrick and Vecchio, 2016). One of the first programs, Alcohol Anonymous, began in the late 1930s. Throughout the past century, other groups have been created that model the organization's approach, including Narcotics Anonymous and Al-Anon, which targets family and friends of individuals with alcoholism ("Center for

Substance Use Treatment," 1999). The integration of peers into these programs started to first occur in the 1970s (Myrick and Vecchio, 2016).

The use of peer recovery specialists has demonstrated significant and compelling outcomes for clients and patients served. Favorable clinical outcomes include assisting patients in recovery by increasing the days of abstinence and providing measurable decreases in substance use (Rowe et. al., 2007). Peers also add value in providing several psychosocial support and connection to services for patients, including housing (Boisvert, Martin, Grosek, and Clarie, 2008), reducing criminal activity (Rowe et. al., 2007), and encouraging primary care treatment and goals of care adherence (Tracy, Burton, Nich, and Rounsaville, 2011). It is also worth noting that the role of a peer recovery specialist is replicated to support other patients, such as those with chronic disease. Roles such as community health workers or lay health advisors have also shown similar results for these chronic disease states. The Witness Project, which is focused on providing health education, specifically targeting black women, reported an increase in the rate of breast and cervical cancer screenings using lay health advisors (Shelton et. al., 2015).

The first two research aims were designed to review the OSOP peer recovery specialist program from an effectiveness perspective on reducing patient utilization and cost. However, the opportunity to conduct qualitative in-depth interviews allows for a more comprehensive analysis of the program. Specifically, in-depth interviews allow for a deeper analysis of what exactly allows the OSOP peer recovery specialist to be so effective. Qualitative research has been conducted to understand the efficacy of the role. To determine a more in-depth understanding of a peer's role in Massachusetts and

their integration into the state mental health system, peers, their supervisors, and clients were interviewed. Peers, supervisors, and clients all noted that their effectiveness lies in their ability to connect and build rapport through a mutually shared experience. This research was conducted just after the Affordable Care Act started covering more behavioral health services through health plans, and therefore, encouraged more widespread peer adoption in a variety of healthcare settings. The gaps identified in the literature were opportunities to further define the role of a peer recovery specialist in terms of expectations in integrating peers as part of a multi-disciplinary healthcare team (Cabral et. al., 2013).

Other studies have sought to examine the implementation of peer recovery specialist programs funded by the 21st Century Cares Act through qualitative data. Assessing peer recovery specialist support specific to opioid use that was integrated into a women's health clinic in Kentucky found the following emerging themes of what makes an effective peer in the view of patients – lived experiences, authenticity, and are an accountability partner to maintain participation in treatment programs. The outcomes noted positive results in assisting women in their treatment and continuum of care, especially post-partum (Fallin-Bennett, Elswick, and Ashford, 2020). A review of emergency-based peer programs in three states – New Jersey, Nevada, and Indiana – by McGuire et. al (2020) had the same goals as the Opioid Survivor Outreach Program, the intervention central to this research. Specifically, the programs were designed to 1) integrate peer recovery specialists as part of a multidisciplinary healthcare team in the emergency department, 2) focus efforts on identifying opioid overdose survivors and linking them to available peer supports, and 3) connect patients to treatment and other

support services. Given that not much is known on patient outcomes, or assessment of health system outcomes, such as patient utilization or cost avoidance, the researchers suggested that future studies should look to evaluate these elements to encourage more widespread adoption in other acute, or outpatient clinical settings (McGuire et al., 2020).

The OSOP peer recovery specialist program as the primary focus of this research proved successful in reducing subsequent hospital visits after enrollment in the program. However, this research seeks to explain those findings in a qualitative research design by interviewing the OSOP peers, as well as the physicians and nurses that interact with the program to care for patients. Specifically, the purpose of this study was to assess three areas – effective strategies used to enroll patients in OSOP, best practices in referring and linking patients to substance use treatment, and understanding the OSOP peer recovery specialists' relationship as a member of the larger interdisciplinary healthcare workforce. Such findings should assist in recommending program adoption to other healthcare systems.

Methods

Design

Informed in partnership with the Maryland Department of Health and the Mosaic Group, a community health services national consulting firm, the OSOP peer recovery specialist conducts a multi-pronged effort as part of the intervention, which on average is a 30-90-day engagement period with each enrolled patient. Patients are connected to the program through a few different methods. Individuals can be referred to the program if a member of the care team, such as a physician or nurse, suspect an opioid overdose

as a reason for visit, or if a patient self-reports opioid use as part of their emergency department visit. The OSOP peer recovery specialist provides a range of supportive services to patients, including, but not limited to referring and linking patients to treatment, supportive services such as access to housing, transportation, and food resources, and providing harm reduction tools (e.g. naloxone) or education.

Implementation at MedStar Health was first launched in the Baltimore regional hospitals in March 2018. The hospitals included MedStar Harbor Hospital, MedStar Good Samaritan Hospital, MedStar Union Memorial Hospital, and MedStar Franklin Square Medical Center. The OSOP program is an extension of existing peer recovery specialist programs at the four hospitals that have been in place since 2017. MedStar Harbor Hospital and MedStar Franklin Square Medical Center employ one OSOP peer recovery specialist for their respective campuses. Given the overlapping service areas, MedStar Union Memorial Hospital and MedStar Good Samaritan Hospital share an OSOP peer recovery specialist between their two campuses. Therefore, three OSOP peer recovery specialists cover all four hospitals. Through the period of March 2018 – July 2019, the OSOP peer recovery specialists have worked with 615 patients. In this study, the first two research aims were analyzed to find a directional reduction in opioid-related visits and associated costs over a 12-month period. Data were then collected by conducting in-depth interviews with three key stakeholders of OSOP – OSOP peer recovery specialists, emergency department physicians, and emergency department nurses. The study was approved by the MedStar Health Research Institute and Johns Hopkins Bloomberg School of Public Health's Institutional Review Boards (IRB).

A total of four (4) OSOP peer recovery specialists were asked to participate in the study, and two accepted the invitation and completed the interview. One of the OSOP peer recovery specialists that participated in the interview is a peer assigned to one of the study setting hospitals. The other OSOP peer that completed an interview is assigned to a hospital within the MedStar Health system, but not at one of the study setting hospitals. Other MedStar Health hospitals have implemented OSOP since the four included in this study, and to increase the number of eligible OSOP peer recovery specialists to participate in interviews, OSOP peers from other hospital settings were included as part of the recruitment process. It is important to note that the OSOP peer recovery specialist that participated and is not directly employed at one of the study setting hospitals received the same training as the other OSOP peer. Additionally, the OSOP programs at the other MedStar Health hospitals have the same policies and protocols for operations, including identification of patients, referral criteria, and data collection/evaluation.

The physicians selected to recruit for the interviews were those that serve in a leadership capacity as either chair or vice-chair of the emergency department, but also practice clinically at the study setting hospitals. A total of eight physicians were asked to participate in the study, and five accepted the invitation and completed the interview. The nurses selected to recruit for the interview were those that serve in a charge nurse capacity of the study setting hospitals. A total of 25 nurses were asked to participate in the study, and four accepted the invitation and completed the interview. All those recruited to participate received three follow-up e-mails, as well as a phone call. The OSOP peer recovery specialists, physicians, and nurses that did not accept the

interview did not refuse to participate; rather, these individuals did not respond to any contact attempts. Interviews with physicians and nurses lasted between 12 to 46 minutes with the average length running approximately 32 minutes. Both interviews with the OSOP peer recovery specialists were over 1 hour.

Interviews were conducted by two masters-level students at the Johns Hopkins Bloomberg School of Public Health. Both students completed ethical research training through the Johns Hopkins Bloomberg School of Public Health and participated in two mock interviews with Ryan Moran, the lead researcher of the study before completing any official interviews. Participants in the interviews were recruited to participate in a secure WebEx video conferencing service. Interviews were not conducted face-to-face due to the COVID-19 global pandemic. Interviews were recorded via the WebEx platform. Interviews were then transcribed by Ryan Moran, the lead researcher of this study. Interviews included open-ended, scripted questions that were informed by other qualitative research previously conducted in this field, such as the work of Powell et al. (2019) to evaluate peer recovery specialist programs in the state of New Jersey. The qualitative data from the interviews were designed to evaluate and help discern and explain the results as it relates to changes in inpatient utilization and its potential corresponding impact on reducing unnecessary hospital costs. The interviews served to also help shape best practices to be shared for other programs, hospitals, or health institutions wishing to design a successful implementation of OSOP. The full key informant guide used by the interviewers, as well as the questions for all three stakeholders can be found in **Appendix: Figure 1.** The structure of the interview questions for all three stakeholders was split up into three key categories:

- Effective strategies used in the process to avoid future acute hospital utilization
- Best practices in referring and linking patients to substance use treatment to prevent future inpatient utilization
- Insights on their relationship with the healthcare system as an integrated member of the interdisciplinary healthcare workforce

Analysis

After transcription of all interviews, the data were analyzed and coded by Ryan Moran, the lead researcher on this study to appropriately capture and articulate key themes. Specifically, the analytical method of narrative content analysis was used to interpret the responses and identify patterns from the research (Owczarzak, 2020). The analysis used a mix of both inductive and deductive techniques. The process was deductive because specific categories that framed the interviews and corresponding responses were gleaned from previous studies. For this research, those categorical selections – effective strategies to engage patients, best practices in linking and/or referring patients to treatment, and collecting insights on peer recovery specialists as part of the health care team – were derived from previous qualitative review of peer recovery specialist programs in New Jersey (Powell et al., 2019). The process was inductive as the content of interviewee responses allowed for additional codes, categories, or themes to emerge (Owczarzak, 2020).

The analytical technique also followed a latent analysis when reviewing the data, which allows codes, themes, and categories to be derived by evaluating the intention or meaning of the participant responses (Bengtsson, 2016). The process of reviewing the data for analysis was through an iterative process conducted by the researcher, which

included the four steps of the content analytical process – decontextualization, recontextualization, categorization, and compilation of research for analysis. The full framework for analysis is included in **Appendix: Figure 2.** Additional recruitment was not completed after the coding of the first 11 interviews as the researcher determined that responses provided reached a level of saturation. Saturation in the analysis is defined as the point within the research where no new insights, categories, or emerging themes can be gleaned from additional data collection. Previous literature that assesses the most appropriate number of in-depth interviews in public health research suggests that saturation occurs in the first twelve interviews conducted (Guest, Bunce, & Johnson, 2006).

Results

A total of 11 interviews were completed – two OSOP peer recovery specialists, five emergency department physicians, and four emergency department nurses. Participating nurses and physicians all had significant tenure with the organization. Their experience practicing emergency department nursing or physician practice ranged between 3 and 16 years at the study setting hospitals. This tenure allowed them to contextualize responses from a perspective of working in the emergency department before OSOP implementation. The OSOP peer recovery specialists participating in this study included an individual that was hired at program inception while the other peer had less than one year of experience in the role.

The results below are organized as it pertains to the research study's three key areas of interest – determining effective strategies used to engage patient in OSOP intervention, determine best practices to link and refer patients to care, and evaluate the

OSOP peer recovery specialists' relationship as a member of the healthcare team. Because of the sample size, information, or direct quotes that may be linked to personally identifiable information have been removed or edited, from any responses included in the results.

Effective Strategies to Engage Patients in OSOP

Responses from physicians and nurses report that the chief reason that OSOP peer recovery specialists are so effective in convincing patients to engage in the program is their ability to relate. They stressed their efficacy of being a peer to patients, bringing their own lived substance use experiences to their work. This allows them to relate to patients and establish trust in a way that clinical providers are not able to harness. Analysis of participant responses validated that the OSOP peer recovery specialists were effective in their role – from patient engagement to referring and linking patients to treatment – because of their ability to relate with patients in a way that is different from clinical providers. In engaging patients to talk about enrolling in the OSOP program, one nurse illustrated the power of a shared connection between the patient and peer recovery specialists:

> **Provider:** "We like to reiterate that these are people [OSOP peer recovery specialists] that are their peers, that have been where they have been…It's easy for us as hospital staff to lecture them or give them [patient(s)] information, but without us ever being in their shoes, being where they are…we just like to relate those two things together to make the individuals more susceptible to speak with our peer recovery coaches."

Similarly, another key theme that emerged from nurses and physicians is the importance of integrating the peer recovery specialist early in the patient's emergency department visit, regardless of whether their chief complaint was related to substance use. This allows the peer to devote more of their time in working with the patient to understand their readiness for support to enroll in OSOP. Providers and peers also provided insight as to why OSOP peer recovery specialists may not be effective in engaging patients to enroll in the program. The top reasons included individual patient readiness to seek support and/or treatment for their substance use disorder, as well as patients not acknowledging that their substance use disorder is a concern.

> **Peer:** "When they are ready, it's easy. If they are not ready, it's hard. Once again, you're talking about the disease of addiction, and a lot of times people don't know that they have a disease. They are in denial. When you are in denial, you don't know that you are in denial until you come out of denial. I understand the process. I'm a person myself in long-term recovery, so I understand the process. It is easy when they're ready, and it's very difficult when they are not."

For patients that declined to participate, one best practice noted was the peer recovery specialists would leave their business card with their contact information. They encourage patients to follow up if the patient changes their mind or wants to discuss peer services in the future. Other notable reasons included patients having enrolled previously in a treatment program and found that to be unsuccessful, or some presenting with substance use were already engaged in a treatment program (e.g. medication therapy program, residential program, etc.).

Best Practices in Linking and Referring Patients to Care

Providers shared their impressions that peer recovery specialists have a superior knowledge of the treatment provider system, as well as the ability to advocate on their behalf to receive these services.

> **Provider:** "I think that a lot of the peer recovery coaches have ins or ties to certain places. So, I think that they are much more effective at getting people to these facilities than I might be, or even knowing what all of them are. Unless we do our own digging or research I just feel like, they know much more about the whole process than we do and what the patient needs to get there, or get in."

These providers also acknowledged that providing a patient with supportive services is also an effective means to capture the opportunity on a patient's readiness for care. Thus, the practice of arranging transportation directly from the emergency department to an agreed-upon treatment provider assists in the accountability of patients to commit to receiving treatment. Other commonalities of best practices of navigating patients to care included working with emergency department physicians to ensure patients had appropriate medications and/or prescriptions to enroll in outpatient programs. Peers noted how important it was to link their patients to treatment services.

> **Peer:** "Very. That's right at the top of the list. Top of the list. It's urgent. It's urgent."

> **Peer:** "I want to say a seven out of ten, because yes, I want to see them to get help. I want to see them turn things around, but sometimes it's going to take three months before they're willing to do that. Yeah, it's about the relationship that you make. I'm not super depressed if they don't get sent right from the

emergency department. It upsets me, but there's still more opportunities. I don't see it as a failure because now I'm still going to be in contact with them."

In this series of questions, all 11 participants were provided with preliminary results of the study's research aims on patient utilization and cost. The program's impact on reducing opioid-related hospital visits, as well as assisting the health system in avoiding cost was all met with favorable reactions. Half of the participants noted that they would have expected to see even more favorable results as it pertains to patient recidivism to the emergency department. This finding corresponds with providers' reactions to the positive experiences and outcomes in working with peer recovery specialists. They believe that the impact that peer recovery specialists have in referring or linking patients to substance use treatment to reduce future hospital visits is greater than what is observed in the raw data. Thus, their perception is that peer recovery specialists are supporting patients' needs in a significant way to reduce future opioid-related hospital visits.

While understanding best practices for referral and linkage to substance use treatment is useful, this research also provided evidence for the barriers that peer recovery specialists also encounter. The chief barrier among all participants interviewed is the availability or accessibility of finding patients' treatment options. The participants illustrate the challenges of finding the appropriate level of behavioral health service to meet patient needs based on a variety of factors – acuity level, treatment provider hours of operations, insurance accepted, and the mere lack of treatment options. A provider brings context to this barrier.

Provider: “I'm guessing there's probably a limited number of places they can go for recovery and so they have a limited number of beds and staff to care for these patients. That’s probably the biggest barrier having enough centers or detox centers for the patients.”

One of the peers noted the difficulty of treatment access based on insurance accepted by the treatment program.

Peer: “Some places just won't accept it [patient’s insurance]. A lot of patients have Medicaid. There are only two providers that take Medicaid, or maybe one. If they don’t have the supplement of A or B, then it’s a struggle. And then, with no insurance, we advocate with the social work team to get them some insurance so we can get them in the door.”

The other barriers to serving patients were not only lack of access and availability of treatment providers, but the lack of resources from a societal perspective to support patients. The most common additional resources that can serve as a barrier to serving patients and their substance use needs include access to reliable transportation, as well as quality and affordable housing. One provider discussed both challenges to serve patients, narrating the intersection of social determinants of health and clinical services.

Provider: “I don’t know how we could provide this, but stable housing. And if there's some way to assist in that regard…stable housing is in the root of a lot of people's problems. Again, transportation is also an issue, if there's some way they can help with that.”

Other solutions and ideas were also provided to strengthen OSOP intervention as a mechanism to support patients in their treatment and recovery journeys. Like the

most common barrier of treatment availability and accessibility, participants called for more mental and behavioral crisis investments by the hospital. Further, other common themes included the development of a more proactive community-based model for peer recovery specialists. Participants noted the program integrated with the hospital as reactive, meaning that patients must present with an overdose or opioid-related event before being able to get support. They suggested a model where community navigation of a peer recovery specialist team could be deployed in communities that would support the goal of saving even more lives. Further, other ideas also included providing more naloxone and medication assistance for patients that may not be able to afford opioid treatment medications.

OSOP Peer Recovery Specialist Relationship as Member of Healthcare Workforce

The overwhelming response from nurses and physicians provided in this research commented that the overall experience of working with the OSOP peer recovery specialists has been positive or very positive. Eight of the nine individuals interviewed noted their experiences and interactions ranged from positive to very positive. Only one provider commented on having limited interaction in working with the peer recovery specialists. Of most significance, the OSOP peer recovery specialists as an integrated team member in the busy emergency department environment were deemed to enhance or assist their practice as a clinician. One physician explicitly noted:

> **Provider:** “It clearly doesn't detract [from our clinical practice] at all. Ever. Clearly, it's just as if it was another service that we feel we never thought about, but also now, I can’t imagine how we can even practice ED medicine without having them.”

To arrive at this state of collaboration, participants noted that the implementation of OSOP did not come without its challenges or barriers. Participants noted that there was not always full buy-in from staff when the program began.

> **Provider:** "There was distrust on the staff at the beginning. We wondered who they [peers] were and if they would really find the resources for our patients. But watching them do it, having rapport with the patients and understand their role has changed staff perception."

These providers commented on the evolving nature of the relationship between the peer recovery specialists as the program has matured and become part of standard clinical operations. Since its inception, the overall sentiment is that the peers have become more integrated with the department over-time. This evolution of a stronger relationship and integration as part of the healthcare team results in having buy-in from staff through proper training and education. The lack of buy-in from all staff – physicians, nurses, social work, and other providers – is noted as one of the key pitfalls to avoid if other hospitals are considering adopting the program. To facilitate this buy-in, participants suggested proper staff training to introduce the OSOP peer recovery specialist, as well as their role and responsibilities.

> **Provider:** "Explain to your staff what the peer recovery coach can provide and how they can help you is huge. Because sometimes the nurses or doctors may feel like it is a burden. Make sure that when you integrate the service that you introduce everyone to the peer, what their purpose is and what they are there for. You want to make sure that relationship is well received from the beginning."

Nurses and physicians also provided practical considerations as other hospitals or hospitals consider adopting the OSOP program. They note the selling points of the program include the ability for organizations and healthcare providers to save lives, connect their work to the mission of their entities, and reduce emergency department recidivism and overall cost. They advised on resources needed to adopt the program including the ability to hire and manage the peer recovery specialist teams, ensure proper space in the department for peers to work, and having the ability to connect patients to the OSOP resources through electronic medical record (EMR) screening tools and referral processes.

In summary, common and key themes from each of the three-research questions and areas for physician and nurse interviews are documented in **Table 1.** The below results are a summation of results provided through the study. A full codebook of all results is listed for reference in **Appendix – Figure 3.**

Table 1: OSOP Peers, Physician, and Nurse Interviews: Common and Key Themes with Included Sample Quotes from Participants

Research Area 1: Effective Strategies to Engage Patients in OSOP		
Providers: What is your overall experience in working with the OSOP peers?		
	Frequency of Observation	**Notable Quotes from Participants or Code Explanation**
Positive Experience	10	***Provider**: And then as a resource nurse, it's kind of nice to have that extra person there to kind of look into things and maybe even offer a different perspective on our patients. So, it's been a good experience to interact with them.*
Collaborate on Patient Care	5	*Discusses how providers work with peers to connect patients to treatment.*
All: What are effective ways to engage patients in OSOP?		
Relatable to Patient	15	***Provider:** We like to reiterate that these are people [OSOP peer recovery specialists] that are their peers, that have been where they have been…It's easy for us as hospital staff to lecture them or give them [patient(s)] information, but without us ever being in their shoes, being where they are…We just like to relate those two things together to make the individuals more susceptible to speak with our peer recovery coaches.*

Early Integration of Peer in Care	6	*Refers to integrating the peer early in the patient's care to engage them in OSOP program.*
Patient willingness/readiness	2	*Refers to OSOP peers encountering patients at a stage for change.*
Contact Information	2	*Leaving contact information behind if patient is not ready to enroll so that patient can enroll for future outreach*
All: Reasons Patients Do Not Participate		
	Frequency of Observation	**Notable Quotes from Participants**
Readiness	10	***Peer:*** *When they are ready, it's easy. If they are not ready, it's hard. Once again, you're talking about the disease of addiction, and a lot of times people don't know that they have a disease. They are in denial. When you are denial, you don't know that you are in denial until you come out of denial. I understand the process. I'm a person myself in long-term recovery, so I understand the process. It is easy when they're ready, and it's very difficult when they are not.*
Acknowledgement	8	*Patient recognizing that there is a substance use and/or misuse present.*
Already Engaged in Treatment	2	*Patient is already linked to existing treatment program*
Previous Negative Treatment Outcome	2	*Patient resists treatment option due to having a negative experience or outcome.*
Providers: Do you believe that OSOP enhances or distracts from your clinical practice?		
Easier	6	***Provider:*** *It clearly doesn't detract [from our clinical practice] at all. Ever. Clearly, it's just as if it was another service that we feel we never thought about, but also now, I can't imagine how we can even practice ED medicine without having them.*
No More Difficult	5	*Providers note that OSOP peers make it no more difficult to practice.*
Research Aim 2: Best Practices to Refer and Link Patients to Treatment		
All: Effective practices to refer or link patients to treatment.		
	Frequency of Observation	**Notable Quotes from Participants**
Substance Use Service System Knowledge	13	***Provider:*** *I think that a lot of the peer recovery coaches have ins or ties to certain place. So, I think that they are much more effective of getting people to these facilities than I might be, or even knowing what all of them are. Unless we do our own digging or research I just feel like, they know much more about the whole process than we do and what the patient needs to get there, or get in.*
Transportation	6	*Peers arranging transportation directly from emergency department to end payments to treatment programs/services*
Time	6	*Refers to the amount of time peers must devote to patients that clinical providers do not.*
Advocacy	6	*Working with ED providers to advocate for clinical care delivery in order to prepare treatment for program/outpatient placement*
All: Barriers to refer or link patients to treatment,		
Access and Availability	13	***Provider:*** *I'm guessing there's probably a limited number of places they can go for recovery and so they have a limited number of beds and staff to care for these patients. That's probably the biggest barrier having enough centers or detox centers for the patients.*

		Peer: *Some places just won't accept it [patient's insurance]. A lot of patients have Medicaid. There are only two providers that take Medicaid, or maybe one. If they don't have the supplement of A or B, then it's a struggle. And then, with no insurance, we advocate with the social work team to get them some insurance so we can get them in the door.*
Transportation	3	*Patients do not have reliable access to transportation to engage in a program.*
Peers: How important is it to you to get your patient into treatment?		
Important – Very Important	2	***Peer:*** *Very. That's right at the top of the list. Top of the list. It's urgent. It's urgent.* ***Peer:*** *I want to say a seven out of ten, because yes, I want to see them get help. I want to see them turn things around, but sometimes it's going to take three months before they're willing to do that. Yeah, it's about the relationship that you make. I'm not super depressed if they don't get sent right from the ER. It upsets me, but there's still more opportunities. I don't see it as a failure because now I'm still going to be in contact with them.*
All: What more could be done to serve opioid overdose survivors?		
Mental Health/Crisis Services	6	*More behavioral health capacity in outpatient and inpatient settings are needed to serve population.*
Stable Housing	2	***Provider:*** *I don't know how we could provide this, but stable housing. And if there's some way to assist in that regard…Stable housing is in the root of a lot of people's problems.*
Community Peer Model	2	*Participants note that peers embedded in the community may be a preventative model to consider.*
All: What are your initial reactions to seeing preliminary results of decreased visits and cost savings to hospital through patients engaging in OSOP?		
Amazing / Positive / Good	*8*	*Participants respond favorably to seeing utilization and cost data results.*
Not surprised / Neutral	*3*	*Participants respond neutrally to seeing patient and cost data.*
All: Were the results as you would have expected?		
Less Than Expected	4	*Participants respond that they thought that utilization and cost results would be more significant.*
Better Than Expected	3	*Participants respond that they thought results were better than expected.*
As Expected	4	*Participants respond that they thought results were as expected.*
Research Aim 3: OSOP as a Member of Healthcare Team		
All: How has the relationship changed between ED providers and OSOP peers since when first launched?		
	Frequency of Observation	**Notable Quotes from Participants**
More Integrated – Collaborative	8	*Participants observe a more integrated and collaborative model since first adoption.*
Communication Improved	5	*Participants observe better communication to serve patients between providers and peers.*
All: Resources needed for success – considerations for other health systems adopting		
Peers	6	*Peers are needed to effectively make the program successful.*
Office Space	4	*Peers and other staff need space in order to be integrated into the team.*
Screening Tool	2	*Workflow and processes must be supported by hospital/site EMR.*

Staff Buy-In	2	*Key to success is having buy-in from all staff that work with peers.*
MAT	2	*Providers note that it is helpful to have initiation of MAT to support patient treatment options.*
Outpatient Treatment Access	2	*Outpatient treatment capacity is needed to effectively serve patients.*
Training – staff	2	*Program must be supported by quality training.*
All: What are the selling points of the program?		
Mission-Driven	8	*Program is at the heart of service in a health system and aligns with hospitals mission to serve communities*
Patient Recidivism and Cost	6	*Program helps reduce patient visits to hospital.*
All: What are the pitfalls to avoid?		
Staff Buy-in	5	***Provider:*** *Explain to your staff what the peer recovery coach can provide and how they can help you is huge. Because sometimes the nurses or doctors may feel like it is a burden. Make sure that when you integrate the service that you introduce everyone to the peer, what their purpose is and what they are there for. You want to make sure that relationship is well received from the beginning.* ***Provider:*** *There was distrust on the staff at the beginning. We wondered who they [peers] were and if they would really find the resources for our patients. But watching them do it, having rapport with the patients and understand their role has changed staff perception.*
Weak EMR / Process	3	*Workflow and processes must be supported by hospital/site EMR.*

Discussion of Results

The rapid advent of the integration of peer recovery specialists into acute care settings to address the opioid epidemic is a trend realized nationwide through federal funds from the 21st Century Cures Act. The role of peer support to assist patients in the behavioral health field of medicine has demonstrated effective outcomes ranging from improved clinical outcomes, reduced mortality, and greater adherence to care plans (Boisvert, Martin, Grosek, and Clarie, 2008; Rowe et. al., 2007; Tracy, Burton, Nich, and Rounsaville, 2011). The leading national organization to issue these funds, SAMHSA, recently noted the role of peer support as a core element to the future of behavioral health care delivery ("Peer Support Recovery Is the Future," 2020). Ohio Empowerment, a behavioral health advocacy and training organization, has equipped more than 200 peer recovery specialists to serve the field in the state of Ohio. Their

lead executive, Jack Cameron, provides a thoughtful summation of the results of this research:

> "The real value a peer supporter has is that they are uniquely qualified to engage people with mental health issues. When we look at what we call 'hotspots'—people who use a lot of health care services—early evidence indicates that peer supporters can reach people who are hard to reach. Sometimes, someone who has a similar history but who has developed the ability to stay out of the hospital has credibility, can get people to try things they might be reluctant to try. They engage the consumer, make a connection, do the little things. It is really an art form." (Paragraph 10)

Chapters 1 and 2 of this research measured the efficacy of reducing hospital visits by enrolling high-risk, vulnerable opioid overdose survivors from emergency departments into a peer recovery specialist program. The results proved promising, demonstrating a reduction in subsequent hospital visits with associated avoidance of health care costs. This chapter sought to provide a more comprehensive review to glean insights on what makes the program successful in reducing hospital visits. This study suggests that the "art form" of a peer to connect with patients, engage them in their recovery, and advocate for them throughout the healthcare ecosystem are the elements to their efficacy. The findings validated other qualitative studies performed that suggest their lived experiences are a key element to relating to patients (Cabral et. al., 2014). Participants also note that one of the most effective aspects of the program is the peer recovery specialists' superior knowledge of the substance use treatment landscape. They are noted to be resourceful in connecting patients to treatment

programs because of their strong and often long-standing relationships with community treatment providers.

The study also adds new contextual evidence of peer recovery specialist integration into hospital emergency department settings by surveying nurses and physicians on how they work together to deliver patient care. The experiences in working with peer recovery specialists were unanimously positive with the illustration of the value that they provide to thinking of peers as a standard role in the delivery of emergency medicine. One provider even notes that “I’m not sure how we can even practice emergency medicine without them.” However, it is also important to note that this high appreciation of the peer recovery specialist role was not immediate. It took time in providing necessary staff training on the scope and parameter of their role, as well as observing the value that this role brings as an interdisciplinary member of the clinical care team. Participants site this as an internal cultural barrier that was overcome to make the program as successful and collaborative as it is today.

The program’s success and day-to-day operations were noted to also have challenges and barriers to effectively serve patients. The participants on the frontline of the opioid epidemic in urban and suburban study setting hospitals brought forth the validation of challenges in servicing this patient population. Namely, they cite lack of outpatient and inpatient behavioral health capacity as both state and federal data trends confirm (“A Roadmap to Essential…, 2017; “Mental Health Association of Maryland,” 2015; Sisti, Sinclair, and Sharfstein, 2018). The lack of access and availability of treatment providers poses challenges in providing immediate support to patients that are ready to begin recovery. When asked how the hospital could address these barriers,

the top response was to make more investments in behavioral health and crisis services. Other barriers included the lack of community resources to assist the social needs of patients, including housing, transportation, and prescription drug affordability.

This study went further than to merely validate other research and studies on the effectiveness of a peer recovery specialist role. The study adds new evidence to the literature in thinking about the successful implementation science of integrating peers into the emergency department, or other hospital environments. Key considerations for replicating the program include a commitment to hire and oversee a peer recovery specialist team and provide them with dedicated tools and space to work within the department. It is also advised that the integration of peers connect directly to other providers by documenting within a shared electronic medical record (EMR). Providers note that it's essential to develop strong referral processes through the EMR.

Strengths and Limitations

While a total of 11 interviews were collected for this analysis, only two interviews were conducted with OSOP peer recovery specialists. This provided for a more limited insight from peer recovery specialists that deliver the program, which in part was due to a small number of participants to recruit from within the study setting hospitals. However, one of the peers interviewed has served as an OSOP peer recovery specialist since the inception of the program at one of the study setting hospitals. This OSOP peer recovery specialist has worked with nearly 1,000 opioid overdose survivors through OSOP, allowing for substantial insights to be gained. The process to recruit OSOP peer recovery specialists may be viewed as a selection bias, as it was not conducted randomly and is not necessarily representative of the entire peer recovery specialist

workforce (Sherman, 2017). The similarity of the questions asked for all roles – peers, physicians, and nurses – allow for emerging themes, however, to be produced from all participants.

As mentioned earlier, OSOP at each of the four study setting hospitals is an extension of other peer recovery specialists that also serve emergency department patients. While the physicians and nurses were directly asked questions specific to the OSOP, some did not necessarily distinguish their responses between the OSOP peer recovery specialists versus the other dedicated peers. This discrepancy was first observed when transcribing the interviews when respondents would specifically mention peer recovery specialists by name that were not peers dedicated to OSOP. On the surface, this phenomenon may appear to be a limitation in the program's evaluation. However, it is believed that the answers provided for the analysis and results of this research are defensible. This conclusion is determined because OSOP is a mere extension of the other peer recovery specialists working in the study setting hospitals. Non-OSOP peer recovery specialists work collaboratively with nurses and physicians to refer patients to the OSOP peer recovery specialist. The pool of peers in the emergency department is viewed as a collective team by physicians and nurses to effectively serve patients with a broad range of substance use disorders, including opioid overdose survivors. Thus, the observations from nurses and physicians in working with peer recovery specialists serve as defensible contributions to this research, as well as the body of peer recovery specialist evaluation literature.

These findings provide data to hospital administrators seeking value, including financial, to be swayed to implement the program. Staff note that it's important to garner

buy-in from the entire team before launching such a program. This buy-in is suggested to be facilitated through solid staff training that conveys role definition and delineation of peers. The results also provide specific resources needed to adopt the program, including the ability to hire and oversee staff, as wells as workflows, technology, and protocols needed for success. These findings bring concrete practice implications in assisting with the broader adoption of the program in hospitals throughout the state and country.

Conclusion

This result of this study suggests that providers and nurses that work alongside OSOP peer recovery specialists in the emergency department have positive experiences with nearly unanimous observations that these specialists enhance their clinical practice and better serve patients. The research confirms that a peer recovery specialist's lived experiences are thought to be the driving force in their effectiveness in getting patients to engage while also reducing subsequent hospitalizations. Peer recovery specialists know the treatment ecosystem well and use this knowledge to advocate to serve their patients. Opportunities for policy and practice changes include the need to expand outpatient behavioral health capacity, according to the key informants interviewed for this study. Their reflections on the successful adoption and integration of the peer recovery specialists and this program can provide insights for other healthcare entities (e.g. hospitals, federally qualified health centers (FQHCs), etc.) to consider beyond the value of reducing hospital visits and avoiding healthcare costs.

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Appendix

Figure 1 – Key Informant Guide and Interview Questions for Opioid Survivor Peer Recovery Specialists and Emergency Department Physicians and Nurses

Survey Guide – Opioid Survivor Outreach Peer Recovery Specialists

Instructions for Student Surveyors.

The following information should be read verbatim to the participant at the time of administering the survey:

You [participant] are being given the opportunity to participate in a research study conducted through Johns Hopkins Bloomberg School of Public Health and the MedStar Health Research Institute. Your participation is completely voluntary. This research study was developed to better understand the important role and functions of the peer recovery specialist serving in the Opioid Survivor Outreach Program. There is no known risk to completing the survey and your participation is completely voluntary. Your participation, including your responses, will be anonymous. This interview will a discussion and conversation that reviews effective strategies to engage patients in the OSOP program, best practices, and barriers. You may skip questions that you do not wish to answer, and at any time, you can end the interview. The recording is necessary to ensure we have accurately captured your response to each question and will be used to create a transcription of those responses. After transcription, the recording will be permanently deleted and will not be shared to anyone other than the person administering the interview. If you do not want to participate, we thank you for your time and your choice not to participate in the survey. Your decision not to participate will have no effect on your role within MedStar Health. Further, decision to participate will

not be shared with supervisors and decision will not affect employment. Your responses will not be shared with supervisors or anyone else in the organization of your employment. Completion of this survey represents your acceptance of these conditions of participation.

Should you have any questions regarding your participation, please contact Ryan Moran at 304-276-8941. MedStar Health Research Institute and Johns Hopkins Bloomberg School of Public Health Institutional Review Boards (IRB) have approved the evaluation method for this project. If you have any questions or concerns, you may contact the IRB.

May I begin the recording?

To the Participant: Please state your role and acknowledge whether you are a formally certified peer recovery specialist. Please also state how long you have been in this position.

Introductory Discussion

- Tell me about your role as the Opioid Survivor Outreach Program peer recovery specialist. I am interested in what your responsibilities are and what you do on a day-to-day basis.
- Do you feel as though your role has changed from when you first began as an OSOP peer recovery specialist? What have you learned since you have started that has made you a better peer recovery specialist?

I. Effective Strategies Used to Engage Patients

- In your view, what are the most effective ways that you have found to engage patients to participate in the OSOP program?

- Do you find that it is generally easy or hard to get patients to participate? What makes it easier for you to get them to participate?
- For patients that do not enroll in the OSOP program, what have you found to be the reasons that they decline to participate?
- Do you feel the training that you received to become a peer recovery specialist was adequate for you to prepare for the role?

II. Best Practices in Referring and Linking Patient to Substance Use Treatment

- What barriers have you encountered to referring and linking patients to substance use treatment?
- How important is it for you that your patients get linked to treatment?
- Describe how you interact with treatment providers in the community.
    - What are the most effective ways that you work with these community-based providers to link patients to substance use services?
    - What are the least effective ways to work with these providers in your opinion?
- Describe what support MedStar could provide that would help you to more effectively serve patients with substance use needs.

I want to let you know about some preliminary results of an evaluation of the Opioid Survivor Outreach Program and get your reaction to them. We found that by connecting patients with an Opioid Survivor Outreach Program peer recovery specialist such as yourself, there was a 28% reduction in opioid-related hospital visits over a 12-month period and a $440,000 savings to the health system.

- What is your initial reaction to hearing the results?

- Were the results as you expected?
- What do you think it is about the Opioid Survivor Outreach Program that helps to reduce patients' opioid related medical visits? What more could be done to be even more effective?

III. Relationship with Healthcare System as Member of Healthcare Workforce

- Can you describe your relationship with the physicians, nurses, and other clinical providers in the emergency department?
- What type of communication do you have with these folks? How often do you interact with them?
- What works well and not so well in terms of how your job fits into the emergency department?
    - How have these relationships with physicians, nurses, and other clinicians changed from when you first started as a peer recovery specialist, if at all?
- Tell me about how you assist and advocate for the patient in the OSOP to get connected to substance use treatment or other recovery support services.

Survey Guide – Emergency Department Physicians and Nurses

Instructions for Student Surveyors.

The following information should be read verbatim to the participant at the time of administering the survey:

You [participant] are being given the opportunity to participate in a research study conducted through Johns Hopkins Bloomberg School of Public Health and the MedStar Health Research Institute. Your participation is completely voluntary. This research study was developed to better understand the important role and functions of the peer

recovery specialist serving in the Opioid Survivor Outreach Program. There is no known risk to completing the survey and your participation is completely voluntary. Your participation, including your responses, will be anonymous. This interview will a discussion and conversation that reviews effective strategies to engage patients in the OSOP program, best practices, and barriers. The recording is necessary to ensure we have accurately captured your response to each question and will be used to create a transcription of those responses. After transcription, the recording will be permanently deleted and will not be shared to anyone other than the person administering the interview. If you do not want to participate, we thank you for your time and your choice not to participate in the survey. Your decision not to participate will have no effect on your role within MedStar Health. Completion of this survey represents your acceptance of these conditions of participation.

Should have any questions regarding your participation, please contact Ryan Moran at 304-276-8941. MedStar Health Research Institute and Johns Hopkins Bloomberg School of Public Health Institutional Review Boards (IRB) have approved the evaluation method for this project. If you have any questions or concerns, you may contact the IRB.

May I begin the recording?

To the Participant: Please state your role and how long you have been in this position at your current hospital of employment.

Introductory Discussion

- Tell me about your overall experience in working with the Opioid Survivor Outreach Program and the peer recovery specialist(s) assigned to work with Opioid Overdose Survivor patients.
- How does the OSOP peer recovery specialist relate to you and your job in the emergency department? Tell me how you interact with them in your day to day practice as a nurse or physician.

I. Effective Strategies Used to Engage Patients

- In your view, what are the most effective ways that you have found to engage patients to participate in the OSOP program?
- For patients that do not enroll in the OSOP program, what have you found to be the reasons that they decline to participate?
- In what ways does the OSOP program enhance or detract from your clinical practice? Are there things about the way the OSOP operates that make it easier or harder for you to utilize their services with your patients?
- Without the OSOP program, how else would this patient population be served in terms of their opioid use disorder?

II. Best Practices in Referring and Linking Patient to Substance Use Treatment

- What has been your experience with the peer recovery specialists connecting your patients to substance treatment in the community?
- In your opinion, what are the most effective ways the OSOP peer recovery specialists uses to get patients linked to treatment?
- What barriers do you think the peer specialist has to refer or link patients to treatment in the community?

- Describe what support MedStar could provide that would help you to more effectively serve this patient population? (Probes: Could more resources be added to support patients with social needs?)

I want to let you know about some preliminary results of an evaluation of the Opioid Survivor Outreach Program and get your reaction to them. We found that by connecting patients with an Opioid Survivor Outreach Program peer recovery specialist, there was a 28% reduction in opioid-related hospital visits over a 12-month period and a $440,000 savings to the health system.

- What is your initial reaction to seeing the data?
- Were the results as you expected?
- What do you think it is about the Opioid Survivor Outreach Program that helps to reduce patients' opioid related medical visits? What more could be done to be even more effective?

III. Relationship with Healthcare System as Member of Healthcare Workforce

- How has your relationship changed with the OSOP peer recovery specialists from when the OSOP program first started, if at all?
- Tell me about ways that you have seen them advocate for patients to receive substance use treatment or support services with you or community treatment providers.
- What should other health care systems know about the OSOP program and working with peer recovery specialists if they are considering starting a program like ours?

- What type of resources and infrastructure are needed? What are some selling points of the program?
- What are some pitfalls to avoid and how can they be avoided?
- Is there anything else that you'd like to share regarding the OSOP peer recovery specialists and program that we have not discussed

Figure 2: Qualitative Content Analysis – Analytical Framework

(Bengtsson, 2016).

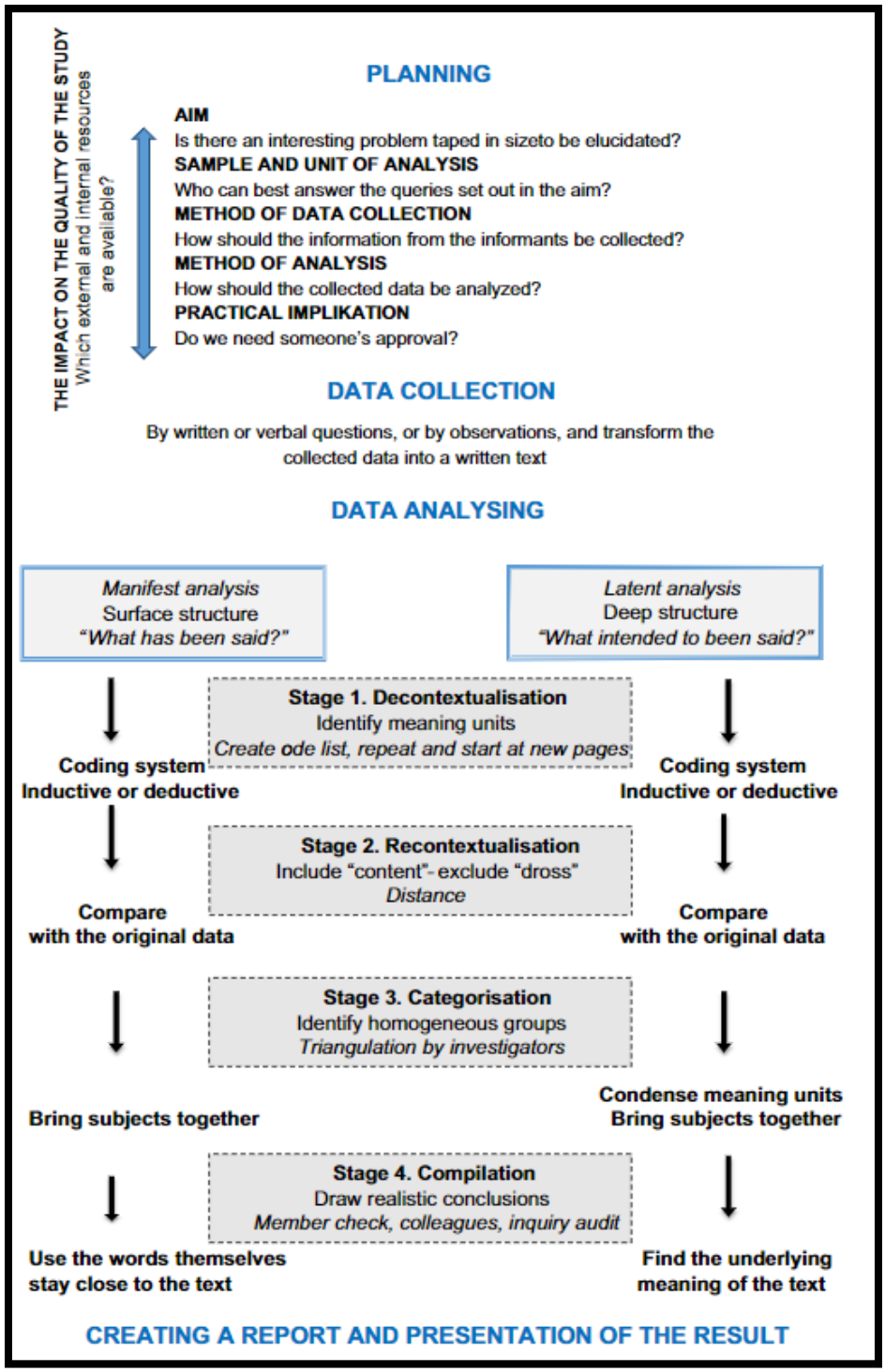

Figure 3: Codebook of Analyzed Results

Qualitative Results –Codebook

Providers: Overall Experience Working with Peers

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Positive Experience	Amazing Program (5) Professionalism (2) Approachable (2) Does not impeded workflow (1)	Interviewees reaction to working with OSOP coaches noted as positive.	10	**Provider**: And then as a resource nurse, it's kind of nice to have that extra person there to kind of look into things and maybe even offer a different perspective on our patients. So, it's been a good experience to interact with them.
Collaborative Patient Care	Assist in treatment placement (2) Provides resources to patient (2)	Discusses how providers work with peers to connect patients to treatment	5	**Provider:** I don't even know all the resources in community because our coaches are so good with coming up with a plan to serve patient needs with us.
Limited Interaction	--	Interviewees reaction in working with OSOP peers was limited.	1	

I. All: Effective Strategies for OSOP / Peer Engagement

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Relatable to Patient	Care / empathy (2) Listening (1) Be Present (2) Outfit (2)	Peers are noted as being able to relate to patients because of their lived substance use experience in a way other provider cannot relate.	15	**Provider:** We like to reiterate that these are people [OSOP peer recovery specialists] that are their peers, that have been where they have been…It's easy for us as hospital staff to lecture them or give them

				[patient(s)] information, but without us ever being in their shoes, being where they are…We just like to relate those two things together to make the individuals more susceptible to speak with our peer recovery coaches.
Early Introduction/Integration of Peer	On-site availability (1)	Refers to integrating the peer early in the patient's care to engage them in OSOP program.	6	**Provider:** They often get to patients very quickly. This helps us get a plan together to serve patients. They update us and come back.
Patient willingness/readiness		Refers to OSOP peers encountering patients at a stage for change.	2	
Contact information		Leaving contact information behind if patient is not ready to enroll so that patient can enroll for future outreach	2	
Familial Pressure		Families and/or spouse encourage enrollment.	1	
EMR System		EMR system is designed to refer and navigate patients easily with communication to providers	1	
Fentanyl Test Strips		Providing harm reduction tools to patients to encourage participation	1	

All: Reasons Patients Do Not Participate

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Patient Readiness		Patient readiness to be willing to engage in discussions regarding treatment.	10	**Peer:** When they are ready, it's easy. If they are not ready, it's hard. Once again, you're talking about the disease of addiction, and a lot of times people don't know that they have a disease. They are in denial. When you are denial, you don't know that you are in denial until you come out of denial. I understand the process. I'm a person myself in long-term recovery, so I understand the process. It is easy when they're ready, and it's very difficult when they are not.
Acknowledgement of Issue		Patient recognizing that there is a substance use and/or misuse present.	8	
Already Engaged in Treatment		Patient is already linked to existing treatment program	2	
Negative Previous Outcome		Patient resists treatment option due to having a negative experience or outcome.	2	
Belief		Patient's own belief that they can complete program/treatment.	2	
Shame		Patient feels guilty for substance use issue.	1	
Familial pressure		Patient has commitment to	1	

		family members and/or gets pressure from family member to enter treatment.		
Seasonal		Changes in temperature impact participant likelihood to seek treatment.	1	

Providers: Enhance or Detract Clinical Practice

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Easier	Observed patient recidivism decrease (1)	Providers note that OSOP peers make it easier for their practice.	6	**Provider**: It clearly doesn't detract [from our clinical practice] at all. Ever. Clearly, it's just as if it was another service that we feel we never thought about, but also now, I can't imagine how we can even practice ED medicine without having them. **Provider:** It enhances. Their ability to do quick touches with the patient is definitely a benefit to our practice.
No more difficult / no distraction	Mission-driven (1)	Providers note that OSOP peers make it no more difficult to practice.	5	

Providers: Service to Patient Population Prior to OSOP

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants

List of Sources	No support (1) Long instructions discharge (1)	Providers note that only a list of places were provided to patient in the past. No other support to patient.	7	
No Service	Dependent on provider knowledge (1)	Providers acknowledge that no services were available to assist this patient population prior to OSOP.	4	
Patient Recidivism		Providers note that they remember seeing patients return to ED at high frequency prior to OSOP for substance use.	1	
Robust Psychiatric Service Line		Hospitals would need to develop a strong behavioral health medicine ED program to serve patients.		

II. <u>All: Best Practices for Linking and Referring Patients to Care</u>

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Substance Use Service System Knowledge	Warm Handoff to treatment providers (2)	Comments regarding the knowledge of treatment providers, relationships with treatment providers, advocacy on behalf of patients to get into care.	13	**Provider:** I think that a lot of the peer recovery coaches have ins or ties to certain place. So, I think that they are much more effective of getting people to these facilities than I might be, or even knowing what all of them are. Unless we do our own digging or research I just feel like, they know much more about the whole

				process than we do and what the patient needs to get there, or get in.
Time	Non-rushed discharge (2) Follow Up (1) Phone calls (1)	Refers to the amount of time peers have to devote to patients that clinical providers do not.	6	
Transportation	Cab vouchers (2)	Peers arranging transportation directly from emergency department to end payments to treatment programs/services	6	
Advocacy	Assist in order placement (2)	Working with ED providers to advocate for clinical care delivery in order to prepare treatment for program/outpatient placement	6	

All: Barriers to Refer and Link and Refer Patients to Treatment

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Access and Availability	Insurance type (2)	Issues with patient placement to treatment programs because of lack of behavioral health capacity and/or insurance issues to accept patient.	13	**Provider:** I'm guessing there's probably a limited number of places they can go for recovery and so they have a limited number of beds and staff to care for these patients. That's probably the biggest barrier having enough centers or detox centers for the patients. **Peer:** Some places just won't accept it [patient's insurance]. A lot of

				patients have Medicaid. There are only two providers that take Medicaid, or maybe one. If they don't have the supplement of A or B, then it's a struggle. And then, with no insurance, we advocate with the social work team to get them some insurance so we can get them in the door.
Transportation		Patients do not have reliable access to transportation to engage in a program.	3	
Geography		Treatment options aren't at a convenient location for patient / their family	2	
Stigma		Patients present issues related to stigma in addressing treatment options	1	
Work-life accommodations		Patients cannot juggle responsibilities of life/work.	1	

Peers: Importance of Patients Getting Connected to Treatment

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Important – Very important		Peers rate their importance of getting patients in treatment as important or very important.	2	**Peer:** Very. That's right at the top of the list. Top of the list. It's urgent. It's urgent. **Peer:** I want to say a seven out of ten, because yes, I want to see them get help. I want to see

				them turn things around, but sometimes it's going to take three months before they're willing to do that. Yeah, it's about the relationship that you make. I'm not super depressed if they don't get sent right from the ER. It upsets me, but there's still more opportunities. I don't see it as a failure because now I'm still going to be in contact with them.

All: Opportunities for More Support to Patient Population

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Mental Health/Crisis Services	Virtual care (1)	More behavioral health capacity in outpatient and inpatient settings are needed to serve population.	6	**Peer:** The biggest by far is availability for our area.
Stable Housing		Patients often present with unstable housing and more options is needed in order to assist them in their treatment plan.	2	**Provider:** I don't know how we could provide this, but stable housing. And if there's some way to assist in that regard…Stable housing is in the root of a lot of people's problems.
Community Peer Model		Participants note that peers embedded in the community may be a preventative model to consider.	2	
Medication Assistance	Narcan (1)	Addressing affordability of	2	

		MAT options for patients		
Medical Staff Training		Offering de-escalation or stigma language training to serve patient population.	2	
Expand Peer Hours		More hours for peers are needed to assist more patients.	2	

All: Initial Reaction to Seeing Patient Utilization and Cost Data

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Amazing / Positive / Good		Participants respond favorably to seeing utilization and cost data results.	8	**Peer:** Well, you can't see me, but I am shouting. Oh, that is amazing. Oh my God. My heart is so fluttered. YES! YES! That's why I do what I do, but I, I mean, it says in the numbers. I'm like really built up right now, because sometimes doing his job, you feel like you're not getting through. Then to hear that it makes me know, like, okay, right, right, yeah, yeah. I work really hard. I don't do it, I mean, of course, I want a paycheck. I do this because I truly believe this is what I was meant to do. I do this because I believe this is my purpose. I do."
Not surprised / Neutral		Participants respond neutrally to	3	

		seeing patient and cost data.		

All: Results Expectation

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Less Than Expected		Participants respond that they thought that utilization and cost results would be more significant.	4	
Better Than Expected		Participants respond that they thought results were better than expected.	3	
As-Expected		Participants respond that they thought results were as expected.	4	

III. All: Relationship as Member of Healthcare Team Relationship Change Since First Launched

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
More Integrated – Collaborative		Participants observe a more integrated and collaborative model since first adoption.	8	**Provider:** I think we engage with them so much that they are part of our department. We are friends and colleagues.
Communication Improved		Participants observe better communication to serve patients between providers and peers.	5	
Culture change	Education (1)	Refers to change in language of providers addressing	2	

		patients and engaging patients re: their substance use disorder		
More patients		Peers are seeing more patients than when program first began.	1	
No change		Participants saying that there are no observed changes.	1	
No comment		Participants noting that they aren't able to comment on the question.	1	

Providers: Resources Needed for Success / Considerations for Other Health System Adoption

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Peers		Peers are needed to effectively make the program successful.	6	
Office Space		Peers and other staff need space in order to be integrated into the team.	4	
Screening Tool	EMR (2)	Workflow and processes must be supported by hospital/site EMR.	2	
Staff Buy-In		Key to success is having buy-in from all staff that work with peers.	2	
MAT		Providers note that it is helpful to have initiation of MAT to support patient treatment options.	2	
Outpatient Treatment Access		Outpatient treatment capacity is	2	

		needed to effectively serve patients.		
Training – staff		Program must be supported by quality training.	2	
Program Administrator		Peers need proper oversight.	1	

Providers: Selling Points

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Mission-Driven	Lifesaving Work (4)	Program is at the heart of service in a health system and aligns with hospitals mission to serve communities	8	
Patient Recidivism and Cost		Program helps reduce patient visits to hospital.	6	
Community Knowledge	Substance use provider knowledge (1)	Peers bringing added knowledge from community and substance use treatment provider ecosystem.	3	**Provider:** Others should know how they can be so effective in getting people linked to community treatment through their connections.

Providers: Pitfalls

Code	Sub-Code(s)	Code Memo	Frequency of Observation	Notable Quotes from Participants
Staff Buy-in		Participants note that it is crucial to have buy in from staff when starting the program to ensure success.	5	**Provider:** Explain to your staff what the peer recovery coach can provide and how they can help you is huge. Because sometimes the nurses or doctors may feel like it is a burden. Make sure that when you integrate the service that you introduce everyone

				to the peer, what their purpose is and what they are there for. You want to make sure that relationship is well received from the beginning. **Provider:** There was distrust on the staff at the beginning. We wondered who they were and if they would really find the resources for our patients. But watching them do it, having rapport with the patients and understand their role has changed staff perception.
Weak EMR	Referral Process (2)	Workflow and processes must be supported by hospital/site EMR.	3	
Outpatient availability		Outpatient treatment capacity is needed to effectively serve patients.	2	
Communication		Teams must communicate together for success.	1	
Hours of Peer		Participants note the need for 24-hour coverage	1	

Policy Memorandum: Practice and Policy Considerations from Research

The implications of the results of this research allows for the consideration of four distinct practice and policy changes. The first two areas address the opportunity for policy and practice implications within the field of state and federal public health, including:

Practice Implications:

- Adoption of Peer Recovery Specialists Program in Other Hospitals
- Expansion of Peer Recovery Specialists in Alignment with Value-Based Payment Models

Policy Implications:

- Provides Evidence for Reimbursement of Peers in Maryland and Broader Reimbursement Strategies for Commercial Payors
- Provides Evidence of the Need to Expand the Adoption of Outpatient Treatment Options (e.g. MAT)

Adoption of OSOP or Peer Programs in Other Hospitals

One of the purposes of this research was to build on a growing field of evidence that peer recovery specialist interventions are not only effective in curbing opioid-related deaths but that the integration of these services in hospital settings could prove beneficial and in alignment with health system financial incentives. In other words, this research sought to examine what would allow more hospital administrators or hospital providers to consider the broad adoption of peer recovery specialist services within hospitals, specifically emergency department environments. Since the inception of the Affordable Care Act, hospitals have been geared to focus on achieving “The Triple Aim”

– lowering healthcare cost, improving quality outcomes, and improving patient experience – through a variety of incentive programs outlined by CMS policies (Berwick, Nolan, & Whittington, 2008).

Examples of these programs include a focus on reducing hospital readmissions through the Hospital Readmissions Reeducation Program (HRRP), as well as the Hospital Quality Reporting Program (HQRP). HRRP focuses on the reduction of hospital admissions over a 30-day time period for specific chronic diseases such as heart failure or chronic obstructive pulmonary disease (COPD) while the HQRP program focuses on reducing all-cause hospital visits. Both programs are designed to reduce acute care spending while encouraging hospitals to promote sound care coordination practices post-hospitalization to improve the patient experience and quality outcomes. Based on performance as benchmarked by other hospital peers, CMS rewards hospitals for favorable readmission performance or can decrease payment unfavorable performance ("Hospital Readmission Reduction," 2020). This program is applicable for the entire country except for Maryland, the setting of the hospitals included in this study. Maryland has a unique payment system that entails an agreement with CMS entitled Total Cost of Care. In this arrangement, Maryland hospitals are also incentivized to focus on hospital readmissions and are rewarded or penalized like other hospital peers across the country ("Maryland All-Payer Model," 2020). The focus of this research was to make the case that the OSOP intervention assists in reducing hospital visits even when compared to patients that did not receive such intervention. Further, this research also examined the specific financial impact of the reduction of opioid-related hospitals can have in avoiding cost.

The first research aim was designed to evaluate patient utilization over a 12-month pre and post-period to determine the observed frequency of emergency department, observation, and inpatient hospital visits. The results showed a statistically significant reduction, in expected opioid-related hospital visits by more than 30% when analyzing the pre and post-enrollment periods of the study group. There was an observed reduction in expected opioid-related visits between the historical control and study groups. All-cause hospital visits between the two groups did, however, show a statistically significant reduction by nearly 39%. These results were as hypothesized and provide the foundation for the evaluation of the second research aim, which was to examine the value of cost avoidance savings to the health system. Among the four study setting hospitals, the net value in cost avoidance as it pertains to hospital charges demonstrated favorable and compelling results. Further, the study setting hospitals were in urban and suburban areas, which assist in making these findings generalizable to other hospitals across Maryland, as well as the rest of the country. The findings from a utilization and cost perspective strengthen the arguments to hospital administrators to support necessary investments in adopting the OSOP intervention. They also align with CMS and state policy goals to reduce hospital readmissions.

In addition to the results of this study demonstrating financial benefit for healthcare institutions to more broadly adopt OSOP, this specific intervention can play a role in providing a concrete strategy to address the opioid epidemic based on individual hospital community health needs assessments. In a recent review of community health needs assessments and implementation strategies of 140 hospitals in 25 states, 70% of these reports identified addressing the opioid epidemic as a top community need. This

study also showed that most were addressing how to expand capacity for treatment modalities to address opioid use disorder. They also concluded that additional incentives were needed for hospital leadership to invest in programs that moved beyond addressing opioid use disorder through a medical lens (Singh, Kiessling, & Rhodes, 2020). The implications of this research provide more incentive for hospitals to invest in addressing the opioid epidemic by adopting OSOP as part of their community health needs assessment implementation strategy and community benefit reporting.

The research provides evidence that may attract hospital senior leadership to make the necessary investments from hospital operational budgets rather than philanthropic or grant support. However, the results from the in-depth interviews conducted provide an array of advice at the hospital-unit level when considering the adoption and implementation of a successful OSOP program. As it relates to resources needed to operate the program, participants noted the following considerations:

- Adequate peer recovery specialist staffing based on the prevalence of substance use in specific communities, as well as proper training that coincides with peer recovery specialist state standards.
- Integrated screening tool in the electronic medical record (EMR). This research is predicated on the use of Screening, Brief Intervention, and Referral to Treatment Model (**Appendix: Figure 1**). The screening questions used include evidence-based tools to screen for alcohol and substance use through the Alcohol Use Disorders Identification Test (AUDIT) and Drug Abuse Screening Test (DAST), respectively (Bush et. al., 1998 & Yudko, Lozhkina, & Fouts, 2007).

- Educating all staff at the hospital/unit level to obtain buy-in from the healthcare multidisciplinary team as peer recovery specialists are integrated into the department. Multiple interviewees suggested that hosting a staff session for peer recovery specialists to share about their past substance use experiences, as well as the scope of their role is considered best practice to assist with this buy-in.
- Operational logistics such as appropriate staff overseeing peers and dedicated office space/area within the hospital department.

Related to incorporating an OSOP peer recovery specialist as part of an integrated multi-disciplinary health care team, interview participants also provided insight on pitfalls to avoid:

- Ensure non-peer recovery specialist staff is educated and well-trained on screening tools, (especially if integrated into the EMR), referral processes to engage peer recovery specialists, and scope of practice of peer recovery specialists.
- Foster strong communication practices between peer recovery specialists and providers (nurses, physicians, social work, etc.). This communication ensures that patient needs are addressed and met.

Thus, this research provides evidence, data, and shared learnings for a broader adoption of OSOP in other hospital environments not only in Maryland, but across the country, through the following considerations:

- **Proves the efficacy for hospital leadership to implement the program by aligning with financial goals and payment policy programs set forth by CMS to reduce rehospitalizations.**

- **Provides a concrete strategy for hospitals to invest in as part of their community health needs assessment strategies and community benefit reporting**
- **Recommends specific workflows, resources, and best practices for other hospitals to consider when launching their program.**

Expansion of Recovery Based Peers Align with Value-Based Payment Models

As mentioned earlier, Maryland's payment model includes a unique arrangement with CMS. Since the 1970s, Maryland has a state-run commission that sets hospital rates. This arrangement means that individual health systems and hospitals do not negotiate rates with individual payors. In 2014, the state negotiated an agreement with CMS to transition to a statewide global budget revenue system, which capped the annual revenue for hospitals to control expenditures while also incentivizing quality improvement. In the global budget revenue's second iteration that began in 2019, Maryland's Total Cost of Care program elevates incentives to reduce overall per capita spending, improve quality, reduce hospital-acquired conditions, and focus on rooting out spending through initiatives that reduce readmissions and potentially avoidable utilization ("Maryland All-Payer Model," 2020). Maryland's measurement of potentially avoidable utilization "hospital care that is unplanned and can be prevented through improved care, care coordination, or effective community-based care or care cost increases that result from a potentially preventable complication occurring in a hospital" ("Health Services Cost Review Commission," 2014). Germane to this study, as part of the Total Cost of Care model, it encourages hospitals to focus on population health initiatives in three areas in partnership with state agencies – behavioral health, including

both mental health and substance use, diabetes, and care for older, medically complex older adults ("Maryland's Total Cost of Care Model," 2017). Paired with other care transformation initiatives and quality-based reimbursement incentives, the selection of the three population health areas occurred based on the opportunity of improving health for the state, decreasing mortality, and decreasing aggregate acute care spending. Through these initiatives, by the end of 2023, the state has agreed to reduce Medicare overall spend by $300 million annually through the combination of all initiatives ("Maryland's Total Cost of Care Model," 2017).

However, while the state put forth behavioral health services with an emphasis on hospitals to address the opioid epidemic as a component of the Total Cost of Care Model, policymakers proposed limited statewide strategies or roadmap for hospitals to implement. In fact, in the agreement with CMS, Maryland is to set forth goals in each area in 2020. These goals cemented have been delayed by the state's focus on combating the COVID-19 global pandemic. The state agency responsible for the formation of a statewide plan is the Maryland Opioid Operational Command Center, formed by Governor Larry Hogan after the state of emergency was declared in 2017 ("Maryland's Total Cost of Care Model," 2020). Data and previous studies conducted by the Maryland Hospital Association demonstrates the opportunity to address behavioral health readmissions. A review of patients in 2016 statewide found that patients with a behavioral health diagnosis, which could be inclusive of a substance use-related visit, had a readmission rate of 15% while all other non-behavioral health diagnosis patients had a readmission rate of 11% ("A Roadmap to an Essential," 2017). The premise of this research was to add evidence that peer recovery specialist interventions, such as

the Opioid Survivor Outreach Program, could not only be an invaluable tool to save lives from the opioid epidemic but could be a means to include as part of value-based programs. The study setting of this research, namely their location in the state of Maryland, provided for an appropriate review of this question.

In the formation of population health metrics for Maryland's Total Cost of Care Model, this research provides solid evidence for the inclusion of impact measures produced by the Opioid Survivor Outreach Program. This study suggests that a broader analysis of the implementation of this program across the state's hospitals would align with the primary goal of the state's model to reduce overall acute care spending. In the study setting of four hospitals in Maryland, the research suggests that OSOP allows healthcare systems to avoid an estimated $773,323 in hospital charges. The study setting also includes urban and suburban hospitals, as well as a study population that demographically reflects statewide opioid-related deaths in the state from previous years. Both points assist in making the study findings on cost avoidance generalizable to other hospitals in the state. Further, the four study setting hospitals included in this research were among the earlier adopters of the program. According to the Mosaic Group, the consultant agency working closely with the Maryland Department of Health to implement OSOP, the program is now operational in 28 hospitals across the state (Oros, 2020). It is hypothesized that a broader and more long-term review of patient utilization and associated cost data would yield an even more significant amount of acute care spending.

There is one limitation in the effort to integrate OSOP impact measures as part of the Maryland Total Cost of Care Model. The program is primarily focused on evaluating

and rooting out Medicare annual spending; however, a majority of those in the study population of this research were enrolled in Medicaid. However, based on reviewing data of previous years of opioid-related deaths in the state, one would expect most patients enrolling in the program to be more likely recipients of Medicaid than Medicare. This is based on the requirement to be at least 65 to be eligible for Medicare. Of all opioid-related deaths in Maryland in 2018, 75% of individuals were under the age of 55 ("Opioid Overdose Deaths," 2020). Based on the metric selected, the Maryland Department of Health should, in the evaluation of Maryland's Total Cost of Care Model, include Medicaid spending. Regardless of the payor type, this research further confirmed evidence that opioid-related hospital visits are associated with higher charges, and therefore, cost, when compared to non-opioid-related hospital visits. Data from this research also showed that OSOP was not only effective when evaluating aggregate acute care hospital charges. Data also showed that patients enrolled in OSOP and experienced an opioid-related hospital visit observed significantly fewer hospital charges when compared to patients not enrolled in the program. The difference in chargers per visit in the post-period was nearly $900.

In summary, this study provides a foundation of evidence that the peer recovery specialist intervention aligns with value-based payment models. The results offer the following concrete practice and policy changes:

I. **OSOP as an intervention aligns with Maryland's Total Cost of Care Program and the below impact measures should be included as part of the state's population health program goals:**

- **Impact of Patient Utilization from Enrollment in OSOP**

- **Value of Cost Avoidance from an Acute Care Perspective for Enrollment in OSOP**

II. **Given the opioid epidemic's impact on a population that primarily is enrolled in Medicaid, Maryland should work with CMS to ensure that Medicaid cost avoidance savings are accounted for in its effort to reduce aggregate acute care expenditures.**

III. **Provides evidence for other states, commercial payors, or health systems investing in value-based models to consider OSOP as a mechanism to reduce cost, improve quality metrics such as mortality, and improve patient experience/value.**

Provides Evidence for Reimbursement of Peer Recovery Specialists in Maryland and Broader Reimbursement Strategies for Commercial Payors

The foundation of this research was to assess not only if peer recovery specialist programs such as OSOP could be used as effective ways to respond to the opioid epidemic but evaluate its success through the lens of population health metrics – patient utilization and cost. When peer recovery specialists engage opioid overdose survivors, a vulnerable, high-risk patient population, the results of this research illustrate a reduction in subsequent opioid-related hospital visits and a respectable financial value of the health system avoiding unnecessary cost. The advent of the role of a peer recovery specialist is not new to the field of public health. Their inception in the United States dates to the 1970s with an increase of their use in the field most recently by states to respond to the current opioid epidemic.

Since that timeframe and as peer recovery specialists have become embedded in healthcare delivery settings, states have worked to partner with the Centers for Medicaid and Medicare Services (CMS) to seek reimbursement for their services. The evolution of peer recovery specialists becoming a reimbursable service through CMS started with Georgia in 1999. Fourteen years later, CMS issued formal guidance to other states on how they could become eligible for peer services to be reimbursed. These requirements include having a formal curriculum training for peers and a state-run process for formal certification (Videka et. al., 2019). The driver for reimbursement has been driven by two industry dynamics. The first is that reimbursement provides a sustainable funding source for organizations, such as hospitals, community-based providers, and treatment centers, to hire peer recovery specialists. The other dynamic relates to the results of this research. Recent studies have demonstrated that peer recovery specialists generate savings for members in health insurance plans. For example, Bouchery et. al. (2018) found that crisis centers that had peers as part of their service model resulted in approximately $2,138 savings per Medicaid enrollee when compared to treatment centers not staffed with peers. A separate study evaluating the use of peers in Georgia showed a cost savings of nearly twice that amount for individuals receiving behavioral health care (Videka et. al., 2019).

However, even with the evidence provided by studies predating this research, reimbursement of peer recovery specialist services has not been universal nor is there a consistent approach between the states where reimbursement is permissible. In a recent comprehensive report issued by the University of Michigan Behavioral Health Workforce Research Center, it found that nine states had not created a mechanism for

peer services to be reimbursed through Medicaid, following Georgia's first adoption in 1999. Maryland, the study setting of this research, was one of the states that do not allow for reimbursement even though the state has formal standards for training curriculum and has developed a state-wide certification program (Videka et. al., 2019).

The results of this research present a compelling case for reimbursement. Maryland's policymakers have recently taken steps to evaluate the utility and feasibility of reimbursing for peer services. In 2018, the Maryland General Assembly based House Bill 722 (Senate Bill 765) that required the formation of a workgroup of experts within the field to provide a report to legislators and Maryland's Governor by January 2019 ("Consumer Affairs – Maryland Department of Behavioral Health Administration," n.d.). No further action has been taken. However, this research solidifies a recommendation for Maryland, as well as the eight other remaining states, to pass legislation that would allow each state Medicaid program to reimburse for peer recovery specialist services. As the results indicated, doing so would allow for the broader expansion of peer recovery services to serve state residents while at the same time prevent unnecessary, avoidable acute care utilization that generates savings for the healthcare system.

The University of Michigan's national review of peer recovery specialist reimbursement services also found inconsistent methods on allowable services for reimbursement, as well as the mechanisms used to reimburse for services. For example, not all states approve reimbursement for peer recovery services that focus on substance use disorder. For example, 12 states allowed reimbursement for peer services for only mental health conditions. On the other hand, four states only provide reimbursement for peers that focus on substance use disorder (Videka et. al., 2019).

This is one example of the variability of payment policy practice among states. Additionally, a report issued in July 2019 to Congress by the Medicaid and Children's Health Insurance Program (CHIP) Payment and Access Commission showed a great disparity in the consistency of approach that states used to reimburse for peer recovery services specific to substance use services (Recovery Support Services for Medicaid…," 2019).

The most common reimbursement mechanisms through Medicaid include the state plan rehabilitation option. Through Medicaid payment policy, this option allows for reimbursement for peer services if patients are being served only for substance use needs. Other most common options were waiver and demonstration programs. The most common waiver used is the Section 1115 waiver, which gives states the option to implement and test new approaches to care while also reimbursing for these services. Another is through demonstration projects that incentivize community behavioral health clinics to adopt peer services and providing them reimbursement to help sustain the peer services offered to their patients (Recovery Support Services for Medicaid…," 2019). The inconsistencies of each state's approach, nonetheless, do not create a standardized platform nor does it necessarily guarantee the reimbursement of peer services post-waiver or demonstration programs. Further, the difference in approach has created disparity across the country in the specific amount of reimbursement allocation for peer recovery specialist services' time. As reported by Videka et. al., the average for 15 minutes of peer recovery specialist services across the country was $13.08. Although, Georgia's reimbursement was the highest at $24.36. Additionally,

states do not use the same coding structure to formally bill for these services (Videka et. al., 2019).

The other challenge with the variety of payment mechanisms is that some approaches in certain states may not extend reimbursement of peer recovery services to hospital entities. For example, hospitals providing peer recovery services in states where Medicaid only reimburses for peer services through community behavioral health clinics would not be eligible for reimbursement. CMS guidelines for peer recovery service reimbursement may also be a limitation for hospitals to receive reimbursement. Per their reimbursement guidelines, peer recovery specialists must be supervised by a mental health professional, including, but limited to social workers, psychiatrists, or other psychotherapist professionals ("CMS Guidance…," 2007). Hospitals that operate in rural areas or hospitals that do not have a robust array of behavioral health clinicians or service line may not be able to meet these requirements. To ensure the broad application of the reimbursement of peer recovery services in a hospital setting as dictated by this research, the following policy recommendations include:

I. **Evaluate the array of payment mechanisms currently in place by 41 states to reimburse for peer recovery specialist services for both mental health and substance use disorder services.**
II. **Determine a nationwide, universal standard recommendation for reimbursement through Medicaid that could be emulated for commercial payors to also adopt in their payment policies.**
III. **Provide a recommended fee schedule for peer recovery specialist services to close the disparity in reimbursable allocations. This fee**

schedule could also serve as a recommendation for a commercial payor payment policy.

IV. **Ensure new guidelines allow for the reimbursement of a broad range of health providers, including hospital-based entities. Other providers include but are not limited to inpatient and outpatient mental health and substance use disorder facilities, detox facilities, and short and long-term residential entities.**

Provides Evidence of the Need to Expand the Adoption of Outpatient Treatment Options (e.g. MAT)

This research evaluated the impact of peer recovery specialist intervention as it pertains to avoiding healthcare system costs. The hypothesis in reviewing cost as a research aim was to make the case that peer recovery specialist programs can reduce acute care spend. It is hypothesized that the reduction in hospital visits may be because patients get connected to outpatient treatment settings. This not only connects the patient to a long-term treatment program, but outpatient environments are deemed a more appropriate, cost-effective setting. The results of this study only include an analysis of the savings derived from acute care utilization. Therefore, the analyzed results are not reflective of a patient's total cost of care, inclusive of considering both inpatient and outpatient charges. This research did, however, prove and validate existing literature related to the costly inpatient care associated with opioid-related hospital visits. This study found a statistically significant difference in comparing the average charges for opioid-related and non-opioid related hospital visits. These findings were similar to previous findings by Masson et. al (2002), which showed healthcare

expenditures, including hospital visit expenditures to be nearly double for patients when compared to those that did not use opioids.

Previous studies, however, have demonstrated the efficacy of outpatient treatment options to treat opioid use disorder. One of the most common treatment methods for opioid use dependence is medication treatment through the modalities of methadone, buprenorphine, and naltrexone. In the context of this research, the OSOP peer recovery specialists may refer patients to these treatment options. As previously cited in the literature review, these medication treatment options show favorable results when examining healthcare costs. In an aggregate review of more than 13,000 patients, total healthcare costs were 29% lower for patients that receive one form of these medications (Baser, Chalk, Fiellin, & Gastfriend, 2011). Work in Vermont of assessing its Medicaid expenditures showed a reduction in hospital visits and healthcare costs for nearly 6,000 state beneficiaries for patients utilizing these medications (Mohlman et. al., 2016). Other research has looked to assess the impact of not only medication therapy, but other options such as detoxification facilities, intensive outpatient treatment, and other behavioral health outpatient care (e.g. counseling services). SAMHSA also notes that patients receiving medication therapies such as buprenorphine or methadone benefit from a mixed approach with counseling services and peer recovery support ("Medications for Opioid Use Disorder," 2020). The results in a cohort study demonstrated that after a new diagnosis of an opioid-related disorder, those receiving these different types of treatment showed decreased costs compared to patients receiving no treatment. The only caveat to that finding was that costs increased for patients that utilized inpatient detoxification as a treatment option. In their discussion,

the researchers encouraged increased outpatient capacity to reign in healthcare costs related to opioid use (Larochelle et al., 2020).

While the literature dictates that outpatient treatment settings improve patient outcomes and reduce overall healthcare spending, this research validates data at the state and national level son the lack of behavioral health service capacity. The results from the in-depth interviews conducted provide an array of evidence from frontline staff that the most significant barrier that the OSOP peer recovery specialists have in getting patients linked to treatment is the availability and accessibility of treatment providers. Further, when nurses, physicians, and peer recovery specialists were asked in the interviews what more could be done to assist the study population, the top answers provided were for the health system to develop in-house treatment programs to expand such capacity. A list of quotes from participants highlight how the challenges of treatment accessibility and availability impede peer recovery specialists from servicing patients.

Provider Quotes:

- “I'm guessing there's probably a limited number of places they can go for recovery and so they have a limited number of beds and staff to care for these patients. That’s probably the biggest barrier having enough centers or detox centers for the patients.”
- “Sometimes they're not able to find a bed, and I don't know if that's because there's not enough recovery centers available or they are full at that time. Sometimes we do have to board the patients for a couple hours or overnight up until a bed opens.”

Peer Quotes

- "The biggest [barrier to link or refer patients to treatment] by far is availability for our area. That's the biggest and pretty much only barrier. When people are ready to go [to treatment], it's frustrating…"
- "Some places just won't accept it [patient's insurance]. A lot of patients have Medicaid. There are only two providers that take Medicaid, or maybe one. If they don't have the supplement of A or B, then it's a struggle. And then, with no insurance, we advocate with the social work team to get them some insurance so we can get them in the door."

Other analyses where the study hospitals provide acute care services validate these findings. In 2016, hospital leaders in partnership with the Maryland Hospital Association conducted a review of behavioral health capacity – both in terms of mental health and substance use disorder services. Pertaining to inpatient care capacity, all facilities were found to be operating at near full capacity, even as emergency department visits for behavioral health complaints increased by 20% between 2013 and 2016. This increase is a correlation to the rising opioid epidemic. Of even more concern, the state's inpatient bed capacity for psychiatric beds decreased by nearly 3,000 beds since 1982 ("A Roadmap to an Essential," 2017). The reduction of inpatient bed capacity, however, has not been set off by the expansion of outpatient, community-based behavioral health services. At the early advent of Maryland's health insurance exchange, health insurance plans available for the public to enroll had limited psychiatrist availability to see new patients ("Mental Health Association of Maryland," 2014). These findings are also consistent with national reviews and studies on

behavioral health capacity, specifically for substance use order. On the national level, between 1970 and 2014, there has been a significant decline in inpatient psychiatry beds, which provide access to acute services for substance use and mental health care. The analysis found a 93% reduction in overall psychiatric beds in state-run facilities from 1970-2014 (Sisti, Sinclair, and Sharfstein, 2018).

The favorable results of the OSOP program contributing to cost avoidance raises the question – what if there was more behavioral health capacity locally and nationally to serve this patient population? How much of an impact would the expansion of more cost-effective outpatient treatment approaches have on further reducing acute care expenditures through the implementation of programs such as OSOP? The research validates not only the need for the expansion of outpatient substance use treatment options but also adds evidence that such expansion is an opportunity for state and federal policymakers to reduce healthcare costs. This research, however, was not predicated on evaluating, or assessing specific types of treatment options as being the most cost-effective in reducing healthcare costs. The results do provide a narrative for existing policy recommendations that would expand treatment capacity to be accelerated for adoption.

In a recent report by the Brookings Institution, Kilmer (2020) provides ten comprehensive approaches that would provide for the further expansion of treatment access, and therefore, reduce overdose deaths. Relevant to this research, three pieces of federal and state legislation that could be advanced to support expanding access to opioid treatment services. First, the Affordable Care Act of 2010 ensured coverage of mental and substance use care as part of healthcare provisions and rapidly expanded

access through states that decided to expand Medicaid. As of August 2020, 12 states still have not expanded Medicaid as an option ("Status of State Medicaid Expansion," 2020). As observed in both the historical control and study groups of this research, a majority of those struggling with opioid use disorder were Medicaid enrollees. By states continuing to hold out from Medicaid expansion, it limits millions from not being able to access necessary care and treatment options. Five of the twelve states – Wisconsin, Tennessee, North Carolina, South Carolina, and Flordia – rank in the top half of states as it pertains to opioid overdose deaths per 100,000 persons ("National Institute on Drug Abuse," 2019). Expanding Medicaid access would allow more funding to be received by healthcare entities and providers to fund peer recovery specialists, making these support services more widely accessible to patients across the country.

Even though the Affordable Care Act of 2010 also required coverage of mental health and substance use services, in Kilmer's latest report, compliance to cover all opioid-related treatment options has not been realized. For example, the primary medication treatment modalities for opioid use disorder – methadone, buprenorphine, and naltrexone – are not covered by all insurance providers. Methadone is most subject to payment policy debate. It is better covered as a benefit under insurance plans to treat pain rather than opioid use disorder (Vuolo, Oster, Maxwell, and George, 2019). Evidence of all three medications is substantive and compelling to include all three modalities as an approach to treating opioid-use disorder, including reducing the risk of opioid-related substances such as heroin and fentanyl, as well as a reduction in overall mortality (Kilmer, 2020).

Even though the efficacy of these treatment modalities is well documented, the availability to patients to see providers that are equipped to prescribe and provide on-going care is limited. The primary limitation is that federal guidelines require rigorous training for physicians and advanced practice clinicians, such as nurse practitioners and physician assistants, to administer buprenorphine. Once training is completed, the providers are then limited to the number of patients that they can prescribe and treat at any given time. This entire process is facilitated by the United States Drug Enforcement Administration (DEA) and is known as the process of becoming "waivered providers." Any provider, however, regardless of specialty can prescribe buprenorphine if they follow these federal guidelines. Thus, this clinical oversight is not reserved for only behavioral health medicine providers – e.g. psychiatrists. Founded in wanting to ensure patient safety and limit the access of the medication for the further prevalence of opioid misuse, there is mounting evidence and call for the DEA to reduce its stringent application of the waiver program to expand treatment access. Fiscella, Wakeman, and Beletsky (2019) advocate on a platform of three premises to deregulate the waiver – (1) Buprenorphine has now been proven through substantive research and clinical trials to be safe; (2) Decreasing regulation would support a nation in crisis as it responds to the opioid epidemic, allowing more providers to be encouraged to prescribe; (3) More patients could be seen as providers, especially primary care physicians and advanced practice clinicians in internal medicine would serve as treatment access. The latter outcome of deregulating the treatment medication in France yielded more providers in primary care settings to prescribe for patients (Fiscella, Wakeman, & Beletsky, 2019).

They outline specific policy changes for adoption, as well as those federal agencies responsible for making such changes in the below chart, **Figure 1**.

Figure 1: Buprenorphine Policy Roadmap of Aims, Actions, and Accountable Entities

Table. Buprenorphine Policy Roadmap of Aims, Actions, and Accountable Entities

Aim	Action	Accountable Entity
Substantively and rapidly expand the prescription of buprenorphine for opioid use disorder	Pass legislation removing the waiver requirement for buprenorphine by creating a buprenorphine exemption from the Controlled Substances Act	US Congress
Mainstream prescribing buprenorphine and reduce prescriber fears and patient stigma associated with receiving buprenorphine	Eliminate buprenorphine regulations based on prescribing intent and halt routine DEA audits	DEA
Ensure basic competence in prescribing buprenorphine (and use of full-opioid agonists for pain) for all clinicians holding DEA licenses	Require basic training linked to DEA licenses (initial and renewal)	SAMHSA/DEA
Encourage medical schools and nurse practitioner, physician assistant, and residency training programs to incorporate buprenorphine training into their curricula	Exempt clinicians from previously mentioned training based on evidence of completing certified training during residency	DEA
Encourage clinicians to seek advanced training in diagnosing and treating opioid use disorder	Offer merit-based incentive payment system bonus points for completing of advanced buprenorphine training	CMS/SAMHSA
Integrate substance use disorder counselling into primary care	Develop billing codes for certified substance use counselors working in primary care	CMS
Improve access to addiction medicine specialists	Use add-on payments to billing codes to incentivize licensure	CMS
Improve affordability for uninsured and low-income patients	Offer pharmacy subsidies through 340B programs based on the number of uninsured and low-income patients receiving buprenorphine	HRSA
Evaluate the benefits and unintended consequences of the program to inform changes in policy	Systematically evaluate trends in prescribers, people receiving buprenorphine, time in treatment, and the net effect on overdoses, emergency department visits, hospitalizations, and deaths	CDC

Abbreviations: CDC, Centers for Disease Control and Prevention; CMS, Centers for Medicare and Medicaid Services; DEA, Drug Enforcement Agency; HRSA, Health Resources and Services Administration; SAMHSA, Substance Abuse and Mental Health Services Administration.

(Fiscella, Wakeman, & Beletsky, 2019)

This research adds to the evidence in the public health field that there is an inadequate treatment infrastructure and capacity to respond to the current opioid epidemic. It reveals how historical changes to reduce behavioral health capacity – mental health, substance use, and co-occurring conditions – leaves a nation and healthcare ecosystem with limited options to address the need appropriately. This research indicates that expanding outpatient treatment capacity to serve patients with substance use disorder can have a positive impact on reducing acute care utilization and financial expenditures. This proves beneficial for several stakeholders – the patient, healthcare system, state and federal budgets, and society. To address these capacity

issues, the following points give a summary of immediate, as well as long-term steps that localities, states, and federal agencies must take to curb the current, and rising, crisis.

I. **Allocate funds through legislative priorities at the state and federal level to expand and build new outpatient treatment services, including mental health/crisis services, residential treatment programs, and incentives for students to become behavioral health medicine providers.**

II. **States that have not pursued Medicaid should consider doing so to provide access to treatment services to at-risk, vulnerable individuals that may not seek appropriate care.**

III. **Federal agencies must enforce all insurance providers to cover medication treatment modalities – buprenorphine, methadone, and naltrexone – equitably to not only treat pain, but opioid-use disorder.**

IV. **Federal policymakers and agencies must consider changes to training guidelines and prescribing protocols for providers that would make buprenorphine more accessible. The traditional waiver process for providers to prescribe this medication is outdated and out of alignment with a nation responding to a dire public health epidemic.**

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Appendix

Figure 1: Screening, Brief Intervention, and Referral to Treatment Components

("Evidence Supporting the Effectiveness of SBIRT," 2011)

Component	Goal
Screening (S)	• Quickly assess all ED patients' severity of substance use w/ validated tool as part of initial patient ED intake process • Identify appropriate level of intervention
Brief Intervention (BI)	• Peer Recovery Specialists provide real-time feedback • Increase insight and awareness regarding substance use and motivation to change • Negotiate and set goals
Referral to Treatment (RT)	• For those identified as needing more extensive care • Peer Recovery Specialists provide linkage to behavioral health provider for further assessment, diagnosis, and intake at proper level of care

Curriculum Vitae

Ryan B. Moran
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EDUCATION

Johns Hopkins Bloomberg School of Public Health Baltimore, MD
- Doctor of Public Health (DrPH) – anticipated completion: December 2020
- *Concentration:* Health Policy and Management – Healthcare Leadership
- Dissertation Topic: *"Engaging Opioid Overdose Survivors: Impact of Peer Recovery Specialists on Patient Utilization and Cost"*

Xavier University Cincinnati, OH
- Master's Degree in Health Services Administration
- Cumulative GPA of 3.83, *Induction to Upsilon Phi Delta Honor Society*

University of Charleston Charleston, WV
- Double Major—Public Policy and Business Administration
- Cumulative GPA of 3.96, *Summa Cum Laude*

WORK EXPERIENCE

MedStar Health
Director of Community Health, Baltimore City Baltimore, MD Oct. 2017 - Present
- Oversight of regional implementation of community and population health strategies for all three MedStar Health hospitals in Baltimore City – MedStar Harbor Hospital, MedStar Good Samaritan Hospital, and MedStar Union Memorial Hospital
- Developed an inaugural strategy and operating plan for hospital-based community and population health in a multi-site and matrixed health system environment
- Form coalitions with community leaders, organizations, elected official, state and local governmental agencies to acquire financial and human resources to advance health across Baltimore City
- Executes Community Health Needs Assessments and facilitates annual community benefit reporting for all three hospitals to state and federal agencies totaling more than $75 million
- Responsible for fiscal management of more than $5 million in human and operational budget
- Launch innovative initiatives that address unnecessary hospital utilization, prevention of readmissions, and new mechanisms to manage chronic disease:
    - Accountable Health Communities –embedding social need screening in clinical workflows of emergency department, inpatient behavioral health,

and labor and delivery areas to connect patients to community-based resources
    - Screening, Brief Intervention, and Referral to Treatment (SBIRT) – evidence-based program linking patients with substance use treatment; all hospital emergency departments since launch have connected 6,000 patients to treatment
    - Opioid Survivor Outreach Program – peer counselors work with patients experiencing overdose(s) resulting in 160 patients connected to treatment in first year
    - HarvestRx – prescription for food program for patients reporting food insecurity
    - Safe Streets – a hospital-based violence responder program in emergency departments to connect victims of violence with community-based resources
    - Lead supporting housing services through state Medicaid waiver program
- Supervise 37 associates including medical direct, health educators, coordinators, manager, and community health workers; formally certified to oversee peer recovery specialists by the Maryland Addiction and Behavioral Health Professionals Certification Board
- Partner closely with grant development and philanthropy teams leading to $2.4 million in grant awards since inception of role
- Serve on system-wide Inclusion, Equity, and Diversity Steering Committee to refresh plan on addressing workforce and patient care strategies to drive health equity
- Matrix reporting structure to Chief Medical Officer of MedStar Harbor Hospital, Vice President of Medical Affairs, Chief Medical Officer of MedStar Union Memorial Hospital

Towson University *Baltimore, MD* *June 2015 – April 2018*
Internship Site Preceptor
- Provide internship placement and supervision for senior health care management and health science undergraduate seniors
- Preceptor guides students through capstone and practicum, including oversight through the 15-week, full-time duration of internship program

MedStar Good Samaritan Hospital
MedStar Union Memorial Hospital
Director of Operational Management *Baltimore, MD* *June 2015 – Sept. 2017*
- Serve as Chief of Staff to President of MedStar Good Samaritan Hospital and MedStar Union Memorial Hospital, as well as the entire senior executive team
- Prepare communication materials for the President for a variety of stakeholders, including associates, senior executive team, hospital and system leaders, and hospital board members
- Serve as President liaison to department leaders, community members, and external agencies

- Focus on leading integration optimization projects between the two hospital campuses that improve the efficiency and quality of care delivery
- Led the restructuring of perioperative services across both campuses including integration of surgical posting, pre-operative exam services, and outsourcing sterile processing services
- Co-chair of outpatient EMR implementation for 50+ outpatient practices and over 700 active users; co-chair of inpatient upgrade and go-live of Cerner MedConnect platform
- Implementation lead for conversion to ICD-10 for both hospitals
- Chair of MGSH and MUMH Patient Throughput Committees with the goal to improve efficiency and patient flow throughout the hospital
- Serve as Meaningful Use Coordinator for both hospitals; assigned to successfully lead attestation for Stage 2 requirements and improve processes to prepare for Stage 3
- Led the creation of a provider-based site for outpatient dialysis and medical oncology / infusion services at MedStar Good Samaritan Hospital
- Lead of MGSH and MUMH Sepsis Improvement Team; focus on quality and implementation of clinical protocols; Sit on the MedStar Health system-wide Improving Sepsis Care Collaborative Advisory Team representing hospital operations and performance improvement
- Serve as facilitator and organizer of leadership development bi-yearly retreats for the hospitals 192 + supervisors, managers, directors, AVPs and vice presidents
- Act as Administrator-On-Call (AOC) between both hospital locations

MedStar Health
Corporate Administrative Resident *Columbia, MD* *July 2014 – June 2015*

- Project manager for system-wide quality initiative to reduce sepsis across 10 hospitals; tasked to mobilize clinician-led effort to move all acute facilities into top decile performance
- Project support for system-wide performance transformation initiative in conjunction with major third party consultant – responsible for communication strategy and planning/implementing a long-term plan for performance improvement sustainability for the entire organization
- Developed patient experience platform for system's 10 urgent care clinic locations
- Provided operational support for system-wide Ebola preparedness steering committee – drafted personal protective equipment protocols and assessed training across the organization
- Participated in observational learning by attending senior management meetings and system level board meetings and other various leadership team retreats; report directly to President/CEO

COMMUNITY AND PROFSSIONAL INVOLVEMENT

Maryland Community Health Worker Training Program Review Committee
March 2020 – Present
- Appointed by MD Department of Health Secretary Neal
- Review and approve training program applications to conduct community health worker curriculum

Maryland Hospital Association Health Equity Committee
January 2020 – Present
- Represent MedStar Health on statewide workgroup to drive strategies and common standards to foster health equity across Maryland's hospitals

Central Baltimore Partnership Steering Committee
July 2019 – Present
- Represent MedStar Union Memorial Hospital
- Foster economic development including crime/safety, housing, community engagement, transportation, and quality of life in Central Baltimore's diverse neighborhoods

Maryland Community Health Worker Advisory Committee
Sept 2018 – Present
- Appointed by Maryland Governor Larry Hogan
- Four-year term expiring in September 2022

Baltimore Choral Arts Society – Member, Board of Directors
July 2018 – Present
- Member, Governance Committee – July 2019 - Present
- Premiere choral group in Baltimore region

Greater Baybrook Alliance – Member, Board of Directors
April 2018 - Present
- Mission is to foster economic development, including crime/safety, housing, community engagement, transportation, and quality of life
- Area of focus include neighborhoods of Brooklyn, Brooklyn Park, and Curtis Bay – cross jurisdictional between Anne Arundel County and Baltimore City
    - Vice Chair, Board of Directors – January 2020 – Present
    - Chair, Governance Committee – April 2018 - Present

Hampden Family Center – Member, Board of Directors
July 2017-Present
- Foster the mission and direction of the center in enriching lives of Hampden residents through education, professional support, and community fellowship
- Chair, Fund Development Board Committee Member – June 2018 – Present

American College of Healthcare Executives – Associate Member
Fall 2012-Present

University of Charleston National Alumni Board
August 2011-Present
- Serve with alumni of the University of Charleston to support the University's growth

HONORS AND ACHIEVEMENTS

John C. Hume Doctoral Award
- Endowed research funding for doctoral research through Johns Hopkins Bloomberg School of Public Health
- Awarded annually to one doctoral candidate showing great potential in the field of public health

Greater Baltimore Committee Next Up Leadership Cohort
- Selected as one of 25 "up and coming" leaders across the region to participate in yearlong leadership development program
- Immersed in political and business seminars and educational opportunities to learn about the regional intersection of government and business

The Daily Record – 2017 Successful By 40 – Very Important Professional (VIP) Recipient
- One of 50 individuals selected across the state of Maryland
- Selected for professional accomplishments, community service, and commitment to inspire change

Association of University Programs in Health Administration Scholarship
- Selected for commitment to health leadership and teamwork through collaboration

Foster G. McGaw ACHE Scholar
- Selected for commitment to the health administration profession and community service
- One of eight scholars nation-wide

Rhodes Scholarship Finalist
- Selected as one of the 13 finalists for the Rhodes Scholarship in the states of WV, PA, and DE

University of Charleston President's Outstanding Senior of the Year
- Awarded for exemplary academic performance, community service, and leadership skills
- Jones School of Business Outstanding Business Administration Student
- Morris Harvey School of Arts and Science Outstanding Public Policy Student

PRESENTATIONS AND POSTERS

Article – Featured Work. Duke University Margolis Center for Health Policy. *Value-Based Care in the COVID-19 Era: Enabling Health Care Response and Resilience.* June 2020.

Panel Participant. University of Charleston Enlightened Living Day. *LGBT Legislation and Social Justice*. January 2020. Charleston, WV.

Panel Participant. Cerner Health National Conference. *Social Determinants of Health*. October 2019. Kansas City, MO.

Presenter. Connelly and Associates Philanthropy Forum. *Intersection of Community Health and Philanthropy.* October 2019. Baltimore, MD

Article – Featured Work. HealthLeads. *Promoting Community Health Through Direct Engagement.* September 2019.

Moderator. Green and Healthy Homes Executive Leadership Institute. *Innovations on Aging in Place*. September 2019. Baltimore, MD.

Panel Participant. Maryland Action Coalition Summit – University of Maryland School of Nursing. *Fostering a Culture of Health*. May 2019. Baltimore, MD.

Poster. (*R. Moran*) *Launching Community and Population Health Across Three Acute Care Settings*. Poster session presented at the annual meeting of the Association of Community Health Improvement, March 2019. Chicago, IL.

Panel Participant. American Heart Association EmPOWERED to Serve National Summit. *Developing Innovative Business Models to Improve Health*. October 2018. Baltimore, MD.

Moderator – Panel Discussion. LGBT Workforce Conference. *Improving Quality of Care for LGBTQ Patients: Electronic Health Record and Institutional Change*. May 2016. New York, NY.

Academic Guest Lectures include:

- University of Charleston
    - Honors College – Undergraduate Level – "The Intersection of Government and Hospitals in the Face of the COVID-19 Pandemic." (2020)
- Xavier University
    - Health Services Administration – Graduate Level – "An Industry in Transition: Volume to Value." (2020)
- Johns Hopkins Bloomberg School of Public Health

- Healthcare Management – Graduate Level – “An Industry in Transition: Volume to Value.” (2017, 2018, 2019)
- Program Planning for Behavior Change – “Best Practices in Conducting Community Health Needs Assessments: Health Systems Approach.” (2018, 2019)